

NHS Greater Glasgow and Clyde	Paper No. 24/96
Meeting:	NHSGGC Board Meeting
Meeting Date:	27 August 2024
Title:	Recovery and Renewal - Transformation of Specialist Neurosciences, OMFS and Spinal Injuries Services in the West of Scotland - Pre OBC - Economic Case
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Report Author:	INS Project Team

1. Purpose

The purpose of the attached paper is to:

Outline the process undertaken to identify a preferred option and present the Pre-OBC Economic Case, which details this work.

2. Executive Summary

The paper can be summarised as follows:

1. The Initial Agreement [IA] presented the compelling clinical case for the re-provision of the Institute of Neurological Sciences on the QEUH campus
2. The IA was agreed by the full GGC Board in April 2022 and approved by Scottish Government in March 2023. On approval of the IA, SGHD asked NHSGGC to identify a preferred option and to provide an outline economic case for the selected option.
3. The full detail of the Initial Agreement and its clinical case is available at <https://www.nhsggc.scot/downloads/ins-sciences-recovery-renewal-initial-agreement/>
4. INS delivers highly specialist regional, supraregional and national services delivered for and to the people of Scotland. As many are interlinked to and interdependent with other specialist regional and national adult and children's services on the QEUH site, there is no alternative site in Scotland which would be appropriate for consideration.

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5. Due to the level of regional and national services delivered by INS the risk of infrastructure failure would impact clinical services for patients across the country, with no capacity to address this within the wider NHS Scotland system.
6. The full Pre-OBC Economic Case document details the work carried out with stakeholders and external advisers to explore the potential options available and the subsequent assessment process undertaken
7. The preferred option has been identified as Option 1 - Single New Build. This option provides optimum clinical adjacencies within INS facilities, scored highest in stakeholder engagement, and has the lowest cost of the options that meet the project requirements.
8. Since the IA approval, the national landscape for funding major capital projects has changed considerably. Scottish Government issued a letter to Boards in December 2023 advising that they should prepare for a reduction in capital availability.
9. In response to the reduction in capital funding a targeted investment option was investigated. This would focus initial investment on the highest areas of risk as a first phase, with further phases to be addressed as the availability of capital improves.
10. The targeted investment process identified the areas of key acute clinical activity (including theatres, imaging, critical care and acute inpatient wards) as the places where failure of the building services or fabric would have the greatest impact on patient safety and clinical outcomes. A Schedule of Accommodation was developed focussing on acute services, the majority of which are based in the surgical tower and podium.
11. The document notes the lower initial cost required to progress the targeted investment approach but highlights some resultant compromises and re-iterates the preferred option as full development of Option 1 Single New Build.
12. The attached case uses the same assumptions for revenue costs which were approved for Initial Agreement. Full workforce modelling will take place when design work on the agreed site and clinical model are agreed and will be included in the full Outline Business Case.
13. Lengths of stay have been modelled on upper quartile UK performance. Theatre utilisation has been targeted at 90% and acute bed utilisation has been modelled at 85% or higher.
14. The IA was approved by the GGC Board at a proposed 257 beds, an increase of 13 over the current funded level. This figure included 23 beds related to proposed externally funded developments. The proposed schedules of accommodation can and will be altered if regional and national plans/funding change.
15. A letter was received from SG to SRO, Arwel Williams on 23 April 2024 formally inviting the submission of the Pre-OBC Economic Case to Capital Investment Group. The letter notes that the CIG invitation will be extended to all member of SG Health & Social Care Management Board due to the importance of this project - Appendix 1.
16. The Executive Summary from the Pre-OBC Economic Case is attached - Appendix 2.

The full Pre-OBC Economic Case document can be found at [21CPO24 - OBC Economic v8.2.pdf](#)

3. Recommendations

The NHSGGC Board is asked to consider the following recommendations:

- Note the content and agree submission to the Scottish Government Capital Investment Group.

4. Response Required

This paper is presented for **approval**

5. Impact Assessment

The impact of this paper on NHSGGC's corporate aims, approach to equality and diversity and environmental impact are assessed as follows:

- | | |
|------------------------|-------------------------------|
| • Better Health | <u>Positive</u> impact |
| • Better Care | <u>Positive</u> impact |
| • Better Value | <u>Positive</u> impact |
| • Better Workplace | <u>Positive</u> impact |
| • Equality & Diversity | <u>Positive</u> impact |
| • Environment | <u>Positive</u> impact |

6. Engagement & Communications

The issues addressed in this paper were subject to the following engagement and communications activity:

The document details a summary of stakeholder engagement carried out throughout the development of the Initial Agreement and then carried into the development of site options and the qualitative assessment of the five final shortlisted options.

7. Governance Route

This paper has been previously considered by the following groups as part of its development:

INS Redevelopment Capital Board on 24 April 2024
Informal Directors on 13 May 2024
Capital Planning Group on 27 May 2024
Acute Senior Management Group on 30 May 2024
Corporate Management Team on 4 July 2024
Financial Planning and Performance Group on 6 August 2024

Interim updates on progress have also been made to the MFT Programme Board throughout 2022, 2023 and 2024.

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The governance route is noted below:

	Submission of Papers	Meeting Dates
INS Redevelopment Capital Board	19/04/2024	24/04/2024
Informal Directors Meeting	09/05/2024	13/05/2024
Capital Planning Group	20/05/2024	27/05/2024
Acute SMG	22/05/2024	30/05/2024
Corporate Management Team	26/06/2024	04/07/2024
Finance, Planning & Performance	30/07/2024	06/08/2024
NHSGGC Board	15/08/2024	27/08/2024
SG Capital Investment	TBC	TBC

8. Date Prepared & Issued

The Pre-OBC Economic Case has been developed over the period April 2023 to May 2024.

The extract for NHSGGC was prepared and updated on 14/08/2024.

Issued to Board members on 20/08/2024.



Pre-OBC Economic Case

RECOVERY AND RENEWAL

Transformation of Specialist Neurosciences, OMFS
and Spinal Injuries Services in the West of Scotland

Project Reference: 21CPO24

August 2024

V8.2

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V8	General update	Draft	20.05.24
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1.0 Overview

1.1 Purpose

The Initial Agreement [IA] set out the case for change to transform, enhance and redevelop an extensive range of national, supraregional and regional specialist clinical services which are currently delivered by NHS Greater Glasgow and Clyde on behalf of NHS Scotland at the Institute of Neurological Sciences [INS], an internationally recognised leader in the treatment of injury and diseases of the brain, head, neck and spine.

The IA clearly identified the compelling case that action is required not only to address critical infrastructure risks to maintain existing vital clinical services and adjacencies, but also to allow these services to adapt and evolve to meet the needs of the populations they serve going forward.

This case was accepted by the Scottish Government and approval was given on 29 March 2023 to commence the first phase of the Outline Business Case [OBC].

This update report details the work undertaken over the past year to identify a preferred site option, backed by both an economic evaluation and a robust appraisal of the clinical, patient and stakeholder benefits.

Although this report is submitted by NHS Greater Glasgow and Clyde, the investment is required to support the continuing delivery of a vital range of complex and specialist national, supraregional and regional care for the people of Scotland.

The INS is the largest specialist hospital in Scotland and the services covered by these proposals are highly complex, with interdependencies across and between a range of other clinical services delivered to children, young people and adults from the Queen Elizabeth University Hospital Campus in NHS Greater Glasgow and Clyde.

The work which has been completed during this early OBC phase has reinforced the significant fragility of the current estate and the consequent risk to service provision. The majority of the key infrastructure components are at end of life and there is significant concern that major disruption or a complete cessation of activity becomes increasingly likely with the passage of time and without significant investment.

As is detailed later in this document, it is important that the reprovision of the INS is seen within the wider context of Scottish healthcare given the complexity and size of the services and care offered to the residents of Scotland.

No other facility within Scotland or the UK could absorb the work of the INS and the ramifications of buildings failure cannot be underestimated. The extent to which its services underpin and integrate with the wider work of other specialist regional and national adult and children's services within Queen Elizabeth University Hospital and the Royal Hospital for Children also cannot be overstated.

During this Site Options Appraisal Phase, the Core Team and Project Board engaged with external consultants to explore the opportunities and constraints of both the existing INS estate and wider QEUH site to develop an informed conclusion on the preferred site of a redeveloped INS.

The journey through Site Options Appraisal and the conclusions of a preferred option position have been undertaken with a range of stakeholders, including clinical and non-clinical teams, patient, carer, third sector and public representatives, and regional and national partners including service commissioners.

The Institute of Neurological Sciences has its own patient and user forum called Neurology Voices, and its members have been key partners in developing the Initial Agreement and through this Site Options Appraisal phase, as has the Neurological Alliance of Scotland. Their input, time, advice and support are gratefully acknowledged.

2.0 Executive Summary

2.1 What is the INS?

The Institute of Neurological Sciences [INS] is the UK's largest brain, head, neck, and spine treatment centre. It treats patients from across Scotland and beyond.

The INS has 60% of Scotland's specialist beds, including Scotland's only spinal injuries unit. All services hosted at the INS are regional, supraregional or national and are delivered to populations of between 2.5m and 5.5m people.

The INS is not just one single building. Its acute services – the admitted and ambulatory services in scope for this business case – are spread across seven buildings on the QEUH campus. These facilities include over 250 Acute beds, 7 theatres, a state-of-the-art interventional neuroradiology suite, facilities for people with both acute and long-term neurological conditions, an Oral Surgery treatment suite, 50 outpatient consulting rooms, an OMFS prosthetics facility and Scotland's largest neurodiagnostics department.

It treats over 50,000 outpatients and 16,000 inpatients, of whom around 60% are emergency presentations.

The services it offers and the populations it serves are:

Specialty	National over 5m	Supraregional 3-5m	Regional 2.5-3m
Acute stroke			✓
Craniofacial Surgery	✓		
Deep Brain Stimulation for tremors	✓		
Hyperacute stroke	✓	✓	
Interventional Neuroradiology	✓	✓	✓
Major Trauma	✓	✓	✓
Neuro-critical care	✓	✓	✓
Neurology	✓	✓	✓
Neurophysiology	✓	✓	✓
Neurosurgery	✓	✓	✓
Oral & Maxillofacial Surgery	✓	✓	✓
Specialist Prosthetics	✓		
Spinal Injuries	✓		
Spinal Injuries critical care	✓		
Surgery for Cleft Lip and Palate (adults)	✓		
Thrombectomy	✓	✓	✓

Prior to the opening of the Royal Hospital for Children in 2015, the INS provided all its services to both adults and children and young people. Its clinicians and clinical teams still deliver services for children in RHC.

These include:

Specialty	National over 5m	Supraregional 3-5m	Regional 2.5-3m
Brachial Plexus Surgery (newborns and children)	✓		
Craniofacial Surgery	✓		
Dorsal Rhizotomy Surgery	✓		
Neurophysiology	✓	✓	✓
Neurosurgery	✓	✓	
Oral & Maxillofacial Surgery	✓	✓	✓
Surgery for Cleft Lip and Palate (children and young people)	✓		

The INS teams also support and deliver elements of adult national and supraregional services based in the QEUH:

Specialty	National over 5m	Supraregional 3-5m	Regional 2.5-3m
Brachial Plexus Surgery (adults)	✓		
CAR-T (targeted, personalised immunotherapy for blood cancers)	✓		
Major Trauma	✓	✓	✓
Neurodiagnostics	✓		
Neurophysiology	✓	✓	✓
Stem Cell Transplants for people with multiple sclerosis	✓		

2.2 Clinical risk of service failure

Over the last 10-15 years, the clinical services have been impacted by a series of issues with the current infrastructure which have resulted in the loss of elective and emergency services on multiple occasions for periods of up to two years.

As recently as late April 2024, a weekend failure of the hot water system on Level 4 of the Surgical Building cascaded through three floors of live wards, including a significant flooding event within Critical Care. All Level 3 intensive care beds had to be closed and patients transferred into the main QEUH critical care facility. The Surgical Building was also left with no hot water. While water was reinstated to the building within 24 hours, the Neurocritical Care

Unit had to be fully contained (boarded up) to allow a major Infection Control review to take place over subsequent days and the facility will not be fully reinstated for 6 weeks with reduced critical care capacity for all INS services during this period.

As noted in the IA, the risk of further potentially catastrophic disruption to clinical services from environmental issues remains very high with severe impact in the event of full building failure. Multiple reports of building/fabric failures impacting on patient care/staff and visitor welfare continue to be recorded the service Risk Register and the Datix incident recording system. There are also revenue consequences of these infrastructure failures: high-cost single-use clinical supplies and ward stores of drugs are routinely condemned as contaminated after water and waste breaches, with the costs running into tens of thousands of pounds.

Based upon lived experience, historical data and survey work undertaken to assess INS buildings and supporting infrastructure, several of the buildings within the INS pose a significant risk of unexpected failure, up to and including the total loss of the facility. If a significant incident were to affect an entire building, there is no centre in Scotland or Northern England which could take on this level of activity.

The nature of brain, spine and head and neck surgery is that most of the activity and beds relate to non-elective work, much of which is time critical. Even if there were alternative providers within Scotland, the impact on the Scottish Ambulance Service of taking 150 emergency transfers per week from across the West of Scotland to Lothian, Grampian and/or Tayside would be immense.

Because the INS has more than half of all Scottish beds across its specialties, the impact of a service falling over would be to swamp the remaining Scottish services; for example:

- because emergency and cancer presentations count for more than 60% of neurosurgery activity and almost 90% of bed days, Scotland would not even be able to provide all of its own emergency care, even if it abandoned providing all planned care, as the capacity required to deliver INS emergency neurosurgery (70-75 beds) is equal to the total number of remaining beds in Scotland (72 beds)
- INS admits 150 emergency patients per week, and the last time there was a significant infrastructure failure which required mutual aid from NHS Lothian, they were able to accommodate only 3 additional cases per week (150 per annum)
- as more than half of Scotland's thrombectomy programme is delivered from INS and expansion on any other site would require further capital investment, Scotland's new flagship service for acute stroke would be at immediate risk
- There are 25 adult OMFS beds, including two national services (cleft lip and palate surgery and craniofacial surgery) which work across RHC and INS to provide life-long care; the next largest centre in Scotland is NHS Grampian, which has 5 adult beds and no children's service
- because INS has Scotland's only spinal and neuro critical care units and also maintains Level 2 patients (intubated and/or tracheostomy in place) on its wards, the impact to Scotland of the loss of the facility would be an immediate need to provide an additional 40-45 ITU and HDU beds. These beds would run at high occupancy, as the lengths of stay in critical care for spinally injured patients can be weeks or months

2.3 Objectives and benefits

Through the Strategic Assessment, Initial Agreement and Pre-Outline Business Cases processes, NHSGGC has worked extensively with patients and carers, our staff, the third sector, partner organisations and the wider community across the Scotland to develop this case for transformation of the clinical services delivered in and by the INS.

This project is centred on improving the services delivered to the people of Scotland for some of its rarest and most complex conditions. The investment objectives are therefore clinically focused, while still seeking to align with the wider goals of the Scottish Government. The objectives also retain a focus on reducing the NHS's impact on the environment.

Objective 1	Services will be provided in a safe and appropriate clinical environment which improves access and outcomes, maintains vital clinical adjacencies, and meets the evolving needs of all patients, carers and staff
Objective 2	Services will remain at the forefront of delivering world-class supraregional and national treatment services to residents of Scotland by continually adapting, enhancing and improving their clinical models
Objective 3	Services will be provided in flexible and adaptable clinical accommodation in a modern healthcare environment that meets all appropriate standards
Objective 4	Services will have optimal safe, efficient clinical pathways which are person-centred, promote adjacencies between services, and enhance the dignity and safety of our patients and users, their families/visitors, and our staff
Objective 5	Services will be delivered in an environment which promotes safety and minimises harm

The Visioning document attached at Appendix 4 gives a wealth of detail of the feedback that the project has received from patients, staff carers, the third sector and other partners about how the future of these services can be shaped.

The proposed investment would:

- create sufficient capacity across outpatients, daycases, diagnostics, inpatients, theatres and critical care to meet current and future demand for national and supraregional services for injuries and diseases of the head, neck, brain and spine
- put the needs of people with cognitive and physical challenges at the forefront of service design while delivering for all of our stakeholders, including our staff
- improve access – not just physical access within the site and between services but by allowing the services to develop and expand, reducing waiting times and offering alternatives to in-person consultations
- allow the INS to develop on its existing world-leading reputation to improve and innovate on behalf of the Scottish people
- harness the potential of gene therapies and other personalised medications for adults with neuromuscular diseases

- continue to expand and develop specialist services which provide access within Scotland for people who would otherwise go to England or even the USA for treatment
- collaborate with our embedded Clinical Research Facility on being a primary trial centre for new gene therapies and other advanced therapy medicinal products (ATMPs)

2.4 Strategic alignment

The Scottish Government has laid out its expectations for Whole System Infrastructure Planning in DL(2024)02, which requires NHS Boards to produce a deliverable, whole-system service and infrastructure change plan for the next 20-30 years.

The first element of this work is to develop a maintenance-only business continuity plan based on a risk-based assessment of the Board's existing infrastructure. NHS Boards are required to submit this to SGHD by 31 January 2025.

NHS Greater Glasgow and Clyde has already been working on an infrastructure strategy with Scottish Government, regional and local stakeholders, external advisors, staff, patients and the public through its Moving Forward Together programme, which sets the clinical vision for health and social care across NHS Greater Glasgow and Clyde.

This clinical vision has been used to inform a delivery plan, describing where and how services will be delivered in the future, focusing on service models rather than specific buildings. This has allowed GGC to identify priorities for investment across its infrastructure strategy to support the proposed transformational service change.

A full review of existing infrastructure has been completed and the reprovision of the INS remains the top priority for capital investment within the Board's MFT programme.

2.5 Development since Initial Agreement

2.5.1 Development from Initial Agreement to candidate site options

The Initial Agreement was approved by Scottish Government on 29 March 2023 and NHSGGC were invited to carry out further work to confirm the Preferred Site Option over the following 12-month period.

The Initial Agreement set out a long list of potential future service delivery options for the national, supraregional and regional services which must be delivered on a highly acute hospital site. From this long list, a shortlist of delivery options were put forward to be considered at Outline Business Case.

At the outset of OBC, this shortlist was fully explored through an options development process, producing a revised long list of potential site scenarios which were reviewed and evaluated to formulate a shortlist of Candidate Sites which went forward to further assessment.

As part of this development, two options which explored the possibility of accommodating some INS services within the QEUH Adult Hospital were ultimately ruled out due to the level of disruption and risk to existing services and the practical issues of such significant alterations to live facilities within the QEUH.

Initial Agreement Option	Current Candidate Site Option equivalent	Comments
Option 1: Do Minimum	Option 0: Do Minimum	
Option 2: All services immediately co-located in a single facility on the QEUH site	Option 1: Single New Build – North QEUH campus	New build envisaging a single INS building.
Option 3a: Split services across more than one location on the QEUH site	Option 2: Campus New Build – North QEUH campus	New build INS on adjacent Candidate Sites.
Option 3b: Selected INS inpatient services integrated within QEUH with remaining services in INS being redeveloped	n/a	Having tested several options to relocate INS services within the QEUH Adult Hospital it was deemed unfeasible, and this option was set aside.
Option 3c: Phased new INS 'Campus' on existing INS, QENSIU and NRU sites	Option 3: Maximum Refurbishment	The current Candidate Site option envisages partial refurb and partial replacement of existing INS buildings to meet the Brief.
	Option 4: Phased Campus Approach	The current Candidate Site option also includes refurb of Langlands to achieve floor area requirements.

2.5.2 Stakeholder engagement

At every stage, stakeholders have been placed at the heart of developing this proposal.

A series of workshops took place in spring and summer 2023 to develop the overall vision and objectives for the project. Further workshops were held over autumn and winter 2023 to refine and update the benefits criteria and to score them. The SMART objectives developed through this process were then utilised to inform the criteria for assessing the Site Options Appraisal process. Section 5.2–5.3 and Appendix 4 detail this extensive engagement.

Decision-making has been democratised by ensuring that all decisions are taken by three equally weighted groups:

1. Patients, carers and third sector
2. Clinical staff
3. Non-clinical staff and other stakeholders

Irrespective of how many individual members of each group attend a session, each of the three groups are given an equal (one-third) vote.

2.5.3 Candidate site options

The Options Appraisal considered 5 different shortlisted options.

0.	Do Minimum	The Do Minimum requires working within the confines of the existing INS Estate, sequentially decanting, and refurbishing the currently occupied buildings. It should be noted that Do Minimum does not meet the investment objectives as it does not include any change to layouts, would not deliver spatially compliant accommodation for the INS and limits the opportunity for future improvement.
1.	Single New Build	This option is for the reprovision of all INS facilities in a Full New Build comprising a single building located on the north-eastern part of the QEUH site.
2.	Campus New Build	This option is for the reprovision of all INS facilities in a Full New Build comprising a cluster of 3 buildings located on the north and north-eastern Candidate Sites.
3.	Maximum Refurbishment	This option maximises refurbishment of the existing INS Buildings (those north of the access road, either side of the ICE building). The balance of additional space required to meet the Schedule of Accommodation (SOA) is in a New Build Facility replacing the existing Neurology Building and NRU facilities to the south of the existing Candidate Site. A northward extension to the QENSIU is also envisaged to achieve SOA requirements.
4.	Phased Campus Approach	Option 4 is a Phased Campus approach using most of existing INS buildings / sites. To achieve the necessary increase in additional space it proposes replacing the Neurology building and NRU (as Option 3), refurbishing the QENSIU (as Option 3) whilst including the existing Langlands PFI building for refurbishment. This enables the Surgical building to be largely vacated.

2.5.4 Site options appraisal

An appraisal workshop was arranged to allow stakeholders to assess the options based upon the benefits criteria. The event took place in-person at the William Quarriers Conference Centre in Glasgow on 31 January 2024.

The Groups scored the candidate sites based on weighted scoring. The three groups of stakeholders were again given equal weighting.

The final ranking of sites was:

Option	Rank
1. Single New Build	1
2. Campus Build	2
4. Phased Campus Build	3
3. Maximum Refurbishment	4
0. Do Minimum	5

2.6 Economic appraisal

2.6.1 Whole-life carbon analysis

NHS Scotland is targeted to be a net-zero Greenhouse Gas (GHG) organisation by 2045 at the latest, and for all NHS Scotland new buildings and major refurbishments to be designed to have net-zero GHG emissions from April 2020. An analysis of the options was undertaken by AECOM to determine energy use, carbon emissions and the total whole life carbon for each option over a 60-year life.

The analysis showed that options 1 and 2 have the lowest whole-life carbon impact.

2.6.2 Risk

A high-level project development risk assessment of each option was carried out by the Project Core Team supported by Technical Advisers. Options that included refurbishment and decant accommodation generally recorded highest risk levels.

Option	Risk
1. Single New Build	Low
2. Campus Build	Low
3. Maximum Refurbishment	High
4. Phased Campus Build	High
0. Do Minimum	Highest

2.6.3 Non-financial appraisal (NFA)

To carry out an accurate value for money assessment of each option, the non-financial benefits of the investment need to be factored in alongside the financial costs.

	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbishment	Option 4: Phased Campus
Net Present Value (NPV)	£608m	£1,263m	£1,184m	£1,527m	£1,750m
Ranking	1	3	2	4	5
Weighted Benefits score	290	1,019	939	487	497
Cost per benefit point	£2.1m	£1.24m	£1.26m	£3.14m	£3.51m
Ranking	3	1	2	4	5

The results of this analysis demonstrated that whilst the Do Minimum option is the lowest financial cost, it provides a very low NFA score, reflecting that this investment option will not deliver the required service benefits, and so ranks low as a value for money investment.

Option 1 is the highest-ranking option in terms of combined financial and non-financial score.

2.6.4 Summary of economic appraisal

The economic appraisal of the short-listed options identifies that **Option 1: Single New Build Campus** is the best value-for-money option.

Option	Stakeholder Rank	Whole Life Carbon Rank	Development Cost	Construction Timescale (years)
1. Single New Build	1	1	£1,034m	5
2. Campus New Build	2	1	£1,044m	4-7*
3. Maximum Refurbishment	4	2	£1,437m	13
4. Phased Campus Build	3	2	£1,665m	11
0. Do Minimum	5	3	£469m	15

* Option 2 has a potential for up to 7-year programme if buildings are developed sequentially in three phases

2.7 Financial appraisal

2.7.1 Capital costs and funding requirements

The capital costs for the preferred option are presented below. These costs are based on the design prepared through this stage of project development, through stakeholder engagement with the project team and project architects.

Description	Option 0: Do Minimum	Option 1: Single New build	Option 2: Campus New build	Option 3: Maximum Refurbishment	Option 4: Phased Campus Build
Total	£469m	£1,034m	£1,044m	£1,437m	£1,665m
GIFA (sqm)	26,038	64,675	64,672	79,025	88,634
Cost per sqm	£18,012	£15,988	£16,143	£18,184	£18,842

2.7.2 Profile of capital expenditure

The economic model presents the profile of capital expenditure across each of the options. This is based on a consistent approach across the options. A detailed cash flow which presents the anticipated spend for capital will be prepared for the Outline Business Case.

2.7.3 Revenue costs

Baseline clinical and non-clinical service costs do not change across the options, as they are driven by the current clinical service model and therefore apply equally to each of the options.

At Initial Agreement Stage, a review of the potential impact of moving to SHTM compliant estate was undertaken, based on lessons learned from relocating services from the Western Infirmary Glasgow – a building of a similar age to INS – into the new Queen Elizabeth University Hospital. The range of additional costs was identified as £11-£25m. These have been factored into the evaluation of all options.

2.7.4 Non-recurring revenue costs

Non-recurrent revenue costs for items such as decant costs is not included and this figure will similarly be reviewed in detail through the development of the Business Case.

2.8 Preferred option conclusions

The process of considering the potential options to meet the requirements and scope set out in the Initial Agreement has been comprehensive. The Board commissioned external support to ensure the engagement with stakeholders was transparent and that the development of benefits, weighting of assessment criteria and presentation of the options were all part of a fully inclusive process. Feedback from the events has been overwhelmingly positive.

Metric	Highest ranked option
Stakeholder preferred option	Option 1
Lowest cost to deliver the investment objectives	Option 1
Lowest cost per benefit point	Option 1
Shortest construction timescale	Options 1 & 2
60-year whole-life carbon requirement	Options 1 & 2
Lowest project development risk	Options 1 & 2

Taking account of the above the Board confirms its preferred option to be Option 1: Single New Build.

2.9 Deliverability constraints

Over 2023/24, the national landscape for capital funded projects changed considerably. Scottish Government's ability to fund large-scale projects has significantly reduced, with almost all large-scale projects paused or halted.

The significant clinical risk of continuing to offer highly specialised services to the people of Scotland in facilities which are already failing led NHS Greater Glasgow and Clyde to review its proposals to identify whether a targeted investment model could be developed.

This analysis mapped the services of highest clinical risk against the areas of highest infrastructure risk.

This process identified the areas of key high acuity clinical activity (including theatres, imaging, critical care and acute inpatient wards) as the places where failure of the building services or fabric would have the greatest impact on patient safety and clinical outcomes.

In an environment where the immediate availability of capital to deliver the preferred option in a single phase appears difficult to assess, a focus was placed upon developing a targeted investment model which would allow the greatest areas of risk for clinical activity and infrastructure to be addressed as a priority at a lower initial cost, whilst lower areas of risk could be addressed at a later phase as the funding environment improves.

2.9.1 Targeted investment model

Based upon the above process, a Schedule of Accommodation was developed to confirm the essential acute services required to be located together to allow a targeted investment approach to be viable from a clinical adjacency and operational management perspective. This model required 39,705m² of total area against the overall requirements of 64,675m² of the preferred option.

A review was undertaken to assess each of the options and identify which could most readily accommodate the targeted investment without significantly impacting on the delivery of the investment objectives.

Option 1 and Option 2 can address the highest risk areas in a targeted investment scenario and deliver fully compliant, energy efficient accommodation, and both scored highly in the Option Appraisal with the patients, third sector and clinical teams. Under a targeted investment approach, they would lend themselves to delivering the required services within a first phase:

- Option 1 would ultimately allow a single new build facility, but the first phase would have a restricted footprint resulting in an 8-storey facility
- Option 2 has a larger footprint and can provide the first phase accommodation over 6 floors; however, it will ultimately be part of a longer-term approach that splits the services across 3 linked facilities

Both options would split the most acute INS services from those in a lower risk category and a more detailed examination of the achievable clinical adjacencies for Options 1 and 2 is required to determine which is the preferred solution.

Split-site working would not, however, deliver the optimal configuration of services and would result in a number of compromises:

- Increased transfer time to access acute services for patients not in the new facility
- Potential workforce impact due to decreased efficiency of working across different facilities
- Separation of multi-disciplinary teams
- Continuing revenue costs for retained estate

There would also be a requirement for some reconfiguration of remaining INS facilities to avoid clinical care being provided from isolated locations.

No revenue forecasting has been undertaken for this modelling and, as either of these options would involve some split-site working for services, this could impact on revenue costs e.g. for facilities services to support transfer of patients between services. Further detailed modelling would be required to confirm final additional revenue costs which would be submitted to the NHSGGC Board.

2.10 Programme

Some dates have moved since Initial Agreement due to delays to approvals, prolongment of periods for future stages based upon Technical Advisor review and change to some procurement activities which are delayed until SG approval to preferred option is secured.

Key Dates from [Table 17](#):

- OBC SCIG Approval November 2027
- FBC SCIG Approval November 2029
- Financial Close January 2030

To date the project has not formally reported or identified a target construction duration, as this is highly dependent on the preferred option that is selected. Indicative programmes for each option have been developed by the Technical Advisor. These remain high level programmes that will require further developed as any phasing plans are refined, together with agreement from the selected contractor.

2.11 Conclusion

NHSGGC has now concluded a Pre-OBC Economic Case, including an options appraisal, to identify a preferred option. Stakeholders have been engaged throughout the process as detailed in this document.

The Board confirms **Option 1: Single New Build** as its Preferred Option for the full redevelopment of The Institute of Neurological Sciences, as outlined in the Initial Agreement.

In recognition of the current challenges around capital funding for large-scale projects, a further review has been undertaken to explore ways to address the highest areas of risk as a targeted investment phase at a reduced initial cost. This approach is deliverable via Option 1 or Option 2.

We now request Scottish Government to note the contents of this Pre-OBC Economic Case and confirm agreement to continue work to conclude the remainder of the OBC.

2.11.1.1

3.0 Strategic/Clinical Appraisal

3.1 Current arrangements

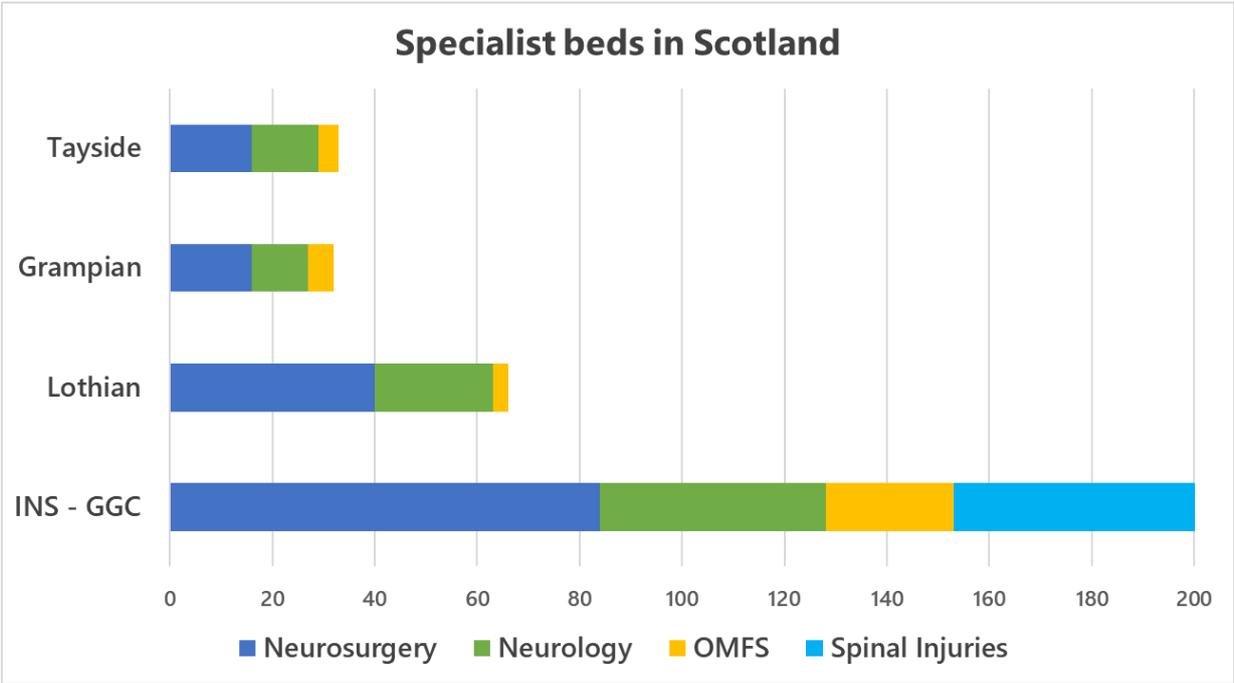
3.1.1 What is the Institute of Neurological Sciences?

The Institute of Neurological Sciences [INS] is the UK's largest brain, head, neck, and spine treatment centre. It treats patients from across Scotland and beyond, including accepting international transfers of UK residents injured abroad.

Only the four major trauma centres in Scotland offer neurosciences:

- The Institute of Neurological Sciences [INS] at the Queen Elizabeth University Hospital, Glasgow
- The Department of Clinical Neurosciences at the Royal Infirmary of Edinburgh
- Aberdeen Royal Infirmary
- Ninewells Hospital, Dundee

The INS has more beds than the other three regional centres in Scotland combined, with 60% of Scotland's specialist beds (201 out of 336), including Scotland's only spinal injuries unit.



Source: [Acute Hospital Activity and NHS Acute Beds, Public Health Scotland](#)

As a hospital in its own right, the Institute of Neurological Sciences is similar in size to a medium-sized district general hospital:

Golden Jubilee National Hospital	187 beds
Perth Royal Infirmary	198 beds
Borders General Hospital	221 beds
Gartnavel General Hospital	233 beds
Institute of Neurological Sciences, Glasgow	251 beds
Inverclyde Royal Hospital	276 beds
Dumfries & Galloway Royal Infirmary	297 beds

The INS admits 16,000 inpatients each year and sees 50,000 outpatients. For comparison the DCN in Edinburgh, Scotland's second largest neurosciences centre, has 67 beds, admits 6,000 inpatients per year and sees 26,000 outpatients.

Again, INS figures fall within the range of those DGHs listed: for comparison, the Golden Jubilee National Hospital sees 25,000 outpatients each year, while Inverclyde Royal sees around 68,000. Perth Royal Infirmary admits approximately 11,000 patients, while Dumfries & Galloway Royal Infirmary admits 23,000.

The major difference between the INS and a general hospital is that all services at INS are regional, supraregional or national, and are delivered to populations of between 2.5m and 5.5m people.

For example, If the orthopaedic ward at Inverclyde Royal Infirmary (26 beds) becomes unavailable due to plant or other failure, that would account for a drop of just over 10% of total orthopaedic capacity across GGC (240 beds). Not only does GGC have five other inpatient hospitals offering orthopaedics, almost every DGH in Scotland could offer some cover. Patients would be disadvantaged, but not left without treatment.

If the 48-bedded national Spinal Injuries Unit becomes unavailable (32 Level 1A specialist rehabilitation beds, 8 Level 2 and 4 Level 3 critical care beds and 4 ventilation support beds), there is no other service in Scotland. The nationally commissioned spinal injuries service in England has just under 350 beds in total. The North East Regional Spinal Injuries Centre in Middlesbrough has 24 beds in total, of which only 4 in total deliver Level 2 care and/or ventilation support.

Even within services which are provided regionally, the fact that GGC and INS provide more than half of Scotland's capacity across all of its services puts all Scottish patients at risk. For example, GGC has recently opened its new interventional neuroradiology [INR] suite, which was SGHD funded to provide more than 50% of Scotland's access to thrombectomy, a life-changing treatment for people with stroke. The INR suite also provides treatment for cerebral haemorrhage. It is the only unit in Scotland with two back-to-back rooms. If the Surgical Building were to fail, that would leave Edinburgh, which has only one INR room, providing for all of the East and West of Scotland. Given the treatment capacity in Lothian is less than half of that in GGC, and it is already being used to treat East of Scotland patients, Scotland would have to decide whether to treat cerebral haemorrhages or provide thrombectomy, as providing both would not be possible. In fact, Lothian would also struggle to provide 100% of either

service, so the choice would be to provide some treatment for sub-arachnoid haemorrhages or some thrombectomy. Given the time-critical nature of the services, the remaining East and West of Scotland patients would not be treated.

3.1.2 Facilities

The INS is not just one single hospital or building. Its acute services – the admitted and ambulatory services in scope for this business case – are spread across seven buildings on the QEUH campus:

- Surgical Building
- Neurology Building
- Queen Elizabeth National Spinal Injuries Unit
- Neurorehabilitation Unit [NRU]
- Clinical Neurophysiology
- ICE Building
- Langlands Building



INS services also provide outpatient, day treatment, short-stay surgery, rehabilitation, and wheelchair / mobility services elsewhere across the Queen Elizabeth campus, in all West of Scotland acute hospitals and some commercial premises, but those are excluded from this business case.

As of April 2024, INS has:

- 251 funded Acute beds over 12 wards
- of these 251 beds, over 30 are Level 2 (HDU) or Level 3 (ITU) Critical Care beds and these form the only stand-alone neuro critical care unit in Scotland
- 7 theatres
- A state of the art interventional neuroradiology suite which opened in March 2024 provides services for both brain trauma (e.g. bleeds, lesions, infections) and stroke (thrombectomy)
 - For the treatment of ruptured brain aneurysms, the service works jointly with Edinburgh to provide a single shared weekend service for Scotland
 - For thrombectomy it is the largest of 3 regional hubs in Scotland
- Day and overnight treatment facilities for people with both acute and long-term neurological conditions such as Multiple Sclerosis and Epilepsy
- An Oral Surgery treatment suite (dental chairs) for specialist care
- 50 outpatient consulting rooms
- An OMFS national and regional maxillofacial prosthetics facility, including 3D printers
- Scotland’s largest Neurodiagnostics department, which offers head and spine CT and MRI, Neuro-Spect and plain film x-ray, supporting both inpatients and ambulatory care for all services on the campus, including the Major Trauma Centres, and for all West of Scotland Boards
- Health Records department

3.2 Supraregional and national services

All INS services cover the West of Scotland Boards as a minimum:

Specialty	A&A	A&B	D&G	FV	GGC	Lan	WI
Hyperacute stroke	✓	✓	✓	✓	✓	✓	✓
Neurology	✓	✓	Major Trauma		✓	✓	✓
Neurophysiology	✓	✓	Major Trauma		✓	✓	✓
Neuropsychology	Specialist care to support INS services only						
Neurorehabilitation	Major	✓	Major Trauma		✓	Major	✓
Neurosurgery	✓	✓	Major Trauma		✓	✓	✓
OMFS	✓	✓	✓	✓	✓	✓	✓

No other West of Scotland Board has any Neurosciences beds.

The most acute and complex services for adults and children serve the entire population of Scotland.

3.2.1 National services for adults

The Institute of Neurological Sciences delivers four nationally designated services for the population of Scotland:

- Queen Elizabeth National Spinal Injuries Unit [QENSIU]
- Deep Brain Stimulation for Parkinson's Disease, Dystonia and other movement disorders
- Cleft Lip and/or Palate Surgery for adults
- Specialist Prosthetics

The co-location of all specialist Neurosciences with comprehensive supraregional adult and children's services on a single campus is vital to supporting other nationally designated services which are based in the Queen Elizabeth University Hospital. Teams based in INS are also a funded and integral part of the following nationally designated services provided on campus:

- Scottish National Allogeneic Stem Cell Transplant Service (donor bone marrow transplants)
- Scottish National CAR-T service

Not all national services are sufficiently high cost to be nationally designated, but many of them support the entire population of Scotland. The INS is also the only Scottish centre for:

- complex epilepsy assessment
- complex base of skull and craniofacial surgery
- assessment and treatment for Myasthenia Gravis (also offers Scotland-wide virtual clinical support for people with MG)
- assessment and treatment of peripheral nerve disorders
- assessment and treatment of rare neuromuscular conditions

All other Boards and hospitals across Scotland send their patients to GGC for these services.

3.2.2 Children's Services

Children's neurosurgery and OMFS moved into the Royal Hospital for Children on the QEUH campus in 2015. Children's neurosurgery and OMFS moved into the Royal Hospital for Children on the QEUH campus in 2015. Clinical teams based in INS work jointly with paediatric colleagues to provide comprehensive services for children and young people in Scotland for diseases and injuries of the spine, brain, head and neck, including:

- Scottish Brachial Plexus Surgery service for children, young people and adults
- Scottish Craniofacial Surgery service for children and young people
- Scottish Dorsal Rhizotomy Surgery service for children and young people with Cerebral Palsy
- Scottish national surgery service for children and young people with Cleft Lip and/or Palate
- Paediatric brain surgery

- Paediatric brain and head & neck tumours
- Paediatric maxillofacial surgery
- The treatment of children with complex needs who are referred to national paediatric services but whose care is not covered by the national service designation, for example:
 - some children who are referred to the national Paediatric Cardiac Service have complex genetic conditions which also affect their spinal and facial growth, and which require surgical intervention not covered by national service designations

If the INS services were no longer provided on the QEUH campus due to building/infrastructure failure, none of these children's services could continue to function, and hundreds of Scottish children each year from all NHS Boards would require transfer to England for craniofacial surgery, base of skull surgery, neuro-vascular surgery and complex spinal trauma.

INS surgeons at junior and middle grade also support the surgical out-of-hours rotas at the Royal Hospital for Children. There would be significant detrimental effects to the operation of the paediatric neurosurgical service were these doctors to be redeployed to another site in the event of failure of INS facilities.

3.2.3 Neurosurgery

Adult neurosurgery is a predominantly emergency service which provides care to people with acute brain or spinal cord injury, vascular injury and Central Nervous System [CNS] tumours.

Its elective programme encompasses spinal surgery, brain cancer diagnosis and management, and the ongoing treatment of neurological conditions. The West of Scotland Neurosurgery service provides the only comprehensive complex epilepsy surgery assessment service for adults in Scotland as well as the national service for Deep Brain Stimulation.

Major Trauma

The Neurosurgery service supports both of the on-site Major Trauma Centres at QEUH and the Royal Hospital for Children, and the Queen Elizabeth National Spinal Injuries Unit.

Spinal Surgery

Neurosurgery manages 95% of elective and non-elective cervical and thoracic spinal surgery (middle-to-upper back/neck surgery), and 80% of all spinal trauma admitted to the QEUH. The service has over forty years' experience in the hyper acute treatment of spinal cord injury.

Deep Brain Stimulation

This national service involves the surgical implantation of electrodes into the brain. The electrodes then send a continuous electrical pulse to the brain. It can significantly reduce tremors, dystonia and spasticity in people with several neurological conditions, most notably Parkinson's Disease. For early-onset Parkinson's, this can be life-altering, allowing younger people to continue to work and to care for themselves independently at home.

See: [Parkinson's UK](#).

3.2.4 Oral and Maxillofacial Surgery (OMFS)

Oral and Maxillofacial Surgery provides surgery of the head, neck, face and mouth. It is Scotland's largest Head and Neck cancer unit and the only dedicated unit for cancers of the salivary glands. As Scotland's largest centre it undertakes around 150 complex cancer resections including replacing lost tissue from the mouth with tissue and/or bone from the arm, leg or abdomen. These complex cancer cases often require 15-16 hours to complete and involve multiple surgeons – e.g. 2 OMFS surgeons and 2 ENT surgeons – rotating into theatre.

The unit provides all complex maxillofacial surgery for West of Scotland residents, and specialist craniofacial procedures – e.g. cleft lip and/or palate, facial deformity and facial trauma – for the population of Scotland.

It is five times the size of the next largest Scottish centre (Aberdeen) and is closely aligned with Glasgow Dental Hospital, which is itself the largest Dental Hospital in the UK. The service hosts the inpatient training for all Scottish Dentists and Oral Surgeons.

It is one of the few UK centres – and the only one in Scotland – which offers comprehensive craniofacial surgery including the replacement of joints of the face using 3D-printed prostheses which replace the patients' own facial structures (jaw, cheek, etc).

The inpatient service works closely with the Ear, Nose & Throat [ENT] team located in the QEUH. Joint operating by OMFS and ENT teams is common and takes place in the OMFS theatres.

3.2.5 Acute and Hyperacute Stroke

The service is the largest hyperacute stroke unit in the West of Scotland and is also the largest acute unit in Scotland. It accepts both immediate transfers by ambulance through QEUH ED and secondary transfers from hospitals across the West of Scotland following assessment and initial treatment or stabilisation. Treatments include the provision of clot-busting therapies (antiplatelet and thrombolysis) and intensive rehabilitation.

Mechanical Thrombectomy

This is a procedure which removes clots from the blood vessels which supply the brain using image-guided interventional neuroradiology techniques, and this service covers the West of Scotland as part of Scotland's flagship national service network for Thrombectomy. It provides more than 50% of all such treatments provided to the residents of Scotland.

3.2.6 Neurology

The West of Scotland Neurology inpatient service is the largest in the UK and is a regional and national hub for people with complex neurological conditions including:

- Multiple Sclerosis [MS]
- Myasthenia Gravis [MG]
- Motor Neurone Disease [MND]
- Guillain-Barre syndrome [GBS]

- Epilepsy and non-epileptic seizures
- a range of motor and neuromuscular conditions e.g. early-onset Parkinson's, Huntington's, muscular dystrophies, spinal muscular atrophy

The West of Scotland Neurology service is also part of the Scottish nationally designated service for CAR-T [Chimeric Antigen Receptor T-cell] therapy, an innovative procedure for treating people with previously incurable leukaemia and lymphoma.

A new Scottish pathway has also been developed for the treatment of people with Relapsing-Remitting Multiple Sclerosis using stem cell transplantation (also known as bone marrow transplant). At present, patients go to England for their transplant as part of a clinical trial; if approved for mainstream treatment, this could only be provided in Scotland on the QEUH campus due to the clinical skills and facilities required across haematology and neurology.

All West of Scotland patients starting a new disease-modifying treatment for a long-term condition such as Multiple Sclerosis will be seen in the unit as first infusions involve 12- or 24-hour specialist monitoring for cardiac and/or ophthalmic side-effects, such as sudden cardiac death and blindness.

For rare neuromuscular and peripheral nerve disorders, the West of Scotland Neurology Short-Stay Admissions Unit is the only treatment site for the population of Scotland. These younger adults can have significant cardio-respiratory issues and physical disabilities; many require mechanical ventilation and 24/7 support at home and are already under the care of specialist national and regional teams operating within the QEUH. The co-location of specialist children's, adult and neurological treatment services on the QEUH campus allows immediate access to specialist teams with expertise in managing the complex needs of people with these rare conditions. The QEUH teams also support the Royal Hospital for Children and therefore have often been familiar with the person and their family since early childhood, and this continuity of care is key to supporting person-centred treatment, especially at very difficult times including the transition between paediatric and adult services.

People with more common long-term neurological conditions are a key component of the services. There are an estimated 30,000 people affected by epilepsy and 8,000 people living with Multiple Sclerosis in the West of Scotland. The goal of the West of Scotland Neurology service is to ensure these people can maintain their lives at home or in a homely setting in line with what matters to them, and to self-manage their own health as independently as possible.

The West of Scotland Neurology service has been a national pathfinder for Advanced Clinical Referral Triage, Patient Initiated Review appointments and virtual clinics, and in developing clinical management guidelines for the tiered care of neurological conditions. The Neurology Voices group (comprising individuals with lived experience – patients and carers) has been closely involved in these developments which have helped to respond to their request for access to services at a time the individual needs it rather than when a scheduled review appointment is offered. More than 70% of all Neurology outpatient contacts now take place virtually, supporting people in maintaining their normal day-to-day lives and reducing their need to travel to access specialist care and advice.

Some 85-90% of patients with a common long-term neurological condition which requires ongoing medication are treated via homecare or in outpatient settings across the West of Scotland. This is supported by a network of outreach arrangements, with the Neurology service covering 14 hospitals across the West of Scotland with on-site clinics and day treatment services. This minimises the disruption to the lives of people with long-term conditions by allowing them to attend their local hospital but still be seen by a regional specialist.

3.2.7 Spinal Injuries

Traumatic spinal cord injury is a relatively uncommon occurrence within the Scottish population (c.170 people each year) but often results in devastating disability. Uniquely in the UK and Europe, the QENSIU admits most new patients within hours of their injury, either by direct ambulance transfer or via transfer from other NHS acute trauma services. Falls account for half of all admissions, with road traffic accidents and medical causes accounting for around a fifth each.

Patients are admitted to the acute ward, Edenhall, which flexibly provides Level 2 (High dependency) and 3 (intensive care) care as required. When ready, patients then step down into the longer stay, less acute ward, Phillipshill, before they either return home or move to an alternative care facility in their local community. Key components of the multi-disciplinary service model include clinical psychology, physiotherapy and occupational therapy. There are dedicated treatment areas for physical therapy as well as clinic space to allow outpatient reviews. Patients benefit from access to large communal areas and a therapy garden which is supported by the charity Horatio's Garden. The unit includes step-down accommodation to enable patients to progress to independent living.

Within its acute ward, there is specific provision for ventilated patients; this service also provides training for families and carers who will support the individual with home ventilation following discharge. Spinal surgery, which may include external (HALO) fixation, is performed in around one third of cases. Patients are routinely transferred to other specialties within INS (Neurosurgery, Neuro Critical Care, Neurophysiology), as well as to other QEUH specialties, such as Orthopaedics, Urology, Colorectal Surgery, Gastroenterology and Cardiology, as part of their ongoing treatment and management. Co-location with these specialist regional services within QEUH, all of whom have experience in managing patients with Spinal Cord Injury, prevents patients from requiring frequent and repeated ambulance transfer, as currently happens in less acute UK spinal injuries units like Stoke Mandeville and Southport. (Prior to the building of the Queen Elizabeth University Hospital and the installation of a fixed link corridor, the national service funded two dedicated SAS ambulances solely to transfer patients between services on the then-Southern General Hospital campus.)



To support older children and young adults, the Queen Elizabeth National Spinal Injuries Unit can accept people from 14 years of age, so works closely with the Royal Hospital for Children to assess, triage, support and, if required, admit young people with a spinal cord injury.

People with spinal cord injury may remain in the Unit for several months after emergency treatment and rehabilitation. Patients with high tetraplegia routinely stay for 18-24 months, with the least disabled patients staying for an average of around 45-60 days prior to onward transfer to a more suitable setting closer to home.



3.2.8 Neurorehabilitation

The Neurorehabilitation inpatient service provides services to patients with complex disabilities that are typically but not exclusively due to brain illness or injury, excluding stroke which has its own specialist rehabilitation services across GGC.

It provides Level 2 Specialist Neurorehabilitation Services, as defined by the British Society of Rehabilitation Medicine, delivering intensive rehabilitation to patients whose acute medical and surgical needs have been met but who still require intense specialist interdisciplinary hospital rehabilitation to maximise recovery and to support a safe transition back to a homely setting.

It has recently expanded its service by 6 beds (from 18 to 24 beds) to support the intensive neurorehabilitation of people admitted to the Major Trauma Centre, to which people can come from any NHS Board in Scotland.

3.3 Clinical local risk register

As noted in the IA the risk of further disruption to clinical services from environmental issues remains very high within service risk registers, with a potential catastrophic impact in the event of a full building failure.

Environmental risks include:

- Breakdown in fabric across multiple areas in INS – noted as failures requiring rectification in HEI inspections. These continue to affect a number of acute clinical areas including inpatient wards and critical care and lead to reduced capacity during prolonged periods of decant and rectification work.
- Drainage issues/risk of flooding throughout the Surgical Building - multiple flooding incidents have affected key clinical areas including theatres, critical care, inpatient wards, diagnostic services and outpatients. These have led to significant loss of service/capacity including loss of elective operating in theatres for a period of 20 months. As recently as April 2024, hot water system failures caused flooding across three full floors of wards. Despite best efforts, Neuro Critical Care had to be closed, with patients transferred into QEUH.
- There is a continuing risk of contamination, including foul waste, in live clinical areas with consequent risk to infection control and risk of increased infection in vulnerable patient groups e.g. surgical site infections in theatre patients.
- Ventilation failure and poor temperature control affecting safe provision of clinical services including theatres and critical care. A failure in either system leads to loss of operating capacity with immediate impact on patient care e.g. loss of emergency (non-elective) and planned theatre cases.
- Lift failures affecting safe and timely patient transfers – due to the time critical nature of many services this is a key safety issue with potential catastrophic impact on patient outcome.

Multiple reports of disruption to/reduced capacity in clinical services from building/infrastructure failures continue to be recorded in the Datix incident recording system with significant impact on patient care, staff and visitor welfare and organisational performance.

3.4 HEI reports

INS services and wards have been included in four recent unannounced inspection visits by Health Improvement Scotland in 2016, 2017, 2018 and 2019.

The most recent report noted:

In the Institute of Neurological Sciences, the current system in place for both ward level and infection prevention and control audits demonstrate that there are issues with the environment, due to the age and fabric of the building. These audits look at several elements of standard infection control precautions. The audits carried out by ward staff show one of these elements is scoring 30-40% for the condition of the ward environment for all the wards in the Institute.

Throughout our inspection of the Institute of Neurological Sciences, we saw multiple estates issues. We found the following:

- Extensive damage to shower trays
- Broken PVC sealant on showers, sinks and toilets
- Extensive damage to walls
- Exposed damaged wooden panelling
- Damage to panels at sinks
- Damage to floors, with tape in place
- Water ingress on ceiling tiles, that was widespread throughout the Institute
- Damage to a staff changing area, including exposed pipes, broken ceiling tiles and damage at sinks.

All of these issues make it difficult to effectively clean the environment.

Queen Elizabeth University Hospital – safety and cleanliness inspection report: February 2020, HEI Scotland: https://www.healthcareimprovementscotland.org/our_work/inspecting_and_regulating_care/hei_greater_glasgow_reports/qeuh_feb_20.aspx

Having to take risks to have surgery with the sewage problems and the disruption that being an inpatient while the “works” happened wasn’t great – plus you are ill so would be beneficial not to have all the disruption/noise/smells etc.

I have personal experience of a fire near MRI department during upgrading works. Scary experience as family had to leave and I had to stay behind and experiencing this on top of being unwell makes me wary of prolonged upgrade works for little benefit.

Patient comment on existing facilities and the impact on care

There is an ongoing rolling ward upgrade programme to address these issues, which has required repeated decants, increasing the pressure on availability of beds. The initial programme – which only addresses the items identified above along with any other maintenance work in close proximity – was initially scheduled to last two years, from 2017 to 2019. Due to the complexity of working in a live clinical environment and the fact that each work programme has uncovered more extensive or unexpected additional issues, the programme is in its seventh year and is expected to continue into 2025/26.

It does not involve wholesale changes to the building structure – room sizes and bed numbers remain the same.

3.5 Clinical risk of service failure

Based upon lived experience, historical data and survey work undertaken to assess INS buildings and supporting infrastructure it is clear that several of the buildings within the INS pose a significant risk of unexpected failure ranging from minor to catastrophic (total loss of facility). Given that all of the major MEP needs replacing, the Project Team has explored the impact of facility failure on the ability to deliver services and provide care to patients. The buildings at greatest risk of total failure are the Surgical Building followed by the Medical and Outpatients buildings.

The building is tired, badly configured for modern care delivery. Staff morale in a less than ideal environment is low. Care is best we can provide, could be so much better but cannot be true gold standard in current buildings, even with refurb.

Clinical staff comment on existing facilities

The infrastructure within the INS has failed on a number of occasions recently including failures of heating, ventilation and drainage as captured by the Datix system and documented within the INS Risk Register.

- Most recently, the service was without an Interventional Neuro-Radiology service for over a year. This meant that GGC could not provide any treatment for brain haemorrhages to more than half of the population of Scotland. While NHS Lothian agreed to take the most urgent cases (330 admissions per year), this was only achieved by INS accepting non-elective surgical admissions from NHS Forth Valley and NHS Dumfries & Galloway in return (180 cases). The overall additional activity that NHS Lothian could provide per year was therefore 150 cases. This is 1% of the total number of admissions to INS in a year.
- When theatres previously failed, the entire elective neurosurgery programme was suspended for 20 months for works to be carried out. The QEUH could not offer any ward space or critical care. One theatre was made available. Non-urgent surgical waiting times went from just over 1 year to over 2.5 years and have never recovered. In this instance, bed capacity was not affected, so the INS was able to maintain an emergency service.

If a more significant incident were to affect an entire building, there is no centre in Scotland which could take on this level of activity. The nature of brain, spine and head and neck surgery is that most of the activity and beds relate to non-elective work, much of which is time-critical.

Even if there were alternative providers within Scotland, the impact on the Scottish Ambulance Service of taking 150 emergency transfers per week from across the West of Scotland to

Lothian, Grampian and/or Tayside would be immense. SAS would likely require its own new inter-hospital fleet for this level of displacement – a ScotStar for brain, head, neck and spine.

Because INS has more than half of all Scottish beds across its specialties, the impact of a service falling over would be to swamp the remaining Scottish services. With only 40 neurosurgery beds in NHS Lothian, it would not be feasible for that centre to provide more than minimal support in the event that INS were to be unavailable.

	INS - GGC	Lothian	Grampian	Tayside	Others	Scotland	INS %
Neurosurgery	84	40	16	16	0	156	54%
Neurology	44	23	11	13	0	91	48%
OMFS	25	3	5	4	4	41	61%
Spinal Injuries	48	0	0	0	0	48	100%
All Brain, Head & Spine	201	66	32	33	4	336	60%
Neurorehabilitation	24						
Acute/Hyperacute Stroke	26						
Total INS	251						

The 29-31 Level 2 and 3 Critical Care beds in INS are similar to or greater than the levels of critical care in most large District General Hospitals across Scotland.

Unit name	Level 3/4 (ICU)	Level 2 (HDU)
INS	6-8	23
Aberdeen Royal Infirmary	30 bed spaces, 25 funded	
Monklands Hospital	9	22
Ninewells Hospital	8-9	16
University Hospital Crosshouse	7	12

In addition, INS has between 8-12 patients on some form of ventilation or respiratory support (tracheostomy, etc) within its ward bed complement at any time. It is the only hospital in Scotland to do this – all other hospitals keep these patients in Level 2 Critical Care.

The impact of losing the acute services within INS would mean a need for an additional 40 critical care beds across the rest of the system.

A floor-by-floor review of the potential impact is provided below.

In the event of the failure of the surgical block due to the ongoing M&E issues, what knock on effects and alternative provision would there be for its current services? How many patients per year would be impacted?

Table 1. Scenario Planning

Level	Service	Service provision	Alternative provision			Comments	Impact
			QEUH	SCO	UK		
Level 5	Clinical Research Facility	Integrated into adult and paediatric pathways for multiple specialties Adult Inpatient, day care treatment, outpatients, Paediatric Inpatient, day care treatment, outpatients CT Pharmacy, Laboratory (-20 & -80 Freezers) ECHO, CPET	RED	N/A	N/A	None - could be moved into QEUH/RHC, but would have to displace an existing ward and outpatient areas in QEUH/RHC with restricted access CT pharmacy provision for >120 clinical trials supplies requiring fridges/freezers and controlled ambient temperature storage; transfer & storage of schedule 1 controlled drugs under Home Office Licence and storage for all regulatory paperwork associated with the trials, sample processing and storage provision. Clinical treatment/assessment provision would need to be found for all patients already on clinical trials to deliver as per contract, ensuring patient safety compliance and conditions of the protocol. New contracts are entered into based on competitive site selection and ability to meet conditions of the contracts. No alternative facility available on QEUH campus. Prospective research activity would need to be suspended. This would directly impact on ability to meet the conditions of Board's activity-based funding and grants.	6,500
Level 4	Ward 65: Neurosurgery	23-bedded ward	RED	RED	RED	None - could be moved into QEUH but would have to displace an existing ward in QEUH.	11,000 + 8-10

	Ward 66: decant	18-bedded ward Was the Pre-Operative Assessment service and Same Day Admissions Unit [SDAU], currently being used as decant ward to allow HEI works to take place in Neurology building	RED	RED	RED	All INS wards routinely manage patients with tracheostomies and/or other severe breathing difficulties - in every other hospital in Scotland, patients on any form of ventilation support are managed in Level 2/3 critical care, therefore some patients could not be maintained on a ward and would need a critical care bed, estimated 8-10 at any time.	critical care beds
Level 3	Ward 64: Neurosurgery	23-bedded ward	RED	RED	RED		
	Wards 63: Neurosurgery	23-bedded ward	RED	RED	RED		
Level 2	Ward 62: Acute and Hyperacute Stroke	26-bedded ward with associated rehab space and ambulatory care treatment spaces	AMBER	AMBER	N/A	None - could be moved into QEUH but would have to displace 1.5 wards in QEUH and have dedicated rehabilitation facilities associated with it. Potentially could be moved to another GGC or West of Scotland unit, but there would be zero ability to provide thrombectomy, if moved off-site	3,500
Level 1	Theatres (7)	3 retained theatres in INS and 4 newer theatres in the ICE Building	RED	RED	N/A	None - during previous long-term theatre closures, QEUH was only able to provide 1 theatre (total) and 0 beds, resulting in the complete suspension of routine elective surgery for 20 months. This was despite more than 50% of theatre operating being retained. Cancer and emergencies use over 85% of all theatre capacity, therefore operating on fewer than 5 theatres would result in patients not being treated or having to be sent to another hospital. NHS Lothian has four theatres in total, but could potentially contribute 1 theatre, but not the bed capacity required.	12,000

	Wards 60 & 61: Neuro Critical Care	QEUH Level 2 and 3 Critical Care - also supports Edenhall Spinal ITU (12 beds)	RED	RED	RED	Potential for some provision - there is an unstaffed ICU pod within QEUH which could provide 10 beds. This would be a third of INS provision. With no access to Edenhall, patients could not be admitted to the national Spinal Injuries unit at time of injury. There is no option to send patients to England, as Spinal Injuries units in the rest of the UK do not offer any highly acute care - therefore all spinal injuries in Scotland would have to be retained in their local ITU/HDUs across Scotland for 60-90 days, as is the practice in England.	30 critical care beds
	Neurodiagnostic services - Neuro-SPECT	These services support all wards and specialties across the INS, QEUH and RHC	RED	RED	RED	The department has Scotland's only Neuro-SPECT scanner and sees patients from every NHS Board, even those with planned surgeries in Lothian, Grampian and Tayside. All Scottish patients would have to be referred to NHS England for scanning. Given the scale of requirements, patients would have to be dispersed across multiple centres, and given NHS England's waiting times pressures, this may not be achievable	5.5m pop
Level 0	Neuro-diagnostic services inc CT, MRI and plain film	The department is split over Level 0 and Level 1 and it supports brain, head, neck and spine imaging for all adult and paediatric hospitals across the West of Scotland	RED	RED	RED	There is no alternative provision in the West of Scotland - patients would have to be sent to NHS Lothian or, more likely, not be imaged, as Lothian would need to treble their existing capacity to cope with WOS patients	2.75m pop

Clinical Research - Imaging Facility [CRIF]	GGC-wide service for research imaging CT and 3T MRI	RED	RED	RED	No alternative provision for Research CT and MRI in the Board and no capacity within diagnostics to meet demands. Patients would have to be sent to another imaging centre to comply with treatment protocols - all cancer Clinical Trial Imaging undertaken in CRIF. Mobile scanners could be considered but would need to have cost covered and suitable location. Protocols require same machine to be used throughout for comparable imaging. Radiology reporting activity could be done remote to the unit. Prospective studies would need to be suspended	1,750
OMFS Dental OPD and Day Treatment Unit	Treatment chairs to support ambulatory care and pre-conditioning for complex inpatients	AMBER	AMBER	AMBER	This could be provided at Glasgow Dental Hospital, but would result in worsening treatment waits for existing GDH patients, as many of the INS patients are covered by cancer targets and would therefore displace existing patients	1,000
Interventional Neuroradiology	Regional service for treatment of sub-arachnoid haemorrhages and other brain bleeds, as well as part of national Scottish network for Stroke Thrombectomy. Two theatre-grade treatment rooms.	RED	RED	RED	INS has half of Scotland's total capacity for providing interventional neuroradiology. Commissioning of new INR suites takes several million pounds and 2-3 years. Scotland would have to choose whether it could offer mechanical thrombectomy at all, and Lothian may have to provide the entire central belt service. The knock-on effect on ambulance transfers would be significant, with SAS ambulances from the entire West of Scotland being taken out of service to transfer patients to Edinburgh.	1,500

Other wards/services which would be impacted

Alternative provision

Location	Service	Service provision	QEUH	SCO	UK	Alternate provision available on QEUH site	Impact
QENSIU	Queen Elizabeth National Spinal Injuries Unit	National service for Scotland	RED	RED	RED	<p>Could not offer acute care in first 60-90 days following injury, as per current model. Without immediate co-location of a full neurosurgery and neuro-ITU, patients would be retained in local services across Scotland until stabilised and suitable for rehabilitation.</p> <p>No ability to refer to England as English spinal injuries units ONLY offer rehabilitation care - there are 48 beds in QENSIU, of which 16 are Level 2/3 critical care and 32 are rehabilitation. NHS England has just over 300 spinal injuries beds across 8 units, with Stoke Mandeville offering a third of the total adult provision. Other units have between 20-30 beds.</p>	200
W53	Neurology Short Stay and Day Treatment Unit	Specialist infusions and short-stay treatments for a range of neurological conditions, including Multiple Sclerosis, Motor Neurone Disease [MND], Muscular Dystrophy, etc	RED	RED	RED	<p>These are treatments which require ITU access, overnight ECG and EEG monitoring or other high-risk drugs which can only be given in a specialist centre. Risks of treatment include loss of sight and sudden cardiac death.</p> <p>Could be moved to another hospital site which had 24/7 access to ITU, neurology, cardiology, electrophysiology, therefore limited to regional centres and limited capacity in Scotland</p>	4,500

Alternative provision

Location	Service	Service provision	QEUH	SCO	UK	Alternate provision available on QEUH site	Impact
W67	OMFS Ward	21-bedded inpatient ward for head and neck surgery, including cancer Ambulatory care service for emergency oral, dental and facial trauma	RED	RED	RED	<p>Largest complex OMFS service in UK, with 25 beds - next largest unit in Scotland has 5 beds. No other UK unit has more than 20 beds.</p> <p>Along with Glasgow Dental Hospital, the service provides all out of hours oral and dental care for the West of Scotland, providing direct inreach and outreach cover for 14 hospitals. For more specialist services, accepts transfers from across Scotland.</p>	5,000

3.6 Investment objectives

Working with stakeholders, including patients, public, third sector, staff and the wider community through the Strategic Assessment and Initial Agreement stages, the programme has developed five core objectives:

3.6.1 Objective 1

Services will be provided in a safe and appropriate clinical environment which improves access and outcomes, maintains vital clinical adjacencies, and meets the evolving needs of all patients, carers and staff

Waiting times for inpatients and day cases are challenged daily by a lack of sufficient facilities to treat patients appropriately. Neurosurgery and OMFS require ultra-clean environments to carry out planned and emergency procedures which involve teams of surgeons working together or in rotation. Theatre sessions are currently planned to operate at beyond 90% utilisation over 50 working weeks, with no dedicated Cepod theatres or other accommodation for emergency presentations except on weekends. This results in planned procedures being rescheduled ('bumped') for emergency presentations.

The Institute of Neurological Sciences does not currently have basic facilities which are common across all modern hospitals - discharge lounge, ambulance receiving and ambulance waiting areas - and developing these into the preferred solution will significantly improve patient flow, experience and dignity for the current patient population.

Across the estate, overcrowding of all areas and inability to meet current SHTM space requirements means that both planned and unplanned downtime has only been accommodated by reducing services, using high-cost private sector capacity or transferring patients to NHS Lothian.

This proposed investment would therefore create:

- sufficient capacity across outpatients, daycases, diagnostics, inpatients, theatres and critical care to meet current and future demand for national and supraregional services for injuries and diseases of the head, neck, brain and spine
- Cepod theatres which allow elective and non-elective activity to be managed separately
- standard facilities that other hospitals take for granted:
 - safe, dedicated ambulance drop-off and pick-up areas
 - discharge lounge
 - patient transport waiting area
 - social and quiet spaces for patients and families
 - staff rest areas
- the ability to carry out necessary maintenance without the need to pause or significantly reduce the delivery of patient services

By remaining on the QEUH campus, the clinical teams at INS will also be able to continue to deliver and support a wide range of supraregional and national services for children, young people and adults. This triple co-location of specialist adult, children's and neurosciences services allows Scotland to offer services on the QEUH campus to children, young people and adults that would otherwise be provided by NHS England.

3.6.2 Objective 2

Services will remain at the forefront of delivering world-class supraregional and national treatment services to residents of Scotland by continually adapting, enhancing and improving their clinical models

The services at INS benefit from an international reputation for being at the forefront of both service delivery and service development in the treatment of the head, neck, brain and spine. The Glasgow Coma Scale, used in every hospital in the world, was developed in INS.

If the services cannot keep pace with international developments in healthcare treatment and delivery, this will diminish the care offered to the people of Scotland and will significantly impact the services' ability to attract high-quality staff in the future.

There are agreed clinical strategies in place across NHSGGC, the West of Scotland and NHSScotland for reconfiguring the delivery of several services, including:

- complex inpatient OMFS surgery for people from NHS Lanarkshire
- Spinal surgery for West of Scotland residents
- extending the provision of sentinel lymph node biopsy for people in the West of Scotland with head and neck cancer
- Level 1 acute neurorehabilitation for GGC residents who are treated in the Major Trauma Centre

The layout of INS and overloading of both estate and key systems will not permit all of these developments to be taken forward.

The landscape of healthcare is changing dramatically, with the continuing development of highly personalised medicine supported by genetic profiling. New treatments for previously untreated conditions are already in the pipeline. There are several exciting therapeutical areas in which GGC has been approached by Pharma, other Scottish centres and SGHD to lead for on Scotland, but cannot be taken forward within existing constraints.

A new INS would allow services to:

- develop on its existing world-leading reputation to improve and innovate on behalf of the Scottish people
- harness the potential of gene therapies and other personalised medications for adults with neuromuscular diseases
- work with the co-located Stem Cell Transplant and CAR-T services in QEUH to pioneer treatment for people with Multiple Sclerosis

- collaborate with our embedded Clinical Research Facility on being a primary trial centre for new gene therapies and other advanced therapy medicinal products (ATMPs)
- continue to expand and develop specialist services which provide access within Scotland for people who would otherwise go to England or even the USA for treatment

3.6.3 Objective 3

Services will be provided in flexible and adaptable clinical accommodation in a modern healthcare environment that meets all appropriate standards

Services are never set in stone. They must evolve and adapt as the profile of patients and their care needs change. Just within the twenty-first century, neuromuscular conditions have seen life expectancies increase rapidly from school age to well into adulthood, but people with these conditions require a range of ongoing services to support and promote their independence which did not exist when the INS was built.

Even within spinal injuries, the patient profile has changed significantly, from predominantly young men suffering major trauma related to high impact sports, road traffic accidents and violence, to a much older and more mixed-sex population whose injuries are from leisure pursuits and significant falls. The service models which were developed when the Queen Elizabeth National Spinal Injuries Unit opened in 1992 have had to constantly evolve to meet the needs of the people they now serve.

The services required to meet these changing demands will require flexible accommodation which is not locked into one model of delivering care. A modern healthcare facility will offer opportunities to respond to these known and as-yet-unknown challenges.

3.6.4 Objective 4

Services will have optimal clinical pathways which are person-centred, promote adjacencies between services, and enhance the dignity and safety of our patients and users, their families/visitors, and our staff

One of the biggest defects highlighted by staff, patients and carers about the current INS is the lack of segregation between groups. Acutely unwell patients – often gowned and intubated – travel through general circulation spaces, sharing corridors and lifts with staff, the public and visitors. This compromises patient dignity and is a significant infection control risk.

Similarly, the lack of storage facilities sufficiently sized to hold large items of medical equipment, including trolleys and mobile clinical support equipment, results in equipment being stored in corridors.

In contrast, examples of optimal segregation can be seen in the QEUH, where public access and staff/patient access is kept completely discrete, with swipe card access to restrict entry. Each floor in the QEUH also has a central core for supporting services which is not accessible to

patients and the public. These core hubs include large central stores for equipment, including RFID monitoring, so that staff can easily locate vital equipment in emergency situations.

Ambulance drop-off and pick-up takes place on a public access road with no shelter from prevailing elements. This is a significant risk to the most acutely unwell individuals, and not optimal for SAS staff, who must negotiate parked cars and other street impediments.

Ensuring that all INS services have access to ultra-clean operating facilities (providing laminar flow facilities in all theatres) will improve safety within the theatre environment.

Patient services are spread over many buildings, which provides challenges to people attending day and outpatient services. Travel distances between departments are significant, which impacts both staffing (the need for escorts to move patients between areas) and on productivity (appointments take significantly longer to build in these travel times).

One-stop visits only mean attending INS on one day. Because outpatients, diagnostics, rehabilitation and other supporting services are spread over multiple buildings, patients will make multiple journeys between departments and buildings, often exposed to the elements. Concerns have been repeatedly raised that patients, staff and users do not feel safe travelling between buildings alongside busy public access roads and through areas which are poorly lit.

All of the candidate locations, including the preferred option identified in this report, will improve our current and future pathways by:

- putting the needs of people with cognitive and physical challenges at the forefront of service design while delivering for all of our stakeholders, including our staff
- segregating staff, public and acute clinical routes to safeguard patient dignity and improve infection control
- rationalising the layout of services, improving co-locations and clinical adjacencies
- reducing the need to cross the site, exposed to the elements
- improving access to and from buildings and individual services
- improving access in particular for those with reduced mobility by removing the clutter of metal cages and large equipment being stored in open circulation spaces

There will also be a digital-first approach to all healthcare – something which is already embedded into the ethos of the services – to ensure that patients only attend hospital when there is a clinical need for them to do so.

3.6.5 Objective 5

Services will be delivered in an environment which promotes safety and minimises harm

This can be achieved by ensuring that the services are provided in an environment which meets all modern healthcare standards and which allows remedial maintenance to take place without compromising patient care through enforced closure of services and clinical areas.

3.7 Benefits

The Project has developed a full Benefits Register which brings together all the points raised by staff and patients. These are summarised below.

Table 2. Summary of benefits

Category	Benefits to be obtained
Safe	Reduced risk of infection by eliminating or significantly reducing use of public circulation spaces for transporting patients between services and for storing supplies, equipment and waste
	Modern facilities will meet all Infection Control requirements and SHTM standards
	Improved functional suitability of the estate will reduce risks from retrofitted solutions (e.g. lowered ceilings to allow appropriate ventilation)
Effective quality of care	Current services can run to optimum efficiency and capacity without unplanned downtime associated with remedial maintenance
	Additional or more suitable capacity will allow the clinical services to meet both existing service pressures and planned service developments which have been agreed with local, regional and national partners
	Additional or more suitable capacity will contribute to reduced outpatient, day case and inpatient waiting times, allowing care to be delivered more timeously
	Better alignment of services and departments will improve access/flow for individuals and their families and reduce delays between episodes of care (e.g. reduced transfer times between critical departments)
	Services will be able to adapt and keep pace with international developments in delivery of highly specialist services, continually evolving to provide better clinical models and outcomes
	Maintaining vital clinical adjacencies with and between services delivered across INS, QEUH and RHC will allow NHS Scotland to continue to provide world-leading care for children, young people and adults.
Health of the population	Higher patient/carer satisfaction with assessment and treatment
	Delivering care in an environment which can meet the needs of people with neurological, cognitive and physical impairments will improve people's experience of healthcare and will support them better in their journey(s) through and between the clinical services
Person-centred	Improve staff, patient and service user dignity and experience

Category	Benefits to be obtained
	Improve the quality and physical condition of the healthcare estate for all users - patients, staff, carers, visitors
Value and sustainability	There will be a flexible modern estate using sustainable technologies which contributes to reducing NHSGGC's carbon footprint
	Ability to change the use of individual spaces to meet current and future needs will reduce the need for retrofitted solutions which are sub-optimal and/or resource intensive
	More functional buildings and better alignment of services and departments will reduce the need for staffing solutions (e.g. portering, trained staff escorts) to 'fix' problems caused by the condition and layout of the estate
	Running costs and backlog maintenance costs will be significantly reduced

3.8 Scottish Government's Health Impact (QALY) Assessment Tool

3.8.1 Quality adjusted life years [QALYs]

Simplistically, a Quality Adjusted Life Year [QALY] is a standardised method of measuring the value of health outcomes to the people who experience them by combining two elements – length of life and quality of life – into a single number. The quality of life score is derived on a scale of 1 for maximal health and 0 for death. (If the person's health state is felt to be worse than death, a negative score can be used.)

If a treatment extends an individual's life by 18 months, but they experience poor health during that year, estimated at 30% of maximal health, then the treatment would be calculated as providing 0.45 QALYs – 1.5 years x 0.3 for quality.

Both the [Scottish Medicines Consortium \[SMC\]](#) and its England, Wales and Northern Ireland equivalent, the National Institute for Clinical Excellence [Nice], evaluate all new high-cost medicines by using a cost-utility analysis which expresses the benefits of a therapy or intervention in terms of cost per QALY.

Complex health economic and specialist clinical analyses are undertaken to develop a picture of how much health gain the target patient population is expected to receive over time. The total cost of administering treatment to the target group is then divided by the total number of expected additional QALYs.

This allows drugs with very different cost profiles, outcomes and sizes of patient population to be compared against each other. It also allows emotion to be stripped from complex discussions about the allocation of scarce health resources.

The main limitation of this cost-utility methodology is that it works within a strictly limited field: it can look at a single treatment in a single indication over a defined period.

To look at wider population effects, health utility indices are more commonly.

3.8.2 Health utility indices

For measuring more general population health, health economists will most commonly use a Health Utilities Index (HUI). This is a rating scale which is used to measure general health status and health-related quality of life by giving a numerical score across a range of dimensions of health and well-being.

There are several tools available, but the four home NHS nations – and most European countries – use the [Euroqol EQ-5D tool](#). This measures five dimensions of health:

- mobility
- self-care
- usual activities
- pain/discomfort
- anxiety/depression

Each dimension has 5 levels:

- no problems
- slight problems
- moderate problems
- severe problems
- extreme problems

Like cost per QALY, this analysis allows health policy setters to use a standardised score to compare very different interventions across very different populations.

The major benefit of this approach is that it not limited to a single data point. It can be used to measure the effectiveness of an entire ward, unit or hospital.

3.8.3 Value of a QALY

The UK government Green Book states that the **current monetary value for a QALY is £70,000 in 20/21 prices** ([Green Book, Annex 1, A1.64](#)).

This is a health economic calculation of how much an individual would be willing to pay for one full year of maximal health (1 QALY).

In the UK, these calculations are undertaken by the Department of Health and Social Care and published via the Green Book and other statutory instruments.

These calculations are a continuation of work undertaken by the UK as part of the Eurovaq project to establish a single European value of a QALY for member states to then localise to suit

their own health systems. There is a very comprehensive guide to the health economic background on the [Eurovaq website](#).

3.8.4 Scottish Government's Health Impact (QALY) Assessment Tool

Building on these existing standards and processes which are widely used across the UK, the Scottish Government has developed an assessment tool for estimating the potential return on significant capital investments from a cost and QALY point of view.

The INS Project Team were asked to use this tool to model the impact on the patient cohort currently treated at INS of a complete closure of all facilities for a period of one year and predicting the impact of doing nothing to the existing infrastructure which will eventually result in its failure.

The clinical assumptions underpinning the scoring are shown below the tables at 3.8.5.

Using a standardised UK cost of 1 QALY as being £70,000 (at 2021/22 prices), the value of the interventions delivered to the INS patient population over one year is £4.75 billion pounds.

If Option 1: Single New Build were to be pursued at a cost of £1.034 billion pounds, this would provide a return on investment factor of 4.6.

3.8.5 Scottish Government's Health Impact (QALY) Assessment Tool – Option 1: Single new build

INS Closure Impact: Delay of 12 months for receiving treatment

1: Situation (assumes 72,900 affected for 12 months)

2: Health Utility Index

3: Health Impact Scenarios

Dimension	Health State:	Score	Utility Index	Scenario 1: Baseline		Scenario 2: Value of treatment		Scenario 3: No intervention		Scenario 4: Severe Impact	
				Population	Utility of Population	Population	Utility of Population	Population	Utility of Population	Population	Utility of Population
Mobility	No Problems	1	0	0	0	2,613	0	0	0	0	0
	Slight Problems	2	0.058	164	9	1,654	96	0	0	0	0
	Moderate Problems	3	0.076	2,320	176	1,270	96	195	15	0	0
	Severe Problems	4	0.207	3,069	635	499	103	3,341	691	3,317	687
	Unable to / Extreme Problems	5	0.274	523	143	40	11	2,540	696	2,758	756
Selfcare	No Problems	1	0	0	0	3,049	0	0	0	0	0
	Slight Problems	2	0.05	164	8	1,654	83	0	0	0	0
	Moderate Problems	3	0.08	1,339	107	997	80	195	16	0	0
	Severe Problems	4	0.164	3,069	503	335	55	3,341	548	3,426	562
	Unable to / Extreme Problems	5	0.203	1,504	305	40	8	2,540	516	2,649	538
Activity	No Problems	1	0	0	0	3,049	0	0	0	0	0
	Slight Problems	2	0.05	164	8	1,654	83	0	0	0	0
	Moderate Problems	3	0.063	1,090	69	997	63	195	12	0	0
	Severe Problems	4	0.162	3,178	515	335	54	3,341	541	3,395	550
	Unable to / Extreme Problems	5	0.184	1,644	302	40	7	2,540	467	2,680	493
Pain	No Problems	1	0	0	0	3,049	0	0	0	0	0
	Slight Problems	2	0.063	164	10	1,654	104	0	0	0	0
	Moderate Problems	3	0.084	2,180	183	997	84	195	16	0	0
	Severe Problems	4	0.276	2,633	727	335	92	3,341	922	2,305	636
	Unable to / Extreme Problems	5	0.335	1,099	368	40	13	2,540	851	3,770	1,263
Anxiety	No Problems	1	0	0	0	3,256	0	0	0	0	0
	Slight Problems	2	0.078	164	13	1,542	120	0	0	0	0
	Moderate Problems	3	0.104	1,090	113	935	97	164	17	0	0
	Severe Problems	4	0.285	3,473	990	304	87	3,278	934	3,333	950
	Unable to / Extreme Problems	5	0.289	1,349	390	40	11	2,634	761	2,743	793
				TOTAL	5,576	TOTAL	1,348	TOTAL	7,003	TOTAL	7,226
				Utility Value:	0.918	Utility Value:	0.222	Utility Value:	1.153	Utility Value:	1.190

No. People affected for 12 months
 QALY Value (12 months)
 Scenario 1 (treatment needed):
 Scenario 2 (treatment received):
 Scenario 3 (treatment not received):
 Benefit of Intervention
 Capital Cost of Intervention:
 Return on Investment:

72,900
 70,000

4: QALY Value - what people are prepared to pay

4,683,743,820	2,537,027,903
1,132,544,280	613,461,485
5,882,839,410	3,186,538,014
4,750,295,130	2,573,076,529
1,034,000,000	1,034,000,000
4.6	2.5

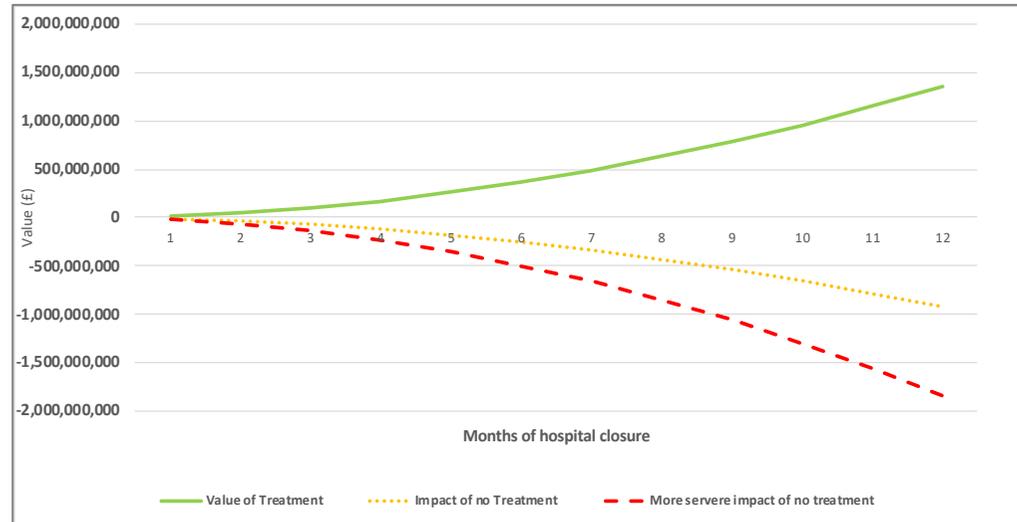
5: Calculation:

Utility Score x number of people x QALY value

6: Benefit: Lost opportunity + Health Impact

7: ROI: 4.6 for 72.9k people affected for 12 months of their life

or: ROI: 2.5 for 72.9k people affected for part of 12 month closure



Assumptions underpinning the scoring:

- This uses the scenarios modelled through at Section 3.5 above and extends them to a total loss of service (all services)
- For time-critical non-elective services, e.g. brain aneurysms, very complex head and spine trauma, etc, outcomes are binary – treatment or death
- INS services use 60-100% of Scotland's total resources for brain, head, neck and spine services, and no other centre has more than marginal spare capacity, as evidenced by previous requests for mutual aid which resulted in only 2-4 patients a week being transferred to Lothian
- Even if individual non-elective operating slots in Lothian, Tayside or Grampian were to be made available to a small proportion of patients, treating an INS patient would mean supplanting another complex emergency case from the East or North of Scotland
- Patients with brain bleeds or multi-factor trauma would not survive a potential multi-hour road ambulance transfer to Liverpool or Newcastle, the nearest centres in England
- For elective surgery, survival rates for Head & Neck, Brain and Central Nervous System cancers are already low for West of Scotland residents – delays to diagnosis and treatment would reduce this even further
- The INS has the only diagnostic facilities for head, neck and spine imaging within the West of Scotland, so patients would need to be sent out of area, as private sector does not offer these services
- For head & neck cancer, INS is the largest UK provider of complex free-flap surgery
- For outpatients, the absence of head, neck and spine imaging would affect the ability to diagnose and treat a range of long-term conditions, including Multiple Sclerosis (MS), Motor Neurone Disease (MND), early-onset Parkinson's, etc
- For these patient groups, intervention is about arresting or slowing the impact of their degenerative illness and treatment is life-long
- Without on-site access to inpatient neurology and neuro-critical care, daycase treatments could no longer be provided due to the need for inpatient service back-up (as part of the licence for the therapies themselves)
 - With degenerative conditions, the impact of each additional month with no treatment is cumulative, e.g. if treatment is missed for a month, the individual will have a worsening of both immediate symptoms and overall health and mobility – once a patient with a neuromuscular condition has lost function in their hand, for example, that function can never fully be regained (if at all). This lower level of mobility will be the new best case scenario when treatment restarts, therefore there is a permanent and lasting impact of delays to or gaps in treatment for this group

4.0 Development since Initial Agreement

4.1 Conclusions of the Initial Agreement

The Initial Agreement was approved by Scottish Government on 29 March 2023 and NHSGGC were invited to carry out further work to confirm the Preferred Option over the following year.

The Initial Agreement set out a long list of potential future service delivery options for the national, supraregional and regional services which must be delivered on a highly acute hospital site.

From this long list, a shortlist of three delivery options were put forward to be considered at Outline Business Case, as follows:

1. Do Minimum (which cannot deliver the service model and is for comparison only).
2. All services immediately co-located in a single facility on the QEUH campus.
3. Services delivered over multiple locations and facilities on the QEUH campus.

These delivery options were expanded upon to cover potential variants within the Option 3 definition and formed the basis of the options definitions which have been appraised as part of Site Options Appraisal activities.

Table 3. Outcomes from Initial Agreement to be explored within Site Options Appraisal

	Option
1	Do Minimum
2	All services immediately co-located in a single facility on the QEUH site
3a	Split services across more than one location on the QEUH site
3b	Selected INS inpatient services integrated within QEUH with redevelopment of remaining services
3c	Phased new INS 'Campus' on or adjacent to existing INS sites

4.2 Procurement of project support

The replacement of some or all the Institute of Neurological Sciences [INS] is a significant capital scheme with a high level of complexity.

The Initial Agreement identified that moving to the next stage of the process required a larger dedicated team reflective of the workload required to develop an Outline Business Case and which recognised the complexity of developing options which maintained vital clinical adjacencies across the QEUH estate.

As the client, the project team must be intelligent procurers and the appointment of the type of technical expertise advising the client team was carefully considered to ensure they are the most suited to a project of this complexity and scale.

Separate Invitations to Tender were extended in May 2023 and appointments made as follows:

- the Facilitator for Planned Stakeholder Engagement was appointed in May 2023
- the Options Appraisal team were appointed in June 2023
- the Technical Advisor team were appointed in June 2023
- the Building Surveyor team were appointed in July 2023
- the Options Appraisal Cost Advisor was appointed in September 2023

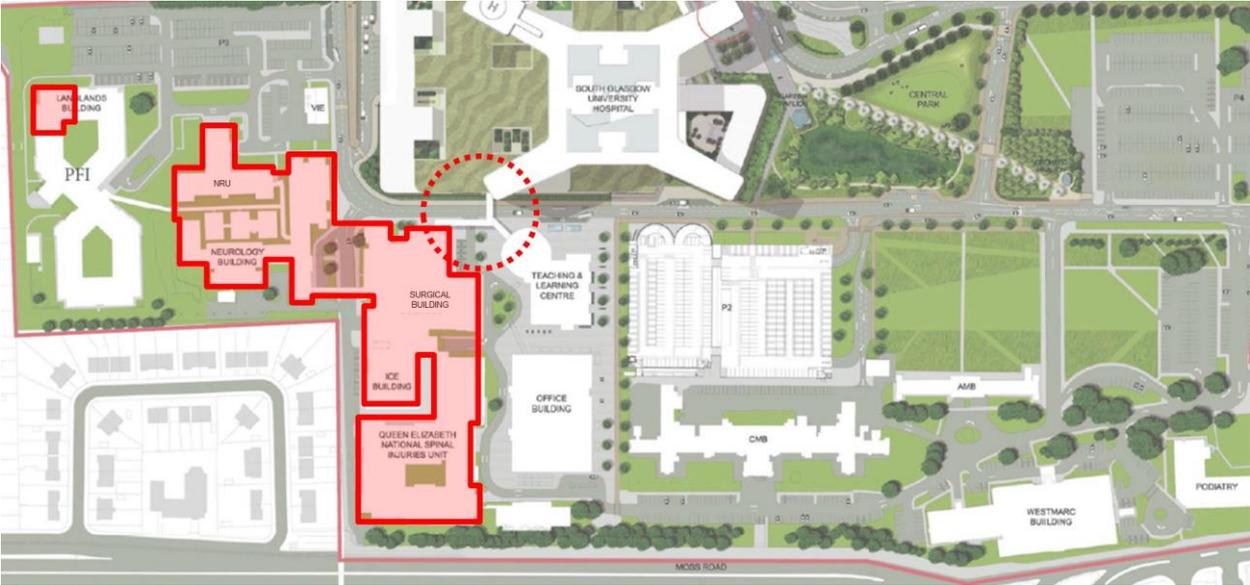
Note: the full list of advisors can be found at Appendix 2.

An early-stage Strategic Options Appraisal was conducted by Austin-Smith:Lord (ASL), architects in late 2021 and early 2022 to inform the Initial Agreement. This work was carried out to determine and confirm that a development of circa 60,000m² could be accommodated on the QEUH campus.

ASL (architects), AECOM (engineering consultancy) and Thomson Gray (cost consultants) were appointed to form a Site Options Appraisal Design Team to examine and establish the most beneficial options to provide the accommodation, within the broad delivery options set out in the Initial Agreement.

During the period from July 2023 until December 2023, the Site Options Appraisal Design Team worked through a long list of potential options to arrive at the most beneficial approaches that aligned with the Initial Agreement’s shortlisted exploration conditions. These options have been developed in conjunction with the Project Core Team and through discussion and evaluation with a wide stakeholder group.

Figure 1. QEUH with core INS and link bridge highlighted



4.3 Options Development

4.3.1 Brief

NHSGGC appointed Austin-Smith:Lord (architects) and AECOM (engineers) as Advisors to prepare this Options Appraisal in relation to the redevelopment of the Institute of Neurological Sciences.

The scope of the work required:

- assessing the requirements of the INS Project Brief, the Initial Agreement and associated project documentation
- considering the compatibility of the INS Project Brief with the existing facilities (to develop a Do Minimum Option)
- reviewing the scenarios outlined in the Initial Agreement, reconsidering other possibilities for Candidate Sites and developing a longlist of Options
- reviewing the longlist of Options prior to agreeing a shortlist based upon alignment with project objectives and technical feasibility
- refining the shortlist Options
- providing a technical commentary against stated Benefits Criteria to inform Options Appraisal

4.3.2 Project Execution Plan

A Project Execution Plan (PEP) was developed to set out the strategy for managing the project, an explanation of the proposed NHS GGC process for delivering the project and the roadmap for project success. It outlined the project aims and its confirmed scope, why it is important to achieve it, who will be involved in managing the process and what their responsibilities are, and the framework for how and when the project will be undertaken.

The PEP contained information on:

- the project background and objectives
- the governance arrangements and roles and responsibilities of those delivering the Project
- the resources available, budgetary control processes and the project timetable
- the project management arrangements and board approach
- the approach to engagement and communication with stakeholders
- the assumptions, constraints and risks relating to the Project and set out the risk management processes

The PEP and the associated procedures are subject to regular review by the Project Team. The purpose of these reviews is to ensure that the PEP remains current and continues to be suitable and effective in satisfying the obligations, expectations, and intentions of the project, throughout the project lifecycle.

4.3.3 Single room derogation

Since 2010 it has been the policy of the Scottish Government that all new inpatient hospital accommodation should be fully provisioned with single occupancy rooms unless there is a clinical case not to.

NHSGGC recognises the value for certain patients in being cared for in single rooms as well as the benefits for infection transmission; however, due to the patient mix in INS the Board would seek a derogation from 100% single rooms and approval to include a mix of single and multi-bedded bays to supply accommodation which meets the clinical and psychosocial needs of our patients.

The INS is relatively unique in that it provides acute/hyperacute, medium (up to 6 weeks) and long-term admissions by virtue of the range of specialist services it houses. These services are:

- Neurosurgery
- Oral and maxillofacial surgery (OMFS)
- Neurocritical care
- Interventional neuroradiology (INR)
- Hyperacute stroke including thrombectomy
- Acute Neurology
- Neurological rehabilitation (NRU)
- Queen Elizabeth National Spinal Injuries Unit (QENSIU)

Consequently, the INS has disproportionately high numbers of both acutely unwell patients and patients with hospital stays of more than 6 months. Each of the patients in these groups has diverse needs. For example, the medical and nursing needs of a patient with an acute brain injury differ from the needs of a patient with a long-term neurological condition. Both groups will benefit from not being in single rooms albeit for distinctly varied reasons.

A paper has been set out by the service detailing the areas and extent of derogation requested department by department. This paper will require approval from NHS GGC and Scottish Government, but it is in line with the derogation already given to the Department of Clinical Neurosciences [DCN] in Edinburgh which also maintained a proportion of open bays to allow line of sight monitoring of its sickest patients.

All of the information set out in this document represents a fully compliant facility (except Option 0 - Do Minimum) including the provision of single rooms throughout; however, it is the intention to progress the derogation paper as soon as there is some certainty around the progress of the project.

If the derogations are approved this would lead to some reductions in total area for Options 1-4, and some consequential reductions of construction and operational costs. It is not possible to quantify these at this stage, but this will be an important part of progressing RIBA Stage 2 design work, and developing the revenue profile required to support the Outline Business Case.

4.3.4 Development from Initial Agreement to Candidate Site Options

The Initial Agreement concluded with five options. These have been developed through a full review, options development, and re-evaluation of a longer list of potential scenarios to formulate a shortlist of Candidate Sites which went forward to further assessment.

Table 4. Shortlist of Candidate Sites

Initial Agreement Option	Current Candidate Site Option equivalent	Comments
Option 1: Do Minimum	Option 0: Do Minimum	
Option 2: All services immediately co-located in a single facility on the QEUH site	Option 1: Single New Build – North QEUH campus	New build envisaging a single INS building.
Option 3a: Split services across more than one location on the QEUH site	Option 2: Campus New Build – North QEUH campus	New build INS on 3 no. adjacent Candidate Sites.
Option 3b: Selected INS inpatient services integrated within QEUH with remaining services in INS being redeveloped	n/a	Having tested several options to relocate INS services within the QEUH Adult Hospital it was deemed unfeasible, and this Option was set aside.
Option 3c: Phased new INS 'Campus' on existing INS, QENSIU and NRU sites	Option 3: Maximum Refurbishment	The current Candidate Site option envisages partial refurb and partial replacement of existing INS buildings to meet the Brief.
	Option 4: Phased Campus Approach	The current Candidate Site option also includes refurb of Langlands to achieve floor area requirements.

The Core Team and its clinical and technical advisors worked with Austin-Smith:Lord to develop a long list of options from those identified at Initial Agreement. This list included multiple options for:

- Single new build
- Campus new build in multiple phases / buildings
- QEUH + refurb + new build
- Minimal through to maximal refurbishment of existing INS facilities
- Other areas of vacant estate

Some of the longlist options outlined at this site options appraisal inception relied upon:

- refurbishment of existing INS and non-INS buildings at QEUH
- utilising space in QEUH Adult Hospital for INS functions / facilities
- replacing the University of Glasgow Learning and Teaching Hub, NHS Office Block and/or the Multi-Storey Car Park (MSCP) to the rear of the Central Medical Building (CMB)

All options were iteratively explored by the Core Team, service representatives, INS Project Board and the MFT Programme Board to ensure that the options being developed could achieve the benefits developed by stakeholders and were aligned with GGC's clinical and infrastructure strategies.

The overall process to develop a final short list of options took place from October 2023 to January 2024. The INS Core Team and the external design team iteratively developed and tested Candidate Site Options against the Brief and the INS Project Vision through:

- a series of Option Development workshops and site visits early in the development process
- regular Options Review meetings
- the preparation of Baseline analysis including an initial assessment of site constraints and existing building conditions using AECOM's Healthcare Categorisation methodology
- establishing fundamental 'sustainable design principles' to inform the preparation of Specimen Designs
- preparation of multiple 2d and 3d Specimen Designs across all longlist Candidate Sites to test site capacity and scope to comply with service adjacencies in the Brief
- pre-SDaC (Sustainability Design and Construction) / Sustainability workshops
- meetings with Glasgow City Council planners and senior officers
- liaison with Technical Adviser and Cost Consultants
- Continued stakeholder engagement, culminating in the Stakeholder Option Appraisal Event Workshop in January 2024

The development of options required a re-assessment of the site context and technical constraints for all sites across the full QEUH campus and brought potential candidate sites (previously not in scope) into consideration including the Central Park Sustainable Drainage Systems (SUDS) site north of the main QEUH building and the Langlands Building.

The viability of re-using existing INS buildings and confirming the limited scope for compliant refurbishment for future INS services was explored in more detail. The evidence from the Building Surveys of the INS estate and the data available on EAMS/SAMS and Datix incident recording system, along with the anecdotal experience of staff, allowed the most at risk systems and buildings within the INS estate to be identified and inform the design team of specific project challenges, particularly in relation to the Do Minimum Option and options involving refurbishment.

The potential to re-purpose or replace buildings adjacent to the existing INS – the Teaching and Learning Building, Office Block, and Multi-Storey Car Park (East) – was given serious

consideration given the advantages of their proximity; however, it was concluded that they did not offer viable options since:

- each would require significant alteration/modification
- each was currently operational and would require replacement elsewhere on the site
- each represented recent significant financial investment
- each represented significant spent carbon

The possibility of accommodating INS services within the QEUH Adult Hospital was also explored.

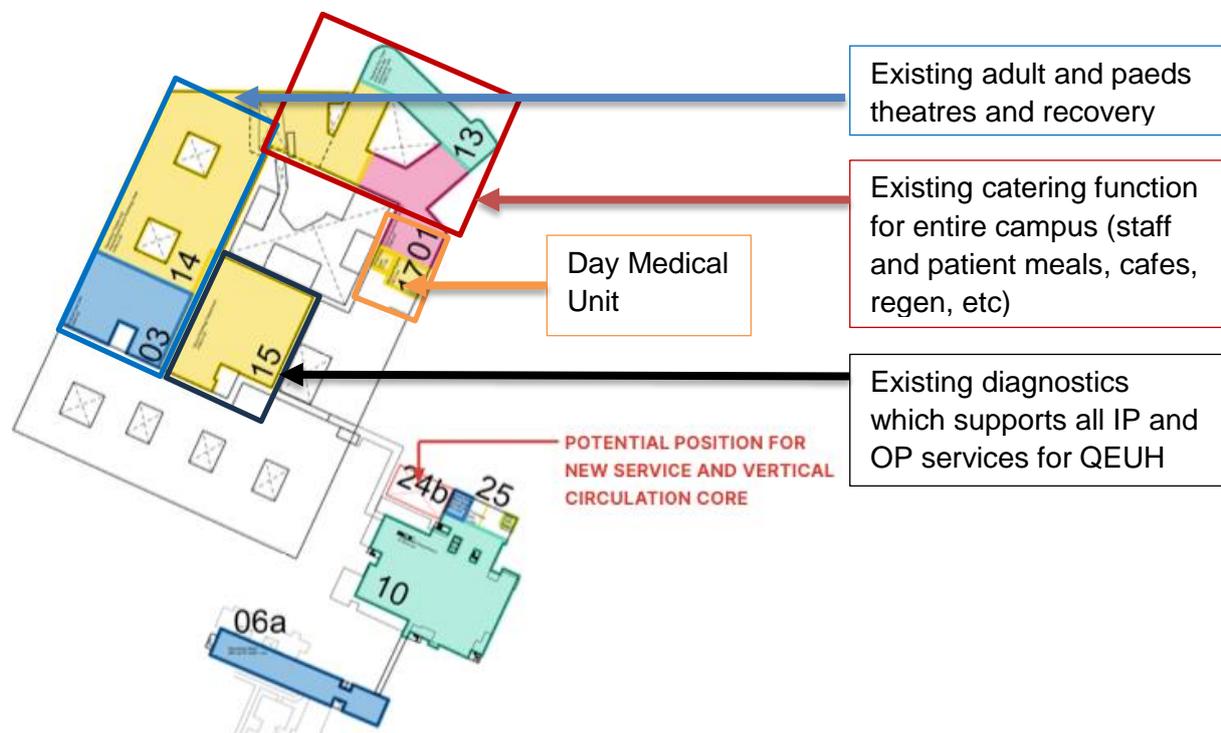
Two service groupings were developed:

- Surgical services
- Medical services

Detailed work by the Design team showed that, to accommodate the surgical model, GGC would need to vacate 6 wards within the QEUH – displacing over 150 beds on a site which already has significant pressures on both acute medical admissions and long waits for elective care – as well as most of the existing first floor services, as shown below.

The services displaced would have included all of existing catering for the entire hospital; staff and patient restaurants; inpatient imaging; day medical unit; all paediatric theatres and recovery; and some adult theatres, leaving both QEUH and RHC unable to function.

Figure 2. Space on QEUH Level 01 required to support INS surgical functions

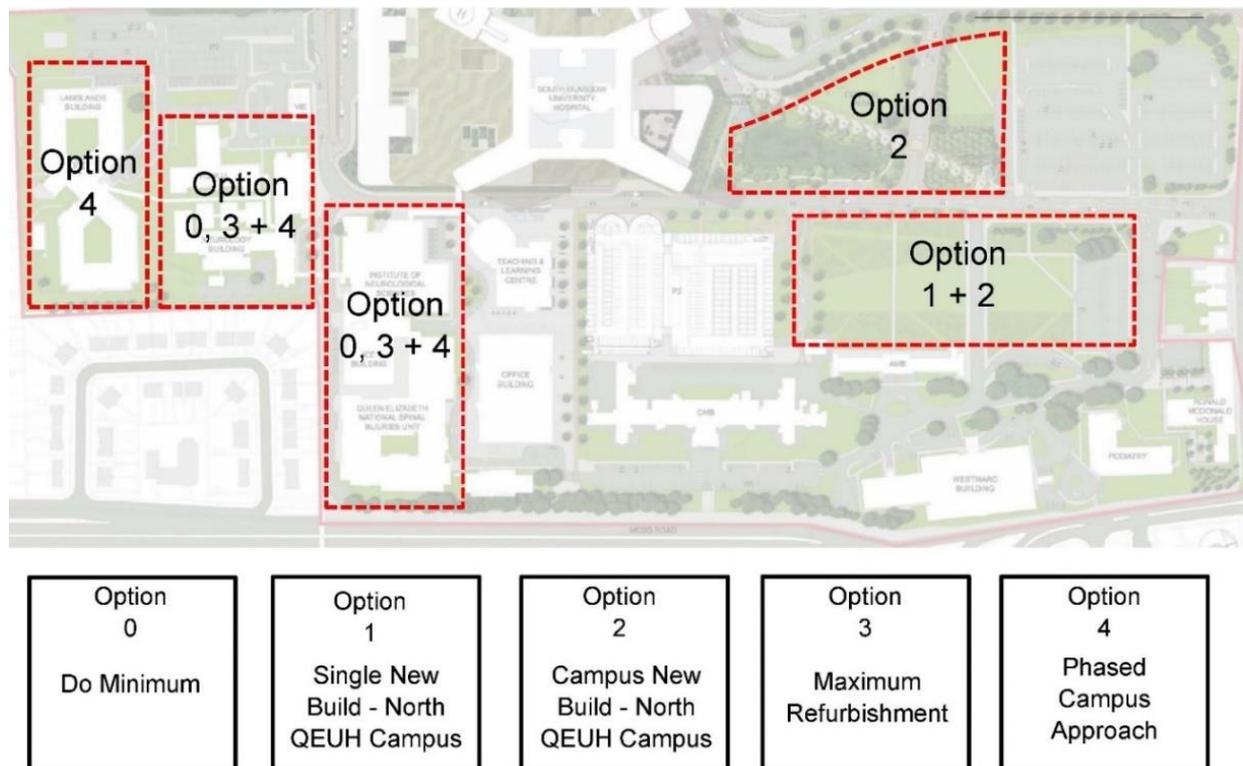


The impact of the medical model was only slightly less intrusive, still displacing existing theatres and imaging for the QEUH, as well as requiring a full floor within the ward stack.

These QEUH options were not deemed viable.

Continued development and assessment by the Design Team, with Core Team and stakeholders' input, allowed the original longlist of options to be assimilated into the four Options (plus Do Minimum) that went forward to stakeholder appraisal and assessment. The Options presented ensured a diversity of site locations, combinations of new build and refurbishment options, and enabled consideration of a single or multi-building approach.

Figure 3. Site Appraisal Options (Shortlist)



4.4 Local authority planning engagement

Early engagement with the Glasgow City Planning Department was conducted as part of this Site Options Appraisal to provide high level feedback and ensure that there were no fundamental concerns with any options before progressing with the appraisal process. Two meetings were held and were attended by NHSGGC; Austin-Smith:Lord architects; Head of Planning; Road and Transportation leads; and Economic Development leads. It is expected that all of the proposals are able to be developed to be compliant with the Local Authority Planning Regulations and Guidance. The need for further community and wider neighbourhood engagement is seen to be a key part of the full OBC process and a requirement of the project fulfilling its ambition to be a good neighbour to the people and surroundings of the QEUG campus.

4.5 Equality impact statement

The design of the facility will be fully compliant with statutory guidance in relation to access and will be developed with input from appropriate stakeholder groups.

A high level EQIA assessment of the protected characteristics was undertaken at Strategic Assessment and at Initial Agreement stage. An updated version has been undertaken for the options being presented in this document. This can be found at Appendix 3 and will be developed further during later OBC stages once a final design and full clinical model are agreed.

There is no expected negative impact on anyone with a protected characteristic associated with any of the options. Reducing health inequalities and improving access have been highlighted as key objectives of the project and any design must, as a minimum, improve both.

5.0 Appraisal of site options

5.1 Background

5.1.1 Constraints and dependencies

As detailed in the clinical case, Neurosurgery, OMFS, Neuro Critical Care, Neurophysiology and Neurodiagnostics are essential components of the QEUH and RHC Major Trauma services. Across the UK and Europe, the trend over the past two decades has been to co-locate adult and children's trauma services with neurosciences on a single campus (triple co-location) wherever possible. An essential justification for the recent move of the Royal Hospital for Sick Children and Department of Clinical Neurosciences to the Little France campus in Edinburgh was to achieve exactly this triple co-location which delivers considerable evidenced benefits for patients. Similarly, there have been recent major capital programmes in Liverpool and Newcastle to align all three services onto a single campus.

Any potential solution, including decant locations, must maintain this critical triple co-location and allow all clinical services to remain operational. The existing fixed corridor between QEUH and INS directly links the INS theatres and critical care facilities to the QEUH theatres and critical care facilities and straight through to RHC theatres and critical care facilities. Any proposed option needs to retain a link to the QEUH and preserve the facility for critically injured and acutely unwell patients to be transferred along a retained or similar link.

The interdependencies between the departments in INS and the need to maintain and expand all clinical services throughout every phase of the programme adds significant complexity to the scheme.

For INS services, there are no alternative service locations or potential decant facilities anywhere in Scotland which could accommodate the scale of services required. The private sector no longer accepts neurosurgery waiting lists from the NHS. It does not have the capacity or ability to provide any complex or emergency services, and it routinely transfers or cross-refers neurologically compromised patients and complex cancer presentations into INS.

5.1.2 Site constraints

The services in scope are currently spread over several inter-linked buildings. It is essential that services maintain a physical connection to the main building of the QEUH and that improved adjacencies be worked into any new proposals.

The Institute of Neurological Sciences is landlocked by residential properties to the south, the main QEUH building to the west, the Clyde Tunnel expressway to the east and other clinical and non-clinical facilities to the north.

The main adult hospital is centrally located on the QEUH site with the Institute of Neurological Sciences, Queen Elizabeth National Spinal Injuries Unit, Neurology block and Neurorehabilitation [NRU] building located to the south and east of the adult hospital.

The existing Private Finance Initiative (PFI) agreement regarding the Langlands Building to the rear, which also incorporates the adjacent carpark in the scope of the agreement, currently

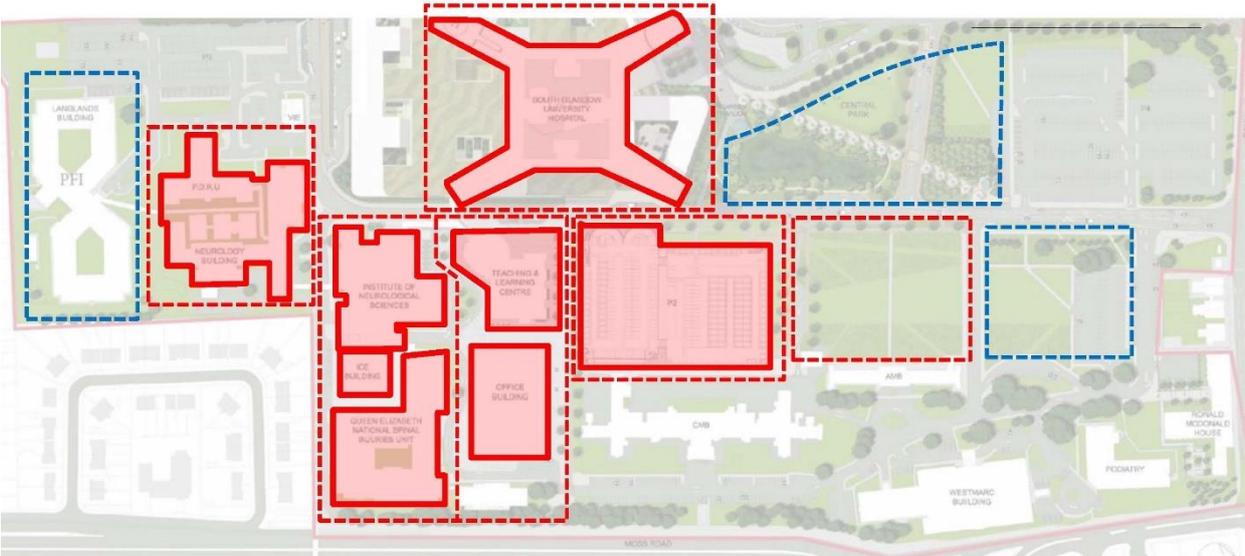
restricts further construction in that area. The PFI contract is for 60 years and is due to expire in 2059, although there are break options in 2026, 2036 and 2043. Early-stage, exploratory discussions with the PFI provider have indicated that there is an open door to explore options around the future of the facility.

The drainage infrastructure on the campus is hampered by having been added over time to a base of nineteenth century drains which were last significantly expanded in the 1950s. Within INS, drainage failures have led to significant service disruption on multiple occasions.

The challenges of the interdependency between the INS infrastructure and the QEUH infrastructure should not be underestimated. The medical gas Vacuum Insulated Evaporator (VIE) to the south of the main QEUH building presents an engineering challenge with any option that potentially occupies a site close to or in replacement of the existing Neurology Building/Langlands.

The options explored at Site Options Appraisal take cognisance of these constraints and opportunities, in conjunction with seeking to explore the options outcomes as defined in the IA (see section [4.1 Conclusions of the Initial Agreement](#)). The candidate sites considered a range of both brownfield and occupied sites and assess the possibility of new-build and refurbishment across a series of distinct approaches.

Figure 4. Range of Potential Option Sites Explored at Site Options Appraisal



Note: Red sites were initially considered at IA feasibility stage, but these were expanded to consider the areas in blue at Site Options Appraisal

The strategies developed at Site Options Appraisal assessed how phasing of construction and management of services would be handled on a variety of constrained sites containing several live emergency healthcare/acute facilities. The strategies also considered the retention, demolition and re-purposing of existing INS buildings, and all proposals took account of sustainability, whole life costing and best value.

5.1.3 Building condition surveys

The INS buildings are of varying condition and vintage, and each has unique attributes which would involve individual approaches to retention or refurbishment. The IA established that the majority of the INS Estate was in a physically poor condition and Thomson Gray were appointed to undertake condition surveys on the following buildings in line with the EAMS/SAMS Board procedures to assist in establishing an up-to-date understanding of the INS Estate: Surgical building, Neurology, Neurorehabilitation (NRU), the Queen Elizabeth National Spinal Injuries Unit (QENSIU), the Multi Storey Car Park and the Office Block.

Fabric surveys were conducted for all noted buildings. This involved a visual inspection of most building areas and took account of internal and external conditions associated with items such as gutters, internal walls, plasterboard ceilings, floor coverings, doors, and sanitary fittings. Structural Engineering surveys conducted visual and some semi-intrusive visual inspections of both external and internal areas. More intrusive surveys and sampling would be required for a more comprehensive structural assessment.

Mechanical and Electrical (M+E) Surveys were limited to incoming services only (plumbing, electrical, ventilation, IT). They did not cover a full assessment or condition report of service runs, as in the event of building refurbishment within the options these services would be replaced. There is, however, extensive recorded and anecdotal evidence of Mechanical, Electrical and Plumbing (MEP) system issues from the Datix incident reporting system, from clinical staff and estates teams, as well as the lifecycle, risk and replacement data currently held on the EAMS/SAMS system.

An overview of Statutory Compliance of the estate, in review with NHS Estate colleagues, was also conducted.

It should be noted that owing to these buildings being live hospital environments, in some instances access to areas was limited by ongoing day to day hospital services, and HAI restrictions.

There is no evidence of Reinforced Autoclaved Aerated Concrete (RAAC) within the INS Estate.

5.1.4 Whole system planning

NHSGGC has been working to develop a whole-system infrastructure investment strategy since early 2022, in conjunction with Scottish Government colleagues.

To meet the overall outcomes sought for the people of Scotland, NHSGGC developed its own vision for Health and Social Care, known as the Moving Forward Together [MFT] Programme. This strategic blueprint was developed with our partners and stakeholders, but very specifically with the full involvement of patients, staff and our wider residents and community.

Moving Forward Together describes a health service fit for the future which can:

- support and empower people to improve their own health
- support people to live independently at home for longer

- empower and support people to manage their own long-term conditions
- enable people to stay in their communities accessing the care they need
- enable people to access high quality primary and community care services close to home
- provide access to world class hospital-based care when the required level of care or treatment cannot be provided in the community
- deliver hospital care on an ambulatory or day case basis whenever possible
- provide highly specialist hospital services

This clinical vision has been used to inform a delivery plan, describing where and how services will be delivered in the future, focusing on service models rather than specific buildings. This has allowed GGC to identify priorities for investment across its infrastructure strategy to support the proposed transformational service change.

The reprovision of the Institute of Neurological Sciences remains the Board's highest priority for investment.

5.1.5 Developing a whole system Programme Initial Agreement

[DL\(2024\)02: Whole System Infrastructure Planning](#) outlines the requirements for Boards to develop a Programme Initial Agreement (PIA) which sets out a deliverable, whole-system service and infrastructure change plan for the next 20-30 years.

The first element of the work is to develop a maintenance-only business continuity plan based on a risk-based assessment of the Board's existing infrastructure. NHS Boards are required to submit this to SGHD by 31 January 2025.

The second element of the work is to develop a longer-term service-informed infrastructure investment strategy – referenced as the Preferred Way Forward or Baseline Option. NHS Boards are required to submit this to SGHD by 31 January 2026.

The work carried out for the MFT Implementation Strategy to date means NHSGGC has already developed a significant amount of the information required to support the development of the Whole System Programme Initial Agreement. Data has been collected across the Board's full range of clinical activity and infrastructure to support the assessment of need and demand and capacity modelling. A series of modelling proposals are under development to explore options for improved efficiency and service delivery which will inform GGC's preferred way forward / baseline option.

It is important to note that none of the modelling options under consideration envisage any significant additional services being brought onto the QEUH site. Equally, there are no proposals to move any significant services away from the QEUH site.

Whilst there is still significant modelling work to complete, there are no emerging proposals that undermine the conclusions within the INS Initial Agreement. The INS services will remain on the QEUH site to maintain the critical existing clinical adjacencies. The site locations and approaches considered under this Options Appraisal remain valid, and there are no additional sites planned to become available.

Maternity Services located at QEUH are recognised as having similar challenges to those at INS in respect of infrastructure, in terms of its functional suitability and fragility and the difficulty in addressing this whilst maintaining services. Any potential redevelopment of Maternity infrastructure requires to be led by service design/redesign, which will form part of the Preferred Way Forward, Programme Initial Agreement. Site development options under consideration for INS have been cognisant of this specific requirement and potentially other service needs and each site option offers the potential opportunity to utilise vacated existing buildings or decant facilities created for the INS project.

Part of the MFT Implementation Strategy requires the provision of a site development plan for each acute hospital campus. The development of the QEUH site development plan is being progressed to include the INS Preferred Option alongside indicative potential future development opportunities for the campus.

Any of the solutions shown in the site development plans need to be rigorously tested alongside the work to develop Preferred Way Forward Programme Initial Agreement.

5.2 Engagement with stakeholders

5.2.1 Developing on the Initial Agreement objectives

The Project has continued to engage with a wide range of stakeholders through this Site Options Appraisal process. The Initial Agreement set out a series of agreed high level Investment Objectives which have already been introduced at [section 3.6](#). These represent the overall objectives that will be addressed by the project, and formed the starting point from which further stakeholder engagement has been undertaken.

Table 5. Investment Objectives

Objective 1	Services will be provided in a safe and appropriate clinical environment which improves access and outcomes, maintains vital clinical adjacencies, and meets the evolving needs of all patients, carers and staff
Objective 2	Services will remain at the forefront of delivering world-class supraregional and national treatment services to residents of Scotland by continually adapting, enhancing and improving their clinical models
Objective 3	Services will be provided in flexible and adaptable clinical accommodation in a modern healthcare environment that meets all appropriate standards
Objective 4	Services will have optimal safe, efficient clinical pathways which are person-centred, promote adjacencies between services, and enhance the dignity and safety of our patients and users, their families/visitors, and our staff
Objective 5	Services will be delivered in an environment which promotes safety and minimises harm

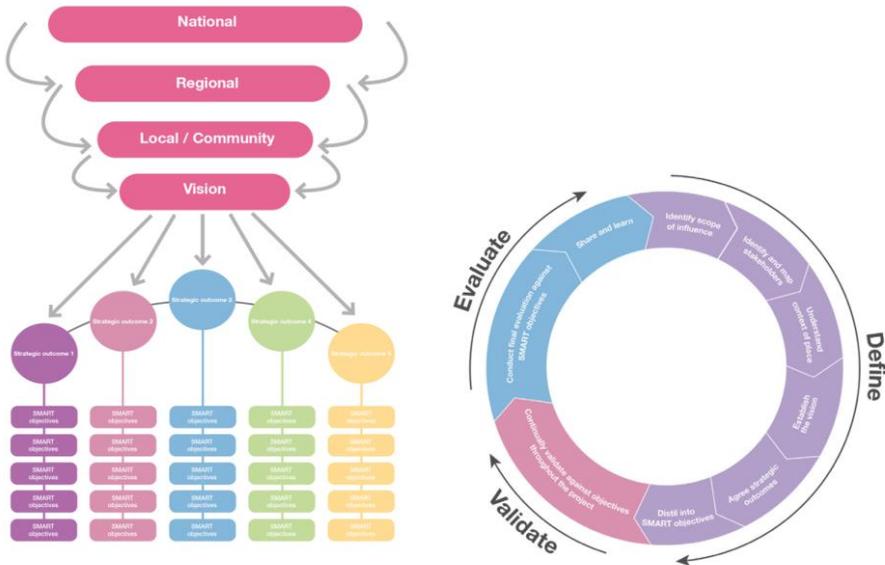
The OBC stage requires that these objectives are further refined to develop clear and identified benefits that can be mapped and managed.

The project used the Scottish Futures Trust (SFT) Briefing and Evaluation Framework as a methodology to work with stakeholder groups to develop clear and measurable (SMART) Objectives that can be used to define tangible benefits to help inform the OBC requirements.

The SFT Framework has been developed to support projects like the INS redevelopment to better define, develop and evaluate the outcomes that it seeks to achieve. The activities in the framework bring core stakeholders together to ensure they are all focused on the same outcomes. This is particularly important on a project such as the INS redevelopment, where there is a complex mix of stakeholders and interdependencies, each of which will have individual requirements but must operate within the wider objectives for the project.

As an engagement process, it integrates with other statutory requirements and guidance, and the framework builds on the engagement work already conducted as part of the Initial agreement, facilitating the collective identification and articulation of the shared benefits the project offers.

Figure 5. SFT Framework



The structure of the framework is circular, starting by drawing in high level context (such as the National Health and Wellbeing Outcomes, Scottish Trauma Care and, more locally, Moving Forward Together) to make sure these core principles remain a key part of the specific success criteria.

Benefits of this approach include:

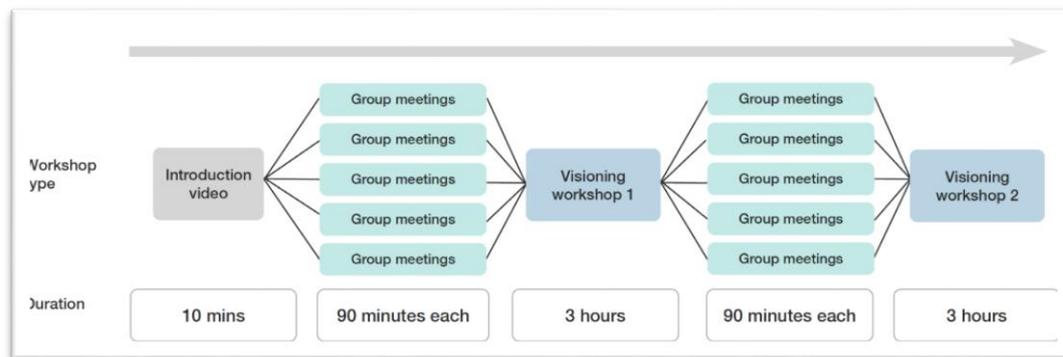
- establishing a clear structure for engagement so that everyone knows what to expect
- early communication with stakeholders and a clear, consistent narrative for the project’s wider stakeholder groups

- protection of important objectives by linking them clearly to performance measurement from the outset, and preserving the decision making process for future reference
- makes post project evaluations meaningful and bespoke

5.2.2 Objective setting and visioning workshops

Four sets of workshops facilitated by Ryder Architecture took place during May to July 2023, online and in person, bringing together a broad range of stakeholders to ensure their voices were heard and recorded as part of the developing brief for the redevelopment of the INS.

Figure 6. Workshop Program



The workshops were utilised to help all stakeholders understand how each other's requirements may overlap in terms of challenges and benefits. The primary outcome was to develop a Vision Statement, a series of Strategic Outcomes and a set of SMART objectives, which, the project will begin to focus on through the more detailed design and delivery stages of OBC.

- **Objective Setting Session 1** - Online between 23 and 25 May 2023 - Identify INS strengths and vision for the future, develop SMART objectives.
- **Visioning Workshop 1** - 6 June 2023 at William Quarriers Conference Centre - Develop and enhance the vision statement.
- **Objective Setting Session 2** - Online between 20 and 22 June 2023 - Review and refine the draft vision statement and SMART objectives.
- **Visioning Workshop 2** - 4 July 2023 at the William Quarriers Conference Centre - Review emerging vision statement, strategic outcomes and SMART objectives

The SMART objectives developed through this process were then utilised to inform the criteria for assessing the Site Options Appraisal process.

The Institute of Neurological Sciences Briefing and Evaluation Framework Visioning Report can be found in Appendix 4 (attachment).

A list of OBC stakeholder participants is included in [Appendix 5](#).

Table 6. Engagement Summary

Engagement Event	Description
Objective Setting and Visioning Workshops	A series of workshops with Staff, Patient/Carer and Third Sector groups, and regional and national partners to establish a Project Vision, Strategic Outcomes and SMART Objectives
Benefits Criteria and Weighting Workshops	A workshop to allow stakeholders to comparatively rate the benefits criteria against which the Options would be assessed.
Briefing Sessions	Touch points with stakeholders to explain the options, allow dissemination to staff or smaller associated groups prior to discussion/scoring at the Options appraisal workshop
Options Appraisal Workshop	Event where Options were presented to the stakeholder group and rated based on the benefits criteria.

5.3 Weighting of the Benefits Criteria

Stakeholders were invited to participate in the ranking of the benefit criteria to establish the weighting carried by each criterion at the final option appraisal workshop. The weighting was conducted at a workshop on Wednesday 11 October 2023.

Each participant was asked to rank the five benefits by directly comparing them against each other (A/B ranking). Responses were counted to derive scores and values for each criterion and preferred weightings were calculated for three groups:

1. Patients, Carers, Families, Third Sector representatives and other external stakeholders
2. Clinical representatives
3. GGC non-clinical representatives (inc members of core team)

Sensitivity analysis was carried out to compare rankings by each of the three groups, but this did not affect the outcome of the ranking.

The scores from the three groups were given equal weighting then combined to create the final scores, giving a numerical rank and weighting for each benefit, as follows:

A. Clinical Service Delivery	33%
B. Accessibility	24%
C. Community and Wellbeing	13%
D. Futureproofing	21%
E. Minimises Disruption	9%

Refer to [Table 10](#) in Section 6.1.2 for detailed benefits criteria.

5.4 Site options

5.4.1 The Do Nothing option

The delivery of a Do Nothing option would not be able to maintain the current arrangements of the INS and would present significant patient and staff safety risks.

Table 7. Do Nothing patient and staff safety risks

Strategic Scope of Option:	Do Nothing
Service provision:	This option fails to mitigate the continued risk of loss of service provision. No extant clinical strategies can be implemented. This would not address external requirements for upgrade of facilities including HEI recommendations
Service arrangements:	Many of the enhanced modern and flexible service models envisaged cannot be accommodated within the existing premises.
Service provider and workforce arrangements:	Will continue to put pressure on the clinical services to deal with compromises to SHTM compliance and amendments to site and facility arrangements outwith NHSGGC control.
Public & service user expectations:	Service user dissatisfaction will continue to increase, patient experience will decline and overall risk to attract/retain workforce.

Maintaining the current arrangements would fail to meet the investment objects of the project; however, more crucially Healthcare Improvement Scotland (HIS) have highlighted in their reports for the years 2016, 2017, 2018 and 2019 non-compliance with Scottish Health Technical Memorandum (SHTM) standards across the facilities.

Inability to deliver services would restrict the ability of West and Central Scotland Health Boards to continue to deliver the range of critical specialist patient services outlined in the Initial Agreement.

While the 'do nothing' option is not considered feasible, as limited opportunity exists to carry out works to parts of the existing estate to maintain the minimal requirements of the SHTM, the Do Minimum Option has been assessed as part of the Site Options Appraisal site options appraisal.

A summary of the review of the current condition of the facilities is noted in Table 8:

Table 8. Analysis of condition report risk areas, systems vs buildings

	SURGICAL BUILDING	NEUROLOGY (inc neurophys.)	NRU	QENSIU
Water	Replace (On-site Experience)	Replace (On-site Experience)	Not noted	Not noted
Drainage	Replace (On-site Experience)	Persistent Leaks (On-site Experience)	Not noted	Persistent leaks. Therapy Pool Maintenance (On-site Experience)
Ventilation	Upgrade system	Upgrade system	Upgrade System	Replace AHU and Controls
Electrical Systems	Replace standby Generator and Switchgear	Upgrade/Repair of select systems. Replace switchgear	Upgrade on-call system and overhaul containment	Upgrade/Repair of select systems. Replace standby generator. Replace power throughout
Lighting	Replace throughout. (on basis of age)	Replace throughout. (on basis of age)	Replace throughout. (on basis of age)	Replace throughout
IT/eHealth	Not noted	Not noted	Not noted	Not noted
Lifts	Common Failure (On-site Experience)	Common Failure (On-site Experience)	N/A	N/A
Heating	Boiler Replacement	Boiler Replacement	Boiler Replacement	Boiler Replacement
Windows	Partial Replacement (On-site Experience)	Partial Replacement (On-site Experience)	Replacement (On-site Experience)	Replacement (On-site Experience)
Fire Safety	Resolve non-compliances	Resolve non-compliances	Resolve non-compliances	Resolve non-compliances
Statutory Compliance	Resolve non-compliances	Resolve non-compliances	Resolve non-compliances	Resolve non-compliances
Fabric	Repair as backlog	Repair as backlog	Repair as backlog	Repair as backlog
HEI-Compliance				

Note: Langlands and ICE Building data not recorded in EAMS/SAMS. Langlands is a PFI asset and ICE is joint occupied with Glasgow University.

5.4.2 The Do Minimum Option

5.4.2.1 Defining Do Minimum

Do Minimum is defined as 'actions that maintain the clinical service continuity of the INS departments, fulfilling the backlog maintenance requirements associated with the existing built infrastructure as a mechanism to omit, mitigate or manage identified areas of risk and statutory non-compliance within the estate'.

The Do Minimum should, however, recognise that both sequential refurbishments completed to date as part of capital investment in the INS estate, and maintenance works as part of NHS Estates procedural and emergency repair, have technical limitations.

Do Minimum, if reflective of the scope of works comparable to this ongoing and historical investment, cannot fully address the most urgent identified building risks. It is therefore recognised that this definition as a long-term solution is unsustainable, in that actions which would seek to de-risk fabric degradation, failure of engineering systems and statutory non-compliance will result in the eventual need to replace plant and building services which are already at an end-of-life position. In addition, Do Minimum must address HEI recommendations.

Do Minimum therefore must consider more comprehensive refurbishment which would involve wider scale displacement of patients and staff.

The risk profile on building fabric, engineering, and statutory compliance varies across the main buildings of the INS; however it is recognised that the area of greatest risk is associated with the more acute services within the Surgical Building.

A single, en-masse decant of the Surgical building presents the scenario where services would be temporarily housed in accommodation which would be fully SHTM compliant, and therefore more spatially and, depending on constraints found through the design and construction phase, more environmentally compliant than the refurbished building they would return to.

As such, the opportunities and limitations of a refurbishment solution utilising phased decant (floor-by-floor, groupings of floors) or more strategic building services implementation should be explored, seeking to achieve:

- Full replacement of water, drainage, electrical systems, ventilation systems, lighting, heating and IT systems
- Full replacement of primary plant systems as housed in current plant spaces.
- Replacement of lifts
- Full fire assessment and compliance with current guidance
- Replacement of windows and doors
- Statutory Compliance
- Full finishes replacement throughout

Where full compliance with the above cannot be achieved the areas of derogation and physical/practical limitations are to be expressed as far as possible.

It is assumed that any fabric defects identified through the process would be rectified. These can be identified as far as backlog maintenance records show but it is recognised the scope of these would increase. The process would then be repeated through the remaining INS estate prioritising the most in-need buildings.

Even at its fullest, Do Minimum would not deliver:

- improvements to address national Net Zero targets
- SHTM compliance for functional clinical space

There would be almost no ability to expand or improve further.

Table 9. Do Minimum patient and staff safety risks

Strategic Scope of Option:	Do Minimum
Service provision:	<p>The capital development for Mechanical Thrombectomy was completed end February 2024. When the service is fully rolled out to 24/7/365, it will allow over 400 people across the West of Scotland to benefit from optimal management for their ischaemic stroke. As this service requires 7 additional beds, the Acute Stroke service has moved to a larger ward following refurbishment.</p> <p>No further service developments which require either inpatient beds or theatre sessions could be accommodated. Most notably, this would have a knock-on impact to NHS Lanarkshire’s plans for a new acute hospital, as their clinical models see their remaining moderate OMFS service transferring to INS. At present (April 2024), there is no operating capacity within INS to provide these cases – only the most complex cancer cases are being seen.</p>
Service arrangements:	<p>The enhanced modern and flexible service models envisaged cannot be accommodated within the existing premises.</p> <p>Existing services will be repeatedly paused or disrupted to allow phased refurbishment over a prolonged period.</p>
Service provider and workforce arrangements:	<p>Will continue to put pressure on the clinical services to deal with compromises to SHTM compliance and amendments to site and facility arrangements outwith NHSGGC control. The inability to keep pace with other UK services will affect the ability to attract and retain a sufficiently skilled workforce.</p>
Public & service user expectations:	<p>Service user dissatisfaction will continue to increase, and patient experience will decline.</p>

5.4.3 Option 0: Do Minimum

0 Do Minimum – Overview

- No changes to layouts or existing total area
- Addresses identified high-risk building services and fabric issues.
- Complex multiple phases / decant taking circa 14 years to fully complete
- Circa 22 phases in total required across 7 buildings
- Achieves improved safety (MEP) but remains significantly non-compliant

KEY:

	Current INS Location
	Refurbished
	Decant
	Parking



Figure 7. Do minimum overview

The Do Minimum requires working within the confines of the existing INS Estate, sequentially decanting and refurbishing the currently occupied buildings.

A phased use of evolving and reconfigured decant accommodation would be required in close proximity to the clinical services of the Institute, shown to the east of the Neurology block in the above illustration.

One of the challenges to upgrade the Surgical Building (podium and tower) has been the limitations on creating apertures within the existing floor structures. This has hampered the ability to create vertical risers to accommodate new ventilation ductwork and building service cores. To unlock the potential for the refurbishment, a new externally constructed lift core for the Surgical building would be one of the initial steps, freeing the building's existing, centrally located lift core to act as a new service riser.

The principal purpose of this option is to address and mitigate (as far as possible) identified high-risk building services and fabric issues.

Key Option Notes

- Complex multiple phases / decant taking circa 14 years to fully complete
- Circa 22 phases in total required across 7 buildings
- No changes to layouts or existing total area
- Achieves improved safety (MEP) but remains significantly non-compliant with SHTM and other requirements

Room sizes would be unchanged, non-compliant. Too long. No improvement on service. Risk and cost of disruption to patients/staff and service for no gain.

Clinical representative

Never going to achieve an internationally appropriate centre. R&D already beyond what the buildings can accommodate e.g. scanners for world class diagnostic interventions. The site is fragmented, isolated and not easily accessible for transport and parking or for getting around the buildings. Multiple decants and refurbishments alongside functioning services will impact hugely. Poor option for morale of staff. Patients. No future proofing for further development, for increased demand and progress in clinical interventions. No accessible green space. Long time to be working and being cared for on a building site.

Patient representative

5.4.4 Option 1: Single New Build

1 Single New Build campus - Overview

- Single phase new-build
- 5 year construction and commissioning period
- No decant requirements
- Full compliance in layouts and services
- 215m distance from new building to existing QEUH bridge link

KEY:

	New Build
	Refurbished
	Parking
	Vacated

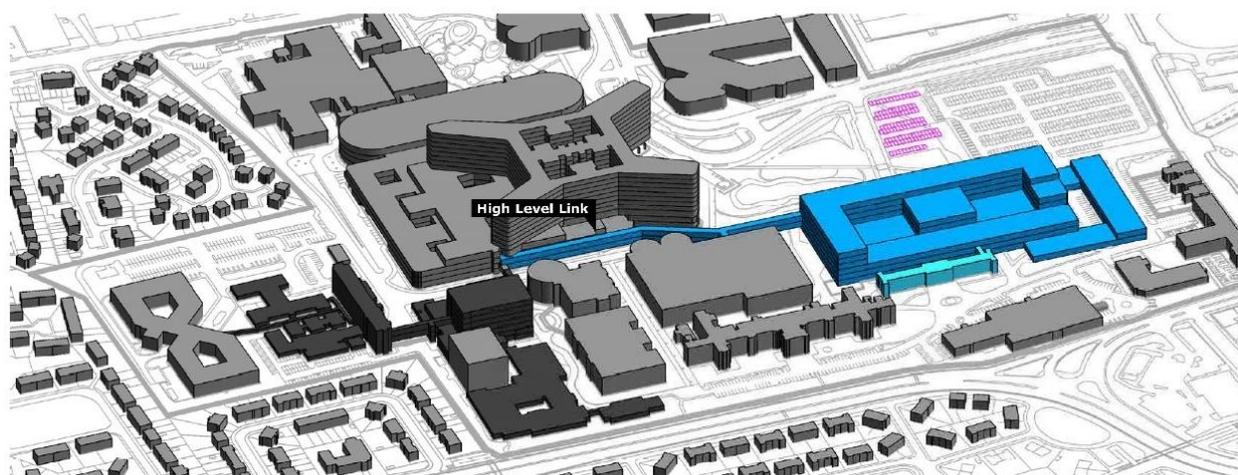


Figure 8. Single New Build campus overview

Candidate Site Option 1 is located in the north-eastern part of the QEUH campus. It is located to the east of the main 'blue light' through route through the QEUH campus. The site is flat and currently consists of a surface car park to the north and a meadow open space previously occupied by hospital buildings. The Candidate Site is bisected with an access road between meadow and car parking and incorporates the B-Listed AMB building on the eastern side of the site.

A Multi-Storey Car Park is immediately south of the Candidate Site, with the main QEUH adult hospital to the south-west, and the Central Park, transport hub and QEUH main entrance to the west.

This option is for the re-provision of all INS facilities in a Full New Build comprising a single building located on the north-eastern Candidate Site described above.

Development Notes

In locating INS to a new build facility, the existing INS buildings and sites would be available for re-use or redevelopment. It is assumed no temporary decant space nor any permanently displaced facilities would be required to enable this Option.

In developing on top of part of the existing surface car park it is assumed that equivalent parking capacity (c.111 spaces) would be re-provided nearby.

A new bridge link is included which connects the new building into the existing link between QEUH and the Teaching & Learning Centre and Office Building. This link will also allow connection into the multi-storey car park at upper levels.

Provides an easily recognisable building with all specialties in one place this appeals to patients and staff and encourages cross-working between services.

Clinical representative

Best option, having everything in one building. Increased accessibility, car park having the potential to link is a massive benefit. Signposting throughout the building would make it easier for outpatients and all patients to attend and know where they are going. Would also be easier for visitors too.

Patient representative

A single facility containing all INS services would support the Centre of Excellence ethos as well as allow for world class branding and identity of Scotland's Neurological Science centre. A single build would significantly improve wayfinding and accessibility for patients and ultimately my preferred option is one that provides the cleanest flow for providing world class healthcare, build, branding and wayfinding.

Patient representative

5.4.5 Option 2. Campus New Build

2 New build campus – Overview

- New build: 3 new buildings and one refurbishment (AMB)
- 4 year construction and commissioning period
- No decant requirement
- Full compliance in layouts and services
- 215m distance from new building to existing QEUH bridge link

KEY:	
	New Build
	Refurbished
	Parking
	Vacated
	Replacement SuDS Pond

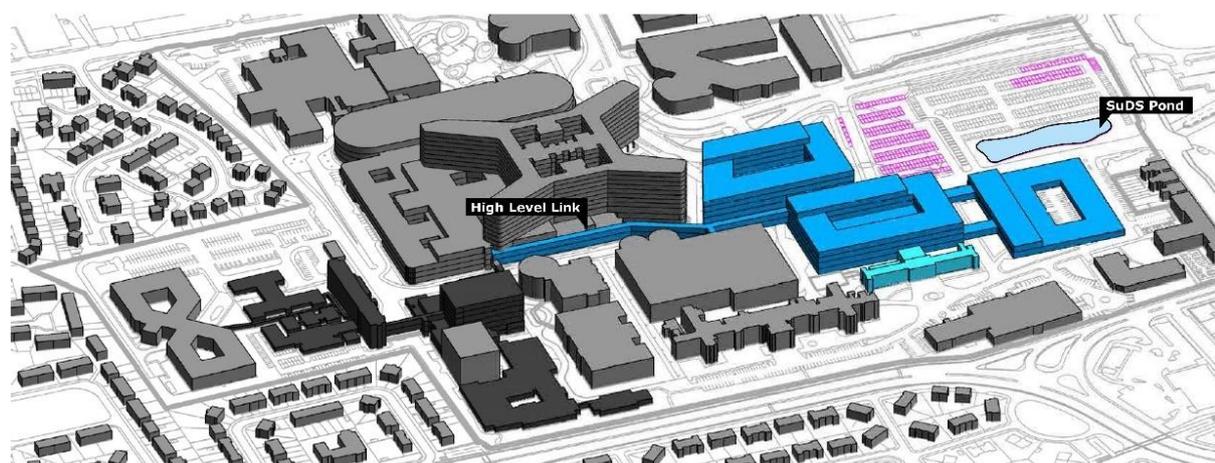


Figure 9. New Build campus overview

Candidate Site Option 2 is located in the north and north-eastern part of the QEUH campus. It incorporates all of the areas listed in Candidate Site Option 1 but also includes the Central Park area adjacent to the QEUH Adult hospital main entrance and transport hub. Candidate Site Option 2 includes three distinct areas; a surface car park to the north-east, the meadow site adjacent to AMB and the Central Park area described above.

The cluster of sites included in this option are located either side of the main blue light through route through the QEUH campus. The Candidate Site is bisected with an access road between meadow and car parking and incorporates the B-Listed AMB building on the eastern side of the site.

A Multi-Storey Car Park and the QEUH Adult hospital are immediately south of this Candidate Site, with the main transport hub / QEUH main entrance to the west. A wayleave for potential future public transport infrastructure (e.g. metro) has been allocated at the request of Glasgow City Council. This setback is parallel with the existing access road from the north.

This Option is for the re-provision of all INS facilities in a full new build comprising a cluster of 3 buildings located on the north and north-eastern Candidate Sites described above.

Development Notes

In locating INS to a New Build facility this would leave the existing INS buildings and sites available for re-use or redevelopment. It is assumed no temporary decant space nor any permanently displaced facilities would be required to enable this option.

In developing on top of Central Park and the existing SUDS pond this attenuation capacity and open space amenity would have to be re-provided. Similarly, given the proposed development on top of the existing surface car park, it is assumed that equivalent parking capacity (circa 269 spaces) would be re-provided nearby.

A new bridge link is included which connects the new buildings into the existing link between QEUH and the Teaching & Learning Centre and Office Building. This link will also allow connection into the multi-storey car park at upper levels.

Easier to have some beneficial segregation of outpatients, acute and rehab services and the different things these services need.

Clinical representative

External accessibility and potential better links to QEUH/RCH at ground level BUT compromised access between the linked buildings within the INS. Issue if all 3 buildings are not completed together/disruption. Would maintain individual identities of departments/services but detracts from service cross collaboration. More horizontal floor space for effective adjacencies of departments. More disruption at front of main hospital & removal of green space for majority of QEUH/RHC patients and visitors. Outlook from the buildings may be compromised. Relocated greenspace too out on a limb for visibility.

Third Sector representative

5.4.6 Option 3: Maximum Refurbishment

3 Maximum Refurbishment - Overview

- Refurbishment of Neurosurgical and Spinal buildings together with significant new build (approx 1/3 refurb, 2/3 new build)
- 13 year construction and commissioning period
- Extensive decant requirement
- Full compliance across new-build and refurbishment layouts and services
- 89m travel distance from new building adjacent to QEUH bridge link



Figure 10. Maximum Refurbishment overview

Candidate Site Option 3 tests the maximum extent of the refurbishment of the existing cluster of buildings associated with the current INS facilities. It therefore seeks to work within the existing development footprint. This thereby retains an equivalent connection to the QEUH Adult Hospital and relationship to the blue light access routes on Langlands Drive to that already existing.

This option maximises refurbishment of the existing INS Buildings (those north of the access road, either side of the ICE building). The balance of additional space required to meet the Schedule of Accommodation (SOA) is in a new build facility replacing the existing Neurology Building and NRU facilities to the south of the existing Candidate Site. A northward extension to the QENSIU is also envisaged to achieve SOA requirements.

Development Notes

To enable the refurbishment and replacement of existing INS facilities within the existing footprint a phased approach would be required and reliant on providing temporary decant facilities (calculated to be 15,500 sqm).

It is assumed that temporary decant space would provide the facilities and space standards required in the SOA and that any decant facility would be located as close as possible to the INS buildings (e.g. on the meadow site). It is not envisaged that there would be any permanently displaced clinical facilities required to enable this option; however, the existing and adjacent VIE medical gases facility would need to be relocated elsewhere within the QEUH campus.

As this option maximises the reuse of the existing INS buildings and footprint it leaves no vacated buildings.

Given the proposed new build development would require the space occupied by existing surface car park at the Neurology building, it is assumed that equivalent parking capacity (circa 100 spaces) would be re-provided elsewhere on campus.

A new bridge link is included which connects the new building into the existing link between QEUH and the Teaching & Learning Centre and Office Building.

Future proofing with a 13-year construction period would be difficult - likely will need uplift by time of completion with changing technologies.

Clinical representative

Confusing time [throughout construction] for patients and staff with possible difficulties accessing clinics and overall disruption of access to all. Impact to the patients for a long time of 13 years!

Patient representative

5.4.7 Option 4: Phased Campus Approach

4 Phased Campus Approach - Overview

- Multi-phase new-build, redevelopment and refurbishment
- 11 year construction and commissioning period
- Full compliance across new-build and refurbishment layouts and services
- Includes re-use of Langlands PFI facility
- Extensive decant and Langlands replacement requirement
- 89m travel distance from new building adjacent to QEUH bridge link

KEY:	
	New Build
	Refurbished
	Parking
	Decant
	New Build Langlands
	Vacated



Figure 11. Phased Campus Approach overview

Candidate Site Option 4 involves the refurbishment / replacement of the existing cluster of buildings associated with the current INS facilities. However, unlike Candidate Site Option 3, it relies upon acquiring and repurposing the Langlands PFI building / site whilst withdrawing from the existing Surgical building.

Option 4 is a Phased Campus approach using most of existing INS buildings / sites. To achieve the necessary increase in additional space it proposes replacing the Neurology building and NRU (as Option 3), refurbishing the QENSUI (as Option 3) whilst including the existing Langlands PFI building for refurbishment. This enables the Surgical building to be largely vacated.

Development Notes

To enable the refurbishment and replacement of existing INS facilities within the existing footprint a phased approach would be required and reliant on providing temporary decant facilities (calculated to be 15,500 sqm).

It is assumed that temporary decant space would provide the facilities and space standards required in the SOA and that any decant facility would be located as close as possible to the INS buildings (e.g. on the meadow site). It is envisaged that the existing and adjacent VIE medical gases facility would need to be relocated elsewhere within the QEUH campus. This option would require procurement of the Langlands PFI facility and re-provision of the existing Langlands accommodation elsewhere (on or off QEUH campus – to be confirmed). For illustrative purposes this displacement of facilities is shown relocated to the north-east of the QEUH site. This option vacates the existing Surgical building.

Given the proposed new build development would require the space occupied by existing surface car park at the Neurology building, it is assumed that equivalent parking capacity (circa 100 spaces) would be re-provided elsewhere on campus.

A new bridge link is included which connects the new building into the existing link between QEUH and the Teaching & Learning Centre and Office Building.

Building more distributed, poor usability/accessibility, community well being reduced - option 4 for me is more negative than option 3 - spinal building more isolated.

Clinical representative

Spinal injuries left very isolated. Long periods of disruption through process, new build would improve adjacency within that building. Increased loss of green space with refreshed Langlands. Parking/transport access no better than currently, potentially worse. Limited future proofing due to residential area.

Patient representative

6.0 Economic appraisal

The Initial Agreement identified a long-list of proposed solutions and presented a detailed analysis of the potential for each option to deliver on the stated investment objectives, as well as indicative costs for each proposed solution.

The approach taken to developing the economic appraisal for this project reflects the requirements of the new Scottish Capital Investment Manual guidance and was also informed by best practice recommendations from Audit Scotland and the National Audit Office. A fundamental principle has been the appraisal of options on their costs and benefits, not subjective preferences, or opinions.

The process built on the highly participative approach to stakeholder engagement that has been a hallmark of the project and that was detailed within the Initial Agreement; and informed by the engagement and deliberations undertaken since the inception of the project. The stakeholder input has been considered and reflected upon by the multi-stakeholder Project Board.

To undertake an appropriate appraisal for this Options Appraisal, the detailed analysis undertaken at Initial Agreement stage was re-appraised and is presented in this section.

6.1 Qualitative assessment of options

6.1.1 Briefing sessions

In preparation for the Options Appraisal Workshop, invitations were sent to all stakeholders to attend briefing sessions with the Core Team in January 2024. These sessions were to provide an overview of the options, to explain the scoring system that would be used at the Option Appraisal Workshop and to explain the purpose of the options appraisal. Stakeholders were each provided a pack with the options and their pros and cons to review and share with their colleagues for consensus when scoring. Patient and Third Sector representatives were encouraged to speak with any groups they were part of to garner opinions.

6.1.2 Options appraisal workshop

A range of stakeholders were invited to attend, representing their department, service, or patient and third sector demographic and score the site options. The event took place on 31 January 2024 at the William Quarriers Conference Centre. The stakeholder groups comprised:

- Patients, Carers and Third Sector
- Clinical representatives
- Non-clinical representatives
- Regional and National Partners

For collating and evaluating the scores, stakeholders were grouped as follows:

- Patients, Carers, Third Sector (inc Regional and National partners)
- Clinical representatives
- Non-clinical representatives, all management, administrative and support services including facilities, estates, and core project team

The number of delegates in each group was:

- Patients, Carers, Third Sector - 9
- Clinical representatives - 29
- Non-clinical representatives - 21

As at each stage of the process to date, these three groups were given equal weight by aggregating scores and deriving a mean for each group; each group's votes therefore accounted for a third of the final scores.

Table 10. Benefits criteria for ranking options

	Benefit	Description
A	Clinical Service Delivery	<p>The site will deliver optimal patient/staff flow and efficiencies in care. It will:</p> <ul style="list-style-type: none"> • Provide all of the services required to be a leading international centre for neurosciences. • Deliver improved critical and desirable adjacencies within and between INS departments and the QEUH building. • Enhance patient privacy and dignity during treatment
B	Accessibility	<p>There will be easy and intuitive wayfinding and navigability for all patients, users, families and staff. It will support people with additional physical and cognitive needs. This will include:</p> <ul style="list-style-type: none"> • Logical routes between departments for the most common patient and staff journeys • Easy-to-find and accessible entry routes. • Easy links to public transport • Parking with protected accessible (blue badge) spaces and drop off close to the entrance.

	Benefit	Description
C	Community and Wellbeing	<p>The site will encourage a sense of community and will put the wellbeing and safety of all of its users at its heart.</p> <ul style="list-style-type: none"> • All users will have access to well maintained, sheltered outside space and greenery. • Access to natural light will be an essential feature of all accommodation. • There will be social and wellbeing places for patients, families and staff to both come together and also be apart/alone. • Staff areas will encourage the sharing of ideas and learning from each other.
D	Futureproofing	<p>The site allows for potential future adaptation/expansion.</p> <ul style="list-style-type: none"> • Services can be isolated so that changes can be made without disrupting other areas and services. • Proposals have a building expansion zone. • Ability to provide adequate space and access for lifecycle replacement of key pieces of equipment and/or plant.
E	Minimises Disruption	<p>The site minimises disruption to current INS services and the functioning of the QEUH campus during its development.</p> <ul style="list-style-type: none"> • Impact of any demolitions on services • Impact of moving services to temporary accommodation • Impact of any changes upon existing functioning facilities • Impact of construction traffic and access on emergency access arrangements

6.1.3 Scoring process

Stakeholders were provided a comprehensive overview of the five options and invited to score each one on its own merits.

A scale ranging from 1-7 was used to score each of the five benefits against each site option.

Alongside scoring, stakeholders were also invited to include free-text comments on each of the options.

Table 11. Scoring Table

Each description to receive a score against each option between 1-7						
		Option 0	Option 1	Option 2	Option 3	Option 4
	Goal/Outcome Description (Full descriptions should be displayed on the screen during the scoring process)	Do Minimum	Single New Build	New Build Campus (3 new buildings)	Maximum Refurbishment with additional build	Phased Campus Approach
A.	Clinical Service Delivery					
B.	Accessibility					
C.	Community & Wellbeing					
D.	Futureproofing					
E.	Minimises Disruption					
	Total Score					

I think the option will impact/support deliver the description:						
1	2	3	4	5	6	7
Very negatively	Quite negatively	Slightly negatively	Neither a positive nor negative effect	Slightly positively	Quite positively	Very positively

6.2 Scoring breakdown

Stakeholders were divided into their respective categories to allow for weighting to be applied, ensuring each group had equal voice regardless of the size of that representative group.

Table 12. Scoring Breakdown

Option 1 - New Build						
	A	B	C	D	E	Total
Patients	201.7	190.7	187.0	183.3	194.3	957.0
Clinical	221.9	204.8	215.1	202.6	219.6	1064.0
Other staff	216.9	205.9	199.6	196.4	218.4	1037.1

Option 2 - New Build Campus						
	A	B	C	D	E	Total
Patients	198.0	176.0	165.0	168.7	183.3	891.0
Clinical	207.1	199.1	188.9	186.6	199.1	980.9
Other staff	201.1	198.0	182.3	183.9	180.7	946.0

Option 3 - Maximum Refurbishment						
	A	B	C	D	E	Total
Patients	124.7	99.0	99.0	95.3	44.0	462.0
Clinical	140.0	103.6	105.8	74.0	38.7	462.0
Other staff	133.6	124.1	117.9	103.7	58.1	537.4

Option 4 - Phased Campus						
	A	B	C	D	E	Total
Patients	128.3	95.3	99.0	91.7	47.7	462.0
Clinical	138.8	107.0	114.9	79.7	45.5	485.9
Other staff	147.7	111.6	113.1	113.1	59.7	545.3

Option 0 - Do Minimum						
	A	B	C	D	E	Total
Patients	77.0	69.7	55.0	36.7	36.7	275.0
Clinical	59.2	69.4	66.0	39.8	41.0	275.4
Other staff	58.1	80.1	80.1	58.1	44.0	320.6

6.2.1 Outcome analysis

As noted, because there were uneven numbers in the three groups – Patient, Carer, Third Sector; Clinical staff; non-Clinical NHS staff – all groups had their member scores added together to create a mean for their group and these mean scores were each allocated a third of the total.

6.2.1.1 Patients, carers, and third sector representatives

This group comprised 9 patients, carers and third sector representatives.

Table 13. Patient, Carer, Third Sector (PCTS) scoring of options

	Option	Weighted	Rank
1.	Single New Build	957	1
2.	Campus Build	891	2
3.	Maximum Refurbishment	462	3=
4.	Phased Campus Build	462	3=
0.	Do Minimum	275	5

The consensus from this representative group varies only marginally from the overall results from each cohort. The main note is this group gave the same scores for option 3 and option 4.

6.2.1.2 Clinical representatives

This group comprised 29 clinical representatives from across all INS services.

Table 14. Clinical representatives' scoring of options

	Option	Weighted	Rank
1.	Single New Build	1064	1
2.	Campus Build	980.9	2
4.	Phased Campus Build	485.9	3
3.	Maximum Refurbishment	462.0	4
0.	Do Minimum	275.4	5

The ranked outcomes differ to the scores achieved by the PCTS group, the largest variances being the scores for Options 1 (+107) and 2 (+89), however this did not change the overall rank that for each of the options. Option 3 scored exactly the same across this and the PCTS group.

6.2.1.3 GGC non-clinical representatives (including members of core team)

This group comprised 22 NHSGGC staff from INS support and administrative services management and regional partners as well as the project core team.

Table 15. GGC non-clinical representatives' scoring of options

	Option	Weighted	Rank
1.	Single New Build	1037.1	1
2.	Campus Build	946	2
3.	Maximum Refurbishment	537.4	3
4.	Phased Campus Build	545.3	4
0.	Do Minimum	320.6	5

These scores offered the greatest variance through options 3-5 from the other two groups, however again the ranking remained the same across all options.

6.2.2 Final outcome of Site Options Appraisal

Having taken a mean of all members in each group to derive a group score for the three groups. The three group scores were then (mean) averaged to create a single consolidated final score.

Table 16. Final outcome of Options Appraisal

	Option	Weighted	Rank
1.	Single New Build	1019.4	1
2.	Campus Build	939.3	2
4.	Phased Campus Build	497.7	3
3.	Maximum Refurbishment	487.1	4
0.	Do Minimum	290.3	5

Option 1 – Single New Build was demonstrated to be the highest rated option by the stakeholder group, ranking highest in terms of qualitative assessment against the benefits criteria.

As part of the options assessment stakeholders were encouraged to leave comments and Option 1 was seen to most align with key project objectives.

Enables all services to be placed in one building. Good accessibility for staff/service users. Ability to develop green space on vacated site. Ability to add additional floors. Minimal service disruption

Clinical representative

Simplicity, less confusion and stress for patients finding other buildings.

Patient representative

Provides an easily recognisable building with all specialties in one place this appeals to patients and staff and encourages cross-working between services.

Clinical representative

This is the most sensible approach, 1 year longer to build but everything is contained. Risk of failure remains but manageable just as it is in the QEUH. Will bring a proper identity to the service - world class facility/service.

Non-clinical staff representative

Option makes this easily identifiable from parking, public transport and more hospital entrances so excellent potential for accessibility.

Patient representative

6.3 Programme

An assessment of construction timescale and programme was undertaken by the Board's technical Advisers AECOM. The dates of the key project stages are summarised in Table 16, and high-level construction programmes are included in Figure 12.

The project development timeline has altered since the Initial Agreement. The key changes arise from:

- The timescale for Scottish Government approval of the Initial Agreement was longer than expected
- The options appraisal process for the selection of a preferred option was introduced as an additional milestone and required an economic appraisal and formal submission to SG Capital Investment Group.
- A review of NHS high level programme by Technical Advisor (AECOM), identified some programme durations for OBC and FBC activities as being optimistic in relation to other similar scale projects.
- Some activities, planned to run in parallel, have had to be re-planned to run sequentially due to requirement for separate “preferred option” option stage approval before proceeding to OBC design team appointments.

6.3.1 Design development stage

The Baseline programme prior to the appointment of the Technical Advisor was considered indicative pending the appointment of the wider professional project team.

During the tender selection process for the Technical Advisor services AECOM developed a programme to meet the dates stated in the ITT documents. Following appointment an exercise to compare these was undertaken, and a review held in collaboration with NHSGGC to incorporate adjustments to both programme logic and activity duration.

In addition, further updates have been incorporated to reflect the requirements for Scottish Government CIG approval of the Preferred Option, prior to progressing with remaining OBC activities in FY 2024 – 2025.

Table 17. Design development programme

Activity	Current Program
OBC Stage	
Brief / ACR Development (RIBA Stage 1)	March 2024
Site Options Appraisal	March 2024
Confirm Site Selection	November 2024
Design Team Selection	April 2025*
Concept Design & Cost Plan (RIBA Stage 2)	April 2025*
Concept Design Signoff	October 2025*
Spatial Coordination & Update Cost Plan (RIBA Stage 3)	October 2025*
Design and Cost Submission to NHS	April 2026*

NHS Technical Review	May 2026*
NDAP & NHS Assure Reviews	September 2026*
NHS Approval	May 2027*
SCIG Approval	July 2027*
FBC Stage	
NHS Approval	September 2029*
SCIG Approval	November 2029*
Financial Close	January 2030*

* Dates are subject to receiving approval to proceed in November 2024

6.3.2 Construction stage

To date the project has not formally reported or identified a target construction duration, as this is highly dependent on the preferred option that is selected. Indicative programmes for each option have been developed by the Technical Advisor. These remain high level programmes that will require further development as any phasing plans are refined, together with agreement from the selected contractor. Programmes are graphically demonstrated in Figure 12.

Within these indicative programmes Option 0 (Do Minimum) takes the longest time period to complete, due to the requirements to minimise disruption to live services. The putative programme assumes that we can vacate 2 storeys at a time working through the Surgical building and sequentially vacating and refurbishing space over the remaining buildings. The shortest delivery timescales are delivered by the two new-build Options, 1 and 2. Neither of these requires the construction of decant and therefore all construction activity is focussed upon creating the new facilities.

Options 3 and 4 require extensive decant accommodation to be constructed before demolitions of parts of the existing estate can be undertaken to allow development to take place. These programmes therefore include constructing decant accommodation, demolitions, constructing new-build and carrying out refurbishment of existing facilities.

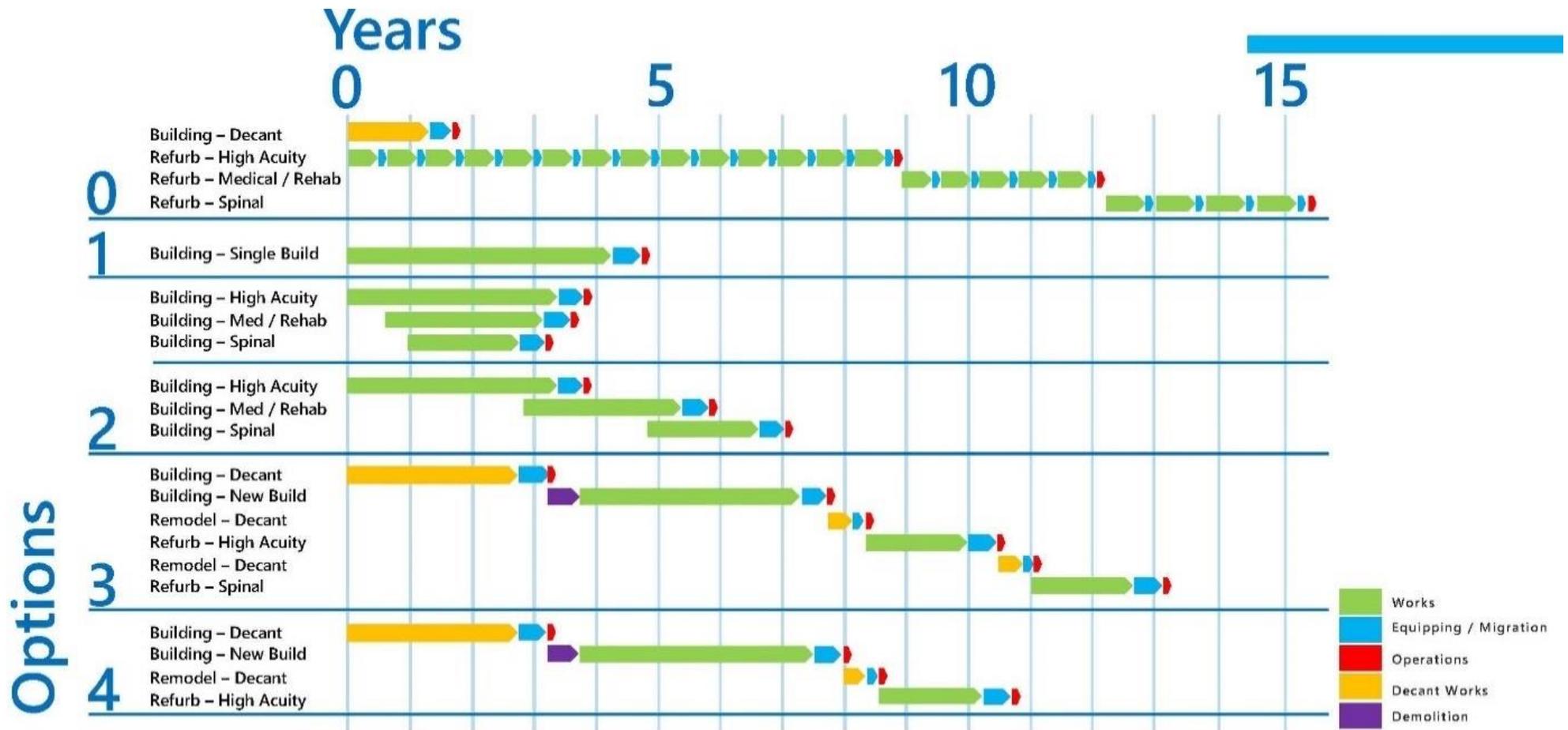


Figure 12 - Option Construction Programmes

6.4 HAI-SCRIBE

During the NHS Scotland Assure IA Key Stage Review, a crucial recommendation was for the Board to conduct a HAI-SCRIBE review of each site option.

To meet the requirements of Scottish Health Facilities Note [SHFN 30: HAI-SCRIBE](#), the project team, alongside colleagues from the clinical team, Estates, Facilities, and Infection Prevention and Control, participated in a workshop facilitated by our technical advisors. This expert group completed a Development Stage 1 HAI-SCRIBE assessment covering Initial Briefing and Proposed Site for Development for each proposed option.

As per the process outlined in SHFN 30, it was confirmed that all options fall into the following categories:

- **Construction Activities:** These works fall under Type 4 – Major demolition, which includes activities such as consecutive work shifts, heavy demolition, removal of a complete cabling system, and new construction.
- **Clinical Area:** The department encompasses a range of areas classified as Group 2 (Medium Risk), Group 3 (High Risk), or Group 4 (Highest Risk).
- **Precautions:** Based on the above, Class IV precautions need to be implemented for the project.

Table 18. HAI-SCRIBE key next-stage actions

Q	Summary Action	Option				
		0	1	2	3	4
1.1	Ground Investigation surveys, together with geotechnical investigations.		X	X	X	X
1.2	Level of testing for local contamination to be increased prior to works commencing to identify presence of infection risks e.g. cryptosporidium.	X				
1.3	Consider Bioaerosol testing for the campus to identify risk of infection or pollution from wider neighbourhood.	X	X	X	X	X
1.4	Consider implementing measures to mitigate the impacts of odours from adjacent wastewater treatment plant including location of external areas and green spaces.	X	X	X	X	X
1.5	Planning Register to be reviewed, engagement with the Local Authority, and review of NHSGGC capital plans to identify risk of pollution or infection from other construction/ demolition works.	X	X	X	X	X
1.7	Designers to take cognisance of high wind issues and undertake modelling, and implement design features as required.	X	X	X	X	X
1.9	Access routes and separation are to be considered through the development of the design, phasing strategy, construction methodology, and transport plan – all to be fully coordinated with clinical operational planning.	X	X	X	X	X
1.10	Lack of space to accommodate future flexibility to be considered further during the design stages.		X	X	X	X
1.11	The Asbestos Management Registers are to be provided to the design team once appointed. Full Refurbishment & Demolition Asbestos Survey to be carried out to identify locations and type of any asbestos.	X	X	X	X	X
1.12	60 year lifespan minimum to be specified, potential to be increased to be reviewed.		X	X	X	X

As noted within the completed checklists, a separate HAI SCRIBE will be required for any decant accommodation that may be required, currently envisaged for Options 0, 3, and 4.

Further HAI-SCRIBE assessments will be required at the following stages:

- Development Stage 2 - Design and planning
- Development Stage 3 - Construction and refurbishment
- Development Stage 4 - Pre-handover check, ongoing maintenance, and feedback

6.5 Whole life carbon analysis

The project team are cognisant of the requirement for NHS Scotland to be a 'net-zero' Greenhouse Gas (GHG) organisation by 2040 at the latest, and for all NHS Scotland new buildings and major refurbishments to be designed to have net-zero GHG emissions from April 2020.

NHS GGC is actively collaborating with the Scottish Government and Scottish Water Horizons (SWH) to explore potential heat recovery options. Specifically, they are investigating the feasibility of utilising waste heat from the Shieldhall wastewater treatment works, which is situated adjacent to the Queen Elizabeth University Hospital (QEUH) site.

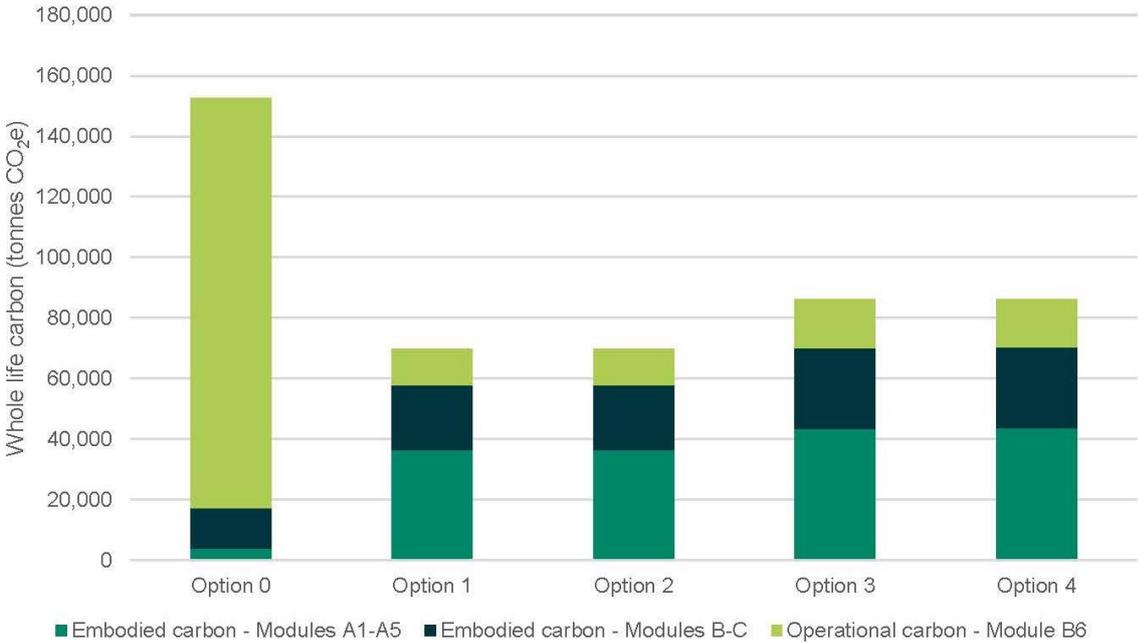
SWH is currently evaluating the implementation of a Waste Heat Recovery (WHR) system. This system would capture heat from the discharge at the Shieldhall wastewater treatment works and transfer it via water-to-water heat pumps to the existing energy centre on the campus. The primary objective is to distribute this recovered heat to multiple buildings within the QEUH campus including any new INS buildings.

The Net Zero Carbon requirements have been considered by NHS GGC through the development of this Options Appraisal and whole life (embodied and operational) carbon has been assessed separately from the broader sustainability topics included in AECOM's options appraisal reports.

Whilst no design-specific modelling or detailed assessment work has been carried out at this stage, this element of the assessment has been undertaken using benchmarks for embodied carbon and operational energy, applied to the different building areas included in each option. These benchmarks are intended to provide an early estimate of the potential whole life carbon emissions associated with buildings of similar design and scale, to inform the net zero carbon strategy for the project. At this early stage no heat recover options from Scottish Water have been considered in any of the calculations.

Meeting these embodied carbon and operational energy benchmarks through the design and construction of the project would require the design team to embed the principles of low energy/carbon design and implement this throughout the project. Additionally, opportunities to reduce the whole life carbon should be explored and maximised throughout the duration of the project with the objective of reducing whole life carbon as far as practical, reducing below these benchmarks where feasible. Summary totals of embodied and operational carbon can be found on Figure 13 below.

Figure 13. Summary of Whole Life Carbon – indicative comparison of Options (60-year reference period)



6.5.1 Embodied Carbon

Option 3 and Option 4 are estimated to have the highest and very similar total embodied carbon associated with them (70,075 tonnes CO₂e and 70,253 tonnes CO₂e, respectively).

Option 1 and Option 2 are estimated to have the lowest and the same total embodied carbon associated with them (57,742 tonnes CO₂e for both options).

Option 0 is estimated to have the lowest embodied carbon (17,151 tonnes CO₂e).

6.5.2 Operational energy demand

In terms of annual operational energy demand, it is estimated that Option 0 would have the highest energy demand (15,106 MWh/year) associated with an older, less energy-efficient building and envelope.

Option 3 and Option 4 are estimated to have slightly lower and very similar energy demand (16,184 MWh/year and 16,125 MWh/year, respectively).

Option 1 and Option 2 are estimated to be even lower, and the same annual operational energy demand associated with them (12,156 MWh/year for both options).

6.5.3 Operational carbon emissions

The corresponding operational carbon emissions, which consider the relative carbon emissions factors, per unit of gas and electricity, are estimated to be much higher for Option 0 and reflect

the impact of a fully electric option, benefitting from the projected decarbonisation of the UK electricity grid over the 60-year reference period for this comparison.

Option 0 (135,631 tonnes CO₂e) is estimated to emit over 11 times more carbon than Options 1 and 2 (12,083 tonnes CO₂e) and over 8 times more than Option 3 (16,087 tonnes CO₂e) and Option 4 (16,028 tonnes CO₂e).

6.5.4 Summary

Operational carbon has a significant impact on the performance of Option 0.

Option 3 and Option 4 have higher indicative whole life embodied carbon benchmarks than Option 1 and Option 2 as these options require demolition of existing buildings and require new decant buildings to be constructed to enable the refurbishment works.

Whilst the embodied carbon benchmarks associated with refurbishing buildings are lower than those of constructing new buildings (reflecting the assumed retention of substructure, superstructure and frames), this is more than outweighed by the additional embodied carbon associated with the demolition works and new decant buildings.

Additionally, the annual operational energy demand associated with refurbished building area (assumed to be less efficient than new build) and the additional decant building area, increase the energy demand estimates relative to Option 1 and Option 2.

Given this projected decarbonisation, the operational carbon over a 60-year study period (in line with the whole life carbon benchmarks) is significantly lower for an all-electric energy strategy compared to one that uses gas for heating systems. It is important to note that for Option 0, it is assumed that gas is used for the entire 60-year study period. This does not take into account the possibility of heating systems being replaced with electric systems during these 60 years.

Note that this is a high-level quantitative assessment of each option, carried out using the building floor areas associated with each option and applying whole life carbon benchmarks to these floor areas.

Options 1 and 2 are assessed to have the lowest Whole Life Carbon requirement over the 60-year reference period.

Additional, detailed commentary can be found in the AECOM Technical Reports attached as Appendix 6.

6.6 Risk

A high-level project development risk assessment of each Option was carried out by the Project Core Team across a number of key headings – Statutory Approvals, Market Conditions, Physical Conditions, Decant Impacts and Clinical Services – per Figure 14.

Criteria were assessed on an Impact Scale of 1 (Negligible) to 5 (Extreme) and a Likelihood Scale of 1 (Rare) to 5 (Almost Certain), with the multiple providing the resulting risk scores.

The averaging of the risk scores highlighted the following:

- Option 0 was seen to be the option carrying the most risk, with a number of red risks across varying categories.
- Options 3 and 4 carried the next level highest risk, elevated through the provision of decant accommodation and the uncertainty around existing building refurbishment.
- Options 1 and 2 were seen to have the lowest associated risk.

Option 1 is marked as having the lowest (unweighted) total risk score. It was assessed as having a higher level of risk of all options in relation to procurement of main contractor, based on the scale of the single building project having a limiting factor on the pool of potential tier 1 contractors.

Option 2 was identified as having a higher risk level than Option 1 in relation to securing Planning Consent due to its potential impact on the greenspace and public at the front of the hospital, albeit more detailed design work would most likely mitigate this at next stage.

Figure 14. Developmental Risk Assessment

		0 - Do Minimum			1 - Single New Build - North QEUH			2 - Campus New Build - North QEUH			3 - Maximum Refurb			4 - Phased Campus Approach		
		IMPACT	LIKELIHOOD	SCORE	IMPACT	LIKELIHOOD	SCORE	IMPACT	LIKELIHOOD	SCORE	IMPACT	LIKELIHOOD	SCORE	IMPACT	LIKELIHOOD	SCORE
STATUTORY APPROVALS																
1	Alignment with IA Objectives Risk of the project not aligning with objectives as set out within the Initial Agreement.	5	5	25	5	1	5	5	1	5	5	1	5	5	1	5
2	Town Planning Risk of securing Planning Consent significantly impacting the project.	3	2	6	4	2	8	4	3	12	4	4	16	4	4	16
3	Building Warrant/ Assure Risk of compliance issues significantly impacting technical approvals.	5	4	20	3	2	6	3	2	6	3	4	12	3	3	9
MARKET CONDITIONS																
4	Main Contractor Procurement Risk of the market not holding depth for a competitive tender process.	5	2	10	5	3	15	5	2	10	5	2	10	5	2	10
5	Supply Chain Deliverability Risk of the supply chain not being able to deliver the works in context of wider market (NHP, Monklands, etc.).	4	2	8	4	3	12	4	3	12	4	2	8	4	2	8
PHYSICAL CONDITIONS																
6	Ground Conditions Risk of unknown ground conditions significantly impacting the project.	2	1	2	3	1	3	3	2	6	4	3	12	4	3	12
7	Existing Building Conditions Risk of unknown building fabric or services significantly impacting the project.	5	5	25	1	1	1	1	1	1	4	4	16	4	3	12
DECANT																
8	Provision of Decant Risk of issues constructing decant provision significantly impacting the project.	5	4	20	1	1	1	1	1	1	3	3	9	3	3	9
SERVICE IMPACT																
9	INS Disruption Risk of clinical services being disrupted in the INS during the works (including from decant facilities).	5	5	25	1	1	1	1	1	1	3	5	15	3	5	15
10	QEUH Campus Disruption Risk of clinical services being disrupted in the QEUH during the works (including from decant facilities).	4	4	16	2	4	8	2	4	8	4	4	16	4	4	16
AVERAGE																
				15.7			6			6.2			11.9			11.2

6.7 Monetary costs

Table 19 below sets out the estimated costs and Net Present Value (NPV) for each of the short-listed options. These costs provide a sound basis for comparison of each proposed solutions and a suitable method of assessing value for money.

The Economic Appraisal was undertaken using the Generic Economic Model (GEM) including the estimated capital costs, along with the known revenue costs which are applicable to the options being appraised.

A detailed Options Appraisal Construction Cost Estimate paper has been developed to assess the estimated capital costs associated with each option, and this is included in Appendix 6. This paper details the general assumptions which have been considered in preparing these costs, and provides details on construction elemental breakdowns, contingency allowances, and inflation.

The NPV presented below indicates that the Do Minimum option provides the lowest NPV, and therefore the least comparable costs based on today's values.

It should be noted that this assessment is based on a financial assessment only. The Do Minimum option is based on an assessment of the backlog maintenance (business continuity) works only, and whilst clearly the least expensive option, this will provide limited benefits to the clinical service, and is unlikely to achieve the non-financial benefits which are set out in earlier sections of this paper.

Table 19. Summary of costs

Costs in £millions	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbish- ment	Option 4: Phased Campus
Capital cost	469.0	1,033.5	1,043.1	1,436.8	1,664.7
Whole of life capital costs	469.0	1,162.1	1,164.2	1,735.5	1,844.2
Whole of life operating costs	614.7	1,123.7	1,061.5	1,284.0	1,304.4
Estimated Net Present Value (NPV) of Costs	608.5	1,262.5	1,184.4	1,527.1	1,749.7

6.8 Non-financial benefits

To carry out an accurate value for money assessment of each option, the non-financial benefits of the investment need to be factored in alongside the financial costs.

Extensive stakeholder engagement through the non-financial benefits workshops has been detailed earlier in this paper. In summary, the stakeholders have assessed and scored the proposed service solutions against a range of benefits criteria which have then been weighted.

This weighting provides the non-financial benefits score for each of the options, which can then be applied to the financial costs to provide a balanced value for money assessment.

6.9 Net Present Value

Table 20 below summarises the outcomes of combining the financial costs with the non-financial benefits of each option.

The methodology is to divide the financial Net Present Value (NPV) by the non-financial appraisal score, to derive a Cost per Non-Financial Appraisal (NFA) Score.

The cost per NFA score is the basis to rank the value for money for each of the options.

Table 20. Net Present Value

Costs in £millions	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbishment	Option 4: Phased Campus
Net Present Value (60 years)	608.5	1,262.5	1,184.4	1,527.1	1,749.7
Non-Financial Appraisal (NFA) Weighted Score	290.3	1,019.4	939.3	487.1	497.7
Cost Per NFA Score	2.096	1.239	1.261	3.135	3.516
Ranking	3	1	2	4	5

6.10 Assessing uncertainty

Sensitivity analysis is a key technique undertaken to examine how the options can be affected relative to each other by reasonable variations in key assumptions.

Uncertainty in capital costs is addressed on a consistent basis across the options through allocating percentages to allow for inflation and risk, and an Optimism Bias exercise has been undertaken and applied to the construction costs.

The Sensitivity Analysis undertaken within the Economic Model is summarised in the sections below. These tables present the financial sensitivity outcomes based on the capital costs, and the non-financial outcomes which are based on the Non-Financial Appraisal (NFA).

Each table sets presents the changes to the ranking of the options after each scenario was applied.

It should be noted that in the short-listed options considered, the service provision is consistent across the options, and so clinical and non-clinical service costs are consistent across all options. Therefore, a sensitivity analysis will return consistent results across the options, and there would have to be a significant movement in either capital or revenue costs relative to the total project cost to have a material effect on affordability.

6.10.1 Financial sensitivity analysis

Table 21. Financial sensitivity summary

Costs in £millions	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbishment	Option 4: Phased Campus
Scenario 1: No changes	2.096	1.239	1.261	3.135	3.516
Ranking	3	1	2	4	5
Scenario 2: Initial Capital Costs replaced with 2nd option	2.096	1.205	1.261	3.135	3.516
Ranking	3	1	2	4	5
Scenario 3: Costs increase by 15% for 1st ranked option	2.096	1.354	1.261	3.135	3.516
Ranking	3	2	1	4	5
Scenario 4: Costs decrease by 15% for 1st ranked option	2.096	1.114	1.261	3.135	3.516
Ranking	3	1	2	4	5
Scenario 5:	2.096	1.260	1.261	3.135	3.516

Costs in £millions	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbishment	Option 4: Phased Campus
Revenue (Non-Pay Costs) increase from Low to Medium for 2nd ranked option					
Ranking	3	1	2	4	5

Scenario 1: presents the NPV and ranking as per the Economic Model, with no changes. This is shown in Table 24 to provide a baseline for comparison.

Scenario 2: This sensitivity adjustment is to check the sensitivity of the top ranked option against the next best option. To check this, the initial capital costs of the top-ranked option (option 1) are replaced with the costs of the 2nd ranked option (option 2).

The outcome is that the top ranked option remains the top ranked option.

Scenario 3: This sensitivity adjustment is to check the sensitivity of the rankings to an increase in capital costs. The capital costs of the top ranked option are increased by 15%, and the impact of this change is that the 2nd ranked option becomes the top ranked option.

If the costs of option 1 were to increase by 15% with the costs of option 2 remaining unchanged, these options would change positions. Whilst it is unlikely that the costs of one option would increase with the others remaining unchanged, this analysis does indicate that the rankings are sensitive to changes in the capital costs, and this should be considered during the finalisation of the Outline Business Case.

Scenario 4: This sensitivity adjustment is to check the sensitivity of the rankings to a decrease in capital costs. The capital costs of the top ranked option are decreased by 15%, and the impact of this change is that the rankings are unchanged.

If the costs of option 1 were to decrease by 15% with the costs of the other options remaining unchanged, option 1 would present an even more favourable NPV, cost per NFA, and would remain as the top ranked option.

Scenario 5: This sensitivity adjustment is to check the sensitivity of the rankings to an increase in revenue (non-pay) costs. The non-pay costs of the top ranked option are changed from 'low' to 'medium' banding, and the impact of this change is that the rankings are unchanged, though the difference between the 2 highest ranked options reduces significantly.

6.10.2 Non-financial benefits sensitivity analysis

Table 22. Non-financial sensitivity summary

	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbishment	Option 4: Phased Campus
Scenario 1: No changes	290.3	1019.4	939.3	487.1	497.1
Ranking	3	1	2	4	5
Scenario 2: Equal Weighting of Benefits	163	612	528	292	299
Ranking	5	1	2	4	5
Scenario 3: Exclude Top Rank Score	111	402	329	190	191
Ranking	5	1	2	4	5

Scenario 1: presents the NFA (weighted benefits score) for each option as per the Economic Model, with no changes, and the ranking remains unchanged. This is shown in Table 25 to provide a baseline for comparison.

Scenario 2: This sensitivity adjustment checks the sensitivity of the NFA across the options. This is done by applying an equal weighting to each of the 5 benefits against which the options were scored. The scenario indicates that the top ranked option would remain the top ranked option in this scenario and the qualitative benefits scoring favours option 1.

The outcome is that the top ranked option remains the top ranked option.

Scenario 3: This sensitivity adjustment checks the sensitivity of the NFA across the options through removing the top ranked benefit. This was Benefit A. Clinical Service Delivery.

With this benefit removed, the NFA scores are adjusted, and the scenario indicates that the top ranked option would remain the top ranked option in this scenario.

The outcome is that the top ranked option remains the top ranked option.

6.11 Identifying the best Value for Money option

Table 23 demonstrates that whilst the Do Minimum option is the lowest financial cost, it provides a very low NFA score, which is that this investment option will not deliver the required service benefits, and so ranks low as a value for money investment.

Similarly, Option 1 which is to invest in a Single New Build is the highest-ranking option in terms of combined financial and non-financial score.

Table 23. Economic Appraisal

	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbish- ment	Option 4: Phased Campus
Net Present Value (60 years)	£608m	£1,263m	£1,184m	£1,527m	£1,750m
Non-Financial Appraisal (NFA) Weighted Score	290	1,019	939	487	497
Cost Per NFA Score	£2.1m	£1.24m	£1.26m	£3.14m	£3.51m
Ranking	3	1	2	4	5

Option 1 Single New Build has best value for money score demonstrated by the lowest Cost per NFA (benefit) score.

7.0 Financial Appraisal

This Financial Case demonstrates the affordability of the proposal by undertaking a review of both the capital and revenue implications of investment. This assessment is based on the financial information within the Generic Economic Model (GEM), which collates the known capital and revenue costs across the investment cycle and discounts these to provide a Net Present Value which allows for comparison of the options.

7.1 Financial Model

NHS Greater Glasgow and Clyde have considered the affordability of this proposal by undertaking a review of the financial implications of investment, both capital and revenue.

The GEM models for each option presents the financial implications of this investment and provides the economic appraisal of the short-listed options.

The methodology and assumptions applied to derive the comparative cost implications of the options are outlined alongside the summary tables in the sections below.

The financial model for each option considers several key outputs from other parts of the business case including estimated capital costs, revenue costs, and operating and maintenance costs.

The financial appraisal will be the driver for assessing affordability whilst the economic appraisal will determine value for money.

The key assumptions used within the financial model include:

The base year for the economic appraisal is the 1st Quarter 2024.

Capital expenditure is assumed to be made over the estimated programme duration for each option. Programme durations across the options range from 5 years to 14 years.

NPV has been calculated using capital costs presented in in the Options Appraisal construction cost estimate dated February 2024. This document is included in the appendices for reference.

The results of the economic appraisal for the options considered are shown below:

Table 24. Economic appraisal results

	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbishment	Option 4: Phased Campus
Net Present Value (NPV)	£608m	£1,263m	£1,184m	£1,527m	£1,750m
Ranking	1	3	2	4	5
Weighted Benefits score	290	1,019	939	487	497
Cost per benefit point	£2.1m	£1.24m	£1.26m	£3.14m	£3.51m
Ranking	3	1	2	4	5

On a purely financial basis, the ‘Do Nothing’ option does give the lowest NPV impact and the lowest lifetime costs. This option, however, does not provide any improvement or meet any of the investment objectives so is only used as a baseline for measuring the other options.

7.2 Capital costs and funding requirements

The capital costs have been considered and prepared for each implementation option and a detailed breakdown of these costs is included in Appendix 6.

The capital costs for the preferred option are presented in Table 25 below. These costs are based on the design prepared through this stage of project development, through stakeholder engagement with the project team and project architects.

Some of the main capital assumptions are noted below for information:

- Costs have been calculated at Q4 2023 prices.
- Capital costs are based on a feasibility report dated December 2024, prepared by the project consultants.
- Costs relate to the provision of INS services only and exclude any enabling or infrastructure work such as site wide services, site wide footpaths, public realm, or repurposing of the existing facility for future uses.
- Capital costs include professional fees, equipment, and allowances for Optimism Bias, inflation, demolition and VAT.
- Allowances have been included for full demolition of vacated buildings. Some of these facilities may be suitable for refurbishment or repurposing as part of the Board’s whole system plan, but for the purpose of this exercise are assumed to be demolished with their sites cleared and landscaped, unless otherwise noted.
- An allowance has been made for equipment which is as per the Initial Agreement, and based on a 15% of the construction costs, in line with the Health Premises Cost Guide.
- VAT has been added to the total capital cost and there may be an element that is recoverable for the fees incurred.
- Capital Charges are not included at this early stage of site selection but will be addressed in the more detailed financial modelling in the full version of the Outline Business case at the next stage.

A more detailed list of assumptions and exclusions is included in the Construction Cost Estimate Detail Report which is in Appendix 6.

The capital cost of the preferred option, which is to develop a single new building is estimated to be in the order of £1,033,457,172. A summary of Capital Costs is provided below.

Table 25. Summary of initial capital cost implications

Initial Capital Cost Implications	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbishment	Option 4: Phased Campus
Opportunity Costs	0	0	0	0	0
Initial Capital Costs					
Professional & NHS Project Team Fees	£15.35m	£34.59m	£35.81m	£49.58m	£58.82m
Construction	£153.53m	£432.35m	£447.62m	£495.83m	£588.19m
Other Costs - Surveys/IT/Estates	£3.38m	£9.34m	£9.67m	£10.91m	£12.94m
Equipment - Group 2 + 3 Client Direct	£23.03m	£64.85m	£67.14m	£74.37m	£88.23m
Inflation	£61.32m	£147.84m	£135.73m	£268.18m	£289.43m
VAT	£78.16m	£172.24m	£173.85m	£239.46m	£277.46m
Optimism Bias	£134.20m	£172.24m	£173.30m	£298.43m	£349.67m
Initial Capital Costs Total	£468.97m	£1,033.46m	£1,043.12m	£1,436.76m	£1,664.74m
Transitional Period Costs	0	0	0	0	0
Costs of Embedded Accommodation	0	0	0	0	0
Total of Initial Capital Cost Implications	£468.97m	£1,033.46m	£1,043.12m	£1,436.76m	£1,664.74m

Due to the fluidity of the construction market, unknown design risk and construction risk at this stage, sensitivity analysis of + and – 15% was carried out to present a range of costs.

Table 26. Capital Cost showing + or – 15%

Description	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbishment	Option 4: Phased Campus
Total	£469m £18,012/m ²	£1,034m £15,988/m ²	£1,044m £16,143/m ²	£1,437m £18,184/m ²	£1,665m £18,842/m ²

Low Range (-15%)	£398.7m	£878.9m	£887.4m	£1,221.5m	£1,415.3m
High Range (+15%)	£539.35m	£1,189.1m	£1,200.6m	£1,652.55m	£1,914.75m

7.2.1 Optimism Bias

An Optimism Bias workshop was undertaken to quantify risk associated with a series of options to re-provide the Institute of Neurological Sciences. The Project Core Team followed HM Treasury Green Book guidance and the Risk Management Guide in the Scottish Capital Investment Manual to determine the level of Optimism Bias that should be applied to the five options.

The upper bound percentage was calculated by determining the build complexity, location, scope of the scheme and changes to service delivery. The team then worked through an assessment of the mitigation already carried out based on experience of previous projects to determine the mitigation factor to be applied to the upper bound percentage. The resulting Optimism Bias rate is summarised in Table 27.

The workshop was undertaken in person on 29 November 2023 and updated on 1 February 2024

Table 27. Optimism Bias

	Option 0: Do Minimum	Option 1: Single New build	Option 2: Campus New build	Option 3: Maximum Refurbishment	Option 4: Phased Campus Build
Optimism Bias	52.30%	25.00%	24.90%	33.20%	33.70%

As the project progresses and detailed designs are developed, the level of optimism bias applied to the preferred solution will be reviewed and considered against the level of quantified risk that can be established. The expectation is that the more risks that can be quantified, the level of optimism bias will reduce. Future reviews of optimism bias will also take account of any inflationary increases beyond those already included.

It is recognised that the Optimism Bias allowance represents an uplift in cost allowances and is based on high-level information at this Site Options Appraisal stage. For this reason, an illustration of a further sensitivity factor of plus/minus 15% is shown in Table 26.

7.2.2 Profile of capital expenditure

The economic model presents the profile of capital expenditure across each of the options. This is based on a consistent approach across the options, and the key points to note are:

- Professional fees are applied from Year 0–5, which is 2024–2028.
- The construction spend will commence in Year 6, 2029.
- The construction spend differs across the options, ranging from 5 years for Option 1; 8 years for Option 2; 14 years for Option 3; and 11 years for Option 4.
- Inflation is calculated to the mid-point of the construction programme for each option. This is the industry standard approach to factoring in inflation.
- Equipment costs will be incurred at the completion of the construction period for new build options, but a phased approach to equipment purchase and installation will be necessary for the refurbishment options.
- VAT and Optimism Bias costs are spread across the construction programme for each option, as these will be a factor of the quantum of construction works.

A detailed cash flow which presents the anticipated spend for capital will be prepared for the Outline Business Case.

7.3 Revenue costs

Revenue costs were reviewed by NHS Greater Glasgow and Clyde at Initial Agreement stage. These were taken through all governance levels within NHSGGC up to full NHS Board.

Without an agreed final design and a fully modelled clinical workforce plan to accompany it, the same assumptions and figures which were approved by the GGC Board as part of the verification of the Initial Agreement in June 2022 are replicated here, as they represent the agreed Board position.

As the current options are broad without fully worked up design models, it is not possible at this stage to provide detailed revenue costings for each of the options as staffing and facilities costs will vary based on square meterage of individual departments, adjacencies between services and departments, and the number of sites across which the services will be provided.

As confirmed in the Initial Agreement (IA), an estimation of the revenue impact has been made and categorised into High, Medium, and Low levels. The specifics of these estimations are outlined in Table 29.

Table 28. Baseline annual revenue costs (at 2021/2022 prices)

Service	Annual Revenue Costs (£m)	WTE
Neurosciences and Spinal Management & Admin	2.1	8
Neurology	24.8	105
Neurosciences (medical and surgical)	10.5	131
Neurorehabilitation Unit (NRU)	2.8	54
Queen Elizabeth Spinal Injuries Unit (QENSIU)	6.3	118
Critical Care	3.6	64
Interventional Neuro-Radiology	2.4	5
Neurosurgery	8.9	132
Oral and Maxillofacial Surgery	6.0	88
Theatres	10.2	130
Stroke	2.3	47
Imaging	3.0	32
Total Clinical Services	82.8	914
Estates & Facilities	7.1	-
Total Revenue Costs	89.8	

Note: The baseline revenue costs for the existing services have been left at 2021/22 prices in Table 28 to allow direct comparison back to IA.

Table 29. Revenue impact

	Revenue Impact		
	Low	Medium	High
Pay	£5.3m	£8.5m	£11.9m
Non-Pay	£1.5m	£2.5m	£3.4m
Estates	£4.3m	£7.0m	£9.7m
TOTAL	£11.0m	£18.0m	£25.0m

In the context of the Generic Economic Model (GEM), the costs associated with revenue have been categorised into two main types: costs related to construction and costs related to operation. This categorisation allows for a more detailed and comprehensive understanding of where the revenue is being allocated.

Tables 30 and 31 provide a breakdown of these costs, indicating where the impacts on revenue, categorised as High, Medium, and Low, have been applied. This classification helps in understanding the varying degrees of impact on the revenue, thereby facilitating better financial planning within the model.

Table 30. Impact on revenue during construction

	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbishment	Option 4: Phased Campus
Pay	Med	-	-	High	High
Non-Pay	Low	Low	Low	Low	Low
Estates	Med	-	-	High	High

Table 31. Impact on revenue at project completion (e.g. ongoing steady state impact)

	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbishment	Option 4: Phased Campus
Pay	Low	Med	Med	Med	Med
Non-Pay	Low	Low	Low	Low	Low
Estates	-	High	High	High	High

The main drivers of the increased costs are the increased Estates and Facilities costs for managing a greater building footprint and the staffing impact of changed layout and reconfiguration. There are also potential additional non-pay costs linked with changes to layout, adjacencies and changed working practices which will be developed further at OBC stage.

7.3.1 Recurring revenue costs

The revenue costs which have been ascertained at this stage include:

The life cycle costs - the costs of maintaining the facilities from the completion of construction, through the anticipated life of the facility. These costs are derived from applying industry standard lifecycle rates from the Building Cost Information Service (BCIS) to the proposed area of each building. The lifecycle rates differ for refurbishment projects (£45/m²) and new buildings (£39.m²).

As the Do Minimum option consists of backlog maintenance activities which consist of ongoing lifecycle maintenance and repair, an additional lifecycle cost is not applied to this option.

The estimated running costs - the energy costs of running each of the proposed facilities. These are based upon energy projections of each option by AECOM. Further detail on these costs is available if required.

7.3.2 Clinical service costs

A baseline cost for the current service has been considered and at this stage, the current service costs would be applied consistently across each of the options, and so would not impact on the second of the options, and identification of the preferred option.

As assessment of the Clinical service costs will include:

- consideration of whole-time equivalents (WTE) for staffing levels.
- pay costs will be inclusive of employer on-costs and allowances for leave.
- non-pay costs will be included.
- VAT is included where appropriate.

Work is continuing on the development of specific workforce plans and staffing models to provide the preferred model of care taking into account the requirements of the Health and Care (Staffing) (Scotland) Act 2019. As the clinical service costs will be broadly similar across the options, and therefore would not influence the selection of the preferred option, these have not been added to the economic model.

7.3.3 Non-clinical service costs

As outlined above, for the clinical service costs, the non-clinical service costs will also be similar across the options, with some efficiencies in a single building though not significant.

Workforce planning and staffing models will consider the requirement for non-clinical service costs, and this will be reflected in the developed workforce model for the preferred option as part of the Outline Business Case. This will include an assessment of impact on catering, domestics, portering, etc.

7.3.4 Non-recurring revenue costs

Non-recurrent revenue costs for items such as decant costs is not included and this figure will similarly be reviewed in detail through the development of the Full Business Case stage.

7.3.5 Financial contributions

No capital contributions are expected from any external NHS Board.

NHSGGC holds Service Level Agreements [SLAs] with all external NHS Boards, in which the total costs of providing its hospital services are allocated against other NHS Boards using a weighted apportioning of costs.

This mechanism, known as the Cross-Boundary Flow [XBF] model, takes the full revenue costs of providing services on a three-year rolling basis and apportions costs by service and Board with a weighting for complexity. The data for this are provided and updated by ISD annually. Simplistically, the XBF methodology attempts to align resource utilisation with charging.

For example, NHS Ayrshire & Arran residents may account for 5% of the total number of patients admitted to General Surgery across all hospitals in NHSGGC, but NHS Ayrshire & Arran has its

own comprehensive General Surgery programme delivered within its base hospitals, so the patients referred on to NHSGGC are likely to be more complex and have longer lengths of stay than the 'average' GGC resident treated within the same specialty. The ISD complexity weighting seeks to identify the share of resources expended on treatment, rather than looking at base numbers of patients admitted. A 5% share of admitted patients therefore may result in a 7-8% share of inpatient costs to reflect this greater complexity.

This process is carried out for all specialties in all NHSGGC hospitals by NHS Board of residence. Changes in individual specialties are smoothed out over a period of three financial years, lessening the impact of changes in any one cost line.

While costs might increase in one area – additional Facilities & Estates costs for managing a greater footprint in an expanded new premises – there will also be offsetting reductions in other areas, for example if a Board refers fewer patients in a different specialty to NHSGGC because of an enhancement it has made locally in provision of services within its own base hospitals.

While it is undoubtedly true that the revenue costs of providing the services currently within the Institute of Neurological Sciences will rise under each of the identified options which NHS GGC wishes to explore further at OBC stage, it is impossible to state what specific difference this might make to the overall SLA contributions expected from individual Boards, given that there will be changes in every specialty in every NHSGGC hospital each year which may increase or decrease the value of any individual Board's SLA contribution.

7.4 OBC development costs

The tables below detail the costs involved in advancing the project through RIBA stages 2 and 3, as well as completing the Outline Business Case (OBC). In total, RIBA stage 2 would cost circa £6.7m over 2 years and RIBA stage 3 would cost circa £9.8m over 3 years. These figures include both design and staffing expenses. These cost estimates, provided by our Technical Advisory team, are preliminary and will undergo a comprehensive tendering process at the beginning of RIBA Stage 2.

Table 32. RIBA Stage 2 Development Costs

	2024/25	2025/26
Architecture		£1,398,000.00
MEP		£972,000.00
C&S		£518,400.00
Specialisms (as above)		£777,600.00
QS		£336,000.00
Technical Advisor	£308,425.54	£462,638.31
Research Visits	£24,000.00	£36,000.00
Risk @ 5%	£106,104.90	£159,157.35
Staffing Costs	£540,167.75	£1,048,181.50
Total Costs	£978,698.19	£5,707,977.16

Table 33. RIBA Stage 3 Development Costs

	2025/26	2026/27	2027/28
Architecture	£693,163.64	£1,848,436.36	
MEP	£353,454.55	£942,545.45	
C&S	£235,636.36	£628,363.64	
Specialisms (as above)	£353,454.55	£942,545.45	
QS	£127,243.64	£339,316.36	
Technical Advisor	£114,947.12	£459,788.48	£149,613.71
Risk @5%	£53,052.45	£212,209.80	£70,736.60
Staffing Costs	£359,534.00	£1,438,136.00	£479,378.67
Total Costs	£2,290,486.30	£6,811,341.55	£699,728.98

8.0 Preferred option

The process of considering the potential options to meet the requirements and scope set out in the Initial Agreement has been comprehensive.

The Board commissioned external support to ensure full, robust and transparent engagement with stakeholders. The development of benefits, weighting of assessment criteria and presentation of the options were all part of a fully inclusive process. Feedback from the events has been overwhelmingly positive.

Option 1 was the highest scoring option.

Construction timescales were examined for each option. Those options which required decant space to be created have extended timelines. New-build Options 1 and 2 have the shortest timescales since they require no decant, and enabling works are relatively minor. Option 2 can provide the shortest timeline, but this is dependent on all three parts being constructed simultaneously. Options 3 and 4 provide the new acute accommodation (areas of highest current risk) circa 4 and 5 years respectively after construction starts. Options 3 and 4 take around 10 years of construction before they can deliver new acute accommodation. This is a prolonged period to continue to require to mitigate the current service risk.

Options 1 and 2 have the lowest 60 year whole-life carbon requirement. Whilst options which retain the existing facilities provide a benefit in terms of embodied carbon, this is outweighed over the longer period by the energy efficiency of purpose-built facilities optimised to reduce energy use. The new build options do not require the provision of temporary decant space and this also reduces their carbon footprint. At the end of the projects a series of existing buildings will be vacant and available to allow comprehensive refurbishment. This could provide temporary decant accommodation for other projects within the site or a long-term home for another service.

In terms of project development risk, Options 1 and 2 have the lowest levels of risk. Options that require extensive upgrading of existing facilities, especially whilst partially occupied by acute clinical services carry higher levels of risk.

In cost terms, Option 0 has the lowest estimated cost. The option consists of upgrading the existing estate and will result in accommodation that still does not meet current (2024) SHTM space standards. It is not possible at this stage to determine if the level of derogations from Building Standards would be deliverable, nor the required support obtained from NHSS Assure to derogate from space and building services standards in light of the level of investment and complexity of the services being delivered from the facility.

The lowest cost option which can both deliver the investment objectives and satisfy the compliance standards is Option 1.

When assessing the NPV costs against the qualitative assessment of the options, Option 1 has the lowest cost per benefit point. This has been further examined using sensitivity analysis and the outcome remains the same. Option 1 has best value for money score demonstrated by the lowest Cost per NFA (benefit) score.

Table 34. Summary of economic appraisal

Option	Stakeholder Rank	Whole Life Carbon Rank	Development Cost	Construction Timescale (years)
1. Single New Build	1	1	£1,034m	5
2. Campus New Build	2	1	£1,044m	4-7*
3. Maximum Refurbishment	4	2	£1,437m	13
4. Phased Campus Build	3	2	£1,665m	11
0. Do Minimum	5	3	£469m	15

* Option 2 has a potential for up to 7-year programme if buildings are developed sequentially in three phases

Table 35. Summary of appraisal outcomes

Metric	Highest ranked option
Stakeholder preferred option	Option 1
Lowest cost to deliver the investment objectives	Option 1
Lowest cost per benefit point	Option 1
Shortest construction timescale	Options 1 & 2
60-year whole-life carbon requirement	Options 1 & 2
Lowest project development risk	Options 1 & 2

Taking account of the above NHSGGC confirms its preferred option to be Option 1, a full single new-build on the QEUH site.

9.0 Deliverability constraints

The approval of the Initial Agreement and the invitation to identify a preferred option was confirmed to NHS Greater Glasgow and Clyde by the Scottish Government on 29 March 2023.

The information outlined in the previous sections of this document sets out the process, the development work undertaken and the conclusion from conducting that sequential approach to identifying a preferred option to deliver all of the objectives set out in the Initial Agreement.

During 2023/24, the national landscape for capital funded projects has changed considerably and the Scottish Government's ability to fund large-scale projects has significantly reduced.

On 19 December 2023, Richard McCallum, Director of Health and Social Finance, Digital and Governance, issued a letter to NHS Boards outlining the financial challenges for the government and advising Boards to prepare for a reduction in capital availability in the coming years. The letter advised that development of large-scale projects which had not been contractually committed, with a few stated exceptions, would be halted.

The prospect of the continuing risk to critical areas of the INS services being prolonged for a further period led to a review of the proposals in the Initial Agreement and an analysis to identify the areas of highest clinical risk mapped across to the areas of highest infrastructure risk.

This process identified the areas of key acute clinical activity (theatres, imaging, critical care and acute inpatient wards) as the places where failure of the building services or fabric would have the greatest impact on patient safety and clinical outcomes for the people of Scotland. Particular consideration was given to the ability to maintain once-for-Scotland services with no available decant.

The services are currently spread over seven buildings and whilst the preferred option would see all of these services co-located together, it is recognised that some of these buildings are in better condition than others. The areas of highest risk within the infrastructure and building services are the surgical tower and its podium.

In an environment where the immediate availability of capital to deliver the preferred option in a single phase appears to be some time off, at the request of Scottish government, work was undertaken to develop a targeted investment model which would allow the greatest areas of risk for clinical activity and infrastructure to be addressed as an initial priority at lower cost, whilst lower areas of risk could be addressed at a later phase as the funding environment improves.

This approach of targeted investment, whilst addressing the high-risk areas, has inherent compromises – splitting the full complement of INS services and distancing the most acute services from services which occupy this lower bracket of risk categorisation. Targeted investment should therefore be considered an interim solution until the full redevelopment scope, per the preferred Option 1, can be realised.

9.1 Targeted Investment Model

Based upon the above process, a Schedule of Accommodation was developed to confirm the highest acuity services which would require to be located together to allow a targeted investment approach to be viable from a clinical adjacency and operational management perspective.

A detailed review of the schedules of accommodation developed for each clinical and non-clinical service was undertaken and the resulting split of services was shared with the design team.

Table 36. Highest acuity services included in modelling

Highest acuity services	Services remaining at existing INS
Critical Care including Edenhall	Neurorehabilitation (NRU)
Neurosurgery	Spinal Injuries
OMFS (Oral & Maxillofacial Surgery)	Neurology Short Stay Day Unit
Interventional Neuroradiology	OMFS Lab
Acute Stroke	Clinical Research Facility (CRF) inc. research imaging
Acute Neurology & VT (Video Telemetry)	Community/Retail/Third sector
Same Day Admissions Unit	Office accommodation
Neurophysiology	Teaching & Education Space
Level 1 Hyperacute rehabilitation	
Diagnostic Neuroradiology	
Family Accommodation	
Services which will be provided in both locations	
Outpatients	
Inpatient Therapy Space	
Pharmacy	

This model requires circa 39,705m² of total area against the requirements of 64,675m² of the preferred option. The preferred option for the full redevelopment project is Option 1 but this review included an assessment of all 5 options to identify which could accommodate a targeted investment approach without significantly impacting on the delivery of the investment objectives. Split-site working would not, however, deliver the optimal configuration of services and would result in a number of compromises:

- Increased transfer time to access acute services for patients not in the new facility
- Potential workforce impact due to decreased efficiency of working across different facilities
- Separation of multi-disciplinary teams
- Continuing revenue costs for retained estate

There would also be a requirement for some reconfiguration of remaining INS facilities to avoid clinical care being provided from isolated locations which may incur additional cost.

9.1.1 Option 0: Do Minimum – Targeted Investment

This option entails a phased renovation of the INS Estate's buildings and requires investment in decant accommodation adjacent to the Institute's clinical facilities. The main issue in renovating the Surgical Building is the in-built restriction on installing new ventilation and service openings.

The only identified option for mitigating major infrastructure and service risks is building an additional external lift core and converting the existing one for service ducts. This would involve progressive refurbishment and considerable service disruption with multiple decants and relocations over nine years, impacting on clinical capacity, efficiency and adjacencies. Ultimately, while it reduces infrastructure failure risk, it does not meet investment objectives, current compliance standards or deliver any service improvements, leaving significant concerns about its viability.

Option 0 is therefore not suitable for a phased/targeted investment approach.

9.1.2 Option 1: Single New Build – Targeted Investment

This option was developed as a single new building bringing all of the services together. It is the preferred option for the full redevelopment. Under a targeted investment model, this option could be developed in a way that the first phase would be able to accommodate subsequent extension of the facility to meet the full identified development area. The resultant block would be 7-8 storeys high, and still include the linkages to the QEUH bridge and the adjacent multi-storey car park. Internally some accommodation may require to be stacked that would ideally flow on a single floor level, but otherwise all accommodation would be fully compliant and clinical adjacencies will be optimised.

This option does not require investment in any decant accommodation and can therefore be delivered relatively quickly with a construction timeline under 5 years.

The estimated cost to deliver this option is **£602m**. This includes an allowance of £14 million to carry out an element of upgrade to vacated facilities where relocations of INS services is required.

This option could also potentially offer the opportunity to use some of the vacated estate for other (less acute) services or as decant space for future projects as part of the whole system infrastructure plan. The vacated areas of the Surgical Building would, however, require investment for comprehensive refurbishment to allow occupation by other services. Since the specific requirements of those other services are outwith the scope of this project these costs are not included.

Looking ahead, careful consideration would need to be given to future extensions of new facilities, due to the risks and potential disruption from deep piling solution adjacent to a live operating acute clinical facility.

Option 1A (Phased and Targeted Investment Option, Highest Acuity Services Only)

Proposal Overview

- Single Phase new-build over 6-8 storeys
- Located on vacant site
- No decant requirement
- Close to transport hub and multi storey car park
- Option to connect to AMB if refurbished as part of overall accommodation
- 215m from new building to existing QEUH bridge link
- Construction period circa 4 years

KEY:

■ New Build,
Acute Services

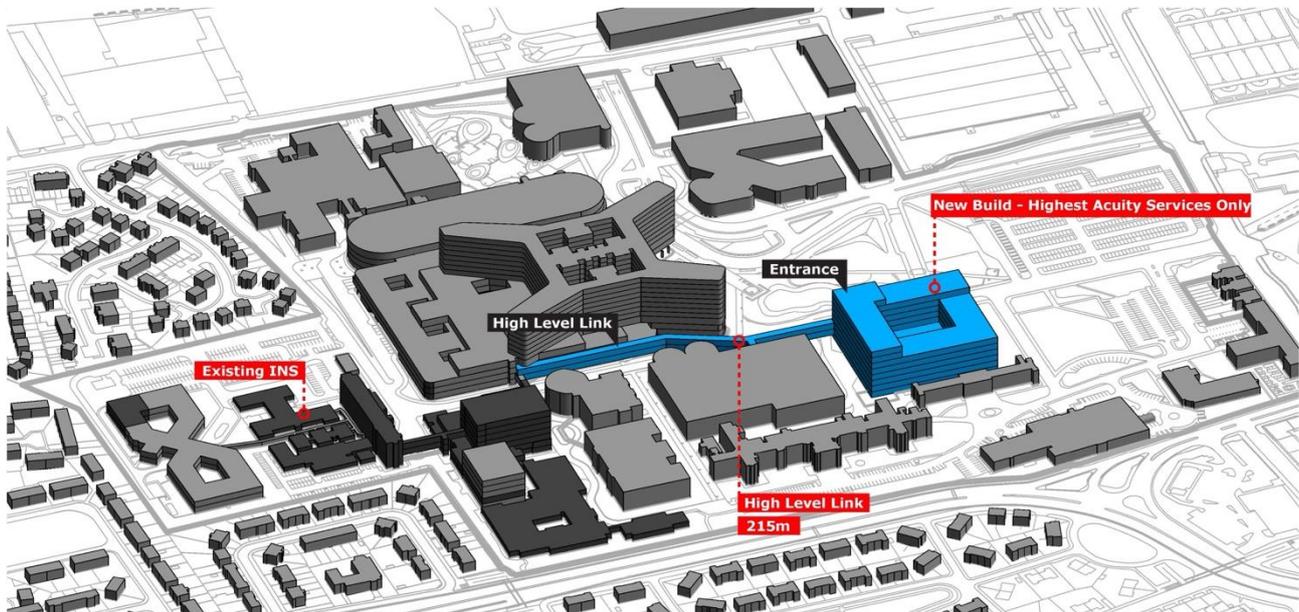


Figure 15. Single New Build – Targeted Investment

9.1.3 Option 2: New Build Campus – Targeted Investment

This option was developed as a group of three new buildings and therefore lends itself quite well to a phased delivery. Under a targeted investment model this option would be developed to deliver the envisaged highest acuity services block first on the vacant meadow site of the campus. The resultant block would be six storeys high, and still include the linkages to QEUH bridge and the adjacent multi-storey car park. This option has a larger footprint than the equivalent in Option 1 and internally all accommodation would be fully compliant and clinical adjacencies will be optimised.

This option does not require investment in any decant accommodation and can therefore be delivered relatively quickly with a construction timeline under 5 years.

The estimated cost to deliver this option is **£602m**. As with Option 1 this includes an allowance of £14 million to carry out an element of upgrade to vacated facilities where relocations of INS services is required.

This option could also potentially offer the opportunity to use some of the vacated estate for other (less acute) services or as decant space for future projects as part of the whole system infrastructure plan. The vacated areas of the Surgical Building would, however, require investment for comprehensive refurbishment to allow occupation by other services. Since the specific requirements of those other services are outwith the scope of this project these costs are not included.

Looking ahead, this option is able to develop subsequent phases with minimal impact on live services within the completed first phase, since it comprises three buildings.

Option 2B (Phased and Targeted Investment Option, Meadows Site, Highest Acuity Services Only)

Proposal Overview

- Single Phase new-build over 6 storeys
- Located on vacant site
- No decant requirement
- Close to transport hub and multi storey car park
- Option to connect to AMB if refurbished as part of overall accommodation
- 215m from new building to existing QEUH bridge link
- Construction period circa 4 years

KEY:

 New Build,
Acute Services

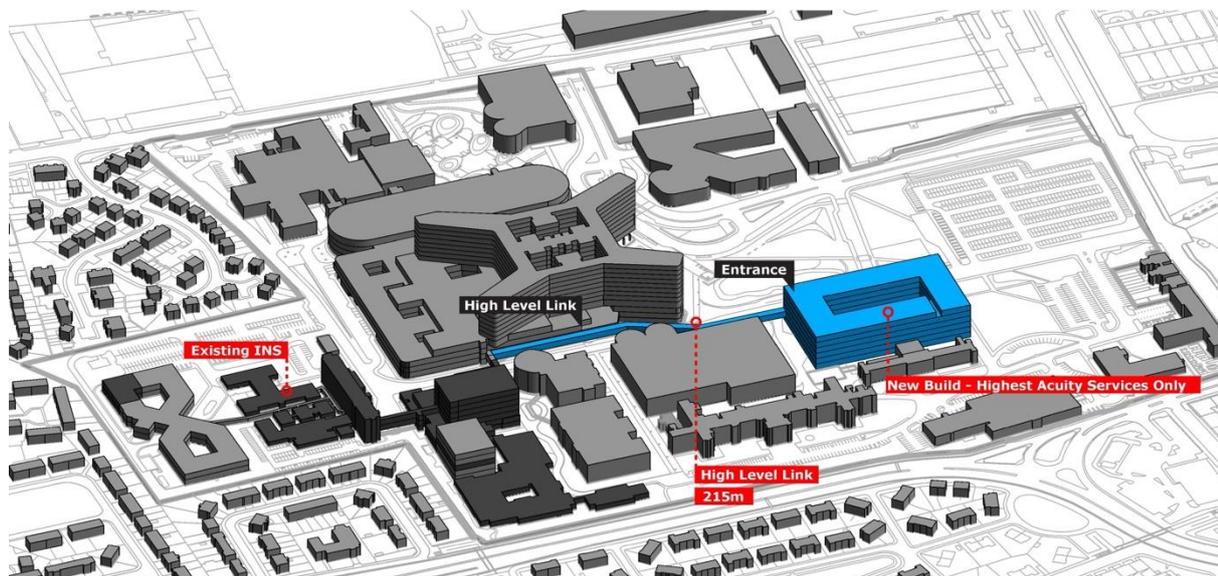


Figure 16. New Build Campus – Targeted Investment

9.1.4 Option 3: Maximum Refurbishment – Targeted Investment

This option was developed to maximise the retention of the existing facilities. It requires a series of demolitions and multiple decants into sizeable newly-created facilities to facilitate its long construction phase. It also has a significant element of new build to house the highest acuity services and bring them up to minimum current SHTM and HEI standards. The constant and repeated disruption of clinical services during the construction phase was one of the main reasons that clinical and patient representatives scored this option poorly at options appraisal. It would undoubtedly affect the service's ability to work at capacity during the construction phase.

To address the highest areas of risk identified for targeted investment would take 9 years of construction activity to achieve. It would still involve moving VIE infrastructure, creation of decant accommodation, demolition of existing building and the re-provision of permanent accommodation for decanted services.

Option 3 is therefore not suitable as a phased/targeted investment approach.

9.1.5 Option 4: Phased Campus Approach – Targeted Investment

Similar to Option 3, this option was developed to maximise the retention of the existing facilities. Again, it requires the development of new-build decant facilities, as well as multiple decants and a series of demolitions. It would disrupt the clinical services over a long time frame, with multiple decants and relocations.

Because it would be using most of the same buildings and requiring all of the same level of decants and new built/demolitions, this would also take 9 years to achieve and has the same constraints and limitations as Option 3. It would also require the decant facility to be retained.

Option 4 is therefore not suitable as a phased/targeted investment approach.

9.2 Targeted Investment conclusions

As outlined in [Section 8](#), NHSGGC has identified **Option 1: Single New Build** as its Preferred Option.

Recognising the financial constraints on capital funding nationally, a further review was undertaken of all options to develop a potential targeted investment approach. This process identified the areas of highest infrastructure risk and areas of key acute clinical activity (including theatres, imaging, critical care and acute inpatient wards) as the places where failure of the building services or fabric would have the greatest impact on patient safety and clinical outcomes.

Testing this approach across the shortlisted options resulted in three options being discounted:

- **Option 0: Do Minimum**
This will take 9 years of construction/disruption to services. It would require significant investment to achieve a solution which would remain substantially non-compliant in terms of areas, layouts and technical standards. It does not deliver the Investment Objectives or deliver service improvements.
- **Option 3: Maximum Refurbishment**
This does not provide an efficient route to dealing with the high risk areas in its early phases. It requires movement of VIE Infrastructure, decant of services and provision of temporary accommodation before starting to construct replacement for high acuity services.
- **Option 4: Phased Campus Approach**
Very similar to Option 3 and does not provide an efficient route to dealing with the high risk areas in its early phases. It too requires movement of VIE Infrastructure, decant of services and provision of temporary accommodation before starting to construct replacement for high acuity services.

Two options are considered suitable for a targeted investment approach:

- **Option 1: Single New Build** can be designed to allow sequential/phased development of a single facility. This first section would take c.5 **years** of construction and does not require any decant or disruption to services. The building would be 7-8 storeys high to allow sufficient development space to complete subsequent phases. The estimated cost is **£602m** and would address the areas of highest risk by providing fully compliant, energy efficient accommodation.
- **Option 2: New Build Campus** can be designed to allow sequential/phased development of a facility spread over 3 linked buildings. This first phase would take c.5 **years** of construction and does not require any decant or disruption to services. The building would be 6 storeys high since it has a larger footprint than Option 1 and uses more vacant land to complete subsequent phases. The estimated cost is **£602m** and

would address the areas of highest risk by providing fully compliant, energy efficient accommodation.

Capital costs for Options 1 and 2 are based on the provision of 100% single rooms and may reduce if the [derogation described in 4.3.3](#) to allow a mix of multi-bedded bays and single rooms is approved to supply appropriate accommodation which meets the clinical and psychosocial needs of INS patients. A similar derogation was approved for the new Department of Clinical Neurosciences in NHS Lothian.

Both Option 1 and Option 2 scored highly in the overall Option Appraisal, but differ slightly in their ability to be delivered under a targeted investment approach:

- Option 1 will ultimately allow a single new build option but the first phase has a restricted footprint resulting in an 8 storey facility
- Option 2 has a larger footprint and can provide the accommodation over 6 floors. However, it will ultimately be part of a longer term approach that splits the services across 3 linked facilities

A more detailed examination of the achievable clinical adjacencies would be required for Options 1 and 2 to determine which is the preferred solution; however, it is clear that within each there is an opportunity to improve facilities for patients, carers, and staff which will provide safe and resilient facilities to maintain acute services and continue to deliver improvements for the residents of Scotland.

An updated QALY analysis is also presented at section 9.3 to show the potential return on investment.

No revenue forecasting has been undertaken for this modelling and, as either of these options would involve some split-site working for services, as noted above this could impact on revenue costs e.g. for facilities services to support transfer of patients between services. Further detailed modelling would be required to confirm final additional revenue costs which would be submitted to the NHSGGC Board.

9.2.1 OBC Targeted Investment development costs

The tables below detail the costs involved in advancing the project through RIBA stages 2 and 3, as well as completing the Outline Business Case (OBC). In total RIBA stage 2 would cost circa £6.7m over 2 years and RIBA stage 3 would cost circa £8.1m over 3 years. These figures include both design and staffing expenses. These cost estimates, provided by our Technical Advisory team, are preliminary and will undergo a comprehensive tendering process at the beginning of RIBA Stage 2.

Table 37. RIBA Stage 2 Targeted Investment development costs

	2024/25	2025/26
Architecture		£1,398,000.00
MEP		£972,000.00
C&S		£518,400.00
Specialisms (as above)		£777,600.00
QS		£336,000.00
Technical Advisor	£308,425.54	£462,638.31
Research Visits	£24,000.00	£36,000.00
Risk @ 5%	£91,709.14	£137,563.71
Staffing Costs	£540,167.75	£1,048,181.50
Total Costs	£964,302.43	£5,686,383.52

Table 38. RIBA Stage 3 Targeted Investment development costs

	2025/26	2026/27	2027/28
Architecture	£604,800.00	£1,612,800.00	
MEP	£235,636.36	£628,363.64	
C&S	£157,090.91	£418,909.09	
Specialisms (as above)	£235,636.36	£628,363.64	
QS	£84,829.09	£226,210.91	
Technical Advisor	£114,947.12	£459,788.48	£149,613.71
Risk @5%	£45,854.57	£183,418.28	£61,139.43
Staffing Costs	£359,534.00	£1,438,136.00	£479,378.67
Total Costs	£1,838,328.42	£5,595,990.02	£690,131.80

9.3 Scottish Government's Health Impact (QALY) Assessment Tool for targeted investment model

The return on investment tool [introduced in Section 3](#) has been updated for the targeted investment scenario.

The value of interventions carried out in the highest acuity services over one year is £4.69 billion, and the capital cost of Options 1A and 1B is estimated at £602m, therefore the updated **return on investment factor is 7.8**.

9.3.1 Updated results of QALY tool for targeted investment

No. People affected for 12 months	71,900	
QALY Value (12 months)	70,000	
Scenario 1 (treatment needed):	4,602,158,820	2,492,836,028
Scenario 2 (treatment received):	1,109,423,280	600,937,610
Scenario 3 (treatment not received):	5,797,960,910	3,140,562,160
Benefit of Intervention	4,688,537,630	2,539,624,550
Capital Cost of Intervention:	602,000,000	602,000,000
Return on Investment:	7.8	4.2

4: QALY Value - what people are prepared to pay

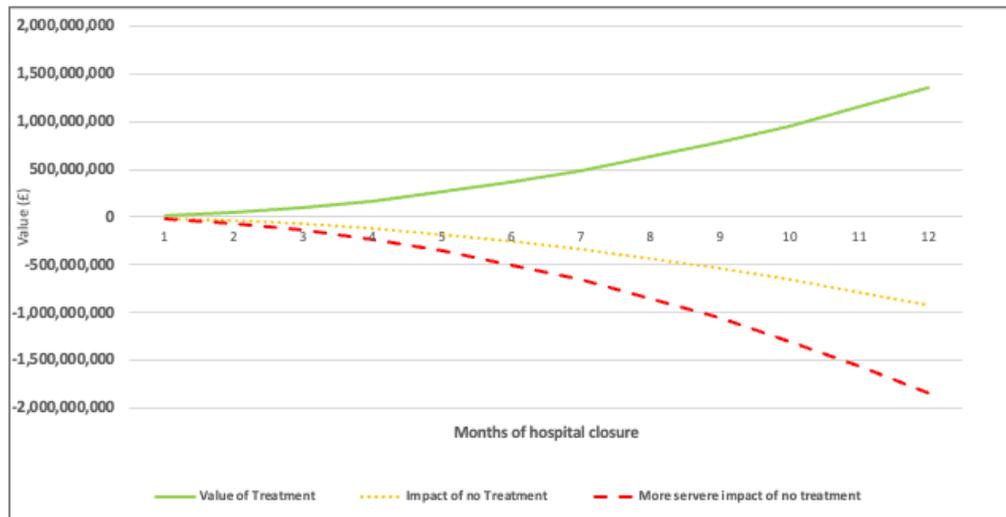
5: Calculation:

Utility Score x number of people x QALY value

6: Benefit: Lost opportunity + Health Impact

7: ROI: 7.8 for 71.9k people affected for 12 months of their life

or: ROI: 4.2 for 71.9k people affected for part of 12 month closure



If the Surgical Building were to fall over, as has been modelled in all scenarios to inform targeted investment, the loss of all neurodiagnostics, theatres, interventional radiology and neuro-critical care would affect all services in all remaining buildings and areas with the exception of downstream rehabilitation inpatients – estimated at 1,000 patients per annum.

Both surgical and medical patients rely on neuro MRI, CT and plain film services for brain, head, neck and spine which only exist in INS for almost all OP, DC and IP services. Without neuro ITU on site, other services could no longer be supported (spinal injuries could only offer non-acute care).

10.0 Conclusion

The Board confirms **Option 1: Single New Build** as its Preferred Option for the full redevelopment of the Institute of Neurological Sciences, as outlined in the Initial Agreement.

The Board has now concluded a Pre-OBC Economic Case including an options appraisal to identify a preferred option. Stakeholders have been engaged throughout the process as detailed in this document.

Recognising the current challenges around capital funding for large-scale projects, a further review has been undertaken to explore ways to address the highest areas of risk as a targeted investment first phase at a reduced cost. This approach would result in a number of compromises due to the requirement for split-site working. The targeted investment is deliverable via Option 1 or Option 2.

We now request Scottish Government to note the contents of this Pre-OBC Economic Case and confirm agreement to continue work to conclude the remainder of the OBC.

11.0 Appendices

Appendix 1. Glossary of Terms and Abbreviations

Abbreviation	Description
A&A	NHS Ayrshire and Arran
A&B	Argyll and Bute Health & Social Care Partnership
A&DS	Architecture & Design Scotland
ACRT	Active Clinical Referral Triage
AEDET	Achieving Excellence Design Evaluation Toolkit
AGP	Aerosol Generating Procedure
ASL	Austin Smith Lord Architects
BCIS	Building Cost Information Service
BMI	Body Mass Index
BMS	Building Management System
BREEAM	Building Research Established Environmental Assessment Method
CAR-T	Chimeric Antigen Receptor T-cell
CCU	Critical Care Unit
CMB	Central Medical Block
CT	Computerised Tomography
D&G	NHS Dumfries and Galloway
DBS	Deep Brain Stimulation Service
EAMS	Estate Asset Management System
ENT	Ear, Nose & Throat
EQIA	Equality Impact Assessment
FBC	Full Business Case
FV	NHS Forth Valley
GBS	Guillain-Barre Syndrome
GEM	Generic Economic Model
GGC	NHS Greater Glasgow and Clyde
GHG	Green House Gases
GJNH	Golden Jubilee National Hospital
GRI	Glasgow Royal Infirmary
HAI	Healthcare Associated Infection
HDU	High Dependency Unit, also known as Level 2 Critical Care
HEI	Healthcare Environment Inspectorate
HFS	Health Facilities Scotland
HIS	Healthcare Improvement Scotland
ICE	Imaging Centre of Excellence
INR	Interventional Neuroradiology

Abbreviation	Description
INS	Institute of Neurological Sciences
ITU	Intensive Therapy Unit, also known as Level 3 Critical Care
KPI	Key Performance Indicator
Lan	NHS Lanarkshire
M&E	Mechanical & Electrical
MDT	Multidisciplinary Team
MEP	Mechanical, engineering and Plumbing
MFT	Moving Forward Together
MG	Myasthenia Gravis
MHRA	Medicines and Healthcare Products Regulatory Agency
MS	Multiple Sclerosis
MSCP	Multi Storey Car Park
MTC	Major Trauma Centre
NDAP	NHS Scotland Design Assessment Process
NHSGGC	NHS Greater Glasgow and Clyde
NFA	Non-Financial Appraisal
NPV	Net Present Value
NRU	Neurorehabilitation Unit
OBC	Outline Business Case
OMFS	Oral and Maxillofacial Surgery
OOH	Out of Hours
OPD	Outpatient Department
PAMS	Property & Asset Management System
PEP	Project Execution Plan
PET	Positron Emission Tomography
PIA	Programme Initial Agreement
PFI	Private Finance Initiative
PSCP	Principal Supply Chain Partner
QEUH	Queen Elizabeth University Hospital
RAAC	Reinforced Autoclaved Aerated Concrete
RIBA	Royal Institute of British Architects
RHC	Royal Hospital for Children
QENSIU	Queen Elizabeth National Spinal Injuries Unit
SAS	Scottish Ambulance Service
SAMS	Strategic Asset Management Systems
SCIM	Scottish Capital Investment Manual
SDAC	Sustainable Design and Construction
SDAU	Same Day Admissions Unit
SEPA	Scottish Environment Protection Agency

Abbreviation	Description
SGHDCIG	Scottish Health Directorate Capital Investment Group
SHFN	Scottish Health Facilities Note
SHTM	Scottish Health Technical Memorandum
SIMD	Scottish Index of Multiple Deprivation
SLA	Service Level Agreement
SMART	Specific, Measurable, Achievable, Realistic, Timely
SNBTS	Scottish National Blood Transfusion Service
SOA	Schedule of Accommodation
SUDS	Sustainable Drainage Systems
VIE	Vacuum Insulated Evaporator
WHR	Waste Heat Recovery
WI	NHS Western Isles
WTE	Whole Time Equivalent(s)
XBF	Cross-boundary flow

Appendix 2. List of Advisors

Independent Client Advisors	
Project role:	Organisation & Named lead:
Options Appraisal Architect	Austin-Smith:Lord Architects Graham Ross Adam Sutherland Colin Miller David Carr Catherine Cosgrove
Options Appraisal Engineer	AECOM Craig Booth (MEP) Chris Taylor (MEP) David Burton (MEP) John McCluskey (Structures) Calum Nicolson (Civils) Nathan Shelley (Sustainability)
Options Appraisal Cost Consultant	Thomson Grey Ross Lovatt Laurence Casserly
Technical Advisor:	AECOM Richard Mann (Project Sponsor) Graham Watson (Project Lead) Karolina Wasek (Project Manager) Jack Chalkley (Project Manager) Robert Rankin (Cost Manager) Gavin Cook (MEP Engineering) Oberlanders Architects Mark Coffey (Director) Mark Pettie (Lead Reviewer)
Building Surveyor	Thomson Gray John Cartwright Narro Associates Ewan McKay Sinead McKenna
Healthcare Planner	KD Health Craig Dixon Scott McCallum
Stakeholder Engagement Facilitator	Ryder Architecture Soo Darcy

Appendix 3. High Level EQIA Assessment

Protected Characteristic	Option 1 - Preferred Option	Option 2	Option 3	Option 4	Option 0
Could the service design or policy content have a disproportionate impact on people due to one or more of the following protected characteristics?	Single new build QEUH Site	New build Campus QEUH site Three new buildings	Maximum Refurbishment New build on QEUH site and refurbishment of retained surgical and spinal buildings	Phased Campus Approach Multi-phased new build, refurbishment and redevelopment	Do Minimum Necessary repairs and upgrades to existing services and buildings to ensure that they are maintained to safe standards
Age?	No anticipated increased risk of disadvantaging people due this protected characteristic or being part of this group.	No anticipated increased risk of disadvantaging people due this protected characteristic or being part of this group.	No anticipated increased risk of disadvantaging people due this protected characteristic or being part of this group.	No anticipated increased risk of disadvantaging people due this protected characteristic or being part of this group.	No anticipated increased risk of disadvantaging people due this protected characteristic or being part of this group.
Disability?	Anticipated improvement with easier access to transport hub, parking and improved wayfinding for accessing multiple services. No impact to travel accessibility to site as site remains the same (QEUH)	Anticipated improvement with easier access to transport hub, parking and improved wayfinding for accessing multiple services. No impact to travel accessibility to site as site remains the same (QEUH)			
Gender identity?	No anticipated increased risk of disadvantaging people due this protected characteristic or being part of this group.	No anticipated increased risk of disadvantaging people due this protected characteristic or being part of this group.	As above	As above	As Above
Marriage and Civil Partnership?	As above	As above	As above	As above	As Above

Protected Characteristic	Option 1 - Preferred Option	Option 2	Option 3	Option 4	Option 0
Could the service design or policy content have a disproportionate impact on people due to one or more of the following protected characteristics?	Single new build QEUH Site	New build Campus QEUH site Three new buildings	Maximum Refurbishment New build on QEUH site and refurbishment of retained surgical and spinal buildings	Phased Campus Approach Multi-phased new build, refurbishment and redevelopment	Do Minimum Necessary repairs and upgrades to existing services and buildings to ensure that they are maintained to safe standards
Pregnancy and Maternity?	As above				
Race?	As above				
Religion and Belief?	As above				
Sex?	As above				
Sexual Orientation?	As above				
Have you considered the specific impact on other groups including homeless people, prisoners and ex-offenders, ex-service personnel, people with addictions, people involved in prostitution, asylum seekers & refugees and travellers?	As above				
Does the service change or policy development include an element of cost savings? How have you managed this in a way that will not disproportionately impact on protected characteristic groups?	The preferred option does not present a cost saving. This is driven by investing and improving services provided at INS.	The potential option does not present a cost saving. This is driven by investing and improving services provided at INS.	The potential option does not present a cost saving. This is driven by investing and improving services provided at INS.	The potential option does not present a cost saving. This is driven by investing and improving services provided at INS.	The potential option does not present a cost saving or invest in on improving services provided at INS.

Appendix 4. Briefing and Evaluation Framework Visioning Report (attachment)



Appendix 5. Stakeholders List

This is a full list of stakeholders who have been involved in one or more of the statutory workshops held to support the Pre-OBC Early Economic Business case.

Patient, Carer and Third Sector Representatives
Patient Representative, Chair of Neurology Voices, Neurology/Neurorehabilitation/Diagnostics User
Patient Representative, Neurology/Neurosurgery/INR/Diagnostics User
Patient Representative, Neurology Voices Member, Neurology/Neurosurgery
Patient Representative, Neurosurgery/Neurology/Diagnostics/Neurorehabilitation User
Patient Representative, Neurology/Neurosurgery/Neurorehabilitation User
Patient Representative, Neurology/Neurosurgery User
Carer Representative and Neurology User
Patient Representative, Neurology User
Funding Neuro, Third Sector Representative
MS Revive, Third Sector Representative
MSA Trust, Third Sector Representative
Neurological Alliance of Scotland, Third Sector Representative

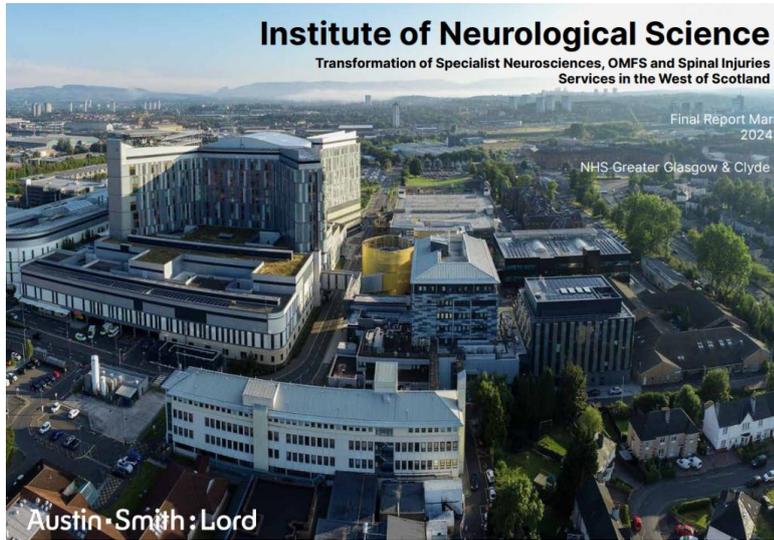
Clinical/Non Clinical Service and Regional and National Partner Representatives:
General Manager, Neurosciences, OMFS, NRU, QENSIU
Clinical Services Manager, Surgical Services, INS
Clinical Services Manager, Medical Specialties, INS
Clinical Service Manager, Older People & Stroke
Interim Associate Chief Nurse, Regional Services
Senior Charge Nurse, INS
Lead Nurse, Surgical Specialties, INS
Lead Nurse, Medical Specialties, INS
Senior Charge Nurse, Neurosurgery
Senior Charge Nurse, Neurosciences and OMFS Theatres
Clinical Director, Medical Specialties, INS/Consultant Neurologist
Clinical Director, Surgical Specialities, INS/Consultant Neuroanaesthetist
Clinical Director, Stroke, South Sector

Clinical/Non Clinical Service and Regional and National Partner Representatives:
Lead Clinician, Neurorehabilitation Medicine
Lead Clinician, Neurophysiology
Lead Clinician, Spinal Injuries
Lead Clinician, Neurology
Lead Clinician, Oral and Maxillofacial Surgery (OMFS)
Lead Clinician, Neuroanaesthesia
Consultant Neurophysiologist, Neurophysiology
Consultant Neurosurgeons, Neurosurgery
Consultants, Interventional Neuroradiology
Consultant, Spinal injuries, QENSIU
Consultant Neuroanaesthetist
Consultant, OMFS
Consultant Neuroradiologist, Imaging
Consultant Prosthetist, OMFS Lab
Clinical Neurophysiology Manager
Chief Allied Health Professional, Regional Services
Associate Chief Allied Health Professional, Stroke
Allied Health Professional Team Lead, Neurosciences and OMFS
Allied Health Professional Team Lead, Neurorehabilitation
Clinical Specialist, Speech and Language Therapy
Speech and Language Therapist
Team Lead, Physiotherapy QENSIU
Specialist Occupational Therapists, QENSIU
Clinical Service Manager, Imaging
Sector Superintendent Radiographer, Diagnostics, South Sector
Site Superintendent, Imaging
Service Support Manager, Imaging
Lead Pharmacist, Pharmacy
Neurosciences Clinical Pharmacist, Pharmacy
Senior Research & Innovation Manager, Research and Innovation
Manager, Clinical Research Facility
Lead Nurse, Glasgow Clinical Research Facility
Lead Pharmacist, Clinical Trials/R&D, R&D Pharmacy

Clinical/Non Clinical Service and Regional and National Partner Representatives:
Lead Research Radiographer, Research Imaging
Sector Manager, Medical Physics, Diagnostics
Section Manager, Medical Physics
Technical Manager, Medical Physics
Business Manager, Administration, INS
Deputy Health Records Manager, South Sector
Service Improvement Manager, Thrombectomy
Assistant Director, Operational Estates
Head of Corporate Estates, Compliance
Assistant Head of Estates, South Sector
Site Manager, Estates
Estates Manager, Facilities
Head of Facilities Management, South Sector
Professional Lead, Domestic Facilities (to Dec 23)
Asst Head of Facilities, South Sector (Jan 24)
Head of Operations, E-Health
Fire Safety Officer, Facilities
Sustainability Manager, Property Procurement & Facilities
Head of Property and Asset Management, Capital Planning
Health & Safety Service Manager
Deputy Manager, Health and Safety
Clinical Priorities Team representatives, National Partners
Planning Manager, West of Scotland, Regional Partner
Consultant Occupational Therapist, Regional Partner
Manager, Patient Engagement and Public Involvement Team
Senior Communications Officer, NHSGGC Communications Team
Staff side Representative, Clinical Specialist, Speech and Language Therapist

Appendix 6. Technical Reports (attachment)

ASL Final Options Report (attachment pages 1-70)



AECOM Final Options Report (attachment - pages 71-250)





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E: alan.morrison@gov.scot

Arwel Williams
Senior Responsible Officer
NHS Greater Glasgow and Clyde
J B Russell House
Gartnavel Royal Hospital Campus
Glasgow
G12 0XH

23 April 2024

Dear Arwel

Recovery and Renewal Transformation of Specialist Neurosciences, OMFS and Spinal Injuries Services in the West of Scotland – Pre-OBC Economic case

Since you submitted the Initial Agreement for the above project, the Scottish Government has been managing a challenging capital funding position. On 19 December 2023, the Director of Health and Social Care Finance, Digital and Governance wrote to NHS Chief Executives informing them that:

‘Given the challenging settlement we are managing, we will not be funding development costs for any new projects, as we do not anticipate starting construction of any new project over the next two years at least.’

While this clearly creates some uncertainty on the long term viability of this project, given the amount of work your team has invested in identifying a preferred site option, backed by both an economic evaluation and a robust appraisal of the clinical, patient and stakeholder benefits, then I think there remains value in you completing the Pre-OBC Economic case and submitting it to the NHS Capital Investment Group (CIG) for review. For that meeting, I would propose to extend the invitation to all members of the Scottish Government’s Health and Social Care Management Board, so that there is an awareness at senior levels of Scottish Government of the importance of this project.

I would therefore like to formally confirm, that the Scottish Government remain supportive of you completing this piece of work and would welcome a submission to the CIG to consider your proposal. Following that review, we can agree next steps based on comments from the CIG and a consideration of the capital funding position that we expect over the next three years.

I trust that you find this helpful.

Yours sincerely

Alan Morrison
Chair, NHS Capital Investment Group



1.0 Executive Summary

1.1 What is the INS?

The Institute of Neurological Sciences [INS] is the UK’s largest brain, head, neck, and spine treatment centre. It treats patients from across Scotland and beyond.

The INS has 60% of Scotland’s specialist beds, including Scotland’s only spinal injuries unit. All services hosted at the INS are regional, supraregional or national and are delivered to populations of between 2.5m and 5.5m people.

The INS is not just one single building. Its acute services – the admitted and ambulatory services in scope for this business case – are spread across seven buildings on the QEUH campus. These facilities include over 250 Acute beds, 7 theatres, a state-of-the-art interventional neuroradiology suite, facilities for people with both acute and long-term neurological conditions, an Oral Surgery treatment suite, 50 outpatient consulting rooms, an OMFS prosthetics facility and Scotland’s largest neurodiagnostics department.

It treats over 50,000 outpatients and 16,000 inpatients, of whom around 60% are emergency presentations.

The services it offers and the populations it serves are:

Specialty	National over 5m	Supraregional 3-5m	Regional 2.5-3m
Acute stroke			✓
Craniofacial Surgery	✓		
Deep Brain Stimulation for tremors	✓		
Hyperacute stroke	✓	✓	
Interventional Neuroradiology	✓	✓	✓
Major Trauma	✓	✓	✓
Neuro-critical care	✓	✓	✓
Neurology	✓	✓	✓
Neurophysiology	✓	✓	✓
Neurosurgery	✓	✓	✓
Oral & Maxillofacial Surgery	✓	✓	✓
Specialist Prosthetics	✓		
Spinal Injuries	✓		
Spinal Injuries critical care	✓		
Surgery for Cleft Lip and Palate (adults)	✓		
Thrombectomy	✓	✓	✓

Prior to the opening of the Royal Hospital for Children in 2015, the INS provided all its services to both adults and children and young people. Its clinicians and clinical teams still deliver services for children in RHC.

These include:

Specialty	National over 5m	Supraregional 3-5m	Regional 2.5-3m
Brachial Plexus Surgery (newborns and children)	✓		
Craniofacial Surgery	✓		
Dorsal Rhizotomy Surgery	✓		
Neurophysiology	✓	✓	✓
Neurosurgery	✓	✓	
Oral & Maxillofacial Surgery	✓	✓	✓
Surgery for Cleft Lip and Palate (children and young people)	✓		

The INS teams also support and deliver elements of adult national and supraregional services based in the QEUH:

Specialty	National over 5m	Supraregional 3-5m	Regional 2.5-3m
Brachial Plexus Surgery (adults)	✓		
CAR-T (targeted, personalised immunotherapy for blood cancers)	✓		
Major Trauma	✓	✓	✓
Neurodiagnostics	✓		
Neurophysiology	✓	✓	✓
Stem Cell Transplants for people with multiple sclerosis	✓		

At Initial Agreement stage, the long list of potential options included other GGC, other WOS and other Scottish sites, but the conclusion was that the services had to remain on the QEUH campus, as the triple co-location of major trauma with specialist adult services and specialist children's services was the optimal model across the UK, with Liverpool, Leeds and Edinburgh investing heavily to bring neurosciences and children's services together onto the same campus as their Major Trauma Centres.

1.2 Clinical risk of service failure

Over the last 10-15 years, the clinical services have been impacted by a series of issues with the current infrastructure which have resulted in the loss of elective and emergency services on multiple occasions for periods of up to two years.

As recently as late April 2024, a weekend failure of the hot water system on Level 4 of the Surgical Building cascaded through three floors of live wards, including a significant flooding event within Critical Care. All Level 3 intensive care beds had to be closed and patients transferred into the main QEUH critical care facility. The Surgical Building was also left with no hot water. While water was reinstated to the building within 24 hours, the Neurocritical Care Unit had to be fully contained (boarded up) to allow a major Infection Control review to take place over subsequent days and the facility will not be fully reinstated for 6 weeks with reduced critical care capacity for all INS services during this period.

As noted in the IA, the risk of further potentially catastrophic disruption to clinical services from environmental issues remains very high with severe impact in the event of full building failure. Multiple reports of building/fabric failures impacting on patient care/staff and visitor welfare continue to be recorded the service Risk Register and the Datix incident recording system. There are also revenue consequences of these infrastructure failures: high-cost single-use clinical supplies and ward stores of drugs are routinely condemned as contaminated after water and waste breaches, with the costs running into tens of thousands of pounds.

Based upon lived experience, historical data and survey work undertaken to assess INS buildings and supporting infrastructure, several of the buildings within the INS pose a significant risk of unexpected failure, up to and including the total loss of the facility. If a significant incident were to affect an entire building, there is no centre in Scotland or Northern England which could take on this level of activity.

The nature of brain, spine and head and neck surgery is that most of the activity and beds relate to non-elective work, much of which is time critical. Even if there were alternative providers within Scotland, the impact on the Scottish Ambulance Service of taking 150 emergency transfers per week from across the West of Scotland to Lothian, Grampian and/or Tayside would be immense.

Because the INS has more than half of all Scottish beds across its specialties, the impact of a service falling over would be to swamp the remaining Scottish services; for example:

- because emergency and cancer presentations count for more than 60% of neurosurgery activity and almost 90% of bed days, Scotland would not even be able to provide all of its own emergency care, even if it abandoned providing all planned care, as the capacity required to deliver INS emergency neurosurgery (70-75 beds) is equal to the total number of remaining beds in Scotland (72 beds)
- INS admits 150 emergency patients per week, and the last time there was a significant infrastructure failure which required mutual aid from NHS Lothian, they were able to accommodate only 3 additional cases per week (150 per annum)
- as more than half of Scotland's thrombectomy programme is delivered from INS and expansion on any other site would require further capital investment, Scotland's new flagship service for acute stroke would be at immediate risk

- There are 25 adult OMFS beds, including two national services (cleft lip and palate surgery and craniofacial surgery) which work across RHC and INS to provide life-long care; the next largest centre in Scotland is NHS Grampian, which has 5 adult beds and no children's service
- because INS has Scotland's only spinal and neuro critical care units and also maintains Level 2 patients (intubated and/or tracheostomy in place) on its wards, the impact to Scotland of the loss of the facility would be an immediate need to provide an additional 40-45 ITU and HDU beds. These beds would run at high occupancy, as the lengths of stay in critical care for spinally injured patients can be weeks or months

1.3 Objectives and benefits

Through the Strategic Assessment, Initial Agreement and Pre-Outline Business Cases processes, NHSGGC has worked extensively with patients and carers, our staff, the third sector, partner organisations and the wider community across the Scotland to develop this case for transformation of the clinical services delivered in and by the INS.

This project is centred on improving the services delivered to the people of Scotland for some of its rarest and most complex conditions. The investment objectives are therefore clinically focused, while still seeking to align with the wider goals of the Scottish Government. The objectives also retain a focus on reducing the NHS's impact on the environment.

Objective 1	Services will be provided in a safe and appropriate clinical environment which improves access and outcomes, maintains vital clinical adjacencies, and meets the evolving needs of all patients, carers and staff
Objective 2	Services will remain at the forefront of delivering world-class supraregional and national treatment services to residents of Scotland by continually adapting, enhancing and improving their clinical models
Objective 3	Services will be provided in flexible and adaptable clinical accommodation in a modern healthcare environment that meets all appropriate standards
Objective 4	Services will have optimal safe, efficient clinical pathways which are person-centred, promote adjacencies between services, and enhance the dignity and safety of our patients and users, their families/visitors, and our staff
Objective 5	Services will be delivered in an environment which promotes safety and minimises harm

The Visioning document attached at Appendix 4 gives a wealth of detail of the feedback that the project has received from patients, staff carers, the third sector and other partners about how the future of these services can be shaped.

The proposed investment would:

- create sufficient capacity across outpatients, daycases, diagnostics, inpatients, theatres and critical care to meet current and future demand for national and supraregional services for injuries and diseases of the head, neck, brain and spine
- put the needs of people with cognitive and physical challenges at the forefront of service design while delivering for all of our stakeholders, including our staff
- improve access – not just physical access within the site and between services but by allowing the services to develop and expand, reducing waiting times and offering alternatives to in-person consultations
- allow the INS to develop on its existing world-leading reputation to improve and innovate on behalf of the Scottish people
- harness the potential of gene therapies and other personalised medications for adults with neuromuscular diseases
- continue to expand and develop specialist services which provide access within Scotland for people who would otherwise go to England or even the USA for treatment
- collaborate with our embedded Clinical Research Facility on being a primary trial centre for new gene therapies and other advanced therapy medicinal products (ATMPs)

1.4 Strategic alignment

The Scottish Government has laid out its expectations for Whole System Infrastructure Planning in DL(2024)02, which requires NHS Boards to produce a deliverable, whole-system service and infrastructure change plan for the next 20-30 years.

The first element of this work is to develop a maintenance-only business continuity plan based on a risk-based assessment of the Board's existing infrastructure. NHS Boards are required to submit this to SGHD by 31 January 2025.

NHS Greater Glasgow and Clyde has already been working on an infrastructure strategy with Scottish Government, regional and local stakeholders, external advisors, staff, patients and the public through its Moving Forward Together programme, which sets the clinical vision for health and social care across NHS Greater Glasgow and Clyde.

This clinical vision has been used to inform a delivery plan, describing where and how services will be delivered in the future, focusing on service models rather than specific buildings. This has allowed GGC to identify priorities for investment across its infrastructure strategy to support the proposed transformational service change.

A full review of existing infrastructure has been completed, and the reprovision of the INS remains the top priority for capital investment within the Board's MFT programme.

1.5 Development since Initial Agreement

1.5.1 Development from Initial Agreement to candidate site options

The Initial Agreement was approved by Scottish Government on 29 March 2023 and NHSGGC were invited to carry out further work to confirm the Preferred Site Option over the following 12-month period.

The Initial Agreement set out a long list of potential future service delivery options for the national, supraregional and regional services which must be delivered on a highly acute hospital site. From this long list, a shortlist of delivery options were put forward to be considered at Outline Business Case.

At the outset of OBC, this shortlist was fully explored through an options development process, producing a revised long list of potential site scenarios which were reviewed and evaluated to formulate a shortlist of Candidate Sites which went forward to further assessment.

As part of this development, two options which explored the possibility of accommodating some INS services within the QEUH Adult Hospital were ultimately ruled out due to the level of disruption and risk to existing services and the practical issues of such significant alterations to live facilities within the QEUH.

Initial Agreement Option	Current Candidate Site Option equivalent	Comments
Option 1: Do Minimum	Option 0: Do Minimum	
Option 2: All services immediately co-located in a single facility on the QEUH site	Option 1: Single New Build – North QEUH campus	New build envisaging a single INS building.
Option 3a: Split services across more than one location on the QEUH site	Option 2: Campus New Build – North QEUH campus	New build INS on adjacent Candidate Sites.
Option 3b: Selected INS inpatient services integrated within QEUH with remaining services in INS being redeveloped	n/a	Having tested several options to relocate INS services within the QEUH Adult Hospital it was deemed unfeasible, and this option was set aside.
Option 3c: Phased new INS 'Campus' on existing INS, QENSIU and NRU sites	Option 3: Maximum Refurbishment	The current Candidate Site option envisages partial refurb and partial replacement of existing INS buildings to meet the Brief.
	Option 4: Phased Campus Approach	The current Candidate Site option also includes refurb of Langlands to achieve floor area requirements.

1.5.2 Stakeholder engagement

At every stage, stakeholders have been placed at the heart of developing this proposal.

A series of workshops took place in spring and summer 2023 to develop the overall vision and objectives for the project. Further workshops were held over autumn and winter 2023 to refine and update the benefits criteria and to score them. The SMART objectives developed through this process were then utilised to inform the criteria for assessing the Site Options Appraisal process. Section 5.2–5.3 and Appendix 4 detail this extensive engagement.

Decision-making has been democratised by ensuring that all decisions are taken by three equally weighted groups:

1. Patients, carers and third sector
2. Clinical staff
3. Non-clinical staff and other stakeholders

Irrespective of how many individual members of each group attend a session, each of the three groups are given an equal (one-third) vote.

1.5.3 Candidate site options

The Options Appraisal considered 5 different shortlisted options.

0.	Do Minimum	The Do Minimum requires working within the confines of the existing INS Estate, sequentially decanting, and refurbishing the currently occupied buildings. It should be noted that Do Minimum does not meet the investment objectives as it does not include any change to layouts, would not deliver spatially compliant accommodation for the INS and limits the opportunity for future improvement.
1.	Single New Build	This option is for the reprovision of all INS facilities in a Full New Build comprising a single building located on the north-eastern part of the QEUH site.
2.	Campus New Build	This option is for the reprovision of all INS facilities in a Full New Build comprising a cluster of 3 buildings located on the north and north-eastern Candidate Sites.
3.	Maximum Refurbishment	This option maximises refurbishment of the existing INS Buildings (those north of the access road, either side of the ICE building). The balance of additional space required to meet the Schedule of Accommodation (SOA) is in a New Build Facility replacing the existing Neurology Building and NRU facilities to the south of the existing Candidate Site. A northward extension to the QENSIU is also envisaged to achieve SOA requirements.
4.	Phased Campus Approach	Option 4 is a Phased Campus approach using most of existing INS buildings / sites. To achieve the necessary increase in additional space it proposes replacing the Neurology building and NRU (as Option 3), refurbishing the QENSIU (as Option 3)

		whilst including the existing Langlands PFI building for refurbishment. This enables the Surgical building to be largely vacated.
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1.5.4 Site options appraisal

An appraisal workshop was arranged to allow stakeholders to assess the options based upon the benefits criteria. The event took place in-person at the William Quarriers Conference Centre in Glasgow on 31 January 2024.

The Groups scored the candidate sites based on weighted scoring. The three groups of stakeholders were again given equal weighting.

The final ranking of sites was:

Option	Rank
1. Single New Build	1
2. Campus Build	2
4. Phased Campus Build	3
3. Maximum Refurbishment	4
0. Do Minimum	5

1.6 Economic appraisal

1.6.1 Whole-life carbon analysis

NHS Scotland is targeted to be a net-zero Greenhouse Gas (GHG) organisation by 2045 at the latest, and for all NHS Scotland new buildings and major refurbishments to be designed to have net-zero GHG emissions from April 2020. An analysis of the options was undertaken by AECOM to determine energy use, carbon emissions and the total whole life carbon for each option over a 60-year life.

The analysis showed that options 1 and 2 have the lowest whole-life carbon impact.

1.6.2 Risk

A high-level project development risk assessment of each option was carried out by the Project Core Team supported by Technical Advisers. Options that included refurbishment and decant accommodation generally recorded highest risk levels.

Option	Risk
1. Single New Build	Low
2. Campus Build	Low

3. Maximum Refurbishment	High
4. Phased Campus Build	High
0. Do Minimum	Highest

1.6.3 Non-financial appraisal (NFA)

To carry out an accurate value for money assessment of each option, the non-financial benefits of the investment need to be factored in alongside the financial costs.

	Option 0: Do Minimum	Option 1: Single New Build	Option 2: New Build Campus	Option 3: Maximum Refurbishment	Option 4: Phased Campus
Net Present Value (NPV)	£608m	£1,263m	£1,184m	£1,527m	£1,750m
Ranking	1	3	2	4	5
Weighted Benefits score	290	1,019	939	487	497
Cost per benefit point	£2.1m	£1.24m	£1.26m	£3.14m	£3.51m
Ranking	3	1	2	4	5

The results of this analysis demonstrated that whilst the Do Minimum option is the lowest financial cost, it provides a very low NFA score, reflecting that this investment option will not deliver the required service benefits, and so ranks low as a value for money investment.

Option 1 is the highest-ranking option in terms of combined financial and non-financial score.

1.6.4 Summary of economic appraisal

The economic appraisal of the short-listed options identifies that **Option 1: Single New Build Campus** is the best value-for-money option.

Option	Stakeholder Rank	Whole Life Carbon Rank	Development Cost	Construction Timescale (years)
1. Single New Build	1	1	£1,034m	5
2. Campus New Build	2	1	£1,044m	4-7*
3. Maximum Refurbishment	4	2	£1,437m	13
4. Phased Campus Build	3	2	£1,665m	11
0. Do Minimum	5	3	£469m	15

* Option 2 has a potential for up to 7-year programme if buildings are developed sequentially in three phases

1.7 Financial appraisal

1.7.1 Capital costs and funding requirements

The capital costs for the preferred option are presented below. These costs are based on the design prepared through this stage of project development, through stakeholder engagement with the project team and project architects.

Description	Option 0: Do Minimum	Option 1: Single New build	Option 2: Campus New build	Option 3: Maximum Refurbishment	Option 4: Phased Campus Build
Total	£469m	£1,034m	£1,044m	£1,437m	£1,665m
GIFA (sqm)	26,038	64,675	64,672	79,025	88,634
Cost per sqm	£18,012	£15,988	£16,143	£18,184	£18,842

1.7.2 Profile of capital expenditure

The economic model presents the profile of capital expenditure across each of the options. This is based on a consistent approach across the options. A detailed cash flow which presents the anticipated spend for capital will be prepared for the Outline Business Case.

1.7.3 Revenue costs

Baseline clinical and non-clinical service costs do not change across the options, as they are driven by the current clinical service model and therefore apply equally to each of the options.

At Initial Agreement Stage, a review of the potential impact of moving to SHTM compliant estate was undertaken, based on lessons learned from relocating services from the Western Infirmary Glasgow – a building of a similar age to INS – into the new Queen Elizabeth University Hospital. The range of additional costs was identified as £11-£25m. These have been factored into the evaluation of all options.

1.7.4 Non-recurring revenue costs

Non-recurrent revenue costs for items such as decant costs is not included and this figure will similarly be reviewed in detail through the development of the Business Case.

1.8 Preferred option conclusions

The process of considering the potential options to meet the requirements and scope set out in the Initial Agreement has been comprehensive. The Board commissioned external support to ensure the engagement with stakeholders was transparent and that the development of benefits, weighting of assessment criteria and presentation of the options were all part of a fully inclusive process. Feedback from the events has been overwhelmingly positive.

Metric	Highest ranked option
Stakeholder preferred option	Option 1
Lowest cost to deliver the investment objectives	Option 1
Lowest cost per benefit point	Option 1
Shortest construction timescale	Options 1 & 2
60-year whole-life carbon requirement	Options 1 & 2
Lowest project development risk	Options 1 & 2

Taking account of the above the Board confirms its preferred option to be Option 1: Single New Build.

1.9 Deliverability constraints

Over 2023/24, the national landscape for capital funded projects changed considerably. Scottish Government's ability to fund large-scale projects has significantly reduced, with almost all large-scale projects paused or halted.

The significant clinical risk of continuing to offer highly specialised services to the people of Scotland in facilities which are already failing led NHS Greater Glasgow and Clyde to review its proposals to identify whether a targeted investment model could be developed.

This analysis mapped the services of highest clinical risk against the areas of highest infrastructure risk.

This process identified the areas of key high acuity clinical activity (including theatres, imaging, critical care and acute inpatient wards) as the places where failure of the building services or fabric would have the greatest impact on patient safety and clinical outcomes.

In an environment where the immediate availability of capital to deliver the preferred option in a single phase appears difficult to assess, a focus was placed upon developing a targeted investment model which would allow the greatest areas of risk for clinical activity and infrastructure to be addressed as a priority at a lower initial cost, whilst lower areas of risk could be addressed at a later phase as the funding environment improves.

1.9.1 Targeted investment model

Based upon the above process, a Schedule of Accommodation was developed to confirm the essential acute services required to be located together to allow a targeted investment approach to be viable from a clinical adjacency and operational management perspective.

This model required 39,705m² of total area against the overall requirements of 64,675m² of the preferred option.

The preferred option for the full redevelopment project is Option 1 but this review included an assessment of all 5 options to identify which could accommodate a targeted investment approach without significantly impacting on the delivery of the investment objectives.

Option 1 and Option 2 can address the highest risk areas in a targeted investment scenario and deliver fully compliant, energy efficient accommodation, and both scored highly in the Option Appraisal with the patients, third sector and clinical teams. Under a targeted investment approach, they would lend themselves to delivering the required services within a first phase:

- Option 1 would ultimately allow a single new build facility, but the first phase would have a restricted footprint resulting in an 8-storey facility
- Option 2 has a larger footprint and can provide the first phase accommodation over 6 floors; however, it will ultimately be part of a longer-term approach that splits the services across 3 linked facilities

Both options would split the most acute INS services from those in a lower risk category and a more detailed examination of the achievable clinical adjacencies for Options 1 and 2 is required to determine which is the preferred solution; however, each offers an opportunity to take forward a significant improvement of facilities for patients, carers, and staff, providing safe and resilient facilities to maintain essential services and continue to deliver improvements for the residents of Scotland.

Split-site working would not, however, deliver the optimal configuration of services and would result in a number of compromises:

- Increased transfer time to access acute services for patients not in the new facility
- Potential workforce impact due to decreased efficiency of working across different facilities
- Separation of multi-disciplinary teams
- Continuing revenue costs for retained estate

There would also be a requirement for some reconfiguration of remaining INS facilities to avoid clinical care being provided from isolated locations.

No revenue forecasting has been undertaken for this modelling and, as either of these options would involve some split-site working for services, this could impact on revenue costs e.g. for facilities services to support transfer of patients between services. Further detailed modelling would be required to confirm final additional revenue costs which would be submitted to the NHSGGC Board.

1.10 Programme

Some dates have moved since Initial Agreement due to delays to approvals, prolongment of periods for future stages based upon Technical Advisor review and change to some procurement activities which are delayed until SG approval to preferred option is secured.

Key Dates:

- OBC SCIG Approval November 2027
- FBC SCIG Approval November 2029
- Financial Close January 2030

To date the project has not formally reported or identified a target construction duration, as this is highly dependent on the preferred option that is selected. Indicative programmes for each option have been developed by the Technical Advisor. These remain high level programmes that will require further developed as any phasing plans are refined, together with agreement from the selected contractor.

1.11 Conclusion

NHSGGC has now concluded a Pre-OBC Economic Case, including an options appraisal, to identify a preferred option. Stakeholders have been engaged throughout the process as detailed in this document.

The Board confirms **Option 1: Single New Build** as its Preferred Option for the full redevelopment of The Institute of Neurological Sciences, as outlined in the Initial Agreement.

In recognition of the current challenges around capital funding for large-scale projects, a further review has been undertaken to explore ways to address the highest areas of risk as a targeted investment phase at a reduced initial cost. This approach is deliverable via Option 1 or Option 2.

We now request Scottish Government to note the contents of this Pre-OBC Economic Case and confirm agreement to continue work to conclude the remainder of the OBC.