Scottish Hospitals Inquiry

Response on behalf of Arcadis, Independent Tester, to the Inquiry's Provisional Position Paper 6

OCTOBER 2023

Public Inquiry: Queen Elizabeth University Hospital, Glasgow and the Royal Hospital for Children and Young People and Department of Clinical Neurosciences, Edinburgh ("RHCYP/DCN")

1. Introduction

1.1 The Inquiry has invited Arcadis to provide its comments on Provisional Position Paper 6 ("PPP6"). Arcadis notes that the purpose of PPP6 is to outline the Inquiry team's current understanding of the process utilised to commission and validate the ventilation systems for the RHCYP/DCN but that the paper remains provisional.

1.2 In this response, Arcadis provides its comments on PPP6 and seeks to correct and/or clarify the Inquiry's understanding of the commissioning and validation of the ventilation systems, in so far as it is able to do so.

1.3 Arcadis' comments are limited to the matters which it considers to be relevant to delivery of the Independent Tester ("IT") role and within the knowledge of John Edwards, who led the team that delivered the IT role.

2. Contractual provisions for ventilation commissioning and validation

2.1 In section 2 of PPP6, the Inquiry has sought to identify the project's contractual provisions relating to commissioning and validation. The focus of the Inquiry appears to be on Schedule Part 6, Section 3 of the Project Agreement, which sets out the Board's Construction Requirements ("BCRs"), rather than the other numerous and detailed contractual provisions relating to the commissioning process.

2.2 Following consideration of paragraph 3.6.3 of the BCRs, the Inquiry states (para 2.1.3) that it understands the mechanical ventilation requirements in the Room Data Sheets were not to be used as part of the commissioning process. Arcadis' view is that this preliminary conclusion cannot be reconciled with the first sentence of 3.6.3 which specifically states that "*As part of the commissioning process, Project Co shall be responsible for demonstrating compliance with the requirements included within the Room Data Sheets*".

2.3 It is Arcadis' understanding that the last sentence of 3.6.3 (as set out in paragraph 2.1.2 of PPP6) was included to cover situations in which there was a change of use of an area or room during design development. It is clear that an IT must be provided with clear and approved design criteria against which the mechanical and electrical systems can be tested and commissioned. The process of review and approval of Room Data Sheets should identify the functional requirements for the intended use of areas and rooms.

2.4 In addition, and as set out in paragraphs 2.1.8. and 2.1.14 of PPP6:

- the Completion Criteria (included in Schedule Part 10 of the Project Agreement) confirms that "2.1.4 All mechanical and electrical Plant and systems shall be tested, commissioned and operate satisfactorily in accordance with the specified design criteria, any manufacturers' operating requirements and the Room Data Sheets" and;
- Clause 17.12 of the Project Agreement provides that the IT was to issue a Certificate of Practical Completion to the NHSL and IHSL when he was satisfied that the facilities were complete in accordance with the Completion Criteria.

2.5 In paragraph 2.1.7 of PPP6, the Inquiry concludes that the operation manuals relating to the categories of works detailed in SA1 as still to be completed as at 22 February 2019 are not relevant to PPP6. Arcadis disagrees with the Inquiry's conclusion. The operation and maintenance manuals provided in relation to the Post Completion Works (as defined in SA1) are relevant and should contain all the commissioning documentation relating to the supply and extract from the isolation rooms together with confirmation of the supply ventilation to the other rooms listed in Table 1 of PPP6.

3. Comparison of contractual provisions with guidance relating to ventilation commissioning and validation

3.1 The Inquiry has acknowledged that the various guidance on commissioning referred to in Section 3 of PPP6 was not written with privately financed or Non-Profit Distribution (NPD) projects, such as the RHCYP/DCN, in mind (para 3.1.1 PPP6), and/or in relation to the SCIM guidance, not referred to in the contract documents at all (para 3.1.2 PPP6). The Inquiry has also recognised that there was no actual provision for parties other than IHSL to adhere to the guidance (para 3.1.3 PPP6).

3.2 In light of the Inquiry's acknowledgements, it is not clear why the Inquiry has gone on to apply elements of the guidance literally which has resulted in a misunderstanding of the role of the IT, which is clearly set out in its contract. For example;

- In paragraph 3.2.7 of PPP6 the Inquiry queries how the reference in Scottish Capital Investment Manual (SCIM) guidance on commissioning to 'user requirements in the Commissioning Master Plan' is to interact with the provision that equipment should perform to the contract specification. This question appears to be erroneous in circumstances where there is no reference to SCIM guidance in the Project Agreement.
- In paragraph 3.3.9 of PPP6, the Inquiry infers that the responsibilities of 'Project Engineer' and 'Client's Commissioning Adviser', as defined in the Guidance on Engineering Commissioning, fell to the IT. Likewise, in paragraph 4.2.24 of PPP6, the Inquiry assumes that the provision of commissioning reports, as referred to in the Guidance on Engineering Commissioning, was the responsibility of the IT. However, as the Inquiry acknowledges, the Guidance defines the Project Engineer and Client's Commissioning Adviser as people nominated by the Client/Client Body whereas the IT was appointed by both IHSL and the Board of NHSL. Neither the role of 'Project Engineer' nor 'Client's Commissioning Adviser' are specified in the IT's contract, which sets out the role and contractual duties of the IT. Accordingly, it is not clear why these inferences have been drawn by the Inquiry.

4. Overview of the ventilation commissioning and validation procedure for Critical Care

Table 1

4.1 Arcadis has reviewed the information detailed in Table 1 of PPP6, the aim of which is to set out an overview of the commissioning and validation process for the Critical Care bedrooms at RHCYP/DCN.

4.2 Arcadis does not believe that the information set out in Table 1 is correct or complete and suspects that the Inquiry has not been provided with and/or has not properly considered the complete set of relevant commissioning documentation.

4.3 Zutec was the platform used for holding all documentation and evidence relating to compliance, including the commissioning test results, room reviews and the compliance matrix as well as other information including Room Data Sheets and record drawings. Arcadis has noted that the documents it is currently able to access on Zutec are not complete, for example:

- Documentation appears to be missing and/or edited to remove the commissioning front sheets which detail the parties who witnessed the commissioning tests.
- The review/approval section has been reset and Arcadis has not been able to obtain details of all the testing, witnessing and commissioning processes (including Arcadis' review and approval) undertaken before 20 April 2021. All activities currently listed (including 'Arcadis Approval') appear to be accredited to Vesta Leikaite, who Arcadis believe is a Bouygues employee.
- The separate series of folders, that were set up on Zutec to contain the commissioning data from the Post Completion Commissioning is missing in its entirety.

4.4 Arcadis' detailed comments in relation to Table 1 are set out in Appendix 1 to Arcadis' Response.

Further discussion on Table 1

4.5 In section 4.2 of PPP6, the Inquiry has sought to identify the final contractual specification for ventilation at the RHCYP/DCN following the dispute that arose between the NHSL and IHSL regarding the ventilation system for the single and multibed rooms and to understand the impact of the Settlement and Supplemental Agreement 1 entered into between the parties on 22 February 2019 ("SA1").

4.6 The Inquiry has queried the apparent lack of any final Room Data Sheets or updated version of the Environmental Matrix and has explained that it is not clear what design conditions the mechanical ventilation systems were to actually meet during commissioning. The Inquiry has also inferred that the commissioning of the ventilation equipment cannot have been completed prior to the Certificate of Practical Completion and Commissioning Completion Certificate being issued.

4.7 Arcadis' view is that the Inquiry has misunderstood the impact of SA1 on the commissioning process and the works undertaken ahead of the Certificate of Practical Completion being issued on 22 February 2019. In addition, the Inquiry does not appear to have taken cognisance of the commissioning tasks that were undertaken post February 2019 and the subsequent completion certificates issued by the IT including:

- Milestone 2 – Drainage Works Completion Certificate 22nd May 2019
- Milestone 3 – Void Detection Works Completion Certificate 21st June 2019
- Milestone 4 – Heater Battery Works Completion Certificate 6th June 2019
- Outstanding Works Completion Certificate 21st August 2020

4.8 In paragraph 4.2.24, the Inquiry has drawn the inference that the responsibility for providing 'commissioning reports' at the end of the commissioning process fell to the IT, as described in the 'Guidance to Engineering Commissioning'. However, there is no such requirement or duty detailed in the IT's contract. During the construction phase of the project the IT issued a monthly report on the activities and findings during the month. Due to completion of the project being delayed, the IT's contract period was extended a number of times and, in or around September 2018, following a scope variation, it was agreed that Arcadis no longer needed to produce monthly reports, as by this point, whilst outstanding compliance issues remained, the construction had been completed.

4.9 For the avoidance of doubt, Arcadis disagrees with many of the points and assumptions made by the Inquiry in section 4.2 of PPP6. However, in order to avoid repetition, Arcadis seeks to address the issues raised in section 4.2 in its response to the provisional conclusions reached by the Inquiry (detailed in section 6 of PPP6).

5. The Inquiry's provisional conclusions

5.1 In paragraph 6.2.3 of PPP6 the Inquiry has queried what was used as the basis of the commissioning data in practice. In accordance with the terms of the Project Agreement and SA1, Arcadis can confirm that the IT used the Room Data Sheets (as approved by NHSL through the Reviewable Design Data process) and the Technical Schedule to SA1 as the basis of the commissioning data in practice.

5.2 In paragraph 6.2.8 of PPP6, the Inquiry has invited Core Participants ("CPs") to clarify how the earlier commissioning of the rooms in Table 1, undertaken between February and October 2018, sits in relation to the finalised specification for these rooms as set out in SA1.

5.3 The Technical Schedule of SA1 provided revised ventilation requirements for a number of four-bed rooms, including those within intensive care and listed in Table 1 of PPP6. Whilst this change only became a contractual requirement with the signing of SA1 on 22 February 2019, the details of this change had been discussed between NHSL and IHSL for over a year. Updated Room Data Sheets to reflect the agreed change were produced by IHSL prior to 31 October 2018, when IHSL first attempted to achieve Practical Completion. These Room Data Sheets are stored in Zutec in the following folders: RHSC & DCN - Edinburgh, General Project Information, Design Consultant Information, Architectural HLM, Final Record Drawings. To allow early implementation of the revised ventilation requirements, Multiplex had undertaken the modification to the system and completed the commissioning in October 2018 and in advance of the signing of SA1.

5.4 Whilst Arcadis is no longer able to access all the testing, commissioning and approval documents on Zutec, Arcadis' records show that the IT initially rejected the October 2018 commissioning results for AHU 04-06 on 29 January 2019 due to a very low airflow volume recorded for extract grille EG26A. However, additional commissioning tests were undertaken and approved by Arcadis prior to issue of the Certificate of Practical Completion on 22 February 2019. The updated Room Data Sheets were formally approved by NHSL when SA1 was signed and, together with the Technical Schedule in SA1, comprised the final environmental design criteria for ventilation in the rooms and areas served by AHU 04 06 at the RHCYP/DCN. Accordingly, by 22 February 2019, the works implementing the agreed resolution for the single and four-bed rooms together with the testing and commissioning had already been completed.

5.5 In addition to the change of requirements in the Technical Schedule, all the isolation rooms (including those listed in Table 1) throughout the hospital were part of the Post Completion Works, Milestone 4 element of SA1. This Milestone provided for the removal of the heater batteries, incorrectly positioned above the lobby and their replacement with radiant panels. Full recommissioning of the ventilation systems serving these areas was undertaken prior to the issue of the completion certificate for Milestone 4. This commissioning included the remeasurement of flow rates, measurement of the pressure differentials between the bedroom and lobby and between the lobby and corridor, and the penetration test on the Heppa filters. All this information was loaded into a separate folder on Zutec, created for the Post Completion Works.

5.6 As set out above, the separate folder set up on Zutec and containing the commissioning data from the Post Completion Commissioning now appears to be missing from Zutec in its entirety. Whilst the referenced material is not accessible through Zutec, all the full commissioning test results should be available through the 'soft' copies of the Operations and Maintenance Manuals provided to NHSL, IHSL and Bouygues, by Multiplex, following the issue of each of the completion certificates.

5.7 The Inquiry has invited CPs to clarify who witnessed the commissioning of AHU 04-06 and who reviewed the test results on behalf of the IT for the rooms in Table 1.

5.8 As detailed above, Arcadis has not been able to access or review all of the commissioning documents and data due to the fact that the documents currently accessible on Zutec do not appear complete. However, as set out in paragraph 5.5, the AHU 04-06 supply to the isolation rooms and the extract systems served by IEF 04, 05 and 06 were re-tested and re-commissioned as part of the Post Completion Works Milestone 4, Heater Battery Works. The commissioning test results for the isolation rooms referenced in the Approved By/On column of Table 1 relate to the original tests undertaken prior to the signing of SA1. The commissioning test results for the isolation rooms referenced in Validated By/On column of Table 1 relate to the final commissioning test results for the isolation rooms undertaken as part of the Post Completion Works Milestone 4, Heater Battery Works. This was the final commissioning, not validation, which was witnessed by Arcadis, and included retests of both the isolation room extract system and the AHU 04-06 supply to the isolation rooms. Arcadis can confirm that John Edwards (chartered engineer and member of CIBSE and CIOB) reviewed all the test results on behalf of the IT for the rooms in Table 1.

5.9 For the avoidance of doubt, as IT, it was Arcadis' role to seek evidence of compliance of the installed ventilation systems with the contractual requirements as stated in the Project Agreement and Schedules, following the processes set out in the IT Contract. It was not the Arcadis' role to express a view on those requirements but to assess if those requirements had been met.

5.10 In paragraph 6.2.21 of PPP6 the Inquiry has queried why the IT issued the Certificate of Practical Completion without room pressure differential data being measured and approved for the rooms in Table 1. In summary, it is Arcadis' position that the only rooms for which pressure differentials were specified in the final contractual requirements were the isolation rooms. As set out in paragraph 5.5 of Arcadis' Response, all isolation rooms throughout the hospital were part of the Post Completion Works and Milestone 4, as detailed in SA1. Full recommissioning of the ventilation systems serving these areas was undertaken prior to the issue of the completion certificate for this work. This commissioning included the remeasurement of flow rates, measurement of the pressure differentials between the bedroom and lobby and between the lobby and corridor, and the penetration test on the Heppa filters.

5.11 As the Inquiry has highlighted in para 6.2.22 of PPP6, in addition to issuing a Practical Completion Certificate it was the role of the IT to issue a Commissioning Completion Certificate. It is Arcadis' position that the IT correctly issued the Commissioning Completion Certificate on the 22nd of February 2019 as both IHSL's Post-Completion Commissioning and NHSL's Post-Completion Commissioning, for the elements covered by this certificate as defined by SA1, had been fully completed by this date. This was due to the lengthy delay in the contract programme allowing these works to be undertaken in parallel with the main commissioning programme.

5.12 In paragraphs 6.2.30 and 6.2.31 of PPP6, the Inquiry has queried the basis on which the Certificate of Practical Completion was issued by the IT, in circumstances where commissioning reports show that the tests for AHU 04-06 were not witnessed and the Inquiry is unable to locate commissioning test report approval for the any of the IEFs other than for IEF 06. For details of the commissioning and testing of both AHU 04-06 and the IEFs listed in Table 1, Arcadis refers the Inquiry to Appendix 1 and paragraph 5.2.2 of Arcadis' Response.

5.13 In paragraph 6.2.36 of PPP6, the Inquiry advises that it has seen documents headed with the Multiplex logo, which indicate that single bed isolation rooms were validated on 6 June 2019 and signed off by Multiplex, Mercury and Arcadis. As detailed in Appendix 1 to Arcadis' Response and paragraph 5.8 of Arcadis' response, the testing of the isolation rooms undertaken in June 2019 was the final commissioning and not validation. As the Inquiry has noted in PPP6, there are no specific contractual provisions relating to the validation of ventilation equipment in the RHCYP/DCN contract documents and there is no reference to validation in the IT contract. The Inquiry has confirmed its understanding that the essential purpose of ventilation commissioning is to verify that the equipment is capable of delivering the performance criteria required by the design and it was the role of the IT to seek evidence to support this through both the witnessing of commissioning tests and reviewing of commissioning test results. It was not the IT's role to express a view on the performance criteria required by the design or to undertake validation of the ventilation system.

6. Questions & requests for documents

6.1 As set out in paragraph 4.3 of Arcadis' Response, the documents it is currently able to access on the Zutec platform are not complete and, accordingly, Arcadis is not able to provide the documents requested by the Inquiry.

6.2 Arcadis' responses to the Inquiry's questions detailed in paragraphs 7.4 to 7.8 of PPP6 are set out in section 5 and/or Appendix 1 of Arcadis' response.

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