

MINUTES of tie AUDIT

DESIGN ISSUES: STRUCTURES

Tuesday 19 January 2010 at 9.00am

at BSC's offices, Edinburgh Park

In attendance:

Bob Bell ("RB")	Colin Brady – Bilfinger Berger (Technical Director) ("CB")
Colin Matlock ("CM")	Martin Hutchinson – Bilfinger Berger (Commercial Team) ("MH")
Donnie Mackinnon ("DM")	Alan Dolan - SDS (Project Manager) ("AD")
Joanne Glover ("JG")	Kate Shudall - SDS (Commercial Manager) ("KS")

Note: These Minutes of tie Audit reflect as far as possible the content of and the language used in the audit meeting, however, in some circumstances responses have been paraphrased.

The audit meeting opened with RB introducing the tie audit party and referring to the content of the letter which had been issued to BSC on 14 January 2010 notifying them of the audit under Clause 104 of the Infraco Contract, the purpose of which is to get an idea of how BSC are managing the design process and the reasons for changes. A copy of the audit scope as notified in that letter is attached at Appendix 1.

CB : Is this an audit under Clause 104.2 or 104.3?

DM : Both.

CB : What is Joanne?

RB : She's a "third party". She'll be taking notes.

CB : So Joanne will be observing only.

RB : Referring to content of clause and the fact that there is no distinction between the parties who can be part of the audit and their function - Jo will be participating.

CB : Do you intend to produce an audit report?

RB : We will produce a report to which BSC will have access.

DM : In principle, we have no issue with sharing a report, although this has not been disclosed yet.

CB : So there will be an internal report and we've got to take it that we will not get to discuss the draft report or draft conclusions.

RB : We will be producing a report and notifying BSC of any actions we require of them. I will be passing the report on to Steven Bell, who will decide what happens with it from there

- CB : Can you note that I expressed concern about the frequency of the audits under Clause 104?
- DM : Are you saying that the frequency of audits is not reasonable?
- CB : Yes - naming the dates of the audits.
- DM : These are all audits under Clause 104.
- RB : There are four audits which DM is involved in and 1 which is pre-arranged (design assurance and system integration). Given the fact that we are 20 months into the contract and the number of difficulties on the job, clause 104 audits have been infrequent.

Baird Drive Retaining Wall

- CB : On 15 January 2010, **tie** sent letter 3180 instituting DRP proceedings regarding Baird Drive. We do not therefore intend to participate in this audit.
- DM : Are you saying that you are prevented from doing the audit under Clause 104 on Baird Drive?
- CB : Yes. "You have superseded the audit process with the dispute process".
- RB : Where in the contract does it back this up?
- CB : I'll come back to you on that - not today, as quick as I reasonably can.

Depot Access Bridge

- DM : We would like to ascertain why the changes have taken place: minutes, instructions, calculations, to show why this change is necessary.
- CB : Can we assume that everyone is familiar with letter 3827 - describes the Estimate and the background?
- It constitutes a Change "because its different". Our position on why it's a change is just that. We have provided information to Andrew Scott by email in the last four weeks.
- RB : But why is it different? Is it different in form, shape, principle?
- MH : It is generally in accordance with the Pricing Assumptions in Schedule Part 4.
- CB : Do you want us to confirm what does/doesn't apply?
- RB : Yes.
- DM : We're looking at the design progression from BDDI to IFC.
- AD : I can give you background as to the history: I asked the designer for a paragraph about the reasons.
- DM : In writing?
- AD : I don't think we have to give you that.
- AD : I can confirm in writing where the evidence is. It's more or less **tie's** instructions to do so. I can explain why something has happened and give you a copy of the change

letter/instruction.

DM : That would reduce the scope for dispute. BSC is happy they have a change, so convince us of that.

AD : *(Reading from a summary sheet, which SDS/BSC agreed they would provide to tie)* During 2007, SDS were working with tie on certain Value Engineering initiatives - May, June and July meetings, of which we have Minutes - regarding looking at the depot and making the design cheaper. Suggestions from all parties concerned. Could we lift up the level of the Depot? Could we take advantage of EARL being cancelled? (land which was adjacent at that time)

In June and August we had meetings with tie. We issued a Design Feasibility Report to tie on all those three items:

- move north
- take out the retaining wall
- lift the depot up as much as we can (not going into the BAA airzone)

August/September 2007 - Report was sent to tie.

End August/September - we were instructed to come up with a price to come up with designs on that basis. The design movement meant the Depot Access Bridge had to come with it. What did we do what we did and why? The note from the designer says that this was a "new design for a new bridge at a new location". It arose from the Value Engineering exercise at the depot

Level lifted from 40 to 43m.

Different depot layout, meant a different bridge. We had started from scratch, although we arrived at broadly the same outcome. There were a number of iterations between track, highway and depot teams. There were two separate bridges - one over main lines and one over depot area

Due to the Value Engineering exercise, which was tie driven, the depot moved up in verticality and north in direction. The Depot Access Bridge had to take this on board, which resulted in the IFC drawing for the bridge.

RB : Were BSC aware of the Design Feasibility Report?

CB : Answered by giving history:

BDDI - 5 March 2007.

IFC containing change - 5 September 2008.

Issued for external approval - 4 July 2008.

In response to your question, this was managed and completed during the period of time when SDS were tie's Designer.

CB : We didn't regard the Report as being part of BDDI.

- RB : Did you have access to the Report?
- CB : To check.
- RB : Can you check when you did have access to it?
- CB : Yes.
- RB : Did the Report go in the Data Room?
- AD : We put reports into **tie** and **tie** put them into the Data Room. Do I have evidence of that? No. In 2007 we didn't put the documents into the Data Room.
- RB : Do you have a document control reference number?
- AD : Yes and I will give you it.
- CB : Can **tie** provide this?
- RB : Yes.
- DM : In terms of the levels of the depot, the general ground level has increased by 3m? and this was part of Value Engineering?
- AD : The original topography was adjacent to BAA and the A8 had soil put into it at an area at the roundabout - needed excavated. The original was around about design level 40 (regarding the flight path). There was a view that there was a possibility of moving the depot around, but this was restricted by the southern elevation. Then EARL was not using the land and it freed it up to move the area around.
- Could SDS raise the A8 underpass?
- It would reduce the amount of dig regarding spoil removal. Simply by less digging this would be less money.
- RB : The cost of the bridge has gone up because overall there is a saving?
- CB : SDS is not party to this therefore why should they know?
- DM : Referring to SDS' economic view.
- AD : If you read the Report, you'll find out this.
- RB : So SDS produced the Report and the Change was instructed?
- AD : I don't know the Change Order off the top of my head.
- RB : Can you confirm?
- CB : You are using the audit process on the Infracore to find out a Change Order number issued to **tie's** designer.
- DM : It may be the case, but we don't know for sure.
- AD : It would have been August/September 2007.

- DM : We are purely investigating, this shouldn't be an issue.
- AD : The Change Order was decided on after the Report.
- RB : Can I ask a question? Can BSC confirm when they first received the Design Feasibility Report? When did BSC first participate in design meetings on the Depot Access Bridge?
- CB : Pre/post contract signature? There was discussion with the Preferred Bidder. BSC did not exist until the commencement of the Contract/when design was novated to us.
- RB : Initially in the form of design progress meetings?
- CB : We would need to check. My guess would be that this was done and dusted before we were involved. The final design was issued only seven weeks after contract/signature.
- RB : Colin, could I have copies of the Minutes of all Design Meetings for the first three months of contract - internally (BSC) and with SDS?
- DM : Can we look at them just now?
- CB : I'm not prepared for that. They are not easily available right now. Sorry, I'm not going to do that. I want reasonable time to access the records.
- MH : Citing "commercial confidence", we are not giving you access.
- RB : Can we clarify that your position is that you will not disclose anything which is commercial between BSC and SDS?
- CB : It's not our position to do that.
- RB : Can you write to us and confirm that's your position on Clause 104 audits?
- CB : Acknowledged that BSC would (*see BSC action list at Appendix 2, point 9*).
- DM : Referred to the content of Clause 104.2 and the fact that BSC is not making the documents available to us. Also referred to the timescales (you got the notification on Friday – it is now more than 48 hours since then).
- CB : Repeating position that we don't have access this morning and you can record this however you see fit with regard to Clause 104 and we will produce them as quickly as we can.
- RB : Alan, were the designs delivered in accordance with v31 Design Programme?
- AD : I don't know. I'm fairly confident that it was around the time. (*This was later confirmed by SDS as three days later than the date shown in the Programme*).
- RB : With reference to question 3, can you confirm that the delivery of the IFC was not delayed by late or inadequate instructions or information from Infracore Members, **tie**, SDS or anyone?
- CB : I can only answer with regard to Infracore Members and sub-contractors. Yes, I am satisfied. I'm not aware of delay by the third party. Are you Alan?
- AD : No, we were just going through the motions.

- RB : Could we have a look at the correspondence file between SDS and BSC for this time?
- CB : I'll take advice on that. I understand your question but I will take advice on the subject. You're looking for correspondence on this particular subject matter.

The audit broke until 10.30am.

*When the audit resumed after the break, CB advised that he had taken advice, delegated in Foerder's absence, and BSC had no issue with **tie** looking at the correspondence. CB had set up the computer system in the meeting room, linked to BSC's document management system – BIW.*

BSC also withdrew their previous position on Baird Drive and they are prepared to respond on the Baird Drive audit fully.

*The audit party then moved to Stefan Rotthaus' (Bilfinger Berger – [design manager]?) desk. Stefan showed his folder of design meeting minutes, which started on 17 July 2008 (as he only started on the project then). David Taylor from BSC had been around earlier and he may have earlier minutes. Stefan carried out a check on the BSC BIW document system and didn't find anything from before July 2008. The BIW system was only set up around August 2008 (and by that time the Depot Access Bridge IFA to IFC was out the door). Stefan agreed to provide the **tie** audit party with copies of the minutes from 17 July 2008 until 8 October 2008 and to check for earlier minutes. (Copies of the Minutes (17 July 2008 to 8 October 2008) were later provided to the audit party).*

- AD : Confirmed some of the details from before the break.

The instruction from **tie** to carry out the Feasibility Report was Change Order reference COS065, dated 31/07/07 from Susan Clark.

The Feasibility Report has reference ULE90130-06-REP-00011v1, issued on 16/08/07 to **tie**.

tie Change Order COS067, dated 12/09/07, instructed **tie** Change regarding the Value Engineering signed by Matthew Crosse.

IFC was three days late.

The audit party then undertook a search of the BIW document system. CB input the search criteria: date range from 15 May 2008 to 30 September 2008.

Incoming correspondence from SDS to BSC (168 entries showed)

- searched for "Depot Access Bridge". One relevant entry was found - Change Estimate DCR0009.

Outgoing correspondence from BSC to SDS (30 entries showed)

- no relevant entries for the Depot Access Bridge.

- RB : Did SDS receive any design changes/send to BSC with regard to the Depot Access Bridge?
- AD : It was all done and dusted by then.
- RB : The IFC was 5 September 2008 - when did BSC notify **tie** of the Change?
- MH : 6 November 2008 (reference number ◆)

- RB : Assuming the dates involved, and your earlier position that this matter was substantially completed at the point of contract, I assume this means you didn't do anything about best value?
- CB : Infraco didn't. SDS did and essentially came up with the same design as before.
- RB : With reference to audit criteria 5, what is the evidence that the planning, technical approvals and close out informatives were completed prior to IFC issue?
- AD : Referred to the "Approvals Tracker".
- CB : Same document as you have had before.
- RB : Would the informatives have been closed out?
- AD : Usually the only informative given on structures is that you have five years to build it.
- CB : This is not a prerequisite to IFC.
- AD : No, it must be built within five years.
- RB : Alan, can you confirm that there are no other outstanding informatives?
- CB : What does question 6 (provide evidence that the Programme obligations for the changed design have been discharged) mean in this or other audits?
- RB : The question means: has it been delivered on time and if not, what has been done to mitigate any delay?
- RB : Asked question 7: demonstrate and evidence the process for carrying out an IDR including how integration of Siemens design was carried out?
- AD : At the time that the IFC was delivered, Siemens had no involvement in the delivery of the bridge. It was a Siemens' requirement to put special fixings on the soffit of the bridge. They asked for a design change following integration discussions with SDS.
- CB : This was identified in a design workshop.
- RB : Is it fair to say that an interdisciplinary approach took place post - IFC?
- AD : Yes - there is an IDR process.
- CB : We can look at the IDR programme together for all four audits, if you like?
- RB : Yes.
- RB : Asked question 8: provide a copy of the Buildability Reports and evidence of CDM and ROGS Compliance.
- AD : The Buildability Reports are part of the AIP procedure and are issued with the IFC package. At the AIP stage, we demonstrate that the bridge is buildable and that the technical authority reviewing that would say so. We have cited this in all of our audits so far.
- CB : ROGS compliance is not applicable at present - confirmed by an independent competent

person.

- CM : Is it worth recording where we are with this?
- CB : It's in progress and there are no items likely to cause a problem.
- RB : Asked question 9: provide take-off sheets and sources of rates associated with Estimates.
- CB : We have provided a bill and a letter of rates with letter 3327. We procure our bill from external sources. If you need a take-off, we don't have it, but happy to do a joint take-off.
- DM : I have no problem with that - we can arrange that in due course.
- CM : Does it refer to quantities?
- CB : Yes. There has been a lot of correspondence on this one.
- RB : Does the Estimate contain any credit from the reduction in scope? ie by not digging so deep and by reducing the extent of the retaining wall on the South. How do you realise the savings in reduction in scope?
- MH : We haven't - you have in your response to the Estimate.
- RB : How do you intend to do so, particularly with regard to the Retaining Wall?
- MH : We will respond to you.
- MH : We have been warned informally that this may be one which is taken to dispute by **tie**.
- RB : Is there any other part of the Change which results in a credit not yet identified?
- MH : Not that I am aware of.
- RB : Does the difference in depth have a knock on effect?
- AD : That involves the A8 underpass, which we'll come on to talk about. We were asked to lift it up from its original levels but because of alignment issues (sewer below and telecom duct 22A above) this was not possible. BT were looking for £1/2m to 1 1/2 m (costs). The realisation of lifting it up would not save £1 1/2m (if we took the maximum). We are lifting it up as we are going where there are green fields and where possible, but there we are wedged.

Baird Drive Retaining Wall

- KS : Gave summary of changes and timeline (*this will be provided to tie*).

The retention of the Baird Drive Retaining Wall necessitated the slewing of the tram alignment 3m North. The track is running adjacent to heavy rail alignment. In negotiations with NR, **tie** agreed it would maintain access; therefore we've got to put it back, which increased the cross-sectional area and we had to move the tram further North and there is therefore a structural change. We are also restricted by Baird Drive. Their fence line is the edge of the LOD. There is a Parliamentary undertaking with the residents at Baird Drive that we will leave a 3m access road (*the summary sheet states that the Parliamentary Undertaking 'prevented toe of embankment moving much further north'*). Therefore, everything shifted.

KS read the note from the designer: this meant changing the proposed granular fill slope solution for a reinforced earth solution. We moved it as far North as we could, but access requirements restricted us.

In May 2007, there was an SDS Options Report on how we can give NR access. **tie** instructed option 3.

There were then emails from NR to SDS (cc-ing **tie**) requesting optioneering to be taken for an alternative access road.

26 September 2007 - SDS wrote to **tie** concerned about the programme and capital costs and asked for an instruction.

Meetings etc.

7 February 2008 - Change Order from **tie** (COS104) to progress Option 3 from the "Balgreen Road/Baird Drive Report" (Report issued between September and February).

The first Report was to decide where the access road was going to go.

The second Report gave the three options:

- access road shared running adjacent to tram;
- adjacent with tram with shared turning head; and
- separate access road and separate turning head.

Went for shared turning head.

- DM : Can I ask you a question on BDDI? Were you involved at that time?
- KS : I was Design Manager.
- DM : Was there any road on the BDDI drawings?
- KS : The Drawings issued at BDDI were preliminary. There were sketches available and the options reports between **tie** and SDS.
- CB : It's on the Estimate.
- KS : The topographical survey is the same, so you can refer to a point.
- RB : The May 2007 Report, Colin, do you consider that is BDDI? Was that Options Report available to BSC?
- DM : Would it have been available during due diligence?
- CB : I don't know - I'll check.
- MH : Commented that the BDDI is just drawings.
- RB : Are you saying that the BDDI is just drawings?

- MH : It is "just design information drawings from our point of view".
- CB : BDDI are the drawings as defined in the contract.
- RB : Asked if the IFC was issued to Programme.
- AD : I don't know. I'll check the IFC against v31.
- DM : Asking a question about the sheet piling against the back of houses - what was the problem?
- KS : There was a request from NR for all the retaining structures along that area to be category 3 checked. We had previously only done a category 2 check (16 May 2008). NR insisted.
- DM : Could you give us evidence of that please?
- KS : It's just a **tie** set of minutes.
- AD : The meetings were chaired by **tie**.
- RB : Do we have Forms A and B?
- KS : Yes, Form A was signed on 15 July 2008 and Form B was signed on 25 July 2008.
The IFC was probably just after that date. [*This was later confirmed as 1 August 2008*].
- RB : Can we see them?
- KS : They form part of the IFC pack.
Report has reference ULE90130-05-REP-00179, dated January 2007
Instruction was **tie** Change Order C0S104. At that time, [Jeff Lloyd] led.
- RB : With reference to audit question 5, are there any informatives?
- AD : I'll confirm that there is no massive informative, other than the bog standard build within five years. (*KS/AD later confirmed that this was the only condition ("condition" rather than "informative")*).
- RB : With reference to question 8, regarding Buildability Reports and CDM?
- AD : We would cite AIP; and for CDM, see RRR.
- RB : With reference to question 9, take-off sheets and rates?
- MH : Some comment as for Depot Access Bridge.
- CB : The Change for Baird Drive has had two iterations. **tie** commented extensively on the rates. A lot of work has been done on rates and quantities.
- RB : Can we have Minutes of the Design Meetings?
- AD : This should be covered by the period which Stefan is getting for us.

The parties then carried out a search for correspondence on BSC's BIW document system.

Incoming correspondence (PB→BSC) - only one letter was found in relation to "Baird Drive" - the SDS Change Estimate regarding additional work for visualisations.

Outgoing correspondence (BSC→PB) - there was no correspondence on Baird Drive.

- AD : There is not much on this. It was all done and dusted by then.
- CM : Can we see something regarding the Change/Minutes?
- KS : No because they are with **tie**.
- CM : If there was a resulting change from Minutes between **tie** and SDS, would we not have expected to see that on file between SDS and BSC?
- KS : SDS is responsible for getting approvals.
The IFC won't come under letter - it will come with a DTF (Document Transmittal Form)
- DM : Would it be possible to see that?
- CB : We would need to go to the Document Controller.
- RB : Let's hold for now and go to Document Controller after the other four audits, if we need to.

The audit meeting broke from 12.10pm until 1.00pm.

- RB : You mentioned that you used a third party for the preparation of Estimates.
- CB : Yes, sometimes we use Corduroy, sometimes BB (Germany), and sometimes a self-employed QS. For bills, not the Estimates. We can find out for the audits.
We are not proposing to offer for audit the taking off which has been done.
- DM : No, but we can use as a sample.
- RB : Would this be done under a sub-contract? Would there have been any correspondence?
- CB : I don't know, I presume it would be a sub-contract with Corduroy, but will find out.
- MH : Responding, it depends on what it is. For the Depot Access Bridge, I think it was Luther Schneider - brought over from BB Germany. Its part put over to Germany and part Corduroy. We have a sub-contract with them. I think for Baird Drive and A8 it was Corduroy.
- RB : Do you have any correspondence?
- CB : What is the purpose of this?
- RB : To try to get an understanding of what's happened in the Estimate.
- MH : There is not much correspondence - just a bill of quantities. We do a spot check of the bill of quantities and take-offs. There will be a letter and terms of reference and a sub-contract order

CB tried a search for correspondence on the BIW document system for "Corduroy" but couldn't find anything.

MH left the audit meeting - he will find out and get back to us.

A8 Underpass

AD : (Reading from SDS summary sheet, a copy of which will be given to *tie*). During 2007 (July - November) a number of initiatives were started by the Project Director at the time (Andy Harper). The VE initiatives involved Geoff Gilbert and Mike Jeffries (TSS) to facilitate the early months of VE. There was the possibility of looking at the A8 underpass and bringing it up to be level with the Depot.

The Preliminary design drawings were in 2007. It was on the table, can we bring the whole level of the A8 up? We needed to look at the headroom. No, we were jammed between a 22-way BT duct and 1525mm sewer. So, we [retained 100mm of the original position] and brought it down as low as possible.

We reduced the cross-section of the box. We've got a preliminary design of the box which is not VE. Then we started again. We were still looking at the VE options in November 2007. We had a meeting in Birmingham with the designers. The resultant IFC drawings had reduced the 5.3m to its current height 4.6m. BT gave a budget of £½m to £1½m for them to relocate the duct.

There was no instruction other than the agreement that the VE exercise was to be carried out by SDS and where possible redesign.

There were discussions with John Dolan (ICP).

RB : So there was no instruction?

AD : We hadn't finished the design - we had the design on the table. There was no instruction as it was the Value Engineering exercise and there were meetings.

RB : As far as *tie* and SDS are concerned, there is no design change.

AD : There is a design change – it's a sub-standard underpass (*in terms of the headroom*).

RB : Why was there no instruction here - were there additional costs?

KS : It does not necessarily mean there are additional costs. We hadn't yet finished the design. When we get different requirements or additional requirements, then we included them in design.

RB : So there was no change under the contract?

AD : There was no instruction - we've got a job to do.

DM : The Value Engineering is useful history, but if we're looking at the current Estimate for the A8, we are not looking at the size of the box. The list of changes includes:

- additional pile numbers;
- additional length of piles;
- change in reinforcement;
- change to trackform - improvement layer (came in at later date);

- bolts deleted; and
- waterproofing added.


KS/AD not able to answer about these Changes, but they later agreed to check with the design team and come back to *tie* with a couple of comments on each.

- AD : Any additional requirements come out in the design. [BDDI shows 5m and some 4.5m]. This was being looked at. It was very close to the BDDI cut off time.
- RB : Why has the price gone up as a result of Value Engineering?
- AD : There are different comparators. It may have gone up less than had the original drawing gone to IFC.
- DM : There is no item for reduction of cost in the Estimate.
- AD : This was the "completion of the design". We were taking the Preliminary Design to IFC.
There is no true comparator.
- DM : What you're saying is that you can't do a fair comparison between the BDDI and IFC drawings?
- AD : We can do an element of comparison. *(There was some other comment made.)*
- DM : What you're saying is that this is "completion of the design"?
- AD : Yes.
- DM : Referred to other things in the IFC design.
- AD : "Purely completion of the design."
- CB : If you're asking us to confirm whether the design has developed in shape, form etc as defined in Schedule Part 4, then we as BSC would say yes.
- DM : Is there a difference between what is normal design development and what is design development for Schedule 4?
- CB : This is the essence of dispute between us on this.
- DM : Asked question regarding design development.
- AD : A true comparison of the two designs would be to take the two designs to the final stage.
- CB : There is a difference between pricing an incomplete design, which we were asked to do, and completing the design is not the same as design developing.

We would not ever acknowledge that completion of an incomplete design is the same as design development.
- RB : Referred to Schedule Part 4 = "normal design development" and asked what category for example pilings would fall into. *[No response noted.]*

- DM : Asked a question in relation to shotcrete to a gap showing on the BDDI drawing.
- KS : The BDDI drawing showed a gap for utilities. Originally we were going to divert a utility and tie then asked us not to. [Note: KS was referring to a gap in the pile walls to avoid a sewer, but this gap is not shown on the BDDI].
- DM : Alan, did the changes in the drawings arise through the completion of design?
- AD : Yes, taking into account our usual constraints.
- DM : So for the parapet lengths, there is no other explanation other than the usual checking and making them longer.
- KS : I think that was a comment from CEC highways, If I remember rightly and I'm just speaking from purely memory so I would need to check, CEC Structures had approved the parapets, but when the roads packages went in, CEC Transport requested higher/longer parapets.
- AD : I think the ICP may have requested changes, so that the kids don't climb in, elements of discussion like that may or may not have had an effect.
- DM : There were something like 12 ducts in BDDI and now there are 14. I think they are in the region of 150 from looking at the drawings.
- AD : Yes - 150s - diameter.
- DM : There were a bank of six on either side.
- RB : Was that a development of your design, or a requirement from development workshops?
- AD : The development of the design came out of whole workshops so, if so, then yes.
- RB : If it's part of the developing design to take account of the Siemens design but not the Development Workshops?
- AD : These post-date the Siemens design.
- Siemens have chopped and changed a bit and the requirement to look at ducting. Siemens said there would be no change in that respect. It's their own requirement.
- RB : Is this the same with the ground improvement layer and piles?
- CB : The drawings produced in 2008 do not contain the Infraco Proposals and they would therefore need to be further produced to reflect the Infraco Proposals.
- RB : We issued an instruction on trackform design in February 2009. So we need to understand why this has happened/where this has come from.
- DM : Referring to the BSC list of major changes - what's this regarding the gap for shotcrete? If the BDDI showed a hole in the wall for the duct, is it not part and parcel that this would need support?
- AD : There were 3 or 4 things happening at same time.
- (Discussion regarding the gap for the sewer/duct).*

"This is part and parcel of constructability and methodologies".

- DM : What about the changes in water proofing?
- AD : I don't know.
- DM : Requesting a couple of comments on each of BSC's list of changes (contained in the Estimate), would you be able to do that for the list of 13?
- AD : Yes it's not one person though, it's a mix of people! I'm making heavy of this because it's probably the most complex structure you'll find. I'll not be drawn on a comment about structural concrete: there is no increase in structural concrete in my IFC. The design is as it stood at completion.
- RB : That's fine. I want to understand why this is different from BDDI and what the basis of the BDDI design is.
- If that is lack of information for example. Or we need to understand if it's a change in principle. We need to understand the basis of BDDI design.
- AD : *With reference to the BSC sheet of design changes (included in the Estimate), asked BSC - "Increase in steel bar - increase in rebar quantities". What is that?*
- CB : You can interpret it as reinforcement.
- AD : I'll take a look at it.
- RB : With reference to question number 2, there has been no change from tie.
- CB : Not from the Infraco. The IFC was issued on 21 July 2008 and IAP on 18 June 2008. IFA on .
- RB : With reference to question number 3 (evidence that the IFC was not delayed by late or inadequate instruction or information from Infraco Members or subcontractors or any third party), I don't think you were too far away from v31.
- With reference to question number 4 (evidence that BSC and SDS considered how a change could be mitigated in terms of cost and time and how they considered best value), acknowledge that there was nothing regarding Infraco - same as the first one.
- With reference to question number 5 (review of Planning, technical approvals and close out of informatives prior to IFC), there are no informatives (other than build within five years).
- With reference to question number 6 (evidence that Programme obligations have been discharged), this is the v31 piece.
- With reference to question number 7 (demonstrate IDR process), same comment regarding IDR.
- CB : Ian Brazenell's team are standing by. I think there is little interface.
- DM : Are the ducts part of the interface?
- CB : The ducts would come out of the Infraco Proposals. The ducts which we build will be

different. The IFC for ducts won't be what we build.

- DM : This Change includes a change in ducting.
- CB : It depends on what we come up with in the Development Workshops.
- RB : With reference to question number 8, this will be the AIP for buildability and the IFC pack for CDM.
- DM : With reference to question number 9, MH is going to come back to us on this and we'll do some sampling and checking.

The audit party then did a check on the BIW document system for correspondence. The date range was 15 May 2008 to 30 September 2008.

Incoming correspondence (PB→BSC):

- 1. Letter dated 18 August 2008 with regard to the issue of the IFC drawings and not able to open a CD.*
- 2. Letter dated 11 August 2008, enclosing a CD of drawings.*

There was no outgoing correspondence (BSC→PB).

Bankhead Drive Retaining Wall

The parties carried out a check in correspondence on BSC's BIW document system.

There was no incoming correspondence (PB→BSC) and no outgoing correspondence (BSC→PB).

- KS : *(Reading from summary sheet which tie will get a copy of).* There were three changes from Preliminary Design to IFC.

The BDDI was Preliminary Design. There were changes in March 2007 and 25 September 2007 and these were all incorporated into the final design

The first change came from the Roads Safety Auditor in June 2007. He requested the path to be 1m wider than it was because it was not user friendly for cyclists. The Roads Safety Auditor is a third party - it happens to be Halcrow. We have got to take what they say into account, unless CEC authorise otherwise. This is our process, not through statute. We have got dispensation from CEC on occasion.

The second change is in relation to the retaining wall on the north side of the tram track. Originally the design was to tie in with NR requirements. Then if we do that, tie would have to make an agreement with NR regarding the land take, as it is outwith LOD and for approval (Forms A and B) so we altered the design to make sure it takes account of this (March 2007).

The third change - on 25 September 2007 we got an instruction from tie (COS068) to move South Gyle Tramstop (now Bankhead Tramstop) closer to South Gyle Bridge. This means an increase in height which drove the height of the retaining wall.

- CB : There has been a debate since the beginning of the Contract, if we need to show why something is a Change or not.
- DM : But if we know why, it helps to sort it.
- KS : TEL and Transdev wanted to undertake feasibility regarding passenger flow and moving the

stop. There were a couple of options, but in the end we kept it where it is, but moved closer to Bankhead Drive. This is referenced in the Change.

- DM : On a drawing of the north retaining wall, it references "by others".
- KS : I looked into this briefly. I think it refers to the two design teams "structures" and "earthworks". If the Structures team refer to "others", they mean the earthworks team.
- DM : Is the tramstop relocation shown on plan?
- KS : It is a report.
- DM : So the increase in the level in tramlines is as a result of this variation.
- AD : It's a client driven change.
- RB : Were any of these changes put into the BDDI and passed over to tie?
- KS : I haven't looked into when it was resolved. These were all instructed under three different ones: comments from third parties for 1 and 2, and the third was an instruction. I don't think we would have put any of them into a drawing until all three were finished, so I believe they would not be in BDDI.
- DM : What about the discretionary aspect of the roads safety auditor? The original design would have been compliant for the widths for cycle ways.
- KS : 3m is the normal width, but with a wall on both sides there is ½m which is not useable.
- CM : The obligation to get Roads Safety Auditor - where does that come from?
- AD : It's part of the design process.
- DM : Is it development of the design to have it audited by the RSA?
- KS : No, it's completion of the design.
- With regard to programme, according to v31 IFC was due on 23 May 2008, and it was delivered on 6 June 2008 (due to the CEC planning batch).
- With regard to informatives, there were six informatives, but they are all regarding the Tramstop and not the retaining wall.
- RB : With reference to question 6, (Programme obligations), I'm happy with that.
- With reference to question number 7, IDR, that was post-IFC.
- With reference to question number 8, Buildability and ROGS, that's IFC.
- With reference to question number 9, we'll wait for something back from MH.
- KS : We'll give you the report reference for Bankhead and the written explanations/summaries and the points on A8.

The audit meeting concluded. The audit party moved to Ian Brazenell's desk for a brief look at the IDR process.

Appendix 1 - Audit scope

Seq No	Audit Criteria
Design Stage	
1	Review of evidence to substantiate why the IFC design constitutes a Change under the Infraco Contract.
2	Review of evidence as to whether change emanated from Infraco, an approval body, or client instruction.
3	Confirm and evidence that delivery of the IFC was not delayed by late or inadequate instruction or information from Infraco members or subcontractors (including SDS) or any other third party.
4	Confirm and evidence that Infraco and the SDS Provider considered how a change could be mitigated in terms of cost and time and how they considered best value.
5	Review of evidence that Planning, technical approvals and close out of informatives was completed prior to IFC issue.
6	Provide evidence that the Programme obligations for the changed design have been discharged.
7	Demonstrate and evidence the process for carrying out an Inter Disciplinary Review [IDR] including how integration of Siemens design was carried out.
8	Provide copy of Buildability reports and evidence of CDM & ROGS compliance.
9	Provide take-off sheets and sources of rates associated with Estimates

Appendix 2 - BSC action list (issued to BSC by email 21 January 2010)

Structures Audit 19 January 2010 – BSC Actions

Generally

1. SDS to provide the summary sheet used in the audit giving design background and history of each audit topic.
2. BSC to revert with information on third party used for the preparation of Estimates for each change under audit, including information about sub contract correspondence and terms of reference.

Depot Access Bridge

3. BSC to confirm under which heading they consider the change to fall under (design principle, shape, form, or outline specification).
4. BSC to confirm if they had access to the Design Feasibility Report and if so when did they have access to the Report?
5. SDS to provide document control reference number for feasibility report - Action Complete.
6. SDS to confirm change order number – Action Complete (COS 065 & COS 067).
7. BSC to confirm if they participated in design meetings on the depot access bridge and if so when.
8. BSC to provide copies of all design meetings minutes for the first three months of the contract – Copies provided of minutes from 17 July 2008 to 8 October 2008. BSC to provide Minutes up to 17th July 2008.
9. BSC to write and explain why they may not provide documentation in a Clause 104 audit if it is commercially sensitive. – Action Complete, access allowed.
10. SDS to confirm position on informatives for design – Action complete
11. Audit to look at IDR process for four audit topics – Action complete
12. BSC to detail and demonstrate how the credit for the deletion of the retaining wall is being dealt with commercially.

Baird Drive Retaining Wall

13. SDS to confirm date of issue of the Balgreen Road / Baird Drive report – Action Complete.
14. BSC to confirm if SDS options report was available to BSC during due diligence.
15. SDS to confirm IFC drawing against programme V31 – Action Complete.
16. BSC to confirm document control process for receipt of IFC drawings.

A8 underpass

17. SDS to provide comments on history and background to the 13 design changes in the current estimate.
18. SDS to provide BDDI and IFC design information on pile lengths, calculations, assumptions etc. and document how the design of the piles has changed at IFC.

Appendix 3 - tie action list

Structures Audit 19 January 2010 – tie Actions

1. tie to confirm position on joint take off with regard to each audit.
2. tie to confirm when they received the Report from SDS and when it was put in the Data Room?
3. tie to check position with parliamentary undertakings at Baird Drive and commitment to leave a 3m access road – (Alasdair Sim / Alf Orrell – CM).
4. tie to obtain evidence (set of tie minutes) confirming that the retaining structure was to be category 3 checked for Network Rail purposes – Richie Adams / Willie Biggins.
5. tie to check IFC pack re forms A & B issued - Willie Biggins.
6. tie to confirm when the changes were put into the drawings / BDDI and passed to tie.