

NHS Highland National Treatment Centre

**Construction
KSAR Report**

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Document Overview

Key Stage Assurance Review Report | Construction Stage

Prepared for:

NHS Highland and the Scottish Government

Prepared by:

NHS Scotland Assure – Assurance Service

Document Control Sheet

Revision History

Version	Date	Revision Details	Originator	Changes Marked
V2.0	01/12/22	Final issue following NHS H Final Accuracy Review	NHS Scotland Assure	N/A

Approvals

This document requires the following signed approvals:

Version	Date	Name & Organisation	Role	Signature
V2.0	01/12/22	Thomas Rodger	Head of Engineering NHS Scotland Assure	TGR

Distribution

This document has been distributed to:

Version	Date of Issue	Name	Role / Area
V2.0	01/12/22	[REDACTED]	Project Director - NHS Highland
		[REDACTED]	Commissioning & Change Manager – NHS Highland
		[REDACTED]	Scottish Government – Health Infrastructure, Investment and

			PPE –Health and Social Care Directorates Scottish Government – Head of NHS Strategic Capital Investment
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1. Executive Summary

Following the Construction Stage Key Stage Assurance Review (KSAR) and based on the information presented by NHS Highland, KSAR, NHS Scotland Assure (NHS SA) are unable to support the project at this time.

The project is currently well progressed on site, and we identified concerns that there was a lack of supporting evidence to demonstrate engagement with IPC colleagues throughout the construction phase.

The KSAR also identified several technical concerns including a potential single point of failure within the electrical infrastructure, concerns over the safe systems of work in relation to switchroom access and supporting evidence in relation to the non-standard SHTM 03-01 theatre design, specifically with respect to the ventilation design. There are also several points in relation to the fire strategy that require further evidence to be produced by the NHS Highland team in support of the developed strategies. The ventilation drawings do not indicate any provision of fire/smoke dampers on the dirty extract ductwork that passes between patient bedrooms, with no consideration in the fire strategy as to how in the event of a fire in one of the bedrooms, all other bedrooms can be safely evacuated.

NHS Scotland Assure also note concerns that at the time of the KSAR, the PSCP had not yet appointed a commissioning manager.

Since the review phase of the KSAR was concluded, NHS Highland have provided evidence that they have moved to mitigate a number of these issues and continue to liaise with NHS Scotland Assure. NHS Scotland Assure have already commenced dialogue with NHS Highland with respect to further reviews of their developed action plan and to undertake the commissioning stage KSAR.

There were a number of positive elements identified through the KSAR process, including the close working relationship between the PSCP team and the NHS Highland project team. The engagement of NHS Highland operational estates colleagues was also recognised.

Throughout the KSAR, NHS Highland were fully engaged with the process and provided full transparency with respect to their processes. The PSCP also facilitated the site inspections, and we thank both NHS Highland and the PSCP for their support.

1.1 Summary of Findings

The findings of this report have been collated based on information provided by NHS Highland. The following table outlines the status of key findings as derived from the KSAR and identified within the NHS SA Recommended Action Plan issued to NHS Highland under separate cover:

Review	No. of Issues per category				
	1	2	3	4	5
Project Governance and General Arrangements	-	6	4	9	-
Water and Internal Plumbing / Drainage Systems	-	2	4	2	1
Ventilation	1	1	2	3	1
Electrical	2	-	2	1	-
Medical Gases	-	1	1	1	1
Fire	2	5	9	3	1
Infection Prevention & Control Built Environment	-	2	1	2	-

The following categories were used in relation to the findings:

Category	Definition
1	Significant – Concerns requiring immediate attention, no adherence with guidance.
2	Major – Absence of key controls, major deviations from guidance.
3	Moderate – Not all control procedures working effectively, elements of noncompliance with guidance.
4	Minor – Minor control procedures lacking, or improvement identified based on emerging practice.
5	Observation and improvement activity.

Project Overview

The new National Treatment Centre (NTC), Inverness is intended to deliver the provision of ophthalmology and orthopaedic healthcare services to the people of Scotland.

The NTC Highland is part of a national network of treatment centres funded by the Scottish Government. The Treatment Centre Programme aims to provide additional hospital based diagnostic and treatment capacity within Scotland.

The Total GIFA is estimated at 7,000m² and comprises of two floors of treatment spaces, theatres, consulting rooms and ancillary areas with the upper level (roof space) set out with plantrooms.

The construction project has been procured under an NEC Option A Target Price Contract, with a PSCP appointed under Health Facilities Scotland Framework Scotland 2 to deliver the design and build of the facility.

Construction of the NTC Highland advanced works commenced on 20th July 2020. Contract of the NTC Highland was signed on 18th January 2021.

2. Review Methodology

2.1 Overview of NHS Scotland Assure & The KSAR Process

Good management and effective control of projects is an essential element to the successful delivery and maintenance of healthcare facilities across NHS Scotland estates.

The NHS Scotland Assure, Assurance Service was launched on 1 June 2021 following a letter issued by Scottish Government to Health Board Chief Executives, Directors of Finance, Nursing Directors, and Directors of Estates. This letter outlined the purpose of NHS Scotland Assure, with an overarching aim to deliver a co-ordinated approach to the improvement of risk management in new builds and refurbishment projects across NHS Scotland. The new service will underpin a transformation in the approach to minimising risk in our healthcare buildings and environments, protecting patients from the risk of infection and supporting better outcomes for patients in Scotland.

From the 1 June 2021, all NHS health board projects that require review and approval from the NHS Capital Investment Group (CIG), will need to engage with NHS Scotland Assure to undertake key stage assurance reviews (KSARs). Approval from the CIG will only follow once the KSAR has been satisfactorily completed. The KSARs have been designed to provide assurance to the Scottish Government that guidance has been followed. The Scottish Government may also commission NHS Scotland Assure to undertake reviews on other healthcare-built environment (HBE) projects. This does not change accountability for the projects; NHS health boards remain accountable for their delivery. NHS Scotland Assure will be accountable for the services it provides that support delivery of the projects.

NHS Scotland Assure will also work closely with health boards to identify where a KSAR may be required for projects under their Delegated Authority, utilising a triage system to assess risk and complexity of projects.

The KSARs will assess if health board's project management teams (inclusive of clinicians, appointed construction consultants, and contractors) are briefed and following best practice procedures in the provision of facilities. We will review if projects are compliant in all aspects of safety, if specific engineering systems are designed, installed and commissioned, and for ongoing safety maintenance including Infection Prevention and Control (IPC).

The KSAR focuses on key topics, specifically – IPC, water, ventilation, electrical, plumbing, medical gases installations and fire. This ensures they are designed, installed and functioning from initial commissioning of a new facility and throughout its lifetime. Health Boards are required to have appropriate governance in place at all stages of the construction procurement journey.

The purpose of the KSAR at the Construction stage is to confirm there is a good and comprehensive understanding of the category of patient who will use the proposed facility and that the project team consider how appropriate quality and safety standards will influence the build. It looks to provide assurance that the project can proceed to the Commissioning stage.

Whilst the KSAR focusses on actions to improve the end product, it is not intended to detract from the merits of a development that will add significant benefit for the healthcare of the population served, and which has many exemplary elements. Rather, it is a reflection of the complexity of healthcare construction projects and the stage of development at which it was reviewed. Some conflicts and changes are to be expected as complex projects develop and project teams have in place mechanisms to identify and address these. This report adds a layer of scrutiny and assurance to that process to address the above requirement from government.

2.2 KSAR Process

2.2.1 The Construction KSAR for NHS Highland National Treatment Centre (NTC) Project took place between 11 April 2022 and 12 August 2022.

2.2.2 To inform the findings of the KSAR, the Health Board were issued with key documents outlining the assurance question set and expected level of evidence and supporting documents in accordance with relevant legislation and guidance. This included the Construction KSAR Workbook and Construction Deliverables list.

2.2.3 The KSAR report includes an overview of the main findings of the review, with a further itemised list of detailed observations included within the appendices of the report. The detailed observations are recorded in an action plan that should be adopted by the health board following the review and subsequently monitored by them to ensure appropriate actions are completed in a timeous manner.

2.3 Application of Standards & Legislation

2.3.1 Health Facilities Scotland (HFS) currently provides a range of advisory and delivery services across a wide variety of topics from a portfolio which covers the built estate, engineering and environment and facilities management. With some exceptions these services are largely advisory in nature, identifying best practice and developing national guidance and standards.

2.3.2 Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) Scotland currently provides advice and guidance on all aspects of infection protection and control nationally in Scotland, inclusive of expert advice and guidance on the topic of Healthcare Associated Infections (HAI) and antimicrobial resistance.

It maintains and continues to develop a practice guide (National Infection Prevention and Control Manual – NIPCM) as well as a HAI Compendium of all extant guidance and policy appropriate for use in NHS Scotland. Like HFS, these services are largely advisory in nature, identifying best practice and developing national guidance and standards.

The NHS Scotland NIPCM was first published on 13 January 2012 as mandatory guidance, by the Chief Nursing Officer ([CNO \(2012\)1](#)), and updated by a second edition on 17 May 2012 ([CNO\(2012\)01-update](#)). The NIPCM provides guidance for all those involved in care provision and should be adopted for infection, prevention and control practices and procedures. The NIPCM is mandatory policy for NHS Scotland.

The authority of guidance produced by National Services Scotland (NSS) and other national organisations e.g. Healthcare Improvement Scotland (HIS) is best described by the definitions outlined below (SHTM 00 – Best practice guidelines for healthcare engineering):

Regulations are law, approved by Parliament. These are usually made under the Health and Safety at Work etc Act following proposals from the Health & Safety Commission. Regulations identify certain risks and set out specific actions which must be taken.

Approved Codes of Practice give advice on how to comply with the law by offering practical examples of best practice. If employers follow the advice, they will be doing enough to comply with the law.

Approved Codes of Practice have a special legal status. If employers are prosecuted for a breach of health and safety law, and it is proved that they did not follow the relevant provisions of an Approved Code of Practice, they will need to show that they have complied with the law in some other way, or a court will find them at fault.

Standards (British or European), institutional guides and industry best practice play a large part in how things should be done. They have no direct legal status (unless specified by Regulations). However, should there be an accident; the applied safety practices at the place of work would be examined against existing British or European Standards. It would be difficult to argue in favour of an organisation where safety was not to the described level.

Guidance is issued in some cases to indicate the best way to comply with Regulations, but the guidance has no legal enforcement status.

2.3.3 Whilst guidance is deemed not compulsory by the Health and Safety Executive (HSE), where compliance with guidance is specified in a contract, as is the case here, it becomes a contractual requirement. Therefore, any permitted deviation from it would be expected to follow a formal process with input from all relevant parties, with clarity around how the outcome was reached, including risk assessments where appropriate and sign off by all those authorised to approve it.

2.4 Project Technical Outline Summary

The building has an above ground drainage system comprising of vertical stacks taken to drain with branch connections to appliances throughout the building.

The water services installations comprise of the main incoming water supply which feeds a main water storage tank which is split for resilience. Water is filtered and stored within a split filtered water storage tank which then is boosted to serve appliances. Domestic hot water services are provided via hot water calorifiers, which feed appliances through piped hot flow and return distribution.

The heating within the building is gas fired, served by three gas fired boilers located on the second floor which provide heat source for the space heating, comprising generally radiant panels, the domestic hot water, primary heating, and the heating requirements of the ventilation systems.

The building has a total of nine air handling units, which are located within the second-floor plant spaces, five of these units serve the theatres and the remaining four serve the general spaces throughout the building. The ventilation systems are generally conventional ducted general supply and extract with UCV units serving some of the theatres. The building has a separate dirty extract system.

The cooling provision for the ventilation systems is provided via two roof mounted air-cooled chillers, which serve the various cooling coils within the air handling plant. ITT/CIS rooms are served by standalone DX cooling split systems.

All systems within the building are linked through the building wide BEMS, which will provide link for external monitoring.

The medical gas provision within the building comprises medical oxygen, , medical air, surgical air, and medical vacuum. Plant associated with these systems is located on the ground floor exiting into the service side of the building. There is also a VIE compound located on campus adjacent to the main road service route. The new NTC is served as a Low Voltage Customer, with the supply derived from a new DNO substation on the site. As part of the works the DNO is establishing a new DNO substation, inclusive of a DNO transformer with incoming HV supply routed through the site. An intake switchroom contains primary switchgear; all mains cabling emanating throughout the building is derived from this location. The electrical distribution is designed for resilience and includes changeovers to alternative supplies in the event of a mains failure condition. The LV system also includes for Medical IT infrastructure at locations where a mains failure condition could be fatal for patients. A photovoltaic system comprising roof-mounted solar panels and inverters is connected to the electrical infrastructure, the design is not intended to provide any export to the electrical grid. Cable containment is provided from the main switchgear, distribution boards and IT equipment rooms to all points of utilisation.

Containment is segregated for various final distribution cables and systems. Containment routes are concealed within suspended ceilings, primarily along corridors, and within risers.

Small power is provided in accordance with requirements of the individual spaces and associated service requirements.

Lighting is designed to achieve required illuminance and uniformity values as defined by SHTM and CIBSE guidelines. LED technology, flexible switching and automatic detection devices minimise energy usage. Emergency luminaires operate on both total power failure to the building and local lighting circuit failure.

The monitored fire alarm system comprises indicator panels, detection and audible warning devices, visual alarm indicators and manual call points. Input/output interface modules provide signals to third party equipment upon alarm activation such as the access control; gas supplies; emergency voice communication, mechanical plant, dampers, and lifts.

Electronic access control restricts entry into the site and building during normal and out-of-hours periods. Doors that are equipped with access control equipment and form a means of escape are interfaced with the fire alarm system to open in the event of an emergency.

A monitored CCTV system covers designated internal and external spaces.

Lightning protection systems and earthing systems are provided.

A structured Cat 6a cabling ICT infrastructure covers all areas of the building in accordance with room data sheets and ICT documentation. The cabling emanates from two comms rooms, which contain cabinets for the cabling and systems installed in and around the building.

Electronic facilities for the disabled include induction and hearing loops, disabled alarms, and refuge call points.

Vertical transportation for passengers and beds are in the form of electrical traction-less lifts.

3. KSAR Review Summary

The following narrative relates directly to the Construction KSAR workbook, and the evidence indicated therein. The comments associated with the points are because of the evidence presented by the Board and their advisors during the review process.

3.1 Project Governance and General Arrangements

3.1.1 Project Governance and General Arrangements KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
1.1	Has suitable plans and documentation been put in place for the project to manage and monitor Quality Management and Assurance?	Project Quality Plan. Inspection and Test Plans. Inspection and Test Schedule/Register.

NHS Scotland Assure Observations:

The NHS Highland Project Execution Plan (PEP) sets out, at high level, the key areas for the management of quality throughout the project. The PEP includes the Project Quality Plan, Inspection and Test Plans and registers within the appendices. The KSAR has identified some areas of the PEP and appendices that require to be reviewed/updated by NHS Highland to ensure they continue to be relevant to the construction phase.

An NEC Project Manager (PM) and NEC Supervisor have been appointed by NHS Highland to undertake the monitoring of quality through the construction stage.

The Principal Supply Chain Partner (PSCP) Project Quality Plan is documented on the project portal (Business Collaborator). The Project Quality Plan sets out the PSCP construction quality management processes and is a core appendix to link the PSCP's, Project Management Plan (PMP).

The document sets out the onsite key PSCP project personnel who are responsible and accountable for managing and reviewing construction quality. Whilst it is stated that this is updated at least monthly, the revision provided for the KSAR was dated 25/01/22 and it is unclear as to whether this is being updated regularly in accordance with the defined protocols.

Monthly quality meetings are held by the PSCP with the client to ensure quality is reviewed and any actions identified and recorded.

The required Inspection, Testing and Commissioning of the works to be undertaken are documented within each of the PSCP's Inspection and Test Plan (ITP).

Results are noted as to be recorded on the appropriate Quality Checklists and Test Certificates Inspection and Test Plans Appraisal Template forms which have been

formulated for both Mechanical and Electrical activities. The ITP's status for Mechanical and Electrical services requires do not appear to be current and NHS Scotland Assure recommend these should be updated within the ITP Register.

The completion of the ITP output/verification documents is noted as being monitored monthly against the ITP Schedule requirements and records being collated in accordance with the completion or handover package requirements specific to the contract.

The ITP forms provided have a programmed finish date of 26/08/2022. The documents provided have not been updated and re-issued in line with the revised completion date of 09/12/2022 under the current updated Commissioning Programme.

The review noted the existence of a comprehensive PSCP Commissioning tracker which detailed all the service tests required across the project and their status.

There are no Inspection and Test Plans (ITP) for the Sprinkler, Dry Riser, and Condense Aerosol Systems. Section 8.2 of the Project Quality Plan indicates that the ITP Schedule is available on BIM 360. NHS Highland must provide the ITP Schedule for the Sprinkler, Dry Riser, and Condense Aerosol Systems to close out this item.

Documents referenced are:

NHS Highland - CfHS2 - Project Execution Plan 150121 - Rev 4.

PRM-TF-0001c Quality Plan.

PRM-TF-0001a Project Management Plan.

NTC-H-Quality Meeting 6 - 01.02.2022.

ITP-NTC-E-01 Appraised.

Testing & Commissioning Master CP1 Elective Care Rev-55.

NTC-H Commissioning Tracker (COMM-002).

5.1 - NTCH ITP Register.

PRM-TF-0001c, Project Quality Plan – Appendix B, Version 5.0 dated 08/07/22 (Business Collaborator).

NHS-H/KSAR/Register, 20 KSAR Schedule of documents, Revision 20 dated 15/07/22.

Workbook Ref No.	Areas to probe	Evidence expected
1.2	Has suitable arrangements been implemented on the project for document control processes for Quality Assurance and Management?	<p>Process for ensuring latest drawings approved and used.</p> <p>Processes for ensuring latest specification and details approved and used.</p> <p>Approach to management of non-conformances.</p> <p>Approach to change management control.</p> <p>Document management recording and structure.</p>

NHS Scotland Assure Observations:

The NHS Highland overarching control processes for quality and management are set out in the PEP. All project documents are managed through the PSCP’s project information portal (Business Collaborator).

The NEC contract software interface (CEMAR) is used in conjunction with Business Collaborator to record and manage the approach to quality, compliance, management, change control, and any identified non-conformances.

The PSCP and the NEC PM and Supervisor are noted within the PEP as being required to administer the drawing review management process using the PSCP Business Collaborator software/portal.

Construction monitoring is being undertaken by PSCP site staff and the appointed NEC supervisors with issues identified on the PSCP checklists and NEC Supervisor reports which are communicated on a “BIM 360 Field” software tool utilised to help monitor quality issues. The output from weekly quality meetings, NEC quality inspections and ongoing Client/ PSCP monitoring inspections, are also logged on the software platform.

Monthly client reports are prepared by the NEC Project Manager and Supervisor detailing all issues and non-conformances, potential defects & areas of concern. The BIM 360 monthly quality reports logs, details and provides photographic evidence for ongoing management, monitoring and sign off of any issues identified.

Bi-monthly quality meetings are currently held with the NEC Supervisor and the PSC site and Quality Management team.

Change control management is captured within the monthly Contractors report under Appendix F Variation register, however there is no documented evidence provided to support that the steps set out within the NHS Highland Project Execution Plan change process for review and approval, have been followed.

Documents referenced are:

NHS Highland - CfHS2 - Project Execution Plan 150121 - Rev 4.

Cemar_Brochure_EN.

(3) NTC-H NCR Checklist Summary 30.03.22.

PRM-TF-0001c Quality Plan (see section 10).

NTC-H-Quality Meeting 6 - 01.02.2022.

0. NTC-H - Contractors Report 06.04.2022 (1).

Workbook Ref No.	Areas to probe	Evidence expected
1.3	How has the Health Board approached Quality Assurance on the project to ensure processes and procedures are being adhered?	Evidence of regular Quality Assurance audits / reports undertaken on the project.

NHS Scotland Assure Observations:

NHS Highland have demonstrated they have Quality Assurance processes in place and whilst there are some evidence gaps, they are implementing the processes in accordance with their PEP.

The NHS Highland PEP states that Head of Estates is the nominated Senior Responsible Officer (SRO) and will be the primary contact for all decision making relating to quality, cost, and programme. It is not clear from the NHS Highland Project organogram documentation and the project directory provided as evidence if this role is still current or if this responsibility now sits elsewhere.

The PSCP is subject to audit by a UKAS accredited body to maintain certification to ISO 9001, ISO 14001, and ISO 45001. The PSCP conduct operational audits as detailed in their annual audit programme. The project audit frequency and scope will be developed considering any project specific requirements, risks, and previous audit results with due consideration to audits planned by PSCP, external certification bodies and stakeholders.

Several non-conformances are flagged within PSCP Audit Summary Report. No evidence is provided on the close out of the items noted as 'Opportunities for Improvement'.

A monthly client report is prepared by the client's technical advisers and details all issues and non-conformances, potential defects & areas of concern. The BIM 360 monthly quality reports logs, details and provide photographic evidence for ongoing management, monitoring and sign off.

The PSCP confirmed that a daily programme and performance template is in use on site as part of the Quality Assurance process for recording daily /weekly site reviews. No evidence has been provided to demonstrate with examples that this has been put in place and are being used on site.

Bi-Monthly dedicated NHS Highland and PSCP construction quality meetings and minutes have been provided (6). NHS Highland clinical attendance and input is limited with no explicit process demonstrated on how the quality interface is managed and documented in relation to the Contractors Report and or the Lead Adviser dashboard reports.

NHS Highland confirmed at the KSAR meetings that any relevant quality issues will be raised with clinical stakeholders as the construction project progresses and if not resolved the matters will be escalated to the Project Board as required. There is no documented evidence provided by NHS Highland to substantiate if this process is in place and has been enacted to date.

Documents referenced are:

Project Execution Plan 26.01.18-CFHS2-ECC.pdf.

NHSH ECC Commissioning Organogram.pdf.

Project Directory CFHS2-ECC12.12.17.pdf.

Audit Summary Report Highland Treatment Centre - Quality - HS.docx.

Quality Issue List 01.04.22.

NTC-H-Quality Meeting 01 - Minutes 14.04.21.pdf.

NTC-H-Quality Meeting 02 - Minutes 22.06.21 (2).pdf.

NTC-H-Quality Meeting 03 - Minutes 17.08.21.pdf.

NTC-H-Quality Meeting 04 - Minutes 07.12.21.pdf.

NTC-H-Quality Meeting 6 - 01.02.2022.

NTC-H-Quality Meeting 6 - 01.02.2022.

04 NTCH PBR 46 - Lead Advisor Dashboard Report No.9 April 2022.

0. NTC-H - Contractors Report 06.04.2022 (1).

PRM-RM-0100h Daily Programme Review Explanation.

Workbook Ref No.	Areas to probe	Evidence expected
1.4	How does the Health Board assure itself that Testing, and Commissioning of services and systems have / are being developed and put in place to meet the project needs?	<p>Evidence of Testing and Commissioning monitoring / witness of tests.</p> <p>Evidence of Testing and Commissioning review of results.</p> <p>Evidence of Testing and Commissioning acceptance of results.</p> <p>Testing and Commissioning programme.</p> <p>Plans have / are being developed for collating information and documents.</p> <p>Have additional checks (external parties) been carried out to review the Contractors T&C's proposed plans.</p>

NHS Scotland Assure Observations:

NHS Highland have demonstrated the presence of a Commissioning Plan, however in the absence of and appointed Commissioning Manager, the plan is at risk of not being developed and several pre-commissioning checks have potentially not been carried out in accordance with that plan. The KSAR also identified gaps in the Inspection and Test Plans as noted in Q1.1 of this report. This is a risk given the current stage of the project. NHS Highland noted that plans were in place to remedy these points and that they aimed to have these in place soon after the conclusion of the KSAR process.

NHS Highland have provided documentation which sets out the outline commissioning master plan and proposed Testing and Commissioning programme which totals 26 weeks. Based on the current project completion date targeted for December 2022, the commissioning programme would therefore need to commence at the latest in June 2022.

It was acknowledged during the KSAR by NHS Highland that the Testing and Commissioning Master Plan requires further development and requires to be aligned with the latest accepted programme as it is current.

Documentation detailing the commissioning responsibilities and the NHS Highland commissioning team have been provided.

A draft testing and commissioning requirement document has been prepared by the NEC Supervisor which forms part of the assessment process prior to the issue of the Defects Certificate.

The PSCP Designers sets out the methodology and approach for the commissioning of the building services in the "Mechanical Services Commissioning" document (this also included Building Energy Management Systems & electrical under schedule 3.1 and 3.2) and states 'A commissioning team including representatives of the FM Service provider the NHS Highland's representative and the client's Technical

Advisors and led by a dedicated Commissioning Manager, will be appointed at the earliest practical stage of detailed design development.’ There was no evidence provided at the time of review that the appointment of a PSCP dedicated commissioning manager was in place.

NHS Highland confirmed that external sources of commissioning and validation support would be supplied through the compliance team inclusive of, Authorising Engineers (AE’s), Technical adviser, and M&E Adviser who will work in collaboration with NHS Highland estates engineering personnel.

NHS Highland described how the specific theatre building systems commissioning would be technically validated by the appointment of two named independent specialist consultants who would attend site to review the works in progress. No documentation has been provided by NHS Highland detailing the basis of the appointment process and evidencing the skills and competencies required to meet the technical and clinical commissioning requirements.

Documents referenced are:

NHSH_Testing and Commissioning Checklist_.

ECC Outline Commissioning Master Plan.

Testing & Commissioning Master CP1 Elective Care Rev-55 (NHS H supplementary information 01.7.22).

TDC-HKA-XX-XX-SPE-M-XX-016.

Commissioning Management Duties (NHS H supplementary information 01.7.22).

Workbook Ref No.	Areas to probe	Evidence expected
1.5	How does the Health Board assure itself that the management of defects have / are being developed and put in place to meet the project needs?	Systems and process for recording and management defects. Process for the rectification and close out of defects prior to handover. Plans have / are being developed for collating information and documents.

NHS Scotland Assure Observations:

The PSCP Project Management Plan and Quality Plan set out a process for monitoring defects, including closeout and percentage monitoring to track progression of closure.

The PSCP quality target is achieve zero defects at delivery of project completion.

An NEC Supervisor including mechanical, electrical, and public health (MEP) specialist have been appointed to undertake weekly inspections of the construction works, and to witness key activities through to contract completion.

The Supervisor team participate in bi-monthly quality meetings, held online with the site management team and The PSCP Quality Manager.

The Supervisor team have access to Business Collaborator, BIM 360 Field Software and Open-Space for the purposes of reviewing works information and assessing progress.

Whilst the monthly NEC Supervisors reports have been provided to evidence the process for recording and managing defects, no documentation has been provided in relation to the weekly inspections.

Documents referenced are:

PRM-TF-0001a Project Management Plan.

PRM-TF-0001c Quality Plan.

Quality Issue List 01.04.22.

21283 NTC-H - NEC Supervisors Report No.3 (Feb-Mar).

Workbook Ref No.	Areas to probe	Evidence expected
1.6	How does the Health Board assure itself that the management of the Handover process have / are being developed and put in place to meet the project needs?	Soft Landings process Plans have / are being developed for collating as installed information and documents.
<p>NHS Scotland Assure Observations: NHS Highland have demonstrated an understanding of the Soft Landing’s process and provided evidence that outline plans have been developed.</p> <p>The ECC Outline Commissioning Master Plan sets out the NHS Highland governance management approach to the Soft Landings process.</p> <p>The NHS Highland organisational organogram identifies the structure of the BIM and Soft Landing’s works streams and who will be responsible to the Commissioning Manager. There is an overarching project role of a BIM and Soft Landings Champion who will report to the Project Director and in turn to the Project Sponsor.</p> <p>The Project Director is covering the leadership role and attending regular meetings in lieu of an NHS Highland Soft Landing’s Champion, who is not identified at the time of this review.</p> <p>NHS Highland have presented evidence of consideration and planning for the soft landing’s process. There is no NHS Highland documentation or evidence provided to demonstrate that the Soft Landing’s process is embedded into the PSCP appointment and planning, and preparation identified within the documents provided</p>		

are being actively progressed within the construction phase in readiness of the commissioning plan and completion process.

As noted in Q1.4, the NEC Supervisor has also prepared a document outlining requirements for testing and commissioning documentation to help support the handover process.

Documents referenced are:

ECC Outline Commissioning Master Plan.

NHSH ECC Commissioning Organogram.

Project Directory\Project Directory CFHS2-ECC12.12.17.

2140_NHSH NTC_SL Prog_Rev -_Issue.

2140_Soft Landings Delivery Plan_Rev-_280222.

NHSH NTC SFT LANDINGS SUPPORT 291221.

Workbook Ref No.	Areas to probe	Evidence expected
1.7	How does the Health Board assure itself that the works are following the procedures as laid out in HAISCRIBE?	<p>Evidence that the Contractor in charge of the works has read, understood and signed the HAISCRIBE.</p> <p>Evidence that Infection Control have carried out interim site inspections at points were setting out of the rooms are underway to pick up implications of any Contractor's onsite adjustments.</p> <p>For works inside of or adjacent to healthcare spaces which are in use, evidence that a task specific HAISCRIBE has been produced and that compliance is monitored by the Board.</p>

NHS Scotland Assure Observations:

The Infection control team have been involved in generation of all HAI Scribes in accordance SHFN 30 Part B: HAI-Scribe, Stage 1,2 & 3 are completed at the time of KSAR review with Stage 4 intended completion indicated at Pre-handover.

A Stage 3 HAISCRIBE has been undertaken for the project. Evidence of the site risk is detailed in HAISCRIBE 1 but has subsequently been removed for HAISCRIBE 2 and 3. NHS Highland noted that this was because it was “Not Applicable as a stand-alone new build on a green field campus site”. The documentation provided does not evidence a risk assessment of the site or describe the progression between each HAISCRIBE stage.

It is noted from the review that the signatories to the Stage 3 HAISCRIBE are not complete.

The HAISCRIBE process is documented within the Outline Commissioning Master plan and states that the Commissioning Manager will be responsible for ensuring that the HAI-SCRIBE 4 is in place post-Handover.

There was no definitive evidence to demonstrate that IPC colleagues have been undertaking site inspections.

Documents referenced are:

Stage 3 Construction HAISCRIBE 180121 (3).

Reviewed CFHS2 -SHFN 30 HAI-SCRIBE stage 1.

Reviewed HAI SCRIBE Stage 2 ECC-CFHS2.

ECC Outline Commissioning Master Plan.

Workbook Ref No.	Areas to probe	Evidence expected
1.8	How does the Health Board continue to assure itself that the clinical needs of the facility are clearly understood by each section of the client organisation?	<p>Updated description of each department of the facility review process evidenced.</p> <p>All specifications are being related back to the Portfolio Document (PD).</p> <p>An updated and live Derogation document.</p>

NHS Scotland Assure Observations:

NHS Highland have demonstrated that a documented review of the department room layouts and clinical flows was undertaken to assure itself that the clinical needs of the facility were reviewed and agreed as part of the RIBA Stage 4 design. The process was then finally approved by the relevant clinical stakeholders and managed by the Lead Clinical Advisor.

NHS Highland confirmed that the Derogation schedule was reviewed as part of the Contract Documentation. At RIBA Stage 4, the derogations process was reviewed by all relevant disciplines evidenced and presented and signed off by the Project Board. It was confirmed by NHS Highland that the Derogation schedule referenced above was at “a point in time” however this document should be updated to reflect the current status of approvals to avoid any ambiguity.

It was noted from the KSAR review that the Derogation Schedule provided as part of the KSAR review dated 18/02/20 still has a number of open items e.g. open items No 23 ‘On-going. To be reviewed as design develops’.

The NHS Highland derogations schedule and the review comments trackers provided do not align. Derogation items have outstanding comments and, in some instances, remain open.

In undertaking the KSAR review of the Derogation information, there was no accompanying supporting evidence provided to document the decision-making methodology, risk assessment, clinical and IPC operational considerations for the derogation approval process.

Documents referenced are:

Derogation Schedule (1) – (NHS KSAR information upload 7.04.22).

NHSH - NTC-H - Derogation Schedule (NHS H supplementary information 04.05.22).

Copy of NHSH-NTCH-RIBA Stage 4 Review-Comments Tracker.

NHSS-XX-XX-GU-X-0001 - Project Derogation Procedure – DRAFT.

Workbook Ref No.	Areas to probe	Evidence expected
1.9	Are the Principal Designers regularly carrying out site inspections and providing reports to the Board and Principal Contractor?	<p>Regular (fortnightly) reports being provided to the clients' project management team, certifying installation is being provided in accordance with the CD.</p> <p>Regular comment on each of the installing contractors' quality safety plan and work delivered.</p> <p>If the Principal Designer is not employed to carry out site inspections, evidence that the Board has alternative, adequate means of design / construction quality control in place.</p>

NHS Scotland Assure Observations:

Whilst a Principal Designer is in place, there was limited evidence to support that they have been discharging their allocated duties fully.

There is a PEP in place which states the Principal Designer will act on behalf of the PSCP as required under the "CDM Regulations 2015".

The Contractors Report has a section for the Principal Designer, which confirms that the Construction Phase Plan has been collated to a "suitably developed" status in conjunction with the Principal Designer prior to the commencement of works on site.

The PEP also states that the Principal Designer will co-ordinate, agree and populate the Health and Safety File which will be “a live document as the project evolves”. No documentation was provided within the review to evidence this process.

NHS Highland have demonstrated that the quality and delivery of the works is being regularly monitored and logged through several documented reports and processes.

Regular commenting on each of the installing contractors’ quality safety plan and work delivered was also evidenced.

However, there is lack of evidence available to evidence the Principal Designer carrying out regular inspections.

It was noted in the review of the Health Board Report the National Treatment Centre Highland site received an award for the being the “safest site in Scotland”.

Documents referenced are:

NHS Highland - CfHS2 - Project Execution Plan 150121 - Rev 4.

0. NTC-H - Contractors Report 11.05.2022.

21283 NTC-H - NEC Supervisors Report No.3 (Feb-Mar).pdf.

BIM 360 Checklist Summary.

BIM 360 Issue Status Summary.

NTC-H_-_BBK_Electrical_Open_Defects_2022-04-04--07-00-1.

NTC-H_-_BBK_Mechanical_Open_Defects_2022-04-04--07-00-07.pdf.

NTC-H_-_MEP_Snag_Summary_2022-04-04--06-00-29.

NTC-H-Quality Meeting 6 1st February.

Workbook Ref No.	Areas to probe	Evidence expected
1.10	The Health Boards approach on the procurement journey with evidence of the plans on how the Board will provide assurance, particularly emphasis on the critical system identified earlier.	<p>Evidence on how this requirement is being managed and how it fits with the project governance arrangements</p> <p>Plans to identify any gaps in the procurement approach that may require to be addressed.</p> <p>Evidence on how Infection Prevention and Control are involved with the procurement approach to future plans for project.</p> <p>Evidence that the Health Boards selected procurement route has gone through the Board's Governance channels.</p>

NHS Scotland Assure Observations:

NHS Highland have engaged with the clinical teams to obtain input on IPC and clinical requirements. This process is generally being managed via the soft landings process and via clinical mock-up reviews.

NHS Highland confirmed in discussion that the Soft Landing's team will visit site as required. The PSCP will prepare model clinical 'mock-up' rooms to allow the clinicians and the IPC team to review and comment on the final setting out, finish and quality. This will allow any adjustments or refinements to be made and mitigate the replication of any issues. Whilst the above process is acknowledged, there is no evidence provided by NHS Highland to demonstrate if this is scheduled to take place nor the supporting resource allocated from the IPC team.

Overall governance and input to the construction phase of the project with respect to IPC colleague involvement, including arrangements for oversight, governance and review were not clearly demonstrated within the documentation provided.

Project Planning and Building warranty trackers are in place as part of the construction progress reports to document the detailed status of these items in relation to the project. NHS Highland acknowledged during the KSAR that the status of the remaining open planning conditions and building warrant items required to be updated to reflect the current position.

Documents referenced are:

2140_NHSH NTC_SL Prog_Rev -_Issue.

(0. NTC-H - Contractors Report 11.05.2022). NHSH ECC Commissioning Organogram.

NHS Highland - CfHS2 - Project Execution Plan 150121 - Rev 4.

Workbook Ref No.	Areas to probe	Evidence expected
1.11	Evaluation of the Health Boards commissioning plan.	<p>Evidence that the Health Board has recorded plans that are comprehensive and adequate to address the needs of the project and that they are fully resourced.</p> <p>Evidence that the Board has had all pre-commissioning checks audited and approved by an independent organisation.</p>

NHS Scotland Assure Observations:

The NHS Highland commissioning plan, roles and responsibilities are defined in the evidence provided along with the governance structure. In the absence of an appointed Commissioning Manager, the Commissioning Plan has not been fully developed along with the master programme and several pre-commissioning checks have not been evidenced. E.g., Domestic Water joint testing has not been carried out. Gaps were also identified in the Inspection and Test Plans as noted within Q1.1 of this report.

- The Outline Commissioning Master Plan Revision 03 27.12.19. Whilst the version control R04 notes an update to teams and roles 10/03/22, the overall document contains drafting notes for update, and it is not clear if this document is up to date and 'live'.
- Project Execution Plan and appendices are comprehensive but requires review and update to ensure their relevance to the project governance and process set out.

NHS Highland have provided documented evidence on the appointment and provision of the NEC supervisor team services and scheduled activities. The services include weekly site attendance by the NEC Supervisor team, although evidence of these inspections was not provided as part of the KSAR response (only the monthly summaries).

Documents referenced are:

ECC Outline Commissioning Master Plan.

NHS Highland - CfHS2 - Project Execution Plan 150121 - Rev 4 (1) and appendices (provided as supplementary information 04.05.22.

NHSH ECC Commissioning Organogram.

Project Directory\Project Directory CFHS2-ECC12.12.17.

21283 - NTC-Highland - TG NEC Supervisor - Activity Schedule Rev 1.

Workbook Ref No.	Areas to probe	Evidence expected
1.12	Evaluation of the Health Boards duty holder matrix.	<p>Evidence that the Health Board have a fully recorded matrix of the required roles and responsibilities and have a clear governance structure that is fully resourced together with plans in place for the implementation.</p> <p>Evidence that Health Boards have appropriate number of competent, qualified staff to carry out specific duties throughout the life cycle of the project e.g., IPC, Engineers, Estates staff etc. The number of competent, qualified staff will depend on the type and size of the Build Project.</p>

NHS Scotland Assure Observations:

The NHS Highland governance, roles, responsibilities, and allocated resource for the project structure have been set out at the outset of the project within the documents referenced.

NHS Highland confirmed in discussion that there has been overall continuity in resource, except for the new named Lead Clinical Adviser who was appointed from April 2022.

The KSAR review notes that some of the document's referenced are historic and in parts are out of date, don't align with current project status and thus require to be updated.

The PSCP have also provided the project governance structure and documented the technical professionals, CV's, experience, and qualifications.

Documents referenced are:

ECC Outline Commissioning Master Plan.

NHS Highland - CfHS2 - Project Execution Plan 150121 - Rev 4 (1).

NHSH ECC Commissioning Organogram.

Project Directory\Project Directory CFHS2-ECC12.12.17.

NHS Highland - CfHS2 - Project Execution Plan 150121 - Rev 4 (1) and appendices (provided as supplementary information 04.05.22).

3.2 BBK NTC H Organogram (provided as supplementary information 28.06.22).

3.1.2 Project Governance and General Arrangements: Further Observations

No further observations were recorded.

3.2 Water and Internal Plumbing / Drainage Systems

3.2.1 Water and Internal Plumbing / Drainage Systems: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
2.1	How does the Health Board assure itself that all plumbers are trained to understand the needs (including special requirements) for the installation of water and plumbing/drainage systems in the healthcare environment?	<p>Evidence of a vetted list of site plumbers which confirms qualifications and healthcare experience.</p> <p>Evidence that the site induction with respect to working on water and plumbing/drainage services has been developed, implemented and agreed with the Board.</p> <p>Where anyone does not have previous healthcare experience, evidence should be provided of the relevant onsite training which was provided to them before they commence work on site.</p> <p>Evidence that all contractors and sub-contractor competency checks have been completed and signed off.</p>

NHS Scotland Assure Observations:

A list of personnel involved in the project has been provided along with training undertaken and qualifications held. There is no specific reference to healthcare experience or healthcare training. There is no specific evidence to demonstrate a formal process for competency checks to ensure the suitability of site personnel on this project.

A clear record of the Induction process specific to this trade has not been provided.

There is no evidence how site personnel are informed of specific site requirements or changes that may affect the project installation. e.g. record of Toolbox Talks.

Documents referenced are:

15 KSAR Schedule of Documents 30.05.22, Rev15.

[2109 - TDC - H&S Employee Matrix - 25-3-22.xlsx](#)

Workbook Ref No.	Areas to probe	Evidence expected
2.2	How does the Health Board assure itself that the plumbing contracting company have the relevant experience to direct and manage their staff on the site for a healthcare environment?	<p>Evidence of similar, previous healthcare projects by the contractor.</p> <p>Evidence of site management structure.</p> <p>Evidence of HAI and SHPN 30 training.</p>
<p>NHS Scotland Assure Observations: Healthcare experience is noted by the Plumbing Contractor Company for similar NHS projects (at a company level – not the specific individuals involved). The evidence does provide assurance that works were completed to an acceptable standard or that operatives working at the NTC were involved in the project.</p> <p>A site management structure being adopted by the Plumbing Contractor was evidenced and no significant observations recorded.</p> <p>Whilst evidence was provided of recent HAI Scribe training on 22 June 2022 attended by NHS Highland staff, it is not clear from the information provided whether this included the Plumbing Contractors personnel.</p> <p>Documents referenced are: 15 KSAR Schedule of Documents 30.05.22, Rev 15.</p> <p>Crawfords Healthcare Experience.zip.</p> <p>17 KSAR Schedule of Documents 01.07.22 Rev 17.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
2.3	How does the Health Board ensure that the water and plumbing / drainage systems are being installed to the correct standard and reflect the agreed design?	Written and photographic, monthly evidence for the progress of work produced by a body, which is independent of the contractor, and which confirms compliance of the works to date.
<p>NHS Scotland Assure Observations: Inspections and witnessing is conducted by an external NEC Supervisor team and their reports are supplemented by those of the Client's NEC Supervisor, (NHS Highland) who attends site based on one / two days per week. This Supervisory team has routine contact with PSCP Site Management.</p>		

External supervision is appointed to undertake weekly inspections of the works and to witness key activities through to contract completion.

They have produced monthly reports where they report on items including:

- Progress against Programme
- Make general observations and comment on quality related issues
- Comment on contract administration and BIM360 information
- Review information in that period
- Monitor statutory approvals and consents with respect to utility providers
- Health and safety issues

We found the reporting to be generally comprehensive, but with specific regard to water services, we note that evidenced examples of pipework and fittings suitably stored in storage areas in advance of these being installed were supplied following an MEP workshop in July 2022. These were not provided for the duration of the installation and therefore NHS Scotland Assure are unclear as to whether these have been inspected regularly.

It is noted the team make use of an effective traffic-light system for actionable items.

Documents referenced are:

15 KSAR Schedule of Documents 30.05.22, Rev15.

21283 NTC- - NEC Supervisors Report No.2 (Jan 2022).pdf.

21283 NTC-H - NEC Supervisors Report No.1 (Dec 2021).pdf.

21283 NTC-H - NEC Supervisors Report No.3 (Feb-Mar).pdf.

NTC-H - NEC Supervisor Monthly Report 4. 04-03-2021.zip.

Workbook Ref No.	Areas to probe	Evidence expected
2.4	How does the Health Board ensure that precautions are taken throughout the works to avoid open pipe ends for a period beyond the time needed to make a joint on that pipe end?	Photographic and written evidence for the progress of work produced by a body which is independent of the contractor (on a monthly basis).

NHS Scotland Assure Observations:

It has evidenced through photographic record that pipe ends are being temporarily protected during installation process. It was noted that this includes the use of tape

over pipe ends which is not in accordance with SHTM 04-01 Part E 2.40 which states “Temporary caps should be fitted to all open pipe ends of the pipework during installation, to protect it from ingress of dirt when it is not being worked on.”

The evidenced December 2021, January 2022, February 2022 and March 2022 NEC supervisor reports contain only one picture showing the pipework being covered with tape and was to be used for above ground drainage and not domestic water. The evidence does not provide comfort that pipework was adequately stored and safely managed to prevent contamination for the duration of the project.

Documents referenced are:

Additional Information 01.07.22 – Site photographs.

Workbook Ref No.	Areas to probe	Evidence expected
2.5	How does the Health Board ensure that water services are installed in a fashion which will provide ease of access for future maintenance?	<p>Evidence that the contractor has presented their co-ordination drawings (BIM model) to the Board.</p> <p>Evidence that the contractor has presented their co-ordination drawings (BIM model) to the design consultant and that they have agreed them for construction.</p> <p>Evidence that the contractor has presented each of the main service runs plus plant rooms to the Board's FM team.</p> <p>Evidence that the plant access strategy is being adhered to.</p>

NHS Scotland Assure Observations:

The BIM360 distribution issue list (TDC-BBK-XX-XX-M3-ME-0001) identifies individual document/drawing issues that have been distributed to all parties including the design consultants, however this does not include a record that specific changes have been signed off by the Design Consultants and that these changes have had formal approval by NHS Highland.

There is evidence of a planned meeting to support fly-through of the BBK model to NHS Highland (21/03/22), however there is no evidence in the information submitted for review which confirms how extensive the presentation was, nor how it was received by NHS Highland. It is also unclear as to whether this was linked to any drawing approval process.

Comments were identified in the NEC supervisor reports for January 2022, February 2022 and March 2022 regarding access problems caused by pipework installations

at the Cold Water Storage Tank and the access panels for the ventilation ductwork. It is not clear what changes are going to be made to allow for sufficient access to these plant items.

Whilst NHS Highland and the PSCP provided some evidence to demonstrate consideration of safe access and maintenance for installed MEP services, there was no evidence provided of a consolidated/detailed access and maintenance strategy for MEP services.

Documents referenced are:

15 KSAR Schedule of Documents 30.05.22, Rev15.

BBK BIM Meeting Invite.pdf.

Document Distribution History - TDC-BBK-XX-XX-M3-ME-0001_M&E.pdf.

Workbook Ref No.	Areas to probe	Evidence expected
2.6	How does the Health Board ensure that water and plumbing / drainage services are installed in a fashion which will retain space for minor additions and modifications to services in the future?	<p>Evidence that the contractor has presented their co-ordination drawings (BIM model), with space for future flexibility identified, to the Board.</p> <p>Evidence that the design consultant has considered and agreed with the Board, space for future flexibility in the service installations.</p> <p>Evidence that the contractor has presented their co-ordination drawings (BIM model), with space for future flexibility identified, to the design consultant and that they have agreed them for construction.</p> <p>Evidence that the contractor has presented each of the main service runs plus plant rooms to the Board's FM team, to highlight space for future flexibility.</p> <p>Evidence that the Health Board has agreed a strategy (percentage) for spare capacity and a documented allowance to be incorporated into the design.</p> <p>Are plant/tank rooms, IPS sections, horizontal distribution runs and risers appropriately sized for the equipment</p>

		being installed and facilitate safe adequate maintenance?
<p>NHS Scotland Assure Observations: The evidence provided does not demonstrate whether NHS Highland have made any consideration for spare capacity as part of the design, nor whether any provision has subsequently been included as part of the installation. There is only anecdotal evidence as to how the access and maintenance of services has been reviewed, with limited supporting written documentation.</p> <p>The evidence and comments as noted in Q2.5 above are also relevant to this question.</p> <p>Documents referenced are: 15 KSAR Schedule of Documents 30.05.22, Rev15.</p> <p>Document Distribution History - TDC-BBK-XX-XX-M3-ME-0001_M&E.pdf.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
2.7	How does the Health Board assure itself that all plumbers materials are stored on site in an environment which protects them from deterioration and from the entry of contaminants into the parts of the component which will be in contact with the water?	<p>Written, monthly evidence for the progress of work produced by a body which is independent of the contractor, and which confirms inspection of the site storage of materials.</p> <p>Photographic evidence of the site storage of materials produced by a body which is independent of the contractor (on a monthly basis).</p>
<p>NHS Scotland Assure Observations: There is photographic evidence of installation methodologies showing the capping of pipework already installed dated 2/12/21 and 16/12/21, however this is not reflected within the NEC Supervisor monthly reports, most recent Report No 4 April 2022.</p> <p>There is evidence of a further NEC Supervisors report dated 29 June 2022, which covers a review of the stored materials which are kept in storage containers and on site. This indicates no issues with the storage of DWS pipework and fittings being kept within the container storage areas. It is unclear from the evidence provided as part of the KSAR response as to whether this was being checked regularly prior to then. The report also indicates that tape has been used to cap the pipework, which as noted earlier in this report is not in accordance with SHTM 04-01 Part E 2.40.</p> <p>Supply chain and Manufacturer storage and transportation methods/QA mitigating contamination issues have not been evidenced during this review which includes the supplier/manufacturer QA testing methodology and the need to dry test plant and</p>		

equipment. Assurance should be sought in relation to any wet testing of components that may have taken place and about the quality of water that was used.

Documents referenced are:

Photographs dated 2/12/21 and 16/12/21.

XBuro Report - 'Material storage inspection' dated 29 June 2022.

Workbook Ref No.	Areas to probe	Evidence expected
2.8	How does the Health Board assure itself that all pre-commissioning inspections are completed and recorded before commissioning can commence?	<p>Evidence that adequate pre-commissioning check sheets (SHTM 04-01 Part A) have been completed and signed off.</p> <p>Evidence that the Health Board has had all pre-commissioning checks audited and approved by an independent organisation.</p>

NHS Scotland Assure Observations:

A sample checklist was evidenced of initial witnessing testing /inspection sign off that has been completed. A pressure testing QA checklist and RAMS (Risk assessment and method statement) was evidenced for the pressure testing of pipework

Domestic water pipework joint testing in accordance with SHTM 04-01 has not been evidenced.

There is no evidence submitted that adequate pre-commissioning checks have been completed or that these have been audited and approved by an independent organisation.

NHS Highland have dedicated staff to oversee the commissioning process and evidenced regular engagement with their APs and AEs. There was, however, gaps in the written documentation that would evidence the site visits/inspections that NHS Scotland Assure were advised had taken place. NHS Highland should consider reviewing how they capture such inspections to add an additional layer of control to their existing provisions.

NHS Scotland Assure also note that at the time of the KSAR, the PSCP had not yet appointed a commissioning manager as noted as being a requirement within the strategic project documentation.

Documents referenced are:

Sample checklist for above ground drainage stack 4a dated 20/10/21.

Pressure testing RAMS: TBS Ref: M001-TBS-4 dated 24/11/21.

Workbook Ref No.	Areas to probe	Evidence expected
2.9	How does the Health Board assure itself that all variations which may be required to water and plumbing and drainage systems after tender are investigated and agreed by all parties before they are instigated?	Evidence that each variation / derogation has a detailed technical analysis and has been referred to the Board and agreed with their water management group, clinical, Estates, infection control and FM teams.
<p>NHS Scotland Assure Observations: NHS Highland project team advised that all changes are covered by the CEMAR and RDD processes, however these were not fully evidenced as part of this KSAR review.</p> <p>Evidence of the schedule of derogations was available, but not all were signed off and dated by NHS Highland.</p> <p>Documents referenced are: 15 KSAR Schedule of Documents 30.05.22, Rev15.</p> <p>NTC-H Derogation Schedule.xlsx.</p>		

3.2.2 Water and Internal Plumbing / Drainage Systems: Further Observations

No further observations were recorded.

3.3 Ventilation

3.3.1 Ventilation: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
3.1	How does the Health Board assure itself that all duct and plant installers are trained to understand the needs (including special requirements) for the installation of ventilation systems in the healthcare environment?	<p>Evidence of a vetted list of duct and plant installers which confirms qualifications and healthcare experience.</p> <p>Evidence that the site induction with respect to working on ducts and plant services has been developed, implemented and agreed with the Board.</p> <p>Evidence that all contractors and sub-contractor competency checks have been completed and signed off.</p>
<p>NHS Scotland Assure Observations: The observations noted in response to question 2.1 apply to this question with respect to ventilation. There is no evidence provided in relation to the qualifications and healthcare experience of the project duct and plant installers. The information provided does not confirm the adoption of specific site inductions that have been developed, implemented and agreed with NHS Fife. There is also no assurance provided that the competency of the sub-contractor has been checked, completed, and signed off by NHS Highland.</p> <p>Documents referenced are: 15 KSAR Schedule of Documents 30.05.22, Rev15.</p> <p>HSF-SF-0018a Subcontractors Demonstration of Competence - Signed.pdf.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
3.2	How does the Health Board assure itself that the ventilation contracting company and their plant installers have the relevant experience to direct and manage their staff on the site for a healthcare environment?	<p>Evidence of similar, previous healthcare projects by the contractor.</p> <p>Evidence of site management structure.</p>
<p>NHS Scotland Assure Observations: The observations noted in response to question 2.1 and 2.2 apply to this question with respect to ventilation.</p> <p>Documents referenced are:</p>		

15 KSAR Schedule of Documents 30.05.22, Rev15.

Management Organisational Chart NTC.doc.

PDI - NHS Contracts.doc.

Workbook Ref No.	Areas to probe	Evidence expected
3.3	How does the Health Board ensure that the ventilation systems are being installed to the correct standard and reflect the agreed design?	Written, monthly evidence for the progress of work (including photographs) produced by a body which is independent of the contractor, and which confirms compliance of the works to date.

NHS Scotland Assure Observations:

The observations noted in response to question 2.3 apply to this question with respect to ventilation.

We found the reporting to be generally comprehensive, but with specific regard to ventilation, we note that evidenced examples of ductwork and associated ventilation plant suitably stored in storage areas in advance of these being installed were supplied following an MEP workshop in July 2022. These were not provided for the duration of the installation and therefore NHS Scotland Assure are unclear as to whether these have been inspected regularly.

We found the reporting to be comprehensive and they make use of an effective traffic-light system for actionable items.

Documents referenced are:

15 KSAR Schedule of Documents 30.05.22, Rev15.

21283 NTC- - NEC Supervisors Report No.2 (Jan 2022).pdf.

21283 NTC-H - NEC Supervisors Report No.1 (Dec 2021).pdf.

21283 NTC-H - NEC Supervisors Report No.3 (Feb-Mar).pdf.

NTC-H - NEC Supervisor Monthly Report 4. 04-03-2021 .zip.

Workbook Ref No.	Areas to probe	Evidence expected
3.4	How does the Health Board ensure that precautions are taken throughout the works to avoid open duct or plant ends for a period beyond the time needed to make a joint on that duct / plant end?	Photographic and written evidence for the progress of work produced by a body which is independent of the Contractor (on a monthly basis).
<p>NHS Scotland Assure Observations: From the evidence provided, it would appear that the appointed NEC Supervisor has been reviewing the ductwork installation including methods of protection, with photographic evidence presented in a number of the supervisor reports. The specific topic is not covered in all supervisors' reports; therefore, it is unclear whether this has been undertaken consistently throughout the installation.</p> <p>With respect to storage of materials, the most recent NEC Supervisor report provided (dated 29 June 2022) indicates that the storage containers were inspected, with no issues raised. As this topic was not covered in earlier supervisor reports, it is unclear if this has been reviewed on a regular basis.</p> <p>Documents referenced are: Photographs dated 2/12/21 and 16/12/21.</p> <p>XBuro Report - 'Material storage inspection' dated 29 June 2022.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
3.5	How does the Health Board ensure that ventilation services are installed in a fashion which will provide ease of access for future maintenance?	<p>Evidence that the Contractor has presented their co-ordination drawings (BIM model) to the Board.</p> <p>Evidence that the Contractor has presented their co-ordination drawings (BIM model) to the Design Consultant and that they have agreed them for construction.</p> <p>Evidence that the Contractor has presented each of the main service runs plus plant rooms to the Board's FM team. Safe and adequate access has been provided.</p>

NHS Scotland Assure Observations:

Whilst there is evidence of document transmittal to support the services co-ordination process, there was no evidence of formal health board approval of the same.

There is evidence of a planned meeting to support fly-through of the BBK model to NHS Highland (21/03/22), however there is no evidence in the information submitted for review which confirms how extensive the presentation was, nor how it was received by NHS Highland. It is also unclear as to whether this was linked to any drawing approval process.

From site investigation it was noted that a heater battery on the high-level ductwork within the roof plantroom is considered difficult to access. It has not been specifically outlined within an Access and Maintenance strategy report how this and other plant/equipment maintenance will be achieved.

Whilst NHS Highland and the PSCP provided some evidence to demonstrate consideration of safe access and maintenance for installed MEP services, there was no evidence provided of a consolidated/detailed access and maintenance strategy for MEP services.

Documents referenced are:

15 KSAR Schedule of Documents 30.05.22, Rev15.

Document Distribution History - TDC-BBK-XX-XX-M3-ME-0001_M&E.pdf.

Workbook Ref No.	Areas to probe	Evidence expected
3.6	How does the Health Board ensure that ventilation services are installed in a fashion which will retain space for minor additions and modifications to services in the future?	<p>Evidence that the contractor has presented their co-ordination drawings (BIM model), with space for future flexibility identified, to the Board.</p> <p>Evidence that the design consultant has considered and agreed with the Board, space for future flexibility in the service installations.</p> <p>Evidence that the contractor has presented their co-ordination drawings (BIM model), with space for future flexibility identified, to the design consultant and that they have agreed them for construction.</p>

		<p>Evidence that the contractor has presented each of the main service runs plus plant rooms to the Board's Estates team and / or, to highlight space for future flexibility.</p> <p>Evidence that the ventilation solution has been agreed with clinical and IPC colleagues.</p> <p>Evidence that the Board has agreed a strategy (percentage) for spare capacity and a documented allowance to be incorporated into the design.</p> <p>Are plant rooms, horizontal distribution runs and risers appropriately sized for the equipment being installed and facilitate safe adequate maintenance?</p>
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NHS Scotland Assure Observations:

The evidence provided does not demonstrate whether NHS Highland have made any consideration for spare capacity as part of the design, nor whether any provision has subsequently been included as part of the installation. There is only anecdotal evidence as to how the access and maintenance of services has been reviewed, with limited supporting written documentation.

The evidence and comments as noted in Q2.5 above are also relevant to this question.

Documents referenced are:

15 KSAR Schedule of Documents 30.05.22, Rev15.

Document Distribution History - TDC-BBK-XX-XX-M3-ME-0001_M&E.pdf.

NHSH-NTCH-RIBA Stage 4 Review-NHS Assure Action Plan.xlsx.

NTCH-RIBA STAGE 4- APPROVAL LETTER (2).pdf.

RIBA 4 Acceptance and Derogation Recommendations (1).zip.

Workbook Ref No.	Areas to probe	Evidence expected
3.7	How does the Health Board assure itself that all ventilation materials are stored on site in an environment which protects them from deterioration and from the entry of contaminants into	Written and photographic, monthly evidence for the progress of work produced by a body which is independent of the contractor, and which confirms inspection of the site storage of materials.

	the parts of the component which will be in contact with the air flow?	Photographic evidence of the site storage of materials produced by a body which is independent of the contractor (on a monthly basis).
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NHS Scotland Assure Observations:

There is photographic evidence of installation methodologies showing capping of ductwork already installed dated 2/12/21 and 16/12/21, however this is not reflected in the NEC Supervisor monthly reports, most recent Report No 4 April 2022.

There is evidence of a further NEC Supervisors report dated 29th June 2022, which covers a review of the stored materials which are kept in storage containers and on site. This indicates no issues with the storage of ductwork and fittings being kept within the container storage areas. It is unclear from the evidence provided as part of the KSAR response as to whether this was being checked regularly prior to then.

There was no evidence provided as to how the ductwork and other materials were protected prior to arriving on site by the suppliers. There were no records provided as to how the PSCP has ensured that ductwork has arrived at site in an appropriate condition and subsequently stored on site in accordance with SHTM 03-01 Part A 2014 8.20 which states *“During installation it must be established that ductwork is being installed to the ‘advanced level’ as defined in the HVCA (2005) ‘TR/19 – Guide to good practice: internal cleanliness of ventilation systems. This specifically includes ensuring that ductwork sections arrive on site and are stored with their open ends sealed and that open ends remain sealed during installation to prevent the ingress of builders’ dust.”*

Documents referenced are:

Photographs dated 2/12/21 and 16/12/21.

XBuro Report - ‘Material storage inspection’ dated 29 June 2022.

Workbook Ref No.	Areas to probe	Evidence expected
3.8	How does the Health Board assure itself that all pre-commissioning inspections are completed and recorded before commissioning can commence?	<p>Evidence that adequate pre-commissioning check sheets (CIBSE, BSRIA) have been completed and signed off.</p> <p>Evidence that the Board has had all pre-commissioning checks audited and approved by an independent organisation.</p>

NHS Scotland Assure Observations:

NHS Highland provided evidence of Inspection and Test Plans, however as noted previously, these were not all complete. Sample checklists of initial witness testing and inspection/sign-off was also provided, albeit not all details were specific to ventilation.

NHS Highland have dedicated staff to oversee the commissioning process and evidenced regular engagement with their APs and AEs. There were however gaps in the written documentation that would evidence the site visits/inspections that NHS Scotland Assure were advised had taken place. NHS Highland should consider reviewing how they capture such inspections to add an additional layer of control to their existing provisions.

NHS Scotland Assure also note that at the time of the KSAR, the PSCP had not yet appointed a commissioning manager as noted as being a requirement within the strategic project documentation.

Overall NHS Highland appear to have robust protocols in place for the commissioning process, however NHS Scotland Assure recommend that the gaps identified are addressed as soon as possible to ensure a successful transition into the commissioning phase.

Documents referenced are:

15 KSAR Schedule of Documents 30.05.22, Rev15.

Sample checklist for above ground drainage stack 4a dated 20/10/21.

Workbook Ref No.	Areas to probe	Evidence expected
3.9	How does the Health Board assure itself that all variations which may be required to ventilation systems after tender are investigated and agreed by all parties before they are instigated?	Evidence that each variation / derogation has a detailed technical analysis and has been referred to the Board and agreed with their clinical, Estates, infection control and FM teams.

NHS Scotland Assure Observations:

The evidence and comments as noted in Q2.9 above are also relevant to this question.

Documents referenced are:

15 KSAR Schedule of Documents 30.05.22, Rev15.

NTC-H Derogation Schedule.xlsx.

3.3.2 Ventilation: Further Observations

In addition to the points raised via the KSAR workbook above, we also include the following observations as a result of the review, all of which relate to the evidence presented during the appraisal.

3.3.2.1

The “Barn Theatre” arrangement on the ground floor constitutes a non-standard theatre layout in relation to SHTM 03-01 2014. Whilst it is described as a barn theatre, there is a dividing wall between the two operating theatres themselves, so essentially these are considered to be separate theatre spaces with a shared scrub.

As currently set out the “Barn Theatre” has one conventional ventilation arrangement on one side and the other side is served by a UCV (Ultra Clean Ventilation).

The NHS National Services Scotland, Interim Review Service undertook a review of the Full Business Case design information (RIBA Stage 4) in 2021. The review recommended that further supporting evidence in relation to the theatre arrangement should be produced, including descriptions of airflows, patient flows and ventilation controls. The Interim Review Service also recommended that SHTM 03-01 Worksheets should be produced to support the development of the ventilation design (reference SHTM 03-01 2014 Appendix 4).

The evidence provided as part of the KSAR did not include details of a recorded derogation or evidence of completed worksheets in accordance with SHTM 03-01. There is therefore no further assurance as to how the hierarchy of cleanliness will be maintained or how ventilation will perform in the theatres.

With respect to commissioning, there is no evidence to demonstrate or support that the required pressure regime and system ventilation air balancing can be achieved, with respect to the shared facility and that both parts of the “Barn Theatre” have independent ventilation systems.

3.4 Electrical

3.4.1 Electrical: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
4.1	How does the Health Board assure itself that all electricians are trained to understand the needs (including special requirements) for the installation of electrical systems in the healthcare environment?	<p>Evidence of a vetted list of site electricians which confirms qualifications and healthcare experience.</p> <p>Evidence that the site induction with respect to working on electrical services has been developed, implemented and agreed with the Board.</p> <p>Evidence that all contractors and sub-contractor competency checks have been completed and signed off.</p>

NHS Scotland Assure Observations:

The PSCP have submitted C.V.'s for the Contract Manager, Senior Project Engineer, and Project Manager; expanded to include for Healthcare Experience.

The PSCP also supplied a spreadsheet holding healthcare experience for 14No. staff and levels of training/certification and a copy of the Site Induction Presentation and confirmation that PSCP undertake daily briefings.

The PSCP submitted Task Briefing Sheets for 1st and 2nd fix stages of the installation and are reflective of the works to be undertaken. These sheets identify site specific risks, control of risk and associated mitigations. Both documents are signed by site attendees.

10No of the 11No personnel whose inductions details were sent for review includes photograph evidence that they are current ECS (Electrotechnical Certification Scheme) and PAL (Powered Access Lift) card holders. This is sufficient to prove competencies compared to their qualifications.

The same site induction records include a brief test where an 80% score is required for passing. All induction forms have been signed by an inductor who is responsible for verify the competencies.

Documents referenced are:

Curriculum Vitae's for 14No individual staff members.

BBK HSESQ Site Induction Presentation for NTC (National Treatment Centre) Highland, V1.1

Task Briefing Sheet, E001-TBS-3, Rev 00.

Briefing Attendance Record, HSES-SF-0011b.

Task Briefing Sheet, E002-TBS-3, Rev 00.

Briefing Attendance Record, HSES-SF-0011b.

Initial Induction Records, HSES-TF-008b for 11No. Staff.

Workbook Ref No.	Areas to probe	Evidence expected
4.2	How does the Health Board assure itself that the electrical contracting company have the relevant experience to direct and manage their staff on the site for a healthcare environment?	Evidence of similar, previous healthcare projects by the contractor. Evidence of site management structure. Electricians completed approved current BS 7671 training course. Evidence that commissioning contractors have completed relevant test and commissioning courses. Evidence of trained operatives (AP and CP) to SHTM 06-02.

NHS Scotland Assure Observations:

The observations within Q4.1 also apply to Q4.2.

NHS Scotland Assure note that within the supporting evidence provided, that of the 5No ESC registered electricians whose inductions details were submitted for review, we found four to have current BS 7671 18th Edition training and one to have BS 7671 17th Edition.

The site is currently under the control of the PSCP. The PSCP Authorised Persons and Competent Persons are not currently operating under principles of SHTM 06-02, rather they are working within the guidance of the PSCPs own safety rules for management of electrical safety and permits for isolations until the site is handed over to NHS Highland.

NHS Highland have noted that their APs are involved in overseeing the works as part of their own site inspection duties, however further work will require to be undertaken prior to handover to define the safe systems of work relevant to the site that will be utilised post completion.

Documents referenced are:

Task Briefing Sheet, E001-TBS-3, Rev 00.

Briefing Attendance Record, HSES-SF-0011b.

Task Briefing Sheet, E002-TBS-3, Rev 00.

Briefing Attendance Record, HSES-SF-0011b.

NTC Highland, Project Organogram, September 2021.

CV's of BBK Management Staff for NTC Highland.

Initial Induction Records, HSES-TF-008b for 11No. Staff.

E-mail from Kevin Richard (Commissioning & Change Manager, NHSH) to Colin Telfer and Gary Crossan (BBK), 05/04/2022.

Workbook Ref No.	Areas to probe	Evidence expected
4.3	How does the Health Board ensure that the electrical systems are being installed to the correct standard and reflect the agreed design?	Written, monthly evidence for the progress of work produced by a body which is independent of the contractor, and which confirms compliance of the works to date. Photographic and written evidence for the progress of work produced by a body which is independent of the contractor (on a monthly basis).

NHS Scotland Assure Observations:

The observations noted in response to question 2.3 apply to this question with respect to electrical systems.

We found the reporting to be generally comprehensive, but with specific regard to electrical systems, we note that there is limited evidence to demonstrate that electrical materials are stored appropriately on site are stored in an environment which protects them from deterioration and from the entry of contaminants into the operational parts of the component.

Documents referenced are:

2173 NTC – NEC Supervisor's Reports, 7No. up until March 2022.

2173 NTC – NEC Supervisor's Reports, 7No. up until March 2022.

Workbook Ref No.	Areas to probe	Evidence expected
4.4	How does the Health Board ensure that electrical services are installed in a fashion which will provide ease of access for future maintenance?	Evidence that the contractor has presented their co-ordination drawings (BIM model) to the Health Board. Evidence that the contractor has presented their co-ordination drawings (BIM model) to the design consultant and that they have agreed them for construction. Evidence that the contractor has presented each of the main service runs

		plus plant rooms to the Health Board's FM team.
<p>NHS Scotland Assure Observations: The BIM360 distribution issue list (TDC-BBK-XX-XX-M3-ME-0001) identifies individual document/drawing issues that have been distributed to all parties including the design consultants, however this does not include a record that specific changes have been signed off by the Design Consultants and that these changes have had formal approval by NHS Highland.</p> <p>There is evidence of a planned meeting to support fly-through of the BBK model to NHS Highland (21/03/22), however there is no evidence in the information submitted for review which confirms how extensive the presentation was, nor how it was received by NHS Highland. It is also unclear as to whether this was linked to any drawing approval process.</p> <p>Documents referenced are:</p> <p>PSCP BIM Meeting Invitation.</p> <p>Document Distribution History of BIM Model – TDC-BBK-XX-XX-M3-ME-0001_M&E.</p> <p>NTCH – RIBA Stage 4 Approval Letter from NHSH to BBK, 25/02/2020.</p> <p>RIBA Stage 4, Acceptance and Derogation Recommendations containing:</p> <ul style="list-style-type: none"> • Appendix E, Comment Tracker. • RIBS Stage 4 Acceptance (Signed). • RIBA Stage 4 Technical Review – PE, Nov 2021. • Appendix F, Derogation Schedule. • NTCH – Derpigation Recommendations (Signed). 		

Workbook Ref No.	Areas to probe	Evidence expected
4.5	How does the Health Board ensure that electrical services are installed in a fashion which will retain space for minor additions and modifications to services in the future?	<p>Evidence that the contractor has presented their co-ordination drawings (BIM model), with space for future flexibility identified, to the Health Board.</p> <p>Evidence that the design consultant has considered and agreed with the Health Board, space for future flexibility in the service installations.</p> <p>Evidence that the contractor has presented their co-ordination drawings (BIM model), with space for future flexibility identified, to the design</p>

		<p>consultant and that they have agreed them for construction.</p> <p>Evidence that the contractor has presented each of the main service runs plus plant rooms to the Health Board's FM team, to highlight space for future flexibility.</p> <p>Evidence that the Health Board has agreed a strategy (percentage) for spare capacity and a documented allowance to be incorporated into the design.</p> <p>Are sub stations, switch rooms, distribution board cupboards, horizontal distribution runs and risers appropriately sized for the equipment being installed and facilitate safe, adequate maintenance?</p>
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NHS Scotland Assure Observations:

The evidence provided does not demonstrate what spare capacity has been allowed and approved in the design for future expansion or if adequate space has been allowed for and approved by relevant stakeholders to facilitate future maintenance.

The KSAR identified a potential lack of space within the main electrical switchrooms to accommodate any future growth or new equipment. Whilst the main LV switchgear has allocated internal spare ways within the board, there was no supporting evidence to note this had been agreed with NHS Highland. There is also little in the way of spare floor space to accommodate growth out with the existing switchgear panel assemblies. SHTM 06-01 Part A, 3.8 advised that electrical supplies in the healthcare sector are growing at a rate of between 3% and 6% year-on-year. SHTM 06-01 Part A, 7.64 identifies the requirement for a risk assessment to determine the amount of space to be set aside.

The evidence and comments as noted in Q4.4 above are also relevant to this question.

Whilst NHS Highland and the PSCP provided some evidence to demonstrate consideration of safe access and maintenance for installed MEP services, there was no evidence provided of a consolidated/detailed access & maintenance strategy for MEP services.

Documents referenced are:

BBK BIM Meeting Invitation.

Document Distribution History of BIM Model – TDC-BBK-XX-XX-M3-ME-0001_M&E.

NTCH – RIBA Stage 4 Approval Letter from NHSH to BBK, 25/02/2020.

TDC-HKA-DC-GF-DR-E-60-001 – LV Switch room Layout.

E+I Construction Issue drawings for Primary Switchgear.

RIBA Stage 4, Acceptance and Derogation Recommendations containing:

- Appendix E, Comment Tracker.
- RIBA Stage 4 Acceptance (Signed).
- RIBA Stage 4 Technical Review – PE, Nov 2021.
- Appendix F, Derogation Schedule.
- NTCH – Derogation Recommendations (Signed).

Workbook Ref No.	Areas to probe	Evidence expected
4.6	How does the Health Board assure itself that all electrical materials are stored on site in an environment which protects them from deterioration and from the entry of contaminants into the operational parts of the component?	Written, monthly and photographic evidence for the progress of work produced by a body which is independent of the contractor, and which confirms inspection of the site storage of materials. Photographic evidence of the site storage of materials produced by a body which is independent of the contractor (on a monthly basis).
<p>NHS Scotland Assure Observations: NHS Highland have appointed an NEC Supervisor to undertake regular site inspections and monitor quality. Whilst some photographic evidence was provided with respect to the adequate storage of electrical materials, this was following a request for further information from NHS Scotland Assure. The monthly supervisor reports do not specifically acknowledge that they have been checking the electrical stores regularly.</p> <p>Documents referenced are: <i>NEC Supervisor's Report No.4, April 2022.</i></p> <p>Supplementary information upload.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
4.7	How does the Health Board assure itself that all pre-commissioning inspections are completed and recorded before commissioning can commence?	Evidence that adequate pre-commissioning check sheets (e.g. SHTM 06-01 Part A, BS7671, etc.) have been completed and signed off. Evidence that the Health Board has had all pre-commissioning checks audited and approved by an independent organisation.

NHS Scotland Assure Observations:

NHS Highland and the PSCP provided evidence of Electrical Inspection and Test Plans, which includes details for testing & commissioning (albeit there is no specific demarcation for pre-commissioning activities).

The PSCP were able to evidence that pre-commissioning checks on the electrical systems had commenced, with over 200 pre-commissioning checks documented on their electronic system.

As noted previously in the KSAR, the PSCP commissioning manager has not yet been appointed.

There was no evidence presented of a formal review/audit of electrical pre-commissioning checks by an independent body.

Documents referenced are:

BBK Inspection and Test Plan appraisal, QUA-TF-0100c, 01/09/21.

NTC Highland – TG NEC Supervisor Activity Schedule.

Workbook Ref No.	Areas to probe	Evidence expected
4.8	How does the Health Board assure itself that all variations which may be required to electrical systems after tender are investigated and agreed by all parties before they are instigated?	Evidence that each variation / derogation has a detailed technical analysis and has been referred to the Health Board and agreed with their clinical, Estates, infection control and FM teams.

NHS Scotland Assure Observations:

The observations noted in response to question 2.1 apply to this question with respect to electrical services.

Whilst NHS Highland demonstrated a generally structured approach to derogation review and approvals.

NHS Scotland Assure did note a concern during the KSAR that some derogations had potential wider reaching implications that may require further consultation/review/approval by senior members of the NHS Highland health board and not just the Project Board. This is in specific respect to the level of electrical resilience provided and a potential single point of failure within the main switchroom.

Whilst there are two independent switchboards (“A” and “B”) they are located in the same room, there is therefore a scenario where a fire or another adverse incident in the switchroom could result in a total and prolonged loss of power to the facility, which may impact on the delivery of clinical care. NHS Highland have implemented mitigation measures in the form of fire suppression; however, this does not eliminate the risk in its entirety. The potential risks should therefore be noted at Health Board level and not just project level.

The KSAR also highlighted a number of points that had not yet been fully considered by the Health Board in respect to the fire suppression mitigation, that may have an impact on the safety of the facility, including electrical safe systems of work. Further details are noted in Section 3.4.2.1 of the KSAR under “Electrical: Further Observations”.

Documents referenced are:

RIBA Stage 4, Acceptance and Derogation Recommendations containing:

- Appendix E, Comment Tracker.
- Appendix F, Derogation Schedule.
- RIBS Stage 4 Acceptance (Signed).
- NTCH – Derogation Recommendations (Signed).

3.4.2 Electrical: Further Observations

In addition to the points raised via the KSAR workbook above, we also include the following observations as a result of the review, all of which relate to the evidence presented during the appraisal.

3.4.2.1

As noted in Q4.8, there is a potential single point of failure within the electrical infrastructure – specifically that both the main switchboards are located within the same room. NHS Highland have noted a derogation in this respect to SHTM 06-01 Part A, and have made reference to a developed flowchart, produced in conjunction with the NHS Highland senior electrical engineer and approved by the NHS Highland fire safety advisors that documents the supporting review of the proposed derogation. This was not provided as part of the KSAR evidence, nor was a copy of the formal approvals (out with the contractual design approvals process at RIBA Stage 4).

NHS Scotland Assure have concerns over the adopted approach, as there are a number of factors that do not appear to have been

considered by NHS Highland when assessing the derogation including.

The supporting evidence does not consider any resultant delay to personnel being able to safely access the space following a discharge of the suppression system, nor whether there is any requirement for staff to wear personal protective equipment such as breathing apparatus when entering the space.

There is no evidence to demonstrate that NHS Highland have considered scenarios where live switchboards must be shut down to, perhaps, minimise further damage and the potential impact on operational and clinical delivery.

There is no supporting evidence to demonstrate how the suppression system has been sized, nor whether there has been consideration of an electrical fault “arc” reigniting following the activation of the suppression system.

There is no supporting risk assessment that considers the impact the activation of the fire suppression system may have on the electrical switchgear, including whether any residual risks will be introduced – for example as a result of extinguishing agent particles penetrating the switchgear carcass.

3.5 Medical Gases

3.5.1 Medical Gases: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
5.1	How does the Health Board assure itself that all medical gas installers are trained to understand the needs (including special requirements) for the installation of medical gas systems in the relevant healthcare environment?	<p>Evidence of a vetted list of site medical gas installers which confirms qualifications and healthcare experience.</p> <p>Evidence that the site induction with respect to working on medical gas services has been developed, implemented and agreed with the Board.</p> <p>Evidence that all contractors and sub-contractor competency checks have been completed and signed off.</p>
<p>NHS Scotland Assure Observations: A list of personnel involved in the project has been provided along with training undertaken and qualifications held, including relevant healthcare experience of the sub-contractor.</p> <p>There is no specific evidence to demonstrate a formal process for competency checks to ensure the suitability of site personnel on this project.</p> <p>There is no evidence how site personnel are informed of specific site requirements or changes that may affect the project installation. e.g. record of Toolbox Talks.</p> <p>Documents referenced are: 15 KSAR Schedule of Documents 30.05.22, Rev15.</p> <p>RE_ NTC - H Key Stage Assurance Review - Algas.msg.</p> <p>AMI Organogram issue 4.pdf.</p> <p>ALGAS-SHTM-02-01-TM.pdf.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
5.2	How does the Health Board assure itself that the medical gas contracting company have the relevant experience to direct and manage their staff on the site for the	<p>Evidence of similar, previous healthcare projects by the contractor.</p> <p>Evidence of site management structure.</p> <p>AP and CP training to SHTM 02-01 for operatives.</p>

	relevant healthcare environment?	
<p>NHS Scotland Assure Observations: The observations noted in response to question 5.1 apply to this question.</p> <p>There was no evidence provided of the AP and CP training to SHTM 02-01 for operatives.</p> <p>Documents referenced are: 15 KSAR Schedule of Documents 30.05.22, Rev15.</p> <p>RE_ NTC - H Key Stage Assurance Review - Algas.msg.</p> <p>ALGAS-SHTM-02-01-TM.pdf.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
5.3	How does the Health Board ensure that the medical gas systems are being installed to the correct standard and reflect the agreed design?	Written and photographic, monthly evidence for the progress of work produced by a body which is independent of the contractor, and which confirms compliance of the works to date.
<p>NHS Scotland Assure Observations: The observations noted in response to question 2.3 apply to this question with respect to medical gas.</p> <p>Documents referenced are: 15 KSAR Schedule of Documents 30.05.22, Rev15.</p> <p>21283 NTC- - NEC Supervisors Report No.2 (Jan 2022).pdf.</p> <p>21283 NTC-H - NEC Supervisors Report No.1 (Dec 2021).pdf.</p> <p>21283 NTC-H - NEC Supervisors Report No.3 (Feb-Mar).pdf.</p> <p>NTC-H - NEC Supervisor Monthly Report 4. 04-03-2021 .zip.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
5.4	How does the Health Board ensure that precautions are taken throughout the works to avoid open pipe ends for a period beyond the time	Photographic and written evidence for the progress of work produced by a body which is independent of the contractor (on a monthly basis).

	needed to make a joint on that pipe end?	
<p>NHS Scotland Assure Observations: The observations noted in response to question 2.7 apply to this question with respect to medical gas.</p> <p>Additionally, it was noted that the pipework was capped with insulating tape and not capped as per SHTM02.01 Part A guidance.</p> <p>Documents referenced are: 21283 NTC- - NEC Supervisors Report No.2 (Jan 2022).pdf. 21283 NTC-H - NEC Supervisors Report No.1 (Dec 2021).pdf. 21283 NTC-H - NEC Supervisors Report No.3 (Feb-Mar).pdf. NTC-H - NEC Supervisor Monthly Report 4. 04-03-2021 .zip.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
5.5	How does the Health Board ensure that medical gas services are installed in a fashion which will provide ease of access for future maintenance?	<p>Evidence that the contractor has presented their co-ordination drawings (BIM model) to the Board.</p> <p>Evidence that the contractor has presented their co-ordination drawings (BIM model) to the design consultant and that they have agreed them for construction.</p> <p>Evidence that the contractor has presented each of the main service runs plus plant rooms to the Health Board's FM team.</p>

<p>NHS Scotland Assure Observations: The BIM360 distribution issue list (TDC-BBK-XX-XX-M3-ME-0001) identifies individual document/drawing issues that have been distributed to all parties including the design consultants, however this does not include a record that specific changes have been signed off by the Design Consultants and that these changes have had formal approval by NHS Highland.</p> <p>There is evidence of a planned meeting to support fly-through of the BBK model to NHS Highland (21/03/22), however there is no evidence in the information submitted for review which confirms how extensive the presentation was, nor how it was received by NHS Highland. It is also unclear as to whether this was linked to any drawing approval process.</p>		
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Whilst NHS Highland and the PSCP provided some evidence to demonstrate consideration of safe access and maintenance for installed MEP services, there was no evidence provided of a consolidated/detailed access & maintenance strategy for MEP services.

Documents referenced are:

15 KSAR Schedule of Documents 30.05.22, Rev15.

Document Distribution History - TDC-BBK-XX-XX-M3-ME-0001_M&E.pdf.

Workbook Ref No.	Areas to probe	Evidence expected
5.6	How does the Health Board ensure that medical gas services are installed in a fashion which will retain space for minor additions and modifications to services in the future?	<p>Evidence that the contractor has presented their co-ordination drawings (BIM model), with space for future flexibility identified, to the Health Board.</p> <p>Evidence that the design consultant has considered and agreed with the Board, space for future flexibility in the service installations.</p> <p>Evidence that the contractor has presented their co-ordination drawings (BIM model), with space for future flexibility identified, to the design consultant and that they have agreed them for construction.</p> <p>Evidence that the contractor has presented each of the main service runs plus plant rooms to the Health Board's FM team, to highlight space for future flexibility.</p>

NHS Scotland Assure Observations:

The evidence provided does not demonstrate what spare capacity has been allowed and approved in the design for future expansion or if adequate space has been allowed and approved by relevant stakeholders to facilitate future maintenance.

The evidence and comments as noted in Q5.5 above are also relevant to this question.

Documents referenced are:

Document Distribution History - TDC-BBK-XX-XX-M3-ME-0001_M&E.pdf.

NHSH-NTCH-RIBA Stage 4 Review-NHS Assure Action Plan.xlsx.

NTCH-RIBA STAGE 4- APPROVAL LETTER (2).pdf.

Workbook Ref No.	Areas to probe	Evidence expected
5.7	How does the Health Board assure itself that all medical gas materials are stored on site in an environment which protects them from deterioration and from the entry of contaminants into the parts of the component which will be in contact with the gas?	Written, monthly evidence for the progress of work produced by a body which is independent of the contractor, and which confirms inspection of the site storage of materials. Photographic evidence of the site storage of materials produced by a body which is independent of the contractor (on a monthly basis).
<p>NHS Scotland Assure Observations: The observations noted in response to question 2.7 apply to this question with respect to medical gas.</p> <p>Documents referenced are: N/A.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
5.8	How does the Health Board assure itself that all pre-commissioning inspections are completed and recorded before commissioning can commence?	Evidence that adequate pre-commissioning check sheets (e.g. SHTM 02-01 Part A) have been completed and signed off. Evidence that the Health Board has had all pre-commissioning checks audited and approved by an independent organisation.
<p>NHS Scotland Assure Observations: NHS Highland provided evidence that they had commenced the process for joint inspections as part of their pre-commissioning activities.</p> <p>NHS Highland have demonstrated engagement with the AE and AP for Medical Gas and at the time of the KSAR were moving towards the commissioning stage of the project, noting they were in the process of consolidating the required information. NHS Scotland Assure note at the time of the KSAR, the PSCP had not yet appointed a commissioning manager.</p> <p>Documents referenced are: N/A.</p>		
Workbook Ref No.	Areas to probe	Evidence expected

5.9	How does the Health Board assure itself that all variations which may be required to medical gas systems after tender are investigated and agreed by all parties before they are instigated?	Evidence that each variation / derogation has a detailed technical analysis and has been referred to the Board and agreed with their medical gas management group, clinical, Estates, infection control and FM teams.
<p>NHS Scotland Assure Observations: The observations noted in response to question 2.9 apply to this question with respect to medical gas.</p> <p>Documents referenced are: 15 KSAR Schedule of Documents 30.05.22, Rev15.</p> <p>NTC-H Derogation Schedule.xlsx.</p>		

3.5.2 Medical Gases: Further Observations

No further observations were recorded.

3.6 Fire

3.6.1 Fire: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
6.1	How does the Health Board assure itself that all fire stopping specialists are trained to understand the needs (including special requirements) for the installation of fire stopping systems in the healthcare environment?	<p>Evidence of a vetted list of site fire stopping specialists which confirms qualifications and healthcare experience.</p> <p>Evidence that the site induction with respect to working on fire stopping services has been developed, implemented and agreed with Board.</p> <p>Evidence that all contractors and sub-contractor competency checks have been completed and signed off.</p>
<p>NHS Scotland Assure Observations: A demonstration of competence form has been completed for the appointed fire stopping specialists. This outlines the qualifications and experience of the key personnel from the fire stopping specialist. However, detailed evidence on their experience specific to healthcare has not provided.</p> <p>Clear evidence of the induction process for the fire stopping specialist not been provided.</p> <p>Documents referenced are: Emtec Demonstration of Competence signed.docx.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
6.2	How does the Health Board assure itself that the fire stopping contracting company have the relevant experience to direct and manage their staff on the site for a healthcare environment?	<p>Evidence of similar, previous healthcare projects by the contractor.</p> <p>Evidence of site management structure.</p>
<p>NHS Scotland Assure Observations: The observations within question 6.1 are also relevant to this question. The site management structure has been provided in the organisational chart for the site. However, this does not specifically include the fire stopping contractor.</p> <p>Documents referenced are: National Treatment Centre – NHS Highland Balfour Beatty/BBK Organisational Chart.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
6.3	How does the Health Board ensure that the fire stopping systems are being installed to the correct standard and reflect the agreed design?	Written, monthly evidence for the progress of work produced by a body which is independent of the contractor, and which confirms compliance of the works to date.
<p>NHS Scotland Assure Observations: Independent checks of the fire stopping are being carried out by the NEC Supervisor and recorded within the monthly NEC Supervisor reports.</p> <p>Documents referenced are: NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 1 Dec ‘21, 20/12/21.</p> <p>NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 2 for the Period to 8 Feb ‘22, 08/02/22.</p> <p>NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 3 for the Period to 23 Mar ‘22, 28/03/22.</p> <p>National Treatment Centre – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 4 for the Period to 25 April 2022, 02/05/22.</p> <p>National Treatment Centre – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 5 for the Period to 1 June 2022, 01/06/22.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
6.4	How does the Health Board ensure that precautions are taken throughout the works to avoid openings in fire barriers to occupied spaces during the works?	Written and photographic evidence for the progress of work produced by a body which is independent of the contractor (on a monthly basis).
<p>NHS Scotland Assure Observations: Where breaches in compartmentation are necessary to install services, the Board have evidenced that fire stopping is installed to the correct standard.</p> <p>Documents referenced are: NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 1 Dec ‘21, 20/12/21.</p> <p>NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 2 for the Period to 8 Feb ‘22, 08/02/22.</p>		

NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 3 for the Period to 23 Mar ‘22, 28/03/22.

National Treatment Centre – Highland UHI Campus, Inverness bNEC Supervisor’s Report No. 4 for the Period to 25 April 2022, 02/05/22.

National Treatment Centre – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 5 for the Period to 1 June 2022, 01/06/22.

Issue_Report.pdf.

BIM 360 Field – Issue 000187.pdf.

Workbook Ref No.	Areas to probe	Evidence expected
6.5	How does the Health Board ensure that fire stopping systems are installed on ventilation, electrical, plumbing and drainage services where they penetrate fire barriers?	Photographic and written evidence for the progress of work produced by a body which is independent of the contractor (on a monthly basis).

NHS Scotland Assure Observations:

The observations within Q6.3 and Q6.4 also apply to this question.

Documents referenced are:

NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 1 Dec ‘21, 20/12/21.

NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 2 for the Period to 8 Feb ‘22, 08/02/22.

NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 3 for the Period to 23 Mar ‘22, 28/03/22.

National Treatment Centre – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 4 for the Period to 25 April 2022, 02/05/22.

National Treatment Centre – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 5 for the Period to 1 June 2022, 01/06/22.

Issue_Report.pdf.

BIM 360 Field – Issue 000187.pdf.

Workbook Ref No.	Areas to probe	Evidence expected
6.6	How does the Health Board ensure that fire stopping is installed in electrical containment (trunking / tray systems) systems where they penetrate fire barriers?	Photographic and written evidence for the progress of work produced by a body which is independent of the contractor (on a monthly basis).
<p>NHS Scotland Assure Observations: The observations within Q6.3 and Q6.4 also apply to this question.</p> <p>Documents referenced are: NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 1 Dec ‘21, 20/12/21.</p> <p>NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 2 for the Period to 8 Feb ‘22, 08/02/22.</p> <p>NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 3 for the Period to 23 Mar ‘22, 28/03/22.</p> <p>National Treatment Centre – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 4 for the Period to 25 April 2022, 02/05/22.</p> <p>National Treatment Centre – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 5 for the Period to 1 June 2022, 01/06/22.</p> <p>Issue_Report.pdf.</p> <p>BIM 360 Field – Issue 000187.pdf.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
6.7	How does the Health Board assure itself that all fire stopping materials are stored on site in an environment which protects them from deterioration?	Written, monthly evidence for the progress of work produced by a body which is independent of the and which confirms inspection of the site storage of materials. Photographic evidence of the site storage of materials produced by a body which is independent of the contractor (on a monthly basis).
<p>NHS Scotland Assure Observations: The NEC Supervisor reports, which are monthly reports compiled by a third party based on weekly site inspections, considers the materials onsite. These reports appear to be compiled on a “by exception” basis, only recording where issues have</p>		

been found. There is therefore no formal assurance provided that material storage is being checked regularly.

Documents referenced are:

NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 1 Dec ‘21, 20/12/21.

NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 2 for the Period to 8 Feb ‘22, 08/02/22.

NTC – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 3 for the Period to 23 Mar ‘22, 28/03/22.

National Treatment Centre – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 4 for the Period to 25 April 2022, 02/05/22.

National Treatment Centre – Highland UHI Campus, Inverness NEC Supervisor’s Report No. 5 for the Period to 1 June 2022, 01/06/22.

Workbook Ref No.	Areas to probe	Evidence expected
6.8	How does the Health Board assure itself that all fire detection and alarm systems are installed in the correct locations and are easily maintained?	<p>Written evidence for the progress of work produced by a body which is independent of the contractor (on a monthly basis).</p> <p>Demonstration by the contractor that any detectors which are above 3m from floor level or in ceiling voids, to the Board's FM team, have suitable access for maintenance.</p>
<p>NHS Scotland Assure Observations:</p> <p>The fire strategy states that a L1 category automatic fire detection and alarm system should be installed in accordance with BS 5839-1 and SHTM 82. Coverage is to be to all areas in accordance with BS 5839-1 including voids greater than 800mm.</p> <p>SHTM 81 and SHTM 82 contain the mandated standards for healthcare facilities and therefore the fire detection, including risk assessed omission of detectors should be in accordance with these documents in conjunction with BS 5839-1.</p> <p>A partial risk assessment has been undertaken by NHS Highland with the intent of omitting detectors from some void areas, however, the assessment does not fully consider the safety aspect and concentrates on the difficulty associated with access for installation.</p> <p>Documents referenced are:</p> <p>NHS Highland The Dewar Centre Fire Detection Risk Assessment (TDC-HKA-DC-XX-SH-E-XX-005), 08/04/2022.</p> <p>TDC-HKA-DC-XX-SH-E-XX-006, 08/04/2022.</p> <p>FW_NTC-H_KSAR Fire – F21 Response.msg.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
6.9	How does the Health Board assure itself that all variations which may be required to fire stopping systems after tender are investigated and agreed by all parties before they are instigated?	Evidence that each variation has been referred to the Health Board and agreed with their clinical, engineering, infection control and FM teams.
<p>NHS Scotland Assure Observations: Variations to fire stopping systems are recorded and signed off in the RDD, NHS Highland, NDAP and Assure Trackers.</p> <p>Documents referenced are: KSAR Schedule of documents 26.04.22 Rev 15.xlsx.</p> <p>Issue_Report.pdf.</p> <p>BIM 360 Field – Issue 000187.pdf.</p>		

Workbook Ref No.	Areas to probe	Evidence expected
6.10	How does the Health Board assure itself that all fire dampers and fire/smoke dampers can be accessed for inspection, resetting and maintenance?	<p>Evidence that the contractor has presented their co-ordination drawings (BIM model) to the Health Board.</p> <p>Evidence that the contractor has presented their co-ordination drawings (BIM model) to the design consultant and that they have agreed them for construction.</p> <p>Evidence that the contractor has presented each of the fire dampers and smoke / fire dampers to the Health Board's FM team.</p>
<p>NHS Scotland Assure Observations: Evidence that the Revit model and co-ordination drawings were issued to the NHS Highland and design consultants for review has been provided. Evidence of a meeting to fly through of the model with NHS Highland has also been provided.</p> <p>The fire and fire/smoke dampers have been presented to NHS Highland's FM team as part of the Mechanical Inspection and Test Plan.</p> <p>Documents referenced are: BBK BIM Meeting Invite.pdf.</p>		

Document Distribution History – TDC-BBK-XX-XX-M3-ME-0001_M&E.pdf.

ITP-NTC-M-01 Appraised.pdf.

Workbook Ref No.	Areas to probe	Evidence expected
6.11	How does the Health Board assure itself that any fire rated ductwork is correctly installed?	Evidence that the system is certificated, and that the installation follows the installation details which were used for the certification. Written confirmation from the design consultant.
<p>NHS Scotland Assure Observations: Evidence that the proposed ductwork, including the fire dampers and fire resisting ductwork has been designed to the certified detail has been provided in the technical submittal and penetrations detail drawings.</p> <p>Written confirmation from the design consultant that the design achieves the requirements of the relevant standards is provided in the technical submittal.</p> <p>Documents referenced are: <i>Ductwork and Ancillaries – Technical Submittal (HK Comments) – WP/RDD Ref No. 32, 23/07/21.</i> <i>Wall Penetration Details: Fire Rated Ductwork Through Partitions, 2311-TDC-OBE-DC-XX-A-22-339-A, 29/09/21.</i> <i>Wall Penetration Details – Fire Rated Ductwork Under Beam Encasement, 2311-TDC-OBE-DC-XX-A-22-341-B, 15/10/21.</i></p>		

Workbook Ref No.	Areas to probe	Evidence expected
6.12	How does the Health Board assure itself that any smoke control and / or clearance systems are fit for purpose?	Evidence that the smoke system has been designed by an accredited Fire Engineer. Evidence that Building Control have accepted the solution. Confirmation from the Building Services Design Consultant that the operating sequence for the smoke system has been agreed and integrated into the control of other building systems.

NHS Scotland Assure Observations:

The Fire Strategy states that an automatic ventilator of at least 1m² should be provided at the top of each firefighting stair on an external wall. NHS Highland provided evidence that the Fire Strategy has been agreed as part of the Building Warrant process by Building Control.

Documents referenced are:

The National Treatment Centre - Highlands Fire Strategy 2022-04-21.

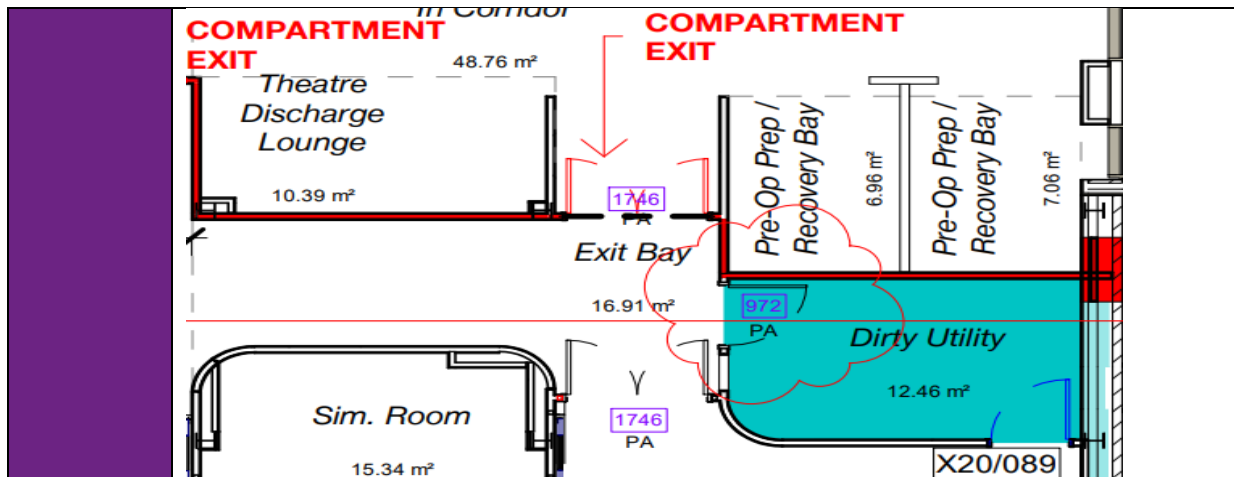
Workbook Ref No.	Areas to probe	Evidence expected
6.13	How does the Health Board assure itself that all pre-commissioning inspections are completed and recorded before commissioning can commence?	Evidence that the Health Board has had all pre - commissioning checks audited and approved by an independent organisation.
<p>NHS Scotland Assure Observations:</p> <p>At the time of the KSAR the installation of fire safety systems was ongoing (for example the condensed aerosol system), with the commissioning and pre-commissioning of some systems such as the sprinkler and dry riser systems underway.</p> <p>As noted previously in the KSAR, there are some gaps in the Inspection & Test Plans, including some fire safety systems. The PSCP commissioning manager had also yet to be appointed and in their absence, it is unclear who has taken overall ownership for commissioning activities to date. NHS Scotland Assure recommend when appointing the individual, that NHS Highland and the PSCP ensure they are competent to work on a healthcare facility.</p> <p>Documents referenced are:</p> <p>PRM-TF-0001c, Project Quality Plan – Appendix B, Version 5.0 dated 08/07/22 (Business Collaborator)</p> <p>NHS-H/KSAR/Register, 20 KSAR Schedule of documents, Revision 20 dated 15/07/22.</p> <p>NTC-H Commissioning Tracker (COMM-003), dated 14/07/22.</p> <p>NTCH – GC Email – Commissioning Management, dated 01/07/22.</p> <p>Commission Manager CV dated 01/07/22.</p> <p>Commission Management Duties, dated 22/07/22.</p>		

3.6.2 Fire: Further Observations

In addition to the points raised via the KSAR workbook above, we also include the following observations as a result of the review, all of which relate to the evidence presented during the appraisal.

3.6.2.1	<p>NHS Scotland Assure note the presence of a dividing wall within the Barn Theatre, essentially meaning that these are two separate theatres. The fire strategy documentation does not fully acknowledge this and it is not clear whether the design fully considers the means of escape provision and the necessity of fire protection of fire hazard rooms.</p> <p>The layout may also have a potential impact on progressive horizontal evacuation arrangements, whereby patients should be evacuated to an adjoining compartment where their care can be continued.</p> <p>It is recognised that the procedures undertaken in the theatres may not necessitate patients being taken to an adjoining theatre, provided it can be evidenced that the principles of PHE are being met.</p> <p>NHS Scotland Assure recommend that the supporting details for the adopted strategy are fully documented within the relevant project documentation.</p>
3.6.2.2	<p>NHS Highland have advised the design for the Condensed Aerosol System is ongoing and a final design will be issued week commencing 18/07/22.</p> <p>Documents referenced are:</p> <p>RDD-078 Fire Alarm (Business Collaborator).</p> <p>Non-conformity Checklist Summary, dated 30/03/22.</p> <p>PRM-TF-0001c, Project Quality Plan – Appendix B, Version 5.0 dated 08/07/22 (Business Collaborator).</p> <p>NHS-H/KSAR/Register, 20 KSAR Schedule of documents, Revision 20 dated 15/07/22.</p> <p>Kemar Brochure, dated 30/03/22.</p> <p>Contract Status Report, dated 30/03/22.</p>
3.6.2.3	<p>There is no evidence of a rationale regarding the choice of fire suppression system within the switch room.</p> <p>There is insufficient detail that considers the effect of a fire in the mains electrical switch room with regard to:</p>

	<ul style="list-style-type: none"> • Contamination of electrical equipment as a result of suppression discharge, • Resilience of the buildings, including theatres, electrical supply in the event of a fire in the switch room. • Safe re-entry procedures following a suppression discharge • Contamination of electrical equipment as a result of suppression discharge • Consideration of a standby supply of extinguishing agent • The likelihood, effect and safety measures with regard to an arc flash • consideration of BS 5306-0:2020 <p>NHS Scotland Assure note that whilst the contractor has confirmed there is no need for pressure relief for the Stat-X system, there are no pressure relief calculations which support the statement. According to BS EN 15276-2:2019, significant overpressure can develop due to the volume of gases generated and the effects of increased temperature of the atmosphere.</p>
3.6.2.4	<p>NHS Scotland Assure note that whilst the bedroom areas are designed to facilitate progressive horizontal evacuation, due to the layout, it is essential that the evacuation management is robust, and staff are trained on the routes that should be used. NHS Highland should ensure that the management and training strategies are developed in advance of the facility handover.</p>
3.6.2.5	<p>There is insufficient evidence that both leaves of bedroom doors will be fitted with 'free swing arm' self-closing devices in accordance with SHTM 81.</p>
3.6.2.6	<p>There is no evidence that transfer grilles installed in fire doors are fitted with remotely resettable fire and smoke shutters in accordance with SHTM 81 Part 1 Section 6.6.</p>
3.6.2.7	<p>A review of the drawings indicates that the provision of cross-corridor smoke doors (for example within the level 1 ward area) is not in accordance with SHTM 81 with respect to prevention of the transfer of smoke between escape routes. There is no supporting evidence to demonstrate that the current proposals provide the required level of smoke control/protection.</p>
3.6.2.8	<p>Fire & Smoke Door Provision – Compliance with SHTM 81</p> <p>Door set 1746 is showing as red on the plan, which would indicate that it is fire resistant, however it is not labelled to identify its fire resistance rating in line with all other door sets.</p>



3.6.2.9

The fire strategy discusses the fire alarm cause and effect, and a separate cause & effect matrix has been provided as part of the KSAR response. Based on the evidence provided, in NHS Scotland Assure's opinion, it is unclear whether the cause & effect matrix is fully aligned to the fire strategy and requirements of SHTM 81 – for example alignment of fire zones and sub compartment zones inclusive of appropriate evacuation strategy for intermittent and continuous alarms. It is also unclear as to whether the cause and effect matrix has been reviewed and approved by the health boards fire safety advisors.

Documents referenced are:

Section 4.2 of The National Treatment Centre – Highlands Fire Strategy – Revision F.9, 21/04/2022.

The Dewar Centre Cause & Effect Matrix (TDC-HKA-DC-XX-SCH-E-68-001) Revision C, 01/06/2022.

FW NTC-H – Fire Alarm Cause Effect Updates.msg.

3.6.2.10

The derogation schedule states that the evacuation lift beside Stair 5 will also be used as a goods lift, which is a derogation from SHTM 08-02. The derogation schedule also states that this has been discussed with NHS Highland and NHS Highland has deemed this acceptable.

SFPN 3 does allow the use of an evacuation lift for light goods necessary for the day-to-day running of the wards but not for heavy goods.

Clarity of what goods will be transported by this lift has not been provided.

Documents referenced are:

Section 3.7.6 of The National Treatment Centre – Highlands Fire Strategy – Revision F.9, 21/04/2022.

Clause 3.61 of SHTM 08-02.

	<p>Clause 4.13 of SFPN 3.</p> <p>Derogation 64 of NTC-H Derogation Schedule.xlsx</p> <p>Item EL4 from the RIBA Stage 4 Action Plan (NHS-NTCH-RIBA Stage 4 Review-NHS Assure Action Plan.xlsx.</p> <p>NHS Highland RIBA Stage 3 Derogations – Technical Recommendation.</p>
3.6.2.11	<p>The fire strategy indicates that the ancillary dirty utility rooms and anaesthetic rooms within the orthopaedic theatres are not considered as fire hazard rooms. The board should ensure that the fire strategy is amended to include a justification for this variance from guidance together with evidence that the standards are being met by an alternate means.</p> <p><i>Documents referenced are:</i> Fire Strategy Drawing Ground Floor Plan – Revision I, 18/06/2021.</p> <p>Fire Strategy Drawing First Floor Plan – Revision I, 18/06/2021.</p>
3.6.2.12	<p>The Fire Strategy Section 5.1.3 states that wheelchair charging point doors will be fitted with a delayed action fire active closer. The Board should provide evidence that these devices are in accordance with SHTM 81, and the rationale detailed in the fire strategy.</p> <p><i>Documents referenced are:</i> Highlands Fire Strategy – Revision F.9, 21/04/2022.</p>
3.6.2.13	<p>Fire/Smoke Damper Provision</p> <p>Ventilation ductwork passes through a series of bedrooms with no fire and smoke damper provision. This is in line with general principles outlined within SHTM 81 however the fire strategy does not consider how in the event of a fire in one of the bedrooms, all other bedrooms can be safely evacuated.</p>

3.7 Infection Prevention & Control Built Environment

3.7.1 Infection Prevention & Control Built Environment: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
7.1	<p>How does the Health Board demonstrate that there is an effective infection prevention and control management structure in place?</p> <p>How does the Health Board demonstrate leadership and commitment to infection prevention and control to ensure a culture of continuous quality improvement throughout the organisation and that there is an effective IPC structure in place?</p>	<p>The Health Board provides evidence that there is an IPC Management Structure with the necessary expertise and leadership skills to support the organisation:</p> <p>The Health Board provides evidence that there is an IPC Management Team with the necessary expertise and leadership skills to support the project. The board are compliant with content of HDL (2008) role of the ICM / CNO 22.12.16.</p> <p>Executive board reports or minutes. Risk registers or equivalent, Minutes from operational and governance groups, (and action points).</p> <p>Structure of infection prevention and control team (IPCT) and qualifications held, previous experience supporting new build projects.</p> <p>Evidence IPC and clinical teams have been involved with any derogation through the build process and are satisfied this will not impact on patient safety, evidence could be through meeting minutes, risk assessments, risk registers relating to IPC with evidence of escalation through the agreed NHS board governance process.</p> <p>Evidence the Executive Board Member assigned to lead on IPCT has been kept informed of IPC risks identified and associated with the project this can be demonstrated by the board.</p> <p>Evidence IPCT advice has been followed, such as IPCT walk round audits during the construction process.</p>

		<p>Evidence that fixtures fitting, and equipment have not been incorporated into the project that would represent an identified IPC risk.</p> <p>Evidence that all contractors and sub-contractor competency checks have been completed and signed off.</p>
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NHS Scotland Assure Observations:

The NHS Highland KSAR response identifies the roles and experience and qualifications of staff providing IPC advice as an Infection Prevention and Control Doctor (IPD), and an IPC lead. The information does not indicate a requirement to have previous experience or qualifications in the built environment to hold the position. Roles for a project Microbiologist have not been identified.

NHS Highland described engagement of stakeholders, including IPC, between design and construction stage and details of design reviews/working groups. Ongoing clinical and IPC engagement and input into the construction stage, planning for commissioning and operation has not been evidenced within the documentation provided.

The consideration and mitigation for the increased Clinical and IPC workload during pandemic is noted within the project joint risk register which details the management of risks to allow deputies attendance at meetings. It is noted that the risk was reduced following completion of room layouts and following completion of page turn layout exercise and equipment specifications (12/08/21 & 13/1/2022). There is no documentation provided to evidence the ongoing monitoring and management of this risk in relation to the construction process.

NHS Highland confirmed that the named Lead Clinical Adviser is on the Project Board and involved in the design process, reviewing and commenting on the selection and specification of appropriate complaint finishes & products under the RDD process. A new named Lead Clinical Adviser has been appointed from April 2022 with an allocated 3 days a week to support the project going forward and provide IPC guidance and advice as required. It is not clear from the evidence provided to what extent the Lead Clinical Advisor has been liaising with IPC colleagues.

Monthly dedicated NHS Highland and PSCP construction quality meetings and minutes have been provided but there is no evidence of NHS Highland IPC attendance or overview.

Documents referenced are:

Section 3.7.6 of The National Treatment Centre – Highlands Fire Strategy – Revision F.9, 21/04/2022.

Clause 3.61 of SHTM 08-02.

Clause 4.13 of SFPN 3.

Derogation 64 of NTC-H Derogation Schedule.xlsx.

Item EL4 from the RIBA Stage 4 Action Plan (NHS-NTCH-RIBA Stage 4 Review-NHS Assure Action Plan.xlsx) NHS Highland RIBA Stage 3 Derogations – Technical Recommendation.

Workbook Ref No.	Areas to probe	Evidence expected
7.2	How does the Health Board demonstrate implementation of evidence based infection prevention and control measures during the design process?	<p>The Health Board provides evidence:</p> <p>The board can demonstrate the current version of the National Infection Prevention and Control Manual has been adopted by the organisation and all staff are aware of how and where to access this and it is being referred to during the construction process.</p> <p>IPC risks (actual or perceived) risks identified during the work programme or through the KSAR evidence review are provided.</p> <p>Evidence of walk rounds during the construction process, and these are being fed back to clinical staff and the executive team to provide assurance that the requirements of the CD are being adhered with.</p>
<p>NHS Scotland Assure Observations:</p> <p>NHS Highland have identified the IPC Project Team structure and demonstrated referencing and documentation relating to the current National Infection Prevention and Control Manual. No evidence and/or documentation was provided within the review to evidence how this IPC documentation was disseminated to all parties and embedded within the construction processes.</p> <p>There is no evidence that IPC colleagues have yet commenced site inspections, with the current arrangements relying upon the NEC Supervisor to undertake inspections and report any issues. It is unclear from the evidence provided whether the NEC Supervisor has the necessary knowledge or competence to fulfil this role on behalf of IPC or what processes are in place for liaison/escalation with IPC colleagues.</p> <p>Documents referenced are:</p> <p><i>IC&P Team.</i></p> <p><i>National Infection Prevention and Control Manual_ Home.</i></p>		

National Infection Prevention and Control Manual_ Winter (21_22), Respiratory Infections in Health and Care Settings Infection Prevention and Co.

Organisation structure ICP.

21283 NTC-H - NEC Supervisors Report No.3 (Feb-Mar).

Workbook Ref No.	Areas to probe	Evidence expected
7.3	How does the Health Board assure itself that the contractors have a proper understanding of the infection prevention and control procedures required by the CD and that the contractors work is being rigorously managed in this respect?	<p>The Health Board evidences that:</p> <p>All relevant staff within the contractors' organisation are provided with clear guidance on roles and responsibilities in relation to infection prevention and control.</p> <p>The contractors' organisation provides an education programme that meets the need of staff which includes mandatory induction, training and updates on HAI guidance, policies and procedures.</p>

NHS Scotland Assure Observations:

Evidence of a Stage 3 HAI-SCRIBE was provided; however, the document was not signed by all parties and is dated 18/01/21. The Contractors reports make reference to further HAI meetings, however no evidence of these was presented, nor was there any evidence of the master HAI-SCRIBE being updated following the meeting(s). It is therefore unclear as to whether the current control procedures being implemented by the PSCP have been agreed with the relevant NHS Highland stakeholders, including IPC colleagues.

Whilst the PSCP noted that they are implementing toolbox talks with respect to IPC, there was no evidence provided to demonstrate that these have been agreed with NHS Highland. NHS Scotland Assure note that NHS Highland made a request for further HAI-SCRIBE training by NHS Scotland Assure, which was subsequently provided – this however took place in summer 2022 with construction activities well progressed by that point.

Documents referenced are:

NTC-H - Contractors Report 11.05.2022.

20220629 NTC-HL HAI-SCRIBE Training 22 Jun22 confirmation.

Stage 3 Construction HAISCRIBE 180121.

Workbook Ref No.	Areas to probe	Evidence expected
7.4	How does the Health Board assure itself that equipment meets the required IPC standards?	The IPC Team are involved, and IPC advice followed in all procurement decisions for new equipment prior to purchase. IPCT are satisfied that all equipment purchased can be decontaminated safely in line with National Guidance and manufacturer's instructions.
<p>NHS Scotland Assure Observations: No specific methodology or evidence been demonstrated with reference to IPC input into the procurement process of equipment.</p> <p>Documents referenced are: HAI Scribe & Layout Meeting.</p> <p>IC&P Team.</p> <p>National Infection Prevention and Control Manual_ Home.</p> <p>National Infection Prevention and Control Manual_ Winter (21_22), Respiratory Infections in Health and Care Settings Infection Prevention and Co.</p> <p>NTC-H - Contractors Report 06.04.2022 (1).</p> <p>ECC RIBA Stage 4 NESH Design Review Process.</p> <p>ECC NESH RIBA Stage 4 Design Review Team.</p>		

3.7.2 Infection Prevention & Control Built Environment: Further Observations

No further observations were recorded.

4. Appendices

Appendix 1: Glossary

Please refer to NHS Scotland Assure – Assurance Service Master Glossary document available to download from [NHS National Services Scotland website](#)

