

BRIDGE OWNERS FORUM

MINUTES OF MEETING BOF38: TUESDAY 25th SEPTEMBER 2012 AT THE BEVES ROOM, KING'S COLLEGE, CAMBRIDGE

PRESENT

Campbell Middleton	Chairman & Cambridge University Engineering Department (CUED)
Graham Bessant	London Underground
Brian Bell	Network Rail
Peter Brown	ADEPT and Oxfordshire County Council
John Clarke	BRB (Residuary Ltd.)
Graham Cole	ADEPT
Liam Duffy	NRA (Ireland)
Andy Featherby	Canal and River Trust (formerly BWB)
Richard Fish	Technical Secretary
Jason Hibbert	Welsh Government
Wayne Hindshaw	Transport Scotland
Neil Loudon	Highways Agency (HA)
John McRobert	DoRD(NI)
Graeme Muir	SCOTS
Stephen Pottle	Transport for London
Mungo Stacy	Transport for Greater Manchester
Paul Williams	LoBEG
Paul Fidler	CUED
Paul Vardanega	CUED

Introduction

The Chairman welcomed members to BOF38. Recognising that this was scheduled to be Brian Bell's last BOF meeting, the Chairman thanked Brian for all his valued work over the years and as one of the few survivors who had attended BOF1 on 21st November 2000. As part of his valedictory, the Chairman also showed photographs from earlier meetings, including the International Bridge Forum in 2009. (Before the afternoon session, the Chairman presented Brian with a piece of engraved glassware and a card signed by all BOF38 attendees. Brian thanked all concerned but also noted that discussions were continuing with Network Rail over his exact finishing date.)

1. Apologies for Absence

Steve Berry	DfT
Peter Hill	HBB and Large Bridges Group
Rod Howe	C&RT
Robert Humphreys	CSS Wales
Mike Winter	UKBB and ADEPT

The Chairman explained that he had received a message from Steve Berry of DfT on the morning of the meeting to give his apologies, saying that he would have to stay in London to help deal with the impact of the floods across the country.

2. Previous Minutes – BOF37: 22nd May 2012

The minutes of BOF37 were accepted and, subject to the following corrections, could be placed on the BOF website.

Page 6, Item 3B, last line of paragraph at top of page: Replace “with” with “will”.

Page 7, Item 4, last paragraph: Replace “Irish Waterways” with “Waterways Ireland”.

Page 8: Item 4b: Remove the line relating to TfL from the suggested subscription table and delete note 2.

Page 11, Item 9a, paragraph 6: Replace “Brain” with “Brian”.

ACTION 1: Paul Fidler

3. Actions from BOF 37

References below refer to the numbered actions on the BOF37 Action Sheet:

Action 2, Bridge Collapse Database:

The Chairman noted that this action was ongoing but he would refer to the subject later in the meeting.

Action 3, Bridge Joints:

The IAN has still not been issued. Neil Loudon will advise as and when it is published but noted that it will focus on modular joints.

ACTION 2: Neil Loudon

Action 4, AIPs for Temporary Bridges:

Neil Loudon explained that, as part of the preparations and planning for the London Olympics, outline AIPs for modular temporary bridges had been prepared in conjunction with the leading suppliers, Mabey and Jansens. Whilst these AIPs were time limited to the end of 2012, it was hoped that they could be kept up to

date, not least because they also contained information on the appropriate inspection regime whilst the bridge was in use. For commercial reasons, the AIPs were considered confidential. However, a Highways Agency internal guidance note had also been issued dealing with Departures from Standard and Neil agreed to try to release this to BOF members.

ACTION 3: Neil Loudon

As part of this work, the issue of compliance with current standards had come to light and had been raised with the suppliers. Neil noted that it was likely that they would opt for a route of “design by testing” in order to meet Eurocode requirements.

The Chairman suggested that such AIPs would be very helpful to all bridge owners. Stephen Pottle agreed: TfL had identified some temporary pedestrian bridges being erected immediately prior to the Olympics and advice on dealing with AIPs and Departures would have been very useful.

Wayne Hindshaw noted that Transport Scotland had dealt with a temporary bridge supplier, Beaver, as well as better known suppliers. He agreed to share AIPs for Beaver bridges with Neil.

ACTION 4: Wayne Hindshaw

The Chairman noted that the original concern of BOF had related to the *availability* of temporary bridges across the UK and it was now clear that this was not an issue. He suggested, however, that ongoing focus on AIPs was important. John Clarke pointed out that this matter was not just of interest to BOF but that it should be brought to the attention of all bridge owners. Stephen Pottle pointed out that there was a big distinction between using temporary bridges for planned works as opposed to those that had to be installed in emergency situations.

Action 5, Availability of Temporary Bridges in Ireland:

Liam Duffy reported that his enquiries had revealed only a few temporary bridges in Ireland. The local authority in Galway had one and the NRA was aware of three companies that could supply vehicular bridges and a fourth that could provide temporary pedestrian bridges. He was very interested to develop the AIP issue and John McRobert suggested that it would be sensible to consider cross-border collaboration on this issue. John also reported that he was aware of some Callendar Hamilton bridges in Northern Ireland.

Action 6, Possible presentation by Royal Engineers:

Neil Loudon noted that the Royal Engineers generally provided manpower for the erection of proprietary temporary bridges in cases such as Cumbria and it was agreed not to pursue this suggestion.

Action 7, US Accelerated Bridge Construction:

Neil Loudon reported that he had loaded some documents onto the BOF website but there were many others which could be found on-line. Brian Bell noted that a YouTube time lapse video of a Network Rail bridge replacement could also be viewed on-line.

Actions 8, 9, 10 & 11, Fire Damage

The Chairman reported that some information was now on the BOF website, including the LUL information which had been discussed at BOF34. There was some discussion as to whether the UKBB Code of Practice should have a specific section on fire damage but this was inconclusive. Wayne Hindshaw suggested that this was simply a matter of risk assessment, referring to a bridge in Glasgow which had a timber yard under it: a risk assessment had concluded that fire prevention measures were in place and that no further action was needed.

Neil Loudon said that the Department for Transport had stated that they were committed to publishing the report on the Deans Brook Viaduct fire. Richard Fish will pursue this with Steve Berry.

ACTION 5: Richard Fish

John McRobert had located the information on the fire under the Lecky Road flyover in Londonderry in 2005 which should have been available at the meeting. John will forward a short report, entitled “Improved fire resistance to concrete piers”, to Paul Fidler to upload onto the BOF website.

ACTION 6: John McRobert/Paul Fidler

Richard Fish reported that he had written to the SCOSS secretary, Alastair Soane, and SCOSS were very interested in highlighting the issues of dealing with land under bridges, with regard to the planning and enforcement matters as discussed at BOF 37.

With regard to Neil Loudon’s action to identify other reports on fire damage, Neil reported that there were many relevant documents which could be found on-line.

Discussion extended into other areas which might impact on the integrity of bridges and the Chairman suggested that the issue of over-weight vehicles presented a far greater risk. He suggested that this might be a subject which would feature in BOF’s forward workload.

ACTION 7: Chairman

Action 12, Remote Monitoring of Scour

The Chairman had previously suggested that a future BOF meeting should focus on scour monitoring and detection, to review what equipment was on the market. He noted that there were currently a number of parallel initiatives: CIRIA were proposing to update their scour guidance document, The HA had recently published BD 97 to replace BA 74, and Professor David Richards at Southampton

University (with other partners) had submitted a proposal for EPSRC funding for the development of a scour monitoring regime.

Discussion extended into the merits of each of these: John McRobert suggested that the CIRIA publication was more like a text book whereas BD 97 took a risk based approach to dealing with scour. Brian Bell agreed, suggesting that scour monitoring techniques should be part of the CIRIA document. He admitted to some scepticism as to the suitability and reliability of the range of proprietary equipment currently on the market, citing only one UK product which had been successfully trialled. He also pointed out that many scour failures were attributable to accidental events, such as the failure at Feltham bridge which had only occurred because a tree trunk had been trapped against the arch and created a weir effect which drastically changed the flow pattern.

Liam Duffy noted that NRA in Ireland was now concentrating on remote monitoring of water levels which in turn reflected flows and velocities which would generate scour. Brian Bell reported that Network Rail liaises closely with the Environment Agency on high risk sites and, as soon as they received notification that rivers levels were above the critical figure, the affected railway network was closed until water levels dropped and inspections could safely be undertaken.

Graeme Muir was aware of some remote monitoring devices being used in West Lothian which employed sonar technology and a web based reporting system. Andy Featherby reported that the Canal and River Trust (C&RT) used remote monitoring of water levels but these were mainly to alert staff to open/close flood gates etc.

The Chairman concluded the discussion by reiterating his belief that the resilience of the networks were going to become an even more critical issue in future, with reducing maintenance budgets and increasing pressures from climate change events. He proposed to keep scour on the BOF agenda but, at this stage, decided not to proceed with a series of equipment demonstrations at a future meeting.

Action 13, Research into hidden bridge components:

The documents from Rod Howe had now been issued.

Action 14, Parapets on Local Roads:

The Sheriff's report into the incident in Scotland was now on the BOF website.

Action 15, Scanning of HA reports:

Richard Fish was in discussion with Paul Hersey at DfT and would report on developments at the next meeting. *Post meeting note – see Item 7e below.*

ACTION 8: Richard Fish

Action 16, Contractor Evaluation:

Neil reported that the Highways Agency's "Managing Success Toolkit" was available on-line and was being used by DfT. The Chairman recalled the origin of this topic which was the requirement to measure and monitor performance of research contractors and suggested that a more simple review system was needed. Discussion also extended into the difficulty in excluding a contractor from a tender list even if his performance had been poor. John McRobert referred to a system which DRD use in Northern Ireland and agreed to forward details.

ACTION 9: John McRobert

Action 19 & 20, BOF membership:

The Chairman noted the new members that were attending BOF for the first time today but also reported that invitations had been sent to other organisations as previously agreed. Some had responded positively but others had not even bothered to reply. Liam Duffy reported that Cathal Mangan of Irish Railways was keen to join but had been unable to attend this meeting. The Chairman also had concerns about BOF becoming too big as the CUED facilities had an upper limit in terms of numbers. Brian Bell suggested that perhaps Tram and LRT organisations could collaborate and send a single representative, as was the case with big bridge owners. John Clarke thought that Sustrans might also be interested but it may be possible for BRB to represent their interests. He agreed to discuss with their Technical Director, Hugh Davis, in Birmingham.

ACTION 10: John Clarke

Following his action from BOF37, Liam Duffy reported that Jim Harvey of Waterways Ireland was interested in joining.

Action 33, ESDAL

The Chairman reported that he had approached the ESDAL Project Manager, Graham Rivers, but had been referred to the HA before agreement could be reached on a possible presentation. Stephen Pottle suggested that the ESDAL work should be pursued but including all dimensional constraints on the network as well as weight restrictions. He proposed that this should be led by Network Managers with bridge owners providing input. It was agreed that there were doubts over the overall effectiveness of ESDAL and how widely it is being used. Graham Cole reported that the recent Code of Practice review had revealed a very variable take-up across UK local authorities. It was agreed that this should be referred to UKBB and on to UKRLG.

ACTION 11: Richard Fish

All unrecorded actions from BOF37 had either been completed or were discussed as part of the BOF38 agenda.

4. Introduction to new members

The Chairman welcomed new members to BOF and invited them to introduce themselves and their respective organisations:

Mungo Stacey presented his areas of responsibility and the existing and proposed networks of Transport for Greater Manchester which incorporated the Manchester Metrolink. His present bridge stock was due to grow from 150 to 400 bridges when the planned expansion of the network was completed. Much of the system utilised disused railway track beds, inherited from either Network Rail or BRB. Mungo's main bridge management issues included:

- Handover problems
- A lack of asset information
- The variable quality of some assessment reports
- The absence of a steady state bridge maintenance budget
- Road/rail restraints and vehicular incursions

Wayne Hindshaw explained that the process of filling Bill Valentine's post in Transport Scotland should be completed in the next few months. He was presently the Network Bridges Manager and had worked with Bill for about eight years. He was responsible for nine staff, 6,000 structures including 2,000 bridges, 20 of which were deemed to be major bridges, on the motorway and trunk road network in Scotland. Management was via four operating contracts and three DBFOs. Wayne was mostly concerned with maintenance issues but his other concerns included:

- Bridge Strikes from over height vehicles
- Completion of the long tail of the assessment programme

Andy Featherby (substituting at this meeting for Rod Howe) reported on the recent change from BWB to C&RT. He had worked for the former in the structures department for about 18 years. His concerns included:

- Trapping hazards with respect to opening bridges
- Improved maintenance painting regimes
- Live load capacity of accommodation bridges
- Processing of AIL movements

5. BOF Future organisation and management

The Chairman referred to the four documents which had been included in the BOF38 agenda packs:

- A draft letter to go to BOF members;
- A paper stating the benefits of BOF membership and recent achievements;
- The draft constitution, originally drafted by Mike Winter;
- The BOF Terms of Reference.

A discussion on the constitution concluded that it was not strictly necessary for BOF to have one but it was agreed that, if it was a requirement of DfT and UKRLG, then it should be there for reference. It was also felt that the requirements in the constitution should also be minimal and able to allow some flexibility in terms of meeting arrangements etc. The BOF relationship to UKBB was also discussed and, again, the meeting felt that BOF's independence was important. It was also agreed that the constitution should reflect the current ToR. Richard Fish will amend the constitution as presently drafted to reflect the views of the meeting and agree it with the Chairman before sending it to Mike Winter and UKBB.

ACTION 12: Richard Fish/Chairman

The draft letter was considered suitable and members asked for it to be sent to them personally and they would secure appropriate approvals within their organisation. A backing sheet should also be added to give details of the BACS payment provision to CUED. All subscription levels agreed and recorded from BOF37 were still considered acceptable to all parties.

The BOF information sheet was also considered acceptable with the changes that the Chairman had already added. Richard Fish will make the necessary changes and ask Lesley Bello to formally send the letters.

ACTION 13: Richard Fish

6. Role of DfT

This item was intended to give DfT the chance to brief BOF on recent developments and to give an indication of future activities. Unfortunately, as recorded in Item 1, Steve Berry had been forced to give last minute apologies and was not present.

Post meeting note: The Chairman asked Richard Fish to arrange to meet with Steve Berry/Paul Hersey as the opportunity arose as and when he was in London on other business to update them of BOF developments and progress and to try to resolve some of the outstanding issues.

ACTION 14: Richard Fish

7. BOF Research Projects Update

7a. Revision of BS6779 Part 4 (Masonry Bridge Parapets)

Brian Bell noted that the final report had been received and accepted by the Steering Group. He expressed his pleasure at the output from the project. It was now on the UKRLG website and Paul Fidler will arrange a link from the BOF website.

ACTION 15: Paul Fidler

7b. Bridge deck slabs with non-metallic reinforcement

John McRobert gave a brief résumé on the project including the bridge construction and testing. He explained that it had been hoped to secure some long term monitoring as part of the project but it seemed that the budget had been expended and this was no longer possible.

There was some uncertainty as to the exact status of the report: it was understood that the contractor (Su Taylor of Queen's University, Belfast) does not want it to be available via the BOF website. The Chairman asked if the Steering Group had approved the final version. John replied that this was his understanding although there had been no specific meeting to make this decision. John agreed to discuss this with Liam Duffy and Albert Daly to ascertain their views. Although John tabled a close-out report, he agreed to reissue to Richard Fish once he had spoken to Liam and Albert.

ACTION 16: John McRobert

The Chairman understood that there were also concerns from Steve Berry over the Intellectual Property issues and that Su Taylor was supposed to be getting in touch with Steve. Richard Fish agreed to raise this when he meets with DfT.

ACTION 17: Richard Fish

7c. Carbon composites for strengthening steel structures

Brian Bell gave a presentation on this project, making use of some of the material prepared by the post-graduate student, Mohammed Aslam Bhutto, at Herriot-Watt University, who can conducted the research. All experimental work had now been completed and had tested two methods of web stiffening: glass fibre poltruded sections, used as diagonal web stiffeners to simulate truss action, and Fibre Reinforced Plastic (FRP) fabric. Work had also taken place on an FE analysis to model the structural behaviour and the early indications were that there was a good match between experimental results and FE output. A copy of Brian's presentation will be loaded on to the BOF website.

ACTION 18: Paul Fidler

Brian confirmed that he also waiting for DfT approval to enable the Phase 1 report to be published. He agreed to follow this up with DfT.

ACTION 19: Brian Bell

The Chairman asked all Steering Group chairs to ensure that all research reports carried the BOF logo.

ACTION 20: Steering Group Chairs

Brian reported that Design Guidance would follow as part of the project which would be reviewed by the Steering Group. It was anticipated that the project would finish in December 2012. He also noted that CIRIA were interested in having a link to the report on their website.

John Clarke asked if painting considerations had been taken into account in either of the solutions. Peter Brown suggested that the materials should be unaffected as long as non-solvent based paints were used.

The Chairman asked for his thanks to be passed on to the members of the Steering Group and congratulated all parties on a successful project.

7d. Automating bridge inspections

Stephen Pottle reported that he was aware that the contractor, TRL, had asked DfT for additional funding and DfT had promised that a decision would soon be taken.

7e. Scanning of HA Research Reports

See Action 8 above. *Post meeting note: DfT have stated that funds for this work are no longer available – Neil Loudon is exploring other options and will report at BOF39.*

7f. Bridge Inspector Qualifications (Part II)

Stephen reported that Steve Berry and DfT colleagues were currently considering the procurement for a supplier to administer this training. Their preference was for a self-funding model but this could present some difficulties with the procurement process. A decision was expected in mid-October.

It was noted that this matter would be raised at the next meeting of UKBB to be held on 3rd October because there were implications for the next revision of the Code of Practice. Neil Loudon also noted that UKBB endorsement was crucial as it was essential to have client buy-in for this initiative to succeed. Stephen Pottle agreed and also noted that there had to be clarity in the transitional arrangements as well as the scheme itself. In the event of problems arising in terms of DfT procurement decisions, Neil Loudon offered the possible assistance of a Highways Agency colleague, Lance Williams, who had experience in dealing with sector schemes.

Stephen reiterated the fact that this was a certification scheme to ensure competence: it was assumed that training schemes would be run on a commercial basis by bespoke providers. Graeme Muir asked how experienced inspectors might be treated. Stephen replied that, whilst formal training may not be necessary, it was important that they could still demonstrate their competence.

8. Boston Manor Viaduct update

Neil Loudon gave a presentation on recent developments which had seen the emergency closure of this structure, carrying the M4 west of London, just before the London Olympics. Built in 1962, the original truss section of the viaduct had been built using electro-slag welding for deep welds, a method popular in the USA at that time. The main problem with this technique was the large heat generation which led to a very coarse grained weld texture. It had been banned in 1977 for this type of application.

Because of the structural similarities with the I35-W truss in Minneapolis, which collapsed in 2007, Boston Manor had been the subject of a detailed investigation, mostly using NDT which had identified about 600 locations of weld cracks. The present work was aiming to restore 40 tonne capacity by October 2012 and involved plating to strengthen key truss members.

Neil noted that one of key lessons from the fast moving events of this summer was the need for a committed and proactive Technical Approval Authority to fast track the approval process.

The presentation will be place on the BOF website.

ACTION 21: Paul Fidler

9. Current Issues

The Chairman invited members to comment either on specific issues that were currently of concern or to discuss the needs or otherwise for having a standing item on BOF agendas to give the opportunity to raise such issues.

John Clarke thought it would be a good idea to be able to bring any pressing issues to each meeting, if only to give early warning of things which might have an impact on other owners. Similarly, including “near misses” would be of general benefit to BOF members. The meeting agreed with this suggestion and Stephen Pottle added that links to issues raised by SCOSS and CROSS could be considered for some of the matters to be raised. As an example, he referred to this summer’s Beaminster tunnel landslip in Dorset which had claimed two lives: HSE had questioned whether Dorset County Council’s inspection regime had covered slope stability in the vicinity of each tunnel portal – this had proved to be the case.

Graham Cole warned that budget cuts probably meant that some smaller local authorities were no longer inspecting bridges. It was possible, therefore, that there would be no awareness of near misses.

10. Future Infrastructure Forum

The Chairman explained the background to the Future Infrastructure Forum which had met on four occasions over the last year with two day workshops to identify research proposals for EPSRC funding. These had now been agreed and the list of proposals would be loaded on to the BOF website.

ACTION 22: Chairman/Paul Fidler

As part of the FIF discussions, the need for leadership of the programmes had been identified, and the Chairman reported that this role was to be taken by ICE. The Chairman also described another recent meeting of academics which had considered some wider subject areas for future research into infrastructure design, construction and management:

- Increased use of diagnostics;
- Network resilience (performance modelling);
- Even smarter infrastructure;
- Performance based design;
- End of life decision taking;
- Demand management;
- Procurement and contracting methods;
- Advanced construction processes;
- Fluid/soil structure interaction.

He offered to keep BOF advised of progress in these areas.

11. BOF Research Priorities

Stephen Pottle reported on discussions from the last meeting of UKRLG where research priorities and funding had been discussed. It had been decided that shared contributory funding was preferred and discussions were to take place with TSB and other funding bodies. Board chairs had been asked to consider priorities in their specific areas. Richard Fish suggested that this might be a role in support of Mike Winter as UKBB chair.

The Chairman suggested that research priorities should feature highly on the BOF39 agenda in January.

12. Infrastructure UK/ICE Working Parties

12a. Industry Standards Group

The Chairman described the work of this group, of which he was a member, chaired by Terry Hill of Arup. He would arrange for their most recent report to be put on the BOF website.

ACTION 23: Chairman/Paul Fidler

He reported that concerns had been expressed over possible overlaps of work with other initiatives such as the Highways Management Efficiency Programme (HMEP) and issues previously raised at BOF over the difference in standards between strategic and local roads. He was aware that these issues were also being discussed by UKRLG and Boards.

12b. Infrastructure Data Group

The Chairman also reported on this group which had been chaired by Brian Collins but who had now been succeeded by Bill Kilroy of Turner and Townsend. Its brief was to consider the provision of adequate data needed to maintain and manage infrastructure in its broadest sense, including private and regulated industries. It was generally accepted that record keeping in private sector clients was poor and that there were few planned replacement programmes or funding to manage them.

John McRobert noted that many local authority roads were subject to utility works over which they had very little control, despite the fact that the councils were the owners. Wayne Hindshaw also pointed out that the recent migration of records from paper to electronic had led to many being lost. He suggested that this was partly attributable to the record keeping processes being moved from engineering to admin staff.

The Chairman advised that he had been asked to compile a report for this group and agreed to keep BOF informed of developments.

13. Other Bridge Research Update

13a. TfL

Stephen Pottle reported that TfL were proposing to pilot BIM techniques on a number of major bridge projects, including repair, strengthening and reconstruction, and he was looking for other examples of this practice being used elsewhere. John McRobert recalled that the topic had featured in the programme for the 2012 Surveyor Bridge Conference. He agreed to forward any papers he had for uploading on to the BOF website.

ACTION 24: John McRobert/Paul Fidler

The Chairman also agreed to broker an introduction for Stephen to Mark Bew in H M Treasury, who was also looking at this topic, with a view to a possible exploratory meeting.

ACTION 25: Chairman

13b. Network Rail

Brian Bell gave a short presentation on research work which Network Rail were working on. The presentation will be placed on the BOF website.

ACTION 26: Paul Fidler

The Network Rail work programme included the use of microwave curing for low energy concrete, aimed at the precast industry; an EU project – Safe Joint – which was dealing with long term joint performance; and methods to detect fatigue cracks, often missed in routine bridge inspections.

13c. Highways Agency

Neil Loudon reported on the HA research commitments:

- A structures cost savings project, aimed at components such as joints and bearings;
- Continuing support for Eurocode developments, including a Eurocode for assessments;
- A new benchmarking survey into the state of bridge infrastructure will be commissioned by the HA,
- A possible programme on fatigue prone structures;
- A follow up on the SCOSS report on tension elements, including safety critical fixings;
- An update of the guidance on managing post-tensioned structures (an internal advanced draft had already been written).

13d. CSIC

The Chairman reported on issues that were facing CSIC (Cambridge Centre for Smart Infrastructure Construction):

- A recently approved project on sensor technology;
- Input into the USA Long Term Bridge Programme (a letter on this subject was on the BOF website.);
- Advanced bridge construction (as had been discussed under Item 3 above).

14. Any other business

There were no further items raised. It was agreed that the “Future agenda items” as noted on the agenda would be culled from the record of this meeting.

15. Propose dates for future BOF meetings

The Chairman proposed the following dates:

BOF39	Tuesday 29 th January 2013
BOF40	Tuesday 21 st May 2013

The Chairman also proposed that BOF40 might be held at the Forth Bridge in Edinburgh; he agreed to discuss this with Barry Colford at Forth.

ACTION 27: Chairman

16. Closing/Summing Up

The Chairman closed the meeting and thanked everyone for their contributions.

Richard Fish
October 2012