SCOTTISH HOSPITALS INQUIRY

Hearings Commencing
13 May 2025

Day 8

27 May 2025
Steven Pardy
Stewart McKechnie

CONTENTS

10:02

THE CHAIR: Good morning to those who are with us in the hearing room in Edinburgh and those who are following online. I think we're able to resume, Mr Connal, with Mr Pardy. Is that correct?

MR CONNAL: That's correct, provided my screen lights up at some point, which would be handy because at the moment I'm not seeing----

THE CHAIR: Yes, do we----

MR CONNAL: -- anything other than a white screen with some headings on it. I don't need it for the next few minutes, but it would be handy in due course to be able to see some things.

THE CHAIR: Right. Can we begin----

MR CONNAL: (Inaudible 10:03:36).

THE CHAIR: Yes, right. Good morning----

MR HARDY: Good morning.

THE CHAIR: -- Mr Pardy. Now, as you understand, you're about to be asked questions by Mr Connal, who is sitting opposite you but, first, I understand you're prepared to affirm.

MR HARDY: Yes.

Mr Steven Pardy
Affirmed

THE CHAIR: Now, Mr Pardy, your voice is, to my no doubt inadequate hearing, a little light. We've got quite a large room, and people need to hear you.

THE WITNESS: Mm-hmm.

THE CHAIR: I certainly need to hear you. The microphones are there to assist, but could I ask you to speak perhaps a little louder and maybe a little slower than you would in normal conversation.

THE WITNESS: I will.

THE CHAIR: I and others will be taking notes. So, if I could ask you to do that, I'd be----

THE WITNESS: Yeah.

THE CHAIR: -- very grateful. Now, Mr Connal.

Questioned by Mr Connal

Q Right, my Lord. Good morning, Mr Pardy. Can I start by asking you a formal question, which is asked of all the witnesses, which is that you've provided a witness statement to the Inquiry. Are you content that you adopt that as part of your evidence to the Inquiry?

A Yes, I am. Yeah.

Q Thank you. Now, I'm going to ask you, obviously, some questions about the ventilation system, in particular, at the-- I'll just call it "the New Hospital" to avoid getting into a debate about which

bit, unless the context requires otherwise. At times, I may use the word “you”. That may mean you individually or you as representing ZVP. So, it’s no more an issue than that. We’re just checking some-- ah the technology is being fixed for me, I hope. Thank you.

Now, I’m not going to go through your CV, but you’ve obviously spent a lifetime working in the field that you ultimately came to specialise in, which appears to be to do with ventilation and often to do with ventilation in healthcare projects. Is that correct?

A That’s correct.

Q You indicate in your witness statement at page 5-- and I’m using page numbers which will appear at the top of the page to accord with the electronic bundles that we have. You indicate a number of projects, including leading roles in the building services design – I’m going to ask you about this concept of ventilation design a little later in a number of hospitals – including Great Ormond Street. Do you remember what kind of protective environment for immunocompromised children you designed at Great Ormond Street and in general terms?

A Yes. In general terms, I was involved in the early days of the project and then handed over to a colleague to get a pause in that process. So we didn’t get into the detail of really nitty gritty detail of that-- systems, but we were made fairly aware at the beginning by the Estates team, who obviously knew their facility – they already had an existing facility in that-- on the site – about the bone marrow treatment rooms in particular, and there were various departments within that building, and they had a series of isolation rooms which had a pressure cascade from the room out the corridor and then to the rest of the hospital, and we did a diagram at the time just to feedback them what they meant, and that’s what we did, and that’s as far as I got with the project. I didn’t go into the actual detail at that time. That was handed out to another colleague.

Q Thank you.

THE CHAIR: Could I just check that detail with you? I understand that you perhaps didn’t spend a lot of time on the project, but my understanding is that the Great Ormond Street Hospital complies with the English Health Technical memorandum. When you are talking about the pressure cascade from, if I noted you correctly, isolation rooms-- is that what you said?

A That’s right, yes. Yes.

THE CHAIR: Was there also a pressure cascade from the ward within which these isolation rooms were situated and the rest of the hospital, the corridor

outside?

A I believe there was, yes.

THE CHAIR: Okay.

A A very low pressure at that point.

THE CHAIR: Right, thank you. Sorry, Mr Connal.

MR CONNAL: Now, you go on to make a point, both specific to Great Ormand Street and elsewhere, about the role that, in your experience, the Estates team played. You make the point in paragraph 8 that you were accustomed, at least, to getting quite a lot of input-- whether the word "pressure" is the right word or not but, input from the Estates team as to what they wanted.

A That's right. They know their facilities best, and therefore that was the first point of call. Certainly, in latter years, we've had that experience, and they often-- in particular at Great Ormond Street, they're very-- obviously leading in this field----

Q If I can just ask you-- It's nothing to do with the content of your answer, but if you could just speak up----

A Okay, sorry.

Q -- again, if you don't mind, because if your voice drops away, his Lordship may not be able to pick it up.

THE CHAIR: His Lordship will not hear you, I'm afraid.

A Apologies.

MR CONNAL: Yes, you were asked a question from the Chair a moment or two ago about following the English guidance, with which I assume you're very familiar. Is that right?

A Yes.

Q In fact, what you say at the top of page 6 of your witness statement is that Great Ormond Street didn't always follow the guidance, but they always got NHS England clearance before they changed anything.

A That's correct, and they pointed that out to us, that they-- that particular system doesn't necessarily follow the HTM, the English HTM, but they'd always consulted with NHS England to get agreement, and they'd had-- I understand, on certain things, they'd had various conversations with them and then finally got agreement.

Q Now, you then give an example in the next paragraph of another hospital where it was done slightly differently but, again, pressed by the estates team. Now, you're obviously making a point here, and you appear to be making the point that in this project that we're talking about in this Inquiry that there was very little discussion with the estates team during the design process.

A Yes, as I recall, we didn't have any conversations, significant conversations with the Estates team on

this-- any part of this project.

Q I'm going to come back in due course to ask you about how you did do what you did in this project, so we'll bear that point in mind. One of the quirks that the Inquiry has been coming across is that, at various points, participants in the process talk about the "Technical team" or the "Tech guys", or the like. Can you remember ZBP ever being described by GGC participants in those terms?

A No, I think we were always considered as the-- part of the contracting team and the M&E designers for the project.

Q Thank you. In your statement at page 7, you explained that you were involved during the bid stage but not formally appointed until Multiplex got the contract in early 2009/early 2010 – the date doesn't matter. Were you advised of any of the responses from the other unsuccessful bidders?

A No, no. In fact, the-- I think there was some information sent out last week, late last week, which was the first time I'd seen that.

Q Yes. Well, you've obviously been following along then. You're aware that one of the other bidders, in the course of a number of complaints about how the process had been scored, indicated that you weren't going to get your air change rates if you used chilled beams, but you hadn't been made aware of that.

A No, no, we hadn't been made aware of that.

Q Now, the next topic that you touch on – and we'll probably get through this reasonably quickly – is the Employer's Requirements, and obviously you were not involved in the preparation of the Employer's Requirements because that was done by GCC with their own team. Is that right?

A That's correct.

Q Were you aware that the Employer's Requirements had a provision to take into account infection prevention and control when designing?

A Having looked back, yes, yes, that-- yes, I saw that was in there.

Q Were you aware of it at the time?

A I would have thought-- We would have read the Employer's Requirements through and been aware of that.

THE CHAIR: Sorry, I didn't catch that answer.

A Yeah, we were-- we would have been aware of that requirement, having read the employer's comments through.

MR CONNAL: Well, I needn't bother digging out the document and putting it up on screen since you're

obviously familiar with it, but it says that:

"Prevention and control of infection shall remain a primary consideration of the contractor in the design and construction of the works."

Now, just taking that as a generality for the moment, how would you as a ventilation designer take account of that in the work that you then did?

A I think that, from our point of view, that would mean we were designing sufficient facilities to allow infection control to be maintained. That would mean access to cleaning ductwork systems, access to terminal units for cleaning on a routine basis, and all the requirements of the SHTM associated with the plant so there was no-- for instance, Legionella would be a thing, so it would mean, from our point of view, that-- it would mean that the systems were designed so that it could be fully maintained to prevent a future microbiological contamination.

Q Now, you go on to touch on a number of issues, including, in the foot of page 7, paragraph 17, what you say is the "carbon target". Now, you say this was heavily emphasised – who by? Do you remember?

A I suspect it was by the Board. This was initially picked up during the competitive dialogue sessions that we had. I think we had three or four of those over that period leading up to the bit being submitted, and it was definitely emphasised. We even had a separate workshop for the breakout.

So, the-- I recall that we went along to these three or four dialogue sessions and then there was a number of topics to be discussed, and one of them, I remember, was the-- how we would actually achieve the carbon target, and we broke off in-- so that would have been ZBP, probably myself, the representative from Multiplex and then it would have been the lead on the carbon target, which was Susan Logan, and we were-- we went through that process, we presented how we were going to show that we would achieve that, and that was in a spreadsheet report form where we could identify various systems.

THE CHAIR: I'm sure it's probably me, Mr Pardy – I am finding it difficult just to get the detail of what you're saying. I don't know if the positioning of the microphones might help, or maybe not.

A I can repeat it if you want.

THE CHAIR: Yes. As I say, please feel free to speak more loudly than you would in conversation.

MR CONNAL: Now, is the amount of carbon emitted by building solely the product of the ventilation system or is it influenced by a lot of other issues?

A Oh, it's definitely influenced by

a lot of other-- All of the systems-- all the active systems in the hospital or any other building would be influenced. The lighting, the amount of power that's consumed by the equipment in the building, the actual heating and cooling of the-- that air or that building would all influence, and the fans are another big energy user in a building, particularly a hospital.

Q Now, if we go on to the next page of your statement, we've had a discussion with various witnesses about this thing called "BREEAM" and whether BREEAM was a driver for what was ultimately produced as a solution here – I'll take that word "solution" out, but an agreed arrangement for air change rates. Your position, as I understand it, is that while BREEAM was something you had to look at, it didn't have a significant influence on anything you were doing.

A No, BREEAM, it was-- is only one relatively small part of the overall analysis process or validation process of how you achieve the excellent rating. There's one element that actually is related to energy. I can't remember which one it is now, but it used to be----

Q But in terms of driving what we're about to discuss, which is the air change rate issue, you don't think BREEAM was the driver for that?

A No, we would have had to achieve a certain number of credits under the BREEAM system to achieve excellent, and that would have then driven the energy.

Q Now, the other issue that's cropped up as possibly being a key element or driver of the discussions about air change rates is what's been called the "maximum temperature variant". Now, the label may or may not be an accurate one, but I take it you're familiar with the fact that a decision had been made to try to achieve 26 degrees as a maximum rather than 28 in the guidance.

A That's right. As I hadn't looked at the documents, I couldn't remember it from my own memory, but having seen the documents, yes, clearly it was a requirement to achieve that.

Q Was that a significant driver for what we are coming on to discuss?

A It would have been, yes, because the typical design summer temperature for Glasgow was around about 26 degrees, so to achieve 26 inside with solar gains and just air coming into the building would have actually influenced the way we designed the systems.

Q Again, in terms of achieving an internal maximum temperature, is that solely a product of the ventilation or do other issues such as the building design fit into that?

A Yes, yes, so essentially you start off, we would do a passive design study to see how the type of glazing in the building, the amount of glazing, any shading devices to prevent the sun getting into the building, and then you would look at the internals, such as the people in the building or in a ward. That would probably be less of an influence – certainly, the building-- but certainly the building has a big influence on the energy performance.

Q Another issue that has been suggested might have had some influence on the discussions about air change rates was cost because, on one view, if you build a system where you only have to provide two and a half to 3 air changes an hour as opposed to a standard of 6, we've heard that you can put in smaller ducting, different air handling units and so on. Was that a factor?

A No, that wouldn't have been a factor in our design. We would have designed what we believed was needed to deliver the brief. As you say, costs would have been affected, but I don't think we were considering that in the actual design.

Q As you probably have gathered from looking at the documents in preparation for this hearing, we did find the document, if we could just have bundle 43, page 35, please. This drove the question, if I might put it that way, Mr Pardy. You've dealt with the whole question of value engineering in some detail in your statement, so I'm not going to pause long on this, but you can see that ward air change rate as a possible value engineering item does seem to have cropped up.

A Yes, I can't recall that actually being added in, but clearly it was added in at that time, and I don't really know the reason why that was added in after this period of time but, yes, it was noted in there.

Q So, your position, as I understand it – and please correct me if I'm not picking it up – is that there would be an impact on cost in providing a lower air change rate, but that wasn't what drove the decision to do it.

A That's correct.

Q Is that your position?

A That's correct. There was no requirement to reduce costs through that.

Q Now, you go on to touch on chilled beams, and I don't think we need to go to the guidance on chilled beams because I think we now know what the guidance was and what it is now because things have moved on a bit, perhaps as a result of the experiences here.

Let's move on back to your witness statement and go to page 10. You make

the point, which, as a content point, is not an issue, that the guidance has changed. Do you know what the concerns were that drove the change in guidance?

A I believe it was due to the maintenance of the chilled beams, and I'm not sure exactly what the problem was with the maintenance, but that was my understanding. That was what mainly drove the move away from chilled beams.

Q While we were on some of these slightly technical points, in the next paragraph you deal with something called thermal wheels. Now, the Inquiry has heard these are essentially heat recovery devices----

A That's right, yes.

Q -- designed to make that part of your system as efficient as possible? Is that a reasonable layman's summary?

A Yes, they are. They recover heat from the-- As most other similar devices, they recover heat from the exhaust air and then put it back into the supply air system so you're actually not throwing the way.

Q And in paragraph 28, you say that the guidance permits the use of thermal wheels, and you say that they weren't used on critical care systems. Now, why not?

A I think there was consideration over-- Whilst the carryover between supply and extract, or extract and supply, is very, very small, there was concern that any slight carryover would be an issue in those areas.

Q Yes. So, again, just so we as laypeople are understanding what is no doubt very obvious to you, the "slight carryover" point means there was a slight risk that something which might cause an infection or the like might be carried over. It's not a big risk, but it's a slight one.

A It is a slight risk, yes, because you effectively trap the air in the wheel as it rotates, and while she should purge it out with, you know, a certain movement of the air, that's not always 100 per cent.

Q Yes. There's a mistype in my copy of the statement, actually, in paragraph 28, I think. "Their use was considered appropriate elsewhere provided there was a"-- I think that should be "a purge".

A Yes, that's right. It should be "a purge".

Q Not "a surge".

A Yes. I noticed that, yes.

Q Now, if you are not using this device in what you describe as critical care systems, would it be therefore appropriate to also exclude it from areas where people with compromised immune systems might be present?

A Possibly. I'm not sure whether-- I think we would have to take advice from that from the Board and their

advisors. But there is a slight-- If there is a slight chance of a carryover, that possibly could be a consideration.

Q I mean, I suppose the way it's been put elsewhere, in other hearings that we've had, is that some have said to us, "Well, if there's a slight risk, you wouldn't take that slight risk where you are trying to protect people whose immune system is weaker."

A Yeah.

Q Would that be a fair point?

A Yes, I think that's reasonable.

THE CHAIR: When we're talking about carryover, could you perhaps tease out what we're talking about?

A Yes. So the air passes through this corrugated metal wheel, and that wheel rotates, so effectively it heats the corrugated metal up as the air passes over, and then that moves into the other air stream, the incoming air stream, and that heat is then given up; but because of corrugations, there are slight air pockets which could trap the air as it rotates around from the extract into the supply, and the purge device should actually flush those corrugations out before it moves into the supply air system.

So you're relying on this process of just effectively moving the air out of that wheel and the corrugations before you actually move into the supply airstream. They should be very effective, but as with any dynamic device there's always a slight chance that a pocket of air could actually move between the extract and the supply.

THE CHAIR: Yes.

MR CONNAL: Now, let's move on a little. I'll just ask you one question in passing. I want to come back to the question of what you do and what you use to do what you do, if I can put that in broadest possible terms, when you're designing a system. At the foot of page 11, there's a small point raised about, "Well, what do you know about HEPA filters in Ward 2A?" Now, you say if they were a requirement, they would have been included in the design, and you left the project by the time of handover. When did your involvement cease?

A Probably round about mid-2014. That was the last time.

Q When you say "if the filters were a requirement", where would you get that requirement from?

A That would be from the Employer's Requirements and the Room Data Sheets.

THE CHAIR: When you're using the expression Employer's Requirements, do you have in mind volume 2.1, which is part of the invitation to participate in dialogue, or are you including other information?

A Essentially, I'm including that

volume 2.1.

THE CHAIR: So it's essentially-- When you're talking about Employer's Requirements, it's essentially volume 2.1.

A That's correct.

THE CHAIR: Right. Thank you.

MR CONNAL: You were asked, basically, from what you recollect, who were Currie & Brown and what were they doing. Do you recall interacting with that firm?

A We had very little direct interaction. We always worked through Multiplex, and they were-- if we had a meeting with them, then certainly Multiplex were present.

Q Thank you. I want to take you to what the Inquiry has called the ventilation derogation, so take nothing from that. It's just a convenient label that we have found broadly acceptable. I should say before I deal with the questions here, although you wouldn't necessarily be aware of it, it is a topic that the Inquiry has looked at at some length already, and at some length with a variety of witnesses-- If I move past a point that you think I'm missing, please just intervene and say, "We need to look at X or Y." That will be my fault.

Can I just ask you a general question? I mean, I'm jumping in a sense to the conclusion. What was being discussed was the use of different air change rates and chilled beams. What parts of the hospital, so far as you were concerned, was it intended that that arrangement should apply to?

A It would apply largely to the wards with the single bedrooms.

Q All wards?

A I saw something the other day, and I believe it applied to the Adult and Children's wards.

THE CHAIR: Sorry, you believe that----?

A I did see a witness the other day mention this. This topic came up, and I believe – and what we followed through was – this applied to the Adult and Children's wards, general wards.

THE CHAIR: General wards.

MR CONNAL: You've just qualified that answer right at the end by talking about general wards. Part of the challenge, as you'll appreciate, is that nothing is written down, which spells this out in simplistic terms. Does that mean there are wards that, so far as you were concerned, the proposed changes would not apply to?

A Yes, I'm assuming there would be. I can't remember now exactly which wards it wouldn't have applied to, but that would have been pointed out in the ERs – the Employer's Requirements – I'm guessing.

Q So, what would-- I mean,

you're an experienced person in healthcare ventilation design. What kind of areas would not be covered, you would anticipate, by that?

A Critical Care would be one, the whole of Critical Care. Accident and Emergency would be another, Emergency Department. Obviously the specialist areas such as operating theatres and anywhere else where there was a requirement that couldn't be met by the chilled beams.

Q Right.

THE CHAIR: Give me that again. Anywhere else where the----?

A Where you had definitive-- For instance, the intensive care area would be one, or you've got-- You don't want to rely on chilled beams in that area because of the cooling loads. Things like operating theatres wouldn't-- They would be a completely different type of system; imaging areas, and any other area that had a different requirement.

THE CHAIR: Now, I think you've explained that you were familiar with certainly the English Health Technical Memoranda.

A Yes.

THE CHAIR: Now, I think I'm right in saying that in the 2007 version of the English guidance, there is a table setting out various applications with various environmental parameters recommended in it.

A Yes.

THE CHAIR: Right. So, just to understand your answer in relation to what the agreed ventilation derogation would not apply to, would I be right in thinking that where applications had particular environmental requirements, you would assume that the general ventilation derogation did not apply to them?

A That's right, yes. It does only apply to wards.

THE CHAIR: Thank you.

MR CONNAL: You go on in paragraph-- We'll go now to page 13, in fairness to you, so you have what's been written in front of you. We go now to paragraph 43, and you say the design-- Now, that's the design that was being proposed that didn't follow the recommended air change rates given in the Scottish guidance. I don't think we need to look at that up, because we know it provides for six as a standard based on the discussion of use of chilled beams.

Then you say, "the introduction gives us its purpose, giving advice and guidance", but you accept, I think, that when the Employer's Requirements were prepared, a number of guidance documents were put in a kind of "look at these and take them into account" box and another into a mandatory box.

A That's right.

Q And SHTM 03-01 was in the mandatory box.

A That's correct.

Q So what you were doing here was proposing a departure from something that the GGC side had said was going to be mandatory.

A Yes, that's right.

Q Then you say, running onto 14, that the departure was discussed on the basis that rooms were generally single occupancy. I'm going to come back to that in a moment. Who was having these discussions that you mentioned there?

A I believe that was put in the original bid proposal, to use chilled beans with this reduced air change rate.

Q I'm looking now for your reference to, you know, the proposal being discussed, because we know there were exchanges. I'm just trying to get your understanding of who was discussing what.

A Yes. I can't record exactly the exact discussions that we had or who they were with. I just believe there was a process of discussion we went through, and I'm assuming that we had-- the Technical Advisor team had an input into that. Certainly, I believe that we spoke with Wallace Whittle between that period of that ventilation strategy paper being produced and being agreed. I'm certain we would have had that discussion. I believe we did, just to run over the points.

Q You make the point at the top of that page that "rooms were generally single occupancy." Now, can you help us understand why was that relevant when the guidance made it plain that single rooms were to have 6 air changes?

A We believed it helped to give separation between the various patients, so whilst not in isolation, there was a physical separation between them which would have helped. In terms of the air change rate being less, you wouldn't have to effectively purge the room as much. That was a-- It wasn't a consideration, but it was one of the factors that we pointed out.

Q But the mere fact that it's a single room isn't of itself a reason not to follow the guidance, is it?

A No. The reason we put forward the chilled beam system was partly to maintain the environmental temperatures in there, and also we had a sealed building situation with the-- if I recall, the helipad was a significant factor with the downdraft and noise from it. So that led us to a sealed building. There was a sewage works just opposite, which had an impact. So we opt for a sealed building and then chilled beams to actually maintain the temperature in the building. That's the direction we've been

given from Employer's Requirements. And that came together with the air volume needed to make those chilled beams work was the 40 litres per second, which obviously equated to a lower air change rate overall.

Q Yes, when you say needed to "make the chilled beams work," we've heard some evidence that the chilled beams can essentially only cope with certain volumes of air. You can't put 10 air changes through them?

A Yes, that's right. They can only take a-- to deliver the duty and operate correctly, they needed a maximum of 40 litres per second.

Q Yes, and the other point you make at the top of that page is about a slight negative pressure.

THE CHAIR: Right, that's page 14?

MR CONNAL: 14. It's the end of what is actually paragraph 43, my Lord-- of page 14 of the witness statement. I wonder if you can help us with this. We've also had some evidence from others with elements of expertise that the idea of maintaining a slight negative or indeed a slight positive pressure is actually very difficult to achieve in practice because of the natural movements of pressure within an operating hospital. Would you agree?

A I think possibly the term "negative"-- "slight negative pressure" is a way of describing essentially more extract than supply. I don't think you could-- you can't measure a slight negative pressure, so that is correct. It would be a term that effectively means-- drives us towards extracting more from the space than actually supplying, which actually gives you an inward air flow of air and that would be only a very, very small negative pressure. It may not even be measurable when it's a direction of air flow.

Q Was that an important part of what you were putting forward, having a negative pressure?

A It was-- I don't think it was an important part. It was maybe helpful. As soon as you open the door, obviously, you lose that completely. So, yes, and you waft air from the room, vice versa, into the adjacent space.

Q Yes, I think I picked you up saying-- I apologise if on occasion I'm repeating something you've said-- that you can't actually measure something that you described as a slight negative pressure?

A You might measure it, but you may not measure it; depends around the gaps around the doors. So, yes, you can't-- if you say you want a definitive negative pressure, then you have, obviously, to address it in a different way.

Q Now, you say in paragraph 45, "The design was accepted by the GGC

Project Team", and, you would say, you expect that they undertook their own review. Is it not right to say you, i.e. ZBP, you were driving this suggestion in these discussions, were you not?

A We were driving that, but we weren't the ultimate decision-makers on that process. We provided the information needed, or as requested, to allow the Board to actually come to a conclusion and acceptance.

Q You say you had no involvement in the process by which it was being considered. Is that right?

A That's right. We had no-- we provided the information to Currie & Brown/Wallace Whittle and then that was taken away. There may have been discussions between Multiplex and the Board; I don't know, I'm not aware of that.

THE CHAIR: Sorry, missed that again. You explained to Mr Connal that you put forward the proposal, providing the information as you put it, but you had no direct-- or, in fact, no discussion with anyone on the GGC side?

A We would have had a discussion with Wallace Whittle as our counterpart technical advisor on the ventilation strategy paper, but that's as far as that went. We didn't have----

THE CHAIR: Face-to-face discussion or what?

A No, I suspect that was a telephone conversation. I don't recall a face-to-face discussion.

THE CHAIR: Right. So you would expect to have-- It may not be a question you can answer: I mean, what would the discussion have been about?

A I suspect that it was probably taken through the relevant points of our ventilation strategy paper.

THE CHAIR: Sorry, say that again?

A We would have talked through the various points made in that paper.

THE CHAIR: All right. Thank you.

MR CONNAL: So, you say in paragraph 45 that you:

"…would expect that they [that's GGC] undertook their own review with various technical advisors, including clinical and IPC advisors…"

But you don't know?

A I don't know, no.

Q I asked that question because at one point there was a note in one of the versions of the log attributed to a Mr Bushfield. Now, I think Mr Bushfield is a bit dubious as to whether it was his comment at all, but attributed to a Mr Bushfield, I think, you would know would be from Wallace Whittle.

A I believe that's right.

Q Which in response to your proposal basically says, "No, and this would need IPC sign-off." Now, did you ever see any evidence that there was a

sign-off by the Board's IPC team?

A No, I don't think we saw any evidence as ZBP.

Q Well, let's have a quick look at this famous log, if we can, which is in bundle 17, page 824. Now, I just wanted to ask you about-- I mean, the content we've seen many times now. I've asked you about the relevance of single bedrooms. That appears in the middle of that narrative there. Then at the foot of the narrative, which you can take it from me is where the narrative stops, because then the log moves on to other things, it says, "Providing 6 air changes is energy intensive and not necessary." Now, that must be a comment that has originated with ZBP, I assume?

A I can't recall, actually. I'm guessing that, yes, we would have actually mentioned the energy intensity. I think in the ventilation strategy paper, we actually suggested there would be a significant carbon saving with the proposal we made, which came back to the energy target that we had to meet.

Q I suppose that the point I need to put to you, since we've got you here, is that rightly or wrongly, the guidance then in place, both in Scotland and in England, for that matter, provided for 6 air changes an hour, and you're dismissing it as "not necessary"?

A I think the "not necessary"-- I mentioned it in my notes-- I think the "not necessary", possibly not worded very well, but I believe that was not necessary to achieve the environmental conditions in the space, yes, predominantly. I think that's what that probably meant.

THE CHAIR: Sorry, can I have that from you again? The "not necessary" may or may not be the perfect wording, but the meaning that you would attribute to that?

A I believe that was related to maintaining environmental control of the space, temperature control of the space, because the chilled beam could do it on the 40 litres per second. So I think that's what that was probably referring to.

THE CHAIR: So "not necessary for"----

A "Temperature control."

THE CHAIR: -- "temperature control."

A I think that's what it should have said.

MR CONNAL: Yes, well, let's leave that document and go to the document you just referred us to, which is the ventilation design strategy, which is in bundle 16 at 1657. I suppose the first thing I have to ask you about this, it looks like a relatively short report from an expert, or something of that kind, was produced, or at least produced to other parties around 15 December, which we

know was something like three days before the contract was actually signed. Was there a particular driver to get something in writing? Or what was the reason why this was being produced at that, on the face of it, very late stage?

A I can't recall exactly why we produced this note, but having looked at-- I think you referred earlier to the clarification log which wasn't accepted. And maybe this was a-- somebody's asked us to actually produce a document to actually fill in the gaps with our proposal and to help others to come to a conclusion.

Q You'll understand by now this has been looked at by any number of individuals, and it narrates the 6 air changes an hour. But the driving factor, if I read it correctly, is this 26 degrees not being achieved in-- near the foot of the first page of the document, second paragraph under the heading "Mechanical ventilation."

A That's right. That came from the earlier modelling that we did.

Q Yes. Then, in fairness to you, you mentioned saving of carbon, and that appears on the next page of the document. If we just go on there, the saving is just above the heading "Conclusion." So you save about 9 kilograms per square metre. Then you go on to discuss "natural ventilation,"

although natural ventilation has essentially been excluded by then, hasn't it?

A That's right, yes.

Q Yes. Now, the guidance-- and we've debated this elsewhere, suggests that the purpose of having recommended air change rates covers a number of topics, including comfort and also dilution of anything that's needed diluted. Is that fair?

A That's-- Yes, correct.

Q So it would be wrong would it to treat the air change rates as only dealing with comfort?

A I think the dilution is referred to in the DSHT and more for more specialised areas. Because if you allow natural ventilation, it's a very variable air change rate. Just relying on windows depends on wind pressure and how much the windows are open.

Q At the foot of that paper, you then refer to two sources of guidance: (1) Scottish Building Regulations and (2) CIBSE codes. Now, I think you have covered this, I think, in your witness statement, and I'll pick it up, I think, in paragraph 55 as we go on, but it's fair to say neither of these are specific to healthcare?

A Not specific, but they are a requirement to be met. The CIBSE guidance is guidance; the Building

Regulations is obviously a regulation you need to comply with.

Q Yes. Well, just let's go back to your witness statement just to make sure I'm understanding what you say. Page 16, at paragraph 55, you say, "Building Regulations and CIBSE codes generally offer minimum standards." The codes give guidance across a whole range of buildings. So these are kind of irreducible minimums rather than something that might be described as a better proposal?

A They are minimums to meet the requirement for fresh air.

Q Yes.

A And (inaudible 10:54:25).

Q So would they be a reason to go with the proposal that you had put forward?

A Not necessarily a reason, but they are supporting information.

THE CHAIR: Could I ask you about the second paragraph under "Conclusion"? I don't know if you have the ventilation design strategy on your screen. Now, the recommended air change rate of 6 air changes now in the SHTM is----

MR CONNAL: Previous page. We need the first page of the ventilation strategy, please.

THE CHAIR: Ah, thank you. No, the second----

MR CONNAL: Are you under the heading of "Mechanical Ventilation"?

THE CHAIR: My fault. The second paragraph under conclusion:

"The recommended air change rate ... is considered to relate to the ability to achieve an acceptable internal environment, i.e. 50 hours exceedence above 28℃."

Where does that information come from? Where does that explanation come from?

A I can't recall, actually. Certainly the 50℃ and 28-- sorry, 50 hours and 28℃----

THE CHAIR: Again, can I ask you to keep your voice up?

A Yeah, sorry. The 50 hours and 28℃-- it's certainly mentioned in the SHTM. I believe that was probably related back to the statement in the SHTM about maintaining comfort conditions for the patients.

THE CHAIR: So the answer to my question is that if I was to go to SHTM 03-01, I would find the 6 air changes an hour explained solely in terms of an air change rate which would avoid a maximum of 20 – or, rather, would keep the temperature within the space to less than 28 degrees centigrade on 50 hours in any year. I mean, I would find that explained?

A No, you-- I don't think you would actually.

THE CHAIR: No?

A I think that's possibly-- I'm trying to think, because the 6 air changes generates a certain amount of air. If it's naturally ventilated and you're bringing outside air in through windows or you're assisting that purpose-- but it depends where you are in-- in the UK and the type of building. So, this-- the actual 28℃ will be a factor of the way the building is designed to provide solar control of the building, the way the ventilation openings – if it's naturally ventilated – are designed to achieve that 6 air changes. So, possibly that is not the right way of explaining that statement. I don't think you would find-- You wouldn't find that statement in the SHTM, I believe.

THE CHAIR: Right. Do you have any understanding as to whether the air-- I appreciate we're talking about the air change rate in general wards. Do you have any understanding of a possible relationship between air change rate and infection control?

A No, I don't think there is any-- I don't think there's anything in the SHTM about air change versus infection control.

THE CHAIR: But you are aware, from your familiarity with the HTMs, that in certain areas of the hospital – and you give the example of critical care – higher air change rates than six are recommended?

A Yes, and that's partly-- For instance, if we take the intensive care areas, there's a lot of equipment in the intensive care area, typically two kilowatts of equipment per bed. So, the actual-- the air change rate is automatically driven by the need to provide more air to actually drive the cooling effect.

THE CHAIR: Right. Well, what I'm taking from this – and if I'm wrong, correct me – is that, from your perspective, air change rates are solely connected to temperature control?

A They are partly connected to temperature control; they're also partly connected to air movement. So, in an operating theatre the air change rate, obviously, is a high-- You've got open wounds in an operating theatre, so you obviously cannot get the air very-- moving a lot, but also you're trying to cascade the air from the operating room to the corridor. So, the air change rate is partly needed to actually drive that air movement. So that-- Temperature control is a big one, but there's also the need to actually drive the direction of airflow.

THE CHAIR: Again, if I'm wrong, correct me. At least in the example of theatres----

A Mm.

THE CHAIR: Your answer would seem to indicate to me that you had an understanding that it had to do with the direction of flow of the air and, therefore, the carrying away of potentially infective material from, for example, medical staff.

A Yes, it's to-- to keep the-- the wound site clear of-- of any contamination from the operating staff.

THE CHAIR: So, I've got that right, have I?

A That's right, yes. Yes.

THE CHAIR: Thank you.

A And dilution of anaesthetic gases – that's the other one, of course.

MR CONNAL: If we leave your paper for the moment and go back to your witness statement, I want to ask you a couple of things. Can you help us at all as to what discussions you, i.e. ZBP, had with anyone representing the Board about this proposed strategy?

A I believe we would have only discussed this with Wallace Whittle as the technical advisor/M&E engineer for the-- acting on behalf of the Board.

Q Can you help us at all – I think his Lordship may already have asked you this – as to what the content of those discussions with Wallace Whittle was? You know, who was saying what were the issues?

A Well, I think we would have-- We were probably asked to produce that paper to help the-- the process of actually getting sign-off. And we would have talked through the-- the content of that paper with Wallace Whittle or others to explain why we'd written what we'd written----

Q If that's right----

A -- and to answer any questions that they may have had at the time.

Q Apologies for interrupting you. If that's right, that would have been on or after 15 December when it was put into circulation.

A It would have been around about that time, yes.

Q On the face of it, it doesn't give a great deal of time for analysis, debate, checking, reports, or anything like that, before the contract is signed, does it?

A No, I don't know where they'd got to with their own conclusions in terms of did this just help-- this paper help to just complete their-- their view of the-- the proposal.

THE CHAIR: Mr Pardy, you may have been asked this already, in which case I apologise. We think the paper was shared with Wallace Whittle on or about 15 December. Had you put forward your proposal earlier than that? Initially?

A Yes. Yes, our initial proposal I believe was in the bid documents, in terms of how we intended to deal with the-- the wards.

MR CONNAL: The initial response, as is recorded in the log and as is recorded in Mr Bushfield's – I'm calling it Mr Bushfield's – comment, was rejection of your proposal.

A Yes, I saw that. Yes. Yes.

Q When did the change come from rejection to acceptance?

A I'm assuming it was-- The final clarification log was-- That-- that concluded that round of discussions and decision making.

Q But in fact, the paper that we've been looking at, it's not just that it was put into circulation-- It's actually dated 15 December in 2009. Is that correct?

A If that's right. I couldn't see a date on it myself.

Q You can take it from me, it's dated the 15th.

A That's fine.

Q In terms of the questions his Lordship was asking you about, "What's this guidance for?" you've obviously been asked that in the course of your questionnaire, and your reply is set out in paragraph 50 of your witness statement. You say it's driven by clause 4.1 (sic), which is one of the introductory paragraphs. You say ventilation is for comfort and, then, specialist ventilation is also provided in some areas. Then you say:

"Ventilation is also noted as controlling air movement to contain, control and reduce hazards from airborne contaminants, dust and harmful micro-organisms."

So you would accept that the guidance mentions these purposes for----

A Yes. That's correct. Yes, it does mention that.

Q Now, in fairness to you, you had an issue about the whether the phrase "not necessary" was well framed, and you deal with that at the top of page 16 on your witness statement, what is part of paragraph 51, so I don't need to ask you about that again. And then you accept it's a derogation. Would I be right in understanding that in these exchanges, you understood that GGC were relying on Wallace Whittle. They weren't relying on you, particularly.

A No, they were relying on their technical adviser team.

Q Well, just so we're clear, apart from Wallace Whittle, were you aware that anyone else with knowledge of these matters involved in the discussions?

A No, I don't think I-- I'm aware of that. I've assumed that that would have been taken to whoever has needed to contribute to this decision.

Q In paragraph 53, you touch on the point that you've made already, that you weren't part of the discussion

process, so you don't know what discussions there were.

In 54, I think we come back to Wallace Whittle as your point of contact for discussion, and you say you remember the strategy was discussed with the reasoning behind the proposal, which you think may have been once the paper was produced. Is that correct?

A Mm-hmm. That's right.

Q Then the point about minimum standards we've already seen, and you don't know whether any risk assessment was done. That's not something that you were involved in.

A No, we weren't involved in that.

Q Well, let me move on to another topic, if I may, unless my Lord has any further questions on the derogation. I'd just like to go to a topic that you don't directly deal with – perhaps indirectly but not directly – in your witness statement, which is the process which goes on to enable you to produce a ventilation design for a healthcare facility, and ultimately for it to end up, as we were hearing from other witnesses, in something called "construction drawings."

What we were hearing from other witnesses-- Once you've got the construction drawing, you don't go back and work out the whys and wherefores of the discussion that preceded it. You just go on and build it----

A Yes.

Q -- and you check whether you're building what's on the drawing. So, I'm looking to the point before we get to something called "construction drawings". I'm going to ask you, as you'd expect, about some specific areas but, just taking it generally, in a project of this kind, what information do you have access to that allows you to design a ventilation system?

A We would look at the-- the layout of the space and, starting off, we would-- we would-- It would go through a series of steps, generally following the RIBA stages – that's the Royal Institute of British Architects – and they set down a certain level of information to be delivered at a certain time. The-- the team are interested in how much space the ventilation systems will take up: that's the ceiling voids, the riser space and the plant space.

So, in the very early days we have to make some general assumptions. On the 1:500 plans, for instance, we would just get a feel for-- for the areas and just make some initial assessments and, as we move into the next stage, we would then – the 1:200 stage – we would start to see the shape of the departments become available, and then we would apply the requirements to individual

rooms.

And, then, as the 1:50 process moves in after that process, we then start locating the various elements and doing the final-- final calculations. Effectively, it's a fine-tuning process you go through. Ultimately, we rely-- we rely on the Employer's Requirements as guidance, and the Room Data Sheets will come into effect at some point, or the ADB sheets. So----

Q Well, let me just ask you to pause your answer there, just so his Lordship can get each of these elements.

THE CHAIR: I'm very interested in understanding this, Mr Pardy, so if you could, as I say, take it quite slowly. Things may seem self-evident to you which are not necessarily self-evident to me.

MR CONNAL: You look at the Employer's Requirements. Is that one of the things that you said?

A Yes, you would look at the Employer's Requirements. That would be one of the key briefing documents, and then you would look at the Room Data Sheets. You'd look at the guidance, the SHTMs, and then you would do the assessment of how the building is performing in terms of its massing, its shading, solar control, etc. That's not necessarily done at the beginning-- all done at the beginning because you have

to-- as you develop the whole building, it's an interactive process that you are actually effectively refining the design from an early concept through to ultimately construction drawings that our design would have finished and been handed over to Mercury, as the subcontractors, to actually develop into the installation drawings.

So, I think our drawings were coordinated in respect to actually fitting in the space, but they wouldn't necessarily have shown the exact routes that we did. That was our arrangement.

MR CONNAL: How do the Room Data Sheets fit into this process?

A So the Room Data Sheets will recall the requirements for that room, the temperature, the air change rate, the pressure, any filtration rates, that's all the standard fields.

THE CHAIR: Again, can I just take that-- The Room Data Sheets will record the requirements for that room, temperature----?

A Temperature, ventilation, pressure----

THE CHAIR: When you say "ventilation", what do you mean?

A A ventilation rate.

THE CHAIR: Right, so that's the air change rate?

A That's the air change rate, yes, or however we would have actually

described that at the time. I think we use the 40 litres per second in many of the rooms rather than air change rate. Humidity, filtration requirements, relative pressures between spaces. Then it goes on to lighting, water temperatures, etc, etc, and then you get the architectural elements.

MR CONNAL: Who prepares the Room Data Sheets? Do you have a role in that?

A I couldn't remember us preparing. I think we started off with this pack of ADB sheets, which would generate-- I think they were part of the ERs, which are basically pulled from the NHS database, and I saw some conversation last week on the Environmental Matrix, which I couldn't remember us providing, but we clearly did because it was, you know, mentioned about the codebook system, which I'm familiar with.

I can't remember us actually doing that exercise, but we obviously did where we actually inputted-- So the codebook system allows you to export the rooms and the various fields that we have to fill in, and we would have had that export from Nightingales, filled in the various elements of the rooms, fields, and then fed that back to Nightingales, which then formed the completed Room Data Sheet. So we would've filled in all those fields, generally using the ADB sheet as the starting point unless we varied it; obviously the 40 litres per second was a variance to the-- whatever's in the ADB sheet.

Q The 40 litres per second had been suggested to be essentially a lift from the phrase-- its use in the ventilation log. Would that be correct?

A Sorry, I didn't understand----

Q Sorry, my apologies. The 40 litres per second was used in discussions at the time of the ventilation derogation.

A That's right, yes.

Q Am I right in thinking that the Room Data Sheets did not contain air changes per hour figures but, if they contained anything, it would be a reference to 40 litres per second?

A That's right, yes, yes.

Q That's because, is it, that that was the figure that was discussed at the time of the derogation?

A Correct, yes. We'd use that as, effectively, a fixed figure.

Q How do the Room Data Sheets relate to the Employer's Requirements?

A They should reflect the Employer's Requirements.

Q Whose job is it to make sure they do?

A That would be the Board's.

Q The Board's?

A Well, we would actually fill

them in with what we understood to be the agreed requirements, criteria, and then they would be passed to the Board for sign-off.

THE CHAIR: Again, bear with me. The production of Room Data Sheets is a contractor's responsibility. Is that right?

A I believe, in this case, it was.

THE CHAIR: Right, and Nightingales would have a responsibility. Did you-- I mean, you've mentioned examples of information which would appear, as I understand it, on what we've been referring to as page 4 of our Room Data Sheet: the temperature, air change rates, humidity, filtration. Now, is it you, is it ZPN, that is putting that information onto every Room Data Sheet?

A That's correct. We would do that, yes.

THE CHAIR: Right. So this is-- and you're drawing that information from the Employer's Requirements, which is the volume 2/1----

A Mm-hmm, yes.

THE CHAIR: -- the relevant guidance documents anywhere else.

A And the agreed contract position/. For instance, the move away from the 6 air changes, that would have been then reflected in the Room Data Sheets.

THE CHAIR: Bearing in mind the ventilation derogation.

A Yes, that's right, we would have brought that in.

THE CHAIR: This process is going on post-contract?

A Yes, that's right. I can't remember exactly when it went on exactly, but it would have been over a period of time. So, in the early-- we would still be-- In our early design phase, the Room Data Sheets wouldn't have been available but we'd have been working to what we knew was going to go in them at that time, and then the Room Data Sheets-- I don't know how, I can't remember how long that took to actually do that process, but it was probably over several months of-- it was a lot of information to fill in.

In terms of the team, some of the team would have filled in the temperature and the ventilation, being the mechanical engineers. They would have been passed to electrical engineers to put in lighting details, and then there would be the public health engineers, which would do any other elements such as water temperatures.

That would then have been sent back to Nightingales in an Excel spreadsheet form as the export, and then they would have imported it into the codebook system to actually form what you would actually see as an output.

THE CHAIR: Right. So then step

back to the Excel spreadsheet. The mechanism in which the mechanical and electrical engineers pass information to Nightingales, as an architect who are responsible for actually drafting or completing the Room Data Sheet, is by filling in an Excel spreadsheet? You said you couldn't remember having produced an Environmental Matrix, but you assume that you did?

A I believe we would have done that. I haven't seen-- I couldn't recall it when I did my witness statement because I think I said I didn't know who produced it, but, having seen the-- last week's witness----

THE CHAIR: Right. When you talk about the Excel spreadsheet, that is the same thing as we're talking about when we talk about an Environmental Matrix?

A I think that's what we probably called it, yes. Yes.

THE CHAIR: So----

A I think that's what we probably called it, the Environmental Matrix, because it presented all the environmental information in one place.

THE CHAIR: As I say, I'm quite interested in making sure that I understand the steps in concrete form, as it were. Mr Connal?

MR CONNAL: The information on ventilation that you are – let me just use those words - inserting at the moment. Did I get you correctly to say that that should be what the Employer's Requirements specify, subject, of course, to the derogation change?

A Yes, I believe that that's right.

Q Should it also comply with guidance? I think that was another source you mentioned.

A It should do, yes.

Q Can I ask you, then-- Let me put this as a general question. Clinical output specifications. First of all, are you familiar with that topic?

A Yes, yes.

Q The architect, Emma White, told us – and I'll be interested in your view – that, because these are, you know, led by teams, the makeup of which may vary from place to place and ward to ward, the nature of what somebody thinks is a clinical output specification may also vary. Some will be more detailed on technical matters, some much less so, more detailed on activities, some less so. Is that your experience?

A I think that I haven't got as much experience as Emma would have had in clinical output specification. There's a lot of it to do with the actual spatial planning. But, yes, because they're written by different departments, I don't think there's a standard format that you actually follow, so it's generally more of a report in terms of how they want to

see things or how they use the space.

Q As a designer of ventilation for the healthcare area, how do you go about coping with the fact that some are more detailed on technical matters, some are not? What do you do to try and work out what the correct ventilation solution is for the area covered by the clinical output specification?

A Sometimes, it's how-- we have to read between the lines as such. It's not absolutely clear. We have to put down what we believe is right and then feed that back to the relevant department for confirmation. That's actually how interpretation is right, because often it's down to interpretation of what we believe is right with the-- you know, with the information we have in front of us.

Q In this contract, as we understand it at least, the clinical output specifications became part of the Employer's Requirements. Do you remember that?

A I believe they were, yes.

Q Can you recall, and we'll turn to some specifics shortly, but can you recall having to do this sort of loop back to the drafters of the clinical output specification in this project?

A I can't recall that. We would have fed back the design process that we'd been through with our solutions to the Board and then I assumed that they would have then taken it to the various departments. We wouldn't have had direct contact with those departments unless there was a specific reason.

Q Okay. Well, let me see if you can help me with the process, then, because we've heard that, as design was starting after the contract had been signed, there were things called User Group meetings taking place. Were you aware of that?

A I was, yes.

Q The User Group meetings, as we've been told-- and please feel free to correct anything that I put to you, as we've been told, the one topic they were not talking about was ventilation.

A I suspect that was correct. The User Group meetings normally concentrate on room relationships, room sizes and, ultimately, the actual room layout.

Q Yes. The room adjacencies, room sizes, room layouts. We've heard about where the furniture should go essentially, what kit was needed in a particular room. Topics like that, would that----

A Yes, yes. That's right.

Q -- match your recollection?

A Invariably, those User Group meetings concentrate on that.

Q The information we have – and again, open to correction by you – is that,

not only were they not discussing ventilation, but they were never looking at documents which had air change rates per hour written on them anywhere. Would that be correct?

A At the User Group meetings, possibly not. Somebody else will have looked at those.

Q The reason I ask is that, for instance, it's been suggested if an experienced person came along to a UGM to discuss, you know, bed layout or something but happened to see, "2½ air changes," written in big print at the top of a document, they might go, "I'm not here to discuss this. What's that about?" But our information is that they didn't have that sort of incidental information and didn't discuss ventilation.

A The Room Data Sheets may not have been available at the time of the User Group meetings. That may have been a parallel process.

Q Let's come to the parallel process because I'm keen to understand that. By the time design was continuing, detailed design of rooms, in that parallel process, can you recall who was participating wearing a GGC hat?

A In the User Group meetings or---

Q Not in the User Group meetings because they contain a large number of people.

A Oh, I see what you mean. Yes.

Q Yes. The suggestion is there was some other thing going on, and we've had some names who recollect being given things to sign and so on and so forth, but I wondered what your take was on who was participating in parallel discussions that might deal with ventilation.

A I can't recall anyone specifically who was involved in that process.

Q The evidence that we've been given by people like Mr Hall of Currie & Brown is that-- it's twofold. (1) There was nobody involved from the Board who was a ventilation engineer in these detailed discussions. Now, does that accord with your recollection?

A I can't remember who was involved with that process. I would expect someone with knowledge would have actually seen those documents.

Q Well, what Mr Hall says is that if anything was signed off-- because we can understand if you're deciding where the beds are going in the User Group meetings someone needs to write down that we're all agreed about that. That's fine but if anything was signed off – might have touched on ventilation – all GGC were doing was reviewing what he described as "clinical functionality", which

is a term which is defined in the contract, and covers adjacencies and lots of these other topics. Now, does that accord with your recollection?

A Again, I can't recall that process. I would be surprised if somebody wasn't looking at the technical side of it.

Q Because we're trying to understand – not only are we going back a long time but also as outsiders to the process – how this was working. The User Group meetings, you know, we can follow. Someone comes along and says, "I don't want that room here. I want it somewhere else. The treatment room needs to be next door. We need medical gases supplied to this room" and so on. Fine. But when we're getting into ventilation-- I mean, let's be quite clear about it. Mr Hall's position is that there was only one party responsible for the design of the ventilation system, and that was ZBP.

A In that respect, that's correct. We were responsible for designing the ventilation system, but we were not responsible for signing it off. It would have been signed off as part of a pack of information that we submitted, as this is our proposals, and that would have been reviewed by someone.

Q Can you help us at all about----

THE CHAIR: Sorry, can I just see

I've got that answer?

MR CONNAL: Sorry. (To the witness) Go back to your previous answer. Ignore me.

THE CHAIR: Sorry, I may be interrupting this very question. It was the reference to "signed off" that I had lost contact with. It may be better, Mr Connal, if you pursue that.

MR CONNAL: I'm trying to get to the answer here. As I may have indicated to various witnesses, Mr Pardy, we're trying to work out where things may or may not have worked terribly well possibly and what it might be possible to suggest could be done to improve them.

Now, let me go back and sort of reapproach this. User group meetings, we follow that. "Sign off" means we agree where the bed goes. Fine. The parallel discussion-- because ventilation is not discussed at the User Group meetings. I think you accepted, first of all, that you were responsible for the design; "you" being ZBP.

A That's correct, yes.

Q Now, Mr Hall's position is that he repeatedly told people, including ZBP and anyone from Multiplex who would listen, that all the Board were ever doing in these discussions was signing off either to show that they'd gone through a process or for clinical functionality. What they were not doing was taking your

design and-- subject to get to some checking or analysis or whatever to say, "Yes, our experts say this is the right thing to do ventilation-wise".

So, I'm keen to understand what your position is. You said that you were responsible for design, but it had to be signed off. Can you explain to his Lordship what you understood was happening when you referred to it being "signed off"?

A So, we would have expected that the-- the initial design effectively reflect-- what we're looking for through the process is that we've got it right, and therefore we are relying on the information that is given to us at the beginning, Employer's Requirements, and interpret that into a design but, ultimately, it's an interpretation. We need confidence that we've actually got it right, and therefore there has to be a process of sign-off, approval, various ways of describing that.

But somebody on the Board's side must say that, "Yeah, this is exactly what we want, and this will deliver the service that we need." I can't remember who that person was, or who that party was. I would be surprised that there was nobody in place because it's such a fundamental part of the building. The services must work.

Q Well, we've identified a number of people whose signatures appeared. One of them was Mr Hall, who's a project manager, not a ventilation engineer, as he told us more than once. He wouldn't, of his own knowledge, be the kind of person you would expect to agree that your proposal is the right thing for a particular area, would he?

A Yeah, that's right. He wouldn't be qualified, I believe, to-- he might know-- may need some of it but, ultimately, he wouldn't have the knowledge to be able to do that.

Q What about other members of the GGC Project team, Mr Moir or someone like that?

A I can't recall Mr Moir and what his expertise was but there will be someone with the necessary experience and knowledge to go through that whole building and say, "Yes, we agree that is exactly what we need. It reflects what our current methods of working are."

THE CHAIR: Mr Connal, this here is quite an important asset. (To the witness) I wonder if I could just ask you to give me what you've said in the last two minutes at dictation speed, with apologies for intervening, Mr Connal. This passage began with Mr Connal's question that you had said the design had to be signed off, and you gave an answer which I heard but rather faster than I could note.

A Right.

THE CHAIR: So, could I just ask you to give it to me a little more slowly.

A Yeah. So, we-- and hopefully I'll put it in the same-- exactly the same way I mentioned before. But, yes, so we would have expected the whole proposals to be agreed and signed off by the Board so that we knew, with confidence, that we were moving into the next stage of design with the right systems, the right criteria in place and, you know, we'd met the brief.

THE CHAIR: I think, when you first answered the question, what you considered your design initially to be was your interpretation of what the Board required by way of its----

A That's right.

THE CHAIR: -- Employer's Requirements. However, I'm hearing a degree of diffidence, as it were. You're looking for a check that your interpretation meets the Board's----

A That's-- Yes, what they've asked for-- because the Employer's Requirements were – I recall – relatively high level, we would have then taken what we knew from, you know-- there may be some mentions in the User Group meeting about certain things which we'd have picked up on. We'd have looked at the guidance that we were directed to. We'd have had the contract agreements in place, and then combine that into a pack of information probably in the form of drawings, schematics, schematic drawings representing the components of the system.

There may have been some technical specifications at that time, and then there would be-- the Room Data Sheets would be the final element to effectively play back to the Board, "This is what we understand you need to deliver the hospital service that you are asking for".

THE CHAIR: Now, when you first gave your answer, as part of my very inadequate note, I think you said, "This was our interpretation, therefore there has to be…"-- and I'm I think I'm quoting you back. "… there has to be someone on the Board's side who said that"-- my note gives up at that point, but I think you said that your interpretation was correct.

A That's right, yeah. So, our interpretation of the requirements is correct, and that we can move on to the next stage. What you don't want to do is get to the end to find out we've interpreted something wrong.

Q Thank you. Sorry, Mr Connal.

MR CONNAL: Well, if I can just try and finish this passage, if I may. If I go back, and I just keep using the User Group meetings as a convenient sort of touchstone. We know there were a number of iterations of User Group

meetings, but the idea was everybody came together, worked out what they thought the answer was, and agreed it, whether in one meeting or two.

I don't get the impression – I'd like to be clear from you – that in any discussions that you had with anyone wearing a Board hat over ventilation at this time-- you were talking to anyone of a kind of specialist qualification nature.

So, you might have been talking to Mr Hall or Frances Wrath or whoever. Is that correct? Because one can see, if you're in a User Group meeting and you're talking to a nurse from the area you're talking about, you know that that person knows where the bed should go.

I'm sorry, I'm not intending to be pejorative about that as an example but if you're talking about ventilation, and you're saying, "Here we are. Here's some stuff about ventilation for these rooms", you say that that was your interpretation of what you thought the Board wanted you to produce.

What are you, as ZBP, saying to the recipient of that information, first of all? I mean, are you saying, "We need you guys to go and confirm this is what you want"? Because we haven't found anything that says that anywhere.

A I think as-- the User Group meetings, we don't contribute a huge amount to because we're there to listen and take notes. We may ask various questions when we're not clear about what they need, and it may have been ventilation. I don't know. There's-- various members of the team went to the User Group meetings. We split them up amongst us.

So, we would have asked those questions where relevant. Often, we would have gauged that-- the people in the User Group meeting probably couldn't answer those questions, and I can't remember how we actually forwarded those questions to the Board, but we would have come back with a pack of information and presented back at some point during that process for agreement.

Q Who did you present back to?

A I can't recall who that would have been. We would have done some-- whether we actually physically presented or we actually put a bundle of information together that went back through Multiplex to the Board, it would have been a process, I'm guessing.

THE CHAIR: I didn't catch that last answer.

A Yeah, a pack of information may-- a series of drawings, documents, would have gone back Multiplex and then that would have been forwarded to the Board for review and agreement, and there may have been some questions coming out of that, or we may have met

on specific topics. I can't recall exactly at that time.

MR CONNAL: Again, do you recall meeting ventilation engineers sitting on the other side of the table to discuss these issues?

A No, I don't recall that. It may have not been me personally. It may be one of the other members of the team that did that.

Q But if somebody was to come back to you say, "Well, we've carried out our own analysis on the ventilation system for room X, which is for purpose Y, and we have assessed this as correct," would that not require the kind of skills that, in effect, you were bringing to the table, the skills of a ventilation engineer, a specialist ventilation engineer?

A Sorry, could you just repeat that? In terms of the actual----

Q Yes, (inaudible 11:40:57)----

A -- who would actually come back----

Q Well, it's a badly-framed question. Let me try it again. Assuming you were not in this process – and, as you said, it might have been in writing rather than at meetings – let's assume there was a meeting and you were sitting with a project manager or a member of the Project team, you say you were expecting someone to go away and come back and tell you whether you've got it

right, your interpretation is correct----

A Mm-hmm.

Q -- you've correctly reflected the Board requirements. If it wasn't happening in that meeting, would that not need to go somewhere else to someone with ventilation design skills?

A Yes, it-- we'd expect somebody of-- fully knowledgeable in what we were proposing to actually review what our proposals were and agree that they were right or disagree that they were wrong and come up with a commentary on those proposals, which we would then take on board and then we would resubmit that for final sign-off. Effectively, we need that sign-off before we can move on.

Q Do you know where you were expecting the Board to get that advice from?

A I would-- I'm not sure exactly, but I would expect them-- that they would go to their technical people, whether that's the estates team or the people who run the individual departments, who are knowledgeable in that process.

Q Do you recall or do you not being told by Mr Hall that when the Board signed off, it only did for clinical functionality?

A I don't recall that, no, no. It may have been said when I wasn't present. It could have been said direct to

Multiplex. We weren't involved in that process.

Q I think this might be an appropriate point to pause, my Lord.

THE CHAIR: Right. We usually take a coffee break at about half past eleven, so could I ask you to be back for twelve o'clock? (After a pause) Right then.

(Short break)

THE CHAIR: Mr Connal.

MR CONNAL: Thank you, my Lord. Mr Pardy, I'm keen that I get the best understanding that the Inquiry can of your evidence about the process for approval, as you have it, of design, so if you don't mind, I'm going to come back to that, and if I go over ground again, apologies. Your position is that you don't remember being told that if the Board signed anything off, it was only for clinical functionality. You don't recall that?

A No, I don't recall that.

Q I'll come to the process itself in a second. What was, so far as you recall, the output of that process? In other words, how did you know that, from your account, somebody had been through your interpretation, assessed it, analysed it, taken advice on it and come back and said, "Yes, that's correct"?

A I can't recall actually what the actual outcome was, but I expected to receive a series of comments against the various pieces of documentation, whether that be drawings, specifications, and then we would have acted on those and then got final agreement before moving on to the next stage of design. I can't remember the exact-- that happening.

THE CHAIR: So you'd expect a response.

A Yes.

THE CHAIR: Probably noted on drawings.

A There may be a combination of written commentary or marked up drawings. Often you get marked up drawings as one way of conveying the response.

THE CHAIR: Do you recollect seeing such responses?

A No, I can't remember seeing that, but that doesn't say we didn't have it. I just can't remember.

THE CHAIR: Sorry, Mr Connal.

MR CONNAL: So this parallel process, parallel to the User Group meetings, did I pick up from one of your earlier answers that you now can't remember whether it was done in meetings or possibly in writing via Multiplex or some other route?

A I can't remember that, but that's only-- There may have been meetings to discuss the proposals, or

there would have almost certainly have been written information, documentation, drawings to form that pack.

Q You understand the issue I've got here, Mr Pardy, is that I'm trying to-- This is quite important potentially. You interpret the Employer's Requirements in a particular way and you expect, you say, somebody to check that and tell you whether that's agreed.

A Yes. We would have expected that, and Multiplex would have certainly required that, because it then forms a way to go forward, because if you haven't got it right at that stage, it can lead to all sorts of complications at a later date.

Q Indeed, so-- In fact, one of the Multiplex witnesses suggested that in light of what had transpired in this hospital, it would be quite good, before anybody started pouring concrete, to have a sort of look back to say, "Pause, this is what we've got for this bit; are we all agreed about that?" and so on, but that's not what was happening.

A Right.

Q So if-- Let me just think of it a little more conceptually. If you are the designer, so the design responsibility is-- Well, it's Multiplex's, but we're not going into the distinction between Multiplex and the subcontractors for the purpose of this. If somebody else does the work and comes back and says, "No, we don't agree with you; we need A, B and C," does that not make them the designers and them responsible?

A No. Ultimately, they are passing comment. They-- You know, as engineers, we debate things between us. That happens if we don't understand or we have a different point of view. We talk that through and we come to a conclusion at the end, and that is the agreed position, whether, you know-- And it may-- There's sometimes a compromise; sometimes it's a case of, "Well, we didn't realise that is the situation; we'll take that on board," or the other party may say, "Well, actually that's not a bad point; we think that could work." But ultimately the design responsibility sits with us and Multiplex.

Q I mean, I appreciate now it's a long time ago, but do you recollect any such discussions, debates, friendly discussions over who was right about what or why actually happening?

A No, I can't actually recall that at all. I did see one of the witnesses the other day suggesting there was some discussion in August of 2010, but I can't recall those conversations. It wouldn't surprise me if that happened. It would be normal practice to have some sort of discussion around the proposals.

Q Yes. I think there is a suggestion that some form of workshop

took place in August 2010, which may have been attended by Wallace Whittle; we've still to hear from Mr McKechnie. The Room Data Sheets wouldn't have been all available by then, would they?

A I'm not sure. I would have expected them to be substantially complete by then. Maybe a first draft would have come out. I can't remember when the Room Data Sheets were effectively finalised.

Q Do you remember any feedback to the effect that Wallace Whittle have approved your design?

A No, I can't remember that as such. But I think there was some-- I saw something the other day on the screen-- there was some comments made, and I assumed that that's what sort of feedback we got.

Q Well, let me try and look at some specifics. Now, you've said in your witness statement that at this distance, you can't immediately remember all the different wards and what they were all meant to be for. So, in relation to Ward 4B, if you take it from me, that was intended to be a Haemato-oncology ward. Now, you would have got then a clinical output specification for Ward 4B, is that right?

A Yes.

Q Now, can we see bundle 16, 1595, please? We can let you read through this if you wish but take it from me that that's the clinical output specification, as it says, for the haemato-oncology ward, which we've got accustomed to calling Ward 4B.

It starts by telling the reader that a high proportion of their patients receive chemotherapy and are immuno-compromised, making them vulnerable. They need a protected environment. Then at the foot of the page, a reference to higher-than-average need for infrastructure – no opening windows, no chilled beams, space sealed, positive pressure to rest of the hospital, HEPA-filtered probably, and so on.

Now, I'm assuming that is a document that you would have received as part of your consideration of the Employer's Requirements?

A Yes, if that was part of the Employer's Requirements, we would have seen that document.

Q That would do two things, would it not? It would tell you what at least one batch of clinicians thought were needed for immuno-compromised patients. Correct?

A Mm-hmm. Yes.

Q Also, in this case, actually give you some suggestions as to the kind of environment that they needed?

A That's correct. Yes, yes.

Q Now, should that ward--

because we know ultimately it was changed. Should that ward as originally designed have had 10 air changes an hour in its room?

A I'd have to look at the guidance to see what they recommend for that, but if 10 changes were required then we would have provided that.

THE CHAIR: Sorry, could you just repeat your question, Mr Connell, did you say "did" or "should"?

MR CONNAL: Should.

THE CHAIR: **"**Should." Right, thank you.

MR CONNAL: The reason I ask that is that this looks like a specialist-- specialised area rather than a general ward. Would you agree?

A Yes, yes. It's not a general ward.

Q You wouldn't therefore expect to provide 2.5 air changes within that ward?

A No, you wouldn't.

Q Would it surprise you to know that it wasn't provided with 10 air changes, but rooms outside the isolation rooms did have 2.5 air changes?

A That is a surprise. I didn't recall that.

Q Do you know why that was the position?

A No, other than we would have-- Well, we would have filled in the Room Data Sheets going back to the, you know, our interpretation. Now, whether our interpretations are right or wrong, we would have, we would have probably put that in, and maybe it was misunderstood that it was a standard ward with certain specialised rooms in there.

Q I mean, the----

THE CHAIR: Sorry, Mr Pardy, could you give me that answer-- give me that answer again?

A Yes. We may have not appreciated that it applied to various rooms. We'd have expected the Room Data Sheets to confirm the requirements.

MR CONNAL: I wanted to ask you specifically, because there was something in your witness statement that we hadn't seen elsewhere, which was that you may have assumed that when there was mention of immuno-compromised people, they would all be in isolation rooms and everything else could therefore be a standard room. Is that something----?

A Yes, I did make that statement without seeing all the documentation many, many years ago.

Q No, no. I----

A Yes, yes.

Q It's just I wanted to ask you about that because why would you make that assumption? What would be the basis for you assuming, without further

material, that anyone who was immuno-compromised would be put in an isolation room and all the other rooms could be ordinary rooms?

A I suppose it's-- and I don't know how you treat immuno-compromised patients – it's not within my expertise – but I've always assumed that a lobby or airlock to the room was needed to give you maximum separation from the general corridor, whereas at a standard room we just HEPA-filter and as soon as you open the door then you obviously bring outside air into that room.

THE CHAIR: Again, with apologies, can we just-- can I take you through your answers again? As you confirmed, Mr Connal, the clinical output specification for what was at that stage intended to be designated 4B, and I think later became 4C, have I got that the right way around?

MR CONNAL: My Lord, the patient cohort that was intended to be in 4B was moved to 4C when the Bone Marrow Transplant unit was introduced for Adults'.

THE CHAIR: Right. Now, you accepted from Mr Connal that what is described there is a ward for immuno-compromised patients, and therefore you would expect whatever is the recommended environmental parameters from SHTM which is appropriate to an immuno-compromised population. Mr Connal then pointed out that outside the isolation rooms, the air change rate was 2.5 with no pressure differential to the corridor, and you said that's a surprise to you, because you had expected the Room Data Sheet to have identified that this ward would require the level appropriate to immuno-compromised patients as set in the SHTM.

Now, if it is the case that the Room Data Sheet did not do that, as I've understood from your previous evidence, that would be an error on the part of ZBP?

A It would have been. Yes, it would have been. We may not have picked up that requirement. I can't remember exactly where we were with that.

THE CHAIR: Now, again, thinking of your earlier answers, is your position that you understood at the time that that Room Data Sheet would have been distributed to GGC through Multiplex or-- and when I say "to GGC" perhaps to whoever was advising them for checking?

A Yes, yes, we were expected at----

THE CHAIR: I mean, that was your understanding at the time?

A That was that group, yes.

THE CHAIR: Sorry, Mr Connal.

MR CONNAL: Yes. So one possible explanation for what appears to

have arisen, I have one further small point to ask you about it. But one possible explanation is that, for whatever reason, the interpretation that ZBP had applied to the Employer's Requirements in this case didn't pick up what needed to be picked up, but nobody else picked it up and corrected you on it.

A That's right. I don't know what the original-- because we would have started off with the ADB sheet as well which was actually delivered as part of the ER, so if that was wrong, we may have well followed that through and made this element of this (inaudible 12:19:49).

Q I think, in fairness, I probably need to put to you, and I think Miss White thought, that one possible explanation for some of the issues that had arisen was that the ABD sheets which were designed as sort of off-the-shelf standard specifications for particular rooms didn't always fit every detailed requirement, and may have got more importance than they deserve?

A Yes, I think that's my thoughts as well. They may have picked one off the shelf for a room and it was actually we followed that through.

Q Can I just ask you one other detailed point? It may not matter too much in the result, but one of the issues that we've discussed in earlier evidence to the Inquiry is whether you need a backup air handling unit in an area where the patients are immuno-compromised and therefore a failure of the unit not just makes life a bit uncomfortable, but can cause them serious health problems. Do you think this ward should have had a backup air handling unit?

A That's one option. The other option is to have-- the most likely component to fail is going to be a fan, so you could have backup fans that would be the other option.

Q So, just----

A Yes, it depends what the failure element is within the air handling unit; there would obviously have to be some downtime for routine maintenance, but that would have been picked up as part of a plan process, so that, you know, there would have been a procedure in place.

Q So if you were designing the air handling, the ventilation system for a ward of this kind, you would expect to at least look at how the patients could be protected in the case of the equipment breakdown or downtime?

A Yes, you would actually, again, understand from the Estates team how they deal with it at the moment.

Q Now, that's an example of somebody who, in writing a clinical output specification, has gone a reasonable distance into the technical ventilation

side, although they haven't specified an air change rate.

Can I ask you to look at the clinical output specification for Ward 2A, which I think even then was being called the Schiehallion unit, which is the bundle 16, 1599. Now, again, if you require to read this, we can accommodate that. But take it from me, if you would, that this is the clinical output specification for the Schiehallion unit.

A Yeah.

Q This, on the narrative I was giving you earlier about different styles, is you've got a lot more chat about what they do, how the patients move, all the different things that they do, and a lot less chat about what is required to protect them. Would you agree?

A Yes, that's right. Yes, yes.

Q Now, here you are, here's a specialist service for children with serious cancers, including various particular facilities, and bone marrow transplant. What do you do, faced with that specification, to try and come up with the right design?

A Well, again, you would do the interpretation of what was in there and then feed it back as part of our proposals.

Q On one view, would you not need to provide at least the kind of protections that the Adult Haemato-oncology ward was asking for: your positive pressure and sealed rooms, and all that stuff?

A It depends, because that's the first page. I don't know what-- I----

Q No, well, please----

A If--

Q Let's move on to the second----

A If there's something further down, I'm sure. I thought there was something further----

Q Are you looking for something in particular, could we confirm?

A Yeah, I think it was page, I think it's section 7, I think it was.

Q Yes.

A If I remember rightly, having looked at this yesterday.

Q That's on----

A There we are.

Q There we are, yes. Now, that's a good page to go to because, first of all, it identifies that this author has not produced the list of technical requirements that the author of the other one did.

A Mm.

Q I suppose my question to you is, since you're already looking at a series of proposed specifications for an area with immuno-compromised people, would you not read a lot of these across to this ward?

A Not necessarily. I can't

remember the order that we designed the hospital in.

Q Right.

A So it could, and I think they were-- they're in completely different parts of the building. So it could be that we actually-- You know, I don't know if we designed the Children's building before the Level 4. It could be that they-- they weren't ready together. So we have to sort of rely on what's been said in front of us there.

Q Now, can I just, while we're on that page – because it's about the only technical thing it tells us – we see at the top:

"... entry through a double-door barrier system [sometimes called, slightly loosely, an airlock] which allows the entire ward the benefit of low pressure ventilation."

Do you know why an airlock wasn't designed when Ward 2A was built?

A No. That would have come from the-- the building plans, the actual architectural plans. So, we would only, probably-- We may have-- I'm not sure if we knew about or if it was something-- we didn't know that was there or we hadn't picked up on that, but certainly we would've expected that to come out of the User Group meetings, because it's a fundamental part of the building layout. So, we would've expected that to come out of the User Group meetings – that airlock.

Q But the point of the airlock, as I understand it – and you're the expert; you tell me – is to assist in maintaining a pressure difference between what's inside and the general corridor outside – in this case, with immunocompromised people, a positive pressure difference, so that nothing gets in, it all comes out, in layman's terms.

A Yes. Yes.

Q Is that correct?

A I think that's how it actually is managed as well. I suppose, you know, if that is the only entry point into the ward, it's how you manage bed movements, waste, food, people. You know, how does that become a real problem to actual operation of the unit, because it is a barrier to get into the unit? And maybe – I don't know – maybe that was looked at during the User Group meetings and moved away from.

THE CHAIR: Sorry, can I just take you back to the beginning of your answers in response to being asked about the double-door barrier system. I can see that providing two doors rather than one door is not the ventilation designer's task, but what did you say about the drawing? You began your answer by saying something about where you would have expected the design

information indicating a double door to be held, to be expressed.

A Yes. That would be on the-- the architectural plans.

THE CHAIR: Sorry, the----

A The architectural plans, so the 1:200, 1:50s would have actually shown that – having gone through the User Group process and appeared on there.

THE CHAIR: Right. So I take it the architectural plans are the responsibility, in this case of Nightingale?

A Yes. They are. Yes. Yes.

THE CHAIR: So, whoever was preparing that drawing would have to have appreciated that this area required to be sealed, effectively – or, at least, the pressure needed to be controlled.

A Yes. Again, it comes down to-- I see-- I see the words “low pressure” . “Low positive pressure ventilation”: that’s not absolutely crystal clear what it means, but I-- Again, back to what I think I said before-- is that you put more air into the space than you take out, and therefore you create an air movement. And I’m not sure how the double-door barrier system would assist with that, but clearly it didn’t make its way through the User Group meetings to the ultimate building plans, and I don’t know the reason for that.

THE CHAIR: Thank you.

MR CONNAL: But am I not right in understanding that a positive pressure gradient between what was in the ward and what was outside is the kind of protective measure that might be designed in by a ventilation designer to protect those inside from unwanted ingress?

A Yes, you would probably put more air into the space than you took out, and that would create an-- an outward airflow of air.

Q And that would be assisted, if not guaranteed – because you can hold all the doors open no doubt – by having a double-door system rather than a single-door system.

A That’s right, yes. So you would actually at least have, as you say, an airlock, whether that’s-- whether people hold the doors open together, you know, or not. I don’t know if it would be controlled or-- or not.

Q You deal with this in your witness statement at paragraph 63 and onwards on page 18. Do I take it from what you say there that you accept that this was another specialist area?

A Certainly, they had a number of isolation rooms together, which suggested it was more-- more specialised than a standard ward. I think it’s the only built part of the hospital that’s got that many isolation rooms in one place. So, yes; it was a specialist area in that respect.

Q You say in the middle of 63, "This was a specialist unique facility," so I was going to ask you whether you agree, therefore, that it was not one to which the 2.5 derogation should have been applied?

A Not necessarily, because, again, we would have looked at the non-lobbied bedrooms as being a standard bedroom. Not knowing the clinical processes or understanding the clinical processes that's gone through in that area, we'd have looked at the drawings, said, "Oh, yes. There's lobbied rooms; they are the specialised rooms. And there's general rooms, which would apply to that-- the standard arrangement."

Q Now, I can show you the Room Data Sheet if we need it, but the non-isolation rooms in Ward 2A appear to have been provided with 40 litres a second, which is the standard level.

A Yeah.

Q Do you know how that happened? Is that the process you were trying to tell me just a moment ago?

A Yes, I think that would have been looked-- they would have been looked at as a standard bedroom and that criteria applied.

Q Notwithstanding the narrative in the clinical output specification and the reference to a requirement for positive pressure?

A Yes, and there may be a-- an error there where we put in negative pressure. Again, we would have----

THE CHAIR: Sorry, you're allowing your voice to drop a little.

A Yes, so we would have expect-- we would have looked at the building plans and said, "Oh, it's a standard bedroom: we will apply that criteria." Now, what we may have missed is actually it was a positive pressure rather than-- I think the standard room was a negative pressure. So we'd have had to adjust the air volume accordingly and that may have been an oversight, but we-- we did. But again, we would have hoped that would have been captured in the review process, you know, considering there are a lot of rooms in the-- in the hospital.

THE CHAIR: As I understand it, there's about 20 bedrooms in all, of which eight are isolation rooms. Maybe more than 20, in fact. I'm just having difficulty understanding why someone who is applying their mind to it would have thought that the rooms, which are not isolation rooms but are nevertheless there to accommodate the potentially immunocompromised patients, were just standard bedrooms.

A I think we-- Probably it's the lack of our knowledge in terms of the actual processes; the clinical processes that go through, we would not have

appreciated that. Whilst it said "immunocompromised", we would assume that they would be-- those patients would be dealt with in the isolation rooms, and that the other rooms are like a-- more of a step-down type arrangement. But that's-- Again, that's probably a lack of our-- We-- we don't necessarily understand those processes. So, we'd have fed that back via the-- the Room Data Sheets.

THE CHAIR: As I understand your evidence, other than relying on the checking of your initial work, you made no enquiry to learn what the – to use your expression – "processes" involving these patients would be.

A Yes, that's right. We-- we-- I don't think we did. I'm not sure if we did now. I don't think we did.

THE CHAIR: Mr Connal?

MR CONNAL: I think his Lordship may have asked you that question, because in paragraph 63 you say this:

"This was a specialist unique facility, but we were not invited to view the existing facilities ..."

Well, let's just pause there. If you needed more information – because you were the people who were charged with the design responsibility, as you tell us – was it not really for you to, in effect, say, "We need more information. This is what we need," or "Can we go and see the Schiehallion in York Hill?", or whatever step you thought was most appropriate?

A I think we were relying-- we were relying on the DRRs; it was a fast-moving project. You know, I think looking back now, we could have-- we could have asked that, or we'd have been offered it. Often-- often, you know, if-- if a User Group want to actually show us the facility, they'd say, "You must come and see this facility, because it's got facilities that are not what you would normally come across." With hindsight, yes, we-- we-- You know, we could have gone. It would have been very helpful to go back to the existing facility, but we weren't offered that, and in the fast-moving project----

Q The reason I ask you the question is quite straightforward. The clinical output specification has very little technical detail in it. It tells you very little. It might give some general description of the kind of people who might or might not have been there, which you might or might not have understood. But with the benefit of hindsight, is that not exactly the kind of situation where you needed more information?

A I think we had to rely on what we knew at that time about the general hospital. You know, we applied-- we looked at the plans, and we-- we assumed that the standard bedrooms

were standard bedrooms.

Q You see, at the foot of----

A We may have got the-- we may have got the negative pressure; we should have put positive pressure, but that would-- well, it would have been corrected relatively simply.

Q At the foot of that page, you say you:

"…cannot recall any concerns with the design as, to the best of my recollection, the design had followed the brief."

Now, with the brief – the clinical output specification we've been looking at----

A Yes. Yes.

Q That's what you think you were doing?

A I think that's right, yes.

Q I need to ask you about it because-- Hindsight is no doubt a wonderful thing, but from 2018 onwards a whole raft of people have looked at this, many of them with varying degrees of expertise in ventilation design, and they've all come back and said, to oversimplify: everything should have had 10 air changes, should have had 10 Pascals of positive pressure; there should have been a backup air handling unit or something similar; no chill beams; no thermal wheels. Was that not the kind of conclusion that you could have reached?

A Not necessarily, because we were-- we were not familiar with the existing facility or what-- and the brief was-- wasn't clear, it turns out, and we also recorded our interpretation on the Room Data Sheets which were submitted and could have been picked up at that time.

Q Let me try to ask you about another topic, if I may: isolation rooms.

A Mm-hmm.

Q These have been the subject of much debate and angst by various participants, for various reasons, but I'm not going to go through all of these with you. First of all, first question: was ZBP responsible for designing the isolation rooms provided in the new hospital?

A Yes.

Q Now, broadly speaking, they were all what are called "PPVL rooms". Is that correct?

A That's right, yes.

Q Now, let me just ask you about that. Were you not made aware that the clinicians, at least, were discussing the need to have in various places negative pressure rooms, positive pressure rooms, and other forms of room – other than PPVL? Was that not something you were made aware of?

A No, we weren't made aware of that, and I think the HBN 04-01 suggests that having different types of room is--

can be-- can be a problem if you use them in the wrong way. So the PPVL should overcome the-- the need to have positive or negative-type pressure rooms.

Q Yes. One of the issues that has arisen is the fact that, when the hospital opens, the people who are charged with where to put the next problematic patient who arrives need to know what the rooms are and what their qualities are. So, let me just ask you about the HBN, the SHBN, which were both referenced in the material that you had.

At the time, and I realise guidance has, as in many cases, moved on. At the time, did that guidance not make it plain that they were not the guidance documents for isolation rooms for those who are immunocompromised?

A There is a note in there, yes. I couldn't remember that being the case.

Q Also, they're not suitable for an Infectious Diseases unit.

A That's right. I don't think there was an infectious disease unit in the hospital as far as I recall.

Q I was going to ask that. In a hospital of this scale, you're the ventilation designer. You know that the guidance doesn't cover an infectious diseases unit. Would you not have been applying your mind as to whether it was likely that people with infectious diseases would be treated at a large hospital of that kind and therefore getting information to allow you to design accordingly?

A I would have expected that one of the wards, if it was treated as an infectious patient ward, would have actually been identified that way. I wouldn't expect the infectious patients to be dealt with on the standard ward other than the normal, low-grade infections. Certainly another project I was dealing with before my retirement that I was involved in, they had an infectious diseases ward.

Q So far as the suitability of the design for immunocompromised patients, at least so far as the guidance is concerned, did the existence of the note saying, "This isn't the guidance for immunocompromised patients," not require you, as the designers, to work out what you should provide, and then agree that with somebody?

A Well, I'm not sure. Again, it says immunocompromised patients, yes. I think it then goes on to say that evident additional material will be forwarded at some point.

Q Yes, yes.

A Yeah.

Q That was the position at that time. I think I'm just trying to understand the way in which a ventilation designer, who's told standard design is HBN 04-01,

SPN 04-01. So you go, “Fine, I can read that.” One of the things you see is, “This is not for immunocompromised patients.” There may be another note, which-- it doesn’t exist at the time. Does that not obligate you, as the designer, to apply your mind as to what should be provided for immunocompromised patients?

A Yes, we could have asked the question at that time, what is the alternative to that. I can’t remember if we did or not. Again, we put our proposal into the pack and then submitted that for agreement.

Q Right. So, again, on isolation rooms, is your position the same as in relation to answers on other topics that you would indicate what you were doing, and you would expect someone from the Board to pick up if that wasn’t correct?

A Yes, certainly. Certainly on these specialised boards.

Q In that case, that would be somebody who would need to apply their mind to what design of isolation room might be appropriate for somebody who is immunocompromised.

A Yes, they would be familiar with their current arrangements or improve their current arrangements depending on their experience.

Q The other thing that crops up in relation to the isolation rooms is this business of the extract in the-- the main extract being in the bedroom rather than the en suite. We’ve had some evidence at this Inquiry, so you can tell me whether you’re familiar with that, that, when the guidance notes were produced, they were basically tested out on a room layout, which, in order to produce the desired air flows, had to be pretty much duplicated. Are you aware of that?

A No, I wasn’t aware of that.

Q What you say, and we’re on page 20 of your witness statement now, you say you and other colleagues have adopted splitting the extract between the en suite and the bedroom for a reason that you then set out. You say it avoids some issues.

A Yeah.

Q In terms of-- Well, first of all, in terms of compliance with guidance, that means that they don’t comply in this design with the guidance that was to be followed. Is that correct?

A Well, looking over, I refreshed my memory about this because it’s a while since I looked at it. I think Table 1’ll be-- the HBN actually does suggest you can actually split the extract between the bedroom and the en suite.

Q So a number of witnesses have told us that, designed in that way, they do not comply with the guidance note. Is that incorrect according to your understanding of it?

A Yes, I think that is incorrect. Table 1 says:

"If extract is fitted in the isolation room, this reduces [this is about the en suite] 45 litres a second in the en suite and 113 litres in the isolation room."

Q Right. You'll need to go a little bit slower and tell us what you're looking at----

A Yes, sorry, Table 1 of the HBN.

Q This is the HBN?

A Yes, it's the HBN 04-01.

Q Yes and what part of it are you looking at?

A Under-- So it says, Table 1: ventilation parameters," and there's a part of that table that says, "The en suite room," and it gives the size of the room.

Q Just bear with me a second, and what we'll do is we'll find a document, we'll put it up and you can just take us through the relevant part.

A Yeah, yeah.

Q That document is in bundle 16, it's document 4. Now, I'm afraid I don't have the page, but it's document 4 in bundle 16.

A Page 314. Yeah, so it's about-- it's about eight pages in, I believe.

Q It's page 8 of the document, so we'll see the page references of the document at the bottom left-hand side for the 8, so that's that page.

A There we are.

Q Is that the page you were referring to?

A Yeah.

Q Just help us by what you're saying.

A Yes. So the en suite there, it's got extract air flow so there's 158 litres per second is the extract rate and it says:

"If extract is fitted in the isolation room this reduces to 45 l/s in the en-suite with 113 l/s extracted in the isolation room."

And that overcomes some of the problems of potentially trying to get 158 extracts, the second extract from a very small room, trying to get in through the door or through a----

THE CHAIR: Entirely my fault. I've got Table 1 in front of me and I think we're interested in the position of the extract.

A Mm-hmm.

THE CHAIR: Now, where should I be looking?

A So it's the-- under that last box at the bottom which is "En-suite".

THE CHAIR: Yes.

A If you go over to the third box down, "Extract air flow," and then the next box, "Nominal design values."

THE CHAIR: Right.

A It's 158----

THE CHAIR: Again, just take me

through this slowly. So, are you pointing to the last but one box on the right-hand side?

A That's correct.

THE CHAIR: An extract airflow is given and then, "If the extract is fitted in the isolation room." That's the bedroom----

A That's the bedroom, yes.

THE CHAIR: "…this reduces to 45 l/s." So you point to that as accepting the possibility of the extract vent being in the bedroom as opposed to in the en-suite?

A Yes, partly in the bedroom and partly in the en-suite rather than fully from the ensuite.

THE CHAIR: I've perhaps got that wrong. Is the alternative-- Well, you tell me.

A Yes, so you introduce air into the lobby only, and then you allow leakage from the lobby into the corridor and then you allow air transfer via a pressure controller into the bedroom and that gives you 10 air changes in the bedroom, which is about 158 litres.

So what we decided to do is, rather than take it all out of the en-suite because that's quite a of air to come out of the en-suite. It's about-- probably around about 40-plus air changes, which can be quite difficult to get into the en-suite because you've got the door that-- you often rely on the door gap, but then you have the big transfer grill to get the air through the door which would be an issue with privacy and potentially noise if you're an undersized transfer grill, so we opted to actually split the extract between the room and the en-suite.

So we're giving a good ventilation rate to the en-suite and then we were taking the balance from the bedroom because extract is relatively localised. It only appears close to the grill. So, if you imagine a vacuum cleaner, put your hand over the nozzle, you move it away very slightly and, actually, the actual suction effect disappears, so the actual extract is more of a hemisphere around the actual grill.

THE CHAIR: I have to confess, I'm not getting all this detail. What I have got is your solution was to split, as you said, in other words to have two extract points.

A That's right.

THE CHAIR: One is----

A In the en-suite.

THE CHAIR: -- in the en-suite.

A Yes, doing the ventilation of the en-suite as you would do a normal WC shower.

THE CHAIR: The other is in the bedroom.

A In the bedroom, yes.

THE CHAIR: Now, I think we've heard some evidence about the extract being above the bed. Would that be

right?

A That can be, yes. It's not quite as----

THE CHAIR: Now, that is just about all the detail I've got, so what more should I understand from-- I mean, you give a fuller answer, so what else were you saying?

A So yeah, my thoughts are the driving force for air distribution in the room is actually the supply air system, because that's actually pushing the air into the room, you know, with some sort of air pattern. The extract is very localised once you move away from the grill. Effectively, if you imagine a hemisphere around the grill, the actual velocity in the air flow, the air entrainment actually falls away very quickly. So the key driver in the isolation room is the differential pressure between the lobby in the bedroom and the actual supply air distribution, which actually gives you the good air distribution in the bedroom for comfort and scouring the room.

MR CONNAL: I think it's probably important for us just to make sure we finish this story by looking at the document. Just above the table, there's some narrative parts and they talk about providing a practical and fail-safe design, and then they say:

"The ventilation system is designed on the basis that all its constituent parts, as described in the table, below work together to form an integrated system. For example, air to the suite is supplied at high level in the lobby, with extract in the en-suite bathroom."

Then it goes on to discuss other issues. So, at least in narrative terms, the main focus is on that type of design, not your version of it. Now, just so his Lordship has the note, if we look onto the next page of the document, page 9, in paragraph 4.12 in the right-hand column, it says, "An extract terminal should be fitted at high level in the en-suite room," and it says:

"An additional terminal may be fitted at low level adjacent to the bedhead in the bedroom."

Is that what you're referring to?

A Yes. Well, we didn't actually provide it at low level in the bedroom. We provided it at high level.

Q You provided it at a high level, so you didn't actually follow what----

A Not strictly, no.

Q -- was required? Well, "Not" is the answer. If we look at the no doubt illustrative drawings which accompany-- it's a guidance document, but it's one that you said you were following.

A Yes.

Q If we look at page 13, that's a single room with an en-suite. So sorry, this will be page 13 of the same

document. We're currently at the same document we were looking at a moment or two ago. We're at page 8; if we go to page 330-- sorry, that's the numbering that I'm using, which is page 13. This is a new-build, single room with en-suite. We find, to be simple about it, that the extract is in the en-suite, correct?

A That's correct, yes.

Q If we look at the next example, page 331, "Key design principles," "En-suite facilities and lobby," we find extract in the en-suite and the supply is also indicated.

A Yes.

Q So, at least in terms of the illustrative material, the authors seem to be emphasising the extract in the en-suite proposition. Is that correct?

A That's right.

Q Is your position-- So I'm clear about it, is this another instance where you did what you did, you designed it in the way that you did, high level extract in the bedroom, and expected the Board to agree or disagree with the proposal that you had for isolation rooms?

A Yes. We would have expressed why we'd done it, and there would have been discussion-- maybe there would have been discussion on this point. It would have been rejected or the discussion would have said, "Yes, I understand where you're coming from"

about the noise and the size of the transfer group.

Q So, again, just so I'm understanding it, somebody who was reviewing your proposed design would need to understand not only why you were doing what you were doing but also what the impact was, if any, of putting the extract at a high level rather than a low level as the guidance suggested. Is that correct?

A Yeah.

Q Which would perhaps suggest that the person doing that would have to be highly competent in the design of that kind of room.

A Well, certainly. So, they would have to be-- understand the ventilation arrangement and understand the reasons why we were proposing that.

Q I think, my Lord, I'm probably at the end of the issues that I wish to cover with this witness for the moment but perhaps a short pause might be feasible, and then we can return, depending on what we're told.

THE CHAIR: Let me just-- a question which may be difficult to answer: the process which you've been through with Mr Connal depends on the employer's side – GGC in this case – understanding, or having the same understanding, as you did of the process which-- of submitting design information

to GGC for approval.

A Mm-hmm.

THE CHAIR: Now, again, if I've understood your evidence, the mechanism whereby that happened was you submitting design information to the contractor, Multiplex----

A Yes.

THE CHAIR: -- and understanding that that information would then be passed on to employer for using a neutral approval. Do you have any knowledge about how it works, that it was----

A I can't really recall that, no.

THE CHAIR: -- explained to GGC, or confirmed to GGC, that their understanding of the process was the same as your understanding of the process?

A I can't recall that, but it's common on most projects to go through a process of review and comment-- rather than approval, review and comment, than raise issues that are unclear or wrong. It's under interpretation, but that's a fairly common process you would expect to go through.

THE CHAIR: Well, Mr Connal has to check if there's any further questions in the room. So, we'll take a break maybe for 10 minutes. If I could ask you to return to the witness room.

(Short break)

THE CHAIR: Mr Connal.

MR CONNAL: I have three short questions so, with my Lord's permission, I'll ask them now.

THE CHAIR: All right. I'm told three short questions.

MR CONNAL: Here's hoping. Right, you told us about the changes you made to the standard design of an isolation room, if I can----

A Yes.

Q I don't mean anything by that other than that's the one you see on the drawings. As you were making the changes and as you were also changing the positioning of the extract in the bedroom from the low level suggested to a higher level, did you carry out any validation or testing of these proposals?

A No, other than testing would have probably involved a mock-up to determine what the impact was, but we didn't do that, no.

Q You didn't do it?

A No, we didn't do it, no.

Q Thank you. This is a slightly random question on a different topic. You left at some point in 2014.

A That's right.

Q Do you know when the water system was filled? You've given us a brief answer about water, but----

A No, we had-- ZBP or, at that

point, Wallace Whittle had no significant involvement in the actual construction or commissioning process.

Q My final point, it simply arises from something that you added into an answer. In paragraph 42 of your witness statement on page 13, which we might as well just get up so everybody can see what we're looking at age 13, you deal with the ceiling, the "Was the building sealed or unsealed?" question.

A Mm-hmm.

Q You say it was "driven by noise", and you've also mentioned "odour from the sewage plant", and also "down draught from the roof-mounted helipad". That was a factor in, as far as you were aware, sealing the building.

A That was one of the factors, yes. Yes, that's right.

Q Can you help us at all – and if you can't, please just say so – as to whether it's possible for contaminants to be driven by that draft that you're trying to seal against?

A From the helipad?

Q Yes.

A I suppose-- I don't know about-- Again, I can only give a-- My view is that there was exhaust from a helicopter and that-- presumably that goes down with the airflow from the aircraft. Other than that, I can't think of any other contaminants that would be impacted.

Q Thank you. I have nothing further, my Lord.

THE CHAIR: That means we've come to the end of your evidence, Mr Pardy, and you're free to go, but before you do go, can I thank you for your attendance today, but also the work that will have gone into answering the questionnaire and preparing your witness statement? So, thank you for that and you're now free to go.

THE WITNESS: Thank you very much.

(The witness withdrew)

THE CHAIR: Now, Mr Connal, I would be inclined to sit again at quarter past two, unless you feel that that will impose a time constraint on the afternoon.

MR CONNAL: I would have hoped not, my Lord. The witness, Mr McKechnie, gives a very short witness statement, so even expanding a little from what's in the text, I would have thought we could deal with that comfortably.

THE CHAIR: Well, in that case, we will sit again at quarter past two.

(Adjourned for a short time)

Mr Stewart McKechnie

Affirmed

THE CHAIR: Now, as I've said, you're probably fairly familiar with our procedure.

THE WITNESS: Unfortunately, yes.

THE CHAIR: But can I remind you that if you want to take a break at any stage, please just give an indication and we can take a break.

THE WITNESS: Okay.

THE CHAIR: Now, Mr Connal.

Questioned by Mr Connal

Q Good afternoon, Mr McKechnie.

A Good afternoon.

Q I'm going to start with a question that you'll be expecting which I ask all the witnesses, which is that you've given a witness statement to the Inquiry. Are you content to adopt its content as part of your evidence?

A Yes.

Q Thank you. I'm not going to go through your experience and so on because we've been there before in other sessions, but I do want to ask you about your involvement with the project that we're concerning here, which I'll just simply call the New Hospital. You deal with that in your witness statement, and that gives rise to one or two additional points. Can we have the witness statement, please? It's in the bundle at page 35. Sorry, next page, please. So, we're going to start-- I'll use your witness statement as a guide through some of the issues we're going to discuss. In paragraph 7, you start to explain that TÜV SÜD – because names, like so many other organisations, have changed – were involved at various stages.

A Yeah.

Q Now, what you then go on to say is that Wallace Whittle-- Which is where you were and where you were involved, correct?

A Yes, yes.

Q -- in the early stages of the contract were involved in the compilation of the Employer's Requirements. Is that correct?

A That's correct, yep. A portion of the Employer's Requirements, the engineering portion.

Q Yes. The M&E stuff, to be colloquial about it.

A Yes.

Q Now, does that mean that you – and if I say "you", it may mean you personally or Wallace Whittle, it matters not unless you tell me to the contrary – were responsible for the provision in the Employer's Requirements that all of the isolation rooms should be PPVL rooms designed under HBN 01?

A Absolutely not, no.

Q No?

A No.

Q Who put that provision into the Employer's Requirements?

A I couldn't honestly tell you. It would have been part of the-- let me get the right words here-- the accommodation schedules. So the accommodation schedules would list the wards and the ancillary areas that they were looking for, and within that I would have expected the isolation rooms would have been called out, but it's not an M&E-type provision to give.

Q Well, is the design to be followed when constructing the isolation rooms an M&E provision?

A The engineering element of it, but the-- excuse me-- the main element of it, the actual room itself, the layout of the room is certainly not an M&E provision.

THE CHAIR: No. I just wonder if perhaps you're at cross-purposes here, Mr Connal.

MR CONNAL: I'll ask the question a different way. In the Employer's Requirements, it essentially says isolation rooms to be designed under HBN 04-01, SHPN 04-01, which are, as we've been hearing, essentially PPVL rooms.

A Yeah.

Q Now, where would that provision come from, and what's-- the provision saying isolation rooms to be designed under that guidance?

A Again, that would have been part of the accommodation. That would have been the title of the isolation rooms.

Q So when you say that you were responsible for putting together the design guidance that was relevant to be inserted into the Employer's Requirements, not that bit of guidance?

A Not the numerical number, nor the style of the isolation rooms.

Q Right. Well, I didn't ask you about the numerical number. I'm just looking to see if we can find out where it came from, but you can't help us with that.

A I'm sorry, no. I realise the question that you're driving at, which is that there was no other style of isolation rooms, but that wouldn't have been an engineering decision or a reflection on the brief.

THE CHAIR: Mr McKechnie, just so that I understand the answer, you would expect the schedule of accommodation, which essentially describes the numbers of rooms involved in a particular department-- You would expect the schedule of accommodation, first of all, to identify whether any rooms were isolation rooms.

A Yes.

THE CHAIR: And you would also expect that isolation rooms would be described as positive pressure ventilation lobbies. It's just that-- Have I understood your evidence?

A Yes, yes. Yes.

THE CHAIR: Thank you.

MR CONNAL: Would that be something you would be asked to check in the course of preparation of the Employer's Requirements?

A I really wouldn't have thought so, no.

Q Thank you. Now, the other thing I need to ask you about is a sort of timing sequence question and what you did or didn't do. We know that you were-- Wallace Whittle was appointed as a sub-consultant to Currie & Brown for the initial stages of the work----

A Yes.

Q -- i.e. when the Employer's Requirements were being prepared.

A Yes.

Q Up to contract signature, essentially?

A Up to December 2010.

Q 2010? Not 2009?

A Oh, sorry. 2009, yeah.

Q If I tell you the contract was signed on 18 December 2009----

A Yes, sorry. Yes. Sorry, I got my numbers mixed up.

Q And the broad picture that we have, which is propped up with other witnesses, is that at or around that point, December 2009, January 2010, the troupe of sub-consultants who had been working to Currie & Brown were all stood down: architects, structural engineers and Wallace Whittle.

A Yes.

Q Is that correct?

A That's correct.

Q And that's why you say in paragraph 7:

"This appointment came to an end in December 2009/January 2010 at the conclusion of the tender exercise."

A Yes.

Q Now, not covered in your witness statement, but we have been told over the last few days of evidence of later involvement during 2010 – so not after change of name and ZBP go bust and all these other things – of Wallace Whittle in the ventilation of the new hospital.

A We were approached-- If I remember this correctly, we were approached by the Health Board with the suggestion that we could be retained to give technical advice post the termination of the Currie & Brown contract.

Q Right.

A The offer that was on the table was on a kind of time and line basis.

Q Yes. So to be charged at a rate to be agreed for the time you spent

doing the work.

A Yes, but without an agreed final sum or whatever for it. And I've been thinking about this one. I believe that we an initial meeting early in 2010, but it wasn't a detailed presentation and it wasn't-- we weren't doing anything other than understanding what was potentially going to be involved.

Q Okay.

A We didn't agree with them on it. We didn't agree (inaudible 14:28:06) on it. So our technical involvement didn't go any further than what we're speaking about here.

Q Okay. Let me see if I've got this answer correctly for his Lordship. You were a sub-consultant; you were stood down; the suggestion was you could be retained on a time and line basis for something that might come up, details of which were not then known; you had an initial discussion. Now, did you then agree that was okay, or----

A No. No, we didn't agree to it. We weren't-- It wasn't commercially attractive to us at the time, what was going to be on the table, so we continued non-involvement, continued right up until later on, 2013.

THE CHAIR: And that was an approach directly from the Health Board as opposed to Currie & Brown?

A My memory is it was from the Health Board as opposed to Currie & Brown because Currie & Brown-- Again, obviously we were part of that party at the beginning, and then that got split and Currie & Brown took on a different role within the contract.

THE CHAIR: Thank you.

MR CONNAL: So, this idea of you being-- let me call it almost on call, so that somebody can ring you up and say, "Can you come and help us about X, it'll take you three hours, we'll pay you Y"----

A Yeah.

Q -- that wasn't an attractive proposition, so when you had a discussion in early 2010, you think, you said no.

A Yes.

Q Were you then subsequently asked to do more work in 2010 by the Board?

A Not on the ventilation. We may have done some work direct to them on the electrical works, to do with the interconnection of the new proposals with the existing infrastructure on the site. My guys had quite a good understanding of what they had on site and because of that, I think-- My memory says that we may have done some work for them there, but that was the only work we would have got involved in. Nothing to do with the vent or the heating or anything that mechanical.

Q A witness, Mr Pike of Multiplex, thought that Wallace Whittle had been involved in M&E reviews in August 2010. Do you recollect anything about that?

A I don't believe so, no. No. Bear in mind that our closing comments in all of this was that there was insufficient detail, in our opinion, from ZBP for us to comment on the mechanical proposals, and that didn't-- Actually, I know from the information I have that that didn't actually go to the RDD process until 2012. So, you know, I don't see the link to a detailed proposal by ZBP in 2010.

THE CHAIR: Right. I think maybe I need to know about this final comment.

MR CONNAL: Yes. I'm sorry these questions are slightly awkward in terms of the detail, Mr McKechnie, because we're only trying to piece together material that we've only just got. In response to the suggestion that you were involved in an M&E review in August 2010, you say no, and you then refer back to a closing comment. Now, first of all, when would that closing comment have been made?

A That would have been pre-- Is that actually in? Excuse me a minute. What I'm referring to is----

Q Forgive me, my Lord. There's no objection to the witness checking some references?

THE CHAIR: No, I have no objection to that. We'll perhaps identify the prominence of the (inaudible 14:32:49) in due course.

A Bundle 43, volume 5.

MR CONNAL: Okay. Let's go find it. Let's have bundle 43, volume 5. And where?

A Sorry, I was trying to be helpful, but I have nae noted the page number. It should have been helpful.

THE CHAIR: I take it you're referring to a note you made yourself, having looked at the documents you were provided with.

A We had a chance to look at the proposals, the Multiplex----

THE CHAIR: Sorry, can I take this a step at a time?

A Sure.

THE CHAIR: You have in front of you what I take is your own note to yourself. Is that right?

A Yeah, but I've got the page number on it (inaudible 14:33:30).

THE CHAIR: Fine. Now, the second step may be to answer Mr Connal's question.

MR CONNAL: Well, let's see if we can identify the document.

THE CHAIR: Yes.

MR CONNAL: We have bundle 43, volume 5 up. It has an index. Can we just go to the index, please, at the front,

and it should-- What am I looking for, if I'm looking for this document? Is it an email or something?

A No, no, no, it's a table of comments on Multiplex's proposals.

Q All right. And do you know when it is, in date terms?

A No, sorry. One second. I'll confirm it to you. Again, I'd just scribbled down the bundle that it was in.

Q I mean, it might be easier for us to find it if we knew roughly when it was dated.

A Well, it's going to be 2010, I would suggest.

Q It may be my fault----

A So you've got the M&E Clarification Log.

Q Yes. Well, that is a document we will be looking at. Is that what you're referring to, the M&E Clarification Log?

A No. No.

Q Okay. So is it before you were stood down by Currie & Brown?

A Yes. Basically, we looked at the proposals and the details that ZBP-- Multiplex had provided, and we commented on them several times, that there was insufficient detail for us, at that point in time, to give a detailed commentary on them. The response, which is also on the table from Multiplex, states quite clearly that the detailed design will follow further down the life of the project. So the point we were making was that at the point in time where we were stood down, there was insufficient detail for us to give a detailed commentary on the ventilation proposals. And it was highlighted that, and agreed if you like, that that was going to be provided during the detailed design stage. None of that's abnormal in my experience.

Q (Inaudible 14:36:44) whether it is or it isn't, I'm just trying to ascertain when you made this. So before, you were stood down in around January 2010----

A See that? See if you go to item 111.

Q 111.

A Page 918.

Q Yes, that's dated November 2010.

A Yep. You'll see our comments on the left-hand side and the Brookfield response.

Q All right, so----

A This is exactly what I was saying.

THE CHAIR: This is the document you were looking for, Mr McKechnie, is it?

A Yeah, it's one of them. There's a number of them.

MR CONNAL: Okay. Well, let's try and help ourselves by getting to the bottom of this. This is a document which

on its face is dated November 2010, so way into the design year, as it were, that followed the standing down of the Technical team. Are you telling us that things that are described as Wallace Whittle comments were actually made about a year earlier?

A I think they were made earlier than that and that document has just been a rolling document and saying what they were, what they were intending to do.

Q Right, so when you say you had a recollection that you told them that what you'd been shown didn't have enough information, that's the kind of thing that's said in Box 1?

A Yes.

Q Right. So if somebody suggested to you that you had been participating in November 2010 in commenting on Brookfield materials, you would say, "No, we weren't"?

A I would, yes. I think what hard is for these things is that once we've raised the comment, as it'd have been passed to Currie & Brown at the time. That's then collated into a master document, which has a life of its own, afterwards.

Q Okay.

THE CHAIR: Would I be right in thinking that, notwithstanding the 8 November 2010 date, these are comments that you would have provided during the competitive dialogue stage, or have I got that wrong?

A No, these would have been comments just prior to Multiplex being awarded. So from the package of information that we had.

THE CHAIR: Right. So by that time Multiplex would have been the preferred bidder?

A I believe that would have been the timescale. Irrespective of that, and probably more important for the Inquiry, is the fact that this is recording that at that earlier-- that there was still a degree of design and development to occur from the ZBP ventilation details. So as of-- if we take it as of revision A of that document, November 2010, there was still details to be-- detailed design development, which would have been their ventilation drawings fully detailed up with the proposals.

THE CHAIR: Right. Just to state the obvious, this table is a means of Brookfield communicating to GGC and whoever GGC is being advised by at that stage?

A Yes. Yes, so it's a running schedule of tasks, if you like, which have got to be completed.

MR CONNAL: So if I go back to my earlier question, if there's a suggestion that you participated in some kind of

review in August 2010 of ZBP ventilation design, what's your response to that?

A I don't personally remember it, but I do know that there was some dialogue that took place which was between the Health Board and themselves on the continuation. But the important factor for me is that that continuation did not happen.

Q Right. Well, let's make it simple. Did you participate after January 2010 in any discussions about the ventilation system at the New Hospital?

A Okay. The simple answer to that, because you've asked a simple question, is that no we couldn't, because what we were recording was that there was insufficient detail to have that type of detailed review.

Q We're just trying to work out if you were involved in it or not.

A Sorry, that's what I was trying to say. I don't personally recall anything. I know that my contract with Currie & Brown was terminated in and around the end of 2009 when Multiplex came on board. We may have attended a couple of meetings to try and sort out, this whether we were going to do more or whatever on it. I don't have any notes of any of that. I haven't seen anything on that. So just trying to be as open as I can with you and what I can recollect and can't.

Q Okay, well, there seems to be some residual confusion as to whether you and Wallace Whittle were involved or not. You think there may have been a couple of meetings, but that was just to see if you could help?

A Yeah, but as I say, the important thing, and I know where you're going there, so I'm trying to help you, is that what we were recording, irrespective of whether we attended these meetings or not, was that the detail-- the detailed design of the ventilation, wasn't available for us, or for anybody at that point in time.

Q Another of the suggestions that's been made is that what was being prepared was something called Appendix K, which was to be part of the full business case that went to the Scottish Government for approval, and that you signed off on that full business case in the autumn of 2010. Sorry, on the Appendix K for the full business case in the autumn of 2010.

A Sorry. Right, I haven't seen anything that suggests that. Well----

Q If you could just try and tell me what you remember first, and if we can find anything that helps, we'll go and do that.

A The----

Q But the implication is that, say, in the autumn of 2010, you or Wallace Whittle were signing off on behalf of the

Board something that was going to the Scottish Government: this Appendix K. Do you remember anything about that?

A I don't remember us signing off anything. I do, and it's part of the, what we have here, which is that that report, I'm assuming the Appendix K, which went to the Government on with the business case, would have recorded our commentary that there was insufficient detail on the ventilation schemes for us to comment, and the same comment being made by Multiplex that that information was to follow in due course.

Q Can we have bundle 43, volume 3, 1280, just in case it helps? Here we are. It's just the same----

A Same document, yeah.

Q It's the same document found in a different place. What about bundle 16, 1677? Now, are you familiar with that?

A Yes, yes, I recognise this document, yep.

Q That appears to be a Wallace Whittle document, or at least Wallace Whittle are noted at the foot.

A It was, yes.

Q On the face of it, it's dated November 2010.

A I agree, yeah.

Q When was it prepared?

A It was prepared in-- it's on there: issue 1, 10/11/10 – November 2010. But yes, that document we produced.

Q So at that point, you were doing some work?

A We were, yes. Absolutely, I agree. That's where----

Q And what were you asked to do?

A Well, ZBP had produced a document which was an Environmental Matrix which had-- which was basically a schedule of a number of rooms which had their engineering proposals detailed on it, and that document there was our commentary against their proposals. And I think when you go into it, we record that there was an amount of ventilation details which were missing, amongst other bits and pieces.

Q Okay, well, let's just----

A So there's something askew here about the dates. That's what we need to check, to be frank.

THE CHAIR: I certainly am not very secure in the dates at the moment because I had understood, which is consistent with Currie & Brown having let go its sub-consultants, including Wallace Whittle, that Wallace Whittle's involvement on behalf of the Board terminated at the end of 2009, but we have a document dated November 2010 which you accept is a Wallace Whittle document and presumably Wallace

Whittle wouldn't have put that date on it without a reason?

A No, no, no, it's definitely-- it's a 2010 document.

MR CONNAL: Well, let's just scroll on a couple of pages to see if that assists us at all? Executive summary: so this is your comments on their matrix. Is that right?

A Yeah. But you also see the introductions, which is confirmed that we were asked to do it by Currie & Brown.

Q Right. And it says, "Reasonable assessment of the requirements…various anomalies" and in paragraph 1:

"… highlights areas that do not appear to be in compliance with the Employer's requirements..."

So, were you asked to go through everything and check whether they met the Employer's Requirements?

A No, I think that this was a selection of rooms.

Q Right, let's scroll on.

THE CHAIR: All right. Just so I'm following: the Environmental Matrix, as I understand it, is an Excel document which, if complete, would include every room in the hospital?

A Yeah, but see, if you look at section 3----

THE CHAIR: Yes.

A -- "Matrix Parameters," that, "720 rooms have a representative sample of the overall project." This wasn't intended to be a complete review of the whole hospital.

THE CHAIR: Right.

A I don't know how I'll find how many rooms it's got, but it's certainly got a lot more than 720.

THE CHAIR: In excess of a thousand, but I can't give you the figure.

A Right.

THE CHAIR: Right, okay.

MR CONNAL: Let's just see if we can sample what's on this document. If we scroll on to the next page, we see there that various topics are discussed – ventilation extract, ventilation supply – and you say derived generally from SHTM 03-01. (Inaudible 14:51:28) agreed at 40 litres per second, but we'll come to that. Say offices are 10 litres per second. They don't meet BCO level of 12. That's another piece of guidance for offices, presumably. Is that right?

A Sorry, what clause are you at there?

Q 4.5.

A 4.5. Sorry, 4.5?

Q Then 4.6.

A Yeah, yeah, same.

Q So what were you trying to do with this document?

A What we were doing was trying to split down the comments on the

various columns, if you like, which were the proposals from ZBP, and highlight if there was any areas which were not in compliance or had some query on them, and then you will see on this document that that document was then passed to ZBP and they appended their own handwritten notes on the----

Q Okay.

A -- against the----

Q Let's scroll on until we get some handwritten notes----

A Yeah.

Q -- and move on a bit. Okay, so this----

A So see----

Q Ah, here we are. So we've got a page-- Sorry, we just saw a page there. Page 11, where some comments on temperatures on the left-hand side, a comment on extract and supply ventilation rates, and then there's some ZBP comments on the right.

A Yeah.

Q So can you remember whether Ward 4B or Ward 2A were reviewed here?

A Ah. No, sorry. I don't-- I can't recall the format of the content, if you like, of the ERs. I think-- I suspect that these were general rooms as opposed to specific wards.

Q So did this instruction from the Board, to do this task, extend any further than, "Please provide your comments on their matrix"?

A No. No, there's nothing else we would have done, to be honest, unless we had been involved in the RDD process further down the line. So this was the ER review saying, "This is what we are picking up from ZBP's proposals." There's actions they need to do once they get to the position where they're actually taking those duties and the engineering solutions that they're describing and putting that into their engineering designs. This is all prior to them sitting down with their drawings and actually sketching out what their end design was going to be.

THE CHAIR: This may be consistent with what you've just said. I see, from time to time, the formulation is derived generally from SHTM 03-01. Now, it's the "generally" I'm interested in. That doesn't suggest to me that you're undertaking a, as it were, line-by-line, detailed review.

A That's correct, yeah. Yeah, because that information didn't exist at that time. In order to do what you're speaking about, you'd really have to go to the designer's finished proposals.

THE CHAIR: Mm-hmm. Mind you, there must have been some information there, if you're able to say, "generally derived".

A It was all in the columns within the matrix that they produced.

THE CHAIR: Right, so it might be a comment on the matrix itself as opposed to the content of the matrix?

A As opposed to the designs which would flow from the matrix.

THE CHAIR: Right.

MR CONNAL: Let me ask you a follow-up question for the moment, if I can. The Inquiry had been hearing about a process, or two processes, at the design stage: one called User Group meetings, where people came together and looked at which room should be beside which other room or where the room should be located and what kit was needed in rooms of particular types and what furniture was needed and what type of furniture and so on, with a view to them being-- the phrase is "signed off" as having been discussed; and we've also been hearing about what was described as a parallel process to discuss ventilation design, because ventilation wasn't discussed in the User Group meetings because there was no one in those groups who was up on hospital ventilation.

What seems to be assumed is that ZBP would produce proposals for the ventilation design of a particular area, a particular ward, or whatever, and they were expecting-- now, these are my words rather than necessarily the precise words the witnesses have used, but they were expecting that someone wearing a GGC hat would carry out a detailed analysis of whether they had picked up the Employer's Requirements correctly for the ward, whether they'd understood what was intended, and so on and so forth, and come back to them and either say, "You've got it spot on," or alternatively, "No, you haven't got it at all," or any variation in between.

Now, did you or Wallace Whittle participate in any such process?

A What I think you've just described is the RDD process, and that RDD process is not dissimilar to any other hospital and, I think, used in a lot of other projects.

That parallel process, if you like, would have been ZBP presenting their detailed design ventilation drawings. Wallace Whittle were involved in that. From my understanding, from various statements, is that the GGC employed a chap called Alistair Smith, and that's on Frances Wrath's statement, and she has recorded that Alistair was employed as an M&E expert or was part of that RDD process, looking at the ZBP drawings.

Q Yes.

A I know Alistair because he used to work for Wallace Whittle a long time ago. He's electrical engineer so I

don't know what his remit was for looking at these, if you like, this second tier that you're speaking about, which is not unusual. That's a normal process to go through the RDD. But I don't know who physically cast their eye over the ZBP drawings.

Q The only information the Inquiry had is that this individual was focused on electrical matters.

A That's what I'd expect from Alistair, but it's a long, long time ago, as most of my contacts are.

Q But the alternative view that's been advanced by Mr Hall of Currie & Brown and by Mr Seabourne in his statement is that design was a matter for ZBP. The Board had a responsibility to check what was described as clinical functionality; the design was a responsibility of the design and build specialist subcontractor. Do you know anything about that? Were you involved in that process?

A I wasn't involved in the process. I'm familiar with the concept and I think ZBP themselves would accept that they were responsible for the ventilation design, as is any designer, to be frank. What they wouldn't be responsible for was reviewing or taking on board any comments. They would do-- Sorry, they would take on board any comments for any special requirements that the end user had but, if you're kind of splitting hairs, yes, ZBP, just like any other designer, is responsible for the design.

Q In any event, you and Wallace Whittle were not involved in the detail and design process. Is that your position?

A Not the RDD. The RDD check-- The dates always seem to happen around about 2012, the final sign-off.

Q Apart from this remit, were Wallace Whittle instructed to do anything else focused on ventilation system at the New Hospital after January 2010?

A Not that I'm aware of.

THE CHAIR: Mr McKechnie, at risk of maybe repeating questions that you've already been asked, if we look at the Wallace Whittle document, the Environmental Matrix, that's on-- well, it's in two places, but bundle 43, volume 3, 1280, which is what is up on the screen at the moment. Could you just give me again what the purpose-- I mean, what was GGC asking you to do and what advice were you giving to GGC through this document?

A Okay. At the point in time when this document was prepared, we would be looking at the details of the M&E proposals that Multiplex were putting to the Board. Our role was to look at those proposals and comment on how-

- if there was any shortcomings with them, and I don't mean-- it's probably better to say if there was any lack of information or further expansion that would have had to happen to those proposals. So it was a picture at a point in time of where we thought the designs sat with Multiplex and ZBP.

THE CHAIR: Right, so it's a comment on the stage of development----

A Yeah.

THE CHAIR: -- represented in the Environmental Matrix in respect of 780 rooms which you understood to be representative of all the rooms in the hospital?

MR CONNAL: I think my Lord may have the wrong----

A Yeah, yeah.

THE CHAIR: Sorry?

MR CONNAL: I wonder, my Lord, whether it's the wrong document reference because we've looked at two documents. What we want is the document commenting on the Environmental Matrix, which we had a moment ago.

THE CHAIR: Well, that's my fault. I think it's my fault in giving you that citation----

MR CONNAL: There we are. That's the one.

THE CHAIR: -- to be B43. This is the document which Mr McKechnie drew our attention to.

MR CONNAL: Yes.

THE CHAIR: You're quite right, Mr Connal. I should have cited that as bundle 16 and page 1678. Thank you for that. (To the witness) However, now that I've got the correct citation, have I described what you were being asked to do by GGC and what you did do for GGC accurately?

A Yes, and in fact the two documents, if you like, go side by side. So, the Environmental Matrix document is a more expanded commentary on where we felt the design was sitting, and that was condensed on the Appendix K comments, all of which was recorded as going to go to further development further down the line. So, there was an acceptance that we got the-- we described the state of the design at that particular time.

THE CHAIR: I may be calling for speculation on your part. Why do you think GGC wanted that information in November 2010?

A Well, I will speculate. So, there would be two levels there. One was that they were-- they would be wanting to know that the designs were being progressed in a normal-- which is a normal manner, and the other one would be to give them what should-- sorry, should have been to give them a heads

up as to what still had to be produced and reviewed further down the line.

THE CHAIR: Right. If I've got my timing right, the full business case had been presented to Scottish Government by November 2010. My memory is 26 October 2010.

MR CONNAL: I think my Lord may be right. I don't have the date immediately to hand, but we can easily check it.

THE CHAIR: Right. Thank you, Mr McKechnie. My apologies, Mr Connal.

MR CONNAL: (To the witness) Yes, I'm going to take you back to your witness statement----

A All right.

Q -- in the hope that we can find where we got to in the narrative. The reason I asked you about that was that in paragraph 7 of your witness statement – that's page 35 – you had narrated the matter we discussed, that your initial appointment came to an end----

A Yeah.

Q -- at the end of the year, and you then go on to tell us what you were involved in up to that date. What we hadn't identified at that point was that you had a subsequent remit to comment on the Environmental Matrix at a later stage.

Now, you then go on to explain some of the things that you did, and then you go on to touch on some of the

complications that arose because the name Wallace Whittle appeared later on the other side of the fence, as it were----

A Yeah.

Q -- for reasons that we needn't worry too much about. You point out at the bottom of page 36 that you weren't part of the team that was at ZBP who designed the ventilation. You just told me you weren't part of any team on behalf of GGC who commented on the design of the ventilation in the ways that we've just discussed. Is that right?

A Yeah.

Q The only footnote that you add, top of page 37, paragraph 12, is that TÜV SÜD, which is the name then being used. Did that include you at that point?

A Yes.

Q "Did some work on the redesign of Wards 2A and 4B in early 2016." Now, leave aside 4B for the moment. Let's just think about 2A. You say there you understood at that time that the redesign was due to a change in the client brief. Now, I suspect that might come as a surprise to GGC, who will say that the brief never changed from day one. It was always the Schiehallion ward for the Paediatric Haemato-oncology department. What made you think there was a change of brief in respect of Ward 2A?

A The 2A works that we were

involved in, again, to the best of my-- weren't do with the-- a minor alteration to a waiting-- a trolley waiting area. So, the reason why-- 4B was a bit more involved but in both instances, I was-- I got separate instructions and separate fees that-- people don't give me instructions or fees to change something that's incorrect. They give me that because something's going to be changed, and they've accepted that it's different from what they briefed or whatever.

Q So, your 2A involvement in a very specific----

A It was a small----

Q -- small item?

A It was a small thing, yes, but I included it because I thought that-- just for completeness.

Q 4B, your different involvement?

A 4B was assisting Multiplex-- so, that-- they wanted to pressurise some of the bedrooms in 4B. So, to do that, they had to upgrade-- there was an upgrade of filters, there was an upgrade of air handling units, and there was physical alterations, like putting in a solid ceiling within the building. So, we were involved in that, and I got the instruction, and I got a fee for doing that for them. So, as I say, certainly neither of them came across to me as being addressing a defect.

Q But you don't know one way or the other whether it was a defect or it was a change----

A I'm pretty sure it wasn't a defect, otherwise-- I think it was-- PMI 147 was issued. So, that's a project manager's instruction that I think covered the work for B wards.

Q Now, in the next section of what you comment on working with Currie and Brown----

A Yeah.

Q Then you go on, on page 38, to touch on the Employer's Requirements, and you say you "prepared the M&E information section. It'll be found in part of the Employer's Requirements," and you passed it on. You were also involved in confirming what the relevant NHS guidance was for M&E aspect.

A Yeah.

Q Now, you say you weren't responsible for the clinical output specifications.

A No.

Q Were you asked to relate them to any of the other materials or it's just-- that was something that somebody else did at that----

A There were a number of sub-- let's call them sub-consultants appointed by Currie and Brown, all of whom were preparing their own part of the ER requirements. The clinical output specs

was one of those separate issues. So, we were looking after the M&E, and some of the others were looking after the clinical output specs.

Q How did you know what to put in the M&E section if you weren't involved in looking at the clinical output specification?

A The M&E section was capturing the general concepts and the guidance documents, which to be adhered to, for the design of the hospital.

Q Now, one of the topics that's cropped up, and is going to crop up again in a minute when we get to the ventilation-- we call "derogation," what you call "clarification."

A Yeah.

Q Is the-- what's been discussed as a maximum temperature variant. Whether that's an accurate label, let's not debate about it----

A No, it's----

Q Now, in your witness statement you say you don't know-- you don't recall anything about this at all.

A Absolutely not. The maximum temperature variant is part of guidance within the SHTM.

Q Yes.

A So, basically, it says you don't let the wards-- the rooms go above a temperature threshold for more than so many hours----

Q We understand that point but what I was trying to refer you to is the middle of paragraph 18 of your statement. You say:

"I don't recall anything regarding the removal of the maximum temperature variant."

A I don't recall anything from Wallace Whittle, but it's not a thing that we would-- Wallace Whittle would have instigated. Now, I'm, again, reading the witness statements. I'm pretty sure that there is-- I don't recall exactly who's it is but, within the witness statements, there's confirmation from the Estates team generally that they had asked for the attention limit to be taken away because – I think I've got the hospital right – it had cost them-- it was it was a budgetary concern over the cost of complying with it, which I think they had recognised from involvement in Stobhill Hospital.

Q I'm asking you the question, Mr McKechnie, because it's suggested that if anybody had been involved in discussing the removal of the variant and looking at possible knock-on effects, implications, whether it could be risk-assessed and so on, it would have been Wallace Whittle, but you don't----

A Not necessarily.

Q -- recollect.

A Not necessarily because you're dealing with an informed client.

So, I have no recollection of us being asked to do any work along the lines of what you're speaking about, but I now know, from my reading of the various statements, where it came from, the relaxation of that upper limit. As a design engineer, we referred to the SHTM requirements. The SHTM had a detail there. Somebody has taken the decision to lift those figures. Now, that could have been the Estates, it could have been the sustainability consultant, or a mixture of all of those, but it didn't emanate from Wallace Whittle.

Q Now, I'm not suggesting it emanated from Wallace Whittle, Mr McKechnie. What I'm suggesting is that, as we'll go on to see, a decision on a point like that could have possible ramifications for other issues such as ventilation, for instance, such as building design, because you're deciding to change your maximum temperature that you're prepared to tolerate. We were trying to find out whether anyone advised the Board on the possible ramifications or any risks that they might run by doing that, or any knock-on effects. Not you, anyway?

A No.

Q You then go on to comment on chilled beams and refer us to the references in guidance at the time. Were you provided at all with any of the feedback comments from bidders other than Multiplex on chilled beams?

A I don't recall any other commentary on chilled beams. I do recall it as being part of the ZBP strategy.

Q I can show you it if you need it, but the point is that one of the unsuccessful contractors put on a comment, the essence of which was to say, "If you go the chilled beams route, you can't meet your air changes per hour figures that the guidance requires you to."

A Quite possible. (Inaudible 15:19:42) already raised-- Wallace Whittle had already raised that anyway.

THE CHAIR: Sorry, couldn't give me that again, Mr----

A I'm saying, quite possibly somebody else commented on it, but Wallace Whittle had commented on that in any event anyway.

MR CONNAL: Okay. The Inquiry has been calling it the ventilation derogation, and I don't want to bandy definitions with you and I don't want to discuss with you, as a ventilation engineer, whether this is the right place to record a derogation which affects many, many rooms, but I'm keen to understand your role in this process that led to the M&E clarification log.

A Okay.

Q Can I put this general point to you first of all? So far as GGC was

concerned, you were really the key player in this process. Is that fair?

A GGC had their own M&E people, so I wouldn't say-- I wouldn't claim to have been the sole M&E person in the room, if you like. We were the guys who were pulling together the ER document to help them with the tender process, and we were also assisting them, as we've just spoken about, on reviewing what they got, but they had-- certainly they had other opinions than ours.

THE CHAIR: Can you remember any names?

A Well, the HFS people. HFS, so you had Ian Storer involved in the sidelines. I don't remember any discussion with him about ventilation, but you also had the estates people themselves who have an M&E background (inaudible 15:21:44) input, and you had-- Alan Seabourne was referring to other people. It's noted on there that he took advice from Peter Hoffman. So, I'm not trying to talk down our role, but we were one of-- we were speaking to, if you like, an educated client.

THE CHAIR: Ian Storer was then, as you say, with HFS----

A I believe so, yeah.

THE CHAIR: -- and Peter Hoffman was down in England. Are there any

GGC estates people who you have in mind when you think of----

A Well, Ian Powrie was certainly kicking----

THE CHAIR: Sorry?

A Ian Powrie----

THE CHAIR: Ian Powrie.

A -- was certainly kicking about at that particular time but you'd really need to speak to-- I would say Alan Seabourne would be able to point to the other people that he discussed matters with.

THE CHAIR: Thank you.

MR CONNAL: What I'm trying to get to, if I can, with your assistance, Mr McKechnie, is this: when we're dealing with the ventilation derogation, there appears to be a series of exchanges in a relatively tight period of time involving a relatively limited number of people – the Currie & Brown people, yourself, the Project team. In terms of that grouping, who were trying to get to-- let me just call it an answer, an end point----

A Yeah.

Q -- you were really the key player, weren't you?

A We gave our opinion-- Sorry, we highlighted to the client body that, in our opinion, the proposal for-- I think at that time it was 32 litres per second – didn't match the SHTM 6 air changes, but we also expressed our opinion and

explained that it was-- sorry, from our position, it appeared to be a reasonable proposition, given that it aligned with the current guidance at that time as opposed to the SHTM 03-01, which was in draft format but which also allowed a ventilation system based on an occupancy level.

So, we flagged it up to them that it wasn't-- We didn't say, "This is definitively correct." We said to them, "It doesn't meet that 6 air changes in that draft that you've got, however it does meet this, this and this," so that they can make an informed opinion-- an informed decision, sorry.

THE CHAIR: The "meeting, this, this and this" are references to non-hospital specific standards?

A No, no, the current document at the time of Queen Elizabeth was SHTM 2025.

THE CHAIR: Yes, but----

A 2025 does not have 6 air changes listed.

THE CHAIR: No, it doesn't have any-- it doesn't specify any----

A It has an occupancy level, so it has a guidance on the amount of air to be provided in relationship to the number of occupants within the room.

THE CHAIR: Yes, but this is a hospital for the next 30 years and everyone involved, you especially, was aware that there was a draft of SHTM 03-01.

A Yes, yes.

THE CHAIR: From the ignorant layman's point of view, I have some difficulty when you have guidance laid down by Government, admittedly not technically in force, but about to become in force, and you're building a hospital for the next 30 years, why you don't just follow the guidance. In a way, that's an unfair question for you, but it's----

A No, it's fine, I'm used to them, right? So, I think you're cherry-picking parts of the SHTM as opposed to looking at it in the whole.

THE CHAIR: Okay.

A The document is a guidance document, it has-- If we're focusing in on the line on the single beds, it has the option to go for natural ventilation. It highlights elsewhere in the document the option of occupancy driven, it highlights within the document that the preference is for natural ventilation, and it also records that there is an acceptance that the non-consistent performance of natural ventilation is acceptable for general wards.

So, you're-- when you take all of those things together, it's not-- I don't really think you can define it as a definitive guide. There's options there, and what we did was we highlighted to

the Board that the-- that it wasn't meeting the 6-air-change option, but it was meeting the occupancy guidance.

THE CHAIR: Just for my education, if I go back to SHTM 03-01 in a version-- well----

A The draft version.

THE CHAIR: -- which was-- well, the draft version----

A Yeah.

THE CHAIR: -- I will find references to calculations of air changes by reference to occupancy level.

A Yes, you will.

THE CHAIR: I will look----

A And you'll also find-- I'll drop you a note on it, if you like, because I've got all these things – you will also find guidance in there on a preference to natural ventilation.

THE CHAIR: Yes, right. That, I recollect. It was the occupancy point I didn't recollect----

A Yeah, it's there, yeah.

THE CHAIR: -- therefore I'll go back to the document. Thank you.

MR CONNAL: I think I'm right in saying – I've no doubt someone will correct me later – that every other witness we've heard from describes what was done here as a derogation from the guidance, but you don't accept that. You say it's not really a derogation----

A Well, (inaudible 15:29:21)----

Q -- for the reasons you've just explained.

A -- how I've been singled out as being away from the pack. All I'm-- all I've said is----

Q You may be right, I don't know.

A Well, all I've said is that a derogation, in my opinion, is where you are talking about something which is a complete alternative. I can't think of an example of it, but where it's something which is an alternative way of doing things. What we are talking about here is a measurement of the performance. I suspect that's why it was called a clarification log.

Q Let me ask you this question. The initial response from the Board to this proposed derogation was, "No, rejected, not acceptable." We know that at some point that became, "Okay, agreed." Can you help us understand at what point a kind of no became a yes?

A I think you'd really need to go to the Board on that because I suspect that that would be an internal discussion that they had.

Q Well, what I'm going to suggest to you is at the time of the-- this was coming to a head in late December, just when the pen is about to be poised to sign the contract----

A Yeah, yeah.

Q -- the last few days, the only

person at least apparently on the plot with expertise in this field was you, so I just wondered whether you knew.

A No, quite honestly, all I can remember was that we flagged up this proposal in the terms that it was put but specifically highlighted that it wasn't the 6 air changes.

Q One of the slightly quirky points here is that a comment is attributed to John Bushfield, which he says wasn't him, but in any event appears on the log beside his name in which he says in response to the proposal, "Not acceptable. This would require Board IPC sign-off." Do you remember that?

A No. It's true, though, so I'm surprised he didn't stick by it because it should have-- All we can ever do is raise an engineering opinion and explain an engineering concept.

Q So, you would agree with the proposition, but what happened about it, you don't know?

A I don't know, no. If there was IPC or any other parties involved in it, they wouldn't normally have involved themselves, but it would be the right way to go, in my opinion.

Q Can we have a look at bundle 17, document number 70, which will be 2860 or something like that?

A Yeah, got it.

Q Now, that's the ZBP paper. Can we just scroll on to the next page, please? What we're going to get here are a series of emails right up at the wire here just before-- Well, we know the contract was signed on the 18th, so we're pretty far along.

A Yeah, yeah.

Q Let's just work through these in the order they come to us, which may not necessarily be the chronological order. So, this is Mark Baird of Currie & Brown to you, I assume, copied to David Hall.

A It's----

Q

"Stewart,

Things for today..."

A Yes, yes, yes, aye. Sorry, I was looking at the top of it. Yep.

Q Yes, and then:

"1) Review of BE M+E statements on the log to date.

2) Air Changes – WW [so, that's you] to take Board through this + specific query – do we think [it's] driven by temperature or HAI for stated nr [number] oa [of] air changes ..."

Then, there's a comment about water storage that we can leave. Now, first of all, when it says there to "take the Board through it", this is a habit that you get in these correspondences. It might be fine to the people at the time, but when we're looking at it years (inaudible

15:24:40), “What on earth do they mean by ‘take the Board through it’? “ Who did you understand you were to take through this issue?

A Reading that email, I’m assuming that it would have been representatives from the Board or the FM-- the Estates guys or whatever were intended to be there. My big problem with this is I don’t remember the meeting and I’ve asked repeatedly for minutes in the meeting. They don’t seem to exist. I ain’t-- I don’t have the best memory in the world.

All I could say is that if I was asked to take somebody through the ZBP proposal, I would have explained exactly what I hope I’ve been able to explain to yourselves, which was that it wasn’t fully compliant with the 6 air changes in the draft SHTM, but that it did align with the other guidance at that time.

Q Can we just scroll down and see if there’s any more on this document? Carry on. Now, here is another one; it’s actually the day before. One of the Project Manager people.

A Yeah.

Q This is:

“On ventilation we see this as a sensible, practical solution and Energy efficient although it doesn’t strictly comply with the SHTM, only further proviso is that room should be kept at a neutral or slightly negative pressure as per the SHTM which needs to be incorporated ...”

Now, two questions about that. We’ve had other evidence that says conditioning something on a room being slightly negative is a very difficult thing to achieve – difficult to measure and difficult to control. So is that a sensible suggestion, putting in a requirement for slightly negative pressure?

A It’s a sensible suggestion prior to going to define pressures. I would disagree that you can-- that it’s difficult to make an area slightly negative, because, in essence, you have supply air going in, you’ve got extra air going out, you’ve got a corridor sitting at the side of it, so if you extract more air than you supply, that room will be slightly negative, and that--

When you go through the details of the SHTM, there are specific areas where you have a defined pressure, like in-- the best example is probably the operating theatres, etc. But it’s not dissimilar to have a small change-- I’m sure it says in the table that-- that it’s slightly negative. And the word “slightly” is used as opposed to a defined-- so many pascals, or whatever the pressure was, with the engineering term.

Q So what you say you’re doing in that email is simply tendering engineering advice. I think you say in your witness statement:

"This is a purely factual statement. In my opinion, this option was energy efficient."

A Absolutely, yeah. I'd never profess to give clinical advice.

Q That's a response to an email. We'll see, if we continue to scroll down, from Mr Baird, asking:

"[Can you] review and advise re ventilation + option choice on flow on pipes?"

There he has asked you to advise? So he's really saying, "What do you think we should do?"

A Is he saying that or is he saying, "Can I lay out what my interpretation of what the proposal is so that the client, who we've already discussed as an informed client, can make an informed decision, and make an informed decision involving any other parties that they need to do, for a hospital?"

Q (After a pause) Can we look at another document? Can we look at the ZBP paper, which I will find a reference to? Bundle 16 at page 1657. Now, we're about to see a document which by now will be painfully familiar to you, because you'll have looked at it.

A (Inaudible 15:39:57) say that.

Q It's dated 15 December, so fairly late on in the process, and it sets out various things, comments on natural ventilation, and then it basically says that what's driving this proposal is the change from 28 degrees to 26 degrees. That's really what's pushing them in that direction. You see under "Mechanical Ventilation", and then the next paragraph.

A Right, yeah.

Q Now, it seems to be suggested that you had been shown this and approved of it. "Stewart at WW apparently supports it" is the comment. Do you remember that?

A Well, I don't remember a comment that may have been made verbally 15 years ago, but I-- I do generally – and I've stated this a number of times in all the correspondence – do generally see the logic of the ZBP proposal from an engineering point.

Q Can we look at the second page? We have a conclusion there. The reference to building regulations and CIBSE, these are sort of bare-minimum requirements, are they not?

A Well, I wouldn't use the word "bare". They're minimum requirements, yes.

Q Okay.

A But I think also that the point they may want to consider is that that paper is proposing, what is it, 30 litres per second? The actual agreed derogation or compliance schedule, whatever you want to call it, was agreed at 40 litres per

second. Now, I would suggest that someone – not ZBP, but someone – has influenced that increase.

Q Was that you?

A No.

Q One of the challenges we've faced here is that people quote things in so many litres per second, and other people quote things in so many----

A Air changes.

Q -- air changes an hour.

A Yep.

Q Unless you're reasonably adept at maths and you understand what you're doing, you can't actually readily translate.

A You can't. I-- I accept that. The litres per second is, in my opinion, the key figure, because the litre per second is tied to the occupancy levels. The air changes is a resultant figure that comes away from that.

THE CHAIR: When you say it's tied to the occupancy level, am I right in thinking that it's calculated by reference to the number of people you assume is in the room?

A Assumes where they were in the room, yeah.

THE CHAIR: And if you end up with 40, that suggests-- and the rate per person is eight, which again I've got from somewhere----

A Aye, aye.

THE CHAIR: -- that assumes five people in the room?

A That assumes five people in the room. I kind of think, if I had been reviewing this from a clinical perspective, I would also have appreciated that, for the majority of the time-- that that single occupant in a single room was getting five times more than the minimum fresh air that he would normally put in. You need to look at it in the whole.

THE CHAIR: Yes, because that means 40 litres of air is being introduced every second----

A Yes.

THE CHAIR: -- and an individual might be alone.

A Yeah, absolutely.

MR CONNAL: Then you go on to make the point that, while others have just said straightforwardly, "This is a derogation. It's a six-air-change-an-hour piece of advice, and we're not complying with that," you take a more nuanced view for the reasons that you set out in your witness statement and also earlier today.

A I think that-- I think we're splitting hairs over-- over whether it's a derogation. It's an item in a clarification log.

Q Well, if you were an outside viewer of this process----

A Yeah.

Q -- and what you were being

told was that the Board was about to build hundreds and hundreds of bedrooms where their own guidance was suggesting 6 air changes an hour, and they were going to build them providing two and a half changes an hour, some people might regard that as a matter of considerable significance that needed brought out and highlighted, would they not?

A Possibly, but – and I don't mean to be disrespectful here – but, again, you're cherry picking a particular aspect. If somebody, likewise, said that they were building a hospital which was in excess of the minimum requirements for ventilation, bearing in mind that the issue you have – and I'm not teaching my granny to suck eggs, or anything like that – the issue you have is that you are trying to build a case on a document which was never, ever intended to be definitive.

You have natural ventilation allowed in it; you've got air changes in it; you've got occupancy levels in it. It states right through it that it's a guidance document. So, yes, you can-- you can cherry pick parts out of that as you like, but it would be an awful lot easier for everybody if it was definitively said, "Do you need that?" And I personally don't believe it does.

Q You go on to make the point that you don't have any recollection of the meeting where you have to take the

Board through things, and you've asked for minutes – as have we – and no one has produced any.

A Which is pretty unusual, to be frank.

Q Well, we thought that as well, Mr McKechnie, but we haven't got them.

A And I'm sorry I don't have them either, but I don't-- I don't see that I would have come up with any other explanation than the explanation I've given to you today.

Q You say in your witness statement, essentially, that you were simply participating in this exchange to give engineering advice----

A Yes.

Q -- and you weren't involved in what assessments were done, risk assessments, discussions with IPC – any of the other things. You were just feeding in some engineering advice.

A That was what our role was and, to be frank, if I'd been asked to sit in and explain to the Infection Control people, or whatever, I would have done that. I've done that in other hospitals for different-- different reasons, but I don't recall it ever happening in Glasgow.

Q Can we look at bundle 17, document 72?

THE CHAIR: Sorry, could I just get that last answer again, Mr McKechnie. It was my fault; I lost attention.

A Sorry, I was saying I don't recall being invited to discuss the air change rates with Infection Control people, but I have – and I am aware that I have – done that on other hospitals----

THE CHAIR: Right.

A -- that I have been involved in.

MR CONNAL: Thank you. Can we go back to 2861? Yes, so that's where we get the reference to the things that we've looked at----

A The meeting. Yeah.

Q -- earlier. Can we just then scroll it forward and we'll just see all of the different exercises? Because there seem to have been a number of meetings and/or discussions around about this time. For instance, if we just go back to 2863, we find at the foot of the page, 15 December, Mr Baird saying:

"If you can review and advise re ventilation + option choice ... (pros + cons ...)"

Did you ever produce anything which had pros and cons on it?

A Yeah, I don't think so, no. Nope.

Q If we scroll on, then----

A You know, if I had, we would have passed it to Currie & Brown, bearing in mind that our-- my employer, as it were, was Currie & Brown. So, any information that we produced, the route went to Currie & Brown.

Q Do you know why this ZBP paper appeared, on one view, pretty late in the process? If you're going to get a report from an expert, you know, you might want it at a time when you can carry out some proper analysis of it.

A Pure guesswork, but I guess they may have made earlier statements, and it's been a kind of-- it's been one of the boxes to be ticked prior to the-- the appointment, and they've been-- they've produced it, again, in an enhanced way, possibly, from what they had before. There would be an awful lot of correspondence would be floating about round about that time.

Q If we just carry on to 2865 to see if that helps us at all. Yes, that's where we get the reference to-- This is Mark Baird saying:

"They [that's presumably ZBP] have discussed this with Stuart at WW who seems to support it."

You say you don't remember that, but you probably would have done----

A Yes.

Q -- for the reasons you've explained. If we go on to the next page-- No, it's blank. 2867. That's the document. 2869. Now, here we have Mark Baird saying to you:

"Stewart,

I think we have a way forward on this one, need a calculation carried out

however ... to prove our resolution. This involves litrespersecond, air changes ... and ... requires your technical input..."

Do you remember that meeting, the half hour in the morning one?

A No. I mean that's the same week as that one that was purported to be on the 19th. So, I mean, I've read that one, and to be honest with you, when I looked at it, I was struggling even now to see what Mark was getting at in terms of he needed a calculation. I don't know what that calculation would have been, but can I suggest that the meeting-- that meeting has possibly morphed into this infamous 19 December meeting?

Q Now, you make a particular point about this in your witness statement at page 41, if we go back there. At paragraph 27, you say the email – that's the one we've just looked at – "refers to a proposed resolution".

"I do not recall ... this. Currie & Brown are asking for our technical input ... we were not in a position to provide resolutions. Any resolution of that ... was a matter for Currie & Brown."

They didn't have any expertise in this area, did they?

A No. No.

Q So the only person that was going to come up with a resolution or confirm the resolution would presumably be Wallace Whittle.

A I don't think the word "resolution" would really fit into the context of what we were doing. As I said earlier, as a technical advisor to an informed client, I can only point things to them. We don't ever, and we never did, have the power to say, "Yep, that's fine, go along with that." We have the power to say, "This is what's being proposed, and here's our opinion on it, and here's what it means," to try and help people to get to that final discussion. And again, something else has happened to turn that into 40 litres per second.

Q My Lord, I don't have any further questions for this witness, but this might be an appropriate time to take a short pause.

THE CHAIR: Mr McKechnie, we'll have to check with a room to see if there's any additional questions, so if I could ask you to return to the witness room.

THE WITNESS: Of course. Will do.

THE CHAIR: Thank you.

(<u>Short break</u>)

THE CHAIR: Perhaps just a few more questions, Mr McKechnie.

THE WITNESS: Sure.

MR CONNAL: Thank you, my Lord. I may have asked you some parts of this earlier but, firstly, at some point in your

evidence, you said that you'd explained to the Board that the earlier guidance, and one reading of the current guidance suggested you could use an occupancy method of calculation and what was proposed met that. Do you know who you told that to?

A No, sorry. What I said was if I had been asked, that's what I would have-- and if that's not what I said, that's what I meant to say, and I think it was in respect of when we were speaking about this 19 December meeting.

Q One point in your evidence, you said something along the following lines, that you saw the logic of the proposal from an engineering perspective.

A Yeah.

Q Why did you say that? "From an engineering perspective"-- just to make sure we understand the point.

A Because from an engineering perspective the proposal aligned with various parts of the guidance which was existent at that particular time.

Q Can we just get the M&E clarification log itself? I think there may be a version in bundle 16 at 1662. It must be further on. Ah, here we are, there's ventilation. Sorry, go back----

A Down the bottom there?

Q Yes. So here we have the comment:

"Ward air change to be 6AC/HR, currently shown as 2.5AC/HR, which is not in compliance with SHTM 03-01."

So that's the initial Board position, isn't it?

A Sorry, I don't know where the header is for that.

Q All right. Well, we can scroll back to the start of the document. Board comment.

A Yeah.

Q So it's Board comment, followed by Brookfield comment.

A "Ward air change to be 6," yeah.

Q Yes.

A And then that's a Brookfield comment.

Q Yes. Brookfield proposed, as outlined, to incorporate chilled beams as a low-energy solution to control-- So, at least on the face of the log, that's the reasoning that's been put forward. This is the, if you like, the recorded result----

A Yes, yeah.

Q -- that what was being proposed was being proposed as a low-energy solution. Is that how you remember the discussion?

A The discussion I remember is as outlined by the ZBP report document that we looked at earlier, where they're explaining the benefits of going down the chilled beam with the reduced air. And

then we see the air change. I don't (inaudible 16:08:10) that, but with the air rate.

Q Yes. You'll probably understand that one of the challenges we have is that, apart from what's in the log and the bits of emails that we've got going back and forwards, there is no record of this having been discussed at a committee, reported, recorded, anywhere else than this log----

A I can see the dilemma there, and unfortunately I can only help the Inquiry with the engineering side of it. But as a layman in health terms, I would have expected that there would have been involvement by health professionals with any of this type of clarification, derogation, whatever you want to call it.

Q Just so we can finish this, just for completeness, you move across the page and then you then get another "Agreed", so I-- Go back because we want to read everything. It says:

"The proposal is accepted on the basis of 40 litres per second."

So that's where the figure comes from, eight litres for one patient and four others, and it says:

"Joint review to be carried out between the Board and Brookfield of the energy model to determine any impact on the energy target..."

And "Negative pressure to be created in the design solution." So at least on the face of the document, as it ended up, it appears to be focused on energy saving?

A It's-- Yeah, I don't know if "focus" is the right word, but it's explaining there how ZBP were going to meet the-- from memory, they were pretty onerous energy targets that they had to meet. And I think that note we'll have just read there is an indication that that was another exercise which was ongoing.

Q I have no further questions, my Lord.

THE CHAIR: Well, Mr McKechnie, that is the end of your evidence for today. I'm sure you will value the fact that, as far as the Inquiry is concerned, I think this is the end of your contribution. But you have, as I said at the beginning, you have attended now on three occasions. You've prepared for that attendance on three occasions and, as it's clear from your evidence today, that has involved background reading. So can I say thank you for your attendance today and indeed on these previous occasions, and thank you for the work that has gone into it.

THE WITNESS: Thank you.

THE CHAIR: But you're now free to go.

THE WITNESS: Thank you. Okay, thank you. Bye.

(The witness withdrew)

THE CHAIR: Now, as I understand it, Mr Baird tomorrow morning, but is Mr Baird the only witness for tomorrow?

MR CONNAL: Mr Baird in the morning, which will be my responsibility, and then I think Mr Redmond.

THE CHAIR: Mr Redmond will be in the afternoon?

MR CONNAL: In the afternoon, which Mr Mackintosh will deal with after we had to shuffle some of the dates.

THE CHAIR: Right. Well, we'll see each other tomorrow at ten o'clock. Enjoy the evening.

(Session ends)

16:05