

Scottish Hospitals Inquiry

Witness statement of

Kenneth Hall

Introduction

1. My name is Kenneth William Hall. I am currently employed by Multiplex Construction Europe Ltd (Multiplex) as a Package Manager.
2. I have been asked to provide this witness statement in relation to the post Financial Close (FC) period at the Royal Hospital for Children and Young People and Department of Clinical Neuroscience Project in Edinburgh (the Project). I have been provided with a list of issues from the Solicitors to the Public Inquiry and I address these, where I am able to, below.
3. This is the second witness statement I have provided for the Scottish Hospitals Inquiry. My education and career background remains as set out in my first witness statement (**A41962682 – Witness statement of Ken Hall (Final redacted) – 4 April 2023 – Bundle 13, Volume 7 – Page 338**).
4. After FC, my role on the Project was to manage the Mechanical, Electrical, Plumbing (MEP) detailed design development. The design was produced by Wallace Whittle and provided to the Board and their technical advisers Mott MacDonald (MML) for review. My role did not extend to leading the MEP site team, and I was not involved with site related installation activities, commissioning, and/or site verification.
5. I have been asked to comment on the following - *“Ken Hall and Graeme Greer corresponding by email on 26 May, 15 June and 22 July 2015 in terms indicating that both parties (through Multiplex and Mott MacDonald) were proceeding on the understanding that the Environmental Matrix (the Matrix) was only Reviewable Design Data (RDD) to the extent of NHSL’s seven comments from the meeting of 11 November 2014, which were subsequently*

included in Section 5 of Schedule Part 6 to the Project Agreement.”

(A32435789 – Schedule Part 6: Construction matters, section 5 (Reviewable Design Data) – Bundle 13, Volume 5 – Page 44).

On 26 May 2015, I emailed Graeme Greer of Mott MacDonald in relation to the seven comments which had been received from NHS Lothian (the Board) on the Environmental Matrix and included in Schedule Part 6 of the Project Agreement. **(A46365636 – Appendix 01 – PID_001_1_00000001-069128 – Bundle 13, Volume 2 – Page 9).**

6. Wallace Whittle were in the process of producing the post FC updated version of the Environmental Matrix taking into account the Board's comments, and we wanted to ensure all outstanding matters were captured.
7. My email dated 26 May 2015 therefore takes all of the Board's comments included in the Project Agreement and shows how they are addressed in the new Environmental Matrix revision that was in the process of being produced by Wallace Whittle. It was intended to ensure that Mott MacDonald were in agreement with the changes made by Wallace Whittle, prior to submitting the Matrix formally via RDD.
8. I then sent a second email, with a copy of the updated revision of the Environmental Matrix produced by Wallace Whittle, to Graham Greer on 15 June 2015. As my email notes, this was again in an attempt to ensure that Mott MacDonald were happy with the Matrix prior to formal submission. (Appendix 2 - PID_001_1_00000001-106970) **(A46365851 – Appendix 02 – PID_001_1_00000001-106970 – Bundle 13, Volume 2 – Page 12).**
9. Mott MacDonald responded on 22 July 2015 (Appendix 3- PID_001_1_00000001-157202) **(A46365856 – Appendix 03 – PID_001_1_00000001-157202 – Bundle 13, Volume 2 – Page 48)** providing their comments. The original seven Board comments included in the Project Agreement are set out in red text, the Wallace Whittle comments are set out in blue text and the Mott MacDonald response is set out in green text.

10. In relation to Point 4 and the single bedrooms, this was the change to the pressure regime requested by the Board prior to FC that I discuss in my first Witness Statement (see for example para 65) **(A41962682 – Witness statement of Ken Hall (Final redacted) – 4 April 2023 – Bundle 13, Volume 7 – Page 338)**.
11. In the email above Mott MacDonald asked for Note 26 in the Guidance Note to be updated to reflect what was agreed pre-FC, and for the Ventilation Type to be updated in the body of the Environmental Matrix. By "Ventilation Type" I understand Mott MacDonald to be referring to one of the columns within the Environmental Matrix titled "Ventilation (type)". The changes requested by Mott MacDonald were made by Wallace Whittle and included within Revision 2 of the Environmental Matrix.
12. In relation to the change requested to the Guidance Note, I have copied Note 26 below – the text in black shows the FC wording and the underlined text shows the change to take account of Mott MacDonald's comment above:

Single Bedroom - The design philosophy for ventilation is for a mixed mode operation where natural vent is encouraged which has benefits both physiological with users being partly in control, and from an energy stand point where mechanical vent loading is partly reduced (2/3rds). This strategy results in zero pressure differential regime within the room where supply and extract is balanced.

En suite dirty extract volume flow rate has been increased to achieve a balanced ventilation system.

13. On 25 August 2015, Mott MacDonald then emailed stating (Appendix 4 - ANX_EDN000224613) **(A46365857 – Appendix 04 – ANX_EDN000224613 – Bundle 13, Volume 2 – Page 52)**.

"I understand that IHSL are currently updating the Environmental Matrix, if possible and to assist the Board can you please provide a list of the associated environmental information for the isolation rooms including gowning lobbies/department".

14. On 2 September 2015, I provided a response (produced by Wallace Whittle) which explains how ventilation rates would be achieved in isolation suites via extract from the en-suites attached to these rooms **(A46365858 – Appendix 05 – ANX_EDN000320683 – Bundle 13, Volume 2 – Page 53)**.
15. As noted in the email accompanying this information, there was a specialist ventilation workshop held on 1 September 2015 where these matters were discussed. I was not at this workshop.
16. On 22 September 2022 Wallace Whittle then issued a query seeking guidance in relation to isolation cubicles, which I forwarded to Mott MacDonald on the same date. Mott MacDonald responded on 25 September 2015, and I forwarded their response to Wallace Whittle **(A46365859 – Appendix 06 – ANX_EDN000427817 – Bundle 13, Volume 2 – Page 55)**.
17. Wallace Whittle produced a further Request For Information ("RFI") **(A46365860 – Appendix 7 – ANX_EDN000276437 – Bundle 13, Volume 2 – Page 58)** which I again forwarded to Mott MacDonald **(A46365861 – Appendix 08 ANX_EDN000321774 – Bundle 13, Volume 2 – Page 60)**.
18. On 21 October 2015 Mott MacDonald responded with a further list of queries **(A46365863 – Appendix 09 – ANX_EDN000228196 – Bundle 13, Volume 2 – Page 62)**.
19. I requested responses to these queries from Wallace Whittle. Wallace Whittle provided their responses on 22 October 2015 **(A46365862 – Appendix 10 – ANX_EDN000276606 – Bundle 13, Volume 2 – Page 65)** which I issued to Mott MacDonald **(A46365864 – Appendix 11 – ANX_EDN000494344 – Bundle 13, Volume 2 – Page 69)**.

20. Mott MacDonald responded seeking some further clarification from Wallace Whittle (**A46365865 – Appendix 12 – ANX_EDN00336120 – Bundle 13, Volume 2 – Page 73**), and so I asked Wallace Whittle to clarify (**A46365866 – Appendix 13 – ANX_EDN000490219 – Bundle 13, Volume 2 – Page 77**). They responded on 29 October 2015 and again I provided this response to Mott MacDonald (**A46365867 – Appendix 14 – ANX_EDN000486518 – Bundle 13, Volume 2 – Page 82**).
21. Mott MacDonald then responded with a further query which I issued to Wallace Whittle (**A46365868 – Appendix 15 – ANX_EDN000497776 – Bundle 13, Volume 2 – Page 87**). My understanding is that this was then discussed at a meeting with Mott MacDonald, the Board and Wallace Whittle, with Wallace Whittle then confirming to Multiplex that the matter had been closed (**A46365869 – Appendix 16 – ANX_EDN000269230 – Bundle 13, Volume 2 – Page 92**).
22. Revision 2 of the Environmental Matrix (**A32623047 – 3.2 0008 20151126 WW-XX-XX-DC-XXX-001 (Rev 2) - Bundle 13, Volume 5 – Page 959**) was then produced by Wallace Whittle and issued to the Board for RDD on 4th December 2015 (**A46365870 – Appendix 17 – ANX_EDN000083461 – Bundle 13, Volume 2 – Page 97**). On the face of this document, it is noted that the Matrix has been amended in line with the Board's comments and the seven points from Financial Close had been incorporated into a table at the start of the document, with comments showing how they had been addressed.
23. However, on 20 January 2016 the Board then issued further new comments on Revision 2 of the Environmental Matrix (**A32623047 – 3.2 0008 20151126 WW-XX-XX-DC-XXX-001 (Rev 2) - Bundle 13, Volume 5 – Page 959**), via Mott Macdonald. I was surprised to see the extent of the comments given a review had been carried out pre-FC by the Board, culminating with seven points carried over at FC to be reviewed via the RDD process.

24. As is noted in the email accompanying the comments, a workshop was arranged for 26 January with Multiplex, Wallace Whittle, the Board and Mott MacDonald to review and discuss these. **(A46365872 – Appendix 18 – ANX_EDN000251878 – Bundle 13, Volume 2 – Page 134).**
25. Following the workshops on 26 January 2016, and another on 2 February 2016, the Environmental Matrix Revision 2 was then returned officially through RDD as Level C on 9th February 2016. **(A46365874 – Appendix 19 – EDL_001_1_00000001-78894 – Bundle 13, Volume 2 - Page 139).** At the same time the Board provided an updated version of their comments issued previously. They provided these comments in track changes, so that you could see the deletion of comments and also in clean copy.
26. The track change version shows that the first comment relating to single bedroom ventilation, (previously item 4 of the “Seven Point” FC comments) had been addressed and so had been deleted:
27. I sent Mott MacDonald's email with the Board's Comments of 09 February 2016 to IHSL and asked to discuss **(A46365877 – Appendix 20 – ANX_EDN000507144 – Bundle 13, Volume 2 – Page 149).** The purpose of the discussion was to seek direction over the extent of the comments that had been made to the Environmental Matrix.
28. I also issued it to Wallace Whittle asking for them to review, with a view to meeting with Mott MacDonald to review the comments before any resubmission of the Environmental Matrix through RDD was made. **(A46365881 – Appendix 21 – ANX_EDN000428014 – Bundle 13, Volume 2 - Page 159).**
29. Other people from Multiplex were involved in the discussions between IHSL and NHSL. I was advised the Board's fifty comments were to be addressed. I therefore asked Wallace Whittle to address the comments and update the Matrix.

30. Revision 3 and 4 of the Environmental Matrix were then issued by Wallace Whittle to Multiplex as “drafts” prior to formal RDD issue to ensure all comments had been captured.
31. Revision 5 of the Environmental Matrix was then submitted through the RDD procedure on 18 March 2016 (**A46365883 – Appendix 22 - EDL_001_1_00000001-63063 – Bundle 13, Volume 2 – Page 169**). This revision captured the updated comments previously provided by the Board in relation to their Level C. All of the Board's comments were noted in a table at the start of the Matrix and responses were provided by Wallace Whittle to show how these had been addressed.
32. Revision 5 was returned on 15th April 2016 marked as Level B (**A46365887 – Appendix 23 – ANX_EDN000086893 – Bundle 13, Volume 2 – Page 218**) and (**A46365890 – Appendix 24 – WW-XX-XX-DC-XXX-001 Rev 05 – Bundle 13, Volume 2 – Page 277**), meaning Multiplex could proceed with procurement and construction in accordance with the Matrix, subject to the comments provided.
33. As I recall none of the Board's comments raised any questions over the air change rate, or pressurisation in the single or multi-bed wards in Critical Care.
34. Whilst the Contract did not require a resubmission of the Level B Environmental Matrix, I asked Wallace Whittle to update the Matrix so it could be resubmitted “for information”, capturing all the Board's comments to allow all stakeholders to be aligned and in agreement, and achieve closure on the Financial Close Environmental Matrix (**A46365891 – Appendix 25 – ANX_EDN000430272 – Bundle 13, Volume 2 – Page 365**).
35. Revision 6 of the Environmental Matrix was then issued to the Board on 28 June 2016 (**A46365893 – Appendix 26 – GRC_002_1_00000008-18944 – Bundle 13, Volume 2 – Page 414**). This was issued for information, review, or both, only and was not submitted through the RDD process, given the previous Rev had already received Level B.

36. I have been asked to comment on the following *“The design of the ventilation system, including AC, Ductwork, Air Handling Units, and Plant Space being necessary to supply the AC number, was reviewed by NHSL and Mott MacDonald, including (1) during the RDD process, where NHSL’s requirement for 4 air changes in critical care bedrooms was confirmed: (2) during discussions in relation to the pressure regime for the multi-bed wards, were in an email of 18 April 2018 (A39975863 – NHSL- GC-002953 Dated 18 April 2018 – Bundle 13, Volume 7 – Page 362). NHSL stated that they were “seeking a design for 4 air changes for all 14 rooms”, which included the multi-bed wards in critical care, and (3) in the settlement agreement between NHSL and IHSL dated 22 February 2019” (A32469163 – Settlement Agreement and Supplemental Agreement – 22 February 2019 – Bundle 4 – Page 11 – Documentation relating to the Certificate of Practical Completion).*

RDD Process

37. The MEP RDD process consisted of a number of elements. Firstly, the agreed list of deliverables were captured within a separate RDD MEP Tracker shared regularly with NHSL and Motts by our document control, updated throughout the course of the design and construction phase.

38. The RDD MEP Tracker contained all of the drawings, schedules and reports, and tracked every document during the submission process each time it was revised and issued for RDD Review. Additional procedures put in place are identified in my first witness statement, see for example paragraph 72 **(A41962682 – Witness statement of Ken Hall (Final redacted) – 4 April 2023 – Bundle 13, Volume 7 – Page 338).**

39. Pre RDD review meetings were held, where Wallace Whittle would review with Mott MacDonald the design intent and work in progress drawings, prior to formal RDD Review. Once the relevant pack was ready for RDD review Wallace Whittle would issue it to Multiplex document control, who then put it in a workflow and submitted it to the Board. The pack would then be returned by the Board after review with the appropriate Level of classification, be it Level

A, B, C or D, and commented upon accordingly. This would then be returned to Wallace Whittle for action.

Critical Care RDD

40. I think it is important to remember that the Environmental Matrix is only one part of the design review process on the Project and that, in parallel, the detailed ventilation design including layout drawings and schedules for all of the ventilation design elements had to be submitted for review and approval, through RDD. These drawings and schedules contain the detailed design to achieve the parameters shown in the Environmental Matrix.
41. In relation to critical care the ventilation design drawing which covers this area is drawing WW-04-01-PL-524-001 titled Zone Z4 Level 01 Ventilation Distribution Sheet 1 of 2 (**A46365895 – Appendix 27 – WW-04-01-PL-524-001 – Bundle 13, Volume 2 – Page – See Paper Apart**). This was reviewed and approved through RDD with Rev J being approved as Level B by Brian Currie of NHSL on 03 May 2018. During the life of the drawing, there were the following RDD submissions: Rev01, August 2015 was given a Level B, Revision E was given Level B June 2016, Revision F Level B July 2016, Revision G Level A September 2016, Revision H Level A December 2016, Revision I Level A November 2017, Revision J Level B May 2018.
42. WW-04-01-PL-524-001 (**A46365895 – Appendix 27 – WW-04-01-PL-524-001 – Bundle 13, Volume 2 – Page – See Paper Apart**). details duct routes, duct ancillaries, duct sizes and contains the grille references. The ventilation flow rates to be achieved at each grille shown on WW-04-01-PL-524-001 (**A46365895 – Appendix 27 – WW-04-01-PL-524-001 – Bundle 13, Volume 2 – Page – See Paper Apart**). are detailed on the associated grille schedules.
43. The grilles schedules for critical care were as follows:
- WW-Z4-01-SH-524-001 (**A46365896 – Appendix 28 – WW-Z4-01-SH-524-001 – Bundle 13, Volume 2 – Page 509**) titled Zone 4-1 Level 01

Schedule of Supply Grilles. Rev H was approved as Level A by Brian Currie on 23/08/2018. During the life of the grill schedule, there were the following RDD submissions: Rev D Level B June 2016, Rev E Level A October 2016, Rev F Level A October 2017, Rev G Level B May 2018, Rev H Level A August 2018.

- WW-Z4-01-SH-524-002 (**A46365897 – Appendix 29 – WW-Z4-01-SH-524-002 – Bundle 13, Volume 2 – Page 524**) titled Zone 4-1 Level 01 Schedule of Extract Grilles Rev I was approved as Level A by Brian Currie on 23 August 2018. During the life of the grill schedule, there were the following RDD submissions: Rev D Level B June 2016, Rev E Level A October 2017, Rev F Level A April 2018, Rev H Level B May 2018, Rev I Level A August 2018.
- WW-Z4-01-SH-524-003 (**A46365898 – Appendix 30 – WW-Z4-01-SH-524-003 – Bundle 13, Volume 2 – Page 532**) titled Zone 4-1 Level 01 Schedule of Dirty Extract. Rev E was approved as Level A by Jackie Sansbury on 02 May 2018. During the life of the grill schedule, there were the following RDD submissions: Rev D Level B June 2016, Rev E Level A May 2018.

44. I have set out below some specific discussion details that took place in relation to the single bedroom ventilation and multibed ventilation design.

Single Bedroom Ventilation

Derogation WW014

45. On 19 May 2016, Mott MacDonald sent an email noting that (as per the approved Environmental Matrix Rev 5 Matrix) the air change rates within the single bedroom en-suites were higher than that required under the relevant SHTM (**A46365900 – Appendix 31 – ANX_EDN000258277 – Bundle 13, Volume 2 – Page 538**). They recognised that this design was to provide adequate air changes for both the en-suite and the bedroom, and the

balanced pressure required between the en-suite and bedroom in these rooms. They also recognised that no heat recovery would be possible on air extracted via the en-suite. Heat recovery is where the heat on waste air is recycled and reused as energy to heat the building. Heat recovery is not possible on air extracted via an en-suite because this would be considered "dirty air".

46. The Board asked Project Co to confirm whether a derogation needed to be approved by the Board to account for these points.
47. From my point of view derogations are a matter for Health Boards, the contractor designs and constructs in accordance with the specific requirements of the contract, if those requirements are to change then this is done through the Change Process under the contract, rather than derogations. Multiplex did not need a change or "derogation" in relation to this matter, as the design was in accordance with the Board's Construction Requirements and the Environmental Matrix. To me, this looked to be Mott MacDonald wanting to record what the design on this Project was for the single bedrooms and I took the email and request for a derogation as a positive marker, showing they understood and were happy the design met the Board's requirements.
48. In response to this email, I therefore asked Wallace Whittle to prepare a derogation and submitted this, as requested, to Mott MacDonald. **(A46365901 – Appendix 32 – ANX_EDN000379536 – Bundle 13, Volume 2 – Page 539) (A46365902 – Appendix 32.1 – ANX_EDN000379537 – Bundle 13, Volume 2 – Page 543)**. The derogation stated:

"The air change rate has been increased within the single bedroom en-suite from 3 air changes per hour to 10 air changes per hour (min) to provide a fresh environment for patients and ensure single bedrooms are balanced as per SHTM 03-01 requirements."

49. The proposal read as follows:

"En-suite to have a ventilation dirty extract of 10 air changes per hour (min)"

Derogation WW015

50. Whilst reviewing the Board's derogation request in relation to the single bedroom en-suites (derogation WW014), Wallace Whittle prepared a separate derogation for the agreed air change rates in single bedrooms, given that the Board seemed eager to have their formal derogations in place.
51. This was derogation WW015, which was provided by Wallace Whittle on 26 July 2016 (**A46365903 – Appendix 33 – ANX_EDN000429472 – Bundle 13, Volume 2 – Page 544**) and submitted to the Board on 1 August 2016 (**A46365904 – Appendix 34 – ANX-EDN000340413 – Bundle 13, Volume 2 – Page 545**).
52. WW0015 stated:
- "the air change rate has been decreased within the single bedrooms from 6ac/hr to 4ac/hr. Mixed mode ventilation has been provided with additional natural vent available from the opening windows. Single bedrooms without opening windows have been provided with 6ac/hr"*.
53. With the proposal being:
- "Single bedrooms with opening windows to have a mechanical ventilation rate of 4ac/hr"*.
54. As can be seen from the tone of my emails issuing the derogations, I did not consider these would be controversial – both reflected the Board's Construction Requirements and the Environmental Matrix which had been approved through RDD by this point. (As discussed above Rev 5 was awarded Level B with no comments which related to these derogation requests). Indeed, in our discussions in May and July 2015 (see paragraphs 5-12 above), Mott MacDonald had specifically asked for Guidance Note 26 to be updated in the Environmental Matrix and it reflected what was now being recorded in these derogation requests.

"Single Bedroom - The design philosophy for ventilation is for a mixed mode operation where natural vent is encouraged which has benefits both physiological with users being partly in control, and from an energy stand point where mechanical vent loading is partly reduced (2/3rds). This strategy results in zero pressure differential regime within the room where supply and extract is balanced.

En suite dirty extract volume flow rate has been increased to achieve a balanced ventilation system."

55. However, at a meeting on 20 September 2016, to my surprise I was told the Board would be rejecting both derogations WW014 and WW015. I requested reasons for this, which were provided in an email on 22 September 2016 (**A46365906 – Appendix 35 – ANX_EDN000246755 – Bundle 13, Volume 2 – Page 547**). The main reason given was to do with heat recovery and the increased AC rate in the en-suites. It also referred to 4 bed wards, which weren't relevant to these derogations. This is because, the design solution for single bedrooms was different to that for multi-bedrooms. The design solution in the single bedrooms was designed to achieve balanced pressure in the single bedrooms. The Board's Environmental Matrix at FC (and the Environmental Matrix that had then been approved Level B) required the multi-bedrooms to have positive pressure.
56. After discussing with Wallace Whittle, Multiplex and IHSL provided a joint review and response on 16 December 2016 (**A46365908 – Appendix 36 – ANX_EDN000301098 – Bundle 13, Volume 2 – Page 549**) stating the derogations related to single bedrooms and were based on the design at FC, which had then been captured in the Environmental Matrix.

Revision 7 of the Environmental Matrix

57. Whilst the discussions in relation to derogations WW014 and WW015 were ongoing, Revision 7 of the Environmental Matrix was prepared by Wallace

Whittle and issued for review on 19 September 2016 (Appendix 37 - EDL_001_1_00000001-18751) (**A46365907 – Appendix 37 – EDL_001_1_00000001-18751 – Bundle 13, Volume 2 – Page 552**), picking up changes which had been made since the last revision. For example, an additional table was added to the beginning of this revision of the Matrix which addressed lighting comments made by the Board.

58. The air change rates and pressure for the single bed isolation cubicles, single bedrooms, and multi-bed wards all remain unchanged.
59. On 17 October 2016, the Board returned Revision 7 of the Environmental Matrix Level C (**A46365910 – Appendix 38 – ANX_EDN000088432 – Bundle 13, Volume 2 – Page 649**). This came as a surprise given the previous grading of Level B at Revision 5. Further, by this point in time a considerable amount of the detailed design drawings and schedules had been through the RDD process, had been approved, procured and was being installed on site.
60. As I explain at paragraphs 37 to 41 above, for example, by October 2016 the critical care drawings and schedules had been designed around the contents of Rev 5 of the Matrix, and submitted for RDD, and approved at a Level B or above by the Board allowing the design to proceed to procurement and installation.
61. Therefore, the sudden downgrading of the Matrix to Level C, meaning contractually we were not to act on it, was unusual. Particularly Revision 5 of the Matrix had been given a Level B, "proceed", and that no substantive changes had been made to the version now being awarded Level C.
62. The main comment in relation to ventilation is General Comment No. 6 in Mott MacDonald's cover email, stating:

"Some ventilation rates don't appear to comply with BCRs. The Board would like to point that is still awaiting response from PCo to the issues raised as per MM-RFI-000172 & MM-GC-002006 relating to ventilation

rates." **(A46365910 – Appendix 38 – ANX_EDN000088432 – Bundle 13, Volume 2 – Page 649).**

63. The "MM-RFI-000172" correspondence referred to relates to the CT, MRI, Fluoroscopy and Gamma camera rooms ventilation and was addressed and closed out – see mail number MPX-RTRFI-001075 **(A46365913 – Appendix 39 – ANX_EDN000208018 – Bundle 13, Volume 2 – Page 652)** and **(A46365916 – Appendix 40 – ANX_EDN000301119 – Bundle 13, Volume 2 – Page 653).**
64. "MM-GC-002006" is then the Aconex reference for the correspondence in relation to derogations WW0014 and WW0015, which I have discussed above, which reflected the Board's Requirements and (as I explain below) were confirmed in the Settlement Agreement.
65. Overall, it appeared that the Board had re-reviewed their own clinical needs for multibed ventilation and wanted the design changed from what was agreed and recorded at FC and within the Level B approved Environmental Matrix, and corresponding design drawings and schedules already submitted and approved through RDD.
66. Following subsequent discussions between IHSL and the Board, the Environmental Matrix was then upgraded to Level B, without any changes being made to the Environmental Matrix. I was not directly involved in these discussions.
67. The upgrade was made on 07 November 2016 under reservation that the Board still had "serious concerns" about the document, noting that they believed the design to be non-compliant **(A46365914 – Appendix 41 – ANX_EDN000079746 – Bundle 13, Volume 2 – Page 654)**. However, the reference given for the "non-compliance" was correspondence MM-GC-002084, which are the Board's comment on Rev 7 from 17 October 2016 which I discussed above. The main comment on ventilation being in relation to

WW0014 and WW0015 which aligned with the Board's requirements, as confirmed in the Settlement Agreement.

Multi-bed Ward Ventilation – Pressurisation

68. After Multiplex had received the approved RDD ventilation designs, the Board then started to raise comments about the pressure regime for the multi-bed ventilation.
69. This was raised for the first time in relation to the discussion around the single bed derogations WW0014 and WW0015, which I discuss above. With the Board suggesting the discussions around the single bedroom pressure regime pre-FC also applied to multi-bed wards. That was not my understanding **(A46365915 – Appendix 42 – ANX_EDN000168759 – Bundle 13, Volume 2 – Page 658)**.
70. A meeting was therefore held to discuss the position on 23 January 2017.

Wallace Whittle Notes and Revised Design Proposals

71. It became clear from the meeting with the Board on 23 January 2017 that the Board's position on the ventilation design had changed and they now wanted the design for multi-bed wards to give balanced pressure.
72. The existing design for the multi-bed wards, as per the original H+K Environmental Matrix and that approved though RDD, was to have positive pressure and 4ac/hr.
73. As part of the meeting Wallace Whittle agreed to produce a paper explaining the design. On 31 January 2017, Wallace Whittle issued a note entitled "Bedroom Ventilation Key Considerations" **(A46365917 – Appendix 43 – ANX_EDN000208856 – Bundle 13, Volume 2 – Page 666) (A46365919 – Appendix 43.1 – ANX_EDN000208857 – Bundle 13, Volume 2 – Page 667)**.

This document looked at both the ventilation in the single bedrooms and in the multi-bed wards.

74. In relation to the single bedrooms, it explained how the design solution to achieve balanced pressure worked and explained the need for an air change rate in excess of 10ac/hr (17ac/hr) in the en-suites for these rooms.
75. In relation to the multi-bedrooms, the report looked at the implications of changing the pressure regime in these rooms to balanced, including the ductwork alterations that would be required.
76. The note was discussed at a meeting on Monday 6 February 2017 and on 9 February 2017, Wallace Whittle then provided a further note entitled "Multi Bedroom Ventilation Amendment Proposal to Achieve Room Balance" **(A46365921 – Appendix 44 – ANX_EDN000209393 – Bundle 13, Volume 2 – Page 668) (A46365923 – Appendix 44.1 – ANX_000209394 – Bundle 13, Volume 2 – Page 669) (A46365922 – Appendix 44.2 – ANX_EDN000209395 – Bundle 13, Volume 2 – Page 672).**
77. This document details a possible design solution to provide balanced pressure in the multi-bed wards on a room-by-room basis. The multi-bed wards in this document include those in Critical Care (those containing the "B1" in the room reference). The solution for the three multi-bed wards in Critical Care is stated as involving reducing the air change rate in these rooms to 3ac/hr, from the 4ac/hr previously required in the Environmental Matrix.
78. Although Wallace Whittle was supplying the detailed design information and impact analysis, the design review and optioneering was very much being led by the Board. Once this note was issued, the Board took the information away for dialogue with their clinical teams. Multiplex were not party to those discussions other than listening to the feedback that would be provided at the next meeting by the Board.

79. By this stage, there were weekly meetings being held with the Board; and Wallace Whittle would take the comments made by the Board on the proposals at these meetings and then provide updated notes and impact analysis.
80. On 21 February 2017 Wallace Whittle then produced another note entitled "Accommodation Design Criteria – Single Rooms & Multi Bed Wards" **(A46365924 – Appendix 45 – ANX_EDN000301171 – Bundle 13, Volume 2 – Page 675) (A46365929 – Appendix 45.1 – ANX_EDN000301172 – Bundle 13, Volume 2 – Page 676) (A46365925 – Appendix 45.2 – ANX_EDN000301173 – Bundle 13, Volume 2 – Page 678).**
81. On 23 February 2017, Wallace Whittle then issued the third revision of their "General Ward – Ventilation Amendment Proposal" **(A46365930 – Appendix 46 – ANX_EDN000199766 – Bundle 13, Volume 2 – Page 680) (A46365931 – Appendix 46.1 – ANX_EDN000199767 – Bundle 13, Volume 2 – Page 681).** This contained the same proposal to achieve balanced pressure in the multi-bed wards as set out previously in their note of 9 February 2017 but provided more detail on the ductwork changes that would be required to implement this change. This again includes the proposal to reduce air change rates in the multi-bed wards (including Critical Care) from 4ac/hr to 3ac/hr.
82. On 24 February 2017, another meeting was held with the Board. I provided a note of this meeting on 27 February 2017, which included a marked-up schedule containing all of the multi-bed wards that were being discussed **(A46365933 – Appendix 47 – ANX_EDN000273257 – Bundle 13, Volume 2 – Page 684) (A46802206 – Paragraph 51 – Ventilation Amendment Proposal – 24.02.17 – Bundle 13, Volume 7 – Page 365).** Each room has been marked as either "essential" or "non-essential". This reflects the discussions at the meeting where the Board went through each of the design solutions to provide balanced pressure in these rooms and decided whether it was essential or not that the changes were made.

83. This meeting was attended by Brian Currie (Project Director for the Board), Janice McKenzie (NHSL Clinical Director), Dorothy Hanley (Project Manager Children's Services Lead), and Ronnie Henderson (NHSL commissioning manager) **(A46365934 – Appendix 48 – ANX_EDN000273259 – Bundle 13, Volume 2 – Page 689)**. The Board led the marking up of the schedule and Ms Hanley fed back what the Board's clinical team considered was essential or non-essential in terms of the changes to the multibed rooms.
84. The outcome of this exercise was that the Board decided that not all 20 multibed rooms had to be modified, instead they said only 14 rooms (including those in critical care) were "essential".

Revision 9 of the Environmental Matrix

85. Whilst the Multi-bedroom discussions were ongoing, revision 9 of the Environmental Matrix was produced by Wallace Whittle and submitted through the RDD process on 19 May 2017 **(A46365935 – Appendix 49 – EDL_003_1_00000004-05305 – Bundle 13, Volume 2 – Page 690)**. The revision box notes that the Matrix had been updated to take account of the Boards comments from 17.01.17.
86. On 18 July 2017, the Board provided their comments confirming Level B. The body of the email accompanying the Board's comments stated **(A46365937 - Appendix 50 - ANX_EDN000074523 – Bundle 13, Volume 2 – Page 748)**:

"The Board notes it is the Board's opinion the ventilation design for multi bedrooms is not compliant with the BCRs and separate discussions are ongoing relative to the satisfactory resolution of the design.

Please also note the Board rejected Project Co's derogation for single rooms and are considering the compliance of the alternative solution."

87. I forwarded the Board's comments to Wallace Whittle on 19 July 2017 and requested that they review them **(A46365938 - Appendix 51 -**

ANX_EDN000522744 – Bundle 13, Volume 2 – Page 808). Wallace Whittle requested a meeting with the Board for clarity on some of the points raised, this was arranged for 28 August 2017.

88. The Board then provided further comments on revision 9 of the Environmental Matrix which were issued on 28 August 2017 (**A46365941 - Appendix 52 - ANX_EDN000075337 – Bundle 13, Volume 2 – Page 867**).
89. Revision 10 of the Environmental Matrix was then produced by Wallace Whittle and submitted for RDD on 12 September 2017 (**A46365943 - Appendix 53 - GRC_002_1_00000009-33240 – Bundle 13, Volume 2 – Page 926**).
90. As is recorded in my email of 26 September 2017, a meeting was then held on 28 September 2017 with the Board and Mott MacDonald (**A46365947 - Appendix 54 - ANX_EDN000301372 – Bundle 13, Volume 2 – Page 1045**). The aim of this meeting was to address any outstanding comments from the Board on the latest revision of the Environmental Matrix.
91. I provided a note of the discussions at this meeting in an email of 5 October 2017 (**A46365818 - Appendix 55 - ANX_EDN000202126 – Bundle 13, Volume 2 – Page 1048**). As is noted in this email, a revised revision 10 of the Matrix was to be submitted for RDD which captured the comments made at the meeting. At point four in my email, I note that multi-bedrooms were not discussed at the meeting. I also note that a change was to be instructed, in relation to the change from positive to balanced pressure in the multi-bed wards.
92. Revision 11 of the Matrix was then produced by Wallace Whittle and submitted to RDD on 26 October 2017 (**A46365824 - Appendix 56 - EDL_003_1_00000004-11083 – Bundle 13, Volume 2 – Page 1052**).

93. The Board returned comments on Revision 11 of the Matrix on 17 November 2017 (**A46365821 - Appendix 57 - ANX_EDN000074985 – Bundle 13, Volume 2 – Page 1172**). The body of their email stated that:

"the design for single and multibedroom ventilation design being progressed by Project Co remains non-compliant and this non-compliance should either be rectified, a PCo change submitted for the Board's consideration or a dispute raised between the parties."

94. No further details were provided, and Revision 11 of the Matrix was approved Level B.

Wallace Whittle April, May and June 2018 Design Notes

95. Following Rev 11, the discussions continued in relation to the multi-bed wards and on 13 April 2018, Wallace Whittle provided a pack of drawings for a "revised ventilation proposal to achieve a room balance at 4a/c" (**A46365826 - Appendix 58 - ANX_EDN000276472 – Bundle 13, Volume 2 – Page 1235**) (**A46365827 – Appendix 58.1 – ANX_EDN000276473 – Bundle 13, Volume 2 – Page 1236**) (**A46365828 – Appendix 58.2 – ANX_EDN000276474 – Bundle 13, Volume 2 – Page 1237**) (**A46365829 – Appendix 58.3 – ANX_EDN000276475 – Bundle 13, Volume 2 – Page 1238**) (**A46365831 – Appendix 58.4 – ANX_EDN000276476 – Bundle 13, Volume 2 – Page 1239**) (**A46365832 – Appendix 58.5 - ANX_EDN000276477 – Bundle 13, Volume 2 – Page 1240**) (**A46365830 – Appendix 58.6 – ANX_EDN000276478 – Bundle 13, Volume 2 – Page 1241**). As by this stage the Board had confirmed they wanted balanced/negative pressure, but wanted to maintain 4AC, rather than reduce it to 3AC as per the previous option.
96. This revised proposal was discussed at a meeting with the Board on 12 April 2018. (**A46365833 - Appendix 59 ANX_EDN000274412 – Bundle 13, Volume 2 – Page 1242**).

97. In an email of 18 April 2018, the Board noted that revision 5 of the "General Ward – Ventilation Amendment Proposal to Achieve Room Balance" still showed air change rates between 2.7 and 3.5, whereas they were "seeking a design for 4AC" for all of the rooms addressed in the schedule – which included critical care **(A46365843 - Appendix 60 - ANX_EDN000204253 – Bundle 13, Volume 2 – Page 1255)**.
98. In response to this email from the Board, I replied and confirmed we understood "*4ACH is the brief*" and that the Schedule was being updated to reflect the 4ac/hr and balanced pressure requested for these rooms **(A46365842 - Appendix 61 - ANX_EDN00276512 – Bundle 13, Volume 2 – Page 1258)**.
99. Wallace Whittle updated the documents and on 22 May 2018, revision 6 of the "General Ward – Ventilation Amendment Proposal" was issued for RDD **(A46365844 - Appendix 62 - EDL_003_1_00000004-03195 – Bundle 13, Volume 2 – Page 1262)** and then returned with Level B on 31 May 2018 **(A46365846 - Appendix 63 - ANX_EDN000057169 – Bundle 13, Volume 2 – Page 1268)**. This document states that the multi-beds in Critical Care are to have an overall air change rate of 4ac/hr. None of the Board's comments included with the Level B query the 4ac/hr rate.
100. Revision 7 of the "General Ward – Ventilation Amendment Proposal" was then issued through RDD on 21 June 2019 **(A46365847 - Appendix 64 - EDL_003_1_00000004-05147 – Bundle 13, Volume 2 – Page 1271)** and given Level A by the Board on 27 July 2018 **(A46365854 - Appendix 65 GOA_001_1_00000002-22293-1 – Bundle 13, Volume 2 – Page 1279)**. The Level A return meant that the Board had reviewed the document and had no comments.
101. Wallace Whittle then updated the relevant rooms in the Environmental Matrix to reflect the changes that had been made to the multi-bed ward pressure regime.

102. This updated extract of the Environmental Matrix was then issued to the Board on 05 July 2018 (**A46409312 - Appendix 66 - ANX_EDN000497477 – Bundle 13, Volume 2 – Page 1337**).

Settlement Agreement

103. On 22 February 2019, the Board and IHSL agreed a Settlement Agreement (SA) (**A33406223 – 28 February 2019 Report on PA Settlement Agreement – Bundle 10 – Documentation relating to Supplementary Agreement 1 (SA1) – Page 156**). A step-down Settlement Agreement was also agreed by Multiplex and IHSL on 22 February 2019.

104. I was not involved in the commercial negotiation of the SA. I did attend some of the meetings along with other technical members of the Multiplex team in relation to the technical resolution being agreed and I liaised with Ronnie Henderson from the Board where further dialogue was required.

105. There were also various workshops where the technical position on the wording to be included in the SA would be discussed. These would then be reviewed by Ronnie Henderson and his team on behalf of the Board.

106. In relation to the matters, I have discussed in this statement, Item 7 – 4 Bed Ventilation and Item 13, Single Bedroom Ventilation air changes of the Technical Schedule included in the SA (Appendix 65A – Extracts from SA) (**A46409292 – Appendix 65A – Technical Schedule - Bundle 13, Volume 2 – Page 1308**) are relevant:

Item 7 – 4 Bed Ventilation. As previously discussed, this item was closed out technically by Revision 7 of the "General Ward – Ventilation Amendments Proposal" which was returned Level A. This was then resolved contractually as being the agreed final position in the SA. No further works were required.

Item 13 – Single Bedroom Ventilation air changes. This item related back to derogations WW0014 and WW0015 in relation to the air change rates in the single bedrooms. The agreed position can be seen in Item 13 to the SA and has two parts, reflecting the two previous separate derogations. Again, no further works were required.

107. I have been asked to comment on the following *“After the agreed approach to the number of air changes per hour in Critical Care (HDUS) was questioned by IOM in their first issues log, circulated by email by Brian Currie on 25 June 2019 (A32653249 – 3.13_0007_IOM Issues Log Dated 25 June 2019 – Urgent – Bundle 13, Volume 7 – Page 368) NHSL approached IHSL to undertake additional work to achieve 10AC in critical care on the basis that this would be a change in accordance with Schedule Part 16 (change protocol) to the project agreement”*

As I understand it, IOM were brought in by NHSL to validate the as installed installation and commissioning results. As this related to site based activities, I was not involved in this dialogue.

108. I have been asked to comment on Stewart McKechnie of TUV-SUD/Wallace Whittle having referred in his evidence to having clarified that the rooms treated with 10AC and 10Pascals of pressure was a correct interpretation.

This is a matter for Mr McKechnie. My understanding was the Environmental Matrix was the brief and contained the Board's requirements.

109. I have been asked to comment on the following *“At page 23 of their closing submissions MML note the alteration to guidance note 15 (after financial close) (A44443771 – Mott MacDonald – Final Closing Submission – 30 June 2023 – Bundle 13, Volume 7 – Page 370) to make it reference isolation rooms only. MML claims this change was not raised with MML or NHSL”*

As I explain at paragraph 22 above Revision 2 of the Environmental Matrix was produced by Wallace Whittle and issued to the Board for RDD on 4th

December 2015 (**A46365870 – Appendix 17 – ANX_EDN000083461 – Bundle 13, Volume 2 – Page 97**). The document having been updated by Wallace Whittle to reflect the Board's comments. As part of this the Guidance Notes were also updated by Wallace Whittle to take account of the Board's comments and discussions since FC. However, I am now aware that Item 15 "Critical Care areas" contains a change that is not highlighted in red in Revision 2. This being the addition of the words "for isolation cubicles" after the words "10ac/hr". I was not aware of this change at the time. Multiplex did not make this change. I am unable to comment further.

110. I have been asked to comment on the following. *“At Para 55.13 MML identifies emails from 2016 that it contends are relevant to understanding the evidence led to date”.*

The October 2016 and November 2016 correspondence referred to by Mott MacDonald relates to Revision 7 of the Environmental Matrix which I have discussed at paragraphs 57-67 above.

111. As I explain above, whilst the Board refer to "non-compliance" the main comment on ventilation from the Board was in relation to WW0014 and WW0015 which reflected the Board's Requirements, as confirmed in the Settlement Agreement.

112. I have been asked to comment on the following *“On 31.1.19, there was confirmation from IHSL that the design solution complied with SHTM’s. IHSL’s letter dated 31 January 2019 is in Bundle 14 at Page 99”.* (**A43103366 – IHS Lothian Letter Re Compliance with SHTM – 31 January 2019 – Bundle 13, Volume 7 – Page 425**).

I was not involved in this dialogue.

113. I have been asked to comment on the following 3 paragraphs, *“On 31.1.19, Wallace Weir of IHSL wrote to Brian Currie* (**A43103366 – IHS Lothian Letter**

Re Compliance with SHTM – 31 January 2019 – Bundle 13, Volume 7 – Page 425) with confirmation that”:

“All ventilation systems have been designed, installed and commissioned in line with SHTM 03-01 as required, systems are maintained in such a manner which allows handover at actual completion to meet SHTM 03-01 standards”

114. *On 12 February 2019, Mr Currie wrote to Mr Weir ‘seeking written assurance on various matters, including that engineering systems had been designed and were being installed and commissioned to meet current guidance: that the engineering systems had been commissioned, validated and set to work to ensure safety, quality and compliance: and that the systems to be handed over at actual completion met the specified requirements and were safe and effective’ (A40988842 – Part A 4.2.6 – 20190212 – Letter from NHSL To IHSL Re Assurance – 12.09.19 – Bundle 13, Volume 7 – Page 427).*

115. *On 13 March 2019, Mr Weir wrote to Mr Currie in slightly different terms to his letter of 31 January 2019, ‘confirming inter alia that the engineering systems had been designed, installed, commissioned and validated in accordance with the Project Agreement (A40988855 – Part A 4.2.8 – 20190313 – IHSL LHB Assurance – Bundle 13, Volume 7 – Page 429) standards’ (Mr Weir’s letter of 13 March 2019 is enclosed with Mr Graham’s letter to Mr James of 1 April 2019) (A41293071 – Three letters relating to assurances regarding the delivery of the RHSC and DCN Project – Bundle 4 – Documentation relating to the Certificate of Practical Completion – Page 228).*

I was not involved in any of this dialogue noted by the Inquiry at paragraphs 113 – 115 above.

116. I have been asked what steps, if any, were NHSL taking to verify compliance with guidance? Were NHSL placing reliance on IHSL and the independent tester to ensure compliance, without any further verification by the health board.

This appears to be a question for NHSL.

Declaration

117. I believe that the facts stated in this witness statement are true. I understand that this statement may form part of the evidence before the Inquiry and be published on the Inquiry's website.