Scottish Hospitals Inquiry

Witness Statement of

Julie Miller

This statement was produced by the process of sending the witness a questionnaire with an introduction followed by a series of questions and spaces for answers. The introduction, questions and answers are produced within the statement.

Personal Details and Professional Background

1. Name, qualifications, chronological professional history, specialism etc. please provide an up-to-date CV to assist with answering this question. Please provide details of your role working for Multiplex Construction Europe Limited previously, Brookfield Construction (UK) Limited until 21 February 2011 and thereafter Brookfield Multiplex Construction Europe Limited until 31 August 2016 (hereinafter referred to as 'Multiplex') during the time Multiplex was appointed as Contractor in respect of QEUH/RHC, providing details of when you started and left this role, your responsibilities.

A I joined Brookfield Construction on 1st March 2012. My role was as a Mechanical & Electrical Services Manager as part of the M&E team. I moved from the QEUH / RHC project around March 2016. Please see attached CV for my responsibilities.

2. What previous experience or training, if any, did you have to work as Director of Construction? How, if at all, did this experience serve you for the role in respect of the QEUH/RHC?

A I was not employed as Technical Advisor on the QEUH/RHC project by Multiplex nor did my role encompass TA duties. I have previously carried out a Technical Advisors role, but this was when I was employed by Mouchel Consulting.

a) What previous experience or training did you have working as a Mechanical and Electrical Services Manager?

A Whilst I had not had this specific job title previously, I have carried out very similar role

responsibilities and activities with Mouchel Consulting as Technical Advisor and particularly as Independent Certifier where I was involved with witnessing building services for mechanical (predominantly) and electrical elements including Ventilation, Fire Alarm, Nurse Call, fabric related elements, BMS, Lighting etc. I have worked in construction for over 20 years in the same field. I would consider that I have the requisite experience, am dedicated and conscious in terms of detail and can communicate well with different groups of people from clinical staff, sub-contractors, designers whilst also learning from other team members and specialists.

b) Describe the role of Mechanical and Electrical Services Manager in respect of QEUH/RHC. What areas were you responsible for? In particular describe your role in respect of the water and ventilation system at QEUH/RHC.

A I did not have a detailed job description for this role and all the members of the M&E team had allocated floors to work on plus other special areas. I was mainly based on Level 2 and Level 3 including Plant rooms but was also to assist the Commissioning Manager with witnessing activities – particularly ventilation. Because I had a clinical background, I added a different element to the M&E team. The Aseptic suite was a package I managed with one of the managers on the build side; I had some involvement in the Audiology rooms, some elements in Theatres, MRI, CT where I liaised with the Trust. Checked plenum sizes for the Fresh Air intakes, Pressure Relief dampers. I have described my role in terms of working with Capita later in this statement. I also checked the installation of pipework e.g. that directional arrows were correct, that commissioning sets and valves were as per the drawing, smoke and fire damper installations, ductwork installation. As an aside, I was involved in the penetrations with WSP later on. There was a myriad of things including communications with our design teams etc. meetings with our sub-contractors. And anything else that was required of me. In terms of water systems, I did not have much involvement. In terms of the ventilation, I witnessed the commissioning of quite a number of systems (but not the towers) and all the Isolation rooms.

3. Please provide details of any other healthcare projects that you were involved in prior to the QEUH & RHC.

A I have not worked on any other healthcare projects whilst employed by Multiplex however I did work on a number of Hospital Projects whilst employed by Mouchel Consulting. These were Oxford John Radcliffe Hospital, Oxford Churchill Cancer

Centre, St Helens & Whiston Hospital Project, Walsall Hospitals, The Garrett Anderson Centre Ipswich & Greater Peterborough Health Investment Plan (GPHIP). Our roles in those noted were either as Technical Advisor or Independent Certifier.

4. Please refer to **Bundle 43 Volume 3, Document 12, Page 493 at page 3**. The Inquiry understands that Multiplex refers to itself as having 'Specialist Contractor and Design Team staff'. Please explain what having a 'Specialist Contractor and Design Team' means, what this entails, what necessary qualifications/experience the team holds, the relevance of this specialism relative to building healthcare premises.

A I was not involved in the preparation of the PEP document, and I therefore cannot make any comments on it. I can read the document, but any comments would just be my opinion and there are others better placed to respond to these questions.

a) In your opinion, please explain what having a 'Specialist Contractor and Design Team' means, what this entails, what necessary qualifications/experience the team holds, the relevance of this specialism relative to building healthcare premises?

A A Specialist Contractor could or would be a company who had worked in a Hospital Environment previously although this is not essential i.e. things such as building partitions, fire stopping details, flooring, power distribution, lighting circuits, fire alarm, BMS, sprinklers and infrastructure and so on are the same in any building – the difference is in the design but there are also specific systems that only a Hospital would have, such as Nurse Call, specialist ventilation systems, specialist departments and very technical equipment systems. Experience of a Contractor who has worked in this environment before and delivered healthcare projects is extremely valuable. The Design team again, should or would be one that had worked on and delivered a compliant healthcare design in line with the current and up to date relevant standards and legislation, Health Technical Memorandums, Health Building Notes and so on (in this regard the Scottish equivalents). The Design team would be comprised of an architectural practice with Healthcare Planning, a M&E Design team for all elements of the MEP and building services, Site Masterplanning, Landscape Architect, Civil and Structural Engineering, and specialist input for specialist systems. Multiplex also had Design Managers, Engineers of different disciplines etc.

5. On the Multiplex website it states:

'We [Multiplex] have a long track record of delivering world-class hospitals and aged care facilities that enhance wellbeing and safeguard the day-to-day running of existing operations…
Our teams are skilled in the detailed planning and robust scenario-testing required to ensure safety and surety of delivery in highly sensitive environments….
We are experts in delivering state-of-the-art medical facilities in collaboration with our specialist supply chain. Our UK portfolio includes the largest hospital campus in Europe, Scotland's largest children's hospital, and luxury later living accommodation in Chelsea, London.'

a) In delivering world-class hospitals, please explain the level of knowledge and understanding of healthcare regulations and guidance expected of Multiplex staff?

A Multiplex appoint leading consultants that specialise in this field with certified and qualified personnel along with experienced Tier 1 contractors. The resulting detailed design would meet the requisite compliance and standards expected for healthcare and its regulations and guidance. The project is built on the design as signed off and agreed by all parties. I cannot really explain what Multiplex expect of all staff employed on a hospital project.

b) Explain your personal knowledge, understanding and any relevant qualifications in healthcare regulations and guidance?

A I believe I have explained this in the previous section and the inclusion of my CV and working experience both in a clinical setting working for the NHS and working for a consultancy thereafter on healthcare projects.

c) Please explain your understanding of the importance of compliance with healthcare regulations and guidance for infection prevention and control?

A Constructing a healthcare facility is a complex and multifaceted undertaking that requires meticulous planning, coordination, and adherence to regulations and standards. Compliance in the construction of the facilities is not only a legal obligation but also a crucial aspect that ensures the safety, functionality, and success of the facility and a fundamental requirement for creating a safe and effective healthcare environment. Infection prevention and control (IPC) i.e. in preventing and reducing the transmission of infectious diseases is essential to ensuring people stay

healthy and people should have confidence in the cleanliness and hygiene of health facilities and services provided within that facility and how it has been built, operates and maintained.

d) Who from the QEUH team provided Infection Control input and at what stage?

A I cannot answer this question, as I had no involvement with the Trust Infection Control Team or their input or when.

Appointment as Contractor

6. The Inquiry understands that Multiplex was appointed as Contractor to undertake the works for the QEUH & RHC. The works under the Building Contract were to be carried out in stages: Stage 1 (Construct Laboratories), Stage 2 (Detailed design of hospital to FBC submission), Stage 3 (Construction), Stage 3A (Demolition surgical block and landscaping) **(Please refer to Bundle 17, Document No. 12, Page 613)**

a) Describe the appointment process leading up to the Multiplex's appointment as Contractor.

A I had no involvement, nor was I employed by Multiplex at the time of the drawing up of the Contract Documents.

b) Describe your role and remit, in particular provide details regarding Multiplex's role, responsibility and authority in respect of the design and build of QEUH/RHC.

A I did not have a role nor remit to undertake works in respect of the design and build of this project. I was not employed by Multiplex at the time of the drawing up of the Contract Documents.

c) Describe your working relationship with NHS GGC prior to appointment, had you worked with any members of the NHS GGC Project Team prior to appointment, if so whom and when?

A I had not worked with any members of the NHS GGC project team prior to appointment.

d) Describe your working relationship with NHS GGC during the terms of your appointment, including day-to-day dealings with the NHS GGC Project Team, details

of who you worked with and in respect of what matters?

A Shiona Frew, Frances Wrath, Peter Moir. I cannot recall any other particular names. Some dealings would have been with the Aseptic Suite, MRI department and I recall speaking about the floor trunking for the Scanner rooms, X-ray Warning Lights but I cannot remember the detail or everything we would have spoken about.

e) Describe your working relationship with Currie & Brown prior to appointment, had you worked with any members of Currie & Brown who worked on QEUH/RHC prior to appointment, if so whom and when?

A I had not worked with any members of Currie & Brown who worked on QEUH/RHC prior to appointment

f) Describe your working relationship with Currie & Brown during the terms of your appointment, including day-to-day dealings, and details of whom you worked with?

A I can recall David Hall, but I did not have regular day to day dealings with Currie & Brown.

g) Describe Currie and Brown's role and responsibilities in respect of the project. Are you aware of any changes to their role during the project? If so, please explain.

A As far as I am aware Currie & Brown were a Trust appointment to provide Technical Advisory Services. Under the documents provided under Bundle 17, this details their following duties: Project Management, Cost Management, Architectural Design Review, Mechanical & Electrical Engineering Design Review, Civil & Structural Design Review and CDM Coordination however I would not know the full extent of their scope of works nor their full role and responsibilities. I would also not know of any changes to their role during the project.

h) Describe your working relationship with Capita prior to appointment, had you worked with any members of Capita who worked on QEUH/RHC prior to appointment, if so whom and when?

A I had not worked with any members of Capita who worked on QEUH/RHC prior to appointment.

i) Describe your working relationship with Capita during the terms of your appointment, including day-to-day dealings, and details of whom you worked with?

A I can recall Dougie Wilson and John Redman from Capita and Alan Follett. We did not meet every day, but Dougie would have been invited to witnessing of building services e.g. ventilation, damper testing, AHU running and other building services but with other members of the M&E team. John Redman was more fabric/ building side. Allan Follett – also M&E. I was the liaison between Capita (who would raise observations) and Mercury's' Compliance Manager (David Dickie) and Multiplex's Compliance Manager (John Wales).

j) Describe your understanding of Capita's role and responsibilities in the project.

A It is my understanding that Capita Symonds were appointed by the Trust as Consultants in the role of Project Supervisors however I do not know the full scope of works of their appointment nor was I involved in their appointment letter.

k) What role, if any, did Capita have in ensuring contractual compliance?

A I understand that they had general compliance responsibilities but cannot provide any other information in regard to contractual compliance. I have noted elsewhere in my witness statement that Capita raised general queries or made observations on various elements including some compliance elements via their Tracker which included both building as well as M&E items. They would ask for further information on observations raised, or photographs or clarification and would close these observations out when satisfied.

l) Describe your understanding of the role of Mercury's Compliance Manager.

A I do not know the Mercury's Compliance Manager's full scope or role, but he was the QA manager and managed the project in terms of established control procedures, and maintaining accurate Quality Records including installation inspections, testing and inspections, audits and tracking documents and completion matrix. He also liaised with the Multiplex QA Manager. Mercury had their own trackers but would provide responses and evidence to any queries or questions raised by Trust parties or Consultants e.g. Capita or Multiplex themselves.

m) Who did you report to on a day-to-day basis?

A Darren Pike (Project M&E manager) & David Wilson (Commissioning Manager).

n) In respect of other contracts and sub-contractors, explain which contractors and sub-contractors Multiplex had worked with prior to appointment, describe your day-to day working relationship with them, and details of whom you worked with?

A As I was not employed by Multiplex prior to the QUEH/RHC project, I cannot fully answer in respect to which contractors and sub-contractors Multiplex had worked with before but a number of these would have worked on the Peterborough Hospitals Project e.g. Mercury (M&E Contractor); TAC (Nurse Call, Fire Alarm, BMS Controls) and the Design Team. All multiplex staff would have day to day contact with a number of the sub-contractor's dependent on the particular trade specialism and which floor they were based on. Also, meetings on progress and programme, any issues raised and so on. I cannot remember everyone I worked with from the Sub-contractor side but most from the M&E Mercury team both mechanical and electrical, Schneider and commissioning engineers.

o) Describe Mercury's role and responsibilities in respect of the project.

A I cannot fully answer for Mercury's whole role and their responsibilities. I had no involvement in their appointment nor their contract terms or scope of works for which they were employed. They were our (Multiplex) Supply Chain Partner and provide the MEP services for the project.

Review of the 'Works Information'

7. What information was provided to Multiplex to assist with the planning and costing of the project to enable Multiplex to prepare the Contractor's Proposals?

A I am afraid I cannot comment on this as this was not part of my role, and I was not employed by Multiplex at the time these would have been in preparation.

8. The Inquiry understands that NHS GGC provided a list of guidance documents (e.g. SHTM/SHPN) that the design had to comply with, please confirm what elements of the design contained in the Contractor's Proposals, did not comply with guidance, and why and how any non-compliances were highlighted during the tender process and ITPD process?

A This was prior to my joining Multiplex, and it would not have been part of my role anyway.

9. What consideration was given to the impact of any non-compliances on patient safety/infection prevention? At what point, if any, was advice sought from Infection Prevention and Control Staff? If advice was sought, from whom was it sought and what was the advice given?

A I cannot answer this question. This would have been at design stage, and I was neither employed at this time nor would it have been part of my role.

10. Did Multiplex propose any changes to the exemplar/reference design? If so, please provide details of the changes and why?

A I am afraid I do not know. Again, this would have been at Design stage and prior to agreement and sign-off.

11. The Inquiry is aware of the agreed ventilation derogation recorded in the M&E Clarification Log. **(Please refer to Bundle 16, Document No. 23, Page 1662)**

a) Describe Multiplex's role in respect of the proposals leading to the ventilation derogation.

A I cannot answer this question as I had no involvement in this process.

b) What was the reason for the ventilation derogation?

A I cannot answer this question as I had no involvement in this process.

c) Who drafted the M&E Clarification Log and who was responsible for updating the Log? Following updates to the log, please provide details of who the log would have been distributed to?

A I do not know who drafted the log specifically as I was not involved in this process, but it is my understanding that it was part of the Contract documents.

d) What was the scope of the agreed ventilation derogation recorded in the M&E Clarification Log? In particular, was it restricted to general wards only? If so, (a) how is this interpretation evidenced within the documentation; and (b) where is the specification located for areas that required specialist ventilation and isolation rooms?

A I am not able to fully answer this question; those parties involved would be better placed to explain. In reading the log myself, it does not specify what areas (it states Single bedrooms) and my understanding would be that this was for the tower wards;

Specialist areas such as Theatres, Aseptic Suite and Isolation rooms have the compliant air change rates.

e) At the time what concerns, if any, did you have regarding the derogation? Did you raise any concerns, if so with whom?

A No, I did not have any concerns. The Derogation had been signed off as agreed by all parties including the Board and included in the Contract Documents

f) Please explain why you say that the Derogation had been signed off by the Board.

A In Bundle 17, the Contract Document is included. Under Contract Data Part 2 – Data provided by the Contractor (page 748) – Under 1. General, the first point is 'The M&E Clarification Log is set out in Volume 3 of the Employer's Requirement. Volume 2.1 has derogations contained and a status of agreed or not in conjunction with the Board and other relevant parties. I have taken this document as being included with the signed contract documents and therefore agreed.

12. Refer to the ZBP Ventilation Strategy Paper dated on or around 15 December 2009? **(Please refer to Bundle 16, Document No. 21, Page 1657)**

a) What was your/Multiplex's involvement in this document being instructed?

A I had no involvement in this document being instructed.

b) What was the intended purpose of this document?

A I cannot comment on this. I am not a designer.

c) When did you first have sight of this document?

A In this Bundle, I do not recall having seen it before.

d) At any time during you working for Multiplex decision set out in the M&E Clarification log to reduce air change rates from 6ACH to 40 litres per second across the hospital and so not to be in conformity with SHTM 03-01 mentioned to you/ brought to your attention? If so, when and by whom? Please explain the context.

A I do not recall someone mentioning this specifically or at a particular time. I was aware of it but as far as I know it had been agreed otherwise the ventilation would not have been designed for this. Also, I can see that it has been noted as agreed in the same document Bundle as under (f) above where it states 'The proposal is accepted on the

basis of 40 litres per second per single (8 litres per second) for one patient and four others'. It clearly says under the Board column that it does not meet the SHTM but the last column says agreed.

e) Who was the document shared with?

A I cannot answer this question.

f) How was Multiplex satisfied that the proposals set out in the above document were suitable for use in a healthcare setting?

A I cannot answer this question.

g) What concerns if any did you have on reading this document? If so, did you escalate these concerns and to whom?

A I am not able to answer this question as I had not seen this document before.

13. Are you aware of any risk assessments, whether in compliance with the standards in HAI Scribe or otherwise, that NHS GGC carried out in respect of the change in the ventilation strategy that appears to follow the ZBP Ventilation Strategy Paper dated 15 December 2009? **(Please refer to Bundle 16, Document No. 21, Page 1657)**

A This is not something I was involved in, and I am not aware of any risk assessments carried out by NHS GGC.

14. Describe the advice sought, if any, or the involvement, if any, of GGC Infection Prevention and Control staff in respect of the change in the ventilation strategy that appears to follow the ZBP Ventilation Strategy Paper dated 15 December 2009?

A I am not able to respond to this question as I had no knowledge of the GGC IPC staff in relation to this strategy.

15. Who from the GGC Project Team and Board were aware of the ventilation derogation?

A I had no involvement in the derogation process. I do not know specifically who was on the Board or all who were on the Project Team. The usual protocol would be detailed as part of the contractual process and normally no derogation could be presented and accepted unless it had been evaluated by the Trusts' Technical Advisors, their Consultants and the Project Team and signed off as acceptable. It is

written on the Clarifications Log, and this would have been in the Contract Documents.

a) Who do you mean when you refer to the “Trusts’ Technical Advisors”?

A I would be referring to Currie and Brown who were the appointed Board Technical Advisors.

16. How was the ventilation derogation communicated to the wider Project Team?

A I do not know specifically as I had no involvement in this process.

17. What impact did the requirement for a BREEAM excellent rating have on Multiplex’s proposed design in particular in respect of ventilation?

A I was not involved in these requirements and cannot answer this question.

a) From the point you started on the QEUH/RHC project in your role at Multiplex, what importance and value, if any, was attached to achieving BREEAM excellence?

A I am afraid I cannot answer this question as I had no involvement in the element of the project.

18. What impact did the energy usage target of no more than 80kg of CO2 per square meter have on Multiplex’s proposed design?

A I do not know the answer to this question.

19. The Inquiry is aware that Chilled Beam Units were proposed by Multiplex and accepted for use through the QEUH/RHC. What was the basis for Multiplex proposing to use Chilled Beam Units? Is the use of Chilled Beam Units appropriate throughout hospitals? At the time, what concerns, if any, did you have regarding the use of Chilled Beam Units?

A I was not involved in any proposals presented or the proposals process, so I am not able to answer the question. However, reading through Page 1063 of Bundle 17 it notes the following ‘The bidders’ attention is drawn to the Employers Requirements and in particular the following sections: Appendix M&E3 2.4.3 Chilled Beams. The use of active chilled beams should be considered within all ward areas. Active chilled beams will provide tempered, filtered air together with heating and comfort cooling of the space; thus, providing effective local control of the environmental conditions’.

Their use therefore appears to be a response to the ER's.

20. Would it have been possible to achieve the sustainability requirements (BREEAM excellent rating and 80kg of CO2 per square meter) if Chilled Beams were not selected for use in the QEUH/RHC?

A I cannot answer this question; I am not an expert in this field.

Full Business Case

21. Under 'Services Systems' confirmation was required "that the design fully complies with the requirements of the Employers Requirements, M&E appendices 1 to 6, all HTM's, HBN's, SHTM's and current legislation". The Inquiry is aware of several departures from SHTM 03-01 Guidance in relation to air change rates, pressure differentials and filtration requirements. There was also a variation to the primary extract arrangement for PPVL isolation rooms from that set out in SHPN 04 Supplement 01. Was Multiplex aware at the time, of these non-compliances? If so, please confirm how Multiplex communicated these non-compliances to the NHS GGC Project Team. If no action was taken by the NHS GGC Project Team what obligations, if any, did Multiplex have to report matters further and to whom?

A I had no involvement in the Full Business Case or departures from guidance so I cannot answer this question. However, normally if there were changes or departures from the noted guidance, these would have to have been presented, discussed, agreed and signed off as acceptable with the Project Team, their Technical Advisors and Consultants. They would need to be documented as part of the Contract.

22. Was the ventilation derogation noted in the M&E Clarification Log, recorded in the Full Business Case? Who was responsible for doing this? If you were aware that it had not been recorded in the Full Business Case, please explain what action, if any, you took.

A I was not involved in this process, and I am afraid I do not know if the Full Business Case would have been presented before the 2010 ItP document was issued and agreed as I do not know the protocols for this documentation.

Design and Construction and Role in the QEUH/RHC Project

23. The Inquiry understands that ward layouts and Room Data Sheets (RDS) were approved through the reviewable Design Data (RDD) process. Describe your role, if any, in the RDD process and the user groups.

A I had no role in the RDD process or the User Group meetings. Usually, this process is led by the Architects and would be carried out in order to ensure design of the departments and rooms including FF&E layouts are functional and in line with the requirements of the particular department/ward type and fit.

24. How were members selected to be part of a user group?

A I do not know in this case but usually, it would comprise of the project team, departmental or ward manager, senior staff and any specialist occupations that would need to have an input to the layout and functional use of the area. It depends on the specialism of the particular area.

25. Confirm who attended the user groups meetings from Multiplex, the NHS GGC Project Team, IPC, Estates and Clinical teams for the following areas: Ward 4B – QEUH; Ward 4C – QEUH; Level 5 – QEUH; Critical Care – QEUH; Ward 2A & 2B – RHC; PICU RHC – RHC; All Isolation rooms.

A I am not able to answer this question as I was not involved in the process.

26. How often were user group meetings scheduled to review design proposals and agree the design with the user groups?

A I do not know as I was not involved in this process.

27. How were designs and the RDS approved to proceed to construction?

A Again, I do not know as I was not involved in this process. However, the usual procedure is that architectural designs along with the matching RDS's would have an RDD sign-off sheet which the Trust and other requisite parties would sign to confirm that they were approved and at Status A to proceed.

28. How was the ventilation derogation communicated to users during the RDD process?

A I was not involved in the derogation process but normally an M&E derogation would not be presented to users under the Reviewable Design Data process. The RDD

process is generally for the architectural elements and would be part of the Design and Build. A derogation in terms of building services against a recognised standard would need to be agreed prior to drawing issue (as M&E design could change significantly in this instance) and would be subject to specialist technical evaluation and input and consultant and Trust sign-off – not via a User group. User groups are generally for the functionality and layouts of rooms and equipment not building services and environment. This is subject to a more specialist involvement.

29. Please describe how the technical requirements (air change rates, pressure differentials and filter requirements) for each ward were managed and approved during the user group meetings and the RDD process, including your role and involvement.

A I believe I have partially answered this in Question 26 above. User group meetings and RDD are not the route for technical requirements to be decided. I was not involved in these processes as noted previously in this questionnaire. The Design Team would present their design documents in terms of the items noted as part of the drawings and schedules to meet the requirements of the guidance and standards included in the ER's and contract documents. The MEP designs would be reviewed by the Trust, their Technical Advisors, their Consultants and specialists before approving (or not) and signing off the designs accordingly.

30. Were any requests made by the User Groups during the RDD process that were refused – please provide details.

A I do not know as I was not involved in the User Group process or RDD. However, it would be quite unusual to refuse a request unless a piece of equipment could not be accommodated, or the layout would compromise compliance perhaps. This would be very much dependent on the request itself.

31. Please refer to **Bundle 17, Document No.75, Page 2881.** Appendix 3 states: "*Commissioning settings for all elements of the works, including microbiological testing proposals for operating theatres and specialist ventilation… Confirmation that the design team fully complies with the requirements of the Employers Requirements, M&E appendices 1 to 6, all HTM's, HBN's, SHTM's and current legislation*".

a) Describe the intended use and purpose of the following wards in QEUH/RHC: Ward

4B – QEUH; Ward 4C – QEUH; Level 5 – QEUH; Critical Care – QEUH; Ward 2A & 2B – RHC; PICU RHC – RHC; all Isolation rooms.

A I did not develop the clinical output specifications and the clinical specialties of these wards. I cannot recall exactly but I think 4B and 4C were Haematology/ Oncology and Renal. Critical Care was a Critical care ward with Isolation rooms. Ward 2A & 2B Schiehallion and Teenage Cancer Trust – specialist cancer ward facilities and Isolation rooms were Isolation rooms. I do not know how else to describe these areas.

b) At the time, would you have been aware of the intended use and purpose of wards? If not, why not?

A Aside from the Generic In-patient Wards which were generally standardised to flex between medical or surgical patient care in the tower, any other Wards described as specialist e.g. Renal – I would expect the intended use would be for Renal patients & Dialysis; Haematology/Oncology would be for Haematology/Oncology patients; Dermatology for Dermatology patients; Critical Care, Coronary Care or ITU would be for critically ill patients. I cannot comment if the Trust used these wards for their intended use.

c) What were the specifications of these wards?

A It is not clear to me what it is you are asking; please provide further clarification or information.

d) What was your understanding at the time, if any, of the ventilation requirements either or general, in respect of the following wards in QEUH/RHC: Ward 4B – QEUH; Ward 4C – QEUH; Level 5 – QEUH; Critical Care – QEUH; Ward 2A & 2B – RHC; PICU RHC – RHC; all Isolation rooms. If you were not aware, why not? Was this out-with your remit as Mechanical and Electrical Services Manager?

A Level 5 was a General Ward so this would have been designed as per the derogated reduced air change rate; Ward 4B was (as noted above in Question 31 (a)) was Haematology/Oncology but this was changed under the upgrade as noted under Question 35 below. Ward 4C was a renal ward but I was not involved in the commissioning of ventilation on Level 4 and I cannot recall the ventilation requirements. Critical Care, as in CCW had 12 Isolation rooms with 10 ach and 10 Pa positive; the same for Isolation rooms across the building and podium where each

generic ward had 2 Isolation rooms. Ward 2A/2B Schiehallion and Teenage Cancer Trust – specialist cancer ward facilities with Isolation rooms. PICU was the Children's Critical Care which had isolation rooms and general ventilation areas.

e) What guidance was considered in the design of these wards, what processes were in place to ensure guidance compliance?

A I was not involved in the design of the wards, but taking the direction from the Clause 8.2.14.7 Ventilation and air conditioning for the Isolation rooms shall be designed and installed in accordance with (a) SHTM 2025, (b) SHTM 2040 (c) SHPN 4 and (d) NHS Model Engineering Specification C04. As far as I am aware, the rooms were designed according to the guidance. SHTM 03 01 was in draft at the time.

f) Do you accept that compliance with SHTM 03-01 was a mandatory requirement of the contract?

A I believe that it was to be taken into consideration in terms of design. SHTM 03-01 is Ventilation for Healthcare Premises Part A Design and Validation; does not specify isolation rooms. These were covered under SHPN 4 Supplement 1 – SHTM 03 -01 specifically states under Appendix 1 Table A1 – to see HBN 4 Supplement 1.

g) Were there any changes to the design during the design and build, if so, please describe any such changes, describe the impact, if any, on guidance compliance as set out in Appendix 3, and describe the sign off process for any such changes, your involvement and how any changes were communicated to the Board. Was external advice ever sought in respect of design changes?

A I was not involved in changes to designs but normally any changes would have been issued via the protocols set out for changes during a contract; they would have been documented, presented to the Board, Technical Advisors and Consultants for discussion and agreement or not and if agreed, the changes would be signed off by all parties.

h) Were you aware of any changes to the design during the design and build? If so, please describe the changes and the impact, if any, to guidance compliance.

A No, I cannot recall any changes to the design during the build.

32. Describe your involvement and understanding, if any, of the decision to remove carbon filters? What was the rationale behind this decision, who was involved and what advice, if any, was sought in reaching this decision?

A I was not involved in this decision. However, I am aware of a PMI issued by the Trust to remove these from the specification. Please refer to PMI 157 signed by Peter Moir 26/4/2012 which the Board confirmed the deletion of carbon filters for A&C Hospital.

a) Do you recall the rationale behind this decision?

A As I have noted above, I would not know the rationale behind this decision.

33. Were any specialist design workshops required? If so, please provide details.

A I am not sure if you mean for just Ventilation (as the all the preceding questions are related to ventilation) or if you mean any other specialist elements. From memory, there was for the Pharmacy Aseptic Suite, Audiology Booths, MRI and Radiology perhaps and the Medi Cinema.

34. Were Value Engineering meetings/workshops held during the design phase? Please provide details of any agreed value engineering elements.

A There may have been, but I do not know as I was not involved at the design phase.

a) Please **refer to Bundle 43 Volume 1, Document 32, Page 113**. Is the Inquiry correct in understanding that this document proposes the use of chilled beams in renal dialysis and a reduction in ACH from 10 to 2.5?

A I have never seen this document before but yes, this would be my understanding too.

b) What was the purpose of this proposal, who signed it off from NHS GGC? What risk assessments were carried out in respect of this proposal? What is your understanding, if any, of the impact of this proposal?

A As noted above in my answer (a), this is the first time I have seen this document. I am afraid I cannot tell you who signed it off from an NHS GGC perspective nor can I comment on any risk assessments that may or may not have been carried out.

Ward 4B and 4C

35. The Inquiry understands that Ward 4B in the QEUH was originally intended to provide accommodation for Renal and Haemato-oncology patients. The 2009 NHS Clinical Output Specification for the Haemato-oncology ward stated, “Please note the haemato-oncology ward area has a very specific function and a considerably higher than average requirement for additional engineering support/infrastructure. There should be no opening windows, no chilled beams. Space sealed and ventilated. Positive pressure to rest of the hospital and all highly filtered air >90%, probably best HEPA with adequate number of positive pressure sealed HEPA filtered side rooms for neutropenic patients as in the Beatson West of Scotland Cancer Centre.” **(Please refer to Bundle 16, Document No.15, Page 1595)**. However, following a Change Order Request in July 2013 by Jonathan Best **(Please refer to Bundle 16, Document No.29, Page 1699)** it was confirmed that the Bone Marrow Transplant (BMT) service would transfer to Ward 4B in the QEUH and the hematology patients that were originally planned to accommodate Ward 4B would move to Ward 4C.

a) Please confirm how this change was communicated to Multiplex and how this change was captured in the revised design and specification documentation, following the Change Order Request.

A Following the Change Order Request, and from memory and my understanding, there was a pack of information issued in relation to the Ward 4B upgrade for approval by NHS GGC Project Team. There was a Description of works, Architectural drawings (NA-SZ- 04-SK-332-001-01; 001-03, 002-03 & 003-03; Details of the Light fitting (Mirage MX24), Room Pressure Gauge (Dwyer Magnehelic Gauge Series 2300-60pa); Access Hatch (Profilix Standard Wall & Ceiling Panel; above Ceiling Maintenance requirements. I do not know who this would have been issued to or the approval process.

b) Describe your understanding, if any, of the impact of the change order?

A Both construction and M&E works had to be carried out to meet the requirements of the works for the upgrade.

c) What actions, if any, to assess the feasibility and impact of the change order were carried out by Multiplex?

A As far as I can recall, a feasibility study was carried out with Wallace Whittle to

ascertain how much more - in terms of air volumes – that the Air Handling Unit could achieve to increase the air change rates. But beyond that, I cannot give any more detail as I was not directly involved in the development of the Change Request and drawing together of the pack of information.

d) Please confirm if Multiplex highlighted any risks with the proposal to move the adult BMT Unit to the QEUH.

A I am not able to answer this question as I was not involved in the proposals, and it was not my role.

e) Who would have been involved in the process?

A I am afraid, I really do not know.

f) Did Multiplex advise the GGC Project Team that the requirements set out in SHTM 03-01 relating to air change rates, pressure differentials and filtration requirements would not be achievable in Ward 4B at the QEUH?

A I believe so. In the Description of Works issued to the NHS GGC Project Team, the requirements of what the AHU could achieve was detailed – which is noted as between 5 – 10pa.

g) Do you recall there being any issue being raised by NHS GGC in respect of the pressure differential, air changes or filtration requirements?

A I cannot answer this question as I was not directly involved in any correspondence in regard to these questions or any issues raised.

h) Who approved the lower specification from the GGC Project Team and the Board for the adult BMT service?

A I am afraid I do not know the answer to this question.

i) Why were suspended ceilings installed in Ward 4B given that the original Clinical Output Specification (COS) referred to ‘space sealed’ – did Multiplex raise this as a non-compliance with the ‘Works Information’?

A I am afraid I do not know the answer to this question.

j) Please confirm who approved the reflected ceiling plans for this area.

A I was not involved in the approval process so I cannot answer this question. However usually the process would be that these would have been reviewed as part of the RDD package and workshops were arranged by the Architects for architectural approval and held in the Project Offices and would have been approved by the Board as per the protocols.

k) As construction progressed on site, please confirm if suspended ceilings were highlighted as non- compliant with the COS (works information).

A The Description of Works states that an MF Ceiling would be installed within the 24 bedrooms i.e. the suspended ceiling would be removed (but the ensuites would retain the grid and tile but with the services and tiles silicon sealed). However, I cannot provide any further responses to this question.

l) Why was the suspended ceiling removed?

A Generally, this would be to provide a better seal and less air leakage – which for achieving a pressurisation of any type would be required.

m) Why was no back up Air Handling Unit (AHU) provided for Ward 4B? Who approved this decision? And what strategy was agreed for PPM or equipment failure?

A Back up Air Handling Units are not common; the SHTM 03 01 under Clause 2.59 states ‘on very rare occasions a duplicate standby air handling plant may be justified…Standby plants can become sources of contamination if warm moist air is allowed to dwell within them’. Even an Operating Theatre does not have a backup AHU.

n) In respect of Ward 4C, what was the specification of this ward at the point of the Change Order? Did you understand that Ward 4C was to be used to house immunocompromised patients? If so, what was the justification from departing from SHTM guidance in respect of ventilation, pressure and filtration requirements and who signed this off?

A As far as I can recall, I did not do any work on Ward 4 C so I cannot answer this question.

o) What was your understanding of the requisite air change rate required in accordance with SHTM guidance in respect of Ward 4B and 4C, and was this the air change rate achieved? If not, why not and who signed this off? What risk assessments were considered in respect of this decision?

A I am not sure on Ward 4C but Ward 4B, I recall that it had been agreed that the room pressures were to be set between 5Pa and 10Pa with a target pressure of 7Pa + or – 1Pa. Pressure readings were achieved between 6.3Pa and 7.9Pa. GGC would have agreed this following the Change Order issued by them and the information submitted for the design and what was able to be achieved. I do not know what risk assessments were considered in respect of this decision.

p) Did you understand the room pressures to be complaint with guidance in respect of the intended patient cohort?

A I assume you are referring to Ward 4B specifically and not room pressures for all isolation rooms. As noted in my answer to Question 35 (o), the pressures were to be set between 5Pa and 10Pa with a target pressure of 7Pa + or – 1Pa.

q) The Inquiry is aware that Ward 4B appeared to be so far off what was required by the patient cohort that the highly unusual event occurred of patients moving in and then having to move out. Can you assist the Inquiry to understand why that arose?

A No, I am sorry, but I cannot answer this question as I was no longer at QEUH when patients were moved into Ward 4B.

r) The Inquiry has heard that Ward 2A appeared to have multiple issues almost immediately after handover and subsequent investigations into the ventilation revealed multiple apparent areas of concern. Can you assist the Inquiry as to how that arose?

A Again, I am sorry, but I do not recall any particular issues at the time.

Ward 2A/ 2B RHC

36. The Inquiry understands that Ward 2A/2B is the paediatric-oncology Unit and includes the Teenage Cancer Trust and the paediatric Bone Marrow Transplant (BMT) Unit - the department is known as the Schiehallion Unit.

a) Confirm your understanding regarding the intended use and purpose of the Ward 2A/2B, what guidance was considered in the design of these wards, what processes Multiplex put in place to ensure guidance compliance?

A I was of the understanding that Wards 2A & 2b were for Haematology & Oncology patients so they would be immunocompromised. Ward 2B had isolation room facilities but the Teenage Cancer Trust had single bedrooms but not isolation rooms and day care facilities. The design for the Isolation rooms and taking the direction from the Clause 8.2.14.7 Ventilation and air conditioning for the Isolation rooms shall be designed and installed in accordance with (a) SHTM 2025, (b) SHTM 2040 (c) SHPN 4 and (d) NHS Model Engineering Specification C04. As far as I am aware, the rooms were designed according to the guidance. SHTM 03 01 was in draft at the time.

b) The Inquiry understands that Contractor's Tender Return Submission by Multiplex, Volume 7 SHTM confirms that ventilation will comply with SHTM 03-01 as a mandatory requirement. Given that this was a mandatory requirement, please confirm whether this guidance was considered in the design of these wards? And if not, why not? Please refer to **Bundle 17, Document No. 11, Page 589**.

A Having looked at the referenced documents, it does state this. However, there was an agreed Derogation for the air change rate to be changed from 6ach to 2.5ach. This was for the General Wards. Any specialised ventilation requirements, to my knowledge were compliant e.g. Theatres. Isolation rooms under the SHTM 03 01 references the SHPN 1 Supplement 4 as noted previously.

c) What changes, if any, were made to the design during construction? Please describe any such changes, describe the impact, if any, on guidance compliance, and describe the sign off process for any such changes and your involvement. Was external advance ever sought in respect of design changes?

A I am not able to answer this question as I was not involved in the design process.

d) Describe the IPC involvement in the design of Wards 2A and 2B, who was involved and who signed off the final design and when?

A I would not know who was involved in terms of IPC as this would have been at the design stage and I did not have any role in this. The design had already been agreed and the rooms were built to the design.

e) Who from Multiplex would have been responsible for carrying out the risk assessments for the air change rate in respect of Ward 4B and 4C?

A I am afraid I do not know but a risk assessment for this responsibility would surely have needed to be carried out by the Hospital Trust not Multiplex in the first instance.

f) What concerns, if any, did you have regarding the final design specification of Wards 2A and 2B, and what action, if any, did you take in respect of these concerns?

A The final design specification had been signed off as agreed by the NHS GGC Project Board, their Technical Advisors and Consultants. As such, I did not have any concerns.

g) Who from Multiplex would have been involved with the final design specification of Wards 2A and 2B?

A I cannot answer this question as I do not know but any final design specification would have had to have been agreed by the Hospital Trust and Project Board – it would not be a Multiplex decision to determine this kind of clinical criticality.

37. What was your understanding of the requisite air change rate required in accordance with SHTM guidance in respect of Ward 2A and 2B, and was this the air change rate achieved? If not, why not and who signed this off? What risk assessments were considered in respect of this decision?

A Ward 2B Schiehallion was at 10 air changes and yes, this was achieved. I cannot recall the air change rate for Ward 2A.

Isolation Rooms

38. Describe how the number and location of the isolation rooms was agreed? Who approved the final number and locations in the QEUH and RHC?

A In the documentation there is a number of references to Isolation rooms and numbers. Under 8.2.14 ITPICD Volume 2 Bundle 16 Page 1529 it states that 'Each 28-bed ward within the Adult Acute Hospital will be provided with a single isolation room. The Children's Hospital will be provided with two isolation rooms per 28 bed ward'. Point 8.2.14.6 notes to Refer to draft SHPN 4 and drawings G1274 M (57) 02 & 03. I did not see these drawings. The only locations and numbers of isolation rooms

I am aware of were on the signed off and agreed drawings and the rooms were built according to these drawings in those locations. They were as follows: Ground Floor OBW.053 & 048; Level 1 CCW 100, CCW 104, CCW 084, CCW 067, CAR 013, CAR 014, CCW 051, CCW 165, CCW 157, CCW 078, CCW 242, CCW 025, CCW 245, CCW 111, CCW 140 & CCW 241; Level 2 ARU 111 & ARU 106; Schiehallion Ward SCH 009, 013, 018, 019, 068, 071, 075 & 064; Level 3 GW3 055, GW3 051, GW2 055, GW2 020, GW1 053 & GW1 058; Level 4 RENW 044, 043; HOW 031, HOW 029, HOW 026, HOW 024, HOW 021, HOW 020, HOW 017, HOW 015 HOW 012 , HOW 011, HOW 009, HOW 067, HOW 064, HOW 062, HOW 059, HOW 058, HOW 055, HOW 053, HOW 050, HOW 202, HOW 198, HOW 195, HOW 193, HOW 190.

a) Who approved the final number and locations in the QEUH and RHC?

A As per Question No. 38 above, I do not know who approved the final number and locations in the QUEH & RHC.

39. Who was responsible for producing the drawings and the specification for isolation rooms; who approved these from the NHS GGC Project Team?

A The Architects would have produced the setting out drawings, the FF&E layouts, the elevation drawings, the finishes drawings, fire strategy drawings, doors, glazing, general arrangement drawings and the Room Data Sheet. The M& E designers would have produced the ventilation strategy, the schematics, the AHU schedules, the grille schedules, the ductwork drawings etc. All would have followed the Clinical Output Specifications and followed the SHTM's, SHBN's and other guidance as specified in the Contract Documents. I cannot give you names of those who approved the drawings. The Architectural set would have gone through the RDD process. MEP drawings do not follow the same route but would have gone to the Trust, their Technical Advisors, Ventilation Safety Group, the Trust Consultants for review and sign off approval.

40. What concerns, if any, did you have regarding isolation rooms and compliance with SHTM/HTM? What action, if any, did you take in respect of any such concerns?

A I did not have any concerns; the design had been agreed and signed off by the Board, the TA and Consultants.

41. The Inquiry has reviewed the RDS in excel format and notes that there is an entry under 'Design Notes' relating to Ward 2A isolation rooms, the entry states:

"WARNING NOTICE: This room is based on a theoretical design model; which has not been validated (see paragraph 1.8 of HBN 4 Supplement 1). Specialist advice should be sought on its design. The lamp repeat call from the bedroom is situated over the door outside the room."

a) Was this note entered on the RDS? If so, why and by whom?

A It is on the Status A Room Data Sheets issue for the Lobby areas to all the Isolation rooms in Schiehallion. The RDS are drawn up by the Architect, so they would have added this note. I do not know why this note would have been added. However, the Design Note has been taken from the 2005 Edition of HBN 4 Supplement 1 and it has not been added in full. The Clause 1.8 actually says 'The guidance on isolation suites in this supplement is based on a theoretical design model. The model will be validated in the near future, and the results published in a separate document. The aim of this supplement is to provide practical guidance on how to provide isolation facilities that are simple to use and meet the needs of the majority of patients on acute general wards'. The RDS should have noted this clause in full and not just an extract as it gives a false impression. In future editions of that HBN, this clause is no longer in the document. It really should have referred to the SHPN 4 Supplement 1 not HBN. The 2008 Version of the SHPN notes that the guidance on isolation suites in this Supplement is based on a validated design model etc.

b) What specialist advice was sought relating to the design of these rooms

A Advice would have been sought from the Multiplex M&E designer and consultants (ZBP).

c) What was the final agreed design for isolation rooms and who approved this?

A Please refer to Question 40 below. I believe this answers the same question.

42. Why was the main extract placed in the patient's bedroom and not the ensuite as outlined in SHPN 04 Supplement 01? Why was this change requested, who requested this change and who approved this from the NHS GGC Project Team?

A In the SHPN 04 Supplement 1 under 4.4 Basic Design parameters, Table 1 there is a case for the Ensuite where is states Extract Air Flow (for a room of this size) under Nominal Design Values 'If extract is fitted in the isolation room this reduces to 45l/s in

the en-suite with 113l/s extract in the isolation room. This is how the rooms were designed. The drawing with this design was signed off by David Hall. Also, under the ER's Page 1726 of Bundle 16 Specialist Systems, it states as follows: Each lobbied isolation room is provided with its own dedicated ventilation system in line with SHBN 04. Air is transferred to the room via a wall mounted pressure stabiliser and then extracted from the suite via the bedroom and ensuite WC, and ducted by fire clad ductwork to a dedicated fan in the plantroom etc. The ER's have noted extract via the bedroom as well as the ensuite. I am not aware that this constitutes a change as the design is in line with the SHPN and the ER's.

a) The Inquiry has been advised that Multiplex decided that in PPVL room the main extract should be in the bedroom not in the en-suite as recommended in Guidance. Who made that decision, how was it communicated to GGC, if it was agreed by GGC who did so and how was that agreement recorded?

A I am sorry but I believe I have already answered this question under 42 above.

Water and Taps

43. Describe your involvement, if any, in respect of the decision to use Horne taps.

a) What concerns, if any, did you have regarding the use of Horne taps?

A I do not know as I was not involved in this decision.

b) Who from Multiplex would have been involved in this decision?

A I am afraid I do not know and cannot answer this question.

c) What risk assessments were carried out in respect of the use of Horne taps?

A I do not know as I was not involved in this process.

d) Who was involved in, and who signed off the use of Horne taps?

A I do not know as I was not involved in this process.

e) Did you attend the meeting regarding the use of Horne taps in 2014**?** If so, why was the decision made to proceed with Horne taps?

A I do not know as I was not involved in this process.

f) Did the use of Horne taps depend on thermal disinfection? If so why, if not, why not? What action, if any, was taken regarding this, and your involvement, if any?

A I am not able to answer this question.

44. Are you aware of the water system having been filled prior to handover on 26 January 2015? If so, who filled the system, why was it filled and what concerns, if any, did you have. If you had concerns to whom did you escalate these concerns?

A I was not involved in the water systems; so, I am not able to respond to this question.

a) To clarify your answer, is the Inquiry to understand that you were not aware of the water system being filled prior to handover?

A No, I simply meant that I did not have any concerns as I was not involved in this process so cannot be specific. However, I believe the system was filled as it would have had to be demonstrated that the flow and return temperatures met parameters, water samples which have to be taken were within parameters and clearly showed that the system had been flushed and dosed and given that the temperatures at the terminal units had to be demonstrated to be within tolerance then water would be required to prove this. It would be needed to be filled too, in order to check for leaks prior to lagging and then a flushing regime put in place.

Commissioning and Validation

45. In respect of commissioning and validation please confirm the following:

a) Describe your role in the lead up to commissioning. What action, if any, did you take to ensure that the wards within RHC and the QEUH met the guidance requirements of SHTM?

A Any witnessing of commissioning systems that I carried out were in line with the agreed and signed off design.

b) How did you ensure that commissioning, as witnessed by you, was carried out in line with agreed and signed off design?

A Each system that was witnessed by myself e.g. ventilation for a particular area or department, had a commissioning pack of information issued. In the case of an Air Handling Unit, there would be a front sheet detailing the System Reference (the AHU

number) and its location plus a summary of the Work Completion and performance; followed by schematics of the area and the grilles and their reference numbers served by this particular AHU, plant schematic, Fan Test sheet, Design data reference i.e. the Performance Details which would include the Designed Flow Rate, Duct size, Duct area, Measured flow rate, % of design, Average Velocity and Static pressure as measured. Traverse Details taken and witnessed as accurate; Also included in the pack was the Terminal Balance Test Sheet with all grille references, any correction factors applied, Design Flow rates for each grille, Measured Flow rate, and Percent Design %. Any traverse measurements that I witnessed I would record on the sheet or in my notebook, I would also check the calculations for the traverse details at the time. Any grille measurements I witnessed, I would also record against the design details on the sheet or in my notebook. We would also have the design drawings with us to check against. If any readings were not within the design parameters, they would be recorded and amended on the spot if this could be done or there would be a re-visit to ensure it was correct thereafter. Each separate system would follow the same procedure. I would sign the pack only after the witnessing was complete and if there were no re-visits to carry out. If I was witnessing fire damper drop tests or smoke damper activation, I would record the numbers of the dampers tested which would include the location on the design drawings and correct numbering; in the case of smoke dampers, these were activated from the Smoke Damper panels. Both types of dampers would have been seen as closed. Smoke Dampers and the actuators seen operating correctly and opening on signal plus numbers checked on the panel to correspond with the ID numbers in the walls. For Isolation rooms, these were witnessed on an individual basis but with the same information but including checking the magnehelic gauges showing 10 pascals achieved.

c) Describe what commissioning of the water and ventilation system took place prior to handover, and your involvement, if any.

A I cannot answer for the water systems as I did not commission these services. I did witness a number of ventilation systems including the isolation rooms. This was a full system witness i.e. the Air Handling unit being set running, traverses and volumes on each of the branches, downstream sampling of grilles across the floor and whichever departments were served from a particular AHU. AHU's put into automatic with the inverters, set dampers locked etc. In the case of the isolation rooms each room has an individual AHU so all were witnessed including the setting up of the magnehelic

gauges at the room entrance.

d) Who from Multiplex was responsible for commissioning the water systems of the QEUH/RHC?

A Our commissioning manager would have overseen this element but the commissioning itself would have been by H&V Commissioning who were the specialist sub-contractor under Mercury (for Water systems and Ventilation).

e) Who was responsible for ensuring that commissioning of the water and ventilation system was carried out, and who signed off that it had been carried out?

A There was a commissioning company employed to commission and balance these systems (H&V Commissioning). Multiplex witnessed and Capita were invited to attend if they wished to sample. A member of the Multiplex team would sign the commissioning sheets of any systems that were witnessed. Commissioning paperwork would have been issued for systems commissioned.

46. Clause 6.8.2 of the Employer's Requirements requires the Contractor to provide a Final Commissioning Programme setting out details of all commissioning tasks, including the timing and sequence of events. This was also to include the relevant testing and commissioning elements of other parties, such as the Control of Infection Officer, the Supervisor and the Independent Commissioning Engineer. **(Please refer to Bundle 16, Document No. 13, Page 1357)**

a) Was the Final Commissioning Programme prepared? If so, by whom and who was it shared with? If not, why not?

A Yes, each area had its own Commissioning Programme and there was a Global commissioning programme. The Commissioning Manager prepared them (David Wilson). My understanding was that it was shared with the Board and their consultants etc. however I do not know how it was issued out.

47. Clause 6.8.4.2 of Employer's Requirements states that the Contractor was required to arrange, "all factory testing and shall furnish the Board, its Project Manager and its Supervisor with the opportunity to witness all factory testing and sign off marked items of Plants and Materials. The Board, its Technical Advisors and the Supervisor shall be given fourteen days notices of such testing." **(Please refer to Bundle 16, Document No.13, Page 1357)**

a) Was Capita given the opportunity to witness all factory testing and sign off on marked items of Plants and Materials?

A I believe they were. Capita Symonds did witness the Generators in the factory test in 2012, also the Bender UPS in Italy, the Whitecroft lighting visit including the Trust (2011 as I can see some emails on these topics). However, I was not part of the process so cannot advise who issued the invitations and arrangement and what plant and materials were witnessed.

b) If Capita was given the opportunity to witness all factory testing, please describe the process.

A I am not able to answer this question.

c) Was Capita given opportunity and did they witness the factory testing you were involved in?

A I believe they were, however, as I have noted above in Question 47 (a), I did not witness any factory testing as I was not involved in this process.

d) If Capita was not given the opportunity to witness all factory testing, why not? How did this impact, if at all, Capita's role as NEC3 Supervisor?

A I am not able to answer this question.

48. The Inquiry understands that NHS GGC decided to forgo the requirement to have an independent commissioning engineer. Who made this decision? What was the rationale behind this decision? What was the impact, if any, of this decision? In hindsight, do you think that it was the correct decision?

A I am afraid I cannot answer this question in full. The Board issued a PM Instruction #2073 which is within Bundle 16, Page 1698, signed by Peter Moir but I would not know the reason why.

a) Did you/Multiplex have any concerns about your/its ability to demonstrate and certify to the Board the successful completion of all commissioning, testing and compliance with all relevant standards in relation to the ventilation system given that the ventilation system was not checked by an independent third party as recommended by the guidance. If so, please describe these concerns. If not, why not?

A I can only confirm that the systems I witnessed (I do not commission) were in

accordance with the agreed and signed off design. I have responded to the third party query under other questions in this statement below and the systems were commissioned to be in an operating condition but the validation process is to prove the system is fit for purpose and achieves the operating performance originally specified. This is not usually done 'in-house' and I quote from the SHTM 'Validation should therefore be carried out by a suitably qualified independent Authorised Engineer appointed by the Health Board' i.e. a third party and not something that the main contractor would do.

49. Please refer to Bundle 15, Document 7, Page 606. SHTM 04-01, part E states that, "any pipes delivered unprotected or with open ends should be rejected". The Inquiry understands that Capita highlighted on a number of occasions that pipework was being left open during the construction work making them vulnerable to contamination. What was done to rectify this issue? Was such pipework subsequently rejected?

A Both Mercury and Multiplex had compliance managers, and the Capita Observations were issued back to both parties for response and actions (if required). In terms of the pipework issue, I was not personally involved in any remedial actions, so I am not able to fully respond to the question. However, in usual circumstances, if pipework ends were left open (not good practice), the system has to be tested for leaks (air) before anything else, then it would be flushed and disinfected before the system is filled, water samples would be taken to ensure the water quality is compliant to requirements and that the results thereafter are clear before being put into use. System would be subject to a flushing regime until results issued and continue to be flushed regularly until the system would be handed over.

50. Was the energy centre commissioned prior to NHS GGC taking occupation of QEUH? If so, describe what you know about the commissioning of the energy centre. Provide details of the intricacies in relation to its completion.

A I believe so. I did not have a lot of input to the commissioning of the Energy Centre, but the generators were tested and operational, HV system up and running, the CHP / Boilers, Chillers etc. otherwise the Hospital would not have had power, lighting, heating and cooling and hot and cold water.

51. Describe your involvement, if any, in the decision for the energy centre to be retained by Multiplex following handover. What as the rationale/when was the energy centre handed over to NHS GGC, and what was your involvement, if any? Describe your knowledge and understanding, if any, of a payment being made by NHS GGC to Multiplex in respect of the energy centre following the same being handed over.

A I am not aware of any of this; I cannot therefore answer the question.

52. Please describe what role Multiplex had, if any, in ensuring that validation was carried out? Was this required to be carried out prior to handover? If so, by whom? The Inquiry understands that validation was intended to be carried out by an independent party. Did this happen? If not, why not?

A I assume you are referring to Validation of the ventilation as opposed to any other validations as it is not clear in the question. If this is in relation to ventilation, please see questions 52 and 56b below. The SHTM 03 01 (draft) under Section 8, it states that Validation of these systems should therefore be carried out by a suitably qualified Independent Authorised Engineer appointed by the Health Board. I cannot answer as to why the Board did not carry this out.

a) Did you advise NHS GGC of its obligation to organise the independent validation of the ventilation system prior to the handover of the QEUH/RHC? If not, why not?

A It was not part of my role to advise this to the Trust. They would be aware of their obligations under the SHTM.

<u>Handover</u>

53. Describe your role in the lead up to NHS GGC accepting handover.

A I undertook witnessing of a number of commissioning elements e.g. a number of ventilation systems, Isolation room witnessing of all component parts, fire damper testing and checking, smoke damper checks and testing, Aseptic suite, colt smoke extract operation, Helipad fire extinguishant operation, BMS point to point testing, checking operation of the Surgeons Panels, X-ray warning lights operation & interlocks, generator testing, some public address witnessing; I am afraid I cannot recall every detail for that time.

b) At the point of handover, how satisfied were you that all areas of QEUH/RHC accepted by NHS GGC, were designed to the intended specification and suitable for the intended patient cohort, meeting all the relevant guidance requirements?

A As far as I am aware, QEUH/RHC was built to the approved designs and guidance as agreed by NHS GGC.

c) How were you assured that all areas of QEUH/RHC accepted by NHS GGC, were designed to the intended specification and suitable for the intended patient cohort, meeting all the relevant guidance requirements if you knew that validation of the ventilation system had not been carried out?

A This question is very similar to the question above (53 (b) and I can only reiterate my answer. In terms of validation requirements, the SHTM refers to specialised ventilation systems (which a general ward would not fall under). However, it would be up to the NHS GGC to undertake validations by a 3rd party on any ventilation system they wish but certainly any specialist areas such as Theatres, Aseptic Suite, Isolation rooms. Part of the commissioning process gives the system performance in terms of Design (air flow rates, air velocities, pressure differentials and control functions). If these are achieved, then the air change rate is confirmed and differential pressures where applicable. The system is in an operating condition. The validation process is to prove the system is fit for purpose and achieves the operating performance originally specified. This is not usually done ‘in-house’ and I quote from the SHTM ‘ Validation should therefore be carried out by a suitably qualified independent Authorised Engineer appointed by the Health Board’ i.e. a third party and not something that the Contractor would do.

d) How were you assured that the wards met the requirements of the specific patient cohorts?

A As far as I am aware, there were no areas that did not meet the requirements of the specific patient groups that were intended to be used for.

e) Were any wards not handed over, or only partially handed over, please confirm. If so, why they were they held back? Was there any financial consequence to both Multiplex and NHS GGC of the ward(s) being held back? What works were carried out in order to allow this ward(s) to be handed over to the NHS GGC?

A As far as wards not being handed over or partially handed over, I cannot recall this

occurring. As far as I remember all wards were handed over. I cannot comment on financial consequences – this is a commercial question.

f) Describe the process for approving the defects listed on the Stage 3 Sectional Completion Certificate (Please refer to Bundle 12, Document No. 3, Page 23) Who saw the Stage 3 Section Completion Certificate before it was signed? Why was the Stage 3 Sectional Completion Certificate signed when there were a number of outstanding defects listed?

A I am afraid I do not know who would have seen the Stage 3 Sectional Completion Certificate as I was not involved in this, and it was not part of my role.

g) Do you think that the Stage 3 Sectional Completion Certificate accurately listed all of the defects with the QEUH/RHC? If not, please describe the inaccuracies.

A I do not know the answer to this as I did not see the Stage 3 Sectional Completion Certificate. When you say Defects (which can suggest that the item is unfit for purpose) but they could also be classed as 'Snags' but either way, Multiplex and their sub-contractors would have to close the snags and defects out following the usual agreed process.

54. Who oversaw contractual compliance? Who was responsible for ensuring that the paperwork was produced to confirm contractual compliance? What action, if any, did you take to ensure that paperwork was in place to ensure contractual compliance? Was validation of the ventilation system a contractual requirement? If so, who signed off on contractual compliance given the lack of validation?

A There were compliance managers on both sides – John Wales for Multiplex and David Dickie for Mercury for instance. They collated all the relevant paperwork and certification for all elements as far as I am aware. These should be on record as well as commissioning paperwork. In terms of the Ventilation Validation, I do not know if it was a contractual requirement. It usually is carried out by a 3rd Party. SHTM 2025 Part 2 (2001) notes in 6.66 that 'The installed system will be required to meet the performance standard set out in Part 3, Validation and Verification. Part 3 under the Introduction gives comprehensive advice and guidance to healthcare management, design engineers, estates' managers and operations' managers on the legal requirements, design implications, maintenance and operation of specialist ventilation in all types of healthcare premises. Under SHTM 03 01 (in draft at the

time), contains a Design and Validation Process Model. Step 6 of this model states How will the system performance be validated? The next column Design Statement and Information required: Validation methodology, Instruments used, Design Information required (Design air flow rates, Design air velocities, Pressure Differentials, Noise levels, Air Quality, Installation Standard). As it is unlikely that 'in-house' staff will possess the knowledge or equipment necessary to validate critical ventilation systems - Under Section 8 of this SHTM, it states that Validation of these systems should therefore be carried out by a suitably qualified Independent Authorised Engineer appointed by the Health Board.

55. Explain what the Building Contract says about a retention period in which some money would be held back pending completion of the QEUH/RHC. In doing so, please explain if the retention period was enforced?

A I am afraid I cannot provide a response to this question as this is really a Commercial & Contractual item and this was not my role.

56. Who was responsible for providing asset tagging. Why was there no asset tagging? Who decided to proceed without it?

A I am afraid I do not know the answer to this question. It was not part of my role.

57. Did you consider it appropriate for the handover of QEUH/RHC to take place when the energy centre was not operational due to design issues? Did you appreciate at the time of handover that it would take almost a year before the energy centre was in a position to be brought online?

A I am not aware that the Energy Centre was not operational at handover. The Hospital could not have operated without the Energy Centre being brought on-line. The Generators, Boilers, CHP plant, the HV power, Chillers, Water tanks etc. were demonstrated as being operational. The generators, for instance, were operational as I saw these running when they were operated under testing. The Hospital would not have had power for distribution boards for power & lighting, or hot water or ventilation plant running or heating or cooling if the Energy Centre was not operational. Perhaps this is referring to a specific element or piece of kit and not the whole Energy Centre.

58. The Inquiry understands that no validation was carried out in respect of the ventilation system of QEUH/RHC prior to handover. When did you become aware of

this? How did handover come to be accepted without the ventilation system being validated? Who was responsible for this and who signed off on this?

A I believe I have answered this under Question 52. However, In terms of the Ventilation Validation, usually is carried out by a 3rd Party. SHTM 2025 Part 2 (2001) notes in 6.66 that 'The installed system will be required to meet the performance standard set out in Part 3, Validation and Verification. Part 3 under the introduction gives comprehensive advice and guidance to healthcare management, design engineers, estates' managers and operations' managers on the legal requirements, design implications, maintenance and operation of specialist ventilation in all types of healthcare premises. Under SHTM 03 01 (in draft at the time), contains a Design and Validation Process Model. Step 6 of this model states How will the system performance be validated? The next column Design Statement and Information required: Validation methodology, Instruments used, Design Information required (Design air flow rates, Design air velocities, Pressure Differentials, Noise levels, Air Quality, Installation Standard). As it is unlikely that 'in-house' staff will possess the knowledge or equipment necessary to validate critical ventilation systems. Under Section 8 of this SHTM, it states that Validation of these systems should therefore be carried out by a suitably qualified Independent Authorised Engineer appointed by the Health Board.

59. Describe Multiplex's involvement in works carried out following handover. Describe the nature of these works, whether remedial or new works, the cost and responsibility of payment of these works, details of who instructed the works and when.

A I have to assume that you are referring to Snags / Defects following handover. There was a QA system (IDMS) that recorded numbers of 'defects' prior to handover on the Mercury elements per departments / rooms and remedials, fixed and outstanding on a weekly basis. At handover and as part of the Contract, there would have been a formal record list agreed of outstanding 'Defects' (although I was not party to the Contractual side). After handover, there was an FM First Summary with event numbers, locations, Room type, Issue description, Date received, Sub-Contractor dealing with the issue, MPX person responsible, Comments and Date when closed. As far as I am aware, Multiplex would have been responsible for anything associated with these works and costs would be sub-contractual. The works could vary from a faulty light switch, a fault on a fan on the BMS, room stat not working, power not at a circuit to a new pump which needed replacing. There would be too many to record

here.

60. Describe the build condition of the QEUH/RHC as at Final Defects Certificate (CI 43.3) Completion of Whole Works – Stage 3 Adults and Child's Hospital and Energy Centre dated 26th January 2017 **(Please refer to Bundle 12, Document No. 113, Page 848)**.

A I am afraid that I am not able to answer this question as the Final Defects Certificate is not something that I would have been involved with and I cannot make any comments.

DMA Canyon

61. Prior to handover, who was the Duty Holder in respect of the water system at QEUH/RHC?

A I cannot answer this question as I do not know.

62. What responsibility, if any, did Multiplex have in respect of carrying out L8 testing prior to handover? If Multiplex had such a responsibility, was the L8 testing carried out and by whom, and where would the records of the testing be sorted? Were these records made available to NHS GGC?

A I am not able to answer this question as I was not involved in the carrying out of the testing.

63. Who became Duty Holder when NHS GGC took handover of the QEUH/RHC site on 26 January 2015?

A I am afraid I do not know the answer to this.

64. SHTM 03 01 remains an obligatory part of the contract except insofar as derogated from. Is it not your/ Multiplex's job to ensure that what you/ Multiplex deliver complies with it?

A I can only reiterate that I witnessed the systems as per the agreed designs which as far as I am aware were compliant.

65. Do you have any further information that you consider relevant or interest to the Inquiry?

A No, I do not think I have anything else to share with the Inquiry.

Declaration

66. I believe that the facts stated in this witness statement are true. I understand that proceedings for contempt of court may be brought against anyone who makes, or causes to be made, a false statement in a document verified by a statement of truth without an honest belief in its truth.

The witness was provided the following Scottish Hospital Inquiry documents for reference when they completed their questionnaire statement.

Appendix A

A50091098 - Bundle 12 - Estates Communications
A47664054 - Bundle 15 - Water PPP
A47851278 - Bundle 16 - Ventilation PPP
A49342285 - Bundle 17 - Procurement History and Building Contract PPP
A52449706 – Bundle 43 Volume 1 - Procurement, Contract, Design & Construction, Miscellaneous Documents
A52706440 – Bundle 43 Volume 3 - Procurement, Contract, Design & Construction, Miscellaneous Documents

Julie Miller

Contact

[redacted]

Mobile [redacted]

Email:

[redacted]

Work History

M&E Manager March 2016 - Current Peterborough City Hospital

Relocated from the Glasgow Project to Peterborough to assist with the Fire Remedials Project on all 3 sites. She was responsible for closing out the works at The Cavell Centre and City Care Centre, thereafter the remaining works in the Acute Building. Following this, she was involved in all Trust Variations, both large and small, from inception to completion. This encompasses both building fabric and building services. Her most recent project involvement, which is on-going, is the construction of two new 36 bed wards on the fourth floor with the team.

March 2012 – March 2016

Julie joined Brookfield Multiplex in March 2012 as part of the Mechanical and Electrical team. Initially she assisted their Design manager, reviewing drawings against Board comments and then moved onto the M&E team. Her roles included internal fit-out for a number of levels in the New Southern General Hospital, Glasgow A&C building, commissioning responsibilities, client liaison and working with our sub-contractors. Handover was in January 2015 and Julie remained behind as part of the 'soft landings' team to ensure that the migration of the hospital and the ensuing NHS commissioning went smoothly. She dealt with the NHS board, clinical and nursing staff as well as

FM on a daily basis She was responsible for the M&E defects close out and PMI's.

Backgrou
nd

Julie originally comes from a clinical / healthcare background in the NHS specialising in pharmaceutical services both as a Pharmacy Manager and Technical Services in an Acute hospital. She left the NHS in 2002 following the handover of the new hospital project where she was the Departmental Lead for the Pharmacy commissioning team and ward migration. She joined a consultancy on their Health Team for the Addenbrookes PFI Hospital Project on the bid team which then became preferred bidder. Julie produced all the room data sheet (RDS) for the whole hospital project, participated in the user group co-ordination process and drawing updates with the Architects and contractor.

After leaving that company in 2004, she was a Principal Consultant for a Management Consultancy for over 8 years and led their services in the areas of Independent Certification/Testing and Technical Due Diligence commissions where she co-ordinated, evaluated and produced due diligence reports for all stages of the competitive dialogue process and earlier PFI structured projects. This also involved meeting the banks' technical and financial sectors and PFI contract reviews. Julie has delivered a range of major projects in both the Health and Education Sectors. Her skills also extended to bid and tender production, costing and resourcing for these commissions.

Brookfield Multiplex role New Southern General Hospital:	M&E manager with an emphasis on specialist areas; compliance reviews; design checks; commissioning. Ownership and delivery on site for the fit out, area completion and sign off for L2 Adults, L2 and L3 Children's; Aseptic Suite; Specialist areas including Radiology / MRI. Quality & Compliance with Mercury / BM Compliance Manager and liaison with Capita to close out defects and observations. Co- ordination with design consultants TUV-SUD in terms of workshops and reporting along with updating of associated schedules and closing out of issues. Monitoring and responding to RFI's and their close out. Julie also took over the construction element of Cores / Penetration co-ordination with WSP /BM / Mercury. Carried out regular H&S site inspections and followed the Brookfield SHEQ policies. Issue instructions to sub-contractors via commercial team Review and comment on sub-contractors RAMS.
Skills:	Independent Certification; Technical Due Diligence; Technical compliance Audit; Able to develop and sustain strong client relationships; experience in working in commissioning of M&E and building services; Working on all aspects of a project including construction elements; Able to work well under pressure or to tight deadlines without losing quality of work; A proven track record of working in new sectors and taking on new challenges. Very capable and self-motivated with excellent interpersonal and communication skills. Committed to her job and takes professional and personal pride in doing so.
Qualifications:	Bachelor of Humanities (B Hum) (Hons). BTEC in Pharmaceutical Sciences Level 3; Royal Society of Arts (RSA) Diploma

	Business Studies Site Management Safety Training Scheme (SMSTS) CSCS

Sector	Project name/ Location		Completion date
Health	New Southern General Hospital		2015
	St Helens & Knowsley PFI project		2012
	Northern Ireland Health Group – The Acute Hospital for the Southwest (Enniskillen)		2012
	Walsall Hospitals Redevelopment Project		2008
	Pembury Hospital PFI Project		2008
	Oxford Churchill Cancer Centre		2010
	Greater Peterborough Health Investment Plan (GPHIP)		2012
	John Radcliffe PFI Hospital Project, Oxford		2006
	Garrett Anderson Centre, Ipswich Hospital		2007
	Leicester LIFT (2 Health Centres)		2011
	Sandwell LIFT (1 Health Centre)		2011

Education	South Tyneside and Gateshead BSF (STaG) Independent Certifier (IC) for 10 schools under the Building Schools for the Future Programme (BSF) and a Health Centre under the same scheme.		2012
	Nottingham BSF Independent Certifier 7 schools under the Building Schools for the Future programme.		2011
	Tameside BSF Technical advisor for two PFI schools under the Building Schools for the Future programme.		2011

Other information:	NHS Accreditation for Pharmacy Final Checking NHS NVQ Trainer for Pharmacy Assistants