

**NHS Lothian
Western General Hospital
Infrastructure Upgrade Ph 2
Key Stage Assurance Review**

**RIBA Stage 4
KSAR Report**

Table of Contents

1. EXECUTIVE SUMMARY	5
1.1 SUMMARY OF FINDINGS	8
1.2 PROJECT OVERVIEW	9
2. REVIEW METHODOLOGY	10
2.1 OVERVIEW OF NHS SCOTLAND ASSURE & THE KSAR PROCESS.....	10
2.2 KSAR PROCESS.....	11
2.3 APPLICATION OF STANDARDS & LEGISLATION.....	11
2.4 PROJECT TECHNICAL OUTLINE SUMMARY	13
3. KSAR REVIEW SUMMARY	14
3.1 PROJECT GOVERNANCE AND GENERAL ARRANGEMENTS	14
3.2 WATER AND INTERNAL PLUMBING / DRAINAGE SYSTEMS.....	28
3.3 VENTILATION	40
3.4 ELECTRICAL	48
3.5 MEDICAL GASES.....	59
3.6 FIRE	60
3.7 INFECTION PREVENTION & CONTROL BUILT ENVIRONMENT	66
4. APPENDICES	70
APPENDIX 1: GLOSSARY	70



Document Overview

NHS Lothian Western General Hospital Infrastructure Upgrade Phase 2 | Key Stage Assurance Review Report | FBC Stage

Prepared for:

NHS Lothian

Prepared by:

NHS Scotland Assure – Assurance Service

Document Control Sheet Revision History

Version	Date	Revision Details	Originator	Changes Marked
V1.0	03/07/2022	First Issue	NHS Scotland Assure	N/A
V2.0	31/10/2022	Issued to CIG for information – no factual accuracy comments received from NHS Lothian	NHS Scotland Assure	N/A

Approvals

This document requires the following signed approvals:

Version	Date	Name & Organisation	Role	Signature
V1.0	03/07/2022	Thomas Rodger	Principal Engineering Manager – NHS Scotland Assure	TGR
V2.0	31/10/2022	Thomas Rodger	Head of Engineering – NHS Scotland Assure	TGR

Distribution

This document has been distributed to:

Version	Date of Issue	Name	Role / Area
V1.0	03/07/2022	██████████	NHS Lothian
V1.0	03/07/2022	██████████	NHS Lothian
V2.0	31/10/2022	██████████	Health Infrastructure, Investment and PPE - Scottish Government Health and Social Care Directorates
V2.0	31/10/2022	██████████	Head of NHS Strategic Capital Investment

1. Executive Summary

As a result of the RIBA Stage 4 Key Stage Assurance Review (KSAR) and based on the information presented to NHS Scotland Assure (NHS SA), we are unable to support the project progressing to the Construction Stage at this time. The KSAR has identified a number of major findings that we recommend be addressed as a priority. NHS SA also recommend that NHS Lothian produce an action plan to resolve the potential risks identified.

Whilst NHS Lothian have demonstrated the urgent need to progress the infrastructure project as part of the wider Western General site masterplan, several elements of the scope appear to be reactive in order to progress the works. Whilst this may be a necessity to address critical resilience issues on site, NHS Scotland have concerns over the governance currently being applied by NHS Lothian to monitor the development of this scope and to ensure that design packages are suitably developed (NHS Scotland Assure acknowledge that NHS Lothian have appointed a Technical Advisor to review the design proposals, however it is not clear as to whether their comments have been addressed within the design proposals). A failure to do so could result in significant risks to quality/time/cost being transferred to the construction phase of the project.

Consequently, the level of design information presented is not consistently to a RIBA Stage 4 level of detail. Whilst several packages are noted as to be developed as Contractor Design Portions, the supporting basis of design is not, in the opinion of NHS Scotland Assure, suitably developed to fully inform project risks such as programme and cost.

The design as currently documented also contains potential single points of failure/lack of diverse cable routing in places with respect to the electrical infrastructure design. It is not clear to what extent these have been reviewed with key stakeholders and whether a documented resilience assessment has been completed and approved.

The KSAR also identified potential gaps within the project briefing information and supporting documentation. For example, as part of the original OBC document* prepared by NHS Lothian, requirements were outlined for various strategic reports to be prepared at subsequent stages of the project including resilience strategies, utilities strategies and net zero carbon commitments. There was no evidence to support that these reports had been developed, nor was any evidence provided to demonstrate how NHS Lothian had considered such elements when preparing the scope for the Stage 4 works. The absence of developed resilience and net zero strategies is of particular concern to NHS Scotland Assure.

*Note: NHS Lothian prepared an initial OBC report which was not subject to a KSAR – this document was provided by NHS Lothian as evidence for the Stage 4 KSAR, with the Health Board noting this document was currently being refreshed. Reference to the “OBC” within this KSAR report relates to Version 5 of this document issued on 18/02/21.

As part of the KSAR response, NHS Lothian provided some evidence to demonstrate stakeholders had been engaged through the development of the project works, however there were a number of gaps identified in the process including limited engagement with clinical, estates and IPC stakeholders. There was no consolidated list of stakeholders provided, nor was there a stakeholder management/briefing plan evidenced. The latter is an important item given the potential disruption to elements of the site that the infrastructure

works may cause. NHS Scotland Assure have concerns that the stakeholder engagement process did not appear to cover all elements of the works, with the KSAR identifying that several stakeholder groups were not consulted that could be impacted by the works (for example areas of the site that were assumed to be vacant were in fact occupied by clinical services).

Similarly, there was a lack of evidence to demonstrate dialogue with clinical user groups to assess and determine the impact the works may have on clinical services, particularly with respect to any isolations/outages of the electrical supplies, low temperature hot water (LTHW) and domestic hot water (DHW) and steam decommissioning works.

From an Infection Prevention and Control (IPC) perspective, whilst the works are not necessarily intrusive to clinical services, the nature of the groundworks and services impacted by the works require to be carefully considered. NHS Lothian provided evidence of a Stage 2 HAI-SCRIBE document, however this noted that further specific HAI-SCRIBES would be required. There is no evidence of these having been undertaken at this time. There are no records as to who was party to the development of the overarching HAI-SCRIBE. There is no evidence to support wider engagement with the Boards IPC team.

Whilst the KSAR has identified a number of actions for consideration, NHS Scotland Assure would recommend that NHS Lothian look to prioritise the following key items in order to mitigate the issues and risks identified above:

1. Produce a consolidated scope of works for the current phase of the project and make clear the demarcation of the works in relation to future phases of the masterplan. NHS Lothian should also ensure the project programme is updated to accurately reflect this.
2. Produce a consolidated project governance plan, clearly identifying roles and responsibilities of those involved in the project. The governance plan should clearly identify the required hierarchy of project approvals, with such matters clearly documented (particularly sign-off/approval of key decisions and design/project milestones).
3. Undertake a revised stakeholder mapping exercise to ensure all parties that could be impacted by the works are identified and appropriately consulted. Create a consolidated stakeholder list and consider who needs to be represented on matters relating to project governance.
4. Ensure consistent input to the design process, including review/approval of key milestone deliverables from relevant technical and clinical stakeholders, including estates and IPC colleagues.
5. Ensure that specific HAI-SCRIBES are undertaken and documented. All parties involved in the HAI-SCRIBE should be recorded and relevant sign-offs provided.
6. Undertake a gap analysis with respect to the current design proposals to ensure all relevant information is updated to a RIBA Stage 4 level of detail prior to commencement of the construction phase. All risks should be clearly identified and appropriate mitigation measures defined. All design assumptions should be validated.
7. Ensure the studies/reports as outlined in the original OBC documentation relevant to the works are undertaken, including resilience and net zero reports.
8. Ensure a documented assessment of potential single point of failures/diverse cabling routing is undertaken. This should be reviewed and approved by relevant stakeholders including clinical and technical colleagues. The assessment should consider potential impact on clinical and business continuity.

9. Undertake a review of the potential impact of isolations to electrical/water/ventilation systems.

NHS Lothian should also consider the wider actions identified within the KSAR report in relation to their current programme and prioritise as necessary.

1.1 Summary of Findings

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

Review	No. of Issues per category				
	1	2	3	4	5
Project Governance and General Arrangements	-	10	9	3	1
Water and Internal Plumbing / Drainage Systems	-	2	8	31	9
Ventilation	-	-	5	7	2
Electrical	-	9	4	3	-
Medical Gases	-	-	-	-	-
Fire	-	-	2	2	-
Infection Prevention and Control Built Environment	-	1	2	-	-

The following categories were used in relation to the findings:

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

1.2 Project Overview

The project seeks to replace the existing site-wide steam and electrical infrastructure systems with a solution based on a low temperature district heating network, which can utilise renewable and low carbon solutions. This is intended to provide increased resilience, increased efficiency and lower associated carbon impact. The renewable energy and low carbon solution is dependent upon the future provision of the Energy Centre which is currently scheduled for Phase 3 of the programme, and other phases of the WGH Masterplan.

The scope of the project has been augmented since the original OBC was written and now also includes the diversion of the incoming water main to the site and surface water drainage works. The water main diversion has been added to facilitate the construction of the new HV intake sub-station and allow the demolition of the Laundry building within Phase 2 works.

NHS Lothian confirmed in their 5-year Property and Asset Management Investment plan for 2017/18 that the replacement of the heat and power infrastructure at WGH was recognised as NHS Lothian's number one priority on the site. Both critical networks have reached the end of their normal serviceable life and need to be replaced, in order to maintain operations in a safe, resilient and effective manner. The existing systems are both costly to run and inefficient in terms of carbon emissions.

Phase 2 of the energy infrastructure programme is intended to maximise the reach of the investment in the new boiler and District Heat network installed in Phase 1 and to secure the power supply to the site in the context of the Phase 1 Master Planning Works. This aligns with the Oncology Enabling Works programme to provide heat and power to new and refurbished buildings, by matching increased loads and altering existing service routes. This should improve the safety of patients and public by increasing resilience and reducing the risk of failure associated with the steam and power systems. This strategy is also intended to minimise future disruption to the Phase 2 zone.

The proposed solution has considered the site wide strategy and is designed ready for future integration. The Phase 2 solution should not prejudice future site flexibility to upcoming developments and emerging Scottish Government policies. The proposals will also improve safety by eliminating confined spaces & high temperature conditions for maintenance personnel.

Through a workshop, NHS Lothian confirmed the most suitable location for the Energy as being the site occupied by the Laundry Building. Hence the inclusion of the demolition of the Laundry Building in this phase of the programme.

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.

The 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 Scotland 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 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; NHS health boards 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 Full Business Case (FBC) 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 Construction phase. Additionally, the KSAR at FBC will carry out an appropriate level of checking of the design calculations and solutions adopted.

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

2.2 KSAR Process

2.2.1 The Stage 4 KSAR for NHS Lothian Western General Hospital HV Infrastructure Upgrade project took place between January 2022 and June 2022.

2.2.2 To inform the findings of the KSAR, the Health Board were issued with key documents outlining the assurance question set and expected level of evidence and supporting documents in accordance with relevant legislation and guidance. This included the FBC KSAR Workbook and FBC 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 NHS Lothian. The detailed observations are recorded in an action plan that should be adopted by NHS Lothian following the review and subsequently monitored by them to ensure appropriate actions are completed in a timeous manner.

2.2.3 As part of the KSAR process, NHS Lothian issued a document transmittal log, which details the evidence provided in response to the KSAR Workbook and NHS SA recommended deliverables list. As part of an initial gap analysis, NHS SA reviewed the transmittal log to ensure all documents had been successfully received. The transmittal log provides a version history and audit trail of information reviewed.

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. This includes, amongst others, specific healthcare engineering guidance.

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

The project forms part of a wider Energy Infrastructure programme of works being undertaken by NHS Lothian as outlined in 1.2 above.

This KSAR review covers the RIBA Stage 4 design for Phase 2 of the Energy Infrastructure programme of works. The project programme of works for Phase 2 can be split into the following distinct categories, power, heat, and mains water.

Power

The power elements of the Phase 2 masterplan proposals include the following:

- Scottish Power main incomer relocation from existing laundry to new HV substation.
- Provision of new HV substations and HV/LV switch rooms to enable the laundry demolition.
- Diversion of existing HV cables and connection into new HV switch rooms.
- Provision of new secondary substation to the south of the site adjacent ward 1.
- Provision of new generator to feed into secondary substation LV supplies.
- New dual LV feeds provided to existing switchboards in Ward 1, Linac and Renal units.

Heat

The Heat element of the Phase 2 masterplan proposals includes the following:

- Decommissioning & replacement of all existing steam/Low Temperature Hot Water (LTHW) and steam/Domestic Hot Water (DHW) heat exchange (HX) plant within the Department for Clinical (DCO) and Cyclotron plantrooms, as well as new connections from the District Heat Network (DHN) pipework infrastructure.
- Decommissioning and removal of all existing redundant steam infrastructure pipelines and ancillary plant internally within the DCO Plantroom, Cyclotron roof and Cancer Care Unit roof.
- New heat exchangers plant within Scottish Health Service Centre (SHSC) undercroft plantroom
- New secondary LTHW and DHW flow and return pipework shall be routed across Hospital Main Drive into the existing Cyclotron plantroom.

Mains Water Diversion

To water mains diversion works (to facilitate demolition of the Laundry Building) includes the following:

- Existing mains water pipework routed through the footprint of the HV intake substation to serve the Estates building to be diverted.
- Mains water pipework routed through the existing Laundry building to be stripped out.

3. KSAR Review Summary

The following narrative relates directly to the FBC 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.
NHS Scotland Assure Observations: There has been no previous KSAR undertaken.		

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.
NHS Scotland Assure Observations: NHS Lothian did not provide any evidence in relation to this question. They noted that the project was being progressed under the Health Board's delegated authority following prior agreement with CIG.		

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: Due to the nature and scope of this project, NHS Lothian have deemed the NDAP and AEDET processes as not being required. This is noted by NHS Lothian on page 33 of the OBC document. As NHS Lothian have indicated this is being funded under their delegated authority, they noted that they did not engage with NDAP or AEDET. Documents referenced: <ul style="list-style-type: none"> SC04-2_WGH Energy Infrastructure OBC phase 2 v5. 		

Workbook Ref No.	Areas to probe	Evidence expected
1.4	Does the Health Board continue to demonstrate service / clinical input into design decisions based on a current and comprehensive knowledge of patient cohorts?	Recorded and updated input taken from service lead(s) / clinician(s) about relevant patient cohort characteristics and their typical needs in terms of the accommodation's environment, safety and infection control standards. Demonstrable expertise of service lead(s) / clinician(s) in providing this advice.

NHS Scotland Assure Observations:

NHS Lothian have provided limited evidence to demonstrate service / clinical input into design decisions. NHS Lothian have commented during the review that given the location of the work being distanced from occupied clinical areas they have concentrated their consultations and interaction with Estates, Capital Planning and General Hospital Management. During the KSAR it was noted that some areas designated as unoccupied in the Neurosciences building are in fact being used to deliver patient services.

On page 44 of the NHS Lothian OBC report a table is included under '*5.2.1 Engagement with Stakeholders*' which states that engagement has taken place with the Staff potentially affected by this proposal including clinical, up to the time that the NHS Lothian OBC report was produced. NHS Lothian state that following this engagement a '*stakeholder engagement and communication plan*' was to be developed. No supporting documentation of this engagement has been provided, and a stakeholder engagement and communication plan has not been provided.

NHS Lothian include reference in the OBC to the WGH Master planning group. This group has an extensive and varied membership of stakeholders, who it is stated '*have been fully involved through meetings and briefing papers in the evolution of the masterplan site development framework including the energy infrastructure strategies*'. There has been no supporting evidence provided in the form of minutes and attendees to show this engagement.

NHS Lothian set out the Governance and assurance arrangements on page 9 of the OBC, which states that arrangements are in line with the '*NHS Lothian Capital Projects Assurance and Resources Framework*'.

NHS Lothian have provided a draft Project Execution Plan (PEP) which on page 11, NHS Lothian confirm the membership of the Programme Steering Group (PSG) along with their respective roles. NHS SA note that the Site Director for WGH sits on this Group, but there is no indication of representation for Clinical Directorates. No examples of minutes to detail discussions, decisions and actions of this group have been provided.

The project programme is a key management tool for any project, NHS Lothian have provided the programme version WGH SCO-04 Infrastructure Phase 2_Contract Programme Draft-Rev D_21-06-25. At the time of the KSAR this programme was circa 6 months old and it was not clear from the KSAR responses provided by NHS Lothian what processes they are implementing to ensure that the programme is reviewed/updated regularly and to ensure that it accurately represents the scope of works being taken forward.

Documents referenced:

- SC04-2_WGH Energy Infrastructure OBC phase 2 v5.
- WGH EXEC REPORT PRESENTATION APRIL 18 FINAL.
- WGH Infrastructure - PEP - January 2021 Rev.0 DRAFT.
- WGH SCO-04 Infrastructure Phase 2_Contract Programme Draft-Rev D_21-06-25.

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 quality and safety standards.	<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 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>

NHS Scotland Assure Observations:

NHS Lothian have provided limited evidence that the Project team demonstrate a unified and recorded understanding of needs of main users and patient cohorts and how this has influenced the design and execution of the project.

NHS Lothian identifies the Programme Board and Project Team on pages 41 and 42 of the OBC, Tables 8 and 9 respectively. Both tables identify the individual members of the groups

along with their capability and experience. However, no records of meetings have been provided for the Programme Board or Project Team meetings.

There is limited evidence of engagement with the IPC Team. A Stage 3 HAI-SCRIBE review of the overall project has been completed however no signatories are included and there are references to separate HAI-SCRIBES that are to be undertaken which were not evidenced. NHS Lothian acknowledged that further, more detailed, reviews are required for this stage of the project and that these have yet to take place.

there is a lack of evidence provided regarding the level of engagement with clinical groups in relation to power outages when switching supplies, isolations and downtime associated with Low Temperature Hot Water and Domestic Hot Water services. There has been no evidence submitted to confirm engagement with relevant stakeholders, including documenting of these risks.

NHS Lothian provided no evidence of a consolidated list of all stakeholders, service users or patient cohorts potentially impacted by this project. The KSAR identified a number of potential areas that may be impacted by the works that did not appear to have been considered initially by NHS Lothian and NHS Scotland assure recommend that the Health Board produce a fully updated list of stakeholders, together with their updated stakeholder engagement plan.

NHS Lothian undertook a briefing of stakeholders in the form of an event held on 21 July 2021 to share the presentation titled '*Infrastructure Phase 2 Overview Methodology July 2021*'. Although the names of attendees are provided, the designated roles of the stakeholders are not. It is therefore not possible to understand the clinical directorates, hospital management, Estates & Facilities and others who have been appraised of the project by attending the event.

Several documents have been provided (final 6 documents in the list below) as part of the review relating to the site logistics and carrying out the enabling works, authored and developed by the Main Contractor. However, NHS Lothian have not confirmed who this information has been shared with within the Health Board, including details of departments who will be affected by the works.

Documents referenced:

- SC04-2_WGH Energy Infrastructure OBC Phase 2 v5.
- WGH SC04 Phase 2 FBC Infrastructure Scope Feb 21.
- WGH SC04 Phase 2 Infrastructure Scope Feb 21_Internal.
- Infrastructure Phase 2 Overview Methodology July 2021.
- 210720 WGH Infrastructure Phase 2 Methodology Presentation Attendee List rev 0.
- Delivery Schedule WC 31.01.2022.
- EIP2 Delivery and Coordination Proposals 25.09.2021.
- EIP2 Isolation Schedule 28.01.22 (012).

- EIP2 Site Set Up-PP 29.09.21.
- EIP2-Pedestrian and Vehicular Access TM Plan.
- Microsoft Word - RMF Infrastructure Weekly Look Ahead Monday 31 January.

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 FBC 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 advisors (IPCN and ICD) to be used throughout the final design stages, and details of the resource plan in place to ensure continuity into the construction phase.</p>

NHS Scotland Assure Observations:

A full list of standards and SHTM documents is provided within the specification document however these are not refined to be project specific and cover other standards that may not be applicable. There is no evidence identified for the process on how the final appropriate guidance list will be agreed, signed off, monitored, reported against and if necessary escalated / adjudicated throughout the design, construction, and commissioning stages.

NHS Lothian have not provided confirmation that a Building Warrant is in place for the Sub-station Building but have included a start of work notification 'Model Form J'.

Documents referenced:

- 211001WGHInfraPhase 2Stage 3 HAI SCRIBE ConsandRefurbDRAFT.
- ufm213 (Planning Decision Notice).
- Form+J++Notice+regarding+Start+of+Work.

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 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?</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>
-----	---	--

NHS Scotland Assure Observations:

No evidence has been provided of IPC or clinical input into any derogations, or of how IPC specialists will be engaged in future decision making, other than expressions of intent to carry out HAI-SCRIBE reviews for specific elements of the project. Given the stage the project is at, this input should have been recorded prior to now.

There is minimal evidence that IPC is fully embedded in the project team. Emails between the Project and IPC Teams suggest that IPC are engaged for specific purposes only (e.g. completion of HAI-SCRIBE documents) rather than acting as full members of the project team.

Documents referenced:

- N/A.

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

		of any actual or perceived risks identified provided.
<p>NHS Scotland Assure Observations:</p> <p>No evidence has been provided as to the adoption of the NIPCM by the Board. The NIPCM is intended to be used by all those involved in care provision and includes elements relating to safe management of the care environment; all projects should be assessed for impact on care environments on the hospital site, rather than it being assumed that there will be none if the work is not being carried out in these areas.</p> <p>There is minimal evidence that IPC are fully embedded in the project team. Emails between the Project and IPC Teams suggest that IPC are engaged for specific purposes only (e.g. completion of HAI-SCRIBE documents) rather than acting as full members of the project team.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • National Infection Prevention and Control Manual. • 211001WGHInfraPhase 2Stage 3 HAI SCRIBE ConsandRefurbDRAFT. 		

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.
<p>NHS Scotland Assure Observations:</p> <p>There is limited evidence to support that a co-ordinated infection prevention & control strategy is being adopted by NHS Lothian. NHSSA acknowledge that whilst the number of clinical areas directly impacted by these works will be minimal other than connections there is an IPC risk of unintended construction related issues.</p> <p>As noted in 1.8 above, there is limited evidence of engagement with the IPC specialists outwith the overarching HAI-SCRIBE process.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> - N/A. 		

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 FBC. For example, evidence that the proposals for equipping incorporate IPC requirements?
------	--	---

NHS Scotland Assure Observations:

As noted in section 1.8, an overarching HAI-SCRIBE document has been completed for Phase 2, which expresses the intention to complete more detailed reviews for specific elements of the project although these have not yet been carried out. Given the stage of the project, NHS Scotland Assure would have expected the specific HAI-SCRIBES to be in place. There is little evidence of the Board integrating the project with wider IPC requirements.

Documents referenced:

- 211001WGHInfraPhase 2Stage 3 HAI SCRIBE ConsandRefurbDRAFT.

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>
<p>NHS Scotland Assure Observations:</p>		

NHS Lothian have provided limited evidence to identify their planned approach for managing the design process to ensure successful compliance with agreed and approved standards.

The evidence provided demonstrates limited engagement with key stakeholders such as Authorising Engineers, Estates FM teams, IPC teams and clinical groups has taken place. This has been acknowledged by NHS Lothian during KSAR workshop discussions.

NHS Scotland Assure have concerns that there is a reliance on the PSCP to fulfil these requirements and a lack of governance demonstrated by the Board through the evidence provided.

NHS Lothian have employed a technical advisor to review design, however a number of the design documents provided as part of the KSAR response by NHS Lothian (e.g. drawings) do not appear to have been updated to take cognisance of the technical advisor comments.

There are also several documents that have been reviewed by the Board's technical advisors that have not been provided to NHS SA for review (e.g. plant & equipment schedules, scope of works specification). The review undertaken by NHS Lothian's Peer Reviewers also excluded the works associated with the mains water diversion.

NHS Lothian Governance arrangements for the project are set out in the OBC within the Management Case section 5.1.1 page 39. A diagram shows the organisational governance and reporting structure, which in descending order is NHS Lothian Board, Lothian Capital Investment Group, Finance & Resources Committee, Project Board, Project Team, with connections to the WGH Master Planning Group and WGH Hospital Management Group /Acute Senior Management Team. On page 40 the project reporting requirements are identified, which as a minimum will include the Project Owner will provide regular reporting to the following relevant groups',

- Energy Infrastructure Board Electronic report submission – Monthly Formal meeting – Monthly / Quarterly as required.
- WGH Masterplanning Group Attendance and update at quarterly meetings
- LCIG Quarterly update
- Cancer Capital Programme Board Quarterly update

NHS Lothian have provided limited documentation in support of the above governance arrangements.

NHS Lothian have provided evidence of engagement with the NHS Lothian Capital Investment Group (LCIG) at various milestones throughout the project. As part of the KSAR response, the Health Board have noted that the project has been deemed to fall under their delegated authority following discussions with Scottish Government Capital Investment Group. Whilst engagement with LCIG has been demonstrated, no evidence of final approval of scope/costs has been evidenced and as such NHS Scotland Assure note this as a potential risk to the project.

NHS Lothian have provided samples of minutes of the Energy Programme Board Meetings which occur every two months as evidence, these minutes also include the names of

attendees. *Energy Programme Board - 210622_minutes* Line 28 *Energy Programme Board - 210831 notes final*, these documents provide assurance of the governance and monitoring of the project by the Energy Programme Board. However, the Energy Programme Board membership is not confirmed, therefore roles of people attending cannot be confirmed. Subsequently it has not been possible to identify appropriate stakeholder representation at these meetings e.g. Estates and or Site Director/Clinical representation.

NHS Lothian have provided a draft Project Execution Plan (PEP). The name on the cover identifies this as a 'Programme Execution Plan' and it refers to Phases 1, 2 and 3. The PEP is incomplete and not signed. NHS Lothian should update and complete the PEP and obtain sign off.

Section 3.0 of the PEP includes an organogram for the 'Programme Organisation'. The organogram notes a Programme of Works Steering Group and Programme Board, Technical Meetings and Design Team Meetings. Section 4.0 Also captures monthly Reporting Requirements and Communications. There is inconsistency in the PEP to the references contained in the OBC. The correct references/titles of the groups should be the same across all documentation.

NHS Lothian have provided the following reports to the LCIG as evidence of ongoing project governance within the Health Board. '11.05.21_WGH Energy Infrastructure_Flood and Laundry Inclusion_LCIG' & '14.06.21_WGH Energy Infrastructure_LCIG Update' and

'SCO4 Energy Infrastructure Phase 2_Advance Works Paper dated 11.08.2021 (LCIG Paper)'. The reports cover keys issues on the project and update LCIG on the scope, costs and progress. Notably these confirm of the Demolition of the Laundry Building is to be included in the project and also requests the approval of LCIG to commence the Advanced Works Package. This evidences the reporting and governance process; however, confirmation that the approvals have been granted were not provided.

Documents referenced:

- SC04-2_WGH Energy Infrastructure OBC phase 2 v5.
- SCO4 Energy Infrastructure Phase 2_Advance Works Paper 11.08.2021.
- 06.01.22_WGH Energy Infrastructure Phase 2_LCIG Update.
- Energy Programme Board - 210622_minutes.
- Energy Programme Board - 210831 notes final.
- WGH Infrastructure - PEP - January 2021 Rev.0 DRAFT.
- 11.05.21_WGH Energy Infrastructure_Flood and Laundry Inclusion_LCIG.
- 14.06.21_WGH Energy Infrastructure_LCIG Update.
- SCO4 Energy Infrastructure Phase 2_Advance Works Paper dated 11.08.2021.
- 'SCO4 Energy Infrastructure Phase 2_Advance Works Paper dated 11.08.2021 (LCIG Paper).

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 this requirement is being managed and how it fits with the project governance arrangements</p> <p>Plans to identify any gaps in the procurement approach that may require to be addressed.</p> <p>Evidence on how Infection Prevention and Control are involved with the conceptual procurement approach to the design stage and future plans for project.</p> <p>Evidence that the Health Boards selected procurement route has gone through the Board's Governance channels.</p>

NHS Scotland Assure Observations:

NHS Lothian have provided information on the procurement journey with evidence of the plans and process on how the Board have procured the services of the PSCP.

NHS Lothian have not provided evidence as to the involvement of IPC specialists within the procurement approach.

NHS Lothian state in the OBC, item 3.1 Procurement Strategy that roles & responsibilities of external contractors are defined and delivered through the Framework Scotland 2 procurement programme) under NEC3 Contract processes, principally Lead Advisor roles (Project Management, Cost Advisor and Technical Advisors) and Project Delivery PSCP (including Technical and Design Development). The adoption of the Frameworks provides assurance that appropriate procurement arrangements are being followed, however no further evidence was provided of the actual evaluation processes utilised to select the successful bidders.

The High Level Information Pack (HLIP) has been provided for the appointment of a Principal Supply Chain Partner (PSCP) to assist with the delivery of a programme of works at the Western General Hospital. The HLIP includes the details on the process of selection, evaluation and scoring methodology and basis of awarding the contract. There have been no specific documents provided to confirm the actual evaluation and scoring process and award to the PSCP, or that the selected procurement route has gone through the Board's Governance channels.

NHS Lothian have referred to the risk allocation process and the risk register in the OBC under 3.3 page 34. The risk register has also been provided. The risk register does not appear to have been updated during the Stage 4 design and does not appear to fully consider all service risks.

Documents referenced:

- SC04-2_WGH Energy Infrastructure OBC phase 2 v5.
- NHSL WGH HLIP Version 5.1.
- WGH Infrastructure Phase 2 - Risk Register Rev 4 13.10.21.

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).	Evidence that the procurement of the lead designer will encompass these areas in their oversight and sign off of the complete design. Evidence that a clear demarcation of design responsibility is being developed.
<p>NHS Scotland Assure Observations:</p> <p>NHS Lothian provided the document titled 'Contractor Design Packages' (CDP's). This document is a simple list of works identified to be contractor designed. NHS Lothian have not provided any other documentary evidence on how this will be managed, governed, or signed off.</p> <p>The demarcation of design responsibility & co-ordination for these packages is not clear. The drawings and specification documents submitted for the electrical review show most of the design elements being by the PSCP which does not align with the CDP's list provided.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • Contractor Design Packages. 		

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.
<p>NHS Scotland Assure Observations:</p> <p>Limited evidence has been provided by NHS Lothian to confirm that the Board has completed a commissioning plan for the project.</p> <p>Commissioning of the works is referred to under 5.5 on page 47 of the OBC, 'A project specific commissioning plan will be developed by the contractors commissioning manager'. No evidence of this document was provided as part of the KSAR response.</p>		

NHS Lothian have appointed a Technical Advisor to undertake a design review on their behalf and to provide support during the construction phase, inclusive of commissioning and handover.

Documents referenced:

- SC04-2_WGH Energy Infrastructure OBC phase 2 v5.

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:

Whilst NHS Lothian have provided information relating to various stakeholder groups within the KSAR response, there is no consolidated duty holder matrix that outlines all required roles and responsibilities.

NHS Lothian identifies the Programme Board and Project Team on pages 41 and 42 of the OBC, Tables 8 and 9 respectively. Both tables identify the individual members of the groups along with their capability and experience.

Of the identified roles within the various documents, there are gaps that have been identified through the KSAR. These include the role of Lead Project Manager. There are also gaps with respect to IPC oversight and input roles. It is also unclear how NHS Lothian are managing overall resource on the project.

Documents referenced:

- SC04-2_WGH Energy Infrastructure OBC phase 2 v5.
- WGH Infrastructure - PEP - January 2021 Rev.0 DRAFT.

3.1.2 Project Governance and General Arrangements: 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.

3.1.2.1	Advanced Works Not all the design information provided as part of the KSAR works was to a RIBA Stage 4 level of detail and it was not fully clear how this would impact on the extent and status of the enabling works. NHS Scotland Assure are therefore concerned that elements have not been fully evidenced and that works are being progressed at risk.
3.1.2.3	Project Evaluation Plan NHS Lothian note in the OBC on page 49 that 'A full Project Evaluation Plan will be presented in the Full Business Case'. A copy of the Project Evaluation Plan has not been provided as part of the KSAR response. <i>Documents referenced:</i> – SC04-2_WGH Energy Infrastructure OBC phase 2 v5.

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> <p>Evidence that all contractors and sub-contractor competency checks have been completed and signed off.</p>

NHS Scotland Assure Observations:

NHS Lothian have appointed their Principal Supply Chain Partner (PSCP) and designers via the Health Facilities Scotland (HFS) Framework Scotland 2. The Board has stated the competency review and checks of the PSCP and their design teams responsible for water and drainage design has been undertaken as part of the HFS Framework Scotland 2 procurement process.

In addition to the above a High Level Information Pack (HLIP) details NHS Lothian's requirements for the appointment of the PSCP to assist with the delivery of a programme of works at the Western General Hospital. However, this document does not detail how the Board has assessed the competency of the PSCP and their appointed consultants & sub-contractors to undertake the design, installation and commissioning of the water and drainage works associated with this project.

There is also no evidence provided by the Board that demonstrates their governance around re-evaluating the competencies of the PSCP and their supply chain partners where the project scope of works is amended and updated.

The documentation provided for this KSAR includes email correspondence that confirms NHS Lothian has engaged with their Authorising Engineer for Water (AE (W)) regards the project works being undertaken

The documentation provided to the AE (W) by NHS Lothian for review does not contain all of the information relevant to the water systems that has been provided to NHS SA review. For example, the documentation provided to the AE (W) did not include the Low temperature hot

water (LTHW) heating works associated with the DCO plantrooms or details of the mains water diversion works.

The AE (W) has provided NHS Lothian with review comments on the documentation provided, which NHS Lothian has responded too. However, there was a specific comment raised by the AE requesting that new system should be surveyed and risk assessed from a legionella perspective prior to wetting the system. The AE (W) also notes that once the system is wetted a water safety plan shall be provided from this point onwards until project handover. NHS Lothian have noted in their response to the AE that these requirements would be incorporated into their documentation however from the documentation reviewed by NHS SA does not provide evidence that these items have been actioned.

The AE (W) also noted that his review did not extend to making comment on the pre-commissioning cleaning of the LTHW systems. There is no evidence provided by NHS Lothian that any requirements for the pre-commissioning cleaning of the LTHW systems has been reviewed by those responsible for the cleanliness of the LTHW systems (e.g. NHS Lothian's Authorised Person (AP) or Responsible Person (RP)).

Documents referenced:

- High Level Information Pack for appointment of Frameworks Scotland 2 Principal Supply Chain Partner, December 2017 (NHSL WGH HLIP Version 5.1.doc).
- Email from NHS Lothian Project Manager to NHS AE (W), 03/09/2021 (NHS Lothian – Western General – Energy Infrastructure Project_Water AE Email.msg).
- Email from NHS Lothian M&E Design Consultant to NHS Project Manager, 02/11/2021 (Water AE KSAR Review Comments - HK Response.msg).

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>

		Are plant/tank rooms, IPS sections, horizontal distribution runs and risers appropriately sized for the equipment being installed and facilitate safe adequate maintenance.
--	--	---

NHS Scotland Assure Observations:

The documentation provided to NHS SA for this KSAR review includes 2-Dimensional CAD drawings (general arrangement layout drawings and schematics) for works that are being undertaken within existing plantrooms (DCO, Cyclotron and SHSC buildings) and works associated with the diversion of the existing external mains water. In addition to the drawing information, a series of materials and workmanship specifications and an Access and Maintenance strategy have been provided.

NHS Lothian's designers confirmed at the Mechanical services KSAR workshop held on Wednesday 16 March 2022, that there has been no Building Information Modelling (BIM) undertaken on this project. NHS Lothian designer's has confirmed their scope of works included the production of 2-dimensional drawing information only and that there was no requirement for the PSCP to undertake BIM modelling in the subsequent construction stage, with respect to producing their working and installation information.

It is unclear from the evidence provided as to what this statement is based upon, nor if NHS Lothian have considered the requirements to comply with Scottish Government policy with respect to BIM requirements for new projects commencing procurement procedures from April 2017, nor if the Scottish Government BIM grading tool has been used to support this assessment. There is no evidence which indicates the Board's acceptance nor agreement with their designer's position in relation to the use of BIM.

Whilst 2-dimensional layout drawings have been provided there is no sectional drawing information provided for the works being undertaken within the plantrooms to demonstrate spatial co-ordination has been undertaken and that future flexibility has been considered. No equipment schedules have been provided detailing the specified plant dimensions that would subsequently confirm that the 2-dimensional plant layouts have been drawn to scale taking cognisance of the plant dimensions and associated access and maintenance requirements.

The Plant Access and Maintenance Strategy document details NHS Lothian's approach to requirements for normal and routine maintenance of plant as well as end of lifecycle replacement. Supplementary drawing information has been provided within this document noting proposed access routes for future maintenance. However, the resolution of the report has resulted in the drawing information not being legible. The document also does not appear to clearly address space for future flexibility or any limitations around this due to the installations being within existing plantrooms.

NHS Lothian's Peer Reviewer's have also produced a report that notes concerns around the lack of evidence provided to demonstrate spatial co-ordination. The key themes of the report

in relation to spatial co-ordination are that no co-ordinated sections have been provided and that plant drawings do not adequately define the maintenance space required.

The evidence provided does not demonstrate that the projects approach to access, maintenance and future flexibility has been reviewed with NHS Lothian's Estates team that are responsible for the Facilities Management (FM) of the Western General site. NHS Lothian acknowledged at the Mechanical Services KSAR workshop on Wednesday 16th March 2022 that engagement with the Estates team had been very limited.

NHS SA do not consider the evidence provided to demonstrate spatial co-ordination and future flexibility as being sufficient for a Full Business Case (FBC) submission at RIBA Stage 4 design. NHS Lothian's technical advisor review report also supports this view and highlights concerns around the lack of information provided to demonstrate space for future maintenance and additions/modifications. The response to this peer review puts a reliance on the PSCP and their sub-contractors to demonstrate these requirements through their working and installation drawings at the next stage.

Documents referenced:

- PSCP Stage 4 MEPH Peer Review Report (Infrastructure Works Phase 2 Stage 4 MEPH Design Report -D02.pdf).
- Cyclotron & DCO Plantrooms - Access & Maintenance Strategy Report.pdf.
- SCO04-H&K-IFR-00-DR-M-50-001_Cyclotron Proposed New LTHW HX Plant – Block Plant Layout (within SHSC P Rm)_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-002_Cyclotron Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-003_Cyclotron Plantroom LTHW DHW Proposed New Connections_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-004_DCO Proposed New LTHW HX Plant – Block Plant Layout_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-005_DCO Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-006_DCO Plantroom LTHW DHW Proposed New Connections_Ver2.pdf.

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 are incorporated in the design?	Evidence that the 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.

NHS Scotland Assure Observations:

With the exception of a derogation schedule template, there is no evidence provided by the Board that confirms their governance around variations and derogations for this project.

NHS SA have highlighted an omission from the KSAR evidence in relation to SHTM 04-01 guidance (SHTM 04-01 Part 1, Clause 16.9 Commissioning) due to the lack of designers commissioning brief being provided for the works being undertaken.

NHS Lothian confirmed during KSAR project progress meetings and discipline workshops that they consider there are no derogations or variations associated with the works being undertaken.

This statement has not been evidenced by the Board through the documentation provided for review. NHS SA have concerns that there are no formal procedures implemented to review potential variations and/or derogations with the relevant stakeholders. There are also no records to confirm how the conclusion that there are no variations or derogations on this project has been determined.

Documents referenced:

- Schedule of Derogations Master Template_July 2021.xls.

Workbook Ref No.	Areas to probe	Evidence expected
2.4	Water Management Strategy	<p>Assessment of 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 Board has provided no evidence in relation to how they have assessed their water management strategy and how this relates to their project, its associated scope of works, specifications and the applicable guidance.

Whilst evidence has been provided to demonstrate dialogue with the AE(W) and AP for water systems there is no evidence to demonstrate that there has been involvement with NHS Lothian's Water Management Group.

NHS SA have concerns around the lack of evidence and governance that demonstrates that the Board's water management strategy has been given due consideration.

Documents referenced:

- Email from NHS Lothian Project Manager to NHS AE (W), 03/09/2021 (NHS Lothian – Western General – Energy Infrastructure Project_Water AE Email.msg).

- Email from NHS Lothian M&E Design Consultant to NHS Project Manager, 02/11/2021 (Water AE KSAR Review Comments - HK Response.msg).
- Email from NHS Lothian Estates to NHS Lothian Project Manager, 25/10/2021

Workbook Ref No.	Areas to probe	Evidence expected
2.5	Water governance arrangements	Has the Board commenced its planning and recorded 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 the Board and is it clear how this project will interface with this existing group?

NHS Scotland Assure Observations:

There is no evidence provided in relation to NHS Lothian's current water governance arrangements, how the Board will ensure it adheres to the water management strategy and if this project will have any impact on the current governance arrangements associated with the water management strategy.

As noted in 2.4 above, no evidence has been provided by the Board that demonstrates how the project has interfaced with the existing water management group.

NHS SA have concerns around the lack of evidence that demonstrates that the Board has followed their water governance arrangements.

Documents referenced:

- Email from NHS Lothian Project Manager to NHS AE (W), 03/09/2021 (NHS Lothian Western General – Energy Infrastructure Project_Water AE Email.msg)
- Email from NHS Lothian M&E Design Consultant to NHS Project Manager, 02/11/2021 (Water AE KSAR Review Comments - HK Response.msg)
- Email from NHS Lothian Estates to NHS Lothian Project Manager, 25/10/2021

Workbook Ref No.	Areas to probe	Evidence expected
2.6	Evidence that the Health Board is developing commissioning proposals.	Evaluation of the suitability of the proposed plans in the context of the FBC, are these sufficient to meet the requirements of the project, guidance and the design of the system.

		<p>Evidence that the design has considered the commissioning of the water system including:</p> <ul style="list-style-type: none"> • Safe storage of materials • Agreed type of chemical (to avoid warranty and corrosion issues) • Adequate time scale • Competency checks on all contractors • Water sampling scope <p>Water sampling test results and approval process.</p>
<p>NHS Scotland Assure Observations:</p> <p>SHTM 04-01 Part A, Clause 16.9 states ‘The designer should prepare a commissioning brief for use by the contractor’s commissioning engineer’. There is no evidence of a specific designers commissioning brief – only generic commissioning notes with the specification.</p> <p>NHS Lothian’s documentation includes a Flushing, Testing, Sterilisation and Pre-Commissioning specification however the documentation is generic in nature and is not site/project specific with references to elements of work that are not part of the scope of this project (e.g. reference to Thermostatic Mixing Valves (TMV’s), testing of sentinel points in the system).</p> <p>There is also no evidence provided confirming any specific water safety group requirements or any local water management procedures have been incorporated within the documentation provided. There is also limited reference to SHTM 04-01 with respect the Commissioning & Testing of the Water systems.</p> <p>The specification does not provide sufficient evidence to confirm that items such as the agreed type of chemicals, adequate timescales, the scope for water sampling results and the associated water sampling approval process has been considered.</p> <p>There is also no evidence to confirm the local water safety group has reviewed and considered the proposals to confirm that all necessary testing and commissioning requirements have been incorporated into the PSCP’s scope of works.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • WGH, Edinburgh SC04 Infrastructure Phase 2 - Flushing Testing Sterilisation and Pre Commissioning Specification_Flushing Testing Sterilisation and Pre Commissioning Specification_Ver1.pdf. 		

Workbook Ref No.	Areas to probe	Evidence expected
------------------	----------------	-------------------

2.7	Evaluation of the Health Boards planned preventative maintenance (PPM) proposals.	<p>Has the Health Board commenced its planning and recorded the PPM requirements and approach to ensure appropriate levels of maintenance, comprehensive statutory compliance and robust management processes, including:</p> <ul style="list-style-type: none"> • Adequate numbers of staff • Water management PPM including all outlets, TMT & TMV, plumbing and drainage systems, etc?
<p>NHS Scotland Assure Observations:</p> <p>No evidence has been provided to confirm that the Board has commenced its planning and considered its approach with regards to PPM on this project.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> - N/A. 		

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>There are a number of instances of below ground pipework (LTHW, DCW, DHW etc) entering and exiting plantrooms.</p> <p>Some drawings refer to the structural engineer's drawings for further detail with respect to the builders work detail associated with these works however, these drawings have not been provided for review.</p> <p>There is limited information on the proposed pipework services entry/exit details and the associated builders work in connection with these elements.</p> <p>The drawing information provided does not provide evidence that the specified manufacturers installation details and the associated builders work has been considered.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • SCO04-H&K-IFR-00-DR-M-50-001_Cyclotron Proposed New LTHW HX Plant – Block Plant Layout (within SHSC P Rm)_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-002_Cyclotron Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-003_Cyclotron Plantroom LTHW DHW Proposed New Connections_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-004_DCO Proposed New LTHW HX Plant – Block Plant Layout_Ver2.pdf.
---------	--

	<ul style="list-style-type: none"> • SCO04-H&K-IFR-00-DR-M-50-005_DCO Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-006_DCO Plantroom LTHW DHW Proposed New Connections_Ver2.pdf. • SCO04-H&K-IFR-XX-DR-M-50-101_Phase 2 Site Layout, Proposed M&E Services Phasing Strategy_Ver2.pdf. • SCO04-H&K-IFR-XX-DR-M-50-102_Phase 2 Site Layout, Proposed LTHW Heating Pipework Layout_Ver3. • SCO04-H&K-IFR-XX-DR-M-50-105_Mechanical Services, District Heating Network, Details Shee_Ver2.
<p>3.2.2.2</p>	<p>There are notes on various drawings stating that asbestos may be present and will require approval from NHS Lothian to proceed with any works in these areas.</p> <p>Whilst NHS Lothian have stated at the Mechanical Technical Workshop on 16th March 2022 that asbestos surveys have been undertaken, no evidence has been provided for review to confirm the status of asbestos surveys undertaken to date and what is known from NHS Lothian's existing asbestos register.</p> <p>To the best of NHS SA's knowledge, no works have currently been undertaken in areas where asbestos is present. NHS SA would strongly recommend that all necessary surveys are undertaken in advance of any works progressing in areas where asbestos may be present.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • SCO04-H&K-IFR-00-DR-M-50-001_Cyclotron Proposed New LTHW HX Plant – Block Plant Layout (within SHSC P Rm)_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-002_Cyclotron Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-003_Cyclotron Plantroom LTHW DHW Proposed New Connections_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-004_DCO Proposed New LTHW HX Plant – Block Plant Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-005_DCO Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-006_DCO Plantroom LTHW DHW Proposed New Connections_Ver2.pdf.
<p>3.2.2.3</p>	<p>There is evidence to confirm the designers intended sequence for removal of existing plant to facilitate the new DCW, DHW and LTHW pipework connections to the existing infrastructure.</p> <p>This changeover will result in a downtime and loss of LTHW, DHW and DCW to the buildings/areas served from these plantrooms.</p>

	<p>There is no evidence to confirm how the impact of these works on the Clinical services has been considered and what dialogue has been undertaken to date with the Clinical/Non-Clinical users/stakeholders that may be impacted by these works.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • SCO04-H&K-IFR-00-DR-M-50-001_Cyclotron Proposed New LTHW HX Plant – Block Plant Layout (within SHSC P Rm)_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-002_Cyclotron Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-003_Cyclotron Plantroom LTHW DHW Proposed New Connections_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-004_DCO Proposed New LTHW HX Plant – Block Plant Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-005_DCO Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-006_DCO Plantroom LTHW DHW Proposed New Connections_Ver2.pdf.
3.2.2.4	<p>Some builders work requirements are noted on the LTHW drawings (e.g. potential extension of plinths). The drawings also noted that some of the new plant is likely to require extended plinths to facilitate their installation. However, there is no evidence of builders work drawings being produced.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • SCO04-H&K-IFR-00-DR-M-50-001_Cyclotron Proposed New LTHW HX Plant – Block Plant Layout (within SHSC P Rm)_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-002_Cyclotron Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-003_Cyclotron Plantroom LTHW DHW Proposed New Connections_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-004_DCO Proposed New LTHW HX Plant – Block Plant Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-005_DCO Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-006_DCO Plantroom LTHW DHW Proposed New Connections_Ver2.pdf. • SCO04-H&K-IFR-XX-DR-M-50-101_Phase 2 Site Layout, Proposed M&E Services Phasing Strategy_Ver2.pdf.
3.2.2.5	<p>Pipework is proposed to be routed across Hospital Main Drive. There is limited evidence provided for review that confirms what Stakeholder dialogue has been undertaken and what impact the duration of these works has on Hospital</p>

	<p>operations such as blue light routes and general traffic management on the Western General Hospital site.</p> <p>The project risk register notes that dialogue has been undertaken with the NHS Lothian Traffic Management Group however no evidence of this dialogue has been provided by the NHS Lothian for review.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • SCO04-H&K-IFR-00-DR-M-50-006_DCO Plantroom LTHW DHW Proposed New Connections_Ver2. • SCO04-H&K-IFR-XX-DR-M-50-102_Phase 2 Site Layout, Proposed LTHW Heating Pipework Layout_Ver3.pdf.
3.2.2.6	<p>Pipework is proposed to be routed across Hospital Main Drive. There is also pipework diversions (mains) water required to facilitate the demolition of the laundry building.</p> <p>There is no evidence provided by the Board to confirm that ground penetrating radar (GPR) surveys or other forms of intrusive/non-intrusive investigative works have been undertaken to inform and co-ordinate the proposed below ground pipework routes.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • SCO04-H&K-IFR-00-DR-M-50-001_Cyclotron Proposed New LTHW HX Plant – Block Plant Layout (within SHSC P Rm)_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-002_Cyclotron Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-003_Cyclotron Plantroom LTHW DHW Proposed New Connections_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-004_DCO Proposed New LTHW HX Plant – Block Plant Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-005_DCO Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf. • SCO04-H&K-IFR-00-DR-M-50-006_DCO Plantroom LTHW DHW Proposed New Connections_Ver2.pdf. • SCO04-H&K-IFR-XX-DR-M-50-101_Phase 2 Site Layout, Proposed M&E Services Phasing Strategy_Ver2.pdf.

3.2.2.7

The drawings provided for review show removal of trees to the west of the water mains pipework diversion and tree route protection to the north of the estates building.

The documentation provided for review does not confirm if a specialist (e.g. an Arboriculturist) has been engaged to inform these works and what survey works or analysis has been undertaken to determine these requirements.

Documents referenced:

- SCO04-H&K-IFR-XX-DR-M-50-107_Laundry Building (1F), Proposed Mains Water Diversion Route (GPR Survey co-ord)_Ver4.pdf.
- SCO04-H&K-IFR-XX-DR-M-50-108_Laundry Building (1F), Proposed Mains Water Diversion Route, Water Byelaw Notification_Ver4.pdf.
- SCO04-H&K-IFR-XX-DR-M-50-109_Laundry Building (1F), Proposed Mains Water Diversion Route, Water Byelaw Notification_Ver5.pdf.

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>Evidence that all contractors and sub-contractor competency checks have been completed and signed off.</p>

NHS Scotland Assure Observations:

The NHS SA KSAR observations noted in '3.2.1 Water and Internal Plumbing / Drainage Systems: KSAR Observations' of this report in relation to competency checks on the consultant designers also apply to Ventilation. Refer to the response to Workbook Ref No. 2.1 for further detail.

There has been no recorded evidence provided to confirm that input has been sought from the Board's Authorising Engineer for Ventilation (AE(V)).

Documents referenced:

- High Level Information Pack for appointment of Frameworks Scotland 2 Principal Supply Chain Partner, December 2017 (NHSL WGH HLIP Version 5.1.doc).

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	<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 Board, space for future flexibility in the service installations.</p>

	appropriate plant access strategy?	<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 ventilation solution has been agreed with clinical and IPC colleagues.</p> <p>Evidence that the Board has agreed a strategy (percentage) for spare capacity and a documented allowance to be incorporated into the design.</p> <p>Are plant rooms, horizontal distribution runs and risers appropriately sized for the equipment being installed and facilitate safe adequate maintenance?</p> <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>
--	------------------------------------	---

NHS Scotland Assure Observations:

The NHS SA KSAR observations noted in '3.2.1 Water and Internal Plumbing / Drainage Systems: KSAR Observations' of this report also apply to Ventilation. Refer to the response to Workbook Ref No. 2.2 for further detail.

Documents referenced:

- SCO04-H&K-IFR-00-DR-M-50-001_Cyclotron Proposed New LTHW HX Plant – Block Plant Layout (within SHSC P Rm)_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-002_Cyclotron Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-003_Cyclotron Plantroom LTHW DHW Proposed New Connections_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-004_DCO Proposed New LTHW HX Plant – Block Plant Layout_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-005_DCO Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-006_DCO Plantroom LTHW DHW Proposed New Connections_Ver2.pdf.
- SCO04-H&K-IFR-XX-DR-M-50-103_Phase 2 Site Layout, Proposed Steam Downtakings Alterations Layout_Ver2.

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 the each variation / derogation has a detailed technical analysis, has been referred to the Board, and agreed with their ventilation safety group, clinical, engineering, Estates, infection control and FM teams.
<p>NHS Scotland Assure Observations:</p> <p>With the exception of a derogation schedule template, there is no evidence provided by the Board that confirms their governance around variations and derogations for this project.</p> <p>NHS Lothian confirmed during KSAR project progress meetings and discipline workshops that they consider there are no derogations or variations associated with the works being undertaken.</p> <p>This statement has not been evidenced by the Board through the documentation provided for review. NHS SA have concerns that there are no formal procedures implemented to review potential variations and/or derogations with the relevant stakeholders. There are also no records to confirm how the conclusion that there are no variations or derogations on this project has been determined.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> Schedule of Derogations Master Template_July 2021.xls 		

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:

There are limited ventilation works associated with the project. The ventilation scope of works includes natural & mechanical ventilation of the High Voltage (HV) substations, natural ventilation to the Scottish Health Service Centre (SHSC) plantroom, modifications to existing ventilation ductwork adjacent to the DCO plantroom and removal of redundant steam humidifier lances within existing air handling units (AHUs).

The health board have not provided an agreed environmental matrix confirming the environmental design criteria for the HV substations and the associated basis of design for the proposed ventilation and heating (where applicable) strategies. Whilst the project does not involve any new ventilation systems serving clinical areas the new HV substations are proposed to be ventilated by a combination of natural and mechanical ventilation.

The transformer rooms within the main HV intake substations are naturally ventilated via louvred doors and high-level louvres on the gable walls. The size and specification of the louvres have been noted on the architectural drawings however the Board has provided no evidence to confirm how the size & specification of the louvres has been determined. No calculations have been provided to confirm what the targeted internal design conditions are nor the ventilation requirements to maintain the desired internal environmental conditions.

In the Low Voltage (LV) and HV switch rooms within the main HV intake substation mechanical ventilation fans are shown on the architectural layouts however these fans are not detailed on the mechanical or electrical documents. There are also no drawings or calculations to confirm the ventilation strategies for the rooms within the secondary (south) sub-station.

Louvres have been shown on the SHSC Low Temperature Hot Water (LTHW) plantroom drawings. The Board have provided no evidence to confirm how the sizing and specification of these louvres have been determined. There is also no evidence to confirm that the builders work requirements associated with these louvres has been incorporated into the architectural or structural engineers documentation.

The works associated with the existing ventilation systems consist of the removal of the steam humidifiers. Whilst NHS Lothian clarified at the Mechanical Services Workshop on 16th March 2022 that they consider the works to be non-intrusive and limited to removal of pipework out with the unit there is no evidence provided to confirm the extent of the works. The evidence provided does not confirm what areas the affected ventilation systems and associated plant serve, if there is any Clinical service impact and if there is any HAI-SCRIBE implications.

Due to the limited evidence provided it is therefore not possible to determine if the proposed works associated with the natural and mechanical ventilation proposals are compliant with SHTM standards & guidance.

Documents referenced:

- 2586-SCO04-OBE-INF-00-DR-A-(20)022-B-Plan as Proposed_HV Intake-Plan as Proposed_Ver1.pdf.
- 2586-SCO04-OBE-INF-EL-DR-A-(20)024-B-Elevations as Proposed_HV Intake-Elevations as Proposed_Ver1.pdf.
- 2586-SCO04-OBE-INF-EL-DR-A-(20)025-B-Section as Proposed_HV Intake-Elevation Section as Proposed_Ver1.pdf.
- WGCC-OBE-INF-XX-DR-A-20-002_Secondary Substation - Options 1, 2_Ver1.
- SCO04-H&K-IFR-XX-DR-M-50-103_Phase 2 Site Layout, Proposed Steam Downtakings Alterations Layout_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-005_DCO Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-001_Cyclotron Proposed New LTHW HX Plant – Block Plant Layout (within SHSC P Rm)_Ver2.pdf.
- SCO04-H&K-IFR-XX-DR-M-50-112_Mechanical Services, DHN Pipework, DCO Entry – Detail 'D'_Ver2.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> <ol style="list-style-type: none"> The type of ventilation (to SHTM 03-01) Patient group and / or function related to the space. Name of the Consultant, Clinical Lead or Department Lead who has agreed to the room requirements. Name of the Infection Prevention and Control Doctor or equivalent who has agreed to the room requirements. Name of the Infection Prevention and Control Nurse who has agreed to the room requirements. Name of the Estates / FM team representative who has agreed to the room requirements. Name of the NHS Project Manager who has agreed to the room requirements. <p>Name of the Decontamination Manager who has agreed to the room requirements (where this is part of the project).</p>

NHS Scotland Assure Observations:

Refer to NHS SA's response to Question 3.4

Workbook Ref No.	Areas to probe	Evidence expected
3.6	Is there evidence of the Health Board developing Ventilation Commissioning Proposals?	<p>Evaluation of the suitability of the proposed plans in the context of the FBC, are these sufficient do the meet the requirements of the project, guidance and the design of the system?</p> <p>What plans have been made for independent validation of the ventilation systems?</p> <p>What plans have been made for independent verification of the ventilation system?</p> <p>What plant and ductwork cleaning has been specified?</p> <p>What safe adequate access has been allowed for access to dampers?</p>

NHS Scotland Assure Observations:

As noted in NHS SA's response to Question 3.4 and 3.5. Whilst the ventilation works are limited on this project, the health board has provided no evidence to confirm how the works being undertaken on the existing ventilation systems (e.g. ductwork modifications to the existing admin corridor AHU and removal of redundant humidifier lances from a number of existing AHUs) may impact on Clinical or Non-Clinical services.

There is no evidence provided to confirm what level of plant (AHU) or ductwork cleaning is required re commissioning of the works undertaken. There is also no evidence provided to confirm if any of these works would require recommissioning of the existing systems or independent validation of any ventilation systems.

Documents referenced:

- SCO04-H&K-IFR-XX-DR-M-50-103_Phase 2 Site Layout, Proposed Steam Downtakings Alterations Layout_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-005_DCO Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-001_Cyclotron Proposed New LTHW HX Plant – Block Plant Layout (within SHSC P Rm)_Ver2.pdf.
- SCO04-H&K-IFR-XX-DR-M-50-112_Mechanical Services, DHN Pipework, DCO Entry – Detail 'D'_Ver2.pdf.

--

Workbook Ref No.	Areas to probe	Evidence expected
3.7	Has the Health Board started developing its ventilation governance arrangements?	Has the Health Board commenced its planning and recorded how it will ensure appropriate numbers of trained staff (AP and CP) staff and appointment of AE(V) for the project and is it clear how this project will interface with the Health Boards existing arrangements for management of the ventilation installations?
<p>NHS Scotland Assure Observations:</p> <p>The NHS SA KSAR observations noted in '3.2.1 Water and Internal Plumbing / Drainage Systems: KSAR Observations' of this report also apply to Ventilation. Refer to the response to Workbook Ref No. 2.5 for further detail.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> N/A. 		

Workbook Ref No.	Areas to probe	Evidence expected
3.8	Evaluation of the Health Boards planned preventative maintenance (PPM) proposals.	Has the Health Board commenced its planning and recorded the PPM requirements and approach to ensure appropriate levels of maintenance, comprehensive statutory compliance and robust management processes?
<p>NHS Scotland Assure Observations:</p> <p>No evidence has been provided to confirm that the Board has commenced it's planning and considered its approach with regards to PPM on this project.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> N/A. 		

3.3.2 Ventilation: Further Observations

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

3.3.2.1

There are a number of heat meters proposed to be installed on various variable temperature (VT), constant temperature (CT) and AHU LTHW heating circuits. These are in areas out with the DCO and Cyclotron plantrooms.

The heat meters are noted as clamp on type and therefore should minimise disruption to the heating systems during the installation of these meters. However, the locations of these meters (and the associated controls cabling routes) are unknown.

There is also no evidence provided by the Board to confirm that integration within the existing energy metering network has been considered and verified with their Estates Colleagues or the manufacturer/specialist associated with the existing system. It is also unclear as to whether this will require to integrate into any existing BMS systems.

Documents referenced:

- SCO04-H&K-IFR-XX-DR-M-58-102_Cyclotron & DCO Plant, Phase 2 Metering Schematic_Ver2.
- WGH, Edinburgh SC04 Infrastructure Phase 2 - BMS & MMT, Automatic Controls, Wiring Specification_BMS & MMT, Automatic Controls, Wiring Specification_Ver1.

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>Evidence that all contractors and sub-contractor competency checks have been completed and signed off.</p>

NHS Scotland Assure Observations:

The NHS SA KSAR observations in relation to competency checks on consultants and contractors noted in '3.2.1 Water and Internal Plumbing / Drainage Systems: KSAR Observations' of this report also apply to Electrical. Refer to the response to Workbook Ref No. 2.1 for further details.

NHS Lothian have submitted email correspondence noting sharing the drawings and specifications with the Electrical Authorising Engineer (AE (LV and HV)) for input and review. No response has been provided confirming acknowledgement or agreement to the design information from the AE.

Documents referenced:

- High Level Information Pack for appointment of Frameworks Scotland 2 Principal Supply Chain Partner, December 2017 (NHSL WGH HLIP Version 5.1.doc).

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	Evidence that the designers have presented their co-ordination drawings (BIM model) to the Board.

	<p>minor additions and modifications to services in the future?</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 and facilitate safe, adequate maintenance.</p>
--	---	--

NHS Scotland Assure Observations:

The NHS SA KSAR observations in relation to access and maintenance noted in '3.2.1 Water and Internal Plumbing / Drainage Systems: KSAR Observations' of this report also apply to Electrical. Refer to the response to Workbook Ref No. 2.2 for further details.

An access and maintenance strategy report has been produced as part of the submission. The report states all electrical rooms have been sized to accommodate the proposed plant and equipment with suitable access being provided for plant installation, maintenance and replacement. However, this has not been demonstrated with the supporting drawing information.

Spare capacity percentages are not documented on the drawings. Spare switches have been provided on the HV switchboards. However, there is no space provision in the room for extending the boards if required in the future.

It is not clear how temporary generator cables will access plantrooms and connect to switchboards.

It is not clear if sufficient space has been provided in switchrooms for future PFC equipment.

NHS SA do not consider the evidence provided to demonstrate spatial co-ordination and future flexibility as sufficient for a Full Business Case (FBC) submission at RIBA Stage 4 design.

Documents referenced:

- SC04 Infrastructure Phase 2 Electrical Substations Plant Access & Maintenance Strategy, December 2021 Stage 4 FBC.
- SCO04-H&K-IFR-00-DR-E-60-002.pdf - Main HV Sub-Station Layout.
- SCO04-H&K-IFR-00-DR-E-60-003.pdf - New South Sub-Station Layout.

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 the 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.
<p>NHS Scotland Assure Observations:</p> <p>Refer to section 3.3 for NHS Scotland Assure comments in relations to derogations.</p>		

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?	<p>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.</p> <p>What is the Health Board's resilience strategy for the electrical infrastructure (including dual supplies, renewables, generators, UPS, etc)?</p>
<p>NHS Scotland Assure Observations:</p> <p>NHS Lothian have confirmed they are using the same existing supply arrangements from Scottish Power Energy Networks (SPEN) and that there is sufficient capacity to meet their current demands.</p> <p>The OBC report talks about improving resilience of supplies however there is no evidence provided relating to a resilience strategy described anywhere for the hospital supplies. The OBC report also specifically highlights the current supply arrangement with both supplies coming into a single location as a risk to the hospital operation.</p> <p>SHTM 06-01 covers resilience in a number of different chapters and makes reference to incoming supply arrangements and routing of HV and LV cables which would be relevant to the scope of these works. Some examples are stated below.</p> <p>SHTM 06-01 Chapter 3.5 states:</p> <p><i>“Large healthcare premises should generally be supplied by a dual PES (ideally both at 100% fully rated) arranged with either an automatic or a manual change-over system. In order to maximise the resilience of dual supply arrangements and minimise the actual single point of failure, the supplies should be diverse. Where possible, they should originate from separate DNO substations, in turn</i></p>		

ideally fed from separate parts of the National Grid, with independent cable routes to and across the healthcare site to the substations”.

SHTM 06-01 Chapter 3.13 states:

“Where essential, non-essential and duplex essential circuits are installed, diverse cable routes should be provided, and the possibility of a single cable fault damaging both circuit cables should be minimised as much as possible”.

NHS SA have identified a number of areas that could impact on the resilience of the system and represent non-compliance with SHTM 06-01. These include:

- Both SPEN incomers entering into single location.
- HV feeds to A&B switchboards in same trench running through same room.
- HV supplies to secondary substation follow same route, not diversely routed.
- Dual LV supply cables follow the same route, not diverse.

There has been no evidence submitted by NHS Lothian to confirm the supply arrangements, substation layouts and cable routing has been agreed with NHS Estates FM team. There is no evidence of a Risk Analysis in accordance with SHTM 06-01 having been carried out by NHS Lothian to assess the risk of the design proposals and the items highlighted above.

NHS SA do not consider that sufficient dialogue has taken place between the designers and the NHS estates team and authorising engineers to satisfy a FBC submission and RIBA stage 4 design.

Documents referenced:

- SCO04-H&K-IFR-XX-DR-E-60-001.pdf - Site Layout - Proposed Cable Routes.
- SCO04-H&K-IFR-00-DR-E-60-002.pdf - Main HV Sub-Station Layout.

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.

NHS Scotland Assure Observations:

Floor plans and schematic drawings have been submitted as part of the review.

The drawings show the design intent for the location of the generator and fuel tank and show schematically how the generator will be connected into the distribution system.

NHS SA do not consider the drawings submitted have sufficient detail for FBC submission at RIBA stage 4 design. Examples include, but not limited to, the drawings lacking detail in certain areas such as spatial co-ordination, sections, missing containment, missing emergency exit luminaires and make reference to trenches and builders work to be developed by the contractor. On the schematics protection relay sizes and circuit breaker sizes & settings are not identified and the earthing strategy for the generator/substation is unclear.

Documents referenced:

- SCO04-H&K-IFR-XX-DR-E-60-001.pdf - Site Layout - Proposed Cable Routes.
- SCO04-H&K-IFR-00-DR-E-60-002.pdf - Main HV Sub-Station Layout.
- SCO04-H&K-IFR-00-DR-E-60-003.pdf - New South Sub-Station Layout.
- SCO04-H&K-IFR-XX-DR-E-6S-002 11kV Distribution Schematic – Proposed.
- SCO04-H&K-IFR-XX-DR-E-6S-003 New Sub-Station at Estates – Proposed LV Schematic.
- SCO04-H&K-IFR-XX-DR-E-6S-004 New Sub-Station at South Car Park – Proposed LV 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 of strategy.
<p>NHS Scotland Assure Observations:</p> <p>NHS Lothian have demonstrated a strategy for locating substations. Floor plans and schematics have been provided. NHS SA do not consider the drawings submitted have sufficient detail for FBC submission at RIBA stage 4 design. The drawings in general lack detail as referenced in 4.5 above.</p> <p><i>Documents referenced:</i></p> <ul style="list-style-type: none"> • SCO04-H&K-IFR-XX-DR-E-60-001.pdf - Site Layout - Proposed Cable Routes. • SCO04-H&K-IFR-00-DR-E-60-002.pdf - Main HV Sub-Station Layout. • SCO04-H&K-IFR-00-DR-E-60-003.pdf - New South Sub-Station Layout. • SCO04-H&K-IFR-XX-DR-E-6S-002 11kV Distribution Schematic – Proposed. • SCO04-H&K-IFR-XX-DR-E-6S-003 New Sub-Station at Estates – Proposed LV Schematic. • SCO04-H&K-IFR-XX-DR-E-6S-004 New Sub-Station at South Car Park – Proposed LV Schematic. 		
Workbook Ref No.	Areas to probe	Evidence expected

4.7	Is there a strategy for locating switch rooms?	Floor plans with switchroom locations highlighted plus simple schematic.
<p>NHS Scotland Assure Observations:</p> <p>The strategy for the HV substations location is dictated by the location and routing of existing HV infrastructure and Primary Electrical Supplies. Floor plans and schematics have been provided. NHS SA do not consider the drawings submitted have sufficient detail for FBC submission at RIBA stage 4 design. The drawings in general lack detail as referenced in 4.5 above.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • SCO04-H&K-IFR-00-DR-E-60-002.pdf - Main HV Sub-Station Layout. • SCO04-H&K-IFR-00-DR-E-60-003.pdf - New South Sub-Station Layout. • SCO04-H&K-IFR-XX-DR-E-6S-003 New Sub-Station at Estates – Proposed LV Schematic. • SCO04-H&K-IFR-XX-DR-E-6S-004 New Sub-Station at South Car Park – Proposed LV Schematic. 		

Workbook Ref No.	Areas to probe	Evidence expected
4.8	Is there a strategy for locating Medical IT distribution equipment?	<p>Floor plans with Medical IT board locations highlighted plus simple schematic.</p> <p>Compliance with BS7671 section 710.</p> <p>Compliance with SHTM 06-01.</p>
<p>NHS Scotland Assure Observations:</p> <p>No medical IT equipment is required for the infrastructure works therefore this question is not applicable.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • N/A. 		

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).
<p>NHS Scotland Assure Observations:</p> <p>This relates mainly to external cable routes for HV / LV cabling.</p> <p>NHS SA do not consider the drawings provided have sufficient detail for FBC submission at RIBA stage 4 design. The drawings in general lack detail as referenced in 4.5 above.</p> <p>For the external cable routing drawings trench sections should be added to ensure correct spacing of services is allowed for and correct installation methods can be achieved. Details, quantities and locations of cable access chambers should be provided.</p> <p>The new earth farm location should be identified on the drawing to ensure space around existing building and no clashes with existing services.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> SCO04-H&K-IFR-XX-DR-E-60-001.pdf - Site Layout - Proposed Cable Routes. 		

Workbook Ref No.	Areas to probe	Evidence expected
4.10	Is there evidence of the Health Board developing electrical commissioning proposals?	<p>Evaluation of the suitability of the proposed plans in the context of the FBC, are these sufficient do they meet the requirements of the project, guidance and the design of the system?</p> <p>Has sufficient time been allocated for a full commissioning program?</p>
<p>NHS Scotland Assure Observations:</p> <p>No commissioning plan or detailed commissioning programme has been submitted as part of the review.</p> <p>The electrical specification contains a generic commissioning section which details the requirement for a commissioning engineer to be appointed and for the commissioning engineer to produce the detailed plan and programme.</p> <p>The construction programme also includes 10 weeks for testing and commissioning. This is not broken down into any detail..</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> SCO-04 Infrastructure Phase 2 Part 1 HV Electrical Services Specification FBC. 		

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?	Has the Health Board commenced its planning and recorded how it will ensure appropriate trained staff and appointment of AE for the project and is it clear how this project will interface with the Health Board existing arrangements for management of the electrical installations, inclusive of third party providers?
<p>NHS Scotland Assure Observations:</p> <p>No evidence of the electrical governance arrangements for the operational phase has been provided as part of the review.</p> <p>There has been no dialogue we are aware of between the designers and the clinical departments which will be affected by the works.</p> <p>There is no schedule of switching operations and isolations for the works which identifies the impact on hospital departments.</p> <p>There is no schedule produced identifying any impacts to departments which encounter power outages when switching supplies.</p> <p>NHS Lothian have advised this would be produced during construction stage by the PSCP once the works order has been placed.</p> <p>NHS SA recommend that this should be understood during design stage and stakeholder engagement progressed.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> No documents provided for review. 		

Workbook Ref No.	Areas to probe	Evidence expected
4.12	Evaluation of the Health Boards planned preventative maintenance (PPM) proposals.	Has the Health Board commenced its planning and recorded the PPM requirements and approach to ensure appropriate levels of maintenance, comprehensive statutory compliance and robust management processes, inclusive of third party providers?
<p>NHS Scotland Assure Observations:</p> <p>No evidence has been provided to confirm that the Board has commenced it's planning and considered its approach with regards to PPM on this project.</p>		

Documents referenced:

- SCO-04 Infrastructure Phase 2 Part 1 HV Electrical Services Specification FBC.

3.4.2 Electrical: Further Observations

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

3.4.2.1	<p>The cable calculations provided for the KSAR review include LV submain cables and final circuit cabling for lighting and small power. The final circuit cables have been calculated using the conduit as the circuit Protective Conductor (CPC) however the Distribution Board (DB) schedules show these as separate CPC's.</p> <p>The submain cables have been calculated using the armour only as the CPC. The SHTM does not allow this reference SHTM 06-01 Paragraph 13.33 <i>“Where circuit cables or conductors have an integral metallic sheath, the sheath will not be used as the sole earth return path. Designers should consider the use of multicore cables with an earth conductor, or where this is not possible, installing a separate CPC.”</i> and a separate CPC should be provided.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • Intake sub-station LV cable calculations. • Secondary sub-station LV cable calculations. • SCO04-H&K-IFR-XX-DR-E-6S-003 New Sub-Station at Estates – Proposed LV Schematic. • SCO04-H&K-IFR-XX-DR-E-6S-004 New Sub-Station at South Car Park – Proposed LV Schematic.
3.4.2.2	<p>No existing services information is included on the HV/LV cable routing drawings and substation locations.</p> <p>Understanding the existing services in the vicinity of the works is critical to the project. It is therefore unclear whether NHS Lothian have identified if any diversions/protection works are required which could impact on cost and programme.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • SCO04-H&K-IFR-XX-DR-E-60-001.pdf - Site Layout - Proposed Cable Routes.

3.4.2.3	<p>No utility report has been provided for the project.</p> <p>The FBC information issued for the review does not demonstrate that the strategies for the site outlined in the OBC report, such as improving resilience, requirements to accommodate growth, future-proofing infrastructure for net zero carbon commitments and the possibility of an all-electric solution for the heating networks have been followed through as part of the Stage 4 design.</p> <p>There is no evidence of a future load assessments or discussions having been carried out including the possibility of future developments such as the New Cancer Centre or supply resilience improvements.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • WGH Energy Infrastructure - Phase 2 Outline Business Case.
3.4.2.4	<p>We have been advised lightning protection is not required for the new substation buildings. A risk assessment and supporting calculations to confirm this have not been submitted for review.</p> <p>The surge protection devices shown on the schematic drawings are not specified. No evidence has been provided that the surge protection strategy has been coordinated with any existing building provision.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • SCO-04 Infrastructure Phase 2 Part 1 HV Electrical Services Specification FBC. • SCO04-H&K-IFR-XX-DR-E-6S-003 New Sub-Station at Estates – Proposed LV Schematic. • SCO04-H&K-IFR-XX-DR-E-6S-004 New Sub-Station at South Car Park – Proposed LV Schematic.
3.4.2.5	<p>The basis of design for lighting levels and emergency lighting levels in the switchrooms and substations is unclear. The drawings and specification do not state levels to be achieved and there are no calculations provided.</p> <p>It's also unclear if a risk assessment has been carried out to establish if any enhanced emergency lighting is required.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> • SCO-04 Infrastructure Phase 2 Part 1 HV Electrical Services Specification FBC. • SCO04-H&K-IFR-00-DR-E-60-002.pdf - Main HV Sub-Station Layout. • SCO04-H&K-IFR-00-DR-E-60-003.pdf - New South Su-Station Layout.

3.4.2.6

There is no containment shown on drawings for HV cables, lighting, small power or fire alarms within the substation buildings.

Documents referenced:

- SCO04-H&K-IFR-00-DR-E-60-002.pdf - Main HV Sub-Station Layout.
- SCO04-H&K-IFR-00-DR-E-60-003.pdf - New South Sub-Station Layout.

3.5 Medical Gases

3.5.1 Medical Gases: KSAR Observations

Medical gases do not form part of the scope of works being reviewed.

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 applicable to healthcare premises.</p> <p>Recorded evidence that input from the Health Boards Fire Advisors has been requested.</p> <p>Evidence that all contractors and sub-contractor competency checks have been completed and signed off.</p>
<p>NHS Scotland Assure Observations:</p> <p>NHS Lothian have not appointed a Fire Engineering consultant designer on this project. There is no evidence provided by the health board to confirm their governance around establishing any consultant input required to deliver the project.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> N/A. 		

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>In addition to the prescribed list in the Building Standards Technical Handbook, 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>
--	--	---

NHS Scotland Assure Observations:

There is no written fire strategy provided for this project.

Whilst the fire engineering requirements associated with the scope of works is limited there is no evidence to confirm a number of items in relation to fire safety considerations.

The Board has not provided evidence to confirm the fire compartmentation and associated fire ratings for the constructional elements associated with the new HV intake sub-station or the secondary (south) HV sub-station.

There is no documented evidence provided by the Board to confirm if fire suppression systems has been considered within the HV sub-station buildings.

The escape routes and associated widths within the modified LTHW plantrooms have not been documented within the evidence provided by the Board.

A new fire alarm system is to be installed into the new substations and switch rooms. This system is to be connected to the existing system in the estates building and the linac / admin

building. The category of design and installation is not stated anywhere on the drawings or within the specification.

There is no detection or interface shown for the generator enclosure.

It is not known what spare capacity is available on the existing system for the new system and if this can be accommodated without modifications to existing equipment.

No emergency lighting calculations have been provided for review.

Documents referenced:

- 2586-SCO04-OBE-INF-00-DR-A-(20)022-B-Plan as Proposed_HV Intake-Plan as Proposed_Ver1.pdf.
- 2586-SCO04-OBE-INF-EL-DR-A-(20)024-B-Elevations as Proposed_HV Intake-Elevations as Proposed_Ver1.pdf.
- 2586-SCO04-OBE-INF-EL-DR-A-(20)025-B-Section as Proposed_HV Intake-Elevation Section as Proposed_Ver1.pdf.
- WGCC-OBE-INF-XX-DR-A-20-002_Secondary Substation - Options 1, 2_Ver1.
- SCO04-H&K-IFR-00-DR-E-60-002.pdf - Main HV Sub-Station Layout.
- SCO04-H&K-IFR-00-DR-E-60-003.pdf - New South Sub-Station Layout.

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 the each variation / derogation and any fire engineering proposals are being referred to the Board and agreed with their fire safety advisors, NDAP group, clinical, engineering, Infection Prevention and Control, FM teams and regulatory authorities.
<p>NHS Scotland Assure Observations:</p> <p>Refer to NHS SA answer in section 3.</p>		

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?	Safe and adequate access has been allocated on both sides of all fire dampers for maintenance.

NHS Scotland Assure Observations:

Based on the information reviewed, to the best of NHS SA's knowledge, fire dampers and fire/smoke dampers do not form part of the scope of works being reviewed. As such this question is considered not applicable to this KSAR.

Documents referenced:

- 2586-SCO04-OBE-INF-00-DR-A-(20)022-B-Plan as Proposed_HV Intake-Plan as Proposed_Ver1.pdf.
- 2586-SCO04-OBE-INF-EL-DR-A-(20)024-B-Elevations as Proposed_HV Intake-Elevations as Proposed_Ver1.pdf.
- 2586-SCO04-OBE-INF-EL-DR-A-(20)025-B-Section as Proposed_HV Intake-Elevation Section as Proposed_Ver1.pdf.
- WGCC-OBE-INF-XX-DR-A-20-002_Secundary Substation - Options 1, 2_Ver1
- SCO04-H&K-IFR-XX-DR-M-50-103_Phase 2 Site Layout, Proposed Steam Downtakings Alterations Layout_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-005_DCO Plantroom Downtakings Alterations Existing Steam Plant Strip Out Scope Layout_Ver2.pdf.
- SCO04-H&K-IFR-00-DR-M-50-001_Cyclotron Proposed New LTHW HX Plant – Block Plant Layout (within SHSC P Rm)_Ver2.pdf.
- SCO04-H&K-IFR-XX-DR-M-50-112_Mechanical Services, DHN Pipework, DCO Entry – Detail 'D'_Ver2.pdf.

Workbook Ref No.	Areas to probe	Evidence expected
6.5	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 that the Health Boards fire advisors and NDAP team are satisfied with the design proposal.</p>

NHS Scotland Assure Observations:

Based on the information reviewed, to the best of NHS SA's knowledge, Smoke control and/or clearance systems do not form part of the scope of works for the project, as such this question is considered not applicable to this KSAR.

Documents referenced:

- N/A.

Workbook Ref No.	Areas to probe	Evidence expected
6.6	Has the Health Board started the development of the fire system outline commissioning proposals?	Is there an established fire management group that will ensure the fire strategy is adhered to?
<p>NHS Scotland Assure Observations:</p> <p>Whilst the scope of works for the project has limited fire systems proposed there are emergency lighting and fire detection & alarm systems proposed within the new HV sub-stations.</p> <p>The Board has provided no evidence that outlines the proposed commissioning proposals. There is also no evidence to confirm NHS Lothian's fire management group have been engaged to ensure any existing fire strategy proposals for the site are adhered to.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> N/A. 		

Workbook Ref No.	Areas to probe	Evidence expected
6.7	Has the Health Board started its early thinking for the Fire Safety arrangements for the operational phase?	Has the Health Board commenced its planning and recorded how it will ensure appropriate trained staff and appointment of Fire Officers for the project in the operational phase and is it clear how this project will interface with the Health Boards existing arrangements for management of the Fire Safety?
<p>NHS Scotland Assure Observations:</p> <p>No evidence has been provided to confirm that the Board has commenced it's planning and considered how this project will interface with NHS Lothian's existing arrangement for Fire Safety.</p> <p>There is no evidence provided to confirm consultation has taken place with NHS Lothian's Fire Safety team.</p> <p>Documents referenced:</p> <ul style="list-style-type: none"> N/A. 		

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	The evidence provided does not detail how the proposed works may impact on traffic movement around the site particularly with regards to fire service access routes to the site.
3.6.2.2	There is limited evidence to demonstrate dialogue with NHS Lothian's Fire Safety team and the Scottish Fire and Rescue Services (SF&RS) on how the works may impact on the existing fire hydrant provision or how the water diversion works may impact on the operational aspects of the site when the works are being undertaken.

3.7 Infection Prevention & Control Built Environment

3.7.1 Infection Prevention & Control Built Environment: KSAR Observations

Workbook Ref No.	Areas to probe	Evidence expected
7.1	<p>How does the Health Board demonstrate that there is an effective infection prevention and control management structure in place?</p> <p>How does the 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.</p> <p>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 identified IPC risk.</p> <p>Evidence that all contractors and sub-contractor competency checks have been completed and signed off.</p>

NHS Scotland Assure Observations:

NHS Lothian's IPC specialists present at the IPC workshop described IPC management and governance structures that are in place, and through which capital projects could be reviewed, but no documentary evidence was presented that this had taken place. Similarly, NHS SA were advised by NHS Lothian that individuals concerned have appropriate skills and experience but no documentary evidence was provided.

There was no evidence provided to indicate required dialogue with clinical staff before works commence nor was evidence provided of a continuing schedule for future works. Without evidence of this dialogue it is difficult to understand how staff and patients could be informed of the works being undertaken and any mitigation required, from either attending or entry and exit routes from clinical areas affected by the works.

Workbook Ref No.	Areas to probe	Evidence expected
7.2	How does the Health Board demonstrate implementation of evidence based infection prevention and control measures during the design process?	<p>The Health Board provides evidence</p> <ul style="list-style-type: none"> The board can demonstrate the current version of the National Infection Prevention and Control Manual has been adopted by the organisation and all staff are aware of how and where to access this and it is being referred to during the design process. The board can demonstrate IPC advisors have been included within the design phase and development of HAISCRIBE.

NHS Scotland Assure Observations:

No evidence was presented relating to adoption of, or reference to, the National Infection Prevention and Control manual in the design process. IPC specialists were included in the Review Team for the Phase 2 overarching HAI-SCRIBE. Detailed HAI-SCRIBES intended for specific elements of this phase of the project have not yet been completed – it is only an overarching HAI-SCRIBE that is in place.

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?	<p>The Health Board evidences that:</p> <ul style="list-style-type: none"> 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:		
No evidence was provided that relevant staff have clear guidance as to their roles and responsibilities with respect to infection prevention and control.		

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 and manufacturers' instructions.
NHS Scotland Assure Observations:		
No evidence was provided as to the involvement of IPC specialists with the procurement approach.		

Workbook Ref No.	Areas to probe	Evidence expected
7.5	Evaluation of the Health Boards planned preventative maintenance (PPM) proposals for equipment issues and the Built Environment in relation to IPC issues.	<p>Has the Health Board considered how they will undertake assessment of and report cleanliness of the proposed facility and equipment within the healthcare environment, this is inclusive of planned programmes of maintenance?</p> <ul style="list-style-type: none"> Does the Health Board plan to seek feedback from patients, staff and visitors for their views? Is it clear how the work for this project will interface with the Health Board existing arrangements for management of the IPC in the Built Environment in the wider estate?
NHS Scotland Assure Observations:		
No evidence was provided as to the consideration of IPC issues in respect of planned preventative maintenance		

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.

<p>3.7.2.1</p>	<p>Section 3.1.5 of the HAI-SCRIBE has the following statement: <i>'Windows in vicinity must remain closed, communication with clinical teams throughout the duration of the works.'</i></p> <p>The following information relating to the statement was not evidenced in the documentation presented:</p> <ul style="list-style-type: none"> • Definition of 'vicinity' in regard to the works, i.e. for what distance from the works windows will need to remain closed, and how this has been assessed. • That when windows are closed, making natural ventilation unavailable, there will be sufficient mechanical ventilation in all affected clinical areas. • Assessment of what effect this loss of natural ventilation will have on the COVID-19 mitigation strategy for the affected clinical areas. • How the above will be monitored, by whom, and the escalation paths available to clinical staff in the event of any subsequent problems. <p>Additionally, dust suppression is mentioned but no information is provided on locations and implementation, or the process in place for activation of any suppression system.</p>
<p>3.7.2.2</p>	<p>Section 3.1.5 of the HAI-SCRIBE also notes that Estates will be contacted with regards to additional maintenance requirements for AHU in the vicinity. It is not clear from the information provided what the definition of 'the vicinity' is, how this will be assessed, or how many AHUs could be affected. It is also unclear what risk assessments are in place, if any, and how they would subsequently alter the estates maintenance regime for AHUs in the affected areas.</p>

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](#)

