

**NHS Tayside
National Treatment Centre
Key Stage Assurance Review**

**OBC KSAR Report
V1.1**

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Document Overview

NHS Tayside National Treatment Centre Key Stage Assurance Review Report | OBC Stage

Prepared for:

NHS Tayside and Scottish Government

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Document Control Sheet

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Approvals

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Version	Date	Name & Organisation	Role	Signature
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1. Executive Summary

As a result of the Outline Business Case (OBC) Key Stage Assurance Review (KSAR) and based on the information presented NHS Scotland Assure (NHS SA) are unable to support the project progressing to Full Business Case (FBC) stage at this time.

Whilst there were a number of positive elements identified within the review, there were a significant number of findings where the health board did not provide assurance for. The key points raised are summarised below, however there are additional observations recorded within this KSAR report that we recommend are considered by NHS Tayside as part of their action plan going forward. A failure to address these timeously could impact on the feasibility of currently proposed design strategies.

- No evidence was provided with respect to consideration of forthcoming changes to the (*Building Standards Technical Handbook 2022: Non-Domestic Buildings* effective 1 February 2023), was demonstrated at time of KSAR review. The forthcoming changes to the Building Regulations, limit the flow and return temperatures of a buildings heating system and no assurance was provided that the feasibility of the proposed strategies will not be adversely affected as a result.
- NHS SA also note that there are inconsistencies across several supporting strategic documents.
- A lack of evidence to support the management, mitigation, and elimination of Healthcare Associated Infections (HAI) risks including drainage pipework for other areas routed above theatres and plant access, and maintenance strategies within clinical areas.
- NHS Tayside noted during the KSAR that several design packages had been superseded during the review. It is understood that a project will not remain static during a KSAR, however the extent of changes intimated by NHS Tayside during the KSAR has led to NHS SA raising concerns around the governance of the project, including how the health board are capturing key milestone design signoffs/approvals from their key stakeholders.
- Risks associated with co-ordination of key services, including theatre ventilation ductwork and main corridor ceiling voids. At the time of the KSAR there were unresolved clashes with no supporting evidence as to how these would be addressed prior to construction. NHS Tayside were therefore unable to provide assurance that key services would be able to be fully co-ordinated during subsequent design stages and provide safe access for maintenance activities.
- Lack of supporting evidence in relation to screenless UCV (Ultraclean ventilation) canopy providing assurance that compliance with SHTM 03-01 can be demonstrated with respect to configuration & co-ordination of the ductwork and the spatial configuration within the theatre suite service ceiling void.
- Lack of supporting calculations/information to support feasibility of strategies to connect to existing oxygen and water infrastructure on the site. These are key strategic decisions that have yet to be proven as feasible.

- The KSAR has identified several potential non-compliances with key guidance and regulations including but not limited to SHTM 03-01, SHTM 06-01, BS7671 and BS5819.
- The KSAR has identified several single points of failure within the electrical infrastructure, with no supporting risk assessments.
- Whilst a project derogations process has been identified, there is a lack of supporting evidence to demonstrate that this has been fully implemented on the project. The derogations schedule provided by NHS Tayside lacked detail and evidence of sign-off by stakeholders to provide assurance.
- There is no evidence of clinical/service lead input to or review/approval of the environmental matrix or a review against Activity Data Base (ADB) room data sheets.
- The net-zero strategy remain unresolved, including verification of operational energy targets and validation of key strategic elements that may have a consequential impact on the efficiency of other systems such as heating. Consequently, there is no assurance this risk is mitigated against impact on the mechanical and electrical equipment selected and potentially the building fabric and envelope(s).
- The project includes enabling works and demolitions and whilst NHS Tayside have indicated a HAI-SCRIBE will be undertaken for these works, there is a lack of assurance that this assessment has been globally assessed. NHS SA have concerns that this appears to be being undertaken in isolation from the main project works.
- It is not clear from the information provided how the proposed sprinkler power supply arrangement will provide compliance with the relevant British Standard(s).
- NHS Tayside did not provide assurance evidencing how they will ensure they have an appropriate number of competent/qualified staff to carry out specific duties once the facility is operational e.g., appropriate number of Authorised Persons or Competent Persons, etc.

NHS SA would like to note that NHS Tayside acted in a collaborative manner throughout the KSAR process and would like to thank the health board's team for their cooperation and commitment to the review process.

1.1 Summary of Findings

The findings of this report have been collated based on information provided by NHS Tayside. 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 Tayside under separate cover:

Review	No. of Issues per category				
	1	2	3	4	5
Project Governance and General Arrangements	0	3	10	13	4
Water and Internal Plumbing / Drainage Systems	0	4	11	20	5
Ventilation	0	14	23	30	2
Electrical	0	5	11	21	2
Medical Gases	0	3	8	8	0
Fire	0	0	0	11	0
Infection Prevention and Control Built Environment	0	1	5	1	3

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.

1.2 Project Overview

The National Treatment Centre Tayside (NTC-T) plans are to build additional theatres, procedure room, peri-operative rooms and dedicated short stay ward capacity and will be build adjacent to the existing main theatres, providing a single front door for all planned surgical activity on the PRI site.

The new build plans provide direct access from the centre to the rest of the hospital as some patients will require to use existing surgical wards when they require a say of longer than 24 hours. The overall project aim is to provide additional capacity as part of the National Treatment Centre Programme. The clinical model at PRI will enable a central location for planned surgical activity.

The scope of works includes:

- Relocation of services affected by the build solution and improved clinical locations.
- Main works comprise the construction of a new two-story extension of clinician accommodation, with plant above, providing accommodation for patient arrival, reception, peri-operative rooms (34), 5 additional theatres, 2 procedure rooms, Post Anaesthetic Care Unit, a 24-bed short say ward and staff and support facilities.

2. Review Methodology

2.1 Overview of NHS Scotland Assure and 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.

NHS Scotland Assure (NHS SA), 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. The letter outlined the purpose of NHS SA, 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 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 SA 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 SA to undertake reviews on other healthcare-built environment projects. This does not change accountability for the projects. The NHS health board remain accountable for their delivery. NHS SA will be accountable for the services it provides that support delivery of the projects.

NHS SA 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 boards' 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 Outline Business Case (OBC) 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 design. It looks to provide assurance that the project can proceed to the Full Business Case (FBC).

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 reflects 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

The OBC KSAR for NHS Tayside National Treatment Centre (NTC) took place between 3 October 2022 and 13 January 2023.

2.2.1 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 OBC KSAR Workbook and OBC Deliverables list.

The KSAR report includes an overview of the main findings of the review, with a further itemised list of detailed observations provided under separate cover to the health board. 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 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

A high-level summary of NHS Tayside's OBC technical proposals for the facility is noted below:

Electrical

- The incoming electrical infrastructure in respect to Utility supplies, mains power and generator backup is being provided as part of a separate infrastructure works project. The final details of the supply arrangements and generator back-up strategy are still in the final stages of design.
- NHS Tayside have advised that the infrastructure will comprise a dual unified HV network with A+B strings and LV generators provided on a N+N basis with full back up provided to A+B strings. It is intended to take an A & B supply from the new A & B LV switchboards into separate A & B LV switch rooms within the new NTC building. A & B supplies will be fed out to supply A & B string distribution boards located throughout the building to provide resilience in the event of a mains or sub-mains failure. UPS back up will be provided to critical areas of the hospital and UPS/Medical IT will be provided to Category 5 areas in accordance with SHTM 06-01.
- LED general lighting as well as emergency lighting will be provided throughout the facility.
- A nurse call system will be provided throughout.
- Security systems will be provided which include CCTV and access control.
- A structured cabling system is to be provided throughout the new facility.
- A lightning protection system is to be installed.
- A Category L1 Fire Detection and Alarm system is to be utilised within the facility.

Mechanical

- The new facility is primarily mechanically ventilated. Mechanical ventilation plant such as Air Handling Units (AHUs) and fans are located within a dedicated ventilation plantroom located at roof level. There is one zone area that is naturally ventilated, incorporating the reception and office/support accommodation.
- The incoming mains water supply is derived from the existing Scottish Water network infrastructure. The water supply company (Scottish Water) have previously carried out one full study and have requested a further network analysis feasibility study is undertaken, the findings of which are still awaited at this stage.
- The cold-water services system consists of a bulk raw cold-water storage tank, filtered bulk water tank and filtration plant, and associated packaged booster sets. The bulk raw water tank, associated ancillary plant including filters, are located on Level 01. The filtered water tank and associated ancillary plant are located at roof level.

Mechanical (continued)

- The proposed domestic cold-water system is a recirculating system which is proposed to be cooled via an air-cooled chiller and plate heat exchanger arrangement.
- Hot water is generated from calorifiers located within the Level 03 plantroom and serves the outlets within the building. The primary side low temperature hot water is generated via CO₂ Air Source Heat Pumps (ASHPs).
- Above ground drainage (foul) is provided throughout the facility via a gravity system consisting of several primary, ventilated stacks distributed around the building connecting to the new below ground drainage network serving the facility. Stacks will be ventilated to atmosphere.
- The current proposal is for the low temperature hot water (LTHW) for heating to be generated by ASHP's located externally on the Level 02 roof and Water Source Heat pumps (WSHP's) located internally within a dedicated plantroom on Level 02 including associated ancillary plant such as circulating pumps and buffer storage vessels. Gas fired boilers are provided for resilience purposes.
- Cooling is provided via air-cooled chillers (and associated plant such as circulating pumps) located at roof level. The air-cooled chillers generate chilled water (CHW) to serve ventilation plant (AHU cooling coils) for maintaining environmental conditions, where required, in clinical areas such as the operating theatres and enhanced treatment rooms.
- Refrigerant based direct expansion (DX) split systems will provide cooling to comms rooms.
- Medical gas systems include oxygen, medical air, and medical vacuum. The oxygen generation is via connection to the existing vacuum insulated evaporators (VIE) plant serving the PRI site. The medical gas bottle storage facility are newly formed/repurposed plantrooms within Level 03 of the existing building. An anaesthetic gas scavenging system (AGSS) is also provided to serve the new facility with the plant located within the Level 03 roof plantroom of the new facility.
- A building management system (BMS) including all necessary controls and cabling will be provided within the building. The BMS will integrate and interface with all Mechanical, Electrical and Public Health (MEP) systems and other Clinical support systems.

Fire Safety

- The building is proposed to be designed to comply with current NHS Scotland Fire Code and Non-Domestic Technical Handbook guidance. No derogations from this basis of design fire safety guidance are currently highlighted in the fire strategy report.
- Elements of structure are proposed to be designed to achieve 60-mins (Medium duration) loadbearing fire resistance.

Fire Safety (continued)

- Compartmentation will also be provided to specific areas, including fire hazard rooms, places of special fire risk, theatres, and in-patient sleeping accommodation. Construction forming compartmentation is proposed to achieve 60-mins (Medium duration) fire resistance in terms of integrity and insulation. Construction forming sub-compartmentation and fire hazard rooms is proposed to achieve 30-mins (Short duration) fire resistance in terms of integrity and insulation.
- An automatic fire sprinkler system is proposed to be installed to protect the new extension.
- The means of escape strategy is proposed to be based upon Progressive Horizontal Evacuation which is to be facilitated by passive fire containment measures and staff intervention throughout in patient areas. Evacuation lifts are proposed to assist with any vertical evacuation of patients if necessitated.
- Firefighting access and facilities are proposed, including fire tender vehicle external access routes and set down points, new fire hydrants and ventilated firefighting stairs.

3. KSAR Review Summary

The following narrative relates directly to the OBC 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	Evaluation of changes detailed from previous KSAR.	Assessment of any substantive changes in highlighted areas from previous review stage and all actions have been implemented.
<p>NHS Scotland Assure Observations: N/A – this is the first KSAR undertaken on the project.</p> <p>Documents referenced are: N/A</p>		

Workbook Ref No.	Areas to probe	Evidence expected
1.2	Verification that CIG recommendations have been implemented with respect to prescribed in scope areas.	Review of the implementation of all CIG recommendations. Evaluation of any deviation from previous submissions or reviews.
<p>NHS Scotland Assure Observations: NHS Tayside have advised that CIG approved the Initial Agreement and that they intend to submit the OBC to CIG following conclusion of the KSAR process.</p> <p>NHS Tayside have not provided evidence of any recommendations made by CIG in approving the IA and granting approval to proceed to OBC. It has therefore not been possible for NHS Tayside to provide assurance that any CIG recommendations have been implemented.</p> <p>NHSSA acknowledge receipt of IA letter on the 9th of November 2022 however this was provided by NHS Tayside after the agreed KSAR information submission cut-off date of 19th October 2022. This will therefore be considered as part of the OBC action plan closeout.</p>		

Documents referenced are:

130922 NHS Assure Workbook submissn v1.0

Workbook Ref No.	Areas to probe	Evidence expected
1.3	Has cross-referencing with NDAP and AEDET recommendations been implemented?	An assessment if there is full compliance with the applicable recommendations and actions from the preceding step.

NHS Scotland Assure Observations:

At the time of the KSAR, the NHS Scotland Design Assessment Process (NDAP) was ongoing with several key points yet to be addressed. Some of these may have a consequential impact on the strategies relevant to the KSAR topics. This remains an open risk that could have a consequential impact on developed strategies such as the building form, fire strategy and sustainability strategies. NHS SA recommend that as the NDAP is progressed, NHS Tayside look to update their developed KSAR action plans to take cognisance of any interdependencies.

NHS Tayside undertook the OBC stage AEDET at a workshop held on 19 April 2021.

Documents referenced are:

21.06.30 NTC-T Design Statement OBC V1

22.11.16 NDAP Interim Report Comments Sheet V4

20210913 TS06 Tayside Treatment Centre OBC NDAP v0.1

22.11.15 NTC-T AEDET Review KSAR OBC Stage V1

Workbook Ref No.	Areas to probe	Evidence expected
1.4	Does the health board continue to demonstrate service / clinical input into design decisions based	Recorded and updated input taken from service lead(s) / clinician(s) about relevant patient cohort characteristics and their typical needs in terms of the

	on a current and comprehensive knowledge of patient cohorts?	accommodation's environment, safety and infection control standards. Demonstrable expertise of service lead(s) / clinician(s) in providing this advice.
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NHS Scotland Assure Observations:

Whilst NHS Tayside have provided evidence of engagement with their service and clinical stakeholders, the evidence provided does not provide assurance of consistent stakeholder input or that recorded approvals are in place for key elements of the OBC design.

An environmental matrix has been provided for the project however there is no record of any clinical input into this through workshops or meeting minutes, nor any evidence of this has been reviewed against the relevant Activity Database (ADB). This was queried within the weekly progress meetings where NHS Tayside advised that it is too early a stage in the project to review the environment matrix with clinicians. To avoid potential issues with stakeholders later in the process, this document should not be created in isolation by the designers and given the potential implication on already developed strategies, the current approach may represent a risk should strategies need to be amended, particularly with respect to ventilation.

A project execution plan (PEP) has been provided *NHS Tayside - NTC-T- Project Execution Plan 030621 - Rev 3 (1)* which does document some of the key parties on the project however this does not include key / wider stakeholders with regards to clinical / service leads. There is also no information in this document on stakeholder management / mapping being carried out.

The document also refers to "Business Collaborator" being the main tool for drawing reviews and sign off however, within the evidence submitted there is nothing to demonstrate this process working in practice, nor how clinical and service leads approvals will access this platform.

NHS Tayside provided evidence of clinical and IPC input into various IPC and design workshops, including theatre design workshops. The meetings noted were project specific workshops including dialogue with stakeholders that were titled water safety group and ventilation safety group workshops.

There is a room by room equipping list provided for the project, however it was noted during the weekly KSAR meetings by NHS Tayside that this document was produced at a national level and is not yet specific to the NTC project. There was no evidence provided as to how this will be refined to reflect project specific requirements or if this had been reviewed by service and/or clinical leads (inclusive of IPC) at this stage.

NHS Tayside provided evidence that an IPC lead is in place and that they have experience of previous construction projects and they are supported by the infection prevention and control manager and the infection control doctor. However, no

evidence was provided regarding the IPC team qualifications which would support the project. No evidence was provided regarding any construction projects the IPC resource have supported previously. Evidence provided only stated they have extensive built environment experience. The health board have confirmed during the KSAR meetings that the IPC resource is sufficient to the project delivery, however no project specific resource plan was provided as this information is held on Estates project management system.

Documents referenced are:

NTCT Room by room list 2022 09 15

RE_ Essential NTC-T KSAR Review and Evidence Workshops - Medical Gases Management Group Workshop 1.1

RE_ Essential NTC-T KSAR Review and Evidence Workshops - Medical Gases Management Group Workshop 1.2

Re_ Essential NTC-T KSAR Review and Evidence Workshops - Security Systems Working Group Workshop 1

RE_ NTC-T KSAR Review and Evidence Workshops - Fire Safety Workshop 1.1

Re_ NTC-T KSAR Review and Evidence Workshops - Fire Safety Workshop 1.2

RE_ NTC-T KSAR Review and Evidence Workshops - Fire Safety Workshop 1.3

TECC-Environmental Matrix EDP

NTC – NHS Assure Workbook Submission – Clarification info - Technical Documents received 29/09/22

NTC – T Designs Statement – 30/06/21 – 1.03 – Folder 1 Governance

Medical equipment group definitions - 1.04 – Folder 1 Governance

NHS Tayside Care Centre Options Appraisal - 1.05 – Folder 1 Governance

NHS Tayside TECC workshops X3 – Plan – Benefit criteria – Option scoring - 1.05 – Folder 1 Governance

TECC – Clinical services output models X 17 – (Breast – Dermatology – ENT – Gen Surgery - Gyn - In-pt X2 – Labs – Neuro – OMFS – Ophthalmology – Ortho – Peri-op – Plastic surgery – Pre-Assess – Urology) - 1.05 – Folder 1 Governance

NTC – T – Structure – Deliverables - Folder 7

TECC HAISCRIBE Stage 1 – 14/05/21 - Signed - 7.01 – Folder 7 IPC

NHS Tayside IPC OBC meeting 18/08/22, 06/09/22 – 7.04 – Folder 7 IPC

Workbook Ref No.	Areas to probe	Evidence expected
1.5	Project team continues to demonstrate a unified and recorded understanding of needs of main users and patient cohorts of the proposed accommodation and how this has influenced the design of critical building, engineering and infection prevention and control	<p>Updated and current list available of all stakeholders, service users and patient cohorts impacted by this project, plus the identification of any high-risk groups and their specialist needs.</p> <p>Updated and recorded engagement on these designs issues having taken place between the project team and service lead(s) / clinician(s), infection prevention and control team, and other key</p>

	quality and safety standards.	<p>stakeholders (e.g. Estates, Medical Physics, IPC, the AEDET, NDAP or other design briefing workshops).</p> <p>Details available of how service users / patient cohort needs, and their expected use of the accommodation are influencing the design brief, including critical building, engineering and infection prevention and control quality and safety standards.</p>
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NHS Scotland Assure Observations:

Whilst NHS Tayside have provided evidence of how they have captured the needs of the users and patient cohorts, the evidence submitted does not provide assurance of consistent stakeholder input to the process, including approval of the OBC design, particularly in respect to the creation of the environmental matrix as outlined in KSAR Workbook question 1.4.

Clinical Output Specifications (COS) have been provided which clearly identify the current service models of each department, what they are doing well and where improvements are necessary. Service leads, clinicians, and users in the form of senior staff have contributed to the documentation.

An options appraisal document has been provided and carried out by a 3rd party healthcare planner which assesses the OBC proposals against the following:

- Option development (longlist to shortlist):
- Development of non-financial benefit criteria; and
- Scoring of options against the non-financial criteria

Evidence of clinicians and service leads attending a number of workshops to review the options that were presented and inputted into the scoring to achieve the shortlisted options was provided by NHS Tayside.

Meeting minutes have been provided for electrical, fire, heating, medical gasses, security, ventilation, water and IPCT workshops. It is not clear however from the attendee lists on these meetings, what the roles and responsibilities are for each individual. An organisation chart for NHS Tayside has been provided and a structure for the NTC Tayside project, however again this does not define the roles and responsibilities of key stakeholders on the project. An IPC committee governance structure has also been provided however the information is not project specific to NTC Tayside.

The identification of any high-risk patient groups was queried with NHS Tayside during the weekly progress meetings where it was advised that due to the nature of the facility (24-hour day surgery) there would be no high-risk patient groups as per SHPN 30 such as immunocompromised or immunosuppressed patients in the building.

Documents referenced are:

TECC-SOA-V6.0-PLUS DESIGN AREA-210830

Clinical Outline Specifications

NTC – T Designs Statement – 30/06/21 – 1.03 – Folder 1 Governance

NHS Tayside Care Centre Options Appraisal - 1.05 – Folder 1 Governance

NHS Tayside TECC workshops X3 – Plan – Benefit criteria – Option scoring - 1.05 – Folder 1 Governance

TECC – Clinical services output models X 17 – (Breast – Dermatology – ENT – Gen Surgery - Gyn - In-pt X2 – Labs – Neuro – OMFS – Ophthalmology – Ortho – Peri-op – Plastic surgery – Pre-Assess – Urology) - 1.05 – Folder 1 Governance

NTC Organisational Chart – Deliverables – Folder 7

NTC – T – Structure – Deliverables - Folder 7

TECC HAISCRIBE Stage 1 – 14/05/21 - Signed - 7.01 – Folder 7 IPC

NHS Tayside IPC OBC meeting 18/08/22, 06/09/22 – 7.04 – Folder 7 IPC

HAISCRIBE Stage 1 – 18/08/22 – Folder 26

Workbook Ref No.	Areas to probe	Evidence expected
1.6	Planned approach towards determining the necessary standards for this accommodation.	<p>Updated and current list of the relevant NHS and non-NHS guidance that is being used and adopted (see previous section of workbook OBC KSAR (Page 9) for examples of appropriate guidance).</p> <p>Updated and current list of all proposed derogations from NHS guidance with a detailed technical narrative on each derogation and/or list of known gaps in guidance that will need to be resolved in order to meet the needs of the patient / user cohort.</p> <p>Knowledge of the role of infection prevention and control and microbiologist advisors to be used throughout the design stages, and details of the resource plan in place to ensure this advice will be available.</p>

NHS Scotland Assure Observations:

NHS Tayside have demonstrated that a process for managing derogations is in place for projects undertaken by NHS Tayside. NHS Tayside could not provide assurance that this process is being applied to the NTC project.

A derogation schedule has been provided which does schedule the guidance which is considered applicable to the project and whether the project design complies with the guidance. The status of this schedule is not clear including who produced it, who was consulted and whether it has been approved in accordance with the governance process.

There is limited content within the schedule and very few derogations highlighted. As noted within later sections of this report, the KSAR has highlighted a number of potential non-compliances within the design that have not been captured by NHS Tayside within the derogation schedule.

Several technical standards listed within the document have been superseded and are not reflective of the current version of guidance/regulations.

The derogation process details various forms to be completed as part of the process to have derogations or non-conformances approved. No evidence has been provided of any derogations or non-conformances having gone through the established NHS Tayside process.

The PEP provided by NHS Tayside does not describe the derogation process for the project. Therefore, there is a lack of clarity about who is the 'Project Lead' in the

context of the derogation process set out in the documentation provided by NHS Tayside for this KSAR.

The risk register provided highlights risks associated with compliance with applicable standards with the mitigation being to develop a derogation schedule and have it approved by the Project Board. There is no evidence of such approval nor of how NHS Tayside are managing the potential of derogations not being approved that may have a consequential impact on other developed strategies.

With respect to IPC resource, NHS Tayside have confirmed they have resource in place for the project and provided a risk assessment to support this statement, including confirmation that microbiology support was in place for the project. Resource is being managed through the Estates Management system; however, this was not accessible to the KSAR team to review.

Documents referenced are:

2022-09-07 Org Chart for OBC – Updated 7 September 2022

22.09.12 NTC-T Structure

TECC-RDA-SH.00-XX-XX-A-001_SK_P02_Derogation Schedule

NHS Tayside Derogation SOP V1.0 Approved and associated Appendices 1 to 5 inclusive

NHS Tayside-NTC-T-Project Execution Plan 030621 – Rev 3

2022-09-15 NTC-T Risk Register v0.45 frozen for OBC costing

NTC – NHS Assure Workbook Submission – Clarification info - Technical Documents received 29/09/22

NTC Organisational Chart – Deliverables – Folder 7

NTC – T – Structure – Deliverables - Folder 7

IPC Workplan 22/23 - Deliverables – Folder 7

IPC Governance Structure & TOR – Deliverables - 7.01 – Folder 7 IPC

TECC HAISCRIBE Stage 1 – 14/05/21 - Signed - 7.01 – Folder 7 IPC

Derogations Schedule – Folder 27

Workbook Ref No.	Areas to probe	Evidence expected
1.7	<p>How does the health board demonstrate that there is an effective infection prevention and control management structure in place and how does it relate to the development of the project?</p> <p>How does the health board demonstrate leadership and commitment to infection</p>	<p>Evidence IPC and clinical teams have been integrated into all decisions regarding any derogations through the design process and are satisfied this will not impact on patient safety such as, specific sign off, supporting meeting minutes, risk assessments, risk registers relating to IPC with evidence of escalation through the agreed NHS board governance process.</p>

	prevention and control to ensure a culture of continuous quality improvement throughout the organisation and that there is an effective IPC structure in place and how does it relate to the design development?	
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NHS Scotland Assure Observations:

NHS Tayside has provided evidence as to the IPC structure within NHS Tayside and an IPC workplan that does reference healthcare-built environment projects. It does not however specifically reference the NTC project. Detail of IPC resource allocation for projects is noted in the Estates management system which has not been evidenced but it is referenced within the NHS Tayside's KSAR workbook submission document. NHS Tayside have provided evidence regarding the IPC management structure and IPC governance within the board which shows the commitment of IPC to the project and to the board.

The IPC lead for this project has been involved with all HAI SCRIBE meetings and minutes are provided to reflect this and shows IPC engagement within project. The derogation document lists derogations identified through the HAI-SCRIBE process, but no detail has been provided regarding risk assessments or mitigations agreed. No sign off is evident.

Documents referenced are:

NTC – NHS Assure Workbook Submission – Clarification info - Technical Documents received 29/09/22

NTC Organisational Chart – Deliverables – Folder 7

NTC – T – Structure – Deliverables - Folder 7

IPC Workplan 22/23 - Deliverables – Folder 7

IPC Governance Structure & TOR – Deliverables - 7.01 – Folder 7 IPC

TECC HAISCRIBE Stage 1 – 14/05/21 - Signed - 7.01 – Folder 7 IPC

NHS Tayside IPC OBC meeting 18/08/22, 06/09/22 – 7.04 – Folder 7 IPC

Derogations Schedule – Folder 27

Workbook Ref No.	Areas to probe	Evidence expected
1.8	Integration with Authority Policies and Operation How does the Board demonstrate implementation of evidence based infection prevention and control measures?	The health 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. (Ask staff). IPC are fully embedded in the project team and the OBC programme-taking

		cognisance of any actual or perceived risks identified provided.
<p>NHS Scotland Assure Observations:</p> <p>Infection Prevention workplan and governance structures provided show the commitment of the IPC team to embedding the NIPCM into the project and the wider board. This was also evidenced within the NHS Assure workbook submission document. It is clear from the documents provided that IPC are embedded in the project design, HAI-SCRIBE and risk assessment process. Where HAI risks are identified the derogations, process will include IPC. The IPC lead is also involved with the board water safety group and the new board ventilation safety group. This ensures NTC project HAI risks are managed and escalated where appropriate with IPC support.</p> <p>Documents referenced are:</p> <p><i>NTC – NHS Assure Workbook Submission – Clarification info - Technical Documents received 29/09/22</i></p> <p><i>NTC-T Risk Register v0.45 frozen for OBC costing - Clarification info - Technical Documents received 29/09/22</i></p> <p><i>NTC Organisational Chart – Deliverables – Folder 7</i></p> <p><i>NTC – T – Structure – Deliverables - Folder 7</i></p> <p><i>IPC Workplan 22/23 - Deliverables – Folder 7</i></p> <p><i>IPC Governance Structure & TOR – Deliverables - 7.01 – Folder 7 IPC</i></p> <p><i>TECC HAISCRIBE Stage 1 – 14/05/21 - Signed - 7.01 – Folder 7 IPC</i></p> <p><i>NHS Tayside IPC OBC meeting 18/08/22, 06/09/22 – 7.04 – Folder 7 IPC</i></p> <p><i>HAISCRIBE Stage 1 – 18/08/22 – Folder 26</i></p> <p><i>Derogations Schedule – Folder 27</i></p>		

Workbook Ref No.	Areas to probe	Evidence expected
1.9	The health boards Infection Prevention and Control Strategy.	Assessment of the health boards approach to all IPC related matters in relation to the development of the design, HAISCRIBE etc. IPCT annual programme of work.

NHS Scotland Assure Observations:

NHS Tayside have provided evidence of engagement with their Infection Prevention and Control team through the development of the OBC. The KSAR has however identified a number of potential gaps within the defined governance processes and a lack of documented evidence to demonstrate its implementation. NHS Tayside has not provided evidence regarding how HAI risks are being documented and managed/mitigated, particularly with respect to the drainage design above theatres and co-ordination of the UCV theatre ventilation.

A Stage 1 HAI-SCRIBE is in place and was last reviewed in March 2021. There is no evidence of a Stage 2 HAI-SCRIBE having commenced in accordance with SHFN 30 Part B which recommends this commence during the “Design and Planning” stage of a project.

As noted in KSAR Workbook Question 1.7, NHS Tayside noted that they have no concerns over IPC resource, but specific evidence and assurance related to how this has been assessed was not provided as part of their KSAR response.

Documents referenced are:

NTC – NHS Assure Workbook Submission – Clarification info - Technical Documents received 29/09/22

NTC Organisational Chart – Deliverables – Folder 7

NTC – T – Structure – Deliverables - Folder 7

IPC Workplan 22/23 - Deliverables – Folder 7

IPC Governance Structure & TOR – Deliverables - 7.01 – Folder 7 IPC

TECC HAISCRIBE Stage 1 – 14/05/21 - Signed - 7.01 – Folder 7 IPC

HAISCRIBE Stage 1 – 18/08/22 – Folder 26

Workbook Ref No.	Areas to probe	Evidence expected
1.10	The health boards Monitoring and Records.	Evidence that the health board integrating this project with wider IPC requirements within the context of the OBC. For example, evidence that the proposals for equipping incorporate IPC requirements?

NHS Scotland Assure Observations:

NHS Tayside have noted that the full process for IPC input into the equipping process is still to be developed. Refer to KSAR Workbook questions 1.4 and 1.10 for further information regarding the equipping process and IPC input.

Documents referenced are:

Medical equipment group definitions - 1.04 – Folder 1 Governance

NTCT Room by Room list - 1.04 – Folder 1 Governance

TECC HAISCRIBE Stage 1 – 14/05/21 - Signed - 7.01 – Folder 7 IPC

Prog NTC – Tayside Outline Test & Commission as Rev-12 As Opt-A - 7.04 – Folder 7 IPC

HAISCRIBE Stage 1 – 18/08/22 – Folder 26

Workbook Ref No.	Areas to probe	Evidence expected
1.11	Planned approach for managing the design process to ensure successful compliance with agreed and approved standards.	<p>The project governance arrangements and resource plan in place to ensure that the necessary decision-making authority and technical expertise is available to take responsibility for and deliver the project as planned and agreed.</p> <p>Details of how gaps in expertise are being filled.</p> <p>Details of how compliance with the appropriate guidance, design brief and other standards are being agreed, signed off, monitored, reported against and if necessary escalated / adjudicated throughout the design, construction and commissioning stages.</p> <p>Details of how all stakeholders' interests are being agreed, signed off, monitored, reported against and if necessary escalated / adjudicated throughout the design, construction and commissioning stages.</p>

NHS Scotland Assure Observations:

NHS Tayside have provided several documents to outline their approach to project governance, in some instances these documents are contradictory or lacking supporting details.

A Project Execution Plan (PEP) has been provided which sets out information on the governance of the project. An NHS Project Board, NHS Project Team and Project Core Group are identified, however the parties included in these groups are not described. The governance structure in the PEP also identifies several 'delivery groups'. There is limited information provided on the individuals involved in these sub-groups, no information on the terms of reference (TOR) for these groups and no evidence on the operation of these groups/stakeholders in practice including how they are involved in the design development process, decision making and approval of design.

It is also noted NHS Tayside have provided separate organisation charts in response to KSAR Workbook Q1.6 that indicates a different governance structure to that in the PEP. These charts refer to 'key workstreams' and identify workstream leads. The workstreams are different to the delivery groups in the PEP and hence there is a lack of clarity on the overall governance structure in place and how it operates including interface with stakeholders.

The PEP refers to a Project Brief being developed however NHS Tayside have not provided a copy of this document, nor information on its status in terms of approval. It is noted that a series of clinical output specifications have also been provided as part of the evidence for KSAR question 1.5.

The PEP references a 'design acceptance schedule' (item 5.3.5) but NHS Tayside have not provided this as part of the evidence for review. Section 5.3.7 of the PEP notes that a design review process including for stakeholders via a 'Business Collaborator' tool is to be used. NHS Tayside have not provided any evidence to demonstrate this in operation including how stakeholders have been engaged in the design review and approval process for the OBC. The PEP describes a change control process, but NHS Tayside have not provided any evidence of this operating in practice.

NHS Tayside have advised that the Principal Supply Chain Partner (PSCP) has been appointed to manage the design development process through 'Design Team' meetings.

A design responsibility matrix (DRM) has been provided for the design team which generally indicates appropriate roles are included in the design team. NHS Tayside have not provided a resource schedule for the design team and no detailed scope of services beyond that outlined in the DRM. Focus of the DRM is on the current design stage and no evidence has been provided to describe the client-side team once the design team are novated to the PSCP.

The PEP describes a high-level approach to risk management on the project although there is a lack of clarity in the PEP on how this operates in practice on the project including in relation to frequency of risk meetings, attendees and governance process to review and approve status. A risk register has been provided which demonstrates that regular risk workshops have been held including attendees at these meetings.

Documents referenced are:

NTC-T Design Responsibility Matrix OBC-RevB_09-09-22
PSCP's Proposal for Stage 2 (OBC)
Works Information Appendices
NHS Tayside-NTC-T-Project Execution Plan 030621 – Rev 3
130922 NHS Assure Workbook submission v1.0
22.09.12 NTC-T structure
22.09.12 NTC-T Org Chart Sept 2022
2022-09-07 Org Chart for OBC – Update 7 September 2022.
2022-09-15 NTC-T Risk Register v0.45 frozen for OBC costing

Workbook Ref No.	Areas to probe	Evidence expected
1.12	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 Infection Prevention and Control are involved with the conceptual procurement approach to the design stage and future plans for project.</p> <p>Plans to identify any gaps in the procurement approach that may require to be addressed.</p> <p>Evidence on how the Infection Control procedures and management will fit with the conceptual procurement approach and initial thinking on how it will be managed.</p> <p>Evidence of a detailed procurement strategy report.</p> <p>Evidence that the health boards selected procurement route has gone through the health board's Governance channels.</p>

NHS Scotland Assure Observations:

NHS Tayside provided various documents to evidence the Procurement processes they have undertaken in appointing the Principal Supply Chain Partner (PSCP), Mechanical Engineering and Plumbing (MEP) Sub-contractor, and the Civil and Structural Engineers for the project. However, NHS Tayside have not provided any specific evidence provided to show how IPC have been involved with the conceptual procurement approach to the design stage and future plans for the project.

The PSCP was procured through Frameworks Scotland 2, the documents provided included the High-Level Information Pack, the Contract Agreement signed by NHS Tayside and the PSCP.

The procurement of the MEP Sub-contractor was a joint exercise between NHS Tayside and the PSCP (led by the PSCP), the evidence provided includes detailed scoring carried, which identified a successful Subcontractor.

NHS Tayside confirmed at the progress meeting 30 November 2022 that the Architect and MEP Designers were appointed via the NHS Tayside multi-disciplinary framework. The PSCP led on the procurement of the Civil and Structural Engineers.

NHS Tayside identified the need for additional resource in support of defining the targets for Net Zero Carbon and to assist in developing the strategy to achieve this. An independent Consulting Engineer was appointed in this respect.

Documents referenced are:*Agreement**NNHS Tayside HLIP V9.0**PSCP's Proposal for Stage 2 (OBC)**BB email attaching MEP Contractor Tender Report_02-08-21**Works Information Appendices**NTC-T MEP Tender Report**Etive S&C Interview Questions_Email_MA_20-08-20**NEC3 Option C Target Contract with Activity Schedule Pages 1-101**NEC3 Option C Target Contract with Activity Schedule Pages 102-196**NHS Tayside - Tender Quality Questionnaire - Etive Consulting Engineers Ltd - submission**NTCT Room by room list 2022 09 15- A room by room list of equipment required.**NHS Tayside - NTC-T- Project Execution Plan 030621 - Rev 3*

Workbook Ref No.	Areas to probe	Evidence expected
1.13	The health boards approach on those areas of design that the procurement route has provided identification as possibly being Contractors Designed Portions (CDP's).	<p>Evidence that the health board integrating this project with wider IPC requirements within the context of the OBC. For example, evidence that the proposals for equipping incorporate IPC requirements?</p> <p>Evidence that the procurement of the lead designer will encompass these areas in their oversight and sign off on the complete design.</p> <p>Evidence that a clear demarcation of design responsibility is being developed.</p>

NHS Scotland Assure Observations:

The evidence provided by NHS Tayside demonstrates they are currently developing a process with respect to CDPs, with further details yet to be determined, including how it flow through subsequent stages of the project. NHS SA recommends that NHS Tayside seeks assurance that all roles and responsibilities surrounding CDP are fully documented and monitored through the life of the project.

A Reviewable Design Data (RDD) schedule and a design responsibility matrix have both been provided which notes the construction packages that are proposed to be contractor design. These documents were queried with NHS Tayside in the weekly KSAR progress meetings where it was noted that the project is at too early a stage for all CDP's to be fully identified.

The RDD schedule is noted as draft. The Design Responsibility Matrix notes 'Performance Specification by M&E Consultant and detailed design by M&E Sub-Contractor' against a number of MEP packages. NHS Tayside should continue to review this to ensure the design develops accordingly through subsequent RIBA

Stages. There was no specific detail provided as to how NHS Tayside will ensure that the IPC governance processes (with respect to engagement through the design process) will extend to CDP packages, including processes for review and approval of the same.

Refer to KSAR Workbook questions 1.4 and 1.10 for further information regarding the equipping process and IPC input.

Documents referenced are:

NTC-T Design Responsibility Matrix OBC- Rev B_09-09-22
NTC-T RDD Schedule - DRAFT 01-10-21
NTC – NHS Assure Workbook Submission – Clarification info - Technical Documents received 29/09/22
NTC – T Designs Statement – 30/06/21 – 1.03 – Folder 1 Governance
Medical equipment group definitions - 1.04 – Folder 1 Governance
NTCT Room by Room list - 1.04 – Folder 1 Governance
NTC-T Design Responsibility Matrix – Rv 09/09/22 - 1.05 – Folder 1 Governance
NTC Organisational Chart – Deliverables – Folder 7
NTC – T – Structure – Deliverables - Folder 7
IPC Workplan 22/23 - Deliverables – Folder 7
IPC Governance Structure & TOR – Deliverables - 7.01 – Folder 7 IPC
TECC HAISCRIBE Stage 1 – 14/05/21 - Signed - 7.01 – Folder 7 IPC
Prog NTC – Tayside Outline Test & Commission as Rev-12 As Opt-A - 7.04 – Folder 7 IPC
HAISCRIBE Stage 1 – 18/08/22 – Folder 26

Workbook Ref No.	Areas to probe	Evidence expected
1.14	Evaluation of the health boards commissioning plan.	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.

NHS Scotland Assure Observations:

NHS Tayside's PSCP has produced a Draft Outline Testing & Commissioning Programme (Prog NTC-Tayside Outline Test & Commission as Rev-12 As Opt-A.pdf) for the project. This details a testing and commissioning period for the Mechanical, Electrical and Plumbing (MEP) systems taking place over a 4 to 5 month period prior to handover. It also identifies direct works/activities to be carried out by NHS Tayside.

NHS Tayside have not evidenced their assessment of internal resources required from Estates, Authorising Engineers, Appointed Persons, or IPC to support the commissioning plan, or what arrangements/process will be undertaken by the PSCP, NEC Supervisors, AEs, APs, and Estates.

NHS Tayside provided their Soft Landings (SL) Strategy and Plan, and their 2022-09-01 NTC-T Soft Landings Actions & Decisions Tracker which indicates several actions remain open. NHS SA recommends that these actions are completed prior to commencing the next stage.

There have been seven meetings of the SL Group, although it is recorded that the PCSP attended only two of these. The PSCP Soft Landings coordinator should attend all SL Group meetings.

NHS Tayside have identified there is no suitable in-house Facilities Management resource available to develop the Facilities Management Plan. NHS Tayside confirmed at the progress meeting 7 December 2022 that the appointment of a Facilities Management External Consultancy has not yet been progressed.

NHS Tayside note in 2022-09-01 NTC-T SL Delivery Plan v1.21 that their Draft Infection Prevention and Control Checklist for New Build/Refurbishment Projects differs in some way from HAI scribe. The differences are not identified, and NHS Tayside should ensure the HAI scribe process is followed and complimented by their checklist.

Documents referenced are:

Prog NTC-Tayside Outline Test & Commission as Rev-12 As Opt-A

2022-09-01 NTC-T SL Delivery Plan v1.21

2022-09-01 Soft Landings Delivery Activities Plan OBC

2022-09-01 NTC-T Soft Landings Actions & Decisions Tracker

20221207 NHS Assure Weekly Review Meeting - Soft Landings Update V0.2

Workbook Ref No.	Areas to probe	Evidence expected
1.15	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:

In their submission '130922 NHS Assure Workbook Submission v1.0' NHS Tayside advise that a Duty Holder Matrix is available for review however it has not been provided as part of the evidence for this KSAR.

A design responsibility matrix (DRM) has been provided for the design team which generally indicates appropriate roles are included in the design team. The version of the design responsibility matrix provided by NHS Tayside contains limited detail on the NHS Tayside team and should be developed to cover all key members of the NHS Tayside senior team, including respective Duty Holders.

The PEP sets out very limited detail on the NHS Tayside team involved in the project at section 4.2, but there is no detail on roles and responsibilities. There is a lack of detail on the NHS Tayside internal team involved in the project (e.g., clinical, IPC, Authorised Engineers/Persons, and other internal advisers as reflected in the governance charts/workstreams), including named individuals and their roles and responsibilities.

NHS Tayside have provided organisation charts in response to KSAR workbook Q1.15. These charts refer to 'key workstreams' and identify workstream leads. This information differs to the governance structure provided in the PEP hence there is a lack of clarity on the overall governance structure in place. NHS SA have found there is a lack of evidence demonstrating the individuals involved in the workstreams identified, no information on the terms of reference (TOR) for these groups and limited evidence on the operation of these groups/stakeholders in practice including how they are involved in the design development process, decision making and approval of design.

NHS Tayside did not provide any evidence to demonstrate how they will ensure they have an appropriate number of competent/qualified staff to carry out specific duties for example a resource plan.

It is noted the design team will be novated to the PSCP at the next stage. No evidence has been provided to demonstrate the governance structure and resource plan for NHS Tayside for this implementation phase.

Given there is limited detail on the personnel involved in the various workstreams, NHS Tayside have not provided assurance to demonstrate how the people involved in the groups have been selected or to demonstrate their expertise/experience to fulfil the role allocated, or to demonstrate their role in decision making/approvals.

Documents referenced are:

130922 NHS Assure Workbook Submission v 1.0

2022-09-07 Org Chart for OBC – Updated September 2022

22.09.12 NTC-T Org Chart Sept 2022

22.09.12 NTC-T Structure

NTC-T Design Responsibility Matrix OBC-Rev B_09-09-22

NTC – NHS Assure Workbook Submission – Clarification info - Technical Documents received 29/09/22

NTC-T Design Responsibility Matrix – Rv 09/09/22 - 1.05 – Folder 1 Governance

NTC Organisational Chart – Deliverables – Folder 7
 NTC – T – Structure – Deliverables - Folder 7
 IPC Workplan 22/23 - Deliverables – Folder 7
 IPC Governance Structure & TOR – Deliverables - 7.01 – Folder 7 IPC

3.1.1 Project Governance and General Arrangements: Further Observations

No additional observations were made with respect to the KSAR workbook questions.

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	Has the health board completed competency checks on the water and drainage consultant designers?	<p>Recorded evidence that the design team are experienced and have a comprehensive knowledge of the relevant design standards.</p> <p>Where anyone does not have a record of extensive health care experience what recorded plans are to be put in place by the Consultant Designers?</p> <p>Recorded evidence that input from the Health Authorising Engineer for Water (AE(W)) has been requested.</p>

NHS Scotland Assure Observations:

NHS Tayside advised that the designer's competencies had been assessed as part of their external design team framework procurement process and provided a verbal overview in relation to the governance undertaken to assess consultant/design team competency, however no documentation was provided to confirm this. Whilst NHS Tayside advised that examples of interview scorebooks could be shared with NHS SA this information was not provided by NHS Tayside as part of their KSAR evidence.

Documents referenced are:

221019 Tayside NTC OBC Gap Analysis KSAR d0.01 Consolidated.xls

Workbook Ref No.	Areas to probe	Evidence expected
2.2	How does the health board ensure that water services are designed in a fashion, which will retain space for minor additions and modifications to services in the future?	<p>Evidence that the engineers are 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 designers have 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 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 being installed and facilitate safe adequate maintenance.</p>

NHS Scotland Assure Observations:

NHS Tayside have provided water services drawings, outline system schematics and water services system reports that outline the proposed water systems strategies at OBC stage. This information is further supplemented by minutes from a water management group stakeholder workshop (*Minutes - Water Management Group NHS Tayside Meeting 01 - 2022-08-25.pdf*). Whilst the information provides details of the proposed water services strategies there are a number of concerns NHS SA have in relation to how the health board has ensured that the water services are designed in a fashion that will retain space for minor additions and modifications to services in future.

There is no evidence provided that confirms how the Building Information Modelling (BIM) and associated main services runs (including ceiling voids, risers etc) within the model have been demonstrated to the health board's Estates/FM team, confirming spare capacities and spatial provision for future flexibility.

There is limited sectional information or riser drawings provided to confirm that plantrooms, distribution runs and risers have been appropriately sized. A typical corridor section view (*7.1 Corridor Zone Section View.pdf*) has been provided however there is no context to this section in terms of its location or whether it is representative of the facility as a whole. The section provided also highlights clashes

of services with architecture, suggesting insufficient void space for services distribution.

It is also unclear whether services cross-over zones have been allowed and structural zones accounted for within ceiling void coordination. Whilst overall spatial co-ordination is a RIBA Stage 3 activity, it is important that adequate ceiling void space has been allowed for at RIBA Stage 2 as this may have consequential impacts on other building form elements such as ceiling heights or building massing/height.

There is no consolidated document that clearly details the spare capacity allocated within the pipework distribution network and within ceiling voids, risers, plantrooms etc. A statement within the Low and Zero Carbon Technology (LZCT) Future Proofing Strategy Report (TECC-EDP-ZZ-ZZ-RP-ME-018) confirms an intent to discuss future capacity with the Water Management Group during the next design stage.

NHS Tayside confirmed during the KSAR workshops that their Estates team do not currently have the capability to review BIM model information. NHS Tayside have been unable to provide assurance of how the key principals have been communicated, agreed and approved with the wider stakeholder groups including NHS Tayside's Estates team.

A Plant Replacement Strategy report (TECC-EDP-ZZ-ZZ-RP-ME-016) describes the provision for plant maintenance and replacement for the various MEP systems. The report provides a high-level overview of proposed maintenance activities required. The report includes the designer's proposed methodology for accessing plant and equipment for maintenance activities and for future removal for plant lifecycle replacement. Annotated building layouts are included that indicate the proposed replacement and maintenance routes.

The Plant Replacement Strategy report does not cover access for maintenance to plant rooms, risers, horizontal distribution runs or other ancillary plant spaces such as electrical distribution board cupboards. There is no evidence to support how services will be accessed within ceiling voids where access to the services shown may be restricted. Whilst this is partially covered it would be anticipated that some form of high-level overview of how ceiling void services are accessed, in conjunction with other aspects covered such as frequency of plant replacement, equipment used for access and the primary maintenance routes to be used.

There are also images noting access considerations, including mobile crane access, at roof level and within the Level 03 plant areas to facilitate major plant replacement. Whilst the locations for cranes have been indicatively shown, the load bearing capacity of these proposed mobile crane locations is not yet defined. There is also no analysis provided on vehicle types, access requirements (including turning circles) and any impact on wider site traffic management routes, including but not limited to fire tender access and "blue light" routes. These aspects will need to be considered and documented in the next stage and prior to finalisation of the architecture and civil/structural designs.

Drainage drawings provided are limited to typical schematics details only. Whilst the schematics provided are generally commensurate with the level of detail defined within BSRIA BG/6 for a RIBA Stage 2 design, there are areas of the building that would merit a further level of detail being developed to demonstrate the Architectural intent provides the necessary access and maintenance, particularly where bedroom ensuites are located directly above theatres, without compromising IPC requirements.

There is no evidence of a typical IPS design / services arrangement. As the overall strategy has a consequential impact on IPC and clinical strategies, NHS SA recommend that the principals should be considered at this stage of the project.

A review of the architectural layouts does highlight that the majority, if not all ensuite IPS, will only be accessible through bedroom spaces. SHPN 04-01 Part A para. 4.30 notes: "Provision for inspection, rodding and maintenance should ensure 'full bore' access; also, these inspection points should be located outside user accommodation." This requirement should be considered when developing the drainage design and given the impact this requirement may have on the architectural layouts it must be supported by a HAI-SRIBE risk assessment.

NHS Tayside have also confirmed there has been no dialogue between NHS Tayside's designers and the Contractor to discuss opportunities for off-site manufacturing of plant rooms, horizontal services runs and risers etc opportunities at this stage. Therefore, it is unclear if any space allowance has been incorporated into the design to facilitate off-site manufacturing opportunities.

Documents referenced are:

7.1 Corridor Zone Section View.pdf
TECC-EDP-ZZ-ZZ-RP-ME-007 Primary Plant Strategies Report.pdf
TECC-EDP-ZZ-ZZ-RP-ME-018 LZCT Future Proofing Strategy Report.pdf
TECC-EDP-ZZ-ZZ-RP-ME-009 Water Services Strategy.pdf
TECC-EDP-ZZ-ZZ-RP-ME-016 Plant Replacement Strategy.pdf
TECC-EDP-ZZ-ZZ-RP-ME-013 Resilience Strategy Report.pdf
Water Services Layouts and Schematic Drawings
Above Ground Drainage Schematic Drawing
Minutes - Water Management Group NHS Tayside Meeting 01 - 2022-08-25.pdf
TECC-BB-ZZ-ZZ-M3-W-0001_FEDERATED.nwd

Workbook Ref No.	Areas to probe	Evidence expected
2.3	How does the health board assure itself that all variations / derogations, which may be required to water systems, are investigated and agreed by all parties before they	Evidence that each variation / derogation has a detailed technical analysis, has been referred to the Board, and agreed with their water management group clinical, engineering, Estates, infection prevention, control, and FM teams.

	are incorporated in the design?	
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NHS Scotland Assure Observations:

Whilst the information submitted for review by NHS Tayside provides assurance that there is a formal derogations process, no specific information has been submitted for review that provides assurance that any derogations relevant to the water and drainage design have been fully considered, recorded, documented, and signed off in accordance with the derogations process.

There are currently no derogations listed relating to water and drainage however there are elements of the design proposals submitted for review that may not be compliant with relevant guidance, with no recorded review of potential non-compliances by NHS Tayside. These include but are not limited to:

- Domestic cold-water storage duration of 24 hour proposed. *HSE HGS274 Part 2 guidance* (clause 2.36) recommends 12-hour storage.
- Single source of mains water supply to site (*2.3 of SHTM 04-01, Part A*)
- Ability for 'full bore' inspection, rodding and maintenance outside user accommodation in theatres (HBN 26, clause 7.77)
- No bypass provided around water meters (7.54 of SHTM 04-01, Part A)
- Drainage access points located within user accommodation (4.30 of SHPN 04-01)
- The use of strainers (9.56 of SHTM 04-01, Part A)

NHS Tayside have confirmed during the KSAR review that a 'Water Services Evidence Booklet' that provides evidence of meetings and conversations between the Design Team, Estates, Water Management Group and AE (W) in relation to any derogations including sign off and agreement in principle to the OBC proposals is currently being produced. This information has not been submitted by NHS Tayside as part of their KSAR documentation.

Documents referenced are:

Appendix 1 - NHS Tayside Derogation Process V1.9
Appendix 2 - Derogation Form and Link
Appendix 3 - NHS Tayside Derogation Form 1.12 Final
Appendix 4 - Derogation Schedule Draft - v1.3
Appendix 5 - NHS Tayside Derogation Dashboard Example
NHS Tayside Derogation SOP V1.0 Approved

Workbook Ref No.	Areas to probe	Evidence expected
2.4	Water Management Strategy	<p>Assessment of health board proposed water management strategy and how this relates to the specification, guidance and project requirements.</p> <p>What involvement has there been from the water management group?</p>

NHS Scotland Assure Observations:

The documentation provided by NHS Tayside does not provide assurance that there has been sufficient assessment of the health board's current water management strategy and how this relates to the project including the involvement of the water management group to date.

The health board have provided their Water Safety Management Procedures (*NHS Tayside Water Safety Management Procedures 14-9-21.pdf*) which is an NHS Tayside board policy document, however no documentation has been provided for review that confirms the development of a formal written scheme specific to the project. The health board have also not defined the stakeholders dedicated to the project who will have responsibility for developing the project specific written scheme.

NHS Tayside have provided a water services strategy report, drawings and water storage/consumption estimates that have been tabled with the Water Management Group and minutes from a design workshop demonstrates liaison with the health board's wider water management stakeholders.

There is also no evidence of OBC sign off from the Water Safety Group and other key stakeholders.

Documents referenced are:

NHS Tayside Water Safety Management Procedures 14-9-21.pdf

TECC-EDP-ZZ-ZZ-RP-ME-009 Water Services Strategy Report.pdf

10. NTC-Environmental Matrix EDP - Water Design.xlsx

Minutes - Water Management Group NHS Tayside Meeting 01 - 2022-08-25.pdf

Workbook Ref No.	Areas to probe	Evidence expected
2.5	Water governance arrangements.	<p>Has the health board commenced its water governance planning and recorded and how it will ensure appropriate numbers of trained staff (AP and CP) and AE(W) will be appointed? Is there an established project water management group that ensures the water management strategy is adhered to for</p>

		<p>the Board, and is it clear how this project will interface with this existing group?</p> <p>Evidence that the health boards AE(W) have been involved with and reviewed the design proposals to date.</p>
<p>NHS Scotland Assure Observations:</p> <p>As per Section 2.4, the health board has confirmed that their water governance arrangements are at an early stage, in particular the development of the written scheme for this project has yet to commence and will be progressed at the next stage.</p> <p>NHS Tayside have provided an extract from their Soft Landings Action Tracker (Soft Landings Document - Extract 1 19.10.22) noting a requirement from their Estates team to identify workforce predictions for the new facility however the health board have not yet identified how they will ensure a suitable number of appropriately trained staff, such as Authorised Persons (AP) and Competent Persons (CP), are in place.</p> <p>The minutes from a design workshop confirms that consultation has taken place with the health board's Water Management Group during the development of the OBC design strategies however there is no evidence to confirm consultation with NHS Tayside's AE(W). The AE (W) was also not present at this workshop.</p> <p>NHS Tayside confirmed at the KSAR Water and Drainage technical workshop on 21 November 2022 that there is currently no dedicated water management group established for this project and that all consultation and review of the water and drainage strategies would be via the health board's existing Water Management Group.</p> <p>Documents referenced are: <i>Soft Landings Document - Extract 1 19.10.22.doc</i> <i>NHS Tayside Water Safety Management Procedures 14-9-21.pdf</i> <i>TECC-EDP-ZZ-ZZ-RP-ME-009 Water Services Strategy Report.pdf</i> <i>10. NTC-Environmental Matrix EDP - Water Design.xlsx</i></p>		

3.2.2 Water and Internal Plumbing / Drainage Systems: 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.

3.2.2.1	<p>Cold Water Temperature Management</p> <p>The cold-water temperature management strategy detailed within the drawings and within the Water Services Strategy report appears to conclude and accept a recirculating system including end of line flush valves and the provision of cooling. It is not clear what passive measures</p>
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	<p>have been considered by the designers to assist with cold-water temperature management or why they have included both end of line flush valves and cooling together. It should be noted that the excessive dumping of water is in contravention of the Scottish Water bylaws.</p> <p>NHS Tayside confirmed during the KSAR workshops that dynamic thermal modelling of ceiling void temperatures has yet to be undertaken, therefore there is no assurance as to how NHS Tayside have considered the potential risks of overheating within the ceiling voids, or the potential impact on domestic cold-water temperatures.</p> <p>It is also unclear as to whether NHS Tayside have considered any residual risks associated with a recirculating system should an adverse microbiological condition develop within the pipework system. These factors should be considered as part of the designer's water risk assessment.</p> <p><i>HSE L8 Clause 75 (b)</i> notes, 'Provide adequate information for the user about the risk and measures necessary to ensure that the water system will be safe and without necessary risk to health when used at work.' The current assessment does provide assurance that water hygiene considerations have influenced the design (such as, contamination, amplification, transmission, exposure or susceptibility of patients).</p>
3.2.2.2	<p>Designers Commissioning Brief</p> <p>No commissioning information in relation to water systems has been provided at this stage. There is no evidence that the design team have considered the requirements for a designer's commissioning brief in accordance with <i>SHTM 04-01</i>.</p>
3.2.2.3	<p>Soil and Waste Drainage Above/Within Theatres</p> <p>The above ground drainage associated with first floor bedrooms, including wash hand basins and adjoining ensuite outlets, needs further consideration to fully understand the intended strategy, specifically where these spaces are located directly above Theatres.</p> <p>NHS Tayside confirmed during the KSAR Water & Drainage workshop that a strategy had been developed to eliminate drainage within the ceiling voids of the theatres and followed this up with a sketch document to clarify the intent. Although the sketch confirms the proposal to route the majority of first floor drainage above slab level, dropping in a suitable location to avoid drainage runs within the theatre ceiling void, it does also highlight that shower waste within the theatre ceiling void remains. The proposed solution may have potential infection prevention and control risks. It is also unclear from the evidence provided as to whether NHS Tayside have considered access and maintenance requirements for the drainage system, including any potential risks to ongoing clinical services given the proposed strategies.</p>

<p>3.2.2.4</p>	<p>Water Storage Capacities</p> <p>Calculations contained within the Water & Drainage Strategy report includes different methods for calculating the required storage capacity, referring to CIBSE Guide G, SHTM-04-01 and the Institute of Plumbing Guide.</p> <p>NHS Tayside confirmed during the KSAR Water & Drainage workshop that the cold-water storage capacities are currently a provisional allowance, with further development required around the rational and justification of the calculated cold-water storage demands to be agreed.</p> <p>At the same workshop it was discussed that historic/recorded data from other hospitals and Clinical/FM input would be beneficial to further refine and inform storage volumes.</p> <p>NHS Tayside should ensure that the basis of design is clearly stated, including the final methodology adopted to ensure no ambiguity in design information.</p>
<p>3.2.2.5</p>	<p>Information Discrepancies</p> <p>The NHS Tayside water drawings and reports contained some discrepancies / contradictions in the design information. Examples include:</p> <ul style="list-style-type: none"> • Reports / drawings make reference to hot water generation via calorifiers, however NHS Tayside confirmed no hot water storage, with plate heat exchangers generating instantaneous hot water. • The Water & Drainage Strategy report confirms that a chilled water return system will be adopted on the cold-water system, however the layouts and schematics do not show this. • The Water & Drainage Strategy report and schematic confirms 50/50 split cold water storage tanks, however the Plantroom and water layout drawings show two separate tanks.
<p>3.2.2.6</p>	<p>Capacity Within Scottish Water Network to Support NTC Development</p> <p>NHS Tayside have noted that further capacity assessments are required to be undertaken in conjunction with Scottish Water to establish whether sufficient capacity exists within the existing Scottish Water infrastructure to support the development. There was no evidence of the currently available capacity, nor any mitigation strategies identified should the existing infrastructure not have sufficient capacity.</p>

3.3 Ventilation

3.3.1 Ventilation: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
3.1	Has the health board completed competency checks on the ventilation consultant designers?	<p>Recorded evidence that the design team are experienced and have a comprehensive knowledge of the relevant design standards.</p> <p>Where anyone does not have a record of extensive health care experience what recorded plans are to be put in place by the Consultant Designers?</p> <p>Recorded evidence that input from the health boards Authorising Engineer for Ventilation (AE(V)) has been requested.</p>
<p>NHS Scotland Assure Observations:</p> <p>The observations noted in response to KSAR Workbook question 2.1 apply to this question with respect to ventilation consultant designers.</p> <p>Documents referenced are: 221019 Tayside NTC OBC Gap Analysis KSAR d0.01 Consolidated.xls</p>		

Workbook Ref No.	Areas to probe	Evidence expected
3.2	How does the health board ensure that ventilation services are designed in a fashion, which will retain space for minor additions and modifications to services in the future, and there is an appropriate plant access strategy?	<p>Evidence that the design engineers have 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 health board, space for future flexibility in the service installations.</p> <p>Evidence that the design engineers have presented each of the main service runs plus plant rooms to the Board's Estates team and / or FM team, to highlight space for future flexibility.</p> <p>Evidence that the health board has agreed a strategy (percentage) for spare</p>

		<p>capacity and a documented allowance to be incorporated into the design.</p> <p>Are plant rooms, IPS sections, horizontal distribution runs and risers appropriately sized for the equipment being installed and facilitate safe adequate maintenance?</p> <p>Evidence that a plant access strategy for the entire ventilation system has been provided to ensure safe, adequate access, including access for cleaning.</p>
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NHS Scotland Assure Observations:

NHS Tayside have provided ventilation services drawings, outline system schematics and various reports that outline elements of the proposed strategies at OBC stage.

Whilst the information provides details of the proposed strategies, NHS Tayside have not provided assurance with respect to the overall co-ordination between the respective design information packages and how the overall strategy is being managed to ensure co-ordination of services, including spatial fit and spare capacity for any potential future additions/modifications.

The general MEP building services observations noted in response to KSAR Workbook question 2.2 also apply to this question. In addition to these general observations NHS SA also note the following observations with respect to ventilation services:

- There is no evidence provided that clearly details the spare capacity allocated within the ventilation design (e.g., ductwork, pipework etc) and within ceiling voids, risers, plantrooms etc. or how the spare capacity allowances for future flexibility have been agreed with the health board's Estates team and wider stakeholders.
- Whilst it was noted from the minutes of the Ventilation Safety Group stakeholder meeting (*Minutes - VSG Tayside Meeting 02 - 2022-08-26.pdf*) that NHS Tayside were satisfied with plantroom clearances NHS SA have significant concerns around plantroom access and maintenance on review of the information submitted for the KSAR.
- There is limited sectional information or riser drawings provided to confirm that plantrooms, distribution runs and risers have been appropriately sized. A typical corridor section view (*7.1 Corridor Zone Section View.pdf*) has been provided however there is no context to this section in terms of its location or whether it is representative of the facility as a whole. The location of containment also appears to limit the opportunity for ductwork crossovers and may restrict the ability to access and maintain any fire or fire/smoke dampers from the corridor.

- The *Proposed Operating Theatre Ventilation Layout* (TECC-EDP-GA.57-03-ZZ-CM-M-001) and the Level 03 architectural plan (TECC-RDA-PL.00-03-DR-A-001) does not demonstrate that appropriate access has been provided to facilitate maintenance of the AHUs. The ductwork routes shown appear to significantly restrict access to the AHU's. The exhaust and fresh air ductwork connections are not detailed on the drawings and there is very limited space (circa 600mm) between the AHU's fresh air/exhaust connections and the plantroom wall, further limiting AHU access and maintenance.
- The Operating Theatre Ventilation Layout also indicates a riser location to serve Operating Theatre Suite 01 (Rooms 03-038 to 03-042) between gridlines 3/4 and F2/F however whilst the riser location appears to be indicated on the Level 03 plan, the location on Level 02 is in a different location and the route to the ductwork riser location on Level 01.

Further concerns with respect to co-ordination of the theatre ventilation are noted in KSAR Workbook question 3.4

Documents referenced are:

7.1 Corridor Zone Section View.pdf

TECC-EDP-ZZ-ZZ-RP-ME-007 Primary Plant Strategies Report.pdf

TECC-EDP-ZZ-ZZ-RP-ME-018 LZCT Future Proofing Strategy Report.pdf

2. Minutes - VSG Tayside Meeting 01 - 2022-06-10.pdf

Minutes - VSG Tayside Meeting 02 - 2022-08-26

8.1 Theatre Types.xls

TECC-BB-ZZ-ZZ-M3-W-0001_FEDERATED.nwd

TECC-EDP-ZZ-ZZ-RP-ME-002 Dynamic Simulation Report.pdf

TECC-EDP-ZZ-ZZ-RP-ME-003 General Ventilation Strategy Report.pdf

TECC-EDP-ZZ-ZZ-RP-ME-004 Heating and Cooling Strategy Report.pdf

TECC-EDP-ZZ-ZZ-RP-ME-006 Operating Theatre Ventilation Report.pdf

TECC-EDP-ZZ-ZZ-RP-ME-01.pdf

TECC-EDP-GA.57-03-ZZ-CM-M-001.pdf

TECC-RDA-PL.00-03-DR-A-001.pdf

Workbook Ref No.	Areas to probe	Evidence expected
3.3	How does the health board assure itself that all variations / derogations, which may be required to the ventilation systems, are investigated and agreed by all parties before they are incorporated in the design?	Evidence that each variation / derogation has a detailed technical analysis, has been referred to the health board, and agreed with their ventilation safety group, clinical, engineering, Estates, infection control and FM teams.

NHS Scotland Assure Observations:

Whilst the information submitted for review by the health board provides assurance that there is a formal derogations process, no information has been submitted for review that provides assurance that any derogations relevant to the ventilation design have been fully considered, recorded, documented, and signed off in accordance with the health board's derogations process.

There are currently no variations/derogations listed relating to ventilation systems within the derogations schedule however there are elements of the design proposals submitted for review that may not be compliant with relevant guidance, with no recorded review of potential non-compliances by NHS Tayside. These include but are not limited to:

- Heating system operating temperatures – this does not comply with the requirements of Clause 1.9 of the 'Non-domestic Building Services Compliance Guide for Scotland 2022'.
- Enhanced Treatment Rooms ventilation noted as following the 'hierarchy of cleanliness' principles and have similar layout and function to operating theatres however layouts and ventilation principles are not aligned with any specific layout or process flows detailed within SHTM 03-01 guidance.

Documents referenced are:

Appendix 1 - NHS Tayside Derogation Process V1.9

Appendix 2 - Derogation Form and Link

Appendix 3 - NHS Tayside Derogation Form 1.12 Final

Appendix 4 - Derogation Schedule Draft - v1.3

Appendix 5 - NHS Tayside Derogation Dashboard Example

NHS Tayside Derogation SOP V1.0 Approved

Workbook Ref No.	Areas to probe	Evidence expected
3.4	Does the health board have a strategy for ventilation (for rooms where this is permitted within the SHTM/SHPN guidance)?	<p>Evidence of agreed environmental matrix.</p> <p>Evidence that the Dynamic thermal modelling confirms what the design must include (e.g., structure, solar shading/protection, orientation, equipment optimisation, etc.) to ensure that room temperatures comply with SHTM guidance, in naturally ventilated rooms.</p> <p>Floor plans with associated plant locations highlighted plus simple schematic of strategy. This must also identify the air intake and exhaust strategy / locations.</p>

NHS Scotland Assure Observations:

NHS Tayside have provided ventilation strategy drawings, outline system schematics and ventilation system reports that outline the proposed ventilation strategies at OBC stage. This information is further supplemented by environmental matrix documentation. Whilst the information provided details the proposed ventilation strategies there are a number of concerns NHS SA have in relation to the proposed strategies. No ADB information has been provided.

The environmental matrix document (*NTC-T-Environmental Matrix.pdf*) details the ventilation strategies and design criteria relevant to each individual room. Supplementary environmental performance information is included in a number of other documents that replicate information that is noted in the environmental matrix document and highlights any proposed variances to the environmental matrix design criteria e.g., 'NTC-T Ventilation Peri-op Vol 2' has lines highlighted in green stating 'Findings agree with Room Data Sheet' and yellow 'Findings Disagree with Room Data Sheet' the interpretation is that the yellow items are highlighting any proposed changes to the original room data sheet brief. It is unclear what takes precedence and how the documents will be aligned during subsequent design stages. There is no assurance that the environmental performance briefing criteria is consistent across all project documents.

These supplementary documents also include extracts from relevant guidance documentation confirming the data source of the referenced guidance for the proposed design criteria. Whilst these documents have been provided for most areas of the facility there is no corresponding document provided for the theatre suites.

NHS Tayside clarified at the KSAR ventilation technical workshop on 17 November 2022 that the supplementary documents submitted for review have been provided to demonstrate the governance process adopted in the development of the environmental matrix however this documentation has yet to be reviewed and signed off by the relevant project stakeholders.

From the evidence submitted by NHS Tayside, there is no consolidated environmental matrix confirming the agreed design criteria and room briefing requirements that has been reviewed and signed off by the health board's relevant stakeholders. The governance and sign-off of these key documents should be undertaken prior to conclusion of the OBC stage.

The ventilation strategy for the operating theatres is summarised in the *Operating Theatre Ventilation Report* (TECC-EDP-ZZ-ZZ-RP-ME-006). NHS Tayside have confirmed that there are five operating theatres, two of which are conventionally ventilated theatres with the other three theatres being Ultra Clean Ventilation (UCV) theatres.

The Operating Theatre Ventilation Report proposes the use of fully recessed UCV canopies with no down stand / diffuser screens. During the KSAR ventilation technical workshop, NHS Tayside noted that the proposal to use recessed UCV canopies was a clinically driven preference, however there is a lack of detailed

supporting information to demonstrate how this will be installed, tested, commissioned and validated in accordance with the requirements of SHTM 03-01. selection.

The Operating Theatre Ventilation Report highlights various considerations that need to be addressed with this type of canopy particularly with respect to spatial constraints and maintenance access. The report concludes that bespoke UCV canopies would be required to overcome spatial constraints associated with a recessed option and would limit the overall depth of the canopy to a maximum depth of 800mm. The report also notes that any co-ordination issues with the canopy would be resolved on site by the ductwork fabricator.

Whilst drawings have been provided that indicate the theatre suite ductwork distribution routes (*Proposed Operating Theatre Ventilation Layout - TECC-EDP-GA.57-03-ZZ-CM-M-001*) the drawings highlight significant ductwork clashes with the recessed UCV canopies. There is also no sectional information provided to demonstrate that spatial co-ordination with the canopies and other services has been considered.

NHS Tayside have not provided assurance that the proposed UCV theatres has not been sufficiently progressed and therefore lacks assurance in relation to the feasibility of the proposed strategies and that appropriate spatial provision has been accommodated within the current architectural scheme.

The requirement for a bespoke UCV canopy does not currently provide appropriate assurance that the operation of the UCV canopies is in accordance with the principles set out in SHTM 03-01, particularly with regards to the interstitial relationships with the wider theatre suite rooms. NHS Scotland Assure recommend that the principles of this approach be reviewed by NHS Tayside to validate the performance of the canopies meets the required standard, with consideration given to further detailed analysis such as computational fluid dynamics (CFD) modelling.

The *Specialist Ventilation Requirements Report* (TECC-EDP-ZZ-ZZ-RP-ME-008) notes that the Enhanced Treatment rooms intend to follow the same 'hierarchy of cleanliness', including layout and functionality, as operating theatres. Currently there is no dedicated plant proposed for these spaces and they are proposed to be served by shared plant. At the ventilation technical workshop NHS Tayside noted that the proposed air change rates for the Enhanced Treatment rooms is unlikely to achieve the principals – the resultant impact on clinical and IPC strategies has yet to be resolved, including assessment and mitigation of any risks associated with shared plant. NHS Scotland Assure recommend that this strategy is clearly documented, and signoffs received by all core stakeholders at the earliest opportunity, including clinical and IPC stakeholders. This should fully consider and document the clinical procedures to be undertaken within the spaces and subsequent ventilation and IPC control measures required.

NHS Tayside have provided a series of file notes and reports that detail the dynamic thermal modelling undertaken to date. The analysis undertaken supports the proposed strategy to mechanically ventilate the majority of spaces within the facility.

This decision is driven by both the Clinical requirements and the inability to achieve the required ventilation rates noted within the appropriate guidance via natural means only.

During the weekly KSAR progress meeting on 9 November 2022, NHS Tayside confirmed that the analysis undertaken was a snapshot in time based on the concept design proposals developed by the design team. NHS Tayside noted that no modelling analysis had been undertaken prior to this to inform the concept design, as aspects such as building form and orientation have been constrained by the limitations of the selected site.

The overheating assessment undertaken is for a sample number of mechanically rooms where ventilation is provided via tempered fresh air (in the winter season). At this stage the modelling analysis has highlighted these sample areas are at risk of summertime overheating. The report also states that other areas out with the sample rooms are at risk of overheating due to the current building fabric configuration, particularly the amount of glazing proposed. Mitigation measures including peak lopping (cooling) of supply air is recommended, however there is no evidence that the mitigation measures have been implemented or the risk of overheating in the facility addressed within the OBC documentation.

As noted in response to KSAR workbook question 3.2, air intakes and exhausts associated with the ventilation system are not clearly defined at this stage. The plantroom layouts have yet to be developed to a level of detail where the overall strategy for air intakes and exhaust has been fully defined.

Documents referenced are:

TECC-DSSR-ZZ-ZZ-FN-ME-010 - Passive Design Review.pdf
TECC-DSSR-ZZ-ZZ-FN-ME-011 - Thermal Comfort and Air flow review.pdf
TECC-DSSR-ZZ-ZZ-FN-ME-012 - Room heating demand and daylighting review.pdf
TECC-DSSR-ZZ-ZZ-FN-ME-013 - Passive Design Recommendations.pdf
TECC-DSSR-ZZ-ZZ-FN-ME-014 - Bedroom Window Study.pdf
TECC-DSSR-ZZ-ZZ-RG-ME-002 P03 - Operational Energy RFI.pdf
TECC-DSSR-ZZ-ZZ-RP-ME-001 P0 - Operational Energy Report.pdf
TECC-DSSR-ZZ-ZZ-RP-ME-021 - Net Zero Carbon Strategy.pdf
NTC-T-Environmental Matrix.pdf
NTC-T Ventilation 24 Bed Ward Vol 6.pdf
NTC-T Ventilation Entrance Vol 1.pdf
NTC-T Ventilation PACU Vol 5.pdf
NTC-T Ventilation Peri-op Vol 2.pdf
NTC-T Ventilation Vertical Circulation Vol 8.pdf
Proposed Operating Theatre Ventilation Layout - TECC-EDP-GA.57-03-ZZ-CM-M-001.pdf

Workbook Ref No.	Areas to probe	Evidence expected
3.5	Is there evidence of stakeholder input to ventilation strategies?	<p>Addition to or supplement to the Environmental Matrix which confirms the following, on a room by room basis:</p> <ul style="list-style-type: none"> a) The type of ventilation (to SHTM 03-01) b) Patient group and / or function related to the space. c) Name of the Consultant, Clinical Lead or Department Lead who has agreed to the room requirements. d) Name of the Infection Prevention and Control Doctor or equivalent who has agreed to the room requirements. e) Name of the Infection Prevention and Control Nurse who has agreed to the room requirements. f) Name of the Estates / FM team representative who has agreed to the room requirements. g) Name of the NHS Project Manager who has agreed to the room requirements. h) Name of the Decontamination Manager who has agreed to the room requirements (where this is part of the project).

NHS Scotland Assure Observations:

As noted in KSAR Workbook question 3.4 the development of an environmental matrix has commenced however this documentation has yet to be reviewed and signed off by the relevant project stakeholders.

There is no consolidated environmental matrix or agreed ADB schedule confirming the agreed design criteria and room briefing requirements that has been reviewed and signed off by the health board's relevant stakeholders. The governance and sign-off of these key documents should be undertaken prior to conclusion of the OBC stage.

Documents referenced are:

NTC-T-Environmental Matrix.pdf
NTC-T Ventilation 24 Bed Ward Vol 6.pdf
NTC-T Ventilation Entrance Vol 1.pdf
NTC-T Ventilation PACU Vol 5.pdf
NTC-T Ventilation Peri-op Vol 2.pdf

NTC-T Ventilation Vertical Circulation Vol 8.pdf

Workbook Ref No.	Areas to probe	Evidence expected
3.6	Is there evidence of the health board developing Ventilation Commissioning Proposals?	Evaluation of the suitability of the proposed plans in the context of the OBC, are these sufficient do the meet the requirements of the project, guidance and the design of the system?

NHS Scotland Assure Observations:

There is no assurance that the health board have commenced development of Ventilation commissioning proposals. The information provided is not considered to be commensurate with the level of detail expected at Outline Business Case (OBC). NHS Tayside's PSCP has produced a Draft Outline Testing & Commissioning Programme (Prog NTC-Tayside Outline Test & Commission as Rev-12 As Opt-A.pdf) for the project. This details a testing and commissioning period for the Mechanical, Electrical and Plumbing (MEP) systems taking place over a 4–5 month period prior to handover. However, the programme provided does not detail the specific considerations with respect to the ventilation systems.

NHS Tayside's designers stated at the ventilation technical workshop on 17 November 2022 that the development of early-stage commissioning documentation has been undertaken however no information was provided as part of the KSAR confirming the commencement of a designer's commissioning brief, as per SHTM 03-01 (clause 11.13) requirements.

Elements of the ventilation commissioning brief should be able to be progressed and documented at this stage including key design criteria and design conditions. This document should be progressed at the earliest opportunity and should be a standalone document that is not embedded within other documents such as RIBA Stage reports and specifications.

NHS Tayside also noted a requirement for a commissioning specialist to be engaged during the design stage to inform and develop the commissioning proposals including reviewing the engineering solutions developed by the design team. During the KSAR ventilation technical workshop NHS Tayside confirmed their intention to appoint an independent commissioning manager that would be appointed by the health board, remaining independent of the health board's Contractor.

NHS Tayside noted from lessons learned on previous projects they intend to appoint the relevant specialist earlier in the design process. NHS Tayside also confirmed that they intend to appoint independent third-party providers to verify and validate the ventilation systems for the project. The health board confirmed that their

Ventilation Safety Group (VSG) are currently reviewing the providers for ventilation verification and validation services and will interface directly with the project team to confirm specific project requirements.

Whilst the above requirements were clarified in the KSAR ventilation workshop there has been no evidence submitted as part of the KSAR that identifies and defines the commissioning roles and responsibilities including an Independent Commissioning Manager and any independent third parties undertaking ventilation verification and validation. Timescales for appointing the above noted roles were not defined within the KSAR evidence provided by NHS Tayside.

Documents referenced are:

Prog NTC-Tayside Outline Test & Commission as Rev-12 As Opt-A.pdf

Workbook Ref No.	Areas to probe	Evidence expected
3.7	Has the health board started developing its ventilation governance arrangements?	Is the Heath Board considering how it will ensure appropriate numbers of trained staff (AP and CP) and AE(V) for the project? Evidence that the health boards AE(V) have been involved with and reviewed the design proposals to date.

NHS Scotland Assure Observations:

The health board have not yet identified how they will ensure a suitable number of appropriately trained staff, such as APs and CPs, are in place.

The 2022 update to SHTM 03-01 (February 2022) introduced the concept of a formal Ventilation Safety Group (VSG). Whilst some evidence (*Minutes - VSG Tayside Meeting 02 - 2022-08-26.pdf*) has been provided that confirms that NHS Tayside have engaged and consulted with their AE(V) and other parties advising the health board on ventilation safety matters during the OBC stage, there is no evidence provided around the governance aspects of how the project team will interface with the Ventilation Safety Group as the design develops and evolves.

Documents referenced are:

Minutes - VSG Tayside Meeting 02 - 2022-08-26.pdf

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.

<p>3.3.2.1</p>	<p>Heating System Operating Temperatures</p> <p>The current heating system operating temperatures associated with the proposed Air Source Heat Pump (ASHP) and Water Source Heat Pump (WSHP) system are 75°C flow and 65°C return. The Domestic Hot Water Service (DHWS) demand is decoupled from this system and is served by dedicated high temperature CO₂ heat pumps.</p> <p>The hospital is intended to be a highly insulated building with a thermally efficient envelope, where the estimated space heating load represents circa 16% of the overall building heating demand.</p> <p>This is illustrated in the <i>Operational Energy report (TECC-DSSR-ZZ-ZZ-RP-ME-001 P0 - Operational Energy Report.pdf)</i> provided by NHS Tayside which confirms space & ventilation heating accounts for circa 25% of the buildings total estimated energy usage.</p> <p>Operating heat pump technologies at higher operating temperatures will result in a lower seasonal heating system efficiency and increased operational energy costs. High operating temperatures may also limit the potential for connection to a low/zero carbon district heat network in the future.</p> <p>It is unclear from the KSAR evidence provided by NHS Tayside whether they have analysed the impact of optimising system flow and return temperatures with respect to the associated Seasonal Coefficient of Performance (SCoP) and the impact on the overall operational energy demands.</p> <p>NHS SA have concerns around running the plant at such high operating temperatures given the reduced system efficiencies and increased energy intensity associated with a bivalent system.</p> <p>The revised <i>Scottish Building Standards Technical Handbook 2022: Non-Domestic</i>, effective 1 February 2023, require all heating systems to have a mean water temperature of no greater than 50°C and a maximum temperature differential of 10°C. This does not appear to have been considered by NHS Tayside at this stage.</p>
<p>3.3.2.2</p>	<p>Achieving Compliance with Revised Scottish Building Standards Technical Handbook 2022: Non-Domestic</p> <p>As noted above, updates to Section 6 of the <i>Scottish Building Standards Technical Handbook 2022: Non-Domestic</i> become effective on the 1 February 2023. Whilst NHS Tayside noted in their response that the SDAC requirements are over and above the revised Building Regulations, there was no evidence/assessment of criteria provided to support this statement. The impact of these regulation changes will require a full appraisal to assess the impact on the project.</p> <p>The revised building regulations implements an updated National Calculation Methodology (NCM) which introduces a Delivered Energy</p>

	<p>compliance metric alongside the existing carbon emissions standard. The notional building requirements that the hospital will require to be assessed against introduce more onerous requirements than the current regulations.</p> <p>NHS Scotland Assure recommend appropriate mitigation measures be reviewed and considered by NHS Tayside in lieu of these changes, and a full appraisal undertaken at the earliest opportunity in RIBA Stage 3.</p>
3.3.2.3	<p>Impact of Heat System Flow & Return Temperatures on Heat Emitter Sizing</p> <p>The <i>LZCT Implications report (TECC-EDP-ZZ-ZZ-RP-ME-010 LZCT Implications Report Item 8.2.pdf)</i> illustrates the impact of lower heating system flow and return temperatures on the physical size of heat emitters (radiators) and ventilation re-heat/trimmer coils. A sample heat loss calculation (<i>1- Sample heat Loss.pdf</i>) has been provided that confirms an air infiltration rate of 1 air change per hour has been applied to the calculation. This level of infiltration is not aligned with the air tightness levels being targeted within the project net zero strategy documents. CIBSE Guide A provide empirical figures for typical infiltration rates for various building types and exposures that would be more representative of the building fabric performance that have been targeted. This could equate to as much as 25-30% reduction in infiltration heat losses.</p> <p>There also appears to be no analysis undertaken that considers the potential heat contribution from mechanical ventilation particularly in spaces that are heated by local emitters (such as radiators) but where high mechanical ventilation rates are being provided (e.g., peri-op rooms and ward areas).</p> <p>The <i>LZCT Implications report</i> also notes that the overall height of trimmer/re-heat coils, when using low heating system flow and return temperatures, could be reduced by introducing further rows of coils. The report concludes that this would increase the ventilation resistance therefore increasing fan power and overall energy consumption. However, there is no appraisal undertaken to assess the energy associated with increased fan power against the energy associated with operating the heating system at higher flow and return temperatures.</p> <p>NHS Tayside have not provided assurance that the proposed heat emitter strategy and the rationale behind the proposed heating flow and return temperatures has been fully tested at this stage and as a result the full potential for an energy efficient, low carbon design may not be realised.</p>

3.3.2.4	<p>Dynamic Thermal Modelling Monitoring, Checking and Validation</p> <p>NHS Tayside has engaged with a third party to undertake the dynamic thermal modelling analysis on their behalf.</p> <p>The process for checking and validating the input data within the model by NHS Tayside’s design team is undefined.</p> <p>NHS Scotland Assure recommend a roadmap for monitoring the dynamic thermal modelling through the forthcoming design stages, particularly with respect to item 3.3.2.1 and 3.3.2.2 above, is developed to ensure a documented governance process is in place throughout the design.</p>
3.3.2.5	<p>Net Zero Carbon (NZC) Strategy</p> <p>NHS Tayside have provided a Net Zero Strategy report (<i>TECC-DSSR-ZZ-ZZ-RP-ME-021 - Net Zero Carbon Strategy.pdf</i>) specific to the project and a supporting site wide Net Zero Strategy document (<i>310119 Perth Royal Infirmary Net Zero Strategy 2.0.pdf</i>) for Perth Royal Infirmary (PRI).</p> <p>The scope of the project Net Zero Strategy document focuses on Operational Carbon and has reviewed typical Energy Use Intensity (EUI) targets, passive design analysis, operational energy analysis, and energy offset from renewable sources.</p> <p>The strategy notes the analysis undertaken in developing the net zero strategy was on ‘base case’ information provided by the Design Team in February 2022. It acknowledges that the design team have continued to evolve and develop the design further in parallel with the production of the strategy. It is therefore unclear how reflective the current net-zero analysis is of the NTC OBC design proposals, and the feasibility of the design improvement options tabled.</p> <p>It is critical that the project net zero aspirations and targets are clearly defined and agreed, and that the building services strategies, architectural design and other associated engineering disciplines are aligned at the beginning of RIBA Stage 3. Failure to address the NZC aspirations timeously introduces significant challenges to the project in subsequent design stages due to there being limited opportunities to further evolve and change the design.</p>
3.3.2.6	<p>Operational Energy Targets</p> <p>The <i>Perth Royal Infirmary Net Zero Strategy report</i> notes a notional operational energy target of 180 kWh/m².</p> <p>The operational energy modelling exercise predicts an estimated operational energy target of 225 kWh/m² with further improvement options tabled resulting in an EUI range of 162-225 kWh/m².</p>

	<p>A series of Requests for Information (RFI's) have been generated by NHS Tayside's Consultant responsible for undertaking the Operational Energy Analysis. The development of the initial operational energy analysis includes a number of assumptions. A significant number of the RFI's remain open requiring further clarification by NHS Tayside.</p> <p>The Operational Energy targets for the project therefore require further analysis and clarity at the earliest opportunity to further inform the ongoing development of the building into RIBA Stage 3 in order to provide a greater level of certainty on the Operational Energy Targets and what will be achieved.</p>
3.3.2.7	<p>Heating Resilience Strategy – Use of Gas-Fired Boilers</p> <p>The current resilience strategy indicates the use of gas-fired boilers as a back-up heating source. There is no supporting design assessment to identify how NHS Tayside arrived at this decision, nor how the infrastructure will be provided to support this. There is no evidence to demonstrate if the use of gas-fired boilers has been considered from an environmental perspective or whether alternative strategies were considered (from a backup infrastructure perspective).</p> <p>It is unclear from the evidence provided as to whether NHS Tayside have considered the time for the gas-fired boilers to come online in the event of an ASHP failure, including consideration of any “temperature dips” in the intervening period.</p>
3.3.2.8	<p>Impact on existing ventilation systems and extent of refurbishment and demolition works</p> <p>NHS Tayside confirmed during the KSAR review that there will be works undertaken within the existing PRI facilities that the new facility will connect too. The scope of works will also involve ongoing demolition and construction works adjacent to existing PRI facilities.</p> <p>The scope and extent of the works is however unclear from the documentation provided and there is no evidence provided to confirm what stakeholder engagement has been undertaken to assess the impact on the existing Clinical services going forward, although NHS Tayside have advised they have an oversight group in place to monitor this</p>

3.4 Electrical

3.4.1 Electrical: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
4.1	Has the health board completed competency checks on the electrical consultant designers?	<p>Recorded evidence that the design team are experienced and have a comprehensive knowledge of the relevant design standards.</p> <p>Where anyone does not have a record of extensive health care experience what recorded plans are to be put in place by the Consultant Designers?</p> <p>Recorded evidence that input from the health boards Authorising Engineer for Electrical (AE(E)) has been requested.</p>
<p>NHS Scotland Assure Observations:</p> <p>The observations noted in response to KSAR Workbook question 2.1 apply to this question with respect to electrical consultant designers.</p> <p>Documents referenced are:</p> <p><i>221019 Tayside NTC OBC Gap Analysis KSAR d0.01 Consolidated.xls</i></p>		

Workbook Ref No.	Areas to probe	Evidence expected
4.2	How does the health board ensure that electrical services are being designed in a fashion which will provide ease of access for future maintenance, and which will retain space for minor additions and modifications to services in the future?	<p>Evidence that the designers have presented their co-ordination drawings (BIM model) to the Board.</p> <p>Evidence that the designers have presented each of the main service runs plus plant rooms to the health board's FM team.</p> <p>Evidence that the Board has agreed a strategy (percentage) for spare capacity and a documented allowance has been 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</p>

		and facilitate safe, adequate maintenance.
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NHS Scotland Assure Observations:

NHS Tayside have provided electrical services drawings, outline system schematics and various reports that outline elements of the proposed strategies at OBC stage.

Whilst the information provides details of the proposed strategies, NHS Scotland Assure have identified concerns with respect to the overall co-ordination between the respective design information packages and how the overall strategy is being managed to ensure co-ordination of services, including spatial fit and spare capacity for any potential future additions/modifications.

The general MEP building services observations noted in response to KSAR Workbook question 2.2 also apply to this question. In addition to these general observations NHS SA also note the following observations with respect to electrical services:

- The electrical drawings provided for the KSAR review in response to this question are work in progress and mostly incomplete.
- The containment drawings provided show arterial containment routes through corridors. NHS Scotland Assure note the section views provided indicate a number of clashes with walls and other services and does not appear to include space for crossover of services. The sections also show A&B supplies running adjacent to each other in the same section of corridor on the same section of containment support. There is therefore no assurance that ceiling voids have been appropriately sized, nor that adequate (physical) resilience measures have been provided with respect to A&B cabling routes in accordance with SHTM 06-01 and BS 8519.

The above was discussed during the KSAR electrical workshop on 15 November 2022 where NHS Tayside advised that the drawings and servicing strategy had subsequently been updated, when discussed during the workshop there were different drawings tabled which demonstrated a completely different strategy for routing containment, ductwork etc which were again work in progress. These were not ready for review and had not been provided as part of the KSAR process. There is therefore no assurance that a fully approved electrical distribution strategy was in place at the time of the KSAR.

The electrical switch room and UPS room layout drawings produced for the KSAR do not include any dimensional information or space allowance for access and maintenance.

NHS Tayside have advised that 25% spare capacity will be provided to the electrical system. This is noted in a number of reports and was noted in the minutes of the Electrical Working Group meetings where it was requested that the 25% spare capacity was carried through into the containment systems. There are no notes to this effect on the electrical schematic drawing or the containment drawings provided for the KSAR to confirm if this has been incorporated into the design.

The main schematic produced for the KSAR review is incomplete and does not include all submain cables outlined within the health boards resilience strategy. It's unclear what the containment sizes are based on and how this is being factored into the space requirements for horizontal cables runs etc.

No evidence was provided with respect to NHS Tayside review/approval of strategies in place for the main distribution routes.

Documents referenced are:

TECC-EDP-ZZ-ZZ-RP-ME-001 - Design Criteria Strategy Report

BBK off site manufacture opportunities section 1.2_Jul 21

TECC-EDP-ZZ-ZZ-RP-ME-01 - Plant Replacement Strategy

*TECC-EDP-GA-66-00-01-CM-E-001 - PROPOSED CONTAINMENT LAYOUT
GROUND FLOOR*

*TECC-EDP-GA-66-00-02-CM-E-001 - PROPOSED CONTAINMENT LAYOUT
FIRST FLOOR*

*TECC-EDP-GA-66-00-03-CM-E-001 - PROPOSED CONTAINMENT LAYOUT
ROOF FLOOR*

7.1 Corridor Zone Section View

TECC-EDP-GA.65-00-ZZ-CM-E-001 PROPOSED IT ROOM LAYOUTS

*TECC-EDP-GA.66-00-03-CM-E-002 - PROPOSED ROOF FLOOR SWITCHROOM
+ UPS LAYOUTS*

*TECC-EDP-GA-66-00-01-CM-E-002 - PROPOSED GROUND FLOOR
SWITCHROOM LAYOUTS*

*TECC-EDP-GA-66-00-02-CM-E-002 - PROPOSED FIRST FLOOR SWITCHROOM
LAYOUTS*

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

NHS Scotland Assure Observations:

Whilst the information submitted for review by the health board provides assurance that there is a formal derogations process, no information has been submitted for review that provides assurance that any derogations relevant to the electrical design have been fully considered, recorded, documented, and signed off in accordance with the health board's derogations process.

There are currently no variations/derogations listed relating to electrical systems within the derogations schedule however there are elements of the design proposals submitted for review that may not be compliant with relevant guidance, with no

recorded review of potential non-compliances by NHS Tayside. These include but are not limited to:

- The use of Arc Flash Detection Devices (AFDD's) in accordance with BS 7671 Amendment 2.
- Routing of services within protected escape routes in accordance with BS 7671 Amendment 2 Regulation 422.2. There is no evidence of this having been considered by NHS Tayside.
- Provision of UPS / Medical IT systems in Category 4 rooms in accordance with SHTM 06-01.
- Agreed fire strategy to switch rooms and UPS rooms in accordance with SHTM 06-01, including any consideration for fire suppression given the overall facility is sprinkler protected.
- Resilience diverse cable routes in accordance with SHTM 06-01 and BS 8519

During the electrical workshop on 15 November 2022 NHS Tayside designers advised that they had not fully considered their strategy in respect to the provision of AFDD's and compliance with the requirements of BS 7671 for Group 0 locations (Regulation 710.421.1.201).

SHTM 06-01 states Medical IT systems should be considered within Category 4 Rooms. The current NHS Tayside strategy is proposed to install dual circuits within Category 4 rooms, from alternative distribution boards, rather than utilise UPS/Medical IT in these rooms. There is no supporting risk assessment to demonstrate how this strategy has been considered and approved by all relevant stakeholders or how this improves patient/staff safety.

Although the SHTM 06-01 does not specifically call for gas suppression in LV switch rooms or UPS rooms it states that the fire strategy for these spaces must be agreed with the fire engineers and fire officers. There is no evidence of this within the information provided.

A & B electrical services are currently shown routed within the same corridor spaces which is not compliant with SHTM 06-01 and BS 8519 with respect to diverse cable routing sections.

Although SHTM 06-01 does not exclude the use of wet cell batteries it does state that Valve Regulated Lead Acid (VRLA) battery types are almost universally used for modern UPS system, due to their low maintenance and because of the reduced requirements for vented gas extraction, which is a significant consideration when using wet cells. NHS SA recommend that the use of wet cells should be analysed further, risk assessed, and any additional safety/ventilation requirements addressed.

Documents referenced are:

Appendix 1 - NHS Tayside Derogation Process V1.9

Appendix 2 - Derogation Form and Link

Appendix 3 - NHS Tayside Derogation Form 1.12 Final

Appendix 4 - Derogation Schedule Draft - v1.3

*Appendix 5 - NHS Tayside Derogation Dashboard Example
NHS Tayside Derogation SOP V1.0 Approved*

Workbook Ref No.	Areas to probe	Evidence expected
4.4	Has the health board assured itself of availability of adequate supply from the local utility infrastructure?	Confirmation from the Regional Electricity Company as to how the supply will be provided from their network and if single or dual supplies are being made available.

NHS Scotland Assure Observations:

NHS Tayside have advised that a separate Electrical Infrastructure Upgrade project is being developed to provide additional supply and resilience to the whole PRI site. This project will supply the New NTC and should be completed prior to the NTC-T project.

NHS Scotland Assure noted inconsistencies across the various documents provided by NHS Tayside in response to this question, further details of which are noted below.

During the electrical KSAR workshop of the 15 November 2022 NHS Tayside tabled a preliminary schematic of the currently proposed infrastructure design. This indicated a dual supply arrangement from the utility company and a dual unified HV system with LV generator back up. NHS Tayside advised that this was still under review and that the design was still to be finalised and agreed. Final information was not available or provided for the KSAR review.

NHS Tayside have advised that they will have an electrical demand of approx. 1.5MVA for the new facility and that this information has been fed into the PRI infrastructure project.

Various reports have been produced by NHS Tayside which state the load demand for the building. However, there are several inconsistencies in these reports, including what the basis of design is – for example the Design Criteria Strategy Report is based on BSRIA BG9/2011 and the Primary Plant Strategies Report is based on SHTM 06-01. Whilst both reports state a load of 1.5MVA including 25% spare capacity, there is no load calculation breakdown included within the Design Criteria Strategy Report to support this. We also note that the schedule of areas used within the load breakdown in the Primary Plant Strategies document is inconsistent. It is therefore unclear as to what the basis of design is for the electrical load. NHS SA recommend that this is consolidated into a single load calculation to ensure an accurate and consistent load assessment is in place. The LZCT Implication Report also contains a load assessment, which differs from the values noted above.

During the workshop of 15 November 2022 NHS SA asked if the known potential extension to the NTC project had been included in the 25% spare capacity or if it had been allowed for within the initial load assessment. NHS Tayside advised that they thought it had been but would check and confirm. It is not shown within the load calculation as a line item and no confirmation has been given from NHS Tayside.

Documents referenced are:

TECC-EDP-ZZ-ZZ-RP-ME-001 - Design Criteria Strategy Report
TECC-EDP-ZZ-ZZ-RP-ME-012 - Utility Report
TECC-EDP-ZZ-ZZ-RP-ME-007 - Primary Plant Strategies Report
TECC-EDP-ZZ-ZZ-RP-ME-010 LZCT Implications Report

Workbook Ref No.	Areas to probe	Evidence expected
4.5	Evidence of provisions for emergency supplies during loss of the utility incoming supply.	Floor plans with standby generator locations highlighted plus simple schematic. Capacity of generators. UPS provision.

NHS Scotland Assure Observations:

NHS Tayside advised that the overall emergency resilience strategy was still under development and at the time of the KSAR, full details of this were not available. NHS Tayside demonstrated elements of the strategy through the KSAR process, however in the absence of a completed and approved strategy being provided, there is limited documented assurance that appropriate emergency electrical supplies are provided.

During the electrical workshop of the 15 November 2022 NHS Tayside tabled a preliminary schematic of the currently proposed infrastructure design. This demonstrates a dual supply arrangement from the utility company and a dual unified HV system with LV generator back up. The drawing tables show separate LV generators in an N+1 arrangement providing full back-up to A & B supplies coming from each substation. NHS Tayside advised that this was still under review and that the design was still to be finalised and agreed. This information was not available or provided for the KSAR review.

The UPS provision is unclear based on the information provided for the KSAR review. The report describes two systems with different autonomies for critical and non-critical system. The drawings show only one system which appears to be for the critical systems part.

Layout drawings have been produced which show the UPS equipment layouts and locations of UPS rooms.

The Medical IT schematic drawing provided for the KSAR review is a supplier's drawing showing the equipment laid out in schematic form. The drawing does not show in an electrical schematic form how the system integrates with the rest of the LV distribution system, including co-ordination with supply arrangements, by-pass arrangements and earthing arrangements. It's unclear if the designers have fully considered this from the information provided, nor how this may impact the electrical safety of the system.

Documents referenced are:

TECC-EDP-SC.6S-00-XX-DR-E-006 UPS_IPS SCHEMATIC

TECC-EDP-ZZ-ZZ-RP-ME-005 Medical IT & Life Safety Strategy Report

TECC-EDP-DE.60-00-ZZ-DR-E-001 LV DISTRIBUTION SCHEMATIC

Workbook Ref No.	Areas to probe	Evidence expected
4.6	Is there a strategy for locating substations?	Floor plans with substation locations highlighted plus simple schematic.
<p>NHS Scotland Assure Observations:</p> <p>No evidence has been provided in support of this question. NHS Tayside have advised that the substations will be new and will form part of the PRI Infrastructure Upgrade Project.</p> <p>NHS Tayside advised on their response to the Gap Analysis report that the Location of sub-stations and HV cable routes are presented on the electrical design information. NHS SA have been unable to locate this information within the documents provided. The only HV cable routes evident are the existing HV cables on site being diverted as part of the enabling works.</p> <p>Documents referenced are:</p> <p><i>TECC-EDP-OS.60-00-ZZ-DR-E-004 Site Services Diversions Electrical Services Power</i></p>		

Workbook Ref No.	Areas to probe	Evidence expected
4.7	Is there a strategy for locating switch rooms?	Floor plans with switch room locations highlighted plus simple schematic.
<p>NHS Scotland Assure Observations:</p> <p>NHS Tayside have provided layout drawings and a simple schematic to show the strategy for locating LV switch rooms. They are providing separate A & B LV switch rooms and have advised that A & B cable routes will follow diverse routes as far as possible, however there are areas where these supplies converge. There is therefore no assurance that the designs comply with SHTM 06-01 and BS8519</p>		

Sketch drawing TECC-EDP-SK-00-01-DR-E-001 Incoming Services shows the upstream LV distribution routes from the PRI Infrastructure project. It shows the A & B LV supplies coming from an LV supply location TBC.

It's still unclear what the supply arrangements are from this location and how they are arranged from a resilience point of view and how A & B strings are being kept separate. The understanding of this is fundamental to the distribution strategy for A & B supplies being provided to the NTC.

Documents referenced are:

TECC-EDP-GA.66-00-03-CM-E-002 - PROPOSED ROOF FLOOR SWITCHROOM + UPS LAYOUTS

TECC-EDP-GA-66-00-01-CM-E-002 - PROPOSED GROUND FLOOR SWITCHROOM LAYOUTS

TECC-EDP-GA-66-00-02-CM-E-002 - PROPOSED FIRST FLOOR SWITCHROOM LAYOUTS

TECC-EDP-DE.60-00-ZZ-DR-E-001 LV DISTRIBUTION SCHEMATIC

TECC-EDP-SK-00-01-DR-E-001 Incoming Services

Workbook Ref No.	Areas to probe	Evidence expected
4.8	Is there a strategy for locating Medical IT distribution equipment?	Floor plans with Medical IT board locations highlighted plus simple schematic. Compliance with BS7671 section 710. Compliance with SHTM 06-01.

NHS Scotland Assure Observations:

NHS Tayside have provided floor plans with Medical IT plant locations highlighted on the drawings. The drawings have no notes stating design standards or project requirements and they do not highlight the areas of the floorplate that each Medical IT cabinet will serve. Therefore, it's unclear as to whether the cabinets are within 30m of the areas served as per SHTM 06-01 Clause 16.34.

The drawings also include other services such as security systems and lines which don't belong on the drawings which gives the impression the drawings haven't been checked before issue.

The schematic drawing provided is a supplier's drawing as noted in section 4.5 above. It makes reference to BS 7671 in relation to fire rating of cables which it states needs to be confirmed by the design consultant. It also mentions that the equipment needs to be located within 30m of the area it is serving, although as noted above it is not clear if this is achieved in practice.

There are no notes on the drawings from the consultants stating that the system needs to comply with BS7671 section 710 or SHTM 06-01.

NHS Tayside have also provided a Medical IT and Life Safety Strategy Report. This report states that it identifies the areas that require medical IT systems as detailed in BS7671 and SHTM 06-01.

It then goes on to state that Medical IT systems, commonly referred to as Isolated Power Supply (IPS) systems shall be provided for all life support equipment and other critical services in the building.

The following list indicates typical areas that will require IPS; however, this requires input from NHS Tayside to ensure that all critical areas and systems are suitably covered:

- Operating Theatres
- Anaesthetic Rooms
- PACU
- Peri-op Rooms
- Enhanced Treatment Room

This suggests that the final strategy for locating Medical IT equipment is still to be concluded and approved by NHS Tayside.

Also as noted in 4.3 above the strategy around Category 4 areas needs to be agreed and included within the Medical IT report and within the derogation schedule.

Documents referenced are:

TECC-EDP-ZZ-ZZ-RP-ME-005 Medical IT & Life Safety Strategy Report
TECC-EDP-SC.6S-00-XX-DR-E-006 UPS_IPS SCHEMATIC
TECC-EDP-GA-60-00-01-DR-E-001 - GF Switch room-IPS & IT Mark-Ups
TECC-EDP-GA-60-00-02-DR-E-001 - FF Switch room-IPS & IT Mark-Ups
TECC-EDP-GA-60-00-01-DR-E-001 - GF Switch room-IPS & IT Mark-Ups

Workbook Ref No.	Areas to probe	Evidence expected
4.9	Is there a strategy for distribution?	Floor plans with containment distribution routing (horizontal and vertical).

NHS Scotland Assure Observations:

As noted in KSAR Workbook question 4.2, the design has not progressed sufficiently to provide assurance that there is an agreed distribution strategy that is compliant with SHTM 06-01, BS7671 and BS8519.

A main LV distribution schematic has been provided which shows separate A & B switchboards and A & B supplies and distribution boards. The drawing appears to be work in progress. The drawing shows single supplies only to some critical and essential supplies such as evacuation lifts and does not reflect the strategy stated in the resilience report in relation to single points of failure. There are no A&B supplies

to essential equipment shown, only A or B supplies. It is unclear if this drawing has been signed off as accepted by NHS Tayside stakeholders.

Floor plans with containment distribution routing have been provided for the KSAR review. These layout drawings show a preliminary layout and section of main containment runs through the main corridors of the new building. When viewed in the corridor zone section view this highlighted a number of clashes with walls, ducts and pipes and had no space for crossover of services.

The section view indicates all electrical services located within an 800mm section with services stacked tightly together and A & B UPS containment running along the same route side by side. NHS Tayside have not provided assurance that services will be accessed safely and without restriction.

These points were raised during the electrical KSAR workshop of 15 November 2022. The latest Revit model was shared by the designers to show that the design was being developed to route A & B services down different sides of the corridors and providing space for services to cross over each other and to allow access for maintenance. At the time of the KSAR, the Revit co-ordination exercise was ongoing and as such final assurance was not provided by NHS Tayside that these issues had been addressed.

The current service distribution proposals contain cabling and electrical accessories routed within protected escape routes, with no evidence of a supporting risk assessment. The information provided by NHS Tayside does not indicate how they have considered compliance with BS 7671 Amendment 2 Regulation 422.2.

The notes stated in KSAR Workbook question 4.2 and 4.7 are also relevant to the distribution strategy.

Documents referenced are:

TECC-EDP-GA.66-00-03-CM-E-002 - PROPOSED ROOF FLOOR SWITCHROOM + UPS LAYOUTS

TECC-EDP-GA-66-00-01-CM-E-002 - PROPOSED GROUND FLOOR SWITCHROOM LAYOUTS

TECC-EDP-GA-66-00-02-CM-E-002 - PROPOSED FIRST FLOOR SWITCHROOM LAYOUTS

TECC-EDP-DE.60-00-ZZ-DR-E-001 LV DISTRIBUTION SCHEMATIC

TECC-EDP-SK-00-01-DR-E-001 Incoming Services

TECC-EDP-GA-66-00-01-CM-E-001 - PROPOSED CONTAINMENT LAYOUT GROUND FLOOR

TECC-EDP-GA-66-00-02-CM-E-001 - PROPOSED CONTAINMENT LAYOUT FIRST FLOOR

TECC-EDP-GA-66-00-03-CM-E-001 - PROPOSED CONTAINMENT LAYOUT ROOF FLOOR

7.1 Corridor Zone Section View

Workbook Ref No.	Areas to probe	Evidence expected
4.10	Is there evidence of the health board developing electrical commissioning proposals?	Evaluation of the suitability of the proposed plans in the context of the OBC, are these sufficient do they meet the requirements of the project, guidance and the design of the system?
<p>NHS Scotland Assure Observations:</p> <p>Refer to the observations in KSAR Workbook question 3.6. These observations also apply to the evidence submitted with respect to the health board's development of the electrical commissioning proposals.</p> <p>Documents referenced are:</p> <p><i>Prog NTC-Tayside Outline Test & Commission as Rev-12 As Opt-A</i></p>		

Workbook Ref No.	Areas to probe	Evidence expected
4.11	Has the health board starting on its early thinking for the electrical governance arrangements for the operational phase?	<p>Is the health board considering how it will ensure appropriate numbers of trained staff (AP(HV), AP(LV), CP(HV), CP(LV), AE(HV) and AE(LV) for the project, inclusive of third-party providers?</p> <p>Evidence that the health boards AE(E) have been involved with and reviewed the design proposals to date.</p>
<p>NHS Scotland Assure Observations:</p> <p>The health board have not yet identified how they will ensure a suitable number of appropriately trained staff, such as APs and CPs, are in place.</p> <p>NHS Tayside provided evidence of engagement with have a number of their stakeholders on electrical safety matters during the OBC stage, including their existing AP for electrical. There was also evidence that the AE for electrical services had been made party to a number of documents, however it is unclear from the information provided to what extent it was subsequently reviewed.</p> <p>NHS Scotland Assure also acknowledge that due to extenuating circumstances out with their control, the position of the electrical authorising engineer is currently vacant. NHS Tayside have advised that they are in the process of finding a suitable replacement but that this has not happened yet. Given the circumstances around the health boards AE(E), once the health board have appointed a new AE for the electrical systems, a design review should be carried out by the AE and record any comments / findings as soon as possible.</p>		

Early discussions should also take place between the Boards AP/AE's and early-stage safe systems of work should be developed in accordance with SHTM 06-02 and SHTM 06-03. No formal documented safe systems of work have been put in place at this stage.

Documents referenced are:

Minutes - Electrical Systems NHS Tayside Meeting 01 - 2022-08-24-combined
Minutes - Electrical Systems NHS Tayside Meeting 02 - 2022-09-06 -combined

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.

<p>3.4.2.1</p>	<p>OBC / Stage 2 Design Report</p> <p>NHS Tayside did not provide an overarching MEP Stage 2 Design Report, which is a recommended deliverable at RIBA Stage 2 in accordance with BSRIA BG6/2018.</p> <p>Whilst a number of individual reports have been provided, information is not consistent and at times contradictory between documents. A consolidated strategy report in accordance with BSRIA BG6/2018 would help to alleviate a number of these issues and as such NHS Scotland Assure would recommend that NHS Tayside consider preparing this document.</p>
<p>3.4.2.2</p>	<p>Fire suppression to electrical switch rooms and UPS / battery rooms</p> <p>No information has been provided on whether fire suppression systems have been considered for use within the electrical plant rooms and should be fully developed by the next project stage at FBC.</p>
<p>3.4.2.3</p>	<p>Sprinkler Power Supply in Accordance with BS EN 12845:2015+A1 2019</p> <p>BS EN 12845:2015+A1 2019 Regulation 10.8.2 notes “Where permitted by the electrical utility, the electrical supply to the pump controller shall be taken from the input side of the main switch on the incoming supply to the premises and where this is not permitted, by a connection from the main switch.”</p> <p>Regulation 10.8.3.1 also notes “The electrical connections in the main switchboard shall be such that the supply to the pump controller is not isolated when isolating other services”.</p> <p>The current electrical schematic arrangement for the NTC indicates the sprinkler supply derived from the live side of the NTC switchboards (A and B supplies), however these switchboards are not directly supplied from the distribution network operator (DNO) supply, rather they are supplied from another NHS Tayside switchboard.</p>

	<p>A scenario exists where should that supply be isolated, the sprinkler pump supplies would also be isolated, which is not in accordance with the above noted BS EN 12845 requirements. There is no evidence of this having been risk assessed by NHS Tayside as part of their electrical and facility resilience risk assessments, nor is any derogation identified.</p>
3.4.2.4	<p>Use of Wet Cell Batteries in UPS</p> <p>NHS SA note that the current design proposals utilise wet cell batteries for the UPS system. SHTM 06-01 Part A 10.3 notes that VRLA batteries are more commonly used as they typically have a lesser environmental risk than other battery types such as wet cell batteries. There was no assurance provided that NHS Tayside had fully considered the environmental and safety implications of using wet cell batteries. NHS Scotland Assure recommend that this is fully detailed during the next design stage and that a safe system of work is developed in accordance with NHS Tayside operational estates to ensure that during the operational phase of the project, maintenance activities can be undertaken in a safe manner.</p>

3.5 Medical Gases

3.5.1 Medical Gases: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
5.1	Has the health board completed competency checks on the medical gases consultant designers?	<p>Recorded evidence that the design team are experienced and have a comprehensive knowledge of the relevant design standards.</p> <p>Where does anyone not have a record of extensive health care experience what recorded plans are to be put in place by the consultant designers?</p> <p>Recorded evidence that input from the health boards Authorising Engineer for Medical Gases (AE(MG)) has been requested.</p>
<p>NHS Scotland Assure Observations:</p> <p>The observations noted in response to KSAR Workbook question 2.1 apply to this question with respect to medical gases consultant designers.</p> <p>Documents referenced are: <i>221019 Tayside NTC OBC Gap Analysis KSAR d0.01 Consolidated.xls</i></p>		

Workbook Ref No.	Areas to probe	Evidence expected
5.2	How does the health board assure itself that all variations / derogations' which may be required to medical gas systems are being 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 gases management group, clinical, Estates, infection control and FM teams.
<p>NHS Scotland Assure Observations:</p> <p>Whilst the information submitted for review by the health board provides assurance that there is a formal derogations process, no information has been submitted for review that provides assurance that any derogations relevant to the medical gases design have been fully considered, recorded, documented, and signed off in accordance with the health board's derogations process.</p>		

There are currently no variations/derogations listed relating to medical gases within the derogations schedule however there are elements of the design proposals submitted for review that may not be compliant with relevant guidance, with no recorded review of potential non-compliances by NHS Tayside. These include but are not limited to:

- Removal of Surgical air from operating theatres
- Providing nitrous oxide via local cylinders rather than a piped system
- Dual circuits required for Peri-Operative Rooms

NHS Tayside should review the above noted derogations with the Medical Gas Authorised Person (AP) and Authorising Engineer (AE) to ensure that any proposed mitigations are well documented, coordinated and accepted by all of the stakeholders involved.

Documents referenced are:

Appendix 1 - NHS Tayside Derogation Process V1.9
Appendix 2 - Derogation Form and Link
Appendix 3 - NHS Tayside Derogation Form 1.12 Final
Appendix 4 - Derogation Schedule Draft - v1.3
Appendix 5 - NHS Tayside Derogation Dashboard Example
NHS Tayside Derogation SOP V1.0 Approved
TECC-RDA-SH.00-XX-XX-A-001_SK_P02_Derogation Schedule

Workbook Ref No.	Areas to probe	Evidence expected
5.3	How does the health board ensure that medical gas services are designed in a fashion, which will provide ease of access for future maintenance, and which will retain space for minor additions and modifications to services in the future?	<p>Evidence that the designers have presented their co-ordination drawings (BIM model) to the Board.</p> <p>Evidence that the designer has presented each of the main service runs to the Board's FM team.</p>

NHS Scotland Assure Observations:

The general MEP building services observations noted in response to KSAR Workbook question 2.2 also apply to this question.

In addition to these general observations NHS SA also note the following observations with respect to medical gas services:

- NHS Tayside presented in progress medical gas plantroom layouts during the medical gas workshop held on 24 November 2022, however the medical gas plantroom i.e., MA4 and Vacuum equipment details have not been provided as part of this review to provided sufficient assurance that the necessary space and

clearances required to facilitate the maintenance and future replacements have been considered.

Documents referenced are:

TECC-BB-ZZ-ZZ-M3-W-0001_FEDERATED

TECC-EDP-GA.54-00-ZZ-DR-M-002 Existing & Proposed Medical Gas Manifold and Storage.

TECC-EDP-GA-54-00-00-DR-M-001 - Proposed New and Diverted Oxygen Supply (External).

Workbook Ref No.	Areas to probe	Evidence expected
5.4	Is there evidence of the health board developing medical gases commissioning proposals?	Evaluation of the suitability of the proposed plans in the context of the OBC are these sufficient do they meet the requirements of the project, guidance and the design of the system?

NHS Scotland Assure Observations:

Refer to the observations in KSAR Workbook question 3.6. These observations also apply to the evidence submitted with respect to the health board's development of the medical gases commissioning proposals.

Whilst the oxygen system is intended to be supplied from the existing VIE setup, no evidence has been provided to confirm that initial testing and commissioning procedures have been developed and planned in the received programme. The testing and commissioning proposals in relation to the modifications and extensions to existing VIE systems should be clearly defined to confirm the existing system performance and provide early notification if a permit-to-work (or another form of appropriate document) is required during the construction and commissioning process.

The list of the medical gas tests included in the programme are not exhaustive and not reflecting the complete process of the medical gas system verification and validation as specified in SHTM 02-01. For example, the following tests should be carried out after purging and filling with the working gas as follows:

- Contamination test
- Gas identity test
- Gas quality test

Documents referenced are:

Prog NTC-Tayside Outline Test & Commission as Rev-12 As Opt-A

Workbook Ref No.	Areas to probe	Evidence expected
5.5	Has the health board started developing its medical gases governance arrangements for the operational phase?	Is the health board considering how it will ensure appropriate numbers of trained staff (AP and CP) and AE(V) for the project? And is it clear how this project will interface with the Board existing arrangements for management of the medical gases installations?
<p>NHS Scotland Assure Observations:</p> <p>The health board have not yet identified how they will ensure a suitable number of appropriately trained staff, such as APs and CPs, are in place.</p> <p>Whilst evidence has been provided that confirms that NHS Tayside have engaged and consulted with a number of their medical gases stakeholders, including the Authorising Engineer for Medical Gases, there is no formally defined governance structure in place. There is therefore no assurance as to how review and approval of the medical gases design will be formally captured throughout the project.</p> <p>Documents referenced are:</p> <p><i>Minutes - Medical Gas NHS Tayside Meeting 01 - 2022-08-23-combined.pdf</i> <i>Medical Gas Systems Evidence Workbook - live document.pdf</i></p>		

Workbook Ref No.	Areas to probe	Evidence expected
5.6	Is there recorded evidence of a strategy for bulk gas and bottle gas storage?	Floor plans with cylinder locations highlighted. Site plan with VIE location(s). Simple schematic. Confirmation that the medical gas strategy is adequate. Floor plans with pipework distribution routing and manifold locations.
<p>NHS Scotland Assure Observations:</p> <p>NHS Tayside have provided a general site plan layout indicating that the existing VIE setup will be utilised for the new NTC. No evidence has been received to confirm NHS Tayside have assessed the existing VIE system capacity, current oxygen demands and the spare capacity within the system to ensure the adequacy of the oxygen supply to the new extension. NHS Tayside also noted that the original</p>		

intent had been for new VIE to be provided – there was no evidence within the KSAR response to demonstrate how the design proposals had evolved, nor what stakeholders had been consulted when determining that the existing VIE could be utilised.

During the medical gas workshop held on 24 November 2022, NHS Tayside confirmed that the primary and secondary supply of the oxygen gas is from the existing VIE but there are no accurate figures to confirm the adequacy of the oxygen supply. NHS Tayside advised that they have requested to install a flow meter to establish current oxygen flow rates and demand to confirm that the capacity for the current installation will be capable of supplying oxygen for the NTC.

NHS SA recommend that NHS Tayside review potential mitigation plans should the existing capacities be deemed to be insufficient, or infrastructure enhancements are not feasible.

NHS Tayside have an existing cylinder store within their estate that is also planned to be utilised for the NTC. No assurance was provided to demonstrate the spatial capacity of the existing store had been assessed to determine whether it could support the NTC.

Documents referenced are:

TECC-EDP-GA.54-00-ZZ-DR-M-002 V.I.E Oxygen Distribution Network Layout OBC Item 20.

TECC-EDP-GA-54-00-00-DR-M-001 - Proposed New and Diverted Oxygen Supply (External)

Workbook Ref No.	Areas to probe	Evidence expected
5.7	Is there recorded evidence of a strategy for medical gas plant?	<p>Description of medical; gas requirements signed off by clinical colleagues.</p> <p>Floor plans with pipework distribution (horizontal and vertical) routing.</p> <p>Details of all medical gas plant areas ensuring safe and adequate access.</p>

NHS Scotland Assure Observations:

Evidence has been provided confirming the medical gas distribution strategy and indicates the type of medical gas required for each clinical area and department. There are however some contradictions between documents, with the drawings noting Surgical Air (7 Bar) which has been noted in other documentation as being omitted. The medical gas provision within the enhanced treatment room areas is also noted as still to be confirmed.

A Medical Gas Evidence workbook has also been provided that confirms dialogue and correspondence between stakeholders however the document is work in progress and has yet to be formally signed off by clinical colleagues and other key medical gas stakeholders.

Whilst Tayside NHS presented the medical gas plantroom as a work in progress layout during the medical gas workshop held on 24 November 2022, these details have not been submitted as part of the KSAR review that confirms the proposed sizes, arrangement, and capacities of the medical gas plantrooms or confirmation that safe and adequate access is provided.

Refer also to KSAR Workbook question 5.6 with respect to the VIE provision.

Documents referenced are:

TECC-BB-ZZ-ZZ-M3-W-0001_FEDERATED

TECC-EDP-GA.54-00-01-CM-M-001 Proposed Ground Floor Medical Gas OBC.

TECC-EDP-GA.54-00-01-CM-M-002 Proposed Ground Floor Medical Gas Strategy OBC.

TECC-EDP-GA.54-00-02-CM-M-001 Proposed First Floor Medical Gas OBC

TECC-EDP-GA.54-00-02-CM-M-002 Proposed First Floor Medical Gas Strategy OBC

TECC-EDP-GA.54-00-ZZ-DR-M-001 Typical Medical Gases - A.G.S.S System OBC

TECC-EDP-GA.54-00-ZZ-DR-M-002 Existing & Proposed Medical Gas Manifold and Storage

Medical Gas Systems Evidence Workbook - live document

3.5.2 Medical Gases: Further Observations

<p>3.5.2.1</p>	<p>Level of Detail - Medical Gas Services</p> <p>The level of detail of the medical gas service design is not consistently to a RIBA Stage 2 level of detail and does not demonstrate clearly the overall system requirements and interfaces with the existing infrastructure. For example, no medical gas system schematics are provided as part of this submission.</p> <p>No general medical gas plantrooms layouts (including manifold and cylinder storage rooms) were provided, and no flowrates and capacities are provided to demonstrate the adequacy of the proposed medical gas services.</p>
<p>3.5.2.3</p>	<p>Differentiation of Existing and Proposed Medical Gases</p> <p>The medical gas services drawings provided do not distinguish between the existing and proposed new services. This should be clearly differentiated to confirm the extent and scope of the proposed works.</p>

3.5.2.4**Design Documentation Discrepancies**

There are discrepancies with the medical gas outlets/terminations points noted on the strategy drawings for the operating theatre areas (based on the colour coding legend used) and other medical gas documentation provided. This should be aligned with the end user requirements noted in the *Medical Gas Systems Evidence Workbook*, e.g., surgical air has been confirmed as being omitted however the layout shows SA7 is provided.

3.6 Fire

3.6.1 Fire: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
6.1	Has the health board completed competency checks on the Fire Engineering consultant designers?	<p>Recorded evidence that the design team are experienced and have a comprehensive knowledge of the relevant design standards.</p> <p>Where anyone does not have a record of extensive health care experience what recorded plans are to be put in place by the Consultant Designers?</p> <p>Recorded evidence that input from the health boards Fire Advisors has been requested.</p>
<p>NHS Scotland Assure Observations:</p> <p>NHS Tayside advised that the designer's competencies had been assessed as part of their external design team framework procurement process. Whilst NHS Tayside advised that examples of interview scorebooks could be shared with NHS SA this information was not provided by NHS Tayside as part of their KSAR evidence. There is therefore no documented assurance in place with respect to the assessment of the designer's competence.</p> <p>Documents referenced are:</p> <p><i>221019 Tayside NTC OBC Gap Analysis KSAR d0.01 Consolidated.xls</i></p>		

Workbook Ref No.	Areas to probe	Evidence expected
6.2	Has a written fire strategy been completed, and does it provide evidence, where there is a variance from statutory and mandatory guidance, that an equivalent level of safety has been achieved by alternative means?	<p>Is there documented evidence that fire suppression systems have been considered for life safety and property protection?</p> <p>Is progressive horizontal evacuation available for all patient areas that continuously moves away from the fire area?</p> <p>Does the design considerations of the fire and detection system, for in-patient facilities, provide L1 coverage including voids?</p>

		<p>Does the design provide for a compliant emergency lighting system?</p> <p>Are free swing arm self-closers fitted to all leafs of doors serving sleeping accommodation?</p> <p>Have escape lifts been considered for the evacuation of patients and others with mobility issues?</p> <p>Are multi sensor fire detectors installed to reduce the occurrence of unwanted fire alarm signals?</p> <p>Are there adequate storage facilities to ensure escape routes are not used for this purpose?</p> <p>Are measures in place to provide safe charging of electrical and personal electronic equipment?</p> <p>Have fire hazard rooms been designated based on fire load?</p> <p>Where there is a mechanical ventilation system - have all compartments, sub-compartments and corridors serving sleeping accommodation been designed to be fitted with fire and smoke dampers?</p>
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NHS Scotland Assure Observations:

A written fire strategy document has been prepared by the Fire Engineering consultant designers and submitted for review. NHS SA have a number of observations and recommendations in relation the documentation provided, as noted below:

- The fire strategy document acknowledges applicable statutory and primary healthcare specific (FIRECODE) fire safety guidance as the basis of design for the project. The submitted fire strategy report (*Fire Engineering Assessment Report*, as labelled in the report introduction) primarily sets out design performance requirements applicable to the project, but there is an absence of confirmatory detail that the performance requirements are / are not achieved by the current proposed design.
- The fire strategy report does not currently reference all relevant published standards, for example, SHTM 82 and SHTM 85. The current NHS Tayside fire safety policy is also not referenced in the fire strategy document.

- The fire strategy report does not indicate any elements of the design that depart / vary from the guidance set out in the relevant basis of design documentation.

However, due to the aforementioned lack of confirmatory detail, it is uncertain if deviations / variations do exist as part of the OBC stage design proposals as there is reference through other documentation of a proposal for a green roof and for omitting sprinkler protection from operating theatres. Both of these proposals constitute a variation from guidance and the fire strategy should capture such elements of the design.

NHS Tayside and the project design team should ensure that as the design progresses registers are developed to record any variations/derogations. The fire engineering consultant should present further analysis on the integration of different fire strategy design components such as sprinklers, living roofs and fire resisting construction methods, to demonstrate how, as a minimum, an equivalent standard is met through alternative means.

The fire strategy report proposes the provision of an automatic fire sprinkler system for the new extension. However, the design performance requirements for this system are conflicted between the fire strategy report (BS EN 12845 specified) and the project architects fire strategy drawings (LPC Rules + BS EN 12845 specified). Furthermore, there remains an ongoing dialogue regarding the scope/scale of sprinkler provision in the new extension, acknowledging the NHS Policy to not sprinkler protect areas such as operating theatres; this detail is not currently captured in the fire strategy report.

The overarching design principle is based upon the provision of Progressive Horizontal Evacuation for the patient areas.

A new fire detection and alarm system is proposed throughout the new extension, achieving Category L1 coverage. The specification of fire detector types remains ongoing during the design process but multi sensor point heads and aspirating smoke detection systems are currently being proposed. NHS Tayside's building services designers state the system shall be "designed to comply with BS 5839-1 and SHTM 82 requirements".

From the information provided, it is unclear as to how the new system will interface with the existing system installed in the existing portion of the PRI. This arrangement needs further consideration as the design progresses. The feasibility of how this can be achieved via the existing infrastructure should also be confirmed during the next design stage.

It is also important to establish how the fire alarm system in the existing PRI should operate during the construction phase (including how it is interfacing with the construction site demise).

The proposed design provides performance requirements with respect to the emergency lighting system in accordance with BS5266.

The project architects design information confirms that the design is progressing where *“All PeriOp & Ward Rooms with Bed to be provided with an Electromagnetic Door Closer to allow free swing action and close upon activation of the fire alarm”*.

The fire strategy report proposes the design should incorporate two evacuation lifts, one situated at either end of the new extension, accessed within protected zones. The recommendations presented in SFPN3 concerning the design of escape bed lifts should be acknowledged however it should also be recognised that full conformance with all design standards / specifications stated therein would have implications on the design of the lobbies.

All fire hazard rooms, as defined in the SHTM and Non-Domestic Technical Handbook (NDTH), are proposed to be enclosed in 30-minutes fire resisting construction. Transient equipment “parking bays” are incorporated into the proposed design, as open annexes situated directly off circulation corridors in patient departments. The suitability and functionality of parking bays for the use of charging electronic equipment should be considered in detail and how this (or an alternative strategy) could be safely accommodated by the fire strategy approach being developed.

Motorised fire and smoke dampers (interfaced with the fire alarm system) are proposed to be installed throughout where ventilation ductwork penetrates fire resisting construction. As the ventilation strategy is to be designed to continue to operate during a fire emergency, EN 1366 tested dampers, classified ‘ES’ should be strongly considered by the design team, in lieu of BS 476 ad hoc tested dampers, in line with good industry practice.

As the new build NTC will form an extension to an existing building, a detailed, interim fire strategy should be established for the existing portion of the building to cater for the period when the new NTC extension is under construction. Any impacts on the existing fire safety operations should be documented and any mitigation established and agreed with all stakeholders prior to commencement of the works phase. It has already been acknowledged by the project design team that the construction of the new NTC will obstruct existing escape routes from the existing building. Markups have been provided showing compartmentation and travel distances for the temporary fire strategy, but no other information relating to the temporary fire strategy has been received.

The fire strategy document should be amended to provide this information as well as articulating how the guidance listed, specifically affects the new building at Perth Royal Infirmary. Equally as the construction process will affect the existing buildings in the surrounding area, a temporary fire strategy document should be created.

Documents referenced are:

7628-FS_01_RA_220912 NHS Tayside National Treatment Centre – Fire Strategy Report (1)
TECC-EDP-GA.67-00-01-DR-E-001 - Proposed Fire Alarms Layout Ground Floor - Item 19

TECC-EDP-GA.67-00-02-DR-E-001 - Proposed Fire Alarms Layout First Floor - Item 19
 TECC-EDP-GA.67-00-03-DR-E-001 - Proposed Fire Alarms Layout Roof Floor - Item 19
 19009p-220822-M-CLT-OBC Fire Safety Meeting

Workbook Ref No.	Areas to probe	Evidence expected
6.3	How does the health board assure itself that all variations / derogations, which may be required to fire systems, are investigated and agreed by all parties before they are instigated?	Evidence that each variation / derogation and any fire engineering proposals are being referred to the Board and agreed with their fire safety group, clinical, engineering, infection prevention and control and FM teams.

NHS Scotland Assure Observations:

The observations noted in response to question 2.3 apply to this question with respect to variations / derogations in relation to the fire safety systems.

There are currently no variations/derogations listed relating to fire safety within the derogations schedule however there are elements of the design proposals submitted for review that may not be compliant with relevant guidance, with no recorded derogations or evidence of review by NHS Tayside. These are as follows:

- Suppression is required in specified areas in accordance with SHTM-81 (Section 10) and the Building Standards technical handbook. NHS Tayside should confirm that there is no variance from these standards.
- SHTM-81 (Section 7) states “automatic fire suppression systems should be fully considered for all new healthcare premises, extensions or structural refurbishments to existing facilities, and the rationale fully documented in the fire strategy proposal.” NHS Tayside should include their proposals, regarding areas that will be fitted with suppression, in the fire strategy.

Documents referenced are:

Appendix 1 - NHS Tayside Derogation Process V1.9
 Appendix 2 - Derogation Form and Link
 Appendix 3 - NHS Tayside Derogation Form 1.12 Final
 Appendix 4 - Derogation Schedule Draft - v1.3
 Appendix 5 - NHS Tayside Derogation Dashboard Example
 NHS Tayside Derogation SOP V1.0 Approved
 7628_FS_01_RA_220912 NHS Tayside National Treatment Centre - Fire Strategy Report (1)

Workbook Ref No.	Areas to probe	Evidence expected
6.4	How does the health board assure itself that all fire dampers and fire/smoke dampers are designed to allow for inspection, resetting and maintenance?	<p>Evidence that the designers have presented their co-ordination drawings (BIM model) to the Board.</p> <p>Evidence that the designers have presented each of the fire dampers and smoke / fire dampers to the Board's FM team.</p> <p>Safe and adequate access has been allocated on both sides of all fire dampers for maintenance.</p>

NHS Scotland Assure Observations:

A separate fire strategy report (prepared by NHS Tayside's building services designers) relating to mechanical ventilation systems within the building was submitted as part of the NHS Tayside KSAR response. In this document fire dampers are mentioned, and it is expressed that they should be installed "where appropriate".

Fire dampers are proposed to be of a type capable of being reset remotely via the Building Management System (BMS). The fire engineering consultants fire strategy report also states a proposal for remotely resettable fire dampers.

In NHS Tayside's building services consultants fire strategy report, reference is also made to relevant BS EN test and classification standards for fire & smoke dampers. This follows best practice. The full performance requirements for fire dampers should be specified to the project design team by the fire engineering consultant.

It is important that the design, situation and coordination of fire dampers is considered coherently by the project design team, contractor and sub-contractors, to ensure that no conflicts or clashes arise during their installation on site. NHS SA have highlighted initial concerns with regards to accessibility of fire dampers in response to question 3.2. A signoff process should be defined in advance of the installation and commissioning phase to ensure dampers are correctly installed to specification and that they are readily accessible for testing and maintenance.

As the design progresses, competency checks should be undertaken on the proposed manufacturer, product and installer. This should form part of a wider project quality plan.

NHS Tayside should consider their quality process and how this is defined and developed for both their contracting partners and other parties fulfilling an inspection and sign off role.

Documents referenced are:

TECC-EDP-ZZ-ZZ-RP-ME-015 Fire Strategy Report

7628_FS_01_RA_220912 NHS Tayside National Treatment Centre - Fire Strategy Report (1)

Workbook Ref No.	Areas to probe	Evidence expected
6.5	How does the health board assure itself that any fire rated ductwork is correctly installed?	<p>Evidence that the system is certificated, and that the installation follows the installation details which were used for the certification.</p> <p>Written confirmation from the design consultant.</p>

NHS Scotland Assure Observations:

There are no kitchen facilities, nor any smoke ventilation / control system proposed as part of the outline fire strategy design being developed. The need for fire-resistant ductwork is not specifically noted in the initial fire strategy. This is typical for this stage of design (OBC) however the full requirements should be developed as the design progresses and be communicated to the project design team by the fire engineering consultant. The BS EN standards for fire resistant ductwork should be utilised rather than BS 476 series as best practice.

In respect of cavity barriers penetrated by ventilation ductwork, the fire strategy report states fire and smoke dampers should be provided, unless “the design and construction of the ductwork in the adjacent spaces on each side of the cavity barrier provides the same minimum level of fire safety performance as the cavity barrier”. This infers that if this alternative solution were to be adopted, there would need to be an assurance that the ductwork can achieve at least 30-minutes integrity fire resistance. This would need careful consideration and coordination between the fire engineering consultant and the mechanical building services engineers. It would require product / system certification to substantiate this approach.

As the design progresses, competency checks should be undertaken on the proposed manufacturer, product and installer. This should form part of a wider project quality plan. The health board should consider their quality process and how this is defined and developed for both their contracting partners and other parties fulfilling an inspection and sign off role.

Documents referenced are:

7628_FS_01_RA_220912 NHS Tayside National Treatment Centre - Fire Strategy Report (1)

Workbook Ref No.	Areas to probe	Evidence expected
6.6	How does the health board assure itself that any smoke control and/or clearance systems are fit for purpose?	<p>Evidence that the smoke system is being designed by an accredited Fire Engineer.</p> <p>Evidence that Building Control are being consulted.</p> <p>Confirmation from the Building Services Design Consultant that the operating sequence for the smoke system has been discussed regarding being integrated into the control of other building systems.</p>

NHS Scotland Assure Observations:

There are no active life safety specification smoke control systems proposed as part of the outline fire strategy design being developed.

A fire service provision for post-fire cold smoke ventilation is proposed to be provided in each escape stair. This provision is in conformance with the Non-Domestic Technical Handbook (NDTH) guidance. The fire consultant's report states this is proposed to be achieved by providing a ventilator of at least 0.5m² at each storey situated on an external wall.

The Building Services consultants M&E services fire strategy report conflicts this by stating that a means of smoke ventilation is to be provided at the head of each escape stair. The type and form of smoke clearance being afforded in each stair enclosure should be coordinated at the next design stage.

The Building Services consultant's report also states that operation of the smoke vents is normally achieved with the use of a powered actuator that activates on receipt of a signal from the BMS/Fire alarm panel.

It is not stated if a local control switch, for use by the fire service, is also to be provided at the topmost storey in each stair, to allow fire-fighters flexibility in their operations. This aspect of the design should be coordinated and clarified in the fire engineering consultants fire strategy at the next design stage

Documents referenced are:

7628_FS_01_RA_220912 NHS Tayside National Treatment Centre - Fire Strategy Report (1)

TECC-EDP-ZZ-ZZ-RP-ME-015 Fire Strategy Report

Workbook Ref No.	Areas to probe	Evidence expected
6.7	Evidence that the health board is ensuring fire safety input into the	Input from Fire lead(s) and HFS / SFRS on fire safety into site / option selection.

	design process together with early design decision-making.	<p>Documents e.g., option appraisal report, fire strategy report, meeting minutes.</p> <p>Demonstrable and appropriate engagement and expertise of relevant Fire lead(s). Signed off documents, e.g., reports, role profiles, minutes.</p> <p>Evidence that the health boards Fire Advisor have been involved with and reviewed the design proposals to date.</p>
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NHS Scotland Assure Observations:

Meeting minutes provided as part of the submission evidence confirms dialogue has taken place between the project design team and NHS Tayside's Fire Safety Advisors at 2 relevant meetings. However, no evidence has been provided which confirms whether the advisors have been issued the fire strategy documents or what documents have been reviewed by them.

NHS Tayside should ensure the Fire Safety Engineers are aware of their role to continue to engage NHS Tayside in the design as it progresses.

Minutes of the fire engineering workshops have been provided to review recording the discussions and input from all parties to date.

The strategy documents are still required to be signed off as part of NHS Tayside's final stages of governance prior to conclusion of the OBC milestone. This will include submission of the signed fire strategy to NHS Tayside 's fire safety group for final stage approval.

This informal consultation will be important in the early parts of RIBA Stage 3 to review and agree items such as fire tender access, fire tender parking and hydrant locations which have already been proposed in the fire strategy document but not formally discussed with the SFRS. We strongly recommend that these are reviewed as they may impact on any advanced site works particularly with respect to the site layout and cut and fill associated with landscaping proposals.

Documents referenced are:

19009p-220816-M-CLT-OBC Fire Safety Meeting

19009p-220822-M-CLT-OBC Fire Safety Meeting

7628_FS_01_RA_220912 NHS Tayside National Treatment Centre - Fire Strategy Report (1)

Workbook Ref No.	Areas to probe	Evidence expected
6.8	Has the health board started the development of	Has the health board designed appropriate trained staff and appointed a

	the fire system outline commissioning proposals?	fire officer for the project, is there an established firer management group that will ensure the fire management strategy is adhered to?
<p>NHS Scotland Assure Observations:</p> <p>Refer to the observations in 3.6. These observations also apply to the evidence submitted with respect to the health board’s development of the fire system outline commissioning proposals.</p> <p>The response noted to question 6.7 clarifies the early stage input from the health Board’s fire safety advisors, NHS Tayside’s fire safety subject matter experts and the wider interface with the health board’s Fire Safety Group.</p> <p>The health board have not yet identified how they will ensure a suitable number of appropriately trained staff, or formally confirmed and appointed a fire officer for the project. Ongoing resource is required from these various stakeholders to support the project going forward and will require further review to ensure the development of fire system commissioning proposals and the successful delivery and implementation of the projects fire strategy objectives.</p> <p>Documents referenced are: TECC-EDP-ZZ-ZZ-RP-ME-015 Fire Strategy Report</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>Establishment of a Temporary Fire Strategy during the works phase</p> <p>Significant staged works are proposed on the existing campus, including the demolition of existing buildings, creating new external walls at 2 separate points on existing buildings and construct the new NTC extension.</p> <p>It has already been recognised by the project design team that, consequently, existing means of escape routes from the existing theatre dept will be compromised during the planned works.</p> <p>At present, there has been no evidence submitted of a holistic temporary fire strategy being developed to (1) evaluate / assess all risks / implications associated with these works and (2) assign control / mitigation measures as necessary.</p> <p>Whilst there is evidence of temporary fire strategy implications and solutions being discussed between NHS Tayside fire safety advisors and the project design team, there is currently no evidence to</p>
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	<p>demonstrate that holistic temporary fire strategy is captured by the fire consultant's report, either integrated into or appended to the fire strategy report at the next design stage.</p>
3.6.2.2	<p>Reliability of / Resilience on Existing Fire Containment in Refurbished Areas of the Existing PRI Demise</p> <p>A reliance is being placed on existing passive fire containment systems that exist in the existing portion of PRI that is being refurbished as part of this project. The project design team acknowledge this ongoing constraint, caused by the clinical and operational nature of these Theatre spaces and the resulting lack of accessibility to inspect the fire containment measures that exist.</p> <p>The project design team should review record information that is said to exist in the building manual, to better understand the existing condition and reliability of these fire containment systems.</p>
3.6.2.3	<p>External Courtyards situated within the building profile</p> <p>The fire consultant's report does not currently address these proposed design features.</p> <p>An assessment should be undertaken by the project fire consultant to confirm (1) the means of escape provisions are sufficiently designed for periodic maintenance, and (2) there is no elevated risk of external fire spread via the courtyards, creating a route for compartmentation to be breached prematurely.</p> <p>The method and outcome of such an assessment should be documented in an updated revision of the fire consultants fire strategy report.</p>
3.6.2.4	<p>Ongoing Fire Consultant involvement for Duration of project</p> <p>It is important to have fire engineering input throughout the duration of the project, particularly given the complexities around the demolition / construction phasing and the interfacing with the existing PRI demise.</p> <p>The fire consultant has been engaged for the OBC stage and NHS T have stated that their continued involvement has been factored in when mapping out FBC stage. It is important this is evidenced.</p>
3.6.2.5	<p>Presence of Green Roofs</p> <p>The proposed design incorporates green (living / wildflower) roofs. The fire consultant's report does not currently address these proposed design features.</p> <p>This design feature could create a constraint / hazard and a deviation from roof classification performance requirements stated in the relevant basis of design fire safety guidance. They could present a medium that could promote fire spread breaching compartments if not carefully considered and there is no suitable maintenance regime in place.</p>

	<p>The method and outcome of such an assessment should be documented in an updated revision of the fire consultants fire strategy report.</p>
3.6.2.6	<p>Fire Tender Vehicle Sizing / Tracking Specification</p> <p>The fire consultants fire strategy report presents a performance specification for a pumping appliance, not a high reach pumping appliance, which is a more onerous set of requirements.</p> <p>No evidence has been submitted evidencing any dialogue between the project design team and the Scottish Fire & Rescue Service to confirm that the less onerous performance specification could be utilised.</p> <p>Evidence of a tracking exercise should be presented to demonstrate that the roadways being constructed and any set down points for fire tender vehicles are in alignment with the appropriate SFRS fire tender specification.</p>
3.6.2.7	<p>Development of Construction Details Achieving Intent of Fire Strategy</p> <p>No evidence has been submitted demonstrating the development of construction details for the project, for example confirming how the 1m vertical fire resisting strips at fire rated/ external wall junctions are to be formed. This information should be developed and submitted at the next design stage.</p>
3.6.2.8	<p>Development of Fire Stopping details</p> <p>No evidence has been submitted demonstrating the development of fire certified fire stopping details and establishment of procedures for the installation and sign off of these systems in line with good industry practice, i.e., in line with the Association for Fire Protection (ASFP) Guidance.</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? How does the 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; inputting into the design process?</p>	<p>The health board provides evidence that there is an IPC Management Structure with the necessary expertise and leadership skills to support the design work.</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.</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 design process and are satisfied this will not impact on patient safety. This can be meeting minutes, risk assessments, and risk registers. There is IPC 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 that fixtures fitting and equipment have not been proposed for the project that would represent an IPC risk.</p>

NHS Scotland Assure Observations:

NHS Tayside have provided evidence that they have in place a management structure to support the board commitments to IPC, including evidence of the IPC Governance structure and Terms of Reference for the board IPC committee and reporting structures. The KSAR has however identified a number of potential gaps within the defined governance processes and a lack of documented evidence to demonstrate its implementation.

NHS Tayside provided an organogram of the IPC governance route for the project board which implies that the HAI executive lead would be informed of IPC risks associated with the project, however as no minutes of IPC committee meetings were provided by NHS Tayside as part of the KSAR response, there is no evidence to support that the HAI executive lead is regularly informed of project updates/risks.

With respect to IPC resource on the project, NHS Tayside noted within their KSAR Workbook submission that IPC resource is in place for the project, however no further evidence was provided regarding how the provision of this resource has been assessed or the resilience of the post for the duration of the project. As noted previously, no documented information is provided regarding the IPC experience and/or qualifications to support the project.

Evidence has been provided regarding IPC involvement in the design process within the IPC design workshop minutes and also in identifying risk with the project through the HAISCRIBE meetings. The project derogation document lists HAISCRIBE derogations but no detail has been provided regarding risk assessments or mitigations agreed. No sign off of derogations is evident.

During the KSAR water and workshop, concerns were identified with respect to the routing of drainage pipework over theatres (as noted in the Water and Drainage section of this report, additional observation which may pose an operational risk to the facility in addition to possible HAI risks. Whilst evidence has been provided that IPC have been involved in the discussions both with the board and at the workshops, these risks have not been fully mitigated within the design, nor are any residual risks captured as part of the project risk register.

A Stage 1 project HAI- SCRIBE is in place. The HAI-SCRIBE stage 1 references potential risk from the preparatory works for construction, namely the relocation of services from old buildings and demolition for facility construction, however there was limited supporting evidence of the definition, assessment and mitigation of these works.

NHS Tayside advised at the weekly KSAR meetings that a further HAI-SCRIBE for the preparatory works is to take place in 2023 in advance of planned service relocation and demolition.

The evidence and responses provided implies, in NHS Scotland Assure's opinion, that the project team view the construction of the NTC and the preparatory works as separate projects and whilst timing of works would indeed indicate clear separation in terms of project management, these represent an on-going HAI risk and should

be considered throughout the project with regular updates captured within the overarching NTC HAI-SCRIBE documentation.

Documents referenced are:

NTC – NHS Assure Workbook Submission – Clarification info - Technical Documents received 29/09/22
NTC-T Risk Register v0.45 frozen for OBC costing - Clarification info - Technical Documents received 29/09/22
NTC Organisational Chart – Deliverables – Folder 7
NTC – T – Structure – Deliverables - Folder 7
IPC Workplan 22/23 - Deliverables – Folder 7
IPC Governance Structure & TOR – Deliverables - 7.01 – Folder 7 IPC
Environmental Matrix – 7.01 – Folder 7 IPC
TECC HAISCRIBE Stage 1 – 14/05/21 - Signed - 7.01 – Folder 7 IPC
NHS Tayside IPC OBC meeting 18/08/22, 06/09/22 – 7.04 – Folder 7 IPC
HAISCRIBE Stage 1 – 18/08/22 – Folder 26
Derogations Schedule – Folder 27

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 evidences that:</p> <p>The health 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 design process.</p> <p>IPC work programme and planned IPC audit programme for new building taking cognisance of any actual or perceived risks identified.</p>

NHS Scotland Assure Observations:

Infection Prevention workplan and governance structures provided show the commitment of the IPC team to embedding the NIPCM into the project and the wider board. This was also evidenced within the NHS Assure workbook submission document.

It is evident from the documents provided that IPC are being engaged in the project design, HAI-SCRIBE and risk assessment process. There is also a defined process for engaging with IPC colleagues on project derogations. Based on the KSAR evidence presented by NHS Tayside, NHS Scotland Assure note concerns that risks being identified from an IPC perspective are not being adequately addressed by the

project team at this stage, for example the co-ordination of services above the theatres.

Further evidence of IPC engagement was provided by NHS Tayside, who demonstrated that the IPC lead is involved with the board water safety group and the new board ventilation safety group.

The HAI-SCRIBE stage 1 is complete however as the board has moved to OBC stage and design has commenced, the Stage 2 HAI-SCRIBE should have been initiated to capture any risks with the design of the facility – there is no evidence that this process has commenced.

Documents referenced are:

NTC – NHS Assure Workbook Submission – Clarification info - Technical Documents received 29/09/22
NTC-T Risk Register v0.45 frozen for OBC costing - Clarification info - Technical Documents received 29/09/22
IPC Governance Structure & TOR – Deliverables - 7.01 – Folder 7 IPC
TECC HAISCRIBE Stage 1 – 14/05/21 - Signed - 7.01 – Folder 7 IPC
NHS Tayside IPC OBC meeting 18/08/22, 06/09/22 – 7.04 – Folder 7 IPC
HAISCRIBE Stage 1 – 18/08/22 – Folder 26
Derogations Schedule – Folder 27

Workbook Ref No.	Areas to probe	Evidence expected
7.3	How does the health board assure itself that the designers have a proper understanding of the infection prevention and control procedures required?	The health board evidences that: All relevant staff within the designers' organisation are provided with clear guidance on roles and responsibilities in relation to infection prevention and control. The contractors' organisation will provide evidence of education in relation to infection prevention in the built environment for all staff involved in the project.

NHS Scotland Assure Observations:

NHS Tayside advised that the designer's competencies had been assessed as part of their external design team framework procurement process (via Framework Scotland). Whilst NHS Tayside advised that examples of interview scorebooks could be shared with NHS SA this information was not provided by NHS Tayside as part of their KSAR evidence.

There is therefore no documented assurance in place with respect to the assessment of the designer's competence in relation to IPC and construction within healthcare facilities.

The Project Execution Plan describes all parties involved in the project team and their role within the project. No evidence is provided regarding previous healthcare construction experience or awareness of IPC requirements to the project. Refer to KSAR workbook Q1.15 for further details.

Documents referenced are:

NTC – NHS Assure Workbook Submission – Clarification info - Technical Documents received 29/09/22

NTC Organisational Chart – Deliverables – Folder 7

NTC – T – Structure – Deliverables - Folder 7

IPC Workplan 22/23 - Deliverables – Folder 7

IPC Governance Structure & TOR – Deliverables - 7.01 – Folder 7 IPC

TECC HAISCRIBE Stage 1 – 14/05/21 - Signed - 7.01 – Folder 7 IPC

NHS Tayside IPC OBC meeting 18/08/22, 06/09/22 – 7.04 – Folder 7 IPC

HAISCRIBE Stage 1 – 18/08/22 – Folder 26

Workbook Ref No.	Areas to probe	Evidence expected
7.4	How does the health board assure itself that equipment being proposed 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 NIPCM and manufacturers' instructions.

NHS Scotland Assure Observations:

As noted in KSAR Workbook Questions 1.4, 1.10 and 1.13 NHS Tayside have provided evidence with respect to their equipping processes. NHS Tayside have noted that currently the equipping list is based on a national equipping specification and that further refinement is required for project specific requirements.

At the time of the KSAR, review of proposals, including compliance with the NIPCM, had yet to be completed by the NHS Tayside IPC team. NHS Tayside noted at the weekly KSAR meeting that the IPC lead is to be involved in the equipping plan and that this will be taken forward by the equipping group at a later date.

Documents referenced are:

NTC – NHS Assure Workbook Submission – Clarification info - Technical Documents received 29/09/22

Medical equipment group definitions - 1.04 – Folder 1 Governance

NTCT Room by Room list - 1.04 – Folder 1 Governance

NTC-T Design Responsibility Matrix – Rv 09/09/22 - 1.05 – Folder 1 Governance

NTC Organisational Chart – Deliverables – Folder 7

NTC – T – Structure – Deliverables - Folder 7

TECC HAISCRIBE Stage 1 – 14/05/21 - Signed - 7.01 – Folder 7 IPC

*NHS Tayside IPC OBC meeting 18/08/22, 06/09/22 – 7.04 – Folder 7 IPC
HAISCRIBE Stage 1 – 18/08/22 – Folder 26*

3.7.2 Infection Prevention & Control Built Environment: 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.

3.7.2.1

Current drainage plans for the first-floor ward area pose a potential flood risk to the theatre suite below. This represents an operational risk to the theatre functioning but also an HAI risk from contamination of the area and possible mould growth following any flood incidents. Whilst the NHS Tayside IPC team and the designers have worked collaboratively to minimise the risk across the theatre suite, there are still elements of the drainage that are routed above the theatre areas.

NHS Scotland Assure recommend that the health board ensure all possible design options have been explored for the facility before finalising design plans to design this risk out and should that not be possible, ensure a fully documented risk assessment and HAI-SCRIBE is in place to capture any residual risks and mitigation measures.

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](#)

