Outline Business Case
Reconfiguration of Theatres Complex
Watford General Hospital

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1. Executive Summary

1.1 Introduction

This Outline Business Case (OBC) seeks approval to progress to Full Business Case (FBC) stage for the investment of an estimated £14.3 million to reconfigure the Watford General Hospital Theatres Complex. This will deliver compliance with modern standards, increase overall theatre capacity and provide a 'hybrid-enabled' endovascular theatre.

This OBC follows the Strategic Outline Case (SOC) which was approved by the Trust in December 2015. Since the production of the SOC, the scope of this project has changed from providing a full hybrid theatre, to providing a hybrid-enabled theatre. The rationale for this relates to the Trust's decision in January 2017 to not bid to become the Hertfordshire Vascular Hub. As a result, the urgency to provide the hybrid theatre is reduced, however the notable benefits it would bring are recognised and therefore this OBC sets intention to provide a hybrid theatre at a later date, with funding of the equipment as part of a separate business case.

1.2 Strategic Case

1.2.1 Case for Change

There is an urgent need to improve the facilities within the Watford Hospital Theatres Complex due to three key reasons:

1. **Compliance**:

   There are several environmental issues within the Watford Theatres Complex that require urgent improvement work, as noted by the Care Quality Commission (CQC) in September 2015, and again in 2016. The environmental issues that need to be addressed urgently are:

   - The theatre used for the care of emergency patients ('CEPOD' patients) was previously a plaster room and is not compliant with modern standards. It does not have an anaesthetic, prep, exit bay or sufficient dirty utility rooms; therefore the patients receive all their treatment in one space. This does not meet modern infection control standards or national recommendations for an operating theatre and so is not appropriate for continued future use;
   - The paediatric recovery area does not afford appropriate separation of children and adults and there are insufficient recovery beds overall;
   - The day surgery admissions and recovery area is sub-standard and does not comply with single-sex and infection control guidance;
   - Operational 'flows' through the theatres complex are sub-standard. There is one entrance into the theatres complex for staff, visitors and patients which means that when patients enter the department, they may encounter staff, relatives, visitors or company representatives in theatre scrubs or normal clothes. In addition there is no waiting area for parents and relatives adjacent to theatres;
   - The ventilation system lacks resilience and needs urgent refurbishment;
   - Staff facilities are inadequate and inappropriate for staff changing and storage, with limited functioning showers.

2. **Capacity Issues:**

The existing theatre complex lacks the capacity to meet future demand for surgery. There is already pressure on current capacity and the Trust is implementing ways to increase capacity operationally through longer working days. Substantial activity modelling work demonstrates that

six theatres are required to provide high quality care for the forecast number of patients requiring surgery at Watford.

The physical limitations of the NCEPOD theatre result in the more complex emergency procedures taking place in the next available operating theatre, displacing elective work, leading to delays and cancellations. This means patients have operations cancelled at short notice in order to accommodate emergency patients, or wait longer as an inpatient for their surgery.

3. **Requirement for a 'Hybrid Enabled' Theatre:**

In order to plan appropriately for the future, a 'hybrid-enabled' theatre is required at Watford Hospital. A hybrid-enabled theatre has the necessary infrastructure such as structural supports and radiation protection, and is configured to enable it to be easily converted from a general to a hybrid theatre by purchasing and installing the interventional imaging equipment in the theatre. This would be less costly and less disruptive than retrofitting the infrastructure works at a later date.

By investing in the infrastructure works as part of this business case, the Trust is giving commitment to providing a hybrid theatre at a later date when funding allows. A hybrid theatre will enhance the provision of modern health-care over for a wide range of patients requiring interventional radiology treatment and care by other clinical specialties. It combines state of the art radiological equipment with operating facilities to enable clinicians to treat patients using both 'open' and 'keyhole' surgical techniques within a single theatre suite.

1.2.2 Strategic Context

This proposal is in line with national, regional and local strategy.

To implement the whole health economy change envisaged in national planning guidance and NHS England's *Five Year Forward View*, Herts Valleys CCG (HVCCG) is leading a system wide transformation of services in west Hertfordshire. Working across all providers and commissioners to assess the demand for services and sustainability of provision, the west Hertfordshire Strategic Review, *Your Care, Your Future (YCYF),* is looking at ways to ensure the local health system can meet local health and social care needs in the future and do so within constrained financial budgets, and WHHT will be able to influence wider change within this review.

Acute Transformation Project

WHHT has developed a SOC to describe the future configuration of acute hospital services and the associated investment required for its estate and infrastructure in line with the *Your Care, Your Future* programme. This was approved by the Trust Board on 2 February 2017.

The preferred way forward confirmed within the Acute Transformation SOC is for the WGH site to continue to be the location of emergency and specialised care and for the SACH site to be further developed as the location of planned care.

The Acute Transformation OBC will determine the split between new build, redevelopment and refurbishment at each site.

YCYF and the Acute Transformation SOC recognise that a large proportion of the key hospital estate at Watford Hospital is in poor condition and not functionally suitable for providing the clinical services currently being delivered from the space.

Trust Estate Strategy

The requirement for investment in theatres is identified in the Trust's Interim Estate Strategy as a key requirement to provide a 'safe, efficient and fit for purpose estate' and is included in the funding profile. It is a stated priority for the Trust.

Summary

It is recognised that interim investment in the current estate, including the theatres reconfiguration, needs to take account of emerging plans for the development of the Watford site in the Acute Transformation project, and as a result this OBC seeks only to deliver what is essential over the medium term, minimising capital expenditure.

1.2.3 Activity Analysis

Activity modelling has been undertaken, utilising a detailed theatre capacity model to quantify theatre requirements at Watford Hospital over the next ten years. Five scenarios were tested to understand the maximum and minimum theatres that might be needed. The minimum and maximum scenarios were discounted as extremes and from the three remaining scenarios, a 'most likely' scenario was selected as the most realistic modelling scenario for this business case. The 'most likely' scenario has used a mid-point between the YCYF growth assumption and historic growth for elective care only, to reflect the anticipated increase in market-share that will result from the Trust coming out of special measures and from active marketing of services. The impact of this adjustment on the overall number of theatres needed will be marginal change. This 'most likely' scenario is consistent with the assumptions used in the Sustainability and Transformation Plan for this area.

The conclusion of the modelling is that 6 theatres are needed within Watford Main Theatres to secure the capacity needed to maintain acute services until longer-term plans for acute care reconfiguration come to fruition.

In order to support the additional surgical activity, it is the Trust's view is that, if the system assumptions are delivered under YCYF, there will be sufficient beds on-site at Watford Hospital. In partnership with other local care providers, a range of measures will be put in place over the coming years to improve the appropriateness of their use and so free up additional overall bed capacity to accommodate the anticipated growth in surgical patients. The success of internal and system wide interventions will need to be monitored throughout the lifetime of the project to ensure the existing bed capacity meets demand.

1.2.4 Key Project Dependencies

Successful implementation of the project requires a number of key other projects to be implemented. These are:

- Implementation of operational changes to reduce the number of DTOCs and reduce length of stay to increase capacity within the surgical bed pool to serve the increased activity;
- Successful implementation of the enabling projects to allow space on levels 4 and 5 to be used for anaesthetists offices and theatre support accommodation:
- Workforce can be recruited in line with workforce plans.

1.3 Stakeholder Support

The following external stakeholders are asked to provide their support for this OBC:

- Herts Valleys CCG *[DN: due end June 2017]*
- Health and Wellbeing Board
- Health Overview and Scrutiny Committee

1.4 Clinical Quality Case

1.4.1 Fit with Clinical Strategy and Commissioning Intentions

The investment in theatres will strengthen core services and support delivery of the Trust's priorities as agreed with HVCCG under the YCYF strategy as set out below:

24/7 Emergency Care

- The investment will enable the Trust to strengthen this core service by providing additional capacity, thereby improving access to emergency theatres
- Where clinically required, all patients admitted through A&E will to be treated on the same day and will no longer have to wait overnight and return the following day for an emergency procedure, improving the emergency care pathway
- Replacement of the existing procedure room with a new and fully compliant theatre as the dedicated NCEPOD theatre will enable the most critically ill patients to be treated in clinically appropriate facilities without interrupting the planned work booked into theatres 1 to 4, again improving the care pathway

Planned Care and Cancer Services

- Additional capacity at Watford will reduce delays and cancellations arising from emergency admission pressures, improving scheduling of elective procedures, and ensuring timely and streamlined access to meet national referral to treatment standards
- Providing capacity at Watford for all patients assessed as ASA 3 and 4 will free capacity of SACH to accommodate appropriate specialties, supporting redesign of pathways and development of one stop models
- Potential to increase interventional imaging capacity provided by a hybrid theatre in the future will increase access to diagnostic imaging services, improving services across a range of planned care pathways

Specialist Services

- Both the hybrid-enabled theatre and the new, fully compliant general theatre will provide the potential to undertake more complex procedures across a range of specialties, improving surgery pathways and specialist cancer pathways and strengthening links with tertiary super-centres for Upper GI and Gynae-oncology

1.4.2 Clinical Leadership and Engagement

This business case has been driven by the clinical teams who have been fundamental in reaching an agreed design that meets the requirements of patients, staff and families. The Divisional Director for Surgery leads the clinical workstream and sits on both the Project Board and Project Team. There has been extensive engagement with clinical teams, infection control and support services as well as discussions at Patient Panel.

1.5 Economic Case

1.5.1 Project Objectives

The following objectives for the redevelopment of the Watford Hospital Theatre Complex are set out below:

1. Upgrade and improve the theatre complex to comply with modern standards, including addressing CQC concerns
2. Provide sufficient theatre capacity to meet anticipated demand for emergency and elective care until longer-term plans for acute care come to fruition.
3. Provide a 'hybrid-enabled' theatre.

1.5.2 Shortlisted Options and Option Appraisal

A summary of the shortlisted options which best address these project objectives are set out below. Qualitative and quantitative assessments have taken place and results are shown.

Table 1.3: Summary of shortlisted options and outcome of option appraisal

	Option Title	Key Features	Capital Cost (inc VAT and inflation) £m	Equivalent Annual Cost (risk-adjusted) £m	Qualitative Score	VFM – cost per benefit point £	Rank (VFM)
B	Do Minimum	• Provides compliant 4-theatre suite • Does minimum to resolve recovery and compliance issues providing: • Existing theatre 5 used as a procedure room only (not a theatre) to achieve compliance. • Some HBN derogations due to building constraints	£7.3m	£4.29m	425	£10,104	6
C	6 theatres in PMoK (one hybrid-enabled) using carousel unit and additional floor space in ICU, level 5 and a level 7 extension	• Provides 6 theatres (2 new, 1 of which is hybrid-enabled) • Remodels part of ICU to provide additional space for theatres department. • Dependent on ICU project to reduce ICU beds from 19 to 16. • Key risk around the carousel which would be a single point of failure • Utilises floor space on level 5 and level 7, including a level 7 extension • Some HBN derogations due to building constraints	£14.0m	£4.53m	670	£6,762	5
D	6 theatres in PMoK (one hybrid-enabled) using carousel unit and additional space on levels 4, 5 and 7 including a level 7 extension	• Provides 6 theatres (2 new, 1 of which is hybrid-enabled) • Key risk around the carousel which would be a single point of failure • Utilises floor space on levels 4, 5 and level 7, including a level 7 extension • Some HBN derogations due to building constraints	£13.1m	£ 4.44m	700	£6,339	3
E	6 theatres in PMoK (one hybrid-enabled) using additional floor space on level 4, 5 & 7 and construction of a lightwell infill on level 6	• Provides 6 theatres (2 new, 1 of which is hybrid-enabled) • Additional space in lightwell infill • Utilises floor space on levels 4, 5 and level 7, but does not require a level 7 extension • No carousel unit required • Some HBN derogations due to building constraints	£14.3m	£4.52m	825	£5,477	2
F	6 theatres in PMoK	• Provides 6 theatres (2 new, 1 of which is hybrid-enabled)	£15.1m	£4.63m	850	£5,442	1

	(one hybrid-enabled) using additional floor space on level 4, 5 & 7 and construction of a lightwell infill on levels 5 & 6	• Additional space provided in lightwell infill on two floors (5 and 6). This provides greater expansion space and flexibility for the future • Utilises floor space on levels 4, 5 and level 7, but does not require a level 7 extension • No carousel unit required • Some HBN derogations due to building constraints					
G	New build 6 theatre block in Shrodells Garden (one hybrid-enabled) with a link bridge connecting it to the main hospital	• Provides 6 new theatres (1 hybrid-enabled) in the Shrodells garden area • Fully HBN compliant • Requires the demolition of a single storey wing of Shrodells • A link bridge is created to the main hospital. The distance between theatres and ICU on surgical beds is increased in this option.	£26.7m	£5.39m	805	£6,690	4

1.5.3 Preferred Option

The option appraisal shows that Option F ranks highest in terms of value for money. A sensitivity analysis has been undertaken on this result which shows option E becomes the preferred option with a 0.65% change to the EAC or a 1% change to the benefit score. Therefore the result between E and F is deemed sensitive meaning that they provide a similar level of value for money.

Given the capital expenditure for option E is approx. £0.75m less than option F, the Project Team recommend that Option E is selected as the preferred option. This acknowledges the strategic context of the investment and the uncertainties around the configuration of the Watford Hospital site which will emerge from the Acute Transformation project.

1.6 Commercial Case

1.6.1 Procurement Strategy

A procurement strategy has been developed following consideration and evaluation of a number procurement routes. Procure 22 has been chosen as the preferred procurement route. It is a contractor framework provided by the Department of Health for the procurement, development and refurbishment of NHS facilities.

The procurement has progressed with the selection of a Principal Supply Chain Partner (PSCP) from the framework Using the standard P22 procurement process, Expressions of Interests (EOIs) submitted by the PSCPs have been evaluated and scored by a Trust selection panel, supported by the DH P22 Implementation Advisor.

Kier have been chosen as the PSCP to take the design and project forward to FBC and construction stages.

1.6.2 Construction Contract

The construction work will be completed under NEC3 Option C contract in line with the DH ProCure22 Framework. It is not anticipated that there will be any non-standard legal issues.

1.7 Financial Case

1.7.1 I&E Impact and Capital Funding

This development adversely affects the Income and Expenditure (I&E) position of the Trust. This is mainly due to the cost of capital associated with a high value capital build. The I&E position of the Trust shows a benefit from the contribution associated with growth in year's 2017-18 and 2018-19. In 2019-20 the new build goes live and outflows are introduced in relation to capital charges. This results in the bottom line of the Trust being adversely affected for the next 5 years until 2023-2024. The I&E account recovers in 2024-25 which is Year 8 of the project and from this point forward the development generates a positive annual impact on the I&E position of the trust.

The summary of the I&E impact, by year, is shown below;

Table 1.4: Summary of I&E impact

Year										Total
2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	
-188,137	-258,726	1,505,208	324,971	297,358	74,582	826,013	-171,490	-605,587	-1,058,155	746,036

* (-) = Surplus

From a Net Present Cost perspective, the investment to resolve urgent environmental compliance issues the preferred option to improve capacity and provide a hybrid enabled theatre shows a negative £7.2m million net present value, over 10 years with a payback period of 16 years.

Capital funding in the region of £14.3 million is required to support this change, and will require external finance.

1.7.2 Comparison of the Preferred Option against the Do Minimum

The preferred option, Option E has a capital cost of £14.3m, which is £7m higher than the do minimum option which has a capital cost of £7.3m. The higher capital cost increases the Net Present Cost in comparison to the do minimum option and therefore option E takes 4 years longer to pay back. The table below summarises Option E against the do minimum option in real terms:

Table 1.5: Comparison of Do Minimum with Option E

	Do Minimum	Option E
Capital Cost	7,320,533	14,318,722
Net Present Cost (NPC)	1,967,896	7,163,854
Payback Period (years)	12	16

In terms of affordability, the higher capital cost of the Option E means an I&E deficit over a 10 year period and lower net cash flows for the Trust. The net I&E position of option E is £2.8m worse off over a 10 year period when compared to the do minimum option and cash flows under option E will be £7m lower than the do minimum option. The table below summarises the affordability of Option E against the Do Minimum option.

Table 1.6: Affordability over a 10 year period

	Do Minimum	Option E
I&E Postion	-1,959,667	746,036
Impact on Cashflows	9,942,373	2,944,017

* (-) = Surplus

1.8 Management Case

1.8.1 Project Management Governance

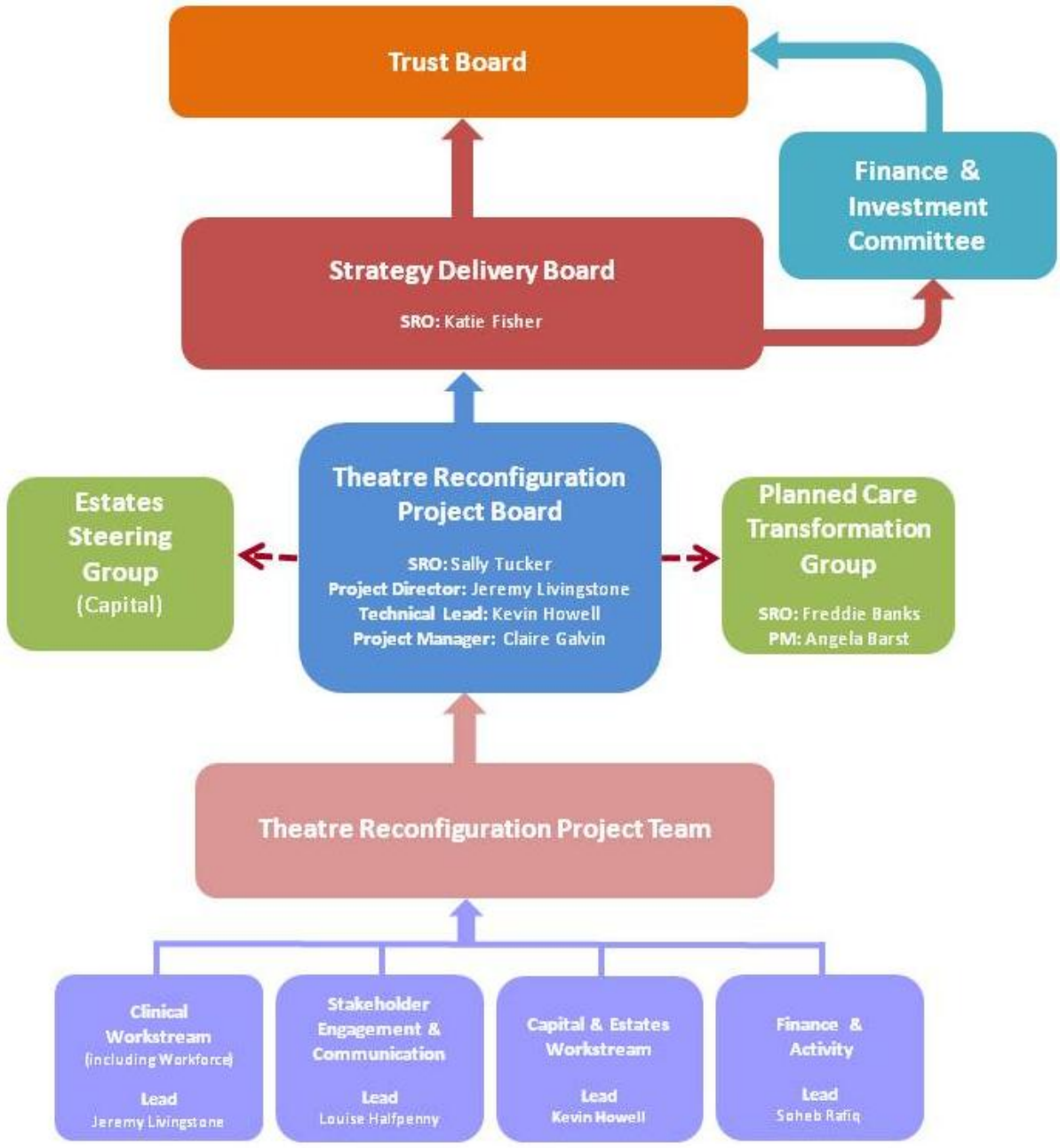
PRINCE2 methodology has been adopted to achieve effective planning, control and reporting throughout the development and delivery of the project. The following are the key project individuals:

Table 1.7: Key Project Individuals

Role	Individual
Sally Tucker	Chief Operating Officer (SRO)
Jeremy Livingstone	Divisional Director for Surgery, Anaesthetics and Cancer, (Project Director)
Kevin Howell	Director of Environment (Technical Lead / Senior Supplier)
Helen Brown	Director of Strategy & Corporate Services (Advisor, Strategy)
Don Richards	Chief Finance Officer
Louise Halfpenny	Communications Director
Stephanie Johnson	Divisional Manager for Surgery, Anaesthetics Cancer
Soheb Rafiq	Finance Lead for Surgery
Jason McKee	Deputy Divisional Manager for Surgery, Anaesthetics and Cancer
Esther Moors	Head of Service Planning
Claire Galvin	Senior Programme Manager (Project Manager)
Ahseia Qureshi	Project Support
Tom Stambach	Head of Anaesthetics

The project governance structure is set out below.

Figure 1.8: Reporting arrangements and project governance



1.8.2 Programme

Key milestone dates are summarised below. The programme assumes that development of the FBC and detailed design will commence once NHSI have approved the business case in July 2017, allowing 2 months for receipt of the monies.

Table 1.9: Key Milestones

Date	Milestone
February 17	Appointment of PSCP
June 17	OBC Trust Board approval
July 17	NHS Improvement approval for OBC (to be confirmed with NHSI)

February 18	FBC Trust Board approval
February 18	Agreement of Guaranteed Maximum Price with PSCP
April 18	NHS Improvement approval for FBC (to be confirmed with NHSI) and confirmation of loan funding from ITFF
April 18	Construction contract signed
May 18 – June 20	Theatres reconfiguration works undertaken (to be confirmed)

1.8.3 Risk Management

Risks are regularly reviewed by the project team and escalated to the Project Board. The highest rated risks and mitigation / management actions are shown in the table below.

Table 1.10: Key Risks

Description	Conse-quence	Likeli-hood	Risk Score / Rating	Risk Management Action	Risk Owner
RISK: Unexpected and unavoidable disruption to a working department during construction creating capacity problems and causing disruption to the service and / or extensions to timeframes. This could result in theatre lists being cancelled or rescheduled. **IMPACT:** - Reduction in RTT performance. - Poorer theatre utilisation.	4	4	16	Plan work that is likely to cause issues outside of main working day i.e. 08:00 and 20:00 hours subject to it not disturbing adjacent clinical areas, noting that this is likely to incur additional costs. Set up Project Operational Management Group to oversee and plan each phase of scheme to ensure risks are understood and mitigated where possible - to include Theatre Management, Infection Control, and Senior Nursing representatives.	Kevin Howell
RISK: OBC underestimates costs to deliver 6 theatre suite due to lack of detailed engineering, structural or condition surveys being completed on the area which may increase construction costs. **IMPACT:** Financial overrun	4	4	16	Detailed intrusive infrastructure and asbestos surveys to be brought forward to ensure full understanding of systems are gained prior to commencement of scheme, thus reducing time delays, infrastructure uncertainty, asbestos risks, subject to early response of funding.	Kevin Howell
RISK: Possible delay to programme if funding cannot be identified to progress the detailed design work ahead of NHSI approval **IMPACT:** Delay in delivering project benefits which results in increase in RTT breaches, cancelled operations.	5	3	15	Bid has been submitted for STP capital but if approved might not be available for some months. Alternative approach will be to fund from revenue and capitalise which would enable the design work to begin quite quickly.	Sally Tucker

RISK: Modelling assumptions are over optimistic / pessimistic with demographic and non-demographic growth not representative of surgical / health demand. This would lead to undersized / oversized facility with under sizing being the greater risk given the uncertainties surrounding capital to build new hospital. **IMPACT:** Trust will not have sufficient theatre capacity to meet demand in advance of new hospital facilities being delivered.	4	3	12	Sensitivity testing shows that 6 theatres will still provide adequate capacity to meet demand up until 10 years if a 60 hour per week schedule continues from Year 8 and historical growth rates continue.	Sally Tucker
RISK: Insufficient inpatient surgical beds to support the additional activity generated by the 6th theatre (NB gradual increase in requirements). **IMPACT:** cancellation of operations, increase in RTT breaches.	3	3	9	Bed Reconfiguration Project established Data analysis looking at Length of Stay and bed utilisation by ward and speciality to re- design how wards are allocated to deliver efficiencies (and improved outcomes). Theatre scheduling and job plans will be planned to minimise the number of IR patients requiring an overnight stay post operatively.	Sally Tucker
RISK: Net present cost of the project delivers a negative NPC over the 10 year appraisal period if decision is made to cease using the PMOK building when the redevelopment of the Watford Hospital site goes ahead. **IMPACT:** Project not reaching its payback period**.**	4	2	8		Don Richards
RISK: A lack of robust Change Management processes during scheme. **IIMPACT**: Potential to lead to project cost overuns and time overuns.	4	2	8	Stringent change management procedures to be implemented prior to commencement of scheme, and to be maintained for duration of the project.	Kevin Howell
RISK: OBC/FBC delays (due to extended approval processes from external bodies) **IMPACT**: Additional theatre capacity not delivered in 2020 which leads to increased RTT breaches, cancelled operations.	4	2	8	Introduce longer opening hours M-F earlier than planned. Introduce 6 day working earlier than planned.	Sally Tucker

1.9 Recommendation

It is recommended that this Outline Business Case for the reconfiguration of the Watford Theatres Complex is approved by West Hertfordshire Hospital NHS Trust.

The WHHT Trust Executive Team, Finance and Investment Committee and Trust Board are asked to approve this OBC, thereby approving the following:

1. Option E is the preferred option for progressing to Full Business Case (FBC) stage. This has an estimated capital cost of £14.3m, compared with the Do Minimum estimated cost of £7.3m.

2. The project proceeds to FBC stage with an estimated development cost of £768,635 (which is included within the £14.3m). This enables the completion of detailed design, the FBC and the agreement of a Guaranteed Maximum Price (GMP) for the works with Kier, the PSCP P22 partner.

3. This OBC is submitted to NHS Improvement (NHSI) for their review and approval.

2. Strategic Case

2.1 Introduction

This Outline Business Case (OBC) follows the Strategic Outline Case (SOC) for the refurbishment and reconfiguration of the theatres complex at Watford Hospital to address the compliance issues, increase capacity in line with activity, and to provide a hybrid-enabled theatre. Since the production of the SOC, the scope of this project has changed from providing a full hybrid theatre, to providing a hybrid-enabled theatre. By providing a hybrid-enabled theatre, the Trust is giving commitment to providing a hybrid theatre at a later date, however due to the Trust's decision not to bid to become the Hertfordshire Vascular Hub, the urgency is not as it was at SOC stage.

The strategic case gives an overview of the Trust and sets out the overwhelming case for change and why investment in theatres is critical. It considers the national, regional and local strategies and how the project is aligned with these. The strategic case then details the current and future activity projections and service model that underpin the requirement for 6 theatres, including one that is hybrid-enabled.

Finally, the strategic case sets out the benefits that investment will deliver, and the constraints, risks and dependencies of achieving these.

2.2 Organisational Overview - West Hertfordshire Hospitals NHS Trust

West Hertfordshire Hospitals NHS Trust (WHHT) is a large acute trust providing hospital services to 550,000 people living in Hertfordshire and north London. It is one of the largest employers locally, with 4,300 staff and 550 volunteers. Services are provided across three sites at Watford, St Albans and Hemel Hempstead hospitals. Underpinned by values of care, quality and commitment, the Trust aims to provide consistently good, safe care in a friendly, compassionate and informative way, as and when people need and want it and always with dignity and respect. These aims are reflected in the organisation's core objectives:

The new vision statement ***"the very best care for every patient, every day"*** and our four key corporate aims:

1. Best quality care
2. A great place to work and learn
3. A strategy for the future
4. Improving our finances

Our Priorities:

- Deliver more care LOCALLY
- Strengthen CORE services
- Provide SPECIALIST care as appropriate

Watford General Hospital is at the heart of the Trust's acute emergency services – the core location for inpatient emergency care, and for all patients who need the specialist emergency facilities (such as intensive care) of a major district general hospital. It also provides inpatient acute elective care (including that for higher risk patients) together with a full range of outpatient and diagnostic services.

2.2.1 Existing Theatre Facilities

West Hertfordshire Hospital Trust has theatres at both Watford General Hospital (WGH) and St Albans Community Hospital (SACH). At WGH the main theatres complex is situated on the sixth floor of the Princess Michael of Kent (PMOK) building and has five theatres in total (four full theatres and a fifth converted theatre that was previously a plaster room, used for emergency 'CEPOD' patients), with a seven-bed recovery area. These theatres provide care for emergency and elective patients, including both adults and children. In the Women and Children's Services building there are a further three Obstetrics and Gynaecology theatres with a recovery area. These theatres are used for emergency and elective female surgery only and are outside the scope of this project. SACH is an adult-only elective surgery site; there are 6 theatres with a recovery area. As SACH does not have a high-dependency or intensive care facility, a more limited range of patients receive care on this site and patients requiring complex surgery or who have more significant care and recovery needs (as confirmed during their pre-operative assessment) must all therefore receive their surgery at WGH.

2.3 Case for Change

There is an urgent need to improve the facilities within the Watford Hospital Theatres Complex for the following three key reasons, which are aligned to the project objectives:

1. Several areas need urgent upgrading and improvement, in order to comply with modern standards,

2. WHHT needs to ensure that it has sufficient theatre capacity to meet anticipated demand for emergency and elective care until longer-term plans come to fruition.

3. In order to respond to developments in medical technology, a 'hybrid-enabled' theatre is required; this will allow a hybrid theatre to be provided with minimal disruption at a later date, providing benefits that respond to the Trust stated aims.

The case for change therefore considers each of these three objectives in turn, and then sets out the risk of not proceeding.

2.3.1 Compliance Issues

There are several environmental issues within the Watford Theatres Complex that require urgent improvement work. The **Care Quality Commission (CQC) Report in September 2015,** noted a number of concerns about the environment in theatres. Improvements are required to ensure safe, responsive and well-led care and treatment for patients. An extract of the report is copied below.

"We had concerns about the operating theatres at the trust. One of the hospital's five main operating theatres was a converted plaster room without an anaesthetic room where most emergencies took place if elective work was happening. A further two theatres had issues with the ventilation system. The ventilation system should provide clean air movement within the theatres and ensure the filtration of air to prevent transfer of bacteria between procedures. This meant that there was an increased risk of surgical infections. Another theatre was poorly maintained. The walls were cracked, the floor was uneven and lighting was poor. There was also no separate anaesthetic room for children. Children were therefore anaesthetised in theatre with their parents present, which increased the risk of infection. The post-operative recovery area was very small and there were no separate recovery areas for adults and children".

Since the inspection took place, the Trust has commenced the capital investment approvals process by developing a SOC, and now this OBC. It has also undertaken surveys of the area to understand all the issues and design constraints in any proposed solution, and has put in place an interim solution for ventilation so that air flows are as required; however the system still lacks resilience and requires a longer term solution. Female changing rooms have also been refurbished and are now situated within a larger room however further investment is required.

The environmental issues are described in more detail under the following 6 areas below:

- The theatre that was previously a plaster room (the CEPOD theatre) is not compliant with modern standards;
- The paediatric recovery area does not afford appropriate separation of children and adults and there are insufficient recovery beds overall;
- The day surgery admissions & recovery area is sub-standard and does not comply with single-sex and infection control guidance;
- Operational 'flows' through the theatres complex are sub-standard;
- The ventilation system lacks resilience; and
- Staff facilities are inadequate and inappropriate.

(1) Non-compliant CEPOD theatre

Of the five theatres in the main department at Watford; four are planned to the pre 2004 space standards and these were refurbished eighteen months ago, but the fifth theatre was originally a plaster room and has since been converted to a theatre.

This theatre is used for the care of emergency patients ('CEPOD'[1] patients) and is not compliant with modern standards as it is below area and does not have anaesthetic, prep, exit bay or sufficient dirty utility rooms; therefore the patients receive all their treatment in one space. This does not meet modern infection control standards or national recommendations for an operating theatre and so is not appropriate for continued future use. This theatre deals with Watford General Hospital's highest risk patients who are frequently admitted as acute surgical emergencies. These cases are often complex and may require the use of laparoscopic or imaging equipment. Currently, this equipment does not fit within the converted plaster room perimeter and therefore may increase risk to both the patient and surgical team when carrying out procedures within the confined space.

The current arrangement also affects care pathways for surgical patients and restricts the number of patients that can be cared for in this theatre. An essential criterion for the redevelopment of Watford main theatres is therefore to close this theatre and replace it with one that meets national standards. The inadequacy of this theatre was a concern highlighted by the CQC.

(2) Non-compliant paediatric recovery area and an insufficient number of recovery beds

The current recovery facility consists of seven recovery beds in one open area. This area is used for paediatric and adult patients of both sexes. The national standard for paediatric patients as set out in HBN23[2] is that they should have a separate recovery area from adults. The lack of this separation was a concern for the CQC as per the extract below

[1] CEPOD: Confidential Enquiry into Perioperative Deaths
[2] Health Building Note 23 - Designing hospital accommodation for children

"The post-operative recovery area was very cramped. There were seven recovery bays for the five theatres, however, this reduced to five recovery bays if there was no room for patients to transfer to intensive care. There was also no separate children's recovery area which meant they were treated with adults. The Royal College of Surgeons guidelines recommend that there should be a separate recovery area for children."

There are a variety of options as to how this can be done, for example by creating designated areas, or by building single rooms that can be used flexibly dependent on list scheduling, but with children always cared for in these side-rooms.

A further improvement needed is to increase the overall number of recovery beds to at least two per theatre, in line with modern guidelines (HBN26[3]) and to support the extended time in recovery for some patient groups as medical technology advances. Also, within the existing theatre complex there are no isolation cubicles for the post-operative care of patients with suspected infections. These patients are currently treated at the end of a surgical list to reduce the risk of infection to other patients, but it is a sub-optimal arrangement. The lack of isolation cubicles also means that there are no appropriate facilities for children and adults suffering from acute mental health episodes following their surgery. These patients may be cared for in inappropriate areas, impacting both on their care and the care of other patients around them.

Whilst the present recovery is not supportive of single sex accommodation, this is acceptable within recovery care guidelines and means the way this area is used does not breach single sex accommodation guidelines. Provision of separate areas for male and female patients would reduce the number of beds within the recovery area, limit their usage and potentially increase costs, so has not been considered as a requirement for the project.

Taking all of these issues into consideration, improvements to the recovery area are needed to ensure that separate paediatric recovery facilities are in place, that there are a minimum of two recovery spaces per theatre with provision to support the isolation of patients where this is of clinical benefit.

(3) Sub-standard day surgery admissions and recovery area

At present, there is a separate day surgery admissions and recovery area at Watford hospital but this is substandard, does not comply with single-sex guidance and does not offer a high-quality patient experience. The CQC observed the following:

"The day case surgery unit was very small. The unit had three cubicles with beds close together. The floor space between each bed was 80cm. This posed an infection control risk, as, for example, staff members would not be able to assist a patient to use a commode which measured 60cm in width. A theatre sister told us that trust policy stated that two staff members should assist a patient when they were in the cubicle".[4]

(4) Sub-optimal flows through the theatres complex

Currently, there is one entrance into the Watford theatres complex for staff, visitors and patients which means that when patients enter the department, they may encounter staff, relatives, visitors or company representatives in theatre scrubs or normal clothes. Modern guidance (HBN26[5]) recommends that there are separate entrances for staff and patients to a Theatre Department to reduce the risk of infection and to reduce patient anxiety; an optimal design would

[3] Health Building Note 26 – Facilities for Surgical Procedures
[4] Care Quality Commission - Watford General Hospital Quality report September 2015
[5] Health Building Note 26 – Facilities for Surgical Procedures

enable a separate flow for staff and patients. At present there is no waiting area for parents and relatives adjacent to theatres.

The theatres complex also has a very limited number of designated storage areas. The majority of storage for small items is along the corridor that runs outside the theatres, in a series of storage cupboards with locks. If the cupboards are locked there can be a delay in getting to this stock quickly, but if left unlocked there is the potential for items of value to be stolen. Large items (mainly equipment) are stored in one of three already crowded rooms or along the corridors. Not all items have a designated space for storage and when these items are required, valuable time is taken in locating them. Overall the storage is inadequate and insecure, requiring resolution as part of this project.

(5) Lack of ventilation system resilience

The ventilation system within the Watford Theatres Complex needs urgent refurbishment. An extract of the CQC report states:

"A further two theatres had issues with the ventilation system. The ventilation system should provide clean air movement within the theatres and ensure the filtration of air to prevent transfer of bacteria between procedures. The ventilation also regulates temperature. This meant that there was an increased risk of surgical infections".[6]

An interim solution has already been put into place and air flows are as required, but the system is not a robust long term solution and lacks resilience. The longer-term solution that is needed is to replace all ductwork supplying air to the theatres and a new plant unit, so that adequate air-flows and air-pressure can be reliably sustained. Maintenance and planned 'downtime' is impeded by the pressure on theatres and only having 5 theatres all working to maximum capacity.

(6) Inappropriate staff facilities

Staff changing facilities within the theatres complex are of poor quality and do not have sufficient functioning showers, adequate space for staff to change or appropriate storage provision for their personal belongings. There are currently three separate changing areas for male and female members of staff; two male and female, further separated by 'medical staff' and 'other staff'. These facilities require updating in line with CQC comments, as quoted here:

"*The staff changing rooms and toilet facilities were poor. There was an exposed breeze block wall in the changing area and missing ceiling panels. There were no shower facilities. A shower cubicle was acting as a storage area. We noted that the missing ceiling panels were stored with clean scrub suits*".[7]

In such a busy clinical environment, it is important that staff have the opportunity to take adequate breaks, with suitable privacy. There are two rest rooms, one for medical staff and one for theatre staff, both able to accommodate six to eight people. These are based within the department to allow staff time to take their break without the need to get changed or use other facilities within the hospital. The medical rest room has three computers to provide email access whilst staff members are on their break. There is no potential for these computers to be moved to another area thus allowing the rest room to be used for this purpose only.

[6] Care Quality Commission - Watford General Hospital Quality report September 2015

[7] Care Quality Commission - Watford General Hospital Quality report September 2015

Overall, the staff facilities are of poor quality and do not promote rest and relaxation and need to be updated and re-provided in such a way that key adjacencies, such as the proximity of the anaesthetic team can be appropriately supported.

Finally, there are no rooms within the Theatre department that provide space for staff training, development or meetings. At present, meetings which need to be held in the department take place in the recovery area when there are no patients in the room. This can mean meetings don't take place or are cut short. If the recovery room isn't available the staff room may be used, this is small, limits staff numbers and lowers staff-meeting attendance rates, Due to the nature of the work it is impossible for these meetings to be far from the clinical area and staff may need to go back to clinical work at any time. Therefore there is a need to give consideration to these additional staff requirements.

2.3.2 Capacity Issues

The current theatre complex lacks the capacity to meet future demand for surgery. Theatres at Watford are already well-utilised and whilst there is always potential to further improve efficiency to ensure patients are seen quickly, modelling work demonstrates that four full theatres and one converted plaster-room are insufficient to provide high quality care for the forecast number of patients requiring surgery at Watford hospital.

There is also pressure on current capacity. This issue manifests itself in several ways, for example, patients may be cancelled at short notice in order to accommodate emergency patients, or wait longer as an inpatient for their surgery. Theatre 5 is designated as the NCEPOD theatre however the physical limitations of this procedure room result in the more complex emergency procedures taking place in the next available operating theatre, displacing elective work, leading to delays and cancellations.

This is evidenced by the need for ad-hoc out of hours working which is costly, particularly when using agency staff. This is currently being addressed as much as possible by a rescheduling exercise to ensure utilisation is maximised and reduce the need for out of hours scheduling.

Section 2.5 sets out the activity modelling and scenarios in more detail to demonstrate the required capacity of 6 theatres.

2.3.3 Requirement for a Hybrid-Enabled Theatre

In order to plan appropriately for the future, a 'hybrid-enabled' theatre is required at Watford Hospital. A hybrid-enabled theatre has the necessary infrastructure such as structural supports and radiation protection, and is configured to enable it to be easily converted from a general to a hybrid theatre by purchasing and installing the interventional imaging equipment in the theatre. This would be less costly and less disruptive than retrofitting the infrastructure works at a later date.

By investing in the infrastructure works as part of this business case, the Trust is giving commitment to providing a hybrid theatre at a later date when funding allows. A hybrid theatre will enhance the provision of modern health-care for a wide range of patients requiring interventional radiology treatment and care by other clinical specialties. It combines state of the art radiological equipment with operating facilities to enable clinicians to treat patients using both 'open' and 'keyhole' surgical techniques within a single theatre suite.

There are many potential reasons why a hybrid theatre would be of value to patients at WHHT. The most important considerations are summarised below, alongside the trust aims that they would support.

Table 2.1 Drivers for investment in a hybrid theatre

Trust Aim	Drivers for Investment in a Hybrid Theatre
To deliver the best quality care for our patients.	**To undertake more complex and demanding endovascular and minimally invasive procedures at Watford General Hospital.** In addition to vascular, key patient groups that this would benefit in future are: ▪ Patients requiring sedated interventional vascular procedures, nephrostomies, embolisation and stenting under sedation would all benefit due to the significantly superior imaging quality and opportunity to undertake procedures not currently offered at WHHT. ▪ Spinal patients: the high quality imaging provided in a hybrid would support accurate localisation for elective spinal surgery, eg compressions and prolapsed discs. ▪ General trauma: imaging (eg an angiogram) whilst in theatre would confirm the extent of injuries (eg a ruptured organ) prior to surgery for unstable patients for whom movement from theatre to existing diagnostic facilities could represent a significant clinical risk. ▪ Orthopaedic patients: a hybrid theatre would enable accurate imaging of patients with severe injuries, so they can go to theatre without delay and have appropriate imaging whilst there to confirm the most appropriate care. ▪ Interventional radiology: a hybrid theatre affords the opportunity to provide a more flexible approach and move between interventional and open procedures in an environment that is designed to accommodate both.
To be a great place to work and learn.	**To improve chances of recruiting interventional radiologists to work at Watford**. WHHT employs 2 interventional radiologists who provide 6 PAs of interventional radiology per week and ad hoc cover is provided for emergency cases. However, the Trust's ability to attract further staff is limited because it has neither a hybrid theatre nor a compliant interventional radiology suite. This is further compounded by a national shortage of interventional radiologists.
To improve our financial sustainability.	**To provide the most efficient care pathways and reduce overall length of stay.** The flexibility of approach and opportunity to use minimally invasive techniques, within the theatre setting will aid recovery time and reduce overall length of stay for some surgical patients.
To develop a strategy for the future.	**To provide facilities that are suitable 'future-proofed' to respond to advances in surgical approaches and techniques.** Whilst the longer-term plans for the Watford Site have yet to be confirmed, there is a possibility that the PMOK building would be retained and if so, ensuring that there is the potential to have a hybrid theatre as part of the current theatres reconfiguration project would ensure that the facility is 'future-proofed' to provide high quality care. There has also been the suggestion that having a hybrid theatre would address some of the risks of having substandard interventional radiology

	facilities on level 2 of the PMOK building. The number of interventional radiology patients requiring sedation and hence treatment in main theatres has increased over the past year and these patients would benefit from the improved facility. However, interventional radiology patients that do not require sedation would continue to be cared for in the radiology department on PMOK level 2.

Provision of a hybrid theatre is therefore undoubtedly of benefit to WHHT patients, to support the development of improved care pathways in a range of clinical specialties.

This business case is to invest in a hybrid-enabled theatre rather than a full hybrid theatre as this will allow further opportunity to explore what sort of hybrid equipment would be best for the anticipated future case-mix. It also ensures that the hybrid theatre is provided only when it is absolutely required to meet activity demands. Therefore the purchase of the equipment will be subject to a separate business case and could be provided through charitable funds.

2.3.4 Risks of not Proceeding

There are many significant risks to WHHT if this project does not proceed. These are set out in the table below:

Table 2.2 Risks of not proceeding

Risk	Risk Assessment:			Mitigation Strategy
	Likelih	Impact	Score	
Strategic Risks				
Failure to care for paediatric recovery patients in an appropriate environment.	5	4	20	Can only be addressed through reconfiguration of the recovery area or by scheduling lists in such a way that there would be a significant and serious reduction in theatre capacity.
Substandard admission facilities for elective and day surgery patients.	5	4	20	Can only be addressed through reconfiguration of the theatres area or by scheduling lists in such a way that there would be a significant and serious reduction in theatre capacity.
Failure to comply with environment and infection control guidance.	5	4	20	Can only be addressed via reconfiguration works.
Failure to address concerns identified in 'inadequate' CQC inspection report.	5	4	20	Can only be addressed via reconfiguration works.
Insufficient theatre capacity to deliver waiting time standards for elective surgical care.	5	4	20	Liaison with alternative care providers and increased use of SACH.
Operational Risks				
Unable to care for number of patients requiring emergency surgery at Watford hospital.	5	4	20	Few viable alternatives and none sufficient to meet demand.

Continued use of inadequate theatre for CEPOD patients.	5	4	20	Use an alternative theatre, hence reducing overall capacity.
Adverse impact of substandard facilities on staff morale and turnover.	4	4	16	Liaison with human resources experts required to confirm mitigation plan.
Too few recovery spaces for number of patients that need to be seen, with knock-on impact on wards and ICU.	4	3	12	Accept impact on ward and ICU capacity.

2.4 Strategic Context

2.4.1 National Strategy

Five Year Forward View, NHS England (October 2014)

The *Five Year Forward View* was published by NHS England and its partners. It reported that, unless determined action was taken, the gap between need and available resources would be £30bn in 2020/21. The document summarised three scenarios about the degree to which that gap could be reduced. The forward view highlighted several approaches which are relevant to healthcare estates planning:

- patient needs are changing and new treatment options are emerging;
- challenges in mental health, cancer and support for frail elderly patients;
- new partnerships are envisaged with local communities, local authorities and employers;
- the need for rapid upgrade in prevention and public health;
- patients will need to gain more control of their care;
- barriers removed to care provided by family doctors, hospitals, physical and mental health and health and social care;
- in future more services delivered locally but others in specialist centres;
- more support for patients with multiple health conditions;
- future radically different care delivery options including integrated hospital and primary care providers.

The *Five Year Forward View* uses the Watford Health Campus as an example of a radically new approach to the development and refurbishment of urban areas offering "*the opportunity to design modern services from scratch, with fewer legacy constraints – integrating not only health and social care, but also other public services such as welfare, education and affordable housing."*

Delivering the Forward View: NHS planning guidance 2016/17 – 2020/2021, NHS England (December 2015)

This planning guidance sets out the steps to help local organisations deliver a sustainable, transformed health service and improve the quality of care, wellbeing and NHS finances.

The planning guidance is backed up by £560 billion of NHS funding, including a new

Sustainability and Transformation Fund (STF) which will support financial balance, the delivery of the Five Year Forward View, and enable new investment in key priorities. As part of the planning process, all NHS organisations are asked to produce two separate but interconnected plans:

- A local health and care system 'Sustainability and Transformation Plan (STP)', which will cover the period October 2016 to March 2021; and
- A plan by organisation for 2016/17. This will need to reflect the emerging Sustainability and Transformation Plan.

The creation of STPs marks a shift from planning based around individual organisations and performance being measured on an organisational level, to one of place based planning and review.

WHHT is located within the STP footprint of Hertfordshire and West Essex, and this STP identifies that addressing the theatre compliance and capacity at Watford is a priority, noting that this OBC is in development.

The Carter Report, June 2015 and Feb 2016[8]

Lord Carter's interim report in June 2015 outlined the work that has been carried out to review the operational productivity of NHS hospitals, working with a group of 22 NHS providers. The report provided interim recommendations and next steps for efficiency centred on workflow, workforce, pharmacy and medicines optimisation and estates and procurement management.

A key interim recommendation was the need for a common set of metrics that could serve as a barometer for hospitals to compare themselves with their peers, taking into account the complexity of care provided, and more importantly provide a baseline for future improvement. This would enable hospital leaders to pinpoint areas of improvement and identify where large improvements could be made by reducing variation in services.

Lord Carter's final report published in February 2016 identified significant and unwarranted variation in costs and practice which, if addressed, could save the NHS £5bn. The report acknowledges that although there is exceptional practice already happening in the NHS, the overall average is not sufficient and more needs to be done to bring poor performance up to meet the best. It concluded there is the potential for efficiency savings of £1bn from better management of estates, such as lighting, heating and utilising floor space, with a large variation between trusts, with one using just 12% for non-clinical purposes, while another used over two-thirds.

The report recommends that:

- "Every trust has a strategic estates and facilities plan in place, including in the short term, a cost reduction plan for 2016-17 based on the model hospital data and benchmarks, and in the longer term (by April 2017), a plan for investment and reconfiguration where appropriate for their whole estate, taking into account the trust's future service requirements" and

- "All trusts estates and facilities departments should operate at or above the median benchmarks for the operational management of their estates and facilities functions by April 2017 (as set by NHS Improvement by April 2016); with all trusts (where appropriate) having a plan to operate with a maximum of 35% of non-clinical floor space and 2.5% of unoccupied or under-used space by April 2017 and delivering this benchmark by April 2020, so that estates and facilities resources are used in a cost effective manner."

[8] DH - Operational productivity and performance in English NHS acute hospitals: Unwarranted variations (February 2016)

This OBC responds to the Carter report by maximising the amount of clinical space in the theatre department. Also, by addressing the theatre capacity issues, this will enable elective and planned emergency procedures to be carried out within operational hours and reduce the costs of out of hours staff, therefore improving cost effectiveness.

2.4.2 Regional Strategy

West Hertfordshire Strategic Review – Your Care, Your Future

To implement the whole health economy change envisaged in national planning guidance and NHS England's *Five Year Forward View*, Herts Valleys CCG (HVCCG) is leading a system wide transformation of services in west Hertfordshire. Working across all providers and commissioners to assess the demand for services and sustainability of provision, the west Hertfordshire Strategic Review, *Your Care, Your Future (YCYF),* is looking at ways to ensure the local health system can meet local health and social care needs in the future and do so within constrained financial budgets, and WHHT will be able to influence wider change within this review. The *YCYF* consultation has revealed strong support for change within the local community with 76% of people and 91% of clinicians saying health services need to improve[9].

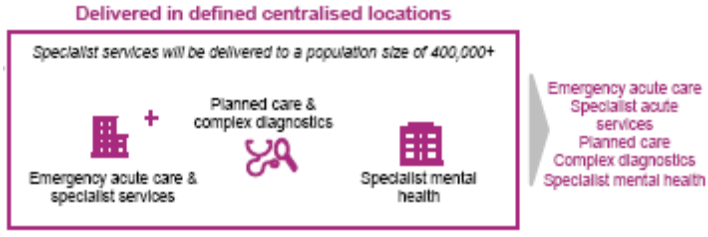
The *YCYF* Case for Change published in July 2015 focused on three core themes:
- Preventing ill health
- Integration
- Local delivery

As part of the case for change, Watford residents gave "many comments about outdated hospital facilities, some of which are not fit for purpose"[10].

The *YCYF* Strategic Outline Case (SOC) published in October 2015 describes the Future Model of Care (FMOC) developed by the partner organisations for the local health and social care economy comprising five key features:
- More effective prevention
- Delivering more joined up care
- An approach to care that seeks to maintain stability and prevent escalation to more acute levels of care
- Centralised and rationalised care in modern facilities
- A locality based, community focused model of care

The FMOC is made up of four building blocks:
- Health and care services delivered in people's homes
- Local services close to home
- Services delivered through locality hubs
- Emergency, acute and specialised services

The emergency acute and specialised services building block includes:
- planned care
- complex diagnostics
- emergency acute care
- specialised acute services



[9] *Your Care, Your Future*, Briefing for the Boards June 2015
[10] Working together for a healthier West Hertfordshire Summer 2015 The case for change YCYF

- inpatient mental health

The model envisages:

- lower risk patients (ASA 1 and 2) undergoing common procedures will continue to be treated at an elective care facility
- high risk patients or those having more complex surgery will require care to be delivered with the full back-up of an acute hospital (e.g. access to critical care)
- as with day case procedures, there are step changes in efficiencies, therefore it is economically advantageous to develop a single elective care facility that is fully utilised, appropriately staffed, and is delivered in fit-for-purpose estate

WHHT Acute Transformation SOC

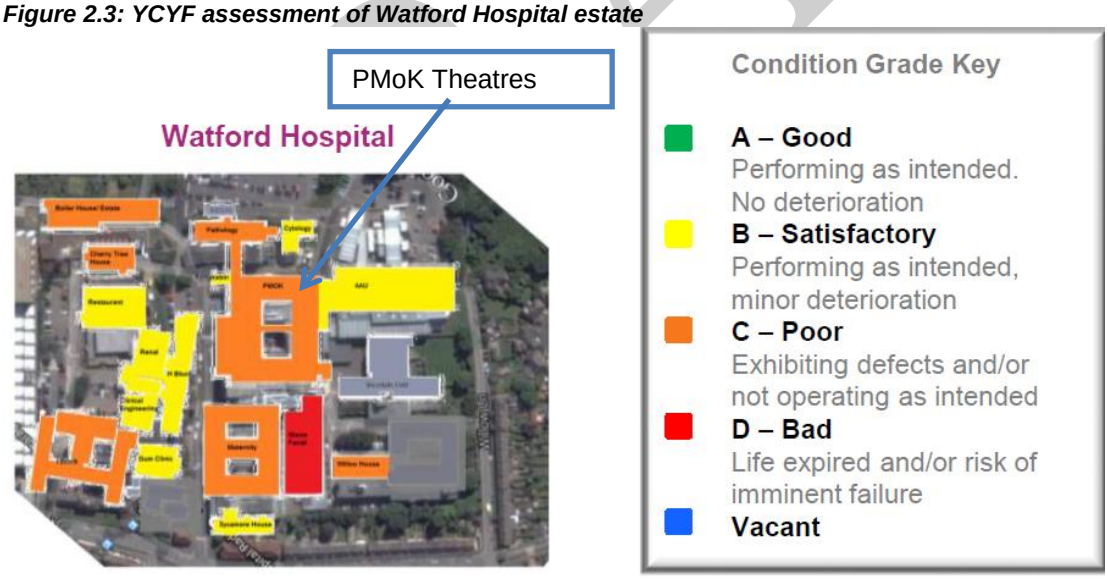
WHHT has developed a SOC to describe the future configuration of acute hospital services and the associated investment required for its estate and infrastructure in line with the *Your Care, Your Future* programme. This was approved by the Trust Board on 2 February 2017.

The preferred way forward confirmed within the Acute Transformation SOC is for the WGH site to continue to be the location of emergency and specialised care and for the SACH site to be further developed as the location of planned care.

The Acute Transformation OBC will determine the split between new build, redevelopment and refurbishment at each site.

YCYF and the Acute Transformation SOC recognise that a large proportion of the key hospital estate at Watford Hospital is in poor condition and not functionally suitable for providing the clinical services currently being delivered from the space, as shown in the figure below.

Figure 2.3: YCYF assessment of Watford Hospital estate



In the context of the site redevelopment, it is acknowledged that the future of the PMoK building (where the main theatres are located) is not certain, however the proposed investment in theatres as described in this OBC is urgently needed to sustain the current services in the medium term.

Local Commissioning Intentions

Herts Valleys CCG's commissioning intentions reflect the national themes of improving quality within a constrained financial environment. The CCGs strategy is aligned to the *YCYF* strategy as

they are leading the work with partner organisations.

The CCG's commissioning intentions reflect the need to address the rising level of unscheduled admissions which is being experienced across the healthcare system and is a significant driver for change at WHHT. The strategy for managing this rising unscheduled demand is to achieve a greater separation of unscheduled and planned work.

HVCCG's Operational Plan for 2015/16 maintains the emphasis on these high level intentions with key themes including[11]:

- Building capacity and primary care and community based services
- Development of improved quality and outcome measures
- Use of benchmarking and best practice to set KPI's
- Focus on delivery of NHS Constitution targets for 18 weeks RTT and A&E 4 hour waiting time
- Continued development of alternatives to emergency admissions
- Improvement of discharge system flow processes
- Improve service specifications and KPI's for key community services
- Promotion and delivery of 7 day working
- Improve communications timeliness and quality between secondary and primary care

The local commissioners, specifically Herts Valleys CCG have been asked to provide their support for this OBC (see Appendix 2A).

Sustainability and Transformation Plan (STP)

HVCCG's commissioning intentions are reflected in the Hertfordshire and West Essex STP. The STP, agreed by commissioners and providers across the health economy, identifies a series of emerging priorities, the first of which is development of a sustainable urgent and emergency care system meeting NHS Constitution and required CQC standards. Success will be predicated on having all parts of the health and social care system working more effectively to reduce the number of avoidable attendances and admissions to hospital.

Investing in increased capacity in theatres will improve flow along the emergency and urgent care pathway, contributing to commissioners' objectives and improving whole system sustainability.

The YCYF SOC sets out a whole system strategy for how to improve outcomes, quality and financial sustainability. Implementing the care model outlined in YCYF enables the redevelopment of the WHHT estate and implementation of the clinical strategy to focus on the elements of care that require acute hospital expertise. The theatres investment will improve a key element of the acute hospital infrastructure on the Watford site, sustaining delivery of complex emergency and planned care services from the site.

Hertfordshire Vascular Centre

In recent years there has been an increasing awareness that the results of complex surgery are related to surgeon and unit volumes of cases. This has been one of the main drivers for amalgamating surgical units performing complex surgery in the UK. Mortality outcomes for patients undergoing vascular surgery have followed the same pattern with smaller units generally having a greater variability in outcomes, particularly for repair of abdominal aortic aneurysms (AAA). As a result, The Vascular Society proposed new guidelines for standards of care for people requiring vascular surgery in 2011. The aim was to halve the mortality rate for AAA

[11] HVCCG Our Operational Plan 2015-16, Commissioning Intentions

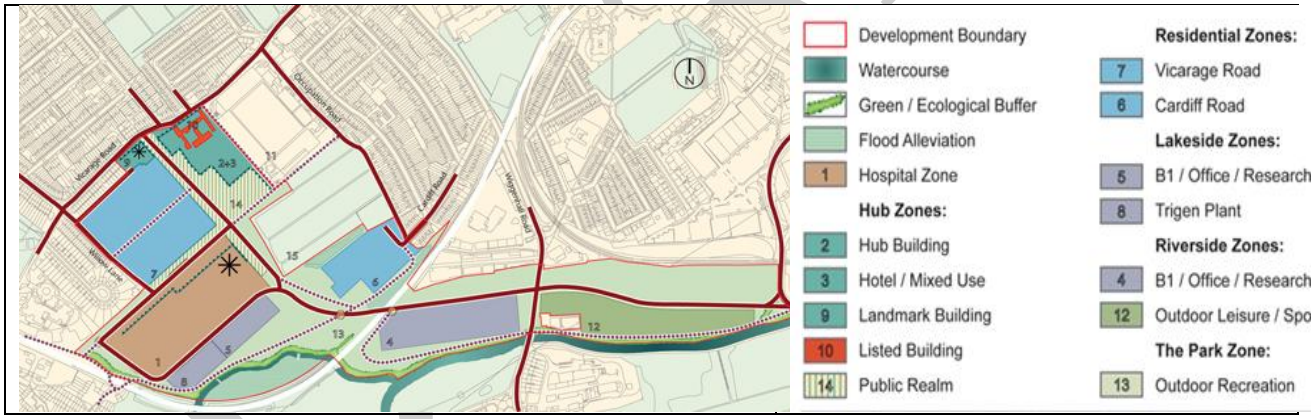
surgery in the UK[12]. These standards have informed the NHS Standard Contract for vascular services; ensuring safe and timely treatment for patients with vascular disease by developing vascular units serving a larger catchment area so as to ensure sufficient numbers of patients to maximise expertise. These units provide vascular surgeons, interventional radiologists and the supporting infrastructure for round-the-clock care.

At present, two NHS hospital trusts provide vascular services in Hertfordshire: West Hertfordshire Hospitals NHS Trust (WHHT) and East & North Hertfordshire NHS Trust (E&NH). Following the publication of the new standards of care for people requiring vascular surgery, it was clear that individually, neither hospital could meet the recommended minimum number of procedures due to the size of their catchment population, but that by working together as a network, with a single designated centre for all vascular surgery, this would then be possible.

This designated Hertfordshire Vascular Centre will not be at WHHT given the Trust's recent decision not to submit a bid. Therefore the activity modelling in this business case assumes that the substantial majority of complex vascular work will go to the designated centre, and not WHHT in line with the national specification.

Watford Health Campus[13]

The Trust has entered into a partnership with Watford Borough Council and Kier Property Ltd to support a regeneration of an area of west Watford, which includes land surrounding Watford General Hospital and land owned by the Council. The development zone is known as Watford Health Campus (WHC) and will see the west Watford area reconnected to the town centre and will provide an opportunity for development of the hospital to the south of the current hospital facilities in zone 1 on the site plan below.



The WHC plans will continue to be developed by stakeholders on a stage by stage basis as Kier, which has formed a Local Asset Backed Vehicle (LABV) to deliver the regeneration, seeks outline planning consents to build out each development zone on a phased basis.

It is recognised that interim investment in the current estate, such as the theatres reconfiguration, needs to take account of emerging plans for the development of the Watford Health Campus and the Acute Transformation project, and as a result this OBC seeks only to deliver what is essential over the medium term, minimising capital expenditure.

[12] Br J Surg. 2007 Apr;94(4):395-403. Meta-analysis and systematic review of the relationship between volume and outcome in abdominal aortic aneurysm surgery. Holt PJ1, Poloniecki JD, Gerrard D, Loftus IM, Thompson MM.
[13] http://watfordhealthcampus.org/

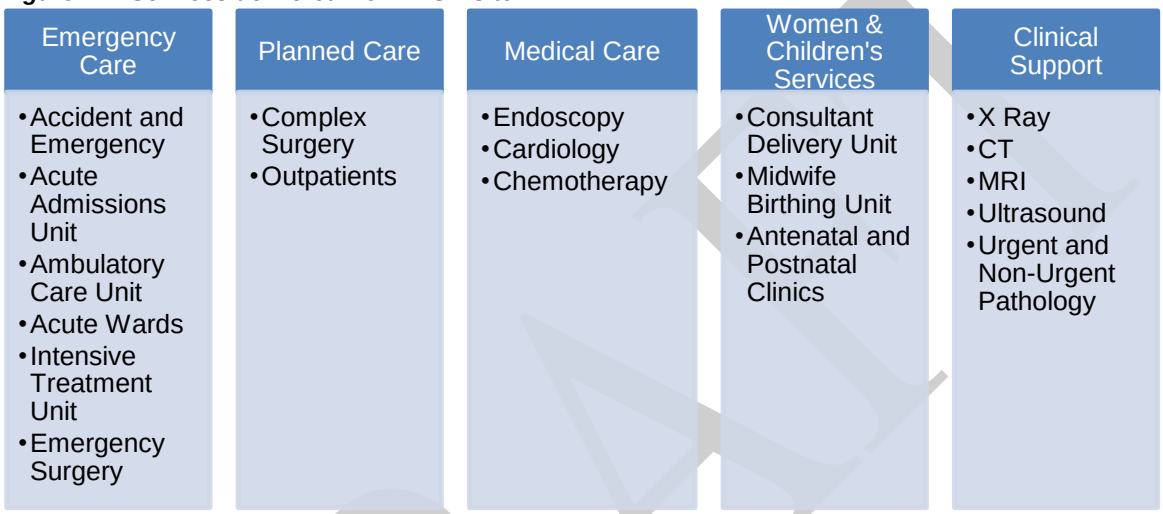
2.4.3 Overview of Trust Services and Strategies

Trust Services

Watford General Hospital is at the heart of the Trust's acute emergency services – the core location for inpatient emergency care, and for all patients who need the specialist emergency facilities (such as intensive care) of a major district general hospital. It also provides elective care for higher risk patients together with a full range of outpatient and diagnostic services. There are c.600 beds and 8 theatres. Watford is also the focus of the Trust's Women's and Children's services including neo-natal care.

Clinical and clinical support services delivered from the WGH site are summarised below.

Figure 2.4: Services delivered from WGH site



Surgical services

Operating theatres are provided in two locations on the Watford Hospital site:

Table 2.5: Theatres on the Watford Hospital site

Main Theatres, Level 6, PMoK building	○ 2 theatres for all surgery, excluding orthopaedics ○ 2 theatres with ultra clean air flow for orthopaedics/trauma ○ 1 CEPOD theatre (procedure room) for emergency surgery	Elective surgery Emergency (CEPOD) surgery Trauma surgery
Women's & Children's building	1 Gynaecology theatre	Elective surgery Emergency caesarean sections out of hours
	2 Obstetric theatres	Elective caesarean sections Emergency procedures

WGH main theatres are used for emergency and elective procedures on both adults and children.

Theatres in the Women's & Children's building are not used for paediatric surgery as additional anaesthetic cover would be required to maintain a safe level of service away from main theatres. All paediatric surgery takes place in main theatres to ensure immediate emergency access is available as required to senior anaesthetic and surgical team backup.

SACH is an adult only elective site for surgery and is provided with 6 theatres and a recovery

area. Due to the limitations on the SACH site only ASA 1 and 2 patients have surgery there. All ASA 3 and 4 patients have their surgery at WGH main theatres.

In addition, all patients are screened pre procedure for MRSA and only those testing negative are booked into SACH. Patients testing positive for MRSA are treated at WGH main theatres.

ASA 3 and 4 patients requiring day procedures are booked into main theatres to enable an appropriate level of medical cover to be provided post procedure. Treating these patients at SACH would require medical cover to be introduced which would increase the costs of providing the service.

Theatre schedule

A review in 2016 of all theatre scheduling (excluding obstetrics) across WGH and SACH theatres found that there were inefficiencies in theatre utilisation, caused by:

- Haphazard template across sites with multiple different start/finish times
- Variable timetable from week to week
- Poor utilisation of evening lists
- Multiple incidents regarding finish times
- Expensive weekend lists to meet capacity
- No all day trauma list
- No all day elective orthopaedic list at WGH

These inefficiencies in theatre utilisation had the following consequences:

- impacts on emergency flows - WHHT is amongst the worst national ED performances (16th from bottom as at January 2017)
- increases inpatient bed utilisation particularly for trauma patients
- contributes to consistent failure in RTT target achievement through elective cancellations
- contributes to theatre staff recruitment difficulties

In order to improve efficiencies, consultation with surgery and anaesthetics staff was undertaken and a revised theatre scheduling timetable was agreed. The two session asymmetric schedule providing 11 hours daily over a 5 day week was introduced in October 2016. The revised schedule is providing:

- additional capacity within normal operational hours
- all day trauma list
- all day elective orthopaedics at WGH for ASA 3&4 patients
- consistent start/finish times
- better use of the theatre time available
- improved patient experience with reduced wait times
- improved environment to recruit

In the longer term it is envisaged that the revised schedule will reduce and potentially eliminate additional weekend sessions booked at short notice which are significantly more expensive than sessions planned during normal operational hours. The changes are also planned to create a cost saving for the Trust as the current demand for surgical procedures can be completed within substantive posts avoiding additional locum and agency costs.

WHHT Clinical Strategy

WHHT provides a wide range of acute emergency and planned services, with emergency care primarily provided at Watford Hospital and with St Albans City Hospital as its elective care centre. Outpatient, diagnostic and urgent care services are provided at Hemel Hempstead Hospital.

The Trust has recently published its Clinical Strategy setting out priorities for further developing clinical services over the coming years. The Clinical Strategy is fully aligned to the Your Care, Your Future strategy and is underpinned by the principles of:

- delivering more care locally,
- strengthening core services, and
- providing excellent specialist care as appropriate.

It considers each element of a lifetime of care, namely:

- Maternity and newborns
- Children's and young people's services
- Adults
- Older people and end of life care

Impact of Clinical Strategy on Theatres

The YCYF shortlisted options for emergency, acute and specialized services and future decisions made regarding these are reflected in the WHHT Clinical Strategy 2016-2020. Over the next 5-10 years there is a need at Watford Hospital to continue to provide surgery and the demand for surgery is growing.

Trust Estate Strategy

The Board approved the Interim Estate Strategy in March 2016 and an update to this was approved by Trust Board in February 2017 and was approved.

Vision

The Trust's ambition is to achieve a step change in estate quality through wholesale renewal and redevelopment, providing sufficient capacity to meet demand and reconfiguring the estate to enable service transformation through the YCYF FMOC. The objectives for the estate are driven by, and respond to the organisational objectives and clinical strategy:

Organisational objectives:	•Estate objectives:
CONTINUOUS IMPROVEMENT	•To ensure that principles of sustainability underpin the development of the Estate
CLINICAL STRATEGY	•To ensure that the quality of the Estate supports delivery of safe, effective, high quality clinical care by strengthening core services and providing specialist care where appropriate
FINANCIAL STRATEGY	•To ensure that the vision for the Estate is supported by adequate investment and that such investment is protected •To set and monitor key performance indicators for this strategy

Current Estate

The Trust is significantly challenged by a low level of compliance with acceptable estate health and safety standards. The Trust is committed to making significant improvements to compliance with statutory estate management standards and this objective is a key consideration in prioritising investment on the estate.

The Trust has been particularly challenged at the Watford Hospital site, with a 58% increase in unscheduled admissions between 2008/9 and 2013/14. This increase in demand has all but consumed existing physical capacity to treat patients with existing service models. WHHT therefore needs to provide sufficient physical capacity for unscheduled admissions and related activity at Watford over the period leading up to the implementation of Your Care, Your Future, making use of available capacity at St Albans and Hemel Hempstead for planned services.

The low level of Estates standards is acknowledged by the Care Quality Commission which found services falling short of the required standard in several areas in a series of inspections during 2014 and 2015, culminating in the Trust being placed in special measures on publication of the latest report on 3rd September 2015.

The six facet survey is currently being updated, however the 2012 Six Facet survey of Watford General Hospital indicated that at that time the hospital was broadly at condition C and not meeting the relevant standards. Around 81% of elements surveyed were considered to need repair or replacement and to be below category B standard. The breakdown of condition grades and overall cost by risk category is illustrated below.

Figure 2.6 Breakdown of condition grades (Watford Hospital)

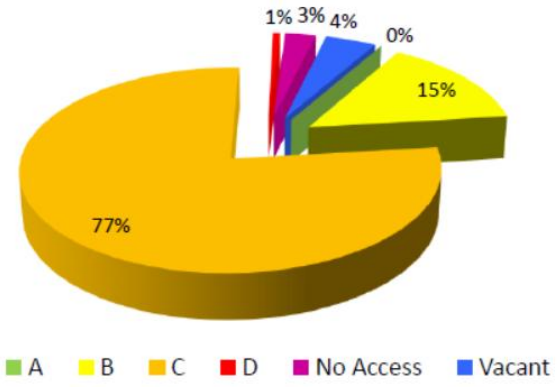
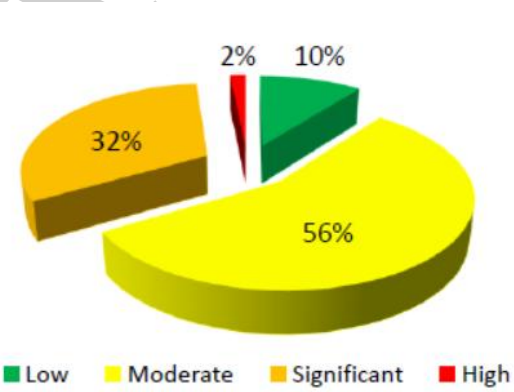


Figure 2.7 Overall cost by risk category (Watford Hospital)



As recognised in Your Care, Your Future (YCYF), the condition of the Estate and infrastructure at WHHT is poor, following years of underinvestment. This has resulted in challenges that are experienced on a daily basis by staff, patients and families using the services provided by WHHT. The last 12 months has seen failures in the water and heating systems, the loss of electrical power to critical clinical services, widespread rainwater ingress due to the poor condition of the external building fabric and constant challenges to maintain appropriate ventilation systems in high risk areas.

A Development Control Plan was produced by the Trust in October 2015 but will undergo review as part of the Watford site OBC development in 2017/18.

Theatres Project

The requirement for investment in theatres is identified in the Trust's Interim Estate Strategy as a key requirement to provide a 'safe, efficient and fit for purpose estate' and is included in the

funding profile. It is a stated priority for the Trust.

Premises Assurance Model

The Trust has adopted the DH Premises Assurance Model (PAM) as the basis for the creation of an evidence-based methodology to provide board-level assurance across the range of services necessary 'to provide a safe environment for the delivery of healthcare'. The model is being populated through a series of workshops in 2016 with a planned completion date of December 2016.

The NHS PAM involves a structured process of self-assessment questions which focus on specific legislation or estate guidance under the following five domains:

- Finance and value for money
- Safety
- Effectiveness
- Patient Experience
- Board Governance

'Live' action plans are being produced during this data population phase to ensure critical failings can be addressed immediately.

Sustainable Development Plan

The Trust has a Sustainable Development Plan that was Board approved in 2011. It is currently undertaking a refresh of this.

2.5 Activity Analysis

The following section sets out the key data and modelling assumptions that have been used to quantify future theatre capacity requirements for Watford Main Theatres and to confirm the number of surgical beds needed to support this growth in activity. It sets out the reasons for selecting the modelling assumptions that have been used by considering the following:

1. Fixed assumptions regarding future theatre demand;
2. Variable assumptions and further scenarios tested;
3. Number of theatres needed under the 'most likely' scenario;
4. Impact on surgical beds needed; and
5. Conclusion.

In order to complete this activity analysis, the Trust commissioned a detailed theatre model from external experts that considered the number of theatres needed across all WHHT sites. This same model has also been used to support the development of the SOC for the overall redevelopment of WHHT's acute sites.

2.5.1 Fixed Assumptions Regarding Future Theatre Demand

The following table sets out the fixed data assumptions that have been used to assess how many theatres are needed at Watford Hospital over the next ten years. The number of patients currently cared for in Watford Theatres has been used as an initial 'proxy' for demand, with different assumptions then applied to ensure that future requirements are as accurate as possible. The fixed assumptions below show core expectations as to how the theatre complex will work in future that are not expected to change significantly in future; these were then applied across all sensitivity-testing scenarios. The rationale for using these particular assumptions is

described below, with any significant changes from assumptions made in the initial SOC also noted.

Table 2.8: Fixed Data Assumptions

ID	OBC Assumption	Justification for OBC Assumption	SOC Assumption
1.	Baseline data 1 Jan to 31 Dec 2016	This represented the most recent validated activity data available.	Baseline data Jan - Jun 2015 data, then extrapolated for the full year.
2.	Demographic growth of 1.2%.	This is in line with *Your Care, Your Future* expectations.	A composite demographic & non-demographic figure of 2.9% was used, then sensitivity tested.
3.	Emergency Theatre Utilisation – 67.5% utilisation (50% utilisation for first emergency theatre, and 85% for second).	This is to facilitate peaks and troughs to care for 'life and limb' cases appropriately and in a timely way.	Unchanged from SOC.
4.	Elective Theatre Utilisation – 85% Utilisation	This is in line with national guidelines, to ensure optimum overall efficiency.	Unchanged from SOC.
5.	Number of weeks per year that elective theatres operate set at 48 weeks per year.	Reflects current arrangements - increasing to test 50 weeks per year would impede routine maintenance of theatres.	Number of weeks per year that elective theatres operate set at 48 weeks but 46 and 50 weeks was sensitivity tested.
6.	Impact of waiting list size on capacity needed.	Due to data validation work undertaken at varying points, changes to waiting list size would not be a reasonably proxy for demand. However, use of the private sector to maintain waiting times would need to be factored in, as outlined below.	The elective waiting list had not increased from the start to the end of the data period used, so no adjustments were needed to ensure all demand was captured.
7.	Any private patients cared for at WGH by private sector are not included in dataset so will understate by a very small and non-material margin.	All outsourcing, i.e. WHHT NHS patients treated elsewhere, undertaken during 2016/17 to meet elective demand factored into baseline data.	Limited outsourcing took place during the data period used in 2015/16, so this did not need to be accounted for.
8.	Impact of <u>expected</u> changes to care pathways. <u>Complex vascular surgery:</u> WHHT has not submitted a bid to become the vascular hub for Hertfordshire, so complex vascular surgery will at some point transfer to another provider. Assumptions are therefore: **2020/21:** AAA related HRGs **2021/22:** 50% of remaining complex vascular transfers **2022/23:** Remaining complex vascular transfers (i.e. zero % then remaining).	Expectations have changed since time of SOC but there is still a significant degree of uncertainty regarding vascular plans and the timescale for change given significant capacity constraints at potential hub sites and the need for significant capital work to support the change.	At SOC stage, 3 different scenarios were tested for vascular surgery in the future, dependent on whether or not WHHT became the vascular hub.

	Interventional radiology: Changes to complex vascular pathways will already be accounted for above. Greater capacity in theatres will allow more patients to be offered a general anaesthetic. Assumption is therefore: **2020/21:** 348 hours of activity undertaken in Radiology will transfer to Main Theatres. This takes into account additional anaesthetic time.	At SOC, drivers for transfer of IR activity from Radiology to Main Theatres were to access higher quality imaging and recovery facilities. Investment in new imaging equipment in Radiology has since been made and therefore driver at OBC is to access recovery facilities.	The SOC assumed that all vascular interventional radiology patients would be cared for in the new hybrid theatre and sensitivity tested impact of further interventional radiology patients also being cared for in the new theatre.

2.5.2 Variable Assumptions and Further Scenarios Tested

There are a range of factors for which it is harder to quantify their anticipated impact on the number of theatres needed, either because they are variables that may alter or because decisions are awaited regarding future service configuration. A number of capacity scenarios were modelled to sensitivity-test the potential impact of these changes on the number of theatres that are required at Watford Hospital. The table below summarises these scenarios and demonstrates how a wide range of potential changes were tested, with Scenario 4 representing the 'most likely' future option. The preferred scenario is then sensitivity tested to estimate the potential impact of varying the number of hours per week that each elective theatre operates and non-demographic growth rates. Further analysis of these scenarios is provided in Appendix 2B.

Table 2.9: Factors used to sensitivity test Watford theatre capacity requirements

		← MOST TO LEAST THEATRES →				
Description	**Ranges tested**	**Scenario 1**	**Scenario 2**	**Scenario 3**	**Scenario 4**	**Scenario 5**
Non Demographic annual growth rate (Elective)	1.27% YCYF (Fewest theatres) to 3.3% Historical (Most theatres)	3.3%	3.3%	3.3%	2.1%	1.27%
Non Demographic annual growth rate (Day Case)	1.27% YCYF (Fewest theatres) to 3.3% Historical (Most theatres)	3.3%	3.3%	3.3%	2.1%	1.27%
Non Demographic annual growth rate (Emergency)	1.2 % YCYF Assumption applied to all scenarios	1.2%	1.2%	1.2%	1.2%	1.2%
Theatre Capacity	55 – 65 hours per theatre per week[14]	Yr 1 55 Yr 4 55 Yr 8 55	Yr 1 55 Yr 4 55 Yr 8 60	Yr 1 55 Yr 4 60 Yr 8 60	Yr 1 55 Yr 4 60 Yr 8 65	Yr 1 55 Yr 4 60 Yr 8 65

[14] Since the development of the SOC, theatres across the Trust have moved to an 11 hour a day, Monday to Friday schedule and in order to meet existing demand, activity is routinely place on Saturdays and on some occasions is surging into Sunday. Any increase in hours above 55 hours per theatre per week at Watford is therefore likely to result in weekend working rather than a further extension to hours during Monday to Friday. The financial analysis has factored in weekend rates which should be sufficient enough to accommodate either weekend working or overtime.

Impact of potential changes to care pathways.	Upper GI: It is possible that Upper GI cancers may transfer to an alternative provider, though a decision has yet to be made.	0	0	Upper GI transfers as of 2020/21: (192 hours a year)	Upper GI transfers as of 2020/21: (192 hours a year)	Upper GI transfers as of 2020/21: 192 hours a year)

2.5.3 Selected Scenario and Alignment with STP Assumptions

It is important that future activity assumptions within this OBC are in line with expectations across the STP footprint and so these have been used to underpin the future activity analysis. Discussions have also been held with the CCG to provide further challenge and assurance that the approach taken is reasonable and pragmatic. Of particular note is the assumption that primary care interventions to reduce secondary care demand for elective care apply to less complex surgical cases and therefore apply to surgical activity at SACH and not the surgical cases at Watford theatres. This is because Watford cares are predominately for cancer patients and patients with complex needs that have a greater anaesthetic risk (i.e. ASA 3 and 4). These patients will continue to be treated at Watford.

In addition to growth and non-demographic growth, natural increases in elective activity are anticipated as a result of the Trust coming out of special measures and from active marketing of services where the Trust offers services that are not available at other DGH's. The table below is based on a recent analysis of market-share for WHHT and demonstrates that there are surgical specialties for which this could increase. Hence, the 'most likely' scenario has used a mid-point between the YCYF growth assumption and historic growth for elective care only, to reflect the anticipated increase in market-share. However, as an overall proportionate change and hence the impact on the overall number of theatres needed, this is a marginal change.

Table 2.10: Potential increases in surgical activity from market share growth

West Hertfordshire Hospitals selected surgical specialties	Market share % Aug 2013 - Jul 2014	Aug 2014 - Jul 2015	Aug 2015 - Jul 2016	Potential increase in elective spells %	Potential increase in elective spells (N#)
Trauma & Orthopaedics	↑ 57.3%	55.9%	↓ 53.7%	6.8%	317
General Surgery	↑ 68.1%	72.8%	↓ 67.8%	7.3%	321
ENT	↑ 55.6%	56.2%	↓ 54.0%	4.0%	53
Pain Management	↑ 52.1%	50.5%	↓ 41.9%	24.2%	183
Colorectal Surgery	↑ 56.7%	43.9%	↓ 40.1%	41.5%	242

Potential increase in elective spells has been estimated from the additional activity from WHHT achieving the highest market share previously recorded in the 3 year period between August 2013 and July 2016 applied to activity in August to July 2016

Finally, no STP impact has been projected for Watford non-elective theatre admissions since the reductions in non-elective activity is anticipated to apply to cases not requiring theatre, such as non-elective surgical patients admitted, assessed and then discharged without surgery and therefore without the requirement for time in theatre. These assumptions, at the time of writing, reflect the need for further system wide discussion and generation of the evidence base for the interventions. This includes documentation on the impact of the reductions where these have been implemented previously within the NHS and further details on implementation and investment plans to facilitate the shifts in activity from the acute sector. It is for these reasons that the lower level of activity growth reflected in scenario 5 has been discounted.

The scenarios showing higher levels of growth based on historical levels and no increase in

elective theatre operating hours have also been discounted. Whilst the demand management assumptions do require further detail and will need to be closely monitored, the Trust accepts that the capacity modelling must be consistent with system led demand management and therefore applying historical growth levels would not be appropriate. Similarly, the modeling has sought to show planned increases in theatre operating hours and therefore, despite some difficulty in increasing elective theatre hours being anticipated, the scenarios where no increase is planned (scenario 1) or where the increase is modest (scenarios 2 and 3) have also been discounted.

The scenarios tested show a range in the number of theatres needed at Watford Hospital – what is needed is to consider a 'most likely' scenario that takes account appropriately of the range of variable assumptions that may change. Of the 5 scenarios tested, scenario 4 is the scenario that is considered both most reasonable and most pragmatic. This scenario reflects YCYF demographic and non-demographic growth assumptions which align with the assumptions in the SOC for the long term redevelopment of the acute services at Watford to ensure a consistency in approach. It is also consistent with the assumptions used in the Sustainability and Transformation Plan for this area.

The application of the full STP assumptions applied to Watford is shown as a further sensitivity testing scenario within Appendix 2B.

2.5.4 Number of Theatres Needed Under 'Most Likely' Scenario

Baseline Activity Data

The table below sets out 2016 theatre activity by admission type.

Table 2.11: Baseline Theatre activity (Number of Operations) for 1 January – 31 December 2016

POD	WGH	SACH	Total
Daycase	1,987	8,539	10,526
Elective	2,344	2,685	5,029
Emergency	3,094		3,094
Total	**7,425**	**11,224**	**18,649**

The data is not available to accurately identify NCEPOD procedures. For this reason, the analysis groups all the emergency admissions carried out in Theatre 5, designated as the CEPOD theatre during operational hours[15].

A full analysis of theatre capacity modelling is attached at Appendix 2B.

2.5.5 Summary of Fixed and Variable Assumptions Applied

The key assumptions that are used in the 'most likely' scenario are set out in the table below:-

Table 2.12: Scenario 4 Optimum Modelling Scenario

Assumptions	'Most Likely' / Mid-point Scenario	Comments
Key Fixed Assumptions		
Baseline data	1 Jan to 31 Dec 2016	
Demographic growth	1.2%	YCYF assumption

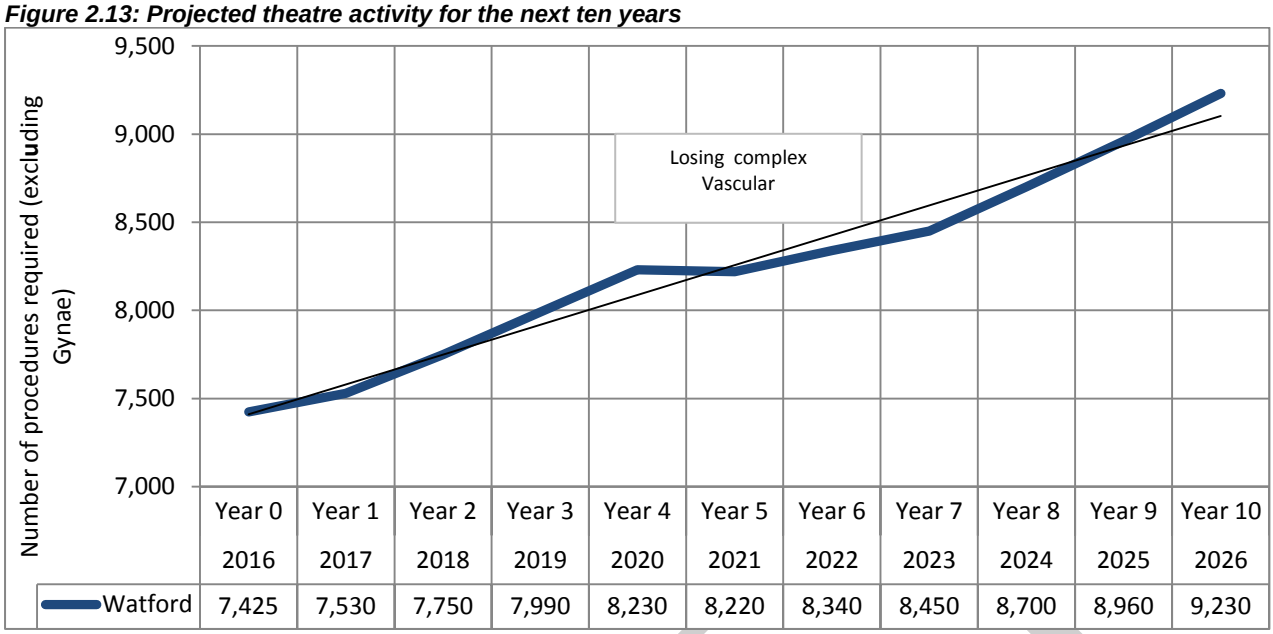
[15] Not adjusted to reflect emergency procedures performed out of hours.

Assumptions	'Most Likely' / Mid-point Scenario	Comments
Emergency Theatre Utilisation	67.5% utilisation	
Elective Theatre Utilisation	85% Utilisation	National guidelines
Number of weeks per year that elective theatres operate	48 weeks per year.	Reflects current arrangements. Increasing to test 50 weeks per year was not tested as would impede routine maintenance of theatres.
Change to waiting list size during baseline period	0	
Use of outsourcing during baseline period	28 Watford patients outsourced (Nov-Dec 16)	
Changes to Care Pathways: Complex vascular surgery moving to hub	**2020/21**: AAAs transfer **2021/22**: 50% of remaining complex vascular activity transfers. **2022/23**: Remaining complex vascular activity transfers.	
Key Variable Assumptions		
Non Demographic annual growth rate (Elective)	2.1%	YCYF assumption (lower than historic growth)
Non Demographic annual growth rate (Day Case)	2.1%	YCYF assumption (lower than historic growth)
Non Demographic annual growth rate (Emergency)	1.2%	YCYF assumption (lower than historic growth)
Theatre Capacity	Yr 1 55 Yr 4 60 Yr 8 65	New theatre schedule introduced in October 17 which introduced 5 x 11 hour day schedule.
Impact of potential changes to care pathways. ▪ Upper GI transfers as of 2020/21	192 hours per year	

2.5.6 Future Theatre Requirements

The following graph shows the number of patients expected to be cared for in Watford Main Theatres over the next 10 years based on the 'most likely' scenario modelling. It shows that by 2026/27 procedures undertaken will increase from 7,425 per annum to around 9,230 per annum.

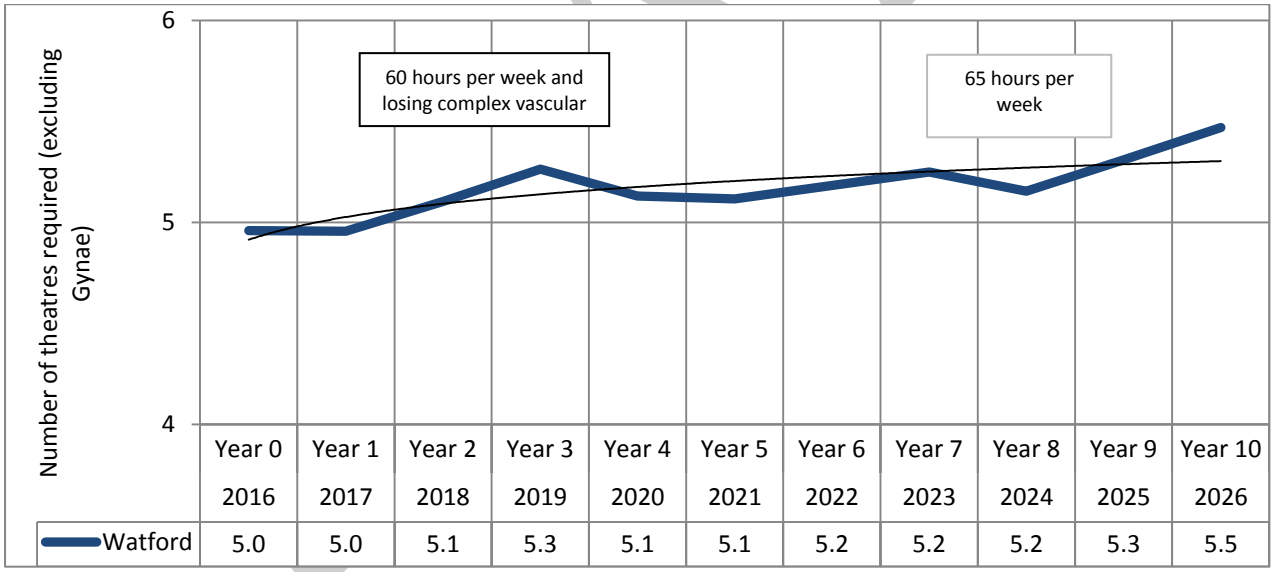
Figure 2.13: Projected theatre activity for the next ten years



	Year 0 2016	Year 1 2017	Year 2 2018	Year 3 2019	Year 4 2020	Year 5 2021	Year 6 2022	Year 7 2023	Year 8 2024	Year 9 2025	Year 10 2026
Watford	7,425	7,530	7,750	7,990	8,230	8,220	8,340	8,450	8,700	8,960	9,230

The modelling uses the numbers of patients that will need surgical care to then quantify the theatre requirements over the next 10 years, as shown in the next graph. The step changes seen in the graph below reflect increases in hours per week used across every elective theatre, applied in Year 4 and Year 8.

Figure 2.14: Projected theatres required for the next ten years



	Year 0 2016	Year 1 2017	Year 2 2018	Year 3 2019	Year 4 2020	Year 5 2021	Year 6 2022	Year 7 2023	Year 8 2024	Year 9 2025	Year 10 2026
Watford	5.0	5.0	5.1	5.3	5.1	5.1	5.2	5.2	5.2	5.3	5.5

Activity has been modelled over a ten year period in recognition that there is a need to invest in much of the estate at Watford Hospital over the long-term, given the significant constraints of the existing environment and the risks this presents to providing high quality care. As a Strategic Outline Case has already been submitted to the WHHT Trust Board to improve the acute site reconfiguration in the longer-term, this OBC has been scoped on the basis of the minimum requirements for theatres over the next 7-10 years to manage capacity in a compliant environment.

2.5.7 Sensitivity Testing for Future Theatre Requirement

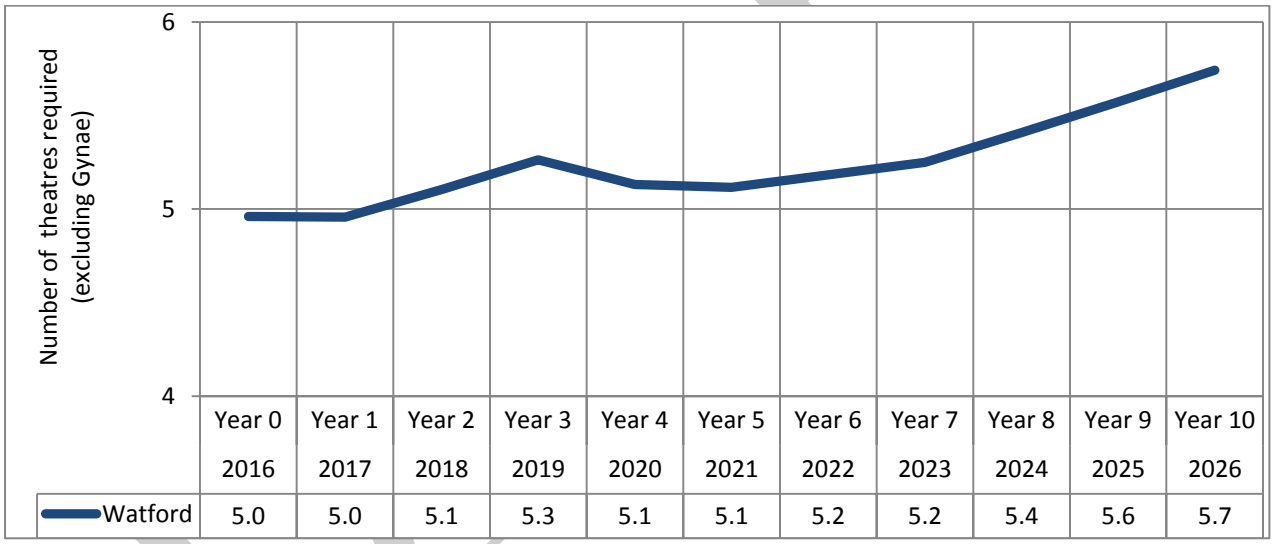
The 'most likely' scenario that was modelled to predict future activity and hence theatre

requirements is based on a variety of assumptions. These all assume greater efficiency or lower demand than at present. It is therefore prudent to further test the impact of changing key variables that will give rise to the greatest change in outcomes. The two variable assumptions that would have the greatest impact on the number of theatres required are the hours of use per week for elective theatres and non-demographic growth rates. The variable assumption that creates the highest proportionate change in anticipated theatres needed is that of the number of hours per week that each elective theatre is in use.

The most likely scenario includes the assumption that all elective theatres at both Watford and St Albans would be in use for a full 6 days each week as of year 8. The recent move to a 55 hour weekly theatre schedule has required detailed planning and consultation but has been successfully introduced. Running every elective theatre 65 hours per week is ambitious but will be achieved over time through new consultants being employed on contracts requiring them to work at weekends if this is needed.

The next graph sensitivity tests the impact should this variable assumption not be fully realised and all elective theatres are instead in use for 60 hours per week as of year 8. This demonstrates that 6 theatres, running for 60 hours a week would provide sufficient capacity up until year 10, all else being equal.

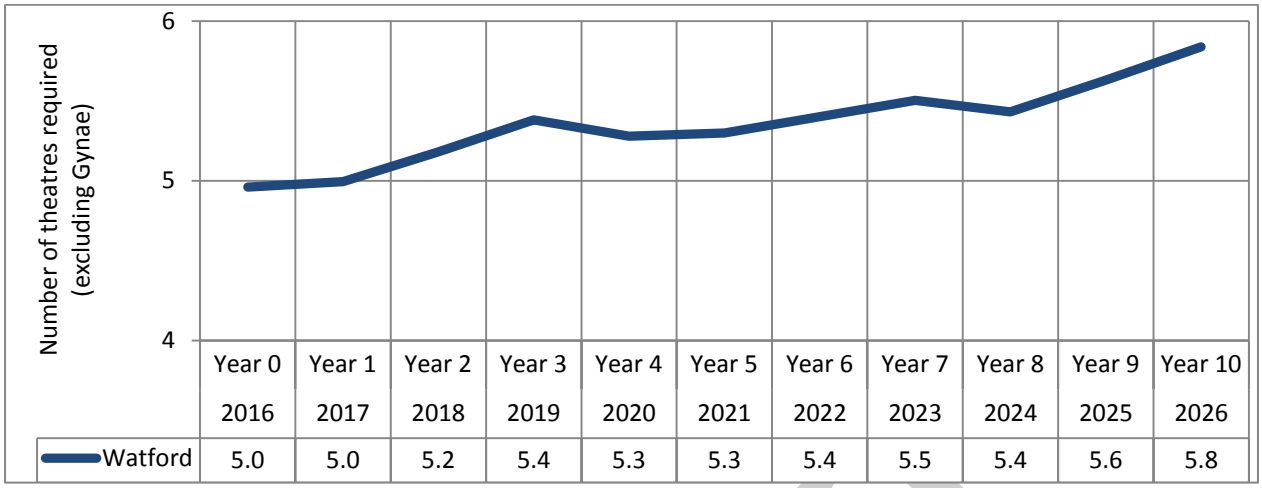
Figure 2.15: Projected theatres required for the next ten years (sensitivity testing for 60 hours rather than 65 from year 8)



	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Watford	5.0	5.0	5.1	5.3	5.1	5.1	5.2	5.2	5.4	5.6	5.7

The 'most likely' scenario includes lower than historic non-demographic growth rates and so the graph below demonstrates the number of theatres that would be needed at Watford Hospital if actual growth matches historic growth, but all other assumptions in the 'most likely' scenario remained the same.

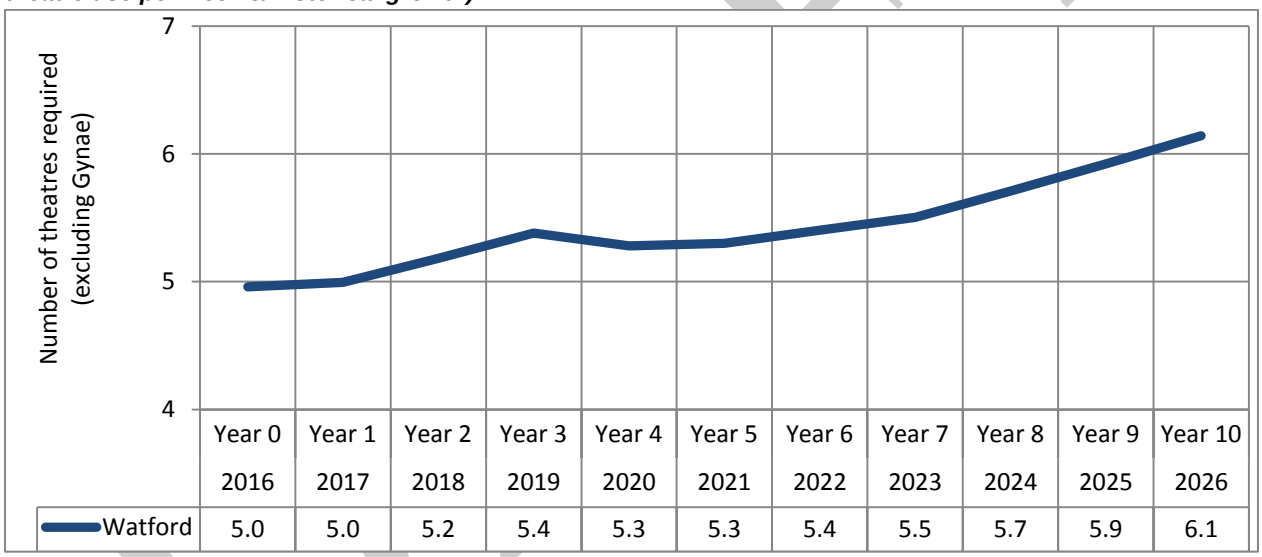
Figure 2.16: Projected theatres required for the next ten years (sensitivity testing for historical growth)



	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Watford	5.0	5.0	5.2	5.4	5.3	5.3	5.4	5.5	5.4	5.6	5.8

The next sensitivity test of the 'most likely' scenario, shows the impact on the number of theatres needed of increasing elective theatre productivity from 55 to 60 hours per week and historical growth rates is shown in the next graph.

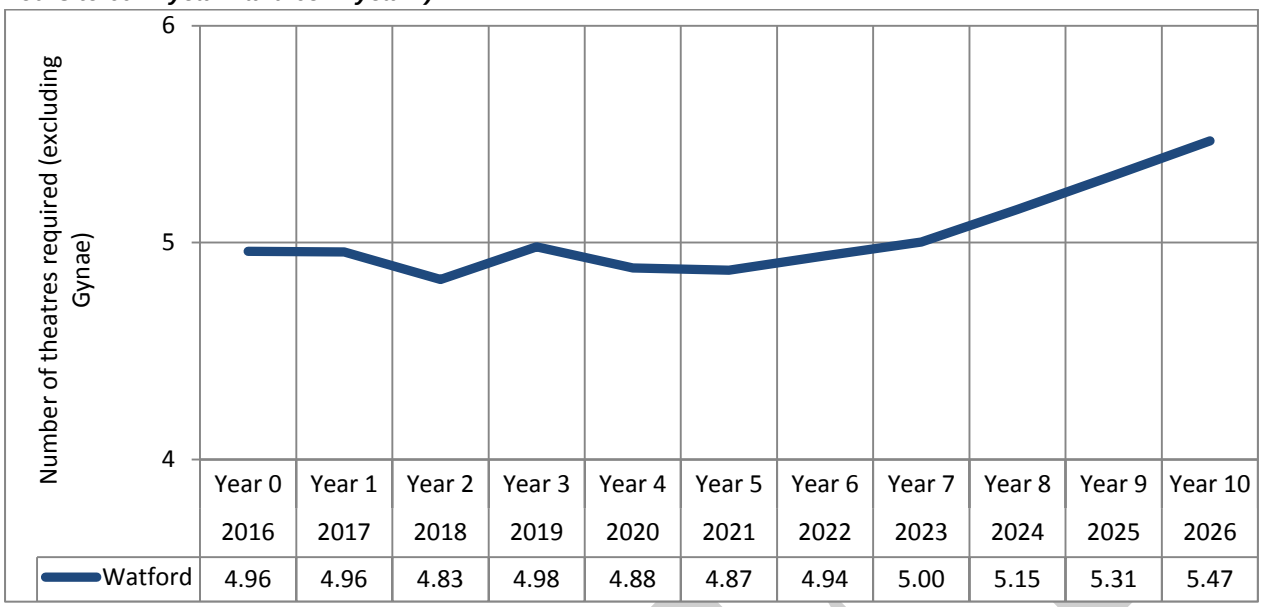
Figure 2.17: Projected theatres required for the next ten years (sensitivity testing for both 60 hours elective theatre use per week & historical growth)



	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Watford	5.0	5.0	5.2	5.4	5.3	5.3	5.4	5.5	5.7	5.9	6.1

A final sensitivity test of the 'most likely' scenario shows the impact on the number of theatres needed if hours per week are increased to 60 hours per week in year 2 and 65 hours per year in year 4 which shows that 6 theatres are required by year 10. This variation to the 'most likely' scenario would be extremely difficult for the organisation to implement, with a 60 hour elective theatre output by the beginning of the 2018 financial year, increasing to 65 hours by the 2020 financial year. It is therefore considered extremely unlikely to be achievable in the short term and therefore this scenario should be discounted.

Figure 2.18: Projected theatres required for the next ten years (sensitivity testing, modified for increasing hours to 60 in year 2 and 65 in year 4)



	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Watford	4.96	4.96	4.83	4.98	4.88	4.87	4.94	5.00	5.15	5.31	5.47

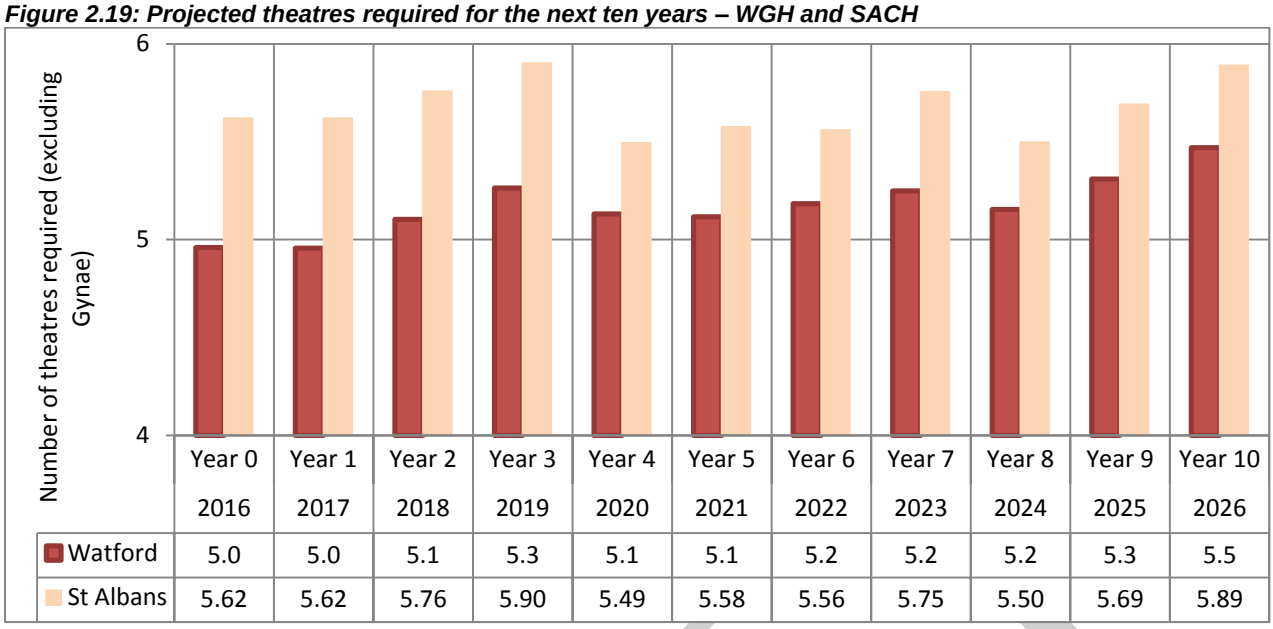
2.5.8 Mitigation Planning to Manage Activity over the next Ten Years

The graphs above confirm that with current demands and with the existing schedule for the elective theatres at Watford, there will be capacity pressures for Watford Theatres whilst the theatre complex is reconfigured and before a sixth theatre is opened. The Trust will closely monitor activity growth and trends and is aware of the capacity pressure it could face before the existing theatre reconfiguration is delivered (expected March 2020). Mitigation plans will therefore be developed and will include the following, to ensure activity can be sustained:

- Consider longer opening hours (open at weekends sooner than planned)
- Introduce 65 hour schedule before Year 8.

Detailed consideration was given as to whether any theatre activity could be permanently transferred to SACH to release capacity at WGH as part of the overall theatre capacity modelling exercise. These opportunities, however, will be limited. Furthermore, whilst some capacity is available in the short term, there would not be capacity available at SACH in the longer term, as growth in SACH activity will fully occupy these theatres (even with a decrease in activity as a result of primary care interventions applied). The theatre model that has been used in planning for St Albans theatre requirements includes the impact of primary care interventions as a variable assumption, with the impact ranging from 0% to 100%. The 'most likely scenario' assumes that 100.0% of the expected reduction in surgical activity will transpire and that reductions will be seen at SACH rather than at Watford Hospital. The graph below summarises the total number of theatres needed each year at both WGH & SACH under the 'most likely' scenario, to demonstrate the assertion that SACH capacity will be needed to accommodate SACH growth:

Figure 2.19: Projected theatres required for the next ten years – WGH and SACH



	Year 0 2016	Year 1 2017	Year 2 2018	Year 3 2019	Year 4 2020	Year 5 2021	Year 6 2022	Year 7 2023	Year 8 2024	Year 9 2025	Year 10 2026
Watford	5.0	5.0	5.1	5.3	5.1	5.1	5.2	5.2	5.2	5.3	5.5
St Albans	5.62	5.62	5.76	5.90	5.49	5.58	5.56	5.75	5.50	5.69	5.89

2.5.9 Impact on Surgical Beds Needed

Bed Modelling Assumptions

The bed modelling used to determine future bed requirements use the same fixed and variable assumptions (where appropriate) as were used for the 'most likely' theatre demand scenario. In addition, the following assumption regarding average length of stay has also been applied.

Table 2.20: Length of stay assumption

Description	Assumptions	Rationale
Average length of stay (Trust wide, WGH and SACH)	No change to ALOS	CCG interventions should result in an increase in ALOS as it is assumed that WHHT will no longer be caring for patients requiring less-complex interventions. An assumption of 'no change' therefore implies some inherent efficiency in overall length of stay. Also, Dr Foster benchmarking data shows that WHHT's beddays are already lower than would be expected for the volume of patients seen so whilst there are always opportunties to improve efficiency further, the greatest opportunity would be to reduce DTOCs across the organisation.

2.5.10 Surgical Bed Requirements (excluding ICU)

The Trust's view is that, if the system assumptions are delivered under YCYF, there will be sufficient beds at Watford Hospital. However, it is recognised that they are not currently being used to best effect, particularly given the high number of patients awaiting transfer to other services.

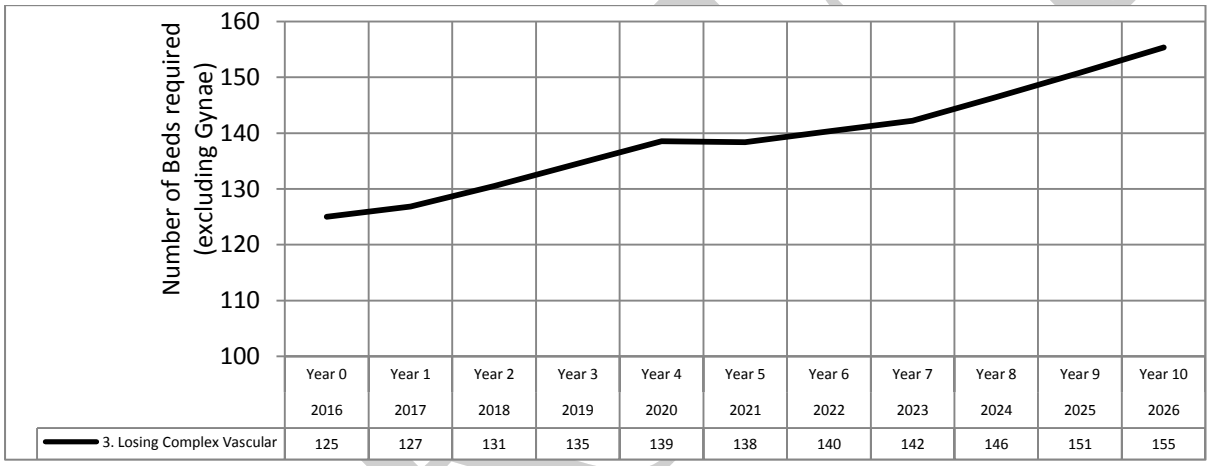
The Trust therefore plans to take measures to ensure there is sufficient future surgical bed capacity to meet requirements over the next 7-10 years and is seeking additional means of ensuring that patients are cared for in the most appropriate way, with their time in hospital a result of their care needs as opposed to delays in moving to the next phase of their care. As a hospital with one of the highest number of patients nationally awaiting alternative care whilst in an acute bed, there is a significant amount that can be done with partner organisations to improve

patient care pathways. The Trust is continually exploring measures to improve the appropriateness of their use (and so free up additional overall bed capacity) including the following measures:

- Optimising pre-assessment to avoid barriers to discharge pre-admission
- Examination of models of Enhanced Recovery
- Exploring the recommissioning of Rapid Response Service to reduce inappropriate admissions and support discharge arrangements
- Ongoing work within the Trust's Estate Strategy to optimise capacity and work with system partners in identifying appropriate models of care to reduce avoidable admissions, length of stay and delayed transfers of care.

The figure below sets out the surgical bed requirements at Watford Hospital over the next 10 years. These requirements are baselined on the surgical bed base as at 31 March 2016. It demonstrates that beds requirements will increase from 125 in 2016 to 155 by 2026 and takes into account the phased transfer of complex vascular activity to the vascular hub (as detailed in the the modelling assumptions).

Figure 2.20 – Surgical bed requirements at Watford Hospital over the next 10 years (excluding ICU)



	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
3. Losing Complex Vascular	125	127	131	135	139	138	140	142	146	151	155

The means by which the Trust will respond to the additional demand for surgical beds over the next 10 years will be through a realignment of medical and surgical beds. Further, there is an expectation that the redevelopment of the acute services will assist with ensuring sufficient surgical beds are available to meet demand in the longer-term.

2.5.11 Conclusion

Theatres

Modelling has been undertaken to quantify theatre requirements at Watford Hospital over the next ten years. Five scenarios were tested to understand the maximum and minimum theatres that might be needed. The minimum and maximum scenarios were discounted as extremes and least likely to be representative. Of the three remaining scenarios, scenario 4 was selected as the optimum and most realistic modelling scenario for this business case. This scenario (and further sensitivity testing) demonstrates that 6 theatres are already needed within Watford Main Theatres to secure sufficient capacity to maintain acute services until longer-term plans for acute care configuration come to fruition.

Surgical Beds

The Trust's view is that, if the system assumptions are delivered under YCYF, there will be sufficient beds on-site at Watford Hospital. In partnership with other local care providers, a range of measures will be put in place over the coming years to improve the appropriateness of their use and so free up additional overall bed capacity to accommodate the anticipated growth in surgical patients. The success of internal and system wide interventions will need to be monitored throughout the lifetime of the project to ensure the existing bed capacity meets demand.

2.6 Benefits

A benefits realisation plan has been developed and is attached at Appendix 7F setting out the benefits that this project will deliver. The overarching benefits are:

- Improve clinical effectiveness and quality of care for patients, thereby improving patient experience
- Aid the delivery of local regional and national strategy
- Provide flexibility for the future to enable more specialised surgery to be provided
- Improve staff morale, recruitment and retention
- Increase capacity
- Improve quality of estate and provide compliant, fit for purpose accommodation

The proposals will significantly improve patient flows and optimise care quality by adhering to national guidelines for infection control and paediatric care. A fully compliant recovery area would allow paediatric patients to recover treatment in an appropriate environment and would provide sufficient overall recovery space and facilities for isolation of patients where required.

Improved changing and rest facilities would support better recruitment and retention of clinical staff and reduce the Trust's reliance on temporary staff.

Finally, increasing the overall theatre capacity at Watford would support the anticipated increase in patients requiring surgical care at Watford Hospital over the coming years.

The benefits have been quantified wherever possible to ensure that they can be measured and demonstrated over time.

2.7 Constraints and Dependencies

The following key constraints have been identified:

- Limitations of the existing estate at Watford Hospital to expand;
- Spatial constraints of the theatre complex footprint;
- Cost and timescale unpredictability arising from the condition of the PMoK building;
- Delivery of major capital works within a busy inpatient area, with associated noise, dust, vibration etc, all next to ICU and directly above other wards.

The following dependencies have been identified as key to successful implementation of the project:

- Implementation of operational changes to reduce the number of DTOCs and reduce length of stay to increase capacity within the surgical bed pool to serve the increased activity;

- Successful implementation of the enabling projects to allow space on levels 4 and 5 to be used for anaesthetists offices and theatre support accommodation;
- Workforce can be recruited in line with workforce plans.

2.8 Stakeholder Support

The following external stakeholders are providing their support for this OBC.

- Herts Valleys CCG
- Health and Wellbeing Board
- Health Overview and Scrutiny Committee

3. Clinical Quality Case

3.1 Introduction

The Clinical Quality Case sets out how the proposed investment will improve the clinical quality of the Trust's services. It describes how the development will improve patient safety and patient experience by providing a clinically functional environment and how it will enhance conditions for the workforce with appropriate supporting facilities for staff.

It describes how the proposal fits with the Trust's clinical strategy to provide the very best care for every patient, every day, working in partnership to deliver integrated care and sets out how the investment will enable the Trust to meet commissioner requirements for a sustainable local health economy and strengthening emergency care.

It also explains how the clinical leadership and engagement of clinicians has been fundamental in achieving a design solution that satisfies national best practice guidance and standards, and improves the quality of patient, family and staff experience. The design is discussed in detail as to how it achieves this.

3.2 Clinical Strategy and Commissioning Intentions Fit

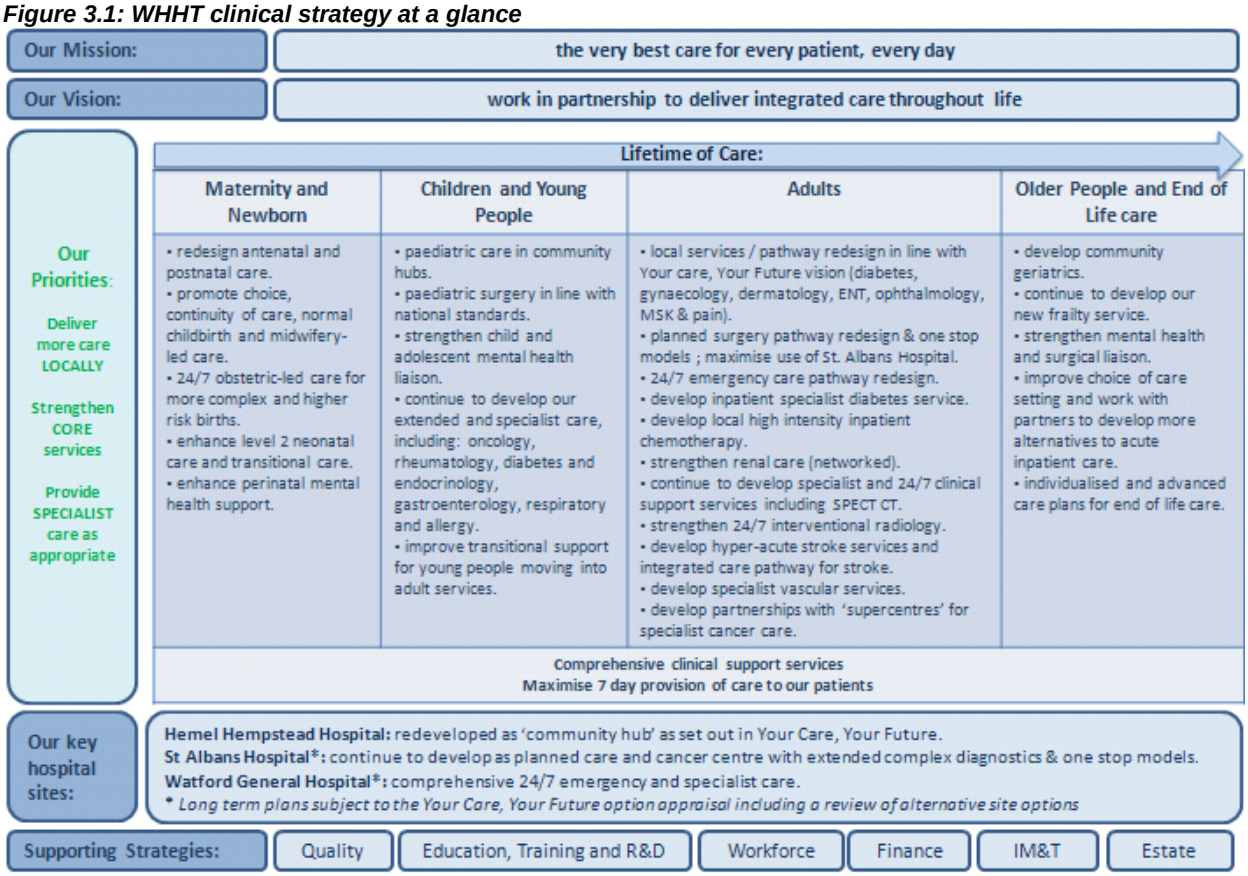
Over the past two years the Trust has been working to develop its clinical strategy and has been actively participating in the YCYF programme to ensure alignment between the Trust's strategic plans and the whole system strategy.

As described in section 2.4, the key thrust of the YCYF SOC is to develop improved preventative, proactive and integrated community and primary care services to reduce long term ill health and reliance on acute hospital based care where community based care can offer a better alternative. The SOC also recognises the need to invest in fit for purpose estate and infrastructure for care that is appropriately provided in an acute hospital setting.

The Trust has now published a first draft of its Clinical Strategy. It confirms a new mission statement for the Trust, to provide ***"the very best care for every patient, every day"*** and has been developed with input from divisional and speciality leadership teams and reflects their priorities for the next 1, 3 and 5 years.

An "engagement draft" of the strategy was published at the end of June 2016 to provide staff and stakeholders with an opportunity to comment on the strategy. The strategy was approved by the Board in September 2016.

Figure 3.1: WHHT clinical strategy at a glance



The Trust's clinical strategy's three priorities and selected key principles and priorities include:

- Deliver more care locally
    - make progress in line with 'Your Care, Your Future' whole system strategy
    - work closely with our partners to redesign care pathways to integrate care, with more focus on prevention, self-care, early intervention and active co-ordination of care for people with the most complex needs
- Strengthen core services

    <u>24/7 emergency care</u>
    - emergency surgery that meets national best practice standards
    - continue to improve emergency surgery care pathway - expand Emergency Surgical Assessment Unit (ESAU), improve access to emergency theatres, workforce redesign
    - provide interventional radiology services 7 days a week

    <u>planned care and cancer</u>
    - ensure timely and streamlined access to meet national 'referral to treatment' standards, redesigning pathways and implementing one stop models where possible.
    - increase separation of planned surgery from emergency surgery – rotas, theatre schedules, ring fenced beds – to ensure planned care 'protected' from emergency care pressures.
    - continuous improvement of planned surgery pathways and promotion of close team-working
    - reduction of limitations in theatre time for Colorectal, Upper GI and Urology will help to maintain cancer outcomes

- Priority strategies in relation to children and young people's services include:
    - ensure all paediatric surgery meets best practice standards and identify whether any surgery would better be provided by a more specialist provider.

The Theatres reconfiguration project is aligned with and will support delivery of the Trust's clinical strategy. It will provide additional capacity and improved high quality surgical facilities to enable redesign of the planned surgery pathway and one stop model of care as well as the 24/7 emergency care pathway redesign. Provision of the hybrid-enabled theatre will give the Trust the opportunity to strengthen 24/7 interventional radiology and enable the provision of the most efficient care pathways and reduce overall length of stay.

The investment in theatres will strengthen core services and support delivery of the Trust's priorities as agreed with HVCCG under the YCYF strategy as set out below:

24/7 Emergency Care

- The investment will enable the Trust to strengthen this core service by providing additional capacity, thereby improving access to emergency theatres
- Where clinically required, all patients admitted through A&E will to be treated on the same day and will no longer have to wait overnight and return the following day for an emergency procedure, improving the emergency care pathway
- Replacement of the existing procedure room with a new and fully compliant theatre as the dedicated NCEPOD theatre will enable the most critically ill patients to be treated in clinically appropriate facilities without interrupting the planned work booked into theatres 1 to 4, again improving the care pathway

Planned Care and Cancer Services

- Additional capacity at Watford will reduce delays and cancellations arising from emergency admission pressures, improving scheduling of elective procedures, and ensuring timely and streamlined access to meet national referral to treatment standards
- Providing capacity at Watford for all patients assessed as ASA 3 and 4 will free capacity of SACH to accommodate appropriate specialties, supporting redesign of pathways and development of one stop models
- The opportunity for increased interventional imaging capacity provided by the hybrid-enabled theatre will enable increased access to diagnostic imaging services, improving services across a range of planned care pathways

Specialist Services

- Both the hybrid-enabled theatre and the new, fully compliant general theatre will provide the potential to develop more complex procedures across a range of specialties, improving surgery pathways and specialist cancer pathways and strengthening links with tertiary super-centres for Upper GI and Gynae-oncology

3.3 Clinical Leadership and Stakeholder Engagement

3.3.1 Clinical Leadership

The Divisional Director for Surgery leads the clinical workstream on this project and is a driving force in moving the project forward, due to the stark clinical need for redevelopment. He sits on both the Project Board and Project Team along with key leads in his Division, and has engaged with other clinical teams and the Patient Panel throughout the process.

3.3.2 Stakeholder Engagement

Clinical Engagement

Consultation and engagement on the reconfiguration of theatres has been undertaken extensively with clinical and support staff, particularly the Surgery, Anaesthetics and Cancer Divisional team. The clinical workstream has been responsible for clarifying the brief, reviewing and signing off design outputs. Core workstream members are:

- Divisional Director for Surgery, Anaesthetics and Cancer
- Deputy Divisional Manager for Surgery, Anaesthetics and Cancer
- Theatre Manager
- Head of Nursing, Surgery, Anaesthetics and Cancer

In addition to the core team, user group meetings (UGMs) have been attended as appropriate by:

- Theatre, recovery and day admissions staff
- Vascular surgery
- Anaesthetics /critical care
- Radiology
- Infection control
- Integrated decontamination team (IDT)
- FM
- Project manager
- Estates lead

Regular UGMs have been held to develop and agree the brief including a schedule of accommodation setting out the clinical and supporting rooms required for a functional department, and room data sheets for all clinical room types.

The outline 1:200 design developed at SOC stage has been reviewed and developed, responding to comments and input received from clinical and technical users. 1:50 room layout plans have also been reviewed and agreed for rooms where there are derogations from HBN standard, to ensure functionality is not compromised. These include:

- Recovery bay
- Recovery room
- Staff change

Clinical workstream members have consulted with and communicated project progress on a regular basis with departmental staff through internal Theatre departmental meetings.

The following specific meetings have been held to incorporate views and ensure the design meets the needs of all affected:

- Meeting with the Clinical Director for Anaesthetics and ICU Matron to review and confirm the potential impact of the project on ICU and to confirm requirements for the enabling decant of the Anaesthetic Team offices

- Integrated Decontamination Team (IDT) meeting to confirm and agree requirements for the enabling decant of the receipt, storage, distribution and returns function for sterile instrumentation

- Meeting with the Procurement team Materials Manager to review and agree storage requirements

- Meetings with infection control to confirm their support for the designs

Patient Engagement

The proposals have been discussed with the Chair of the Patient Panel and the Patient Panel reviewed these in December 2016. It was noted that the panel welcomed these proposals.

Technical Input

Technical meetings have also been held with estates, IT, FM and fire to review and agree aspects of the mechanical and engineering (M&E) and structural design to confirm delivery of the technical aspects of the brief, compatibility with whole hospital systems and compliance with technical guidance.

Design Sign Off

The drawings are being signed off by the clinical lead, infection control, Trust fire officer and other key clinical stakeholders.

3.4 The Design

3.4.1 Introduction

In late 2014 minor refurbishments were undertaken to the four theatre suites in Main Theatres to address urgent compliance issues. Work was undertaken to theatre suite ventilation plant to achieve HTM compliance however no improvements were undertaken to M&E infrastructure within the theatres at that time.

The signed off drawings are attached at Appendix 3A. The design retains the four theatre suites, each comprising theatre, anaesthetic room, scrub, prep and exit bay, with minor alterations to the dirty utility rooms. Although the floor areas of these four theatre suites fall below current guidance[16], they remain clinically functional for the range and complexity of general surgical procedures planned to be undertaken during the life of the building. M&E works will be undertaken to enhance ventilation system resilience to all four existing theatre suites to achieve HTM compliance.

Two additional theatre suites will be provided, one of which will be a hybrid-enabled theatre. The hybrid-enabled theatre has the necessary infrastructure such as structural supports and radiation protection, and is configured to enable it to easily convert from a general to a hybrid theatre by purchasing and installing the interventional imaging equipment in the theatre.

The remaining theatre departmental floor area, currently occupied by the procedure room, recovery, clinical and staff support rooms is to be reconfigured.

A partial infill in the lightwell on level 6 will be constructed. This will be a lightweight structure in accordance with structural engineering advice.

The admissions area in the Day of Procedure Unit located adjacent to ICU on Level 6 is also to be expanded and reconfigured as part of the project.

[16] HBN 26 Facilities for Surgical Procedures, DH (2004)

3.4.2 Theatre Design - Quality and Philosophy

The theatre development will support the implementation of YCYF by providing a modernised, high quality facility for emergency acute surgery. Elective care for high risk patients, assessed at ASA 3 and 4, for more complex elective procedures will be carried out with the full back-up of the acute hospital including immediate access to critical care.

The procedure room, theatre 5, will be replaced with a general theatre suite configured to meet current HBN guidance with dedicated anaesthetic and prep rooms and an exit bay. A shared scrub and disposal, with appropriately configured ventilation flows, will serve both this general theatre and the adjacent hybrid-enabled theatre. The additional capacity provided will allow designation of a dedicated CEPOD theatre, enabling emergency admissions to be treated without delay, and continued development of the all-day trauma list to improve efficiency of resource use.

The design facilitates an appropriate clean to dirty process flow to meet infection control requirements, providing temporary storage of sterile goods in the prep room and enabling sterile instrument trays to be unwrapped and checked in the prep room ready for transfer into the operating theatre. Provision of a dirty utility room will enable materials for disposal and instrument trays for return post procedure to be held separately for collection, speeding the process of preparing theatre for the next patient by quickly removing potential sources of contamination.

3.4.3 Recovery Area

The new design provides 2 recovery places for each of the 6 planned theatres, a total of 12 places in full compliance with HBN guidance. With theatre capacity increasing by 20%, and the recovery capacity of 7 bays increasing by over 70%, this aspect of the investment will result in a substantial improvement in efficiency. Procedures will no longer be delayed awaiting availability of a recovery place. Post procedure patients may also be nursed for a longer period in recovery without this impacting on theatres, allowing direct transfer to a level 1 inpatient bed and reducing the requirement for admission to ICU for short term level 2 nursing care.

Expansion of the existing recovery area to provide sufficient places is constrained by its location immediately adjacent to theatre 4, in a corner of the floor bounded by external walls and with a nearby shear wall and goods hoist. The design makes full use of the available adjacent space and provides flexibility by locating the additional single room recovery places across the circulation corridor.

Paediatric recovery places

Recovery will be provided in two separate and adjacent zones in the new theatre development. The first zone will provide 8 curtained bays and a staff base in an open plan post anaesthetic recovery area for adults. The second zone will provide 4 single recovery rooms off an internal circulation corridor. These rooms may be flexibly used to provide:

- isolation recovery rooms for adults
- gender segregated recovery
- separate recovery places for children

The single recovery room area will therefore provide the flexibility for children to be recovered separately from adults, in compliance with guidance.[17]

[17] HBN 23 Hospital Accommodation for children and young people, DH, 2004;

The single recovery rooms will be appropriately equipped for paediatric recovery.

3.4.4 Admissions Area

The design provides for a substantial increase in the space devoted to day of procedure patients and daycase admissions as well as an improvement in flow through admissions to provide gender segregated changed waiting places.

A supervised waiting area is provided for patients arriving on the day of procedure. Five interview /exam rooms are provided for patient assessment, consenting and prep, ready for patients to be confirmed on the theatre session lists.

Adequate places are required to enable assessment of all patients before commencement of the five scheduled lists, i.e. excluding the CEPOD theatre, to avoid clinicians having to leave theatres mid-session for further assessments.

Separate changing cubicles and changed waiting areas are provided for male and female patients to maintain patient privacy and dignity.

Expansion of the admissions area into adjacent space displaces ICU office and visitor support facilities which are reprovided elsewhere on level 6.

3.4.5 Daycase Recovery Area

As noted above, on the day following their A&E attendance or GP heralded referral, emergency patients, where clinically appropriate, are admitted to WGH main theatres for emergency daycase procedures.

Currently daycase patients requiring stage 1 recovery in a trolley space are either returned by trolley to the existing admissions area or are recovered in one of the 7 available recovery bays, reducing the capacity available for post anaesthetic patients and potentially slowing theatre lists. Daycase patients return to the admissions area for stage 2 recovery and to change into their outdoor clothing before discharge from the unit.

The new design will allow these daycase patients to be transferred post procedure to a single room for stage 1 and 2 recovery, as required, in a gender segregated and compliant environment. Patients may also be transferred to an exam room in admissions for stage 1 and 2 recovery. Following recovery daycase patients will receive a beverage, change into their own clothing, and be discharged from the admissions area or transferred to the discharge lounge.

3.4.6 Improved Operational Flows

Lack of space creates a bottleneck at the current entrance to theatres with pre procedure patients arriving on foot and on trolleys, post procedure patients arriving at and leaving recovery, staff accessing the immediately adjacent support corridor and FM deliveries topping up storage cabinets. Circulation is further constrained by large items of equipment standing in corridors due to a lack of storage.

The new design relocates the theatres entrance and brings in part of the hospital street, locating

reception overlooking the entrance to provide a control point. Equipment and consumables storage rooms reduce the risk of damage to equipment and supports control of infection as well as keeping circulation corridors clear to facilitate patient trolley movements.

The current flow is for post procedure patients going to recovery, ICU or direct to inpatient wards to return along the clean theatre corridor, passing pre procedure patients on their way to theatres. The reconfigured department will introduce a more streamlined and circular flow from admissions to theatre to recovery reducing the potential for pre and post procedure patients to meet.

As children's procedures are booked at the beginning of theatre sessions to avoid lengthy fasting times and reduce the time when both children and adults are using main theatres, this aspect of the design will reduce the potential for children to meet adults en route to recovery.

3.4.7 Adequate and Appropriate Staff Facilities

Currently two small rooms are provided for male changing and one recently refurbished larger room for female staff changing with insufficient space for staff lockers. There is only one female and one male shower functional. The additional workload forecast for the 6 theatre suite will result in an increase in the number of staff working in theatres, requiring additional changing, locker space and sanitary facilities at any one time, together with adequate space for storage of clean scrubs. A female changing room for 40 staff and a male changing room for 30 staff is provided in the new design to meet these requirements

One of the two small rest rooms currently available for theatre staff also provides admin stations for clinical reporting. The new design provides a large rest room including beverage facilities, to be used by all staff. The new theatre schedule with an asymmetric day provides a mid day break for all staff, creating a potential requirement for all theatre staff to require space for rest /lunch at the same time. To maximise both the space and investment funding available for patient use, the design provides a rest room adequate for approximately half the theatre staff. The scheduling of breaks will be managed operationally to ensure all staff have appropriate access to rest facilities.

Admin stations for essential theatre functions including theatreman co-ordinator and blueman co-ordinator are provided at reception to enable immediate contact to be maintained with theatre teams, and allow essential scheduling changes to be managed efficiently. Office space for theatre manager, the supplies officer and 2 educators are also provided to enable effective management and good clinical practice to be maintained.

A reporting room for clinicians to review patient information including PACs images and update case notes post procedure is provided with hot desks to make best use of available space.

3.4.8 CEPOD Requirements

Currently, theatre 5, the procedure room, is designated as the CEPOD theatre however, due to the unsuitability of this room for complex surgery, surgical emergencies are treated in the next available theatre, delaying the planned procedure scheduled for that time as a result. Currently there is no dedicated all day list for trauma and orthopaedic emergencies. If there is an increase in emergencies an elective procedure list will be stood down in one of the two laminar flow theatres in order to accommodate the emergencies.

GP heralded referrals and A&E attenders who require a major surgical procedure are admitted straight to the relevant ward, all other patients who attend and require a procedure are taken to the Emergency Surgical Admissions Unit on Level 5 of PMoK for assessment. Following assessment a treatment plan is put in place and a procedure time is scheduled. If someone is reviewed and requires surgery they are added to the CEPOD list. This list is assessed throughout

the day and depending on clinical need they will have their procedure performed. If the CEPOD list has too many patients, there is an escalation policy in place to ensure patients are treated in a timely fashion and without delay.

Patients requiring less urgent procedures are booked in the following day's CEPOD theatre list and may be discharged home depending on the procedure required and time of day, avoiding the requirement for an inpatient stay. These patients return the following day for treatment on an emergency daycase basis. The investment will provide sufficient capacity to treat CEPOD patients on the day of their A&E attendance, avoiding the need to patients to return the following day. Provision of a compliant theatre suite will also enable patients to be brought into the anaesthetic room in readiness for the anaesthetist, rather than waiting until the procedure room is cleaned following the previous patient, again improving efficiency.

Provision of a total of 6 theatres in the new scheme will enable designation of a suitably configured and compliant CEPOD theatre appropriate for patients requiring surgery on an emergency basis, avoiding the need to cancel elective lists such as oral, general and ENT due to a build-up of trauma cases. The additional theatre will provide the capacity to undertake planned work in the five remaining theatres, allowing one theatre to be held in readiness for emergency procedures.

Expansion of the existing procedure room is constrained by the adjacent general theatre suite and the FM circulation corridor for removal of waste and soiled instruments from the 4 remaining theatres. The design provides for the replacement general theatre and the hybrid-enabled theatre to be co-located to facilitate flows and make best use of available space by sharing appropriate support rooms.

3.4.9 Capacity for All-day Trauma Lists

Currently, trauma sessions run 7 days a week but not on an all-day basis due to insufficient capacity. In accordance with best practice tariff requirements, patients awaiting surgery for fracture neck of femur are given priority when clinically appropriate. Provisional trauma lists are submitted to theatres the day before the list. There is a daily morning meeting to discuss all trauma cases.

The capacity provided by six theatres will allow implementation of an all-day trauma list, improving efficiency in patient flow and this is likely to reduce lengths of stay for inpatients awaiting trauma procedures.

3.4.10 Provision of a Hybrid-Enabled Operating Theatre

Co-location of the hybrid-enabled theatre with other operating rooms in main theatres ensures immediate access to senior anaesthetic and surgical expertise and back up for the complex procedures to be undertaken here. Post anaesthetic care will take place in theatres recovery, making use of the expertise centralised here.

The design provides a hybrid-enabled theatre suite adjacent to the new general theatre suite, enabling scrub and dirty utility rooms to be shared, and enabling efficiencies in design and installation of mechanical, electrical and IT services to be achieved.

The hybrid-enabled theatre is sized and configured to allow the Trust adequate choice in procuring imaging equipment from a range of suppliers. This will ensure a cost effective solution is identified to enable the proposed range of clinical procedures to be undertaken.

3.4.11 Mechanical and Electrical Systems (including Ventilation)

As part of the refurbishment works, the mechanical and electrical systems are being replaced in their entirety in these specific areas. The current installations are at the end of their economic life, and in most cases are non HTM compliant. With the modification and removal of the internal structures (walls, ceilings etc), the existing M&E services are unsuitable to be retained and therefore will be replaced.

Typically the M&E systems being removed and replaced are, Ventilation, Domestic Hot and Cold Water, Heating, Medical Gases, Power, Data, Fire Alarm, Lighting, Nurse Call systems and IPS / UPS Systems. Security systems including access control, video entry and CCTV are also being replaced within the Level 6 and 7 areas. All systems within the refurbished zones will be designed to current standards including the use of energy efficient design where appropriate, eg lighting control will be incorporated where applicable, to prevent any lights remaining on when the areas are unoccupied.

New electrical systems such as the power, lighting, access control will have new points of isolation that will feed the refurbished areas only. This will make the future isolation of systems easier for the Trust to maintain moving forward. The same philosophy has been applied to the Mechanical systems such as medical gases which have all new Area Valve Service Units.

The new designs will be HTM compliant with agreed derogations with the Trust in the refurbished areas, and fed from new HTM compliant plant and equipment.

Energy Statement

An energy analysis has been undertaken by the Sustainability Adviser who has concluded that within the scope of the work being undertaken, this project takes all sensible steps to enhance the efficiency of the space including through the adoption of highly efficient lighting and controls and new Air Handling Units. Where suitable existing assets are being retained this demonstrates both cost and resource efficiencies. The approach to commissioning the space will help ensure it operates to its potential and that it provides a comfortable and cost effective environment. The energy statement is attached at Appendix 3D.

3.4.12 Structural Works

A lightweight partial infill will be constructed at level 6. This will accommodate the staff change areas. Aspin, structural engineers, have undertaken calculations which achieved a factor of safety from 1.34 to 1.39 which is acceptable.

3.4.13 DH Consumerism

The design solution addresses the DH Consumerism requirements for healthcare buildings, as set out in the table below:

Table 3.2: Design response to consumerism

Consumerism requirements	Design response
A design that provides acceptable levels of privacy and dignity at all times.	The design provides gender segregated changed waiting in the new admissions area, supporting privacy and dignity for day of procedure patients. Single recovery rooms will also provide gender segregated post anaesthetic and pre discharge recovery places for patients, resolving a key issue raised by the CQC. Each of the rooms will be provided with blinds to the vision panels and where applicable, the external windows.

	Separate male and female changing areas and supporting post changing waiting facilities have been provided in the Day of Procedure Admissions Unit. Unfortunately, due to the constraints imposed by the existing estate, the Day of Procedure Admissions Unit lies outside of the Theatre complex and travel to Theatre is via the public corridor serving Day of Procedures and ICU. As the Theatre entrance is relocated during the reconfiguration, the travel distance to reception whilst gowned has been reduced improving the current arrangements Acoustic separation in accordance with HTM 08-01 has been planned to maintain privacy between rooms including administrative support areas.
Gender specific day rooms.	Due to the nature of the project, day rooms are not provided and therefore not applicable.
High specification fabric and finishes to reduce lifecycle costs.	The Trust has promoted the use of quality fabric and finishes addressing the requirements for the Control of Infection in terms of finishes, cleaning & maintenance. A recent redevelopment of the Endoscopy Unit within the PMoK building at Level 3 and the installation of a new MRI/CT Scanner Suite on Level 2 have established the standards to be adopted. The Trust is actively standardising materials and equipment used throughout the Hospital site. Output specifications have matched these standards and have been produced in consultation with Trust User Groups, the Estates Department and the Facilities Management Team.
Natural light and ventilation.	The deep plan layout of the existing Theatre suite is challenging with regards to the provision of natural light. Where possible, patient spaces, waiting areas, relatives accommodation and staff rest rooms have been located adjacent to the existing windows to ensure these areas benefit from the limited opportunities for natural light. All clinical areas within the scope shall be designed fully in accordance with HTM 03-01 and equipped with all compliant means of mechanical ventilation in order to provide the required fresh, filtered and tempered air into each space accordingly. Non-clinical areas such as staff offices shall utilise mixed mode or natural means of ventilation where applicable and according to HTM 03-01 guidelines.
Zero discomfort from solar gain.	Currently no notifiable issues are being experienced with regards to solar stimulated discomfort within the proposed area of the hospital. Most windows are within access corridors. Windows within wards are tinted and where possible, patient beds are kept away from windows to avoid discomfort due to possible drafts and incoming light. Internal windows located within infill are mostly shaded from direct solar irradiation as a consequence of the upper level 7&8 plant-rooms and air handling equipment.

Dedicated storage space to support high standards of housekeeping and user safety.	New dedicated storage space has been provided for the following; Theatres consumable storage approx. 85% of HBN recommendation Theatres Equipment storage approx. 90% of HBN Recommendation Loaded layout workshops on these selected rooms have been undertaken early and ahead of the Stage 4 design to ensure the spaces are sufficient for the Trust's needs. ICU equipment store – Increase in current floor area Dedicated cleaners stores for Theatres and ICU departments Cleaners consumables store to serve Level 6 to support cleaners stores
Dedicated storage for waste awaiting periodic removal.	A shared disposal hold has been provided to the rear of the ICU and the theatres complex. The FM team has raised concerns over the space allocated (14.00m2) to accommodate the various waste trolleys and linen cage. Loaded layouts have demonstrated that the hold can accommodate 6 no. Euro bins, however this is still felt inadequate for a daily collection. The Director of Environment has committed to an increased number of collections to offset the storage capacity.
Inpatient bed room configurations of >50% single en-suite and >5 bed bays with separate en-suite WC and shower facilities with 3.6m bed centres.	The number of single beds and supporting sanitary facilities are not applicable in a Recovery and ICU environment. Recovery bed centres are generally 3.6m however two of the bays in Recovery are short of the requirement. The clinical team believe that these are sufficient in size and will manage their use based on patient acuity.
Single sex washing and toilet facilities.	The provision of single sex washing and toilet facilities are not applicable in a recovery and ICU environment.
Safe and accessible storage of belongings including cash.	Lockers have been provided in the Day of Procedure sub-waiting areas for patient belongings.
Immediate access to patients to call points for summoning assistance.	It is proposed that a new Wandsworth nursecall system be provided to the area of works. The nurse call alarms report back to the local nurse base station. Staff are alerted to each patient using the alarm systems by the main alarm panel and the overhead 'follow me' lights.
Patient control of personal ambient environmental	Patient control of the internal environment is not generally provided. This is as per similar systems throughout the hospital. All radiators shall be equipped with local TRVs and can be controlled by staff.

temperatures.	The variable temperature heating system is controlled centrally by the hospital BMS to regulate heat output throughout the year. This is based on both internal and external temperature parameters and also to assist with the ongoing energy conservation of the Trust. Ventilation system supply air temperatures are also controlled by the BMS via temperature sensors located within the ductwork and rooms. Some perimeter areas do include openable windows which can be manually operated to assist summer time cooling.
Patient bedside communication and entertainment systems.	Patient communication shall be via the nursecall system. There is no requirement for TV entertainment system.
Elimination of mixed sex accommodation. (2011).	It is noted that there is accepted dispensation for separate sex facilities in operating theatre stage 1 recovery areas. The Trust's operational policy has however considered the flexible use of the single rooms allocated as paediatric recovery. Operations may be managed to make use of the paediatric rooms for day case discharge when there are no planned paediatric lists. These allow separation to provide the privacy required for patient recovery. Separate male and female changing areas and supporting post changing waiting facilities have been provided in the Day of Procedure Admissions Unit.

3.4.14 CQC Outcome 10 - Safety and suitability of premises guidance on protecting users against the risks associated with unsafe or unsuitable premises

Investment in theatres will enable the Trust to comply with CQC Outcome 10 as follows:

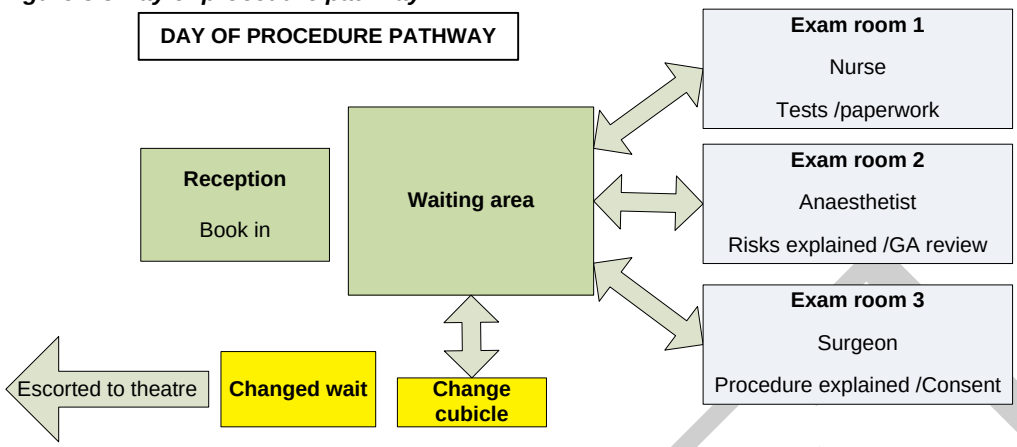
- design and layout of the new theatre floor achieves appropriate zoning, room adjacencies and provision of a clean to dirty flow;
- design of the replacement ventilation system to theatres will comply with HTM guidance;
- appropriate measures in relation to the security are designed in through separation of public, semi public and private areas, siting of lockable doors at suitable control points, and provision of a controlled access system to doors;
- newly provided wall, floor and ceiling finishes will be easy to clean and maintain when the premises are in use.

3.4.15 Patient Need, Privacy and Dignity

The routes patients will take on arrival at the department, on admission to the theatres zone, to the anaesthetic and operating rooms, and subsequently to recovery have been taken into account by the team in considering the position of zones across the theatre floor. In consultation with clinical users the theatre design has been developed to take account of patient needs at each stage of the pathway. The design aims to maintain patient privacy and dignity at all stages of the patient pathway, providing gender segregation and separation of paediatric and adult patients. Introduction of a circular route from arrival to procedure to recovery will avoid pre and post procedure patients mixing and will reduce patient anxiety levels in an environment which can be intimidating.

As an example, the graphic below illustrates the pathway for patients arriving on the day of procedure. The Admissions area design is physically configured around this pathway of arrival, physical assessment, interviewing and consenting of each patient, as illustrated below.

Figure 3.3 Day of procedure pathway



3.4.16 Workflow and Logistics, Access and Security

The design provides access for materials including sterile instruments using the existing communication cores to enable clean goods to be delivered and distributed to designated storage areas close to the point of use in each theatre and recovery area. Existing High Density Modular Storage (HDMS) capacity is retained and additional consumables storage provided in the new theatre suite to provide sufficient capacity for the additional activity projected for the lifetime of the theatre suite. Provision of a large shared disposal hold for theatres and ICU will remove waste bins from circulation corridors and support a clean to dirty flow using the designated FM lifts. The layout supports security through zoning with public areas confined to the Admissions' reception and waiting area, recovery supervised by appropriately located staff bases and theatre suites grouped in the clean area. Access to theatres is controlled with positioning of the theatre reception overlooking the new entrance, and door access controls configured to admit designated staff only.

The new entrance to theatres provides immediate access for staff to the staff change and rest facilities before entering the clean area.

Patients from A&E and wards will be admitted at the theatre reception and escorted to the anaesthetic or operating room. Day of procedure patients will initially be admitted to the Admissions area and when called, will be escorted by staff to the theatre reception.

There will be no access for visitors to the theatres floor with the exception of parents of children undergoing procedures.

3.4.17 Clinical and Non-Clinical Adjacencies

The main theatres complex is currently located on Level 6, the top floor, of the PMoK building. PMoK also accommodates A&E, radiology, interventional imaging, endoscopy, acute inpatient beds and ICU. The development will re-provide theatres in the current location due to the excellent adjacencies provided with the critical and acute care infrastructure on the Watford site.

ICU is immediately adjacent on Level 6 facilitating transfer of critically ill patients to and from theatres. The office base for the Trust's Anaesthetic team is located adjacent to both

departments enabling immediate access to back up resource for both Theatres and ICU. The former CSSD, opposite to procedure room 5, accommodates the Integrated Decontamination Team, holding a ready to use supply of instruments received from the outsourced sterile services provider.

Bed lifts in the main communication core near the entrance to theatres provide access from A&E on Level 1 of PMoK, with a direct corridor route from resus near the A&E entrance to the lift core. Paediatric A&E on Level 1 is sited adjacent to the lift core. Surgical inpatient beds are located on Level 5, immediately below the theatres floor, with patients transferred to and from theatres via the bed lifts. Day patients are admitted to the day surgery facility on Level 6 and transferred to theatres either on foot or in a wheelchair or, if required, on a trolley.

The current location on Level 6 satisfies the essential and desirable clinical adjacencies for theatres with immediate access to ICU, vertical adjacency with inpatient beds immediately below, and a clear vertical route via the bed lift from A&E for critically ill adult and paediatric patients.

3.4.18 Compliance with Guidance

HBN guidance

Briefing outputs and design development has been informed by the following guidance

HBN 00-02 sanitary spaces
HBN 00-03 Clinical and clinical support spaces
HBN 00-04 Circulation and communication spaces
HBN 00-09 Infection control in the built environment
HBN 04-02 Critical care units
HBN 6 Facilities for diagnostic imaging and interventional radiology
HBN 6 Diagnostic imaging: PACS and specialist imaging: HBN6 Volume 2
HBN 10-02: Day surgery facilities
HBN 26 Facilities for surgical procedures: Volume 1
HBN 23 Hospital accommodation for children and young people

Space standards are compliant with HBN guidance, except where identified in the HBN derogation schedule at Appendix 3B. These are being signed off by the clinical teams as functional areas despite being smaller than recommended.

Clinical and non-clinical support accommodation for utility rooms, storage and staff facilities are informed by HBN guidance and based on an assessment of, e.g. volumes of consumables held and numbers of staff to be accommodated throughout the working day.

In the absence of HBN guidance on hybrid theatre space standards, leading suppliers have been invited to deliver presentations on their hybrid theatre systems. Supported by the Trust's appointed equipment advisor, the vascular, imaging and surgical clinical teams have developed a hybrid theatre equipment specification appropriate to the range of vascular procedures and imaging planned to be undertaken in the suite in the future. Informed by the spaces typically provided by hybrid theatre suppliers, the design provides an operating theatre of 67m^2. with an equipment room of 11m^2, sufficient to provide a choice of suppliers to meet the clinical requirement.

HTM Compliance

This project replaces systems on the 6th floor and part of level 5 and 7, and these achieve HTM compliance. Many of the systems (hot water, medical gases etc) are building-wide and inter-connect with the works being undertaken as part of this project. It has therefore been necessary

to derogate from HTM standards in some areas where existing legacy plant feeds the whole of PMoK and has not been checked for compliance. This is set out in the HTM derogation schedule at Appendix 3C and will be signed off by the Trust Director of Environment team.

3.4.19 Parent and Carers' Requirements

Where appropriate, one parent may accompany a child into the anaesthetic room and will then be escorted out by staff. Single recovery rooms which will be used for children recovering from surgery may be used to provide waiting space for parents if available. At times when the Admissions area is no longer occupied, parents may also use this waiting area. There is no designated waiting area within the theatres department; parents and carers will make use of the café and waiting facilities elsewhere on the site if no other area is available. In the event of a patient requiring the support of a carer, for example a patient with a learning disability, staff will make appropriate arrangements to provide a suitable waiting place nearby.

3.4.20 Staff Needs

Changing, rest, and study facilities are provided for staff with separate male and female changing rooms and a rest room at the entrance to Theatres, sized on the basis of the numbers of staff planned to be working on the floor when all six theatres are operational.

3.4.21 Infection Control

The new theatres will provide a safe, clean environment for the delivery of surgical services, facilitating good infection prevention and control practices, and with quality and design of finishes and fittings enabling thorough access, cleaning and maintenance to take place, as recommended by HBN 00-09.

Replacement of the existing theatre ventilation with an HTM compliant system will contribute significantly to the prevention and control of infection through appropriate design to dilute airborne contamination, control air movement and temperature and to extract waste anaesthetic gases.

Infection prevention and control measures are designed into the new theatres through zoning, and appropriate clinical adjacencies to facilitate clean to dirty flows.

The two new operating theatre rooms will be designed and configured in full compliance with HBN and HTM guidance to provide clinically clean environments within which the most complex and invasive clinical procedures may be safely carried out. Supporting rooms in the theatre suites including scrub and dirty utility are designed and configured to support prevention and control of infection through compliance with HBN and HTM guidance. The supporting infrastructure of clinical and non-clinical facilities on the floor is designed to support an efficient and clinically functional clean to dirty workflow, with good access to storage and utilities, and appropriate facilities for temporary holding and removal of used instruments and waste.

Throughout development of the project the clinical lead and clinical team have been fully engaged in consultation to ensure the needs of users are understand and clearly articulated in the design brief. Advice has been provided by the Trust's infection control lead through attendance at user group meetings and through ad hoc liaison with the clinical team on specific issues and design options.

In consultation with clinical users, room data sheets have been developed for all rooms in the scheme, detailing the activities to be undertaken and any specific requirements, and listing the schedules of components required to achieve compliance with guidance and clinical functionality. Where required, clinical hand wash stations, hand gel dispensers and sack holders have been

specified to support control of infection.

The design provides clinically functional examination rooms with clinical hand wash stations in the admissions area for clinical tests and procedures, e.g. catheter insertion, to be undertaken. Post procedure, the single recovery rooms and curtained recovery bays for post anaesthetic recovery will be used for procedures including removal of catheters. Again, clinical hand wash stations will be provided in each room to support maintenance of good hand hygiene.

Appropriate storage facilities are provided in the design to avoid equipment standing in corridors and to protect both equipment and consumables from dust and contamination.

As the scheme progresses, cleanliness will be optimised through good design and construction, providing easy to clean finishes meeting HTM requirements, seamless, smooth, slip resistant flooring in clinical areas, and with pipework concealed in integrated plumbing system panels.

The infection control lead for the Trust has been involved in the design process and has reviewed the layouts. They will continue to input into the design as it develops to the next level of detail including surface finishes. Their support is evidenced at Appendix 3F.

3.4.22 Medicines

In the new theatre department medicines will be stored in a dedicated Medicines store. The room will be lockable and theatres operational policy will specify who will hold keys and have access to this room. The store will be visible from the circulation corridor to provide oversight of those accessing the room, and a vision panel in the door will enable those within the room to be viewed from passing staff to reduce the risk of tampering.

Controlled drugs will be stored in a HTM compliant controlled drugs cupboard, securely fixed to the building structure and provided with an alarm repeating to the recovery staff base.

Medicines other than controlled drugs will be stored in pharmacy cabinets.

Fluids will be stored off the floor on suitable shelving to comply with manual handling requirements.

3.4.23 Resilience

The works are being undertaken within an existing theatre department which has emergency procedures that will continue to apply. Integral to the design is the ability for the facility to be resilient to a range of threats and hazards and as the detailed design and phasing plans progress, resilience will be maintained and improved upon accordingly.

3.4.24 Fire Strategy

A fire strategy has been produced and is attached at Appendix 3I. The Trust fire officer has reviewed the designs and the fire strategy and has provided the necessary support. This is attached at Appendix 3G.

3.5 Design Quality Indicator Review

The Design Quality Indicator for Health (DQIfH) is a process for evaluating and improving the design and construction of health buildings. It focuses on actively involving a wide group of stakeholders in the design of buildings as it not only involves the design and construction teams but also those who will use, finance and be affected by the building. DQI is designed to set and

track design quality at all key stages of a building's development and incorporates post-occupancy feedback.

The Trust considered the benefits offered by DQIfH in relation to the theatres project and has concluded that it does not offer value for money given that it is a refurbishment project with a number of constraints which limit the innovation that DQIfH can offer. In addition, the design team have undertaken significant consultation with staff and users, and those affected by the project, to ensure long term functionality and sustainability of the project.

3.6 Travel Plan

The Trust is developing a Green Travel Plan for staff and visitors travelling to and from its three sites, with year on year performance improvements and an investment programme to support its delivery. The plan will promote sustainable travel choices and reduced reliance on car travel to minimise the impact on the environment. The Green Travel Plan will bring environmental, social and health benefits to both WHHT and its staff and to the local communities they serve.

The proposed development will have limited impact on the site road network as the location of the theatres is unchanged.

Expansion of capacity in response to the higher volume of surgical activity forecast has the potential to increase both the footfall in the building and traffic to the site associated with additional patients and a higher staffing compliment. This potential increase will be offset to some extent by the continued transfer of planned day procedures to SACH and the shift to predominantly inpatient work on the Watford site.

The additional volume of sterile instruments required as activity expands on the Watford site will result in an increase in the volume of deliveries which will be managed by the Integrated Decontamination Team, using larger vehicles where appropriate to avoid an increase in traffic to site.

Regarding consumables, the Trust procurement team's policy is to consolidate as much as possible by using NHS Supply Chain where this is cost effective, thereby reducing the number of vehicles coming onto site.

3.7 Patient-Led Assessments of the Care Environment (PLACE)

The most recent PLACE assessments were carried out between the end of April and the beginning of May 2016 across all 3 sites. In 2016 a sixth PLACE domain of Disability was introduced. Minor changes were made to the assessment for 2016 relating to all areas but none of these are considered to have had any significant impact on the comparability between 2015 and 2016.[18] The chart below compares WHHT's scores for 2016 against the previous year's results.

[18] PLACE Publications 2016, NHSE, 10 August 2016

Table 3.4 PLACE results

Category	Trust Average	Watford 2016	Watford 2015
Cleanliness	98.09%	98.17%	93.95%
Food	80.57%	**80.55%**	80.34%
Food Organisation	82.20%	**81.94%**	No Previous score
Ward Food Service	80.25%	80.35%	No Previous score
Privacy, Dignity and Wellbeing	69.62%	70.44%	78.08%
Condition, Appearance and Maintenance	89.01%	89.09%	83.58%
Dementia	53.41%	**52.72%**	61.68%
Disability (new for 2106)	60.41%	**59.92%**	n/a

*Percentages marked in **BOLD RED** are below the previous Trust average.*

Scores for condition, appearance and maintenance reflect the problems associated with an ageing estate, whilst privacy and dignity scores reflect the poor functionality of departments such as theatres for delivering current models of care including day of procedure and daycase admissions.

Condition, appearance and maintenance scores for 2016 for all sites have improved slightly from last year; Hemel is up by 6.16%, St Albans up by 53.38% and Watford by 5.51%. This has been a result of the ongoing works associated with the (previous) PLACE/ CQC/ TDA action log. Whilst there have been improvements against last year's figures, there are a still a significant number of issues associated with the estate - wear and tear/ outstanding backlog of maintenance/job tickets. In relation to Watford theatres the assessment noted untidy looking corridors which were used to store equipment, a result of the lack of adequate equipment storage on the unit.

The theatres project will contribute to improved PLACE scores on condition, appearance and maintenance by renewing the physical fabric of the department, providing a clean, modern and high quality environment for patient care.

Privacy and dignity will be improved by improving patient flows through the department and by providing gender segregated facilities for day of procedure assessment and recovery.

3.8 Patient Experience and Safety

The investment will enhance the delivery of patient care by improving the physical environment in which services are provided to patients. The CQC inspection in 2015 highlighted concerns including use of the procedure room as a theatre, the lack of an associated anaesthetic room, issues with the ventilation system, and lack of maintenance to floors and walls.

The redevelopment will resolve all the estate related quality issues raised by providing a high quality environment for the delivery of care and a compliant ventilation system.

The scheme will contribute to improvement in clinical outcomes by providing:

- sufficient capacity to treat emergency patients promptly
- appropriate facilities for the most critically ill emergency patients in a compliant CEPOD theatre
- enhanced capacity for all day trauma lists, reducing delays in treatment and improving efficiency
- the potential to treat higher risk patients with the option of conversion from catheter based

intervention to full surgery in the same room

The investment is aligned to the Trust's Quality and Safety Strategy. Priority 14 of the Quality account 2014 – 2015 is to:

"Improve the quality of our hospital environments and invest in facilities and equipment

Ensuring our hospitals maintain a clean, safe and harm-free environment continues to be a priority for the Trust. We want to make our hospitals a better place to work and receive care. In 2015/16, we will focus on improvements which enable us to deliver higher quality, safer care. Subject to capital funding, we intend to invest in:

- *Upgrading theatres at Watford and St Albans, including ventilation and recovery areas to improve safeguarding of adults and children "*[19]

The scheme will benefit patients by providing significant improvements to patient experience. Day of procedure patients will see a transformation in facilities from the point of arrival at the expanded and reconfigured admissions, with a naturally lit waiting area, appropriately sized examination rooms and high quality changing and changed waiting areas.

All patients will experience a more pleasant journey through theatres due to the circular flow introduced by the new design which will avoid pre and post procedure patients passing in corridors, and will eliminate the bottleneck associated with the single access point currently provided.

The investment will also eliminate non compliances associated with patient privacy and dignity and with facilities for children. Admissions will provide adequate space and rooms configured to appropriately manage patient flow on commencement of each scheduled list. Separate female and male changed waiting areas will allow changed patients to wait in gender segregated areas before transferring to theatre for their booked procedure. Single recovery rooms will allow day patients to recover, receive a beverage and change ready for discharge, again maintaining privacy and dignity.

The experience of patients who are conscious on arrival at the new CEPOD theatre will be significantly improved as a result of receiving anaesthesia in the more calming environment of the anaesthetic room, rather than in the operating theatre. The improved physical environment and appearance of the theatre suite will also increase patients' confidence in the quality of the service provided.

3.9 Workforce

Theatres provide services 24 hours per day 7 days per week for emergency patients and from Monday to Friday operating for elective patients. There will be an increase in operating to include Saturday work for elective patients. Staffing will increase to accommodate this increased capacity for elective patients with over 40% of additional staffing required to work on Saturdays. This change will offer more opportunities for staff to work flexibly which has been requested but due to lack of availability refused in the past for theatre staff.

Surgical staff already work at weekends generally on an on-call basis. 6-day working will need to be incorporated into contract and job plans moving forward. Improved staffing levels at

[19] WHHT Quality Account 2014-15

weekends and flexible working supports the delivery of improved service outcomes at weekends providing benefits for the organisation, individual and the patients. There will be no fundamental changes to working patterns and therefore there are minimal staff change implications. Recruitment for theatres is a national issue will remain a focus for improvement; a refurbished theatre will offer staff the opportunity to work in a modern facility and will be attractive to new staff and will help to retain present staff.

The new accommodation will provide additional clinical support and non-clinical support spaces to theatres, particularly storage, changing and office facilities. The new recovery area will provide addition capacity to accommodate paediatrics as per government guideline and there will be a better patient flow through the department, this will increase staff satisfaction, improve morale and mitigate stress. The staff will start utilising the new improved facilities during the construction phase meaning the benefits of the project will be realised early in the project.

3.10 Phasing Plans

Phasing plans and accompanying narrative is attached at Appendix 3H. There are currently 8 phases which have been discussed at a high level with the clinical teams. They will be considered further and developed in more detail at FBC stage to ensure every phase has all necessary emergency planning procedures agreed.

4. Economic Case

4.1 Introduction

In accordance with the Capital Investment Manual and requirements of HM Treasury's Green Book, this section documents the options considered in response to the scope for investment identified within the strategic case. The process of appraisal covers the following:

- identifying the objectives and critical success factors for the investment;
- identifying benefit criteria to appraise options;
- generating the long list of options and establishing a short list;
- descriptions of the short listed options;
- qualitative non-financial appraisal;
- economic appraisal;
- risk appraisal;
- benefits quantification;
- identification of the preferred option.

4.2 Project Objectives and Critical Success Factors

The following project objectives have been determined and agreed by the Project Board:

1. Upgrade and improve the theatre complex to comply with modern standards, including addressing CQC concerns, within two years and without disrupting the ongoing service.
2. Provide sufficient theatre capacity to meet anticipated demand for emergency and elective care until longer-term plans for acute care come to fruition.
3. Provide a 'hybrid-enabled' theatre.

Based on these objectives, the critical success factors have been developed and are set out in the table below. These were produced as part of the development of the Strategic Outline Case (SOC) and reviewed again as part of the OBC process. The one change between SOC and OBC is the decision to provide a hybrid-enabled theatre rather than a fully equipped hybrid theatre from the outset, and the objectives and CSFs have been updated to reflect this decision.

Table 4.1 Project objectives and critical success factors

Project Objective	Critical Success Factor
1: Upgrade and improve the theatre complex to comply with modern standards, including addressing CQC concerns, within two years and without disrupting the ongoing service.	Ensure appropriate separation of paediatric recovery as per HBN 23 Hospital accommodation for children and young people.
	Provide a new theatre that is compliant with HBN 26 guidance to replace existing Theatre 5 (a converted plaster room).
	Re-provide admissions area for elective & day of procedure patients, to achieve single sex compliance.
	Deliver a minimum of two recovery beds per theatre in line with HBN 26 for surgical procedures.
	Provide adequate changing areas and address concerns raised by the CQC.

	Provide separate patient and staff entrances to theatres to comply with modern guidance.
	Resolve current ventilation issues so that theatre ventilation is compliant and resilient, addressing the concerns raised by the CQC.
	Provide suitable staff rest rooms.
	Ensure sufficient clinical office space separate to staff rest rooms, for critical staff groups to complete administrative work whilst within the theatre complex. This is essential for the anaesthetics team in order for them to be available to respond quickly where needed.
	Deliver compliance with modern standards within no more than two years.
	Any works within the existing theatre complex will not disrupt the delivery of the current service.
2: Provide sufficient theatre capacity to meet anticipated demand for emergency and elective care until longer-term plans for acute care come to fruition**.**	Provide 6 theatres and associated recovery beds to ensure there is sufficient capacity to meet future demand over the next decade.
	Decontamination department retain an appropriate facility within or adjacent to the main theatre complex.
3: Provide a 'hybrid-enabled' theatre	Provide a 'hybrid-enabled' theatre to open up the potential at some future date to undertake more complex procedures across a range of specialties, improving surgery pathways and specialist cancer pathways and strengthening links with tertiary super-centres for Upper GI and Gynae-oncology.

4.3 Long-list of Options

The following long list of options has been compiled by the project team as potential ways of delivering the project objectives.

A Do Nothing

B Do Minimum – resolve compliance issues and provides 4 general theatres in PMoK within the existing theatre footprint

C 6 theatres in PMoK (one hybrid-enabled) using carousel unit and additional floor space in ICU, level 5 and a level 7 extension

D 6 theatres in PMoK (one hybrid-enabled) using carousel unit and additional space on levels 4, 5 and 7 including a level 7 extension

E 6 theatres in PMoK (one hybrid-enabled) using additional floor space on level 4, 5 & 7 and construction of a lightwell infill on level 6

F 6 theatres in PMoK (one hybrid-enabled) using additional floor space on level 4, 5 & 7 and construction of a lightwell infill on levels 5 & 6

G New build 6 theatre block in Shrodells Garden (one hybrid-enabled) with a link bridge connecting it to the main hospital

H New build 6 theatre complex off site

I Address compliance issues on 6th floor PMoK (Do Minimum) plus outsourcing of activity

J 5 theatres in PMoK (one hybrid-enabled) within the existing theatre footprint plus outsourcing of activity

K Address compliance issues on 6th floor PMoK (Do Minimum) plus provide 2 temporary mobile theatres on site

L Address compliance issues on 6th floor PMoK (Do Minimum) plus provide 2 new build modular theatres on site

4.4 Shortlisting of Options

A long list of options has been generated by the project team and evaluated against the project objectives to decide whether they should be shortlisted for detailed appraisal.

The shortlisting was reviewed and ratified at the non-financial option appraisal workshop to confirm the options to undergo a more detailed benefit and financial appraisal. The shortlisting is summarised in the table below.

Table 4.3 Shortlisting of options

	Option description	Project objectives			Shortlist?
		Compliance?	Capacity?	Hybrid-enabled?	
A	Do Nothing	X	X	X	X
B	Do Minimum – resolve compliance issues and provides 4 general theatres in PMoK within the existing theatre footprint	✓	X	X	✓
C	6 theatres in PMoK (one hybrid-enabled) using carousel unit and additional floor space in ICU, level 5 and a level 7 extension	✓	✓	✓	✓
D	6 theatres in PMoK (one hybrid-enabled) using carousel unit and additional space on levels 4, 5 and 7 including a level 7 extension	✓	✓	✓	✓
E	6 theatres in PMoK (one hybrid-enabled) using additional floor space on level 4, 5 & 7 and construction of a lightwell infill on level 6	✓	✓	✓	✓
F	6 theatres in PMoK (one hybrid-enabled) using additional floor space on level 4, 5 & 7 and construction of a lightwell infill on levels 5 & 6	✓	✓	✓	✓

G	New build 6 theatre block in Shrodells Garden (one hybrid-enabled) with a link bridge connecting it to the main hospital	✓	✓	✓	✓
H	New build 6 theatre complex off site	Not viable due to clinical adjacency requirement (e.g. critical care)	✓	✓	X
I	Address compliance issues on 6th floor PMoK(Do Minimum) plus outsourcing of activity	Outsourcing deemed not viable	X	X	X
J	5 theatres in PMoK (one hybrid-enabled) within the existing theatre footprint plus outsourcing of activity	Outsourcing deemed not viable	X	✓	X
K	Address compliance issues on 6th floor PMoK (Do Minimum) plus provide 2 temporary mobile theatres on site	✓ Compliant however split of service not clinically viable	✓	✓	X
L	Address compliance issues on 6th floor PMoK (Do Minimum) plus provide 2 new build modular theatres on site	✓ Compliant however split of service not clinically viable	✓	✓	X

Further reasons for discounting are as follows:

- **Option A** does not address any of the project objectives, and the risks to patient care as a result of ventilation issues are not resolved. It was therefore felt that the Do Minimum option offered a preferable baseline as it addresses some key compliance issues.

- **Option H** would not function from an operational perspective due to the proximity required to key functions on the Watford Hospital site such as critical care. In addition, this option would require a large amount of capital in order to purchase the land as well as build a new stand-alone facility and therefore option G was felt to be a preferable 'new build' option for shortlisting.

- **Options I and J** both involve the outsourcing of activity (one or two theatres' worth). There are concerns as to the viability of this option for several reasons. Watford General Hospital is the key acute site for West Herts and there needs to be sufficient theatres on-site in order to manage emergency patients requiring immediate or urgent admission and treatment. Secondly, care pathways would become more convoluted, particularly for patients with more complex conditions requiring care from a variety of clinical teams; in addition to providing emergency care, a core part of the caseload at Watford is complex elective care, often for patients with cancer or significant comorbidities.

  A further key concern is that there would not be sufficient capacity in the private sector locally to accept the number of patients that would be treated in theatres in Watford. During a significant drive to reduce referral to treatment times for elective surgery between October 14 and February 15, an average of just 90 patients per month were cared for by a number of alternative providers. Confirming care pathways, liaising with patients and clinicians, ensuring records were available and ensuring continuity of care was labour intensive. Also, local private providers are only equipped to manage small procedures and WGH has mainly complex procedures, which means limited amount of work can be outsourced in reality.

In addition, this option would also result in a significant loss of income for the Trust and be a risk for the Trust's reputation.

- **Options K and L** both involve splitting of activity across three locations on the Watford site (in PMoK, a new/temporary build and gynae theatres). A clinical workshop was held on 28th February to consider this in detail and it was concluded that it was not clinically viable from a staffing and efficiency perspective.

4.5 Detailed Description of Shortlisted Options

A detailed description of the shortlisted options is provided in this section. Option drawings are attached at Appendix 4I.

Option B – Do Minimum

This option delivers the minimum alterations and remedial works to address the recommendations of the CQC. The key deliverables are as follows:

- Provide an adequate and suitable recovery area comprising of 8 recovery beds of which 4 are isolation rooms. This arrangement serves to address the safeguarding concerns for paediatric patients by providing single rooms that can be used for both adult and paediatric patients.
- Relocate the Day of Procedure Admissions Unit to address the privacy and dignity issues relating to the transfer of 'gowned' patients from the Admissions Unit to the Theatre Suite via the public corridor. This was based on 2 assessment rooms which has since been recognised as insufficient. All later options provide 5 assessment rooms.
- Improved staff changing facilities to replace the existing inadequacies.
- Carry out remedial works to the current ventilation system serving theatres to address concerns around the pressure regimes and single duct extract resulting in appropriate validation and achieve HTM compliance.

This option does not address the current storage issues in the theatre suite.

Due to the constraints of the existing theatre footprint, the Do Minimum can only accommodate the existing 4 operating theatre suites which, as in all shortlisted options, would be retained with no increase in room sizes to meet current guidance. The non-compliant procedure room (Theatre 5) would be lost to achieve compliance, which significantly impacts on the activity the Trust can deliver. This reduction in physical capacity therefore fails to address the project objective for additional capacity.

The Do Minimum displaces Anaesthetic offices to the current admissions area on Level 6 in order to provide improved staff rest and changing facilities with access from the hospital street to the clean theatres area.

To accommodate the new recovery area, the Integrated Decontamination Team is displaced from the former CSSD. The former procedure room is converted to provide separate clean and dirty receipt and distribution storage areas with a store retained in the CSSD vacated space for sterile instrument trays for immediate use in theatres. Storey height carousels may be considered as a project option to increase the sterile storage if required.

In summary, the Do Minimum

- Resolves theatre ventilation, recovery, admissions and staff support compliance issues

- Provides only 4 theatres instead of the 6 theatre capacity required to meet projected demand
- Does not allow for the future provision of a hybrid theatre

Option C – 6 Theatres in PMoK using ICU Space and Carousel, Level 5 and Level 7 Extension

The option delivers 6 theatres; 4 existing and 2 new theatres, 1 being hybrid enabled. It relies on a separate project to reduce the ICU bed compliment from 19 (18 of which are funded) to a total of 16 beds in order to provide additional floor space to accommodate the theatres stores and staff rest room. The benefit of this option is that it provides useful floor space directly adjacent to the theatre complex.

The option requires the use of a carousel for sterile instrument storage. The carousel operates over two floors, Level 6 and 7 allowing underutilised stores on Level 7 to be used for clean R&D and support accommodation for the IDT team. There are concerns over the capacity of the carousel and its use introduces a single point of estate failure. The operational alternative on failure is problematic and has inherent infection control risks.

The phasing of the option is challenging and results in a construction programme in excess of two years. This is due to the number of phases and the limited decant opportunities.

In summary, Option C

– Resolves theatre ventilation, recovery, admissions and staff support compliance issues
– Provides the required capacity of 6 theatres and 12 recovery places
– Provides a solution enabling a hybrid theatre at a future date
– Requires careful phasing of works to maintain continuity of service
– Relies on the closure of 2 funded and 1 non funded ICU beds
– Relies on the carousel for storage of sterile instruments over floors 6 and 7

Option D – 6 Theatres in PMoK using Carousel and space on Level 4, 5 and 7 including Level 7 Extension

This option is a variation of Option C but does not rely on the separate Trust project to reduce the ICU bed numbers on Level 6.

The option uses office space on Level 4 vacated by the Respiratory Department to allow some of the office facilities planned on Level 5 to be transferred to Level 4. The advantage of this is that space on Level 5 can then be used to provide the staff rest room which would be accessed by a new staircase located in the lightwell. The relocation of the staff rest room releases space on Level 6 to accommodate the theatres' storage.

The option still requires the use of the carousel with its inherent concerns outlined above. The phasing is a little simplified from that in Option C.

Option E – 6 Theatres in PMoK using space on Levels 4, 5 & 7 and a Level 6 Lightwell Infill. No Level 7 Extension and no Carousel requirement.

This option is a development of option D but now provides a partial infill of the lightwell on level 6 to provide additional floor space.

The additional floor space results in the following:

- The clean R&D is now provided on Level 6 with an appropriately sized sterile store adjacent. Dirty R&D remains on Level 6 and the R&D pathway is significantly improved negating the need for the floor to floor carousel unit. This addresses concerns around the single point of failure.
- Staff changing is provided in the new infill and allows monitored access from the theatre reception.
- Doctors reporting rooms are located closer to the operating theatres.
- The Day of Procedure Admissions Unit is located such that, once patients are changed they transfer directly to the theatre suite without using the ICU public corridor resulting in improved privacy and dignity. This addresses a CQC recommendation.
- An extension onto the roof area at Level 7 is not required

Disadvantages include:

- Disparate office space on Level 4.
- IDT support space on Level 7 slightly removed from the clean R&D area and the full use of the available space on Level 5 which may impact on the Trust's ability to expand the Emergency Surgical Assessment Unit (ESAU).

Option F – 6 Theatres in PMoK using space on Level 4, 5 & 7 and a Level 5 & 6 Lightwell Infill. No Level 7 Extension and no Carousel requirement

This option is a development of Option E but now provides a partial infill of the lightwell at Levels 5 and 6. The additional floor space results in the same as Option E except that:

- The Level 5 infill is used to provide improved facilities for the Anaesthetics team and staff rest room.
- Level 4 remains available for a vascular lab suite
- Level 5 in part remains available for potential expansion of ESAU.

As in option E, the IDT support space on Level 7 is still slightly removed from the clean R&D area.

Option G – New Theatre Block in Shrodells Garden Area

This option is for a new 6 theatre block in the Shrodells garden area providing HBN compliant space throughout. It requires the demolition of a single storey wing of the Shrodells Building to accommodate the significant footprint. Theatres and recovery are located on the ground floor, with the Day of Procedure Admissions Unit, IDT, support space and plant rooms on the first floor.

A link is created to the main hospital via a first floor link bridge with a junction to the existing AAU link bridge and Level 3 of PMoK. The established route for access to the theatre suite is from the main hospital entrance with a transfer from Level 3. There is little space for drop off adjacent to the Shrodells Building but a space in the Willow House car park may be an option.

Disadvantages include the distance between theatres and ICU on PMoK Level 6, and disparate clinical office accommodation with Anaesthetics on PMoK Level 6 and surgical secretaries on Level 5. The IDT delivery/collection pathway will also need to be considered.

This option assumes that there are no changes to the location of beds within the rest of the hospital.

Programme Assumptions

Following advice from the contractor, Kier, the programme assumptions for each of the options are set out below.

Table 4.4 Shortlisted options programme assumptions

	Start on site	Completion	Construction period
Option B	May 2018	April 2020	102 weeks
Option C	May 2018	December 2020	133 weeks
Option D	May 2018	October 2020	123 weeks
Option E	May 2018	June 2020	111 weeks
Option F	May 2018	June 2020	111 weeks
Option G	June 2018	September 2019	40 weeks

Mitigation of Key Risks Associated with Options

The following key risks associated with some of the options have been considered in more detail to identify mitigations in the event the risk occurred. These scenarios and risks have informed the scoring and appraisal of options.

1. Failure of the carousel unit

Options C and D rely on the use of a carousel unit for storage of sterile instruments which is a risk to the functioning of the department should it fail. If it breaks down (e.g. no electrical power) there is a crank handle that will allow the drum to rotate. This will allow the trays to be removed for surgery/theatres to continue functioning but could only work as a short term solution and would need to be resolved within a few hours to allow normal functioning to take place.
If the carousel derailed or had a long term issue, there is no reasonable option that would allow surgery/theatres to continue functioning as normal or without risk.

2. Lift failure and infection control

If the lift used for access to the decontamination area on level 7 were to fail, staff would not be able to receipt or deliver surgical trays as per the procedure. To minimise the risk of cross infection the indicatively agreed solution to prevent contamination when receiving and removing trays would be to use the lifts at the front of the hospital to transport the trays from level 2 to level 6. The used trays would be removed first followed by delivery of the clean trays.

In options C and D, the route would be through the theatre admission door to the back corridor and vice versa. The corridor used would need to be cleaned following the delivery of the clean trays. Patient use of this corridor during this time would be kept to a minimum. The clean trays would be decanted into the carousel at level 6.

In options E and F, the route would be through the theatre admission door, along the corridor to the decontamination receipt room to the back corridor and vice versa. The corridor floor used would need to be cleaned following the delivery of the clean trays. Patient use of this corridor during this time would be kept to a minimum. The clean trays having been received last would be managed as per procedure and stored accordingly.

4.6 Non-Financial Option Appraisal

The non-financial appraisal of the shortlisted options was undertaken at a workshop on 21st March 2017 with involvement from a wide representation of clinical and non-clinical stakeholders within the Trust. The scores were then reviewed at Project Board on 27 March 2017. The attendees were:

Table 4.5 Staff included in non-financial option appraisal scoring

Attendee	Job Title
Ahmed Al-Bahrani	Clinical Lead, General Surgery
Ahseia Qureshi	Junior Project Manager /Project Support
Alison East	Matron, Intensive Therapy Unit
Antonio Cecco	Head of Integrated Decontamination
Ashley Reece (part of workshop)	Consultant, Paediatrics
Claire Galvin	Senior Programme Manager
Esther Moors	Head of Service Planning
Helen Brown (part of workshop)	Director of Strategy & Corporate Services
Helen Pickering (Facilitator)	Director at Currie & Brown
Jason McKee	Deputy Divisional Manager for Surgery, Anaesthetics & Cancer
Jeremy Livingstone	Divisional Director for Surgery, Anaesthetics & Cancer
Kevin Swaby	Theatre Manager
Mark Lydall	Architect, AHP Architects & Surveyors Ltd
Paddy Hennessy	Associate Director of Environment
Soheb Rafiq	Divisional Head of Finance
Tom Stambach	Consultant, Anaesthetics
Wayne Parson	Managing Surveyor, Kier Group (P22 PSCP)

4.6.1 Benefit Criteria

In order to qualitatively assess the options, benefit criteria have been developed to describe the key deliverables the preferred option should achieve. These criteria flow from the critical success factors and investment objectives and were agreed during the non-financial options appraisal workshop. They are as follows:

1. Clinical effectiveness and quality of care for patients
   - supports the service models
   - improves patient experience
   - enables compliance with CQC standards and other healthcare related standards

2. Quality of estate and compliant, fit for purpose accommodation
   - compliance with statutory legislation
   - enhancing the environment for patients, relatives, carers, visitors and staff

3. Implementation and deliverability
   - minimises the number of phases.
   - minimises disruption and decanting and maintains service activity levels during the works
   - minimises length of time to implement option

4. Capacity
   - provides sufficient capacity
   - provides a hybrid-enabled theatre

5. Staff satisfaction
   - provides a high quality environment for staff
   - assists staff recruitment and retention

6. Future flexibility and strategic fit
   - provides opportunity for future expansion
   - provides flexibility to accommodate more/less activity
   - supporting the trust's clinical and estate strategies
   - being consistent with "Your Care Your Future" strategy
   - suitable given that a longer-term 10 year plan for the site is to be identified

The following table sets out how the benefit criteria are aligned to the project objectives.

Table 4.6 Project objectives aligned to benefit criteria

Project objectives	Benefit criteria
1: Upgrade and improve the theatre complex to comply with modern standards, including addressing CQC concerns, within two years and without disrupting the ongoing service.	• Clinical effectiveness and quality of care for patients • Quality of estate and compliant, fit for purpose accommodation • Implementation and deliverability • Staff satisfaction
2: Provide sufficient theatre capacity to meet anticipated demand for emergency and elective care until longer-term plans for acute care come to fruition.	• Capacity • Future flexibility and strategic fit
3: Provide a 'hybrid-enabled' theatre	• Capacity • Future flexibility and strategic fit

4.6.2 Weighting of Benefit Criteria

Before appraising the options, members of the workshop were asked to consider the criteria in turn and agree a weighting to reflect the relative importance of each. This was done as a group and the results are shown in the table below.

Table 4.7 Benefit criteria weighting

	Criteria	Weighting
1	Clinical effectiveness and quality of care for patients	30
2	Quality of estate and compliant, fit for purpose accommodation	20
3	Implementation and deliverability	10
4	Staff satisfaction	10
5	Capacity	15
6	Future flexibility and strategic fit	15
	TOTAL	**100**

4.6.3 Scoring of Options

Participants were asked to score each option against each criterion. This was done as a group

rather than individually reaching a consensus through discussion. It was understood that the quantitative (financial) appraisal might alter the ordering of the shortlist, but that financial considerations were not part of this appraisal.

Scores were given out of 10, with 10 as the highest possible score for a perfect solution. The weighted scores for each option are shown in the table below.

Table 4.8 Option scores – raw and weighted

		OPTION B		OPTION C		OPTION D		OPTION E		OPTION F		OPTION G	
Benefit Criteria	**Weight**	**Do Minimum (4 general theatres PMoK)**		**6 theatres in PMoK (one hybrid-enabled) using carousel unit and space in ICU, level 5 and level 7 extension**		**6 theatres in PMoK (one hybrid-enabled) using carousel unit and space of levels 4, 5 and 7 including level 7 extension**		**6 theatres in PMoK (one hybrid-enabled) using space on level 4, 5 & 7 and lightwell on level 6**		**6 theatres in PMoK (one hybrid-enabled) using space on levels 4, 5 & 7 and lightwell on levels 5&6**		**New build 6 theatre block in Shrodells Garden (one hybrid-enabled)**	
		Raw Score (0-10)	**Weighted Score**	**Raw Score (0-10)**	**Weighted Score**	**Raw Score (0-10)**	**Weighted Score**	**Raw Score (0-10)**	**Weighted Score**	**Raw Score (0-10)**	**Weighted Score**	**Raw Score (0-10)**	**Weighted Score**
Clinical effectiveness and quality of care for patients	**30**	5	**150**	7	**210**	8	**240**	9	**270**	9	**270**	6	**180**
Quality of estate and compliant, fit for purpose accommodation	**20**	7	**140**	6	**120**	6	**120**	8	**160**	8	**160**	9	**180**
Implementation and delivery	**10**	3	**30**	2	**20**	3	**30**	6	**60**	6	**60**	9	**90**
Staff Satisfaction	**10**	6	**60**	8	**80**	7	**70**	8	**80**	9	**90**	7	**70**
Capacity	**15**	1	**15**	9	**135**	9	**135**	9	**135**	9	**135**	9	**135**
Future flexibility and strategic fit	**15**	2	**30**	7	**105**	7	**105**	8	**120**	9	**135**	10	**150**
Totals			**425**		**670**		**700**		**825**		**850**		**805**

The rationale of the scores is described below:

Clinical effectiveness and quality of care for patients

Options E and F scored highest, closely followed by option D and then option C. These options all provide a clinically functional design in PMoK enabling an improved patient flow through the the theatre complex and sufficient facilities to support efficient operational management of patients through this facility. Option E and F scored higher than options D and C due to the favourable location of the Day of Procedure Unit within the theatre complex.

The lightwell infills in options E and F would impact the light to the floors below however it was felt this could be managed by configuring the beds to minimise negative impact and therefore should still score highest in this benefit.

Option G was felt to be a less desirable option from a patient care perspective, mainly due to the distance from the main hospital.

Quality of care for patients would be least desirable in Option B, mainly because the option does not allow for the provision of a hybrid theatre and would increase waiting times due to a reduced number of theatres available. However the quality of care for patients would be improved from the current position as many CQC compliance issues would be addressed and therefore scores a 5.

Quality of estate and compliant, fit for purpose accommodation

Option G scored highest as a new build provides a new, purpose built theatre block meeting all current guidance without derogation. Options E and F score slightly less than this due to the space derogations that would be necessary due to space constraints.

Options C and D score the lowest as they involve the most derogations and rely on the use of the carousel unit which is a single point of failure and therefore felt to be a big risk when evaluating the options against fitness for purpose. The Do Minimum option B scores slightly higher as it does not rely on the carousel unit and provides fit for purpose accommodation, albeit for only 4 theatres. It does not score as well as the remaining options as they were felt to improve the quality of estate more than the Do Minimum option.

Implementation and delivery

Option G, scored highest for implementation and delivery as the new building would be constructed separate from the existing theatre department and would therefore not disrupt the current service during the construction works,

Of the remaining options which all involve reconfiguration of the existing department, Options E and F score the highest as they create additional space at the start of the programme, allowing greatest ease of phasing the works.

Options B, C and D score lower as no additional decant space is made available and the phasing is complex with 18 phases taking over two years. Option C scores lowest as it requires additional reconfiguration work in ICU, causing greatest disruption.

Staff satisfaction

All options provide adequate change and rest facilities, appropriate access to admin and reporting workstations, and designs facilitate appropriate operational flows to create a satisfactory working environment. Therefore all options score reasonably well.

Option F scored 9, the highest for this criterion, as it keeps theatres in PMoK which is felt to be advantageous in terms of patient transfer between beds and also ICU.

Option G would provide a new facility for staff to work in however it was felt that staff would find the distance from surgical beds and ICU difficult to manage operationally and therefore have a negative impact on their satisfaction. It therefore scores 7.

Taking into consideration the risks of the carousel unit and the split of anaesthetist accommodation over levels 4, 5 and 6, option D scored 7. Option C uses ICU space on level 6 rather than level 4 making adjacencies easier for staff, and option E negates the need for the carousel unit which will instil more confidence in staff on accessing sterile instruments. Therefore options C and E have scored slightly higher than option D for staff satisfaction.

The Do Minimum option scored lowest as it does not provide a hybrid-enabled theatre and therefore does not facilitate the ability to undertake more complex surgery with the latest equipment in the future. This does not support staff retention or encourage recruitment in a competitive environment. This option also fails to provide adequate capacity for the future and therefore does not provide a secure environment to support retention and recruitment of staff.

Capacity

All options other than the Do Minimum deliver the required capacity and therefore score equally high. The Do Minimum option only provides 4 compliant theatres and therefore does not meet this criterion and scores low accordingly.

Future flexibility and strategic fit

Option G scored highest against this criterion on the basis that it provides flexible accommodation that could be extended in the future by adding floors. It also releases space within PMoK for future expansion.

Of the PMoK options, Option F scores highest because it provides the most additional space which allows for greater flexibility in the future and allows for the potential future expansion of ESAU. Option E scores lower in line with it providing less additional space, followed by options C and D.

All options except Option B are in line with the Trust Estate Strategy and the 'Your Care Your Future' strategy.

Option C scored low for strategic fit as a key element of the Trust Estate Strategy is to provide compliant estate, and due to the high number of derogations associated with this option this is not met.

4.6.3 Sensitivity Analysis

The weighted totals scores show that Option F (850 points) scores highest, closely followed by Option E (825 points) and option G (805 points). The Do Minimum (Option B) scores lowest with 425.

A sensitivity analysis has been undertaken to test whether any individual change to a score would alter the outcome of the non-financial appraisal. The sensitivity analysis shows that options E and G could become the preferred option from a qualitative perspective if a single change to a score is made as follows:

- Option G becomes the preferred option if the score for "clinical effectiveness and quality of care for patients" is increased from 6 to 8.
- Option E becomes the preferred option if the score for "quality of estate and compliant, fit for purpose accommodation" is increased from 8 to 10.

Whilst both these changes are not felt to be a realistic evaluation of the options against these criteria, it shows that a small increase to one or more criteria could alter the preferred option from a non-financial perspective.

4.6.4 Outcome of Non-Financial Appraisal

Given the results of the non-financial appraisal and the sensitivity analysis, it can be concluded that options E, F and G are all front runners from a non-financial perspective.

4.7 Economic Appraisal

This section provides an overview of the main costs associated with each of the shortlisted options and explains how they were derived.

The economic appraisal is based on the whole life costs and relevant property related capital, revenue and operating costs. It includes all capital costs, lifecycle costs, maintenance and Facilities Management (FM) costs, utilities, clinical and non-clinical operating costs, but excludes VAT and capital charges. It also includes the valuation of certain risks.

4.7.1 Capital Costs

The trust and its advisors have developed a schedule of accommodation and functional requirements based on the agreed scope, together with an initial design and construction and enabling works programme. The capital costs of all options have been produced by Currie & Brown cost consultants and are summarised in the table below.

Table 4.9 Capital cost estimates of shortlisted options

	Option B Do Minimum £	Option C £	Option D £	Option E £	Option F £	Option G £
Departmental Costs (Building Cost)	2,598,219	5,062,560	4,732,221	4,848,631	5,184,265	11,535,691
On-Costs (Infrastructure & Enabling Works)	1,901,923	2,361,923	2,311,883	3,068,443	3,201,612	3,716,356
Works Cost Total at Current Prices	**4,500,143**	**7,424,483**	**7,044,104**	**7,917,074**	**8,385,877**	**15,252,047**
Provisional Location Adjustment	450,014	742,448	704,410	791,708	838,588	1,525,205
Sub-Total	**4,950,157**	**8,166,931**	**7,748,514**	**8,708,782**	**9,224,465**	**16,777,251**
Fees	693,022	1,143,370	1,084,792	1,219,229	1,291,425	1,342,180
Non-Works Costs	15,000	27,500	27,500	27,500	27,500	27,500
Equipment Costs	128,955	1,209,312	1,038,184	938,184	938,184	1,400,000
Contingency	385,539	901,920	882,962	893,231	902,343	1,245,722
Total (for approval purposes)	**6,172,673**	**11,449,034**	**10,781,952**	**11,786,926**	**12,383,917**	**20,792,654**
Optimism Bias / Risk	340,114	713,275	671,716	769,686	827,246	1,665,492

Sub-Total	**6,512,787**	**12,162,308**	**11,453,668**	**12,556,612**	**13,211,162**	**22,458,145**
Inflation adjustments (5) (PUBSEC 2 or 4Q2018)	21,807	107,933	102,403	38,365	40,636	0
Forecast out-turn business case, excl. VAT	**6,534,594**	**12,270,241**	**11,556,071**	**12,594,977**	**13,251,799**	**22,458,145**
VAT (including recent HMRC changes from 1st April 2014)	1,306,919	2,454,048	2,311,214	2,518,995	2,650,360	4,491,629
VAT Recovery	-520,979	-784,841	-743,670	-795,250	-806,015	-268,436
TOTAL COST INCLUDING VAT	**7,320,534**	**13,939,448**	**13,123,615**	**14,318,722**	**15,096,143**	**26,681,338**

The full OB forms are included in Appendix 4A, and are based on the following notable assumptions:

- The chosen procurement route is ProCure 22 (see Commercial Case)
- Works will have to be undertaken across multiple phases
- Standby generator is included to support new theatres and existing theatres ventilation upgrades
- Decant space to Shrodells and Level 5 is included
- Costs for all options are based on 1:200 designs
- Costs for option G have been informed by modular specialists

Equipment Costs

The equipment costs of all options have been developed by MTS equipment advisors following the production of an equipment schedule using the latest Room Data Sheet information. The equipment cost report is attached at Appendix 4B.

Specifications and models for architecturally significant items have been developed and discussed with users. This includes the pendants, operating lights and an automated storage system in options C and D.

MTS also undertook a detailed audit of existing equipment in the theatre complex which could be re-used in the refurbished facilities. This report is attached at Appendix 4C and identifies that there is a saving of £472,241 on what needs to be purchased as a result. The table below sets out the equipment requirements for each option.

Table 4.10 Equipment cost of shortlisted options

	Option B Do Minimum	**Option C**	**Option D**	**Option E**	**Option F**
New General OR x 2	-	744,320	744,320	744,320	744,320
Shared General OR Support	-	5,689	5,689	5,689	5,689
Entrance and Support	241,492	241,492	241,492	241,492	241,492
Day of procedure admissions area/Day patient recovery area	43,286	43,286	43,286	43,286	43,286
Recovery	206,606	265,826	265,826	265,826	265,826

Staff Facilities	29,770	29,770	29,770	29,770	29,770
ICU	-	171,128	-		
IDT	25,178	125,178	125,178	25,178	25,178
Anaesthetics	54,864	54,864	54,864	54,864	54,864
TOTAL	**601,196**	**1,681,553**	**1,510,425**	**1,410,425**	**1,410,425**
less transfer items	-472,241	-472,241	-472,241	-472,241	-472,241
TOTAL EX VAT £	**128,955**	**1,209,312**	**1,038,184**	**938,184**	**938,184**

For option G, the modular build, an allowance of £1.4m has been included in the capital cost for equipment. This assumes all new equipment for 6 theatres. Modular building costs include for ultra clean canopies, operating lights, pendants and surgeon's panels, therefore some equipment costs are included within the modular building rates. The equipment allowance of £1.4m in option G is based on the following assumptions:

- 6 theatres fit-out - £150,000 each = £0.9m
- All other areas (taking into account transfer items) = £0.5m

4.7.2 Optimism Bias

Optimism bias has been calculated for each option the results are summarised in the table below. The detailed optimism bias calculations are attached in Appendix 4D.

Table 4.11 Optimism bias calculations

Option	Upper Bound	Mitigation %	Optimism Bias %
B	36.00%	84.70%	5.51%
C	37.50%	83.40%	6.23%
D	37.50%	83.40%	6.23%
E	37.50%	82.60%	6.53%
F	37.50%	82.20%	6.68%
G	20.50%	60.95%	8.01%

4.7.3 Revenue Costs

Clinical revenue costs have been calculated following clinical workstream meetings with key staff in the Surgical Division. They are based on the 1:200 designs and planned ways of working. Further detail is provided in Appendix 4E and the finance case.

Estates revenue costs have been estimated using existing running costs as a basis.

The table below shows each of the revenue costs once 'steady state is reached following completion of all the construction works

Table 4.12 Revenue costs for option appraisal for the first full year following completion of works

	Option B	Option C	Option D	Option E	Option F	Option G
Pay £m pa	2.998	2.612	2.612	2.612	2.612	2.786
Non pay £m pa	1.169	1.111	1.111	1.111	1.111	1.137

All options assume that forecast activity will be met and therefore there is no difference between income for each option, however income is excluded from the GEM as per Treasury Green Book guidance.

For option B the activity is met through weekend working rather than through an additional theatre and therefore the pay costs and overheads are higher for this option. Options C to F have the same assumptions in terms of pay and non-pay. Option G assumes more expensive pay costs due to the inefficiencies created by the location of the unit and poor adjacencies with ICU and surgical beds. The non-pay costs in option G are higher as a larger space is being serviced (as there are spatial derogations in the PMoK options).

4.7.4 Lifecycle Costs

Currie & Brown cost consultants have provided a lifecycle cost model based on the capital costs above, assessed over the life of the building. These costs cover the renewals of engineering elements and are assessed over sixty years following completion, the normal appraisal period for new build. Refurbished areas have also been assessed over a thirty year period as per GEM guidance.

The lifecycle cost profiles are included in Appendix 4F and are included within the GEM and total whole life costs summarised below.

Table 4.13 Lifecycle costs for option appraisal

	Area m^2	Asset Life (years)	Total lifecycle cost over asset life	£/annum	£/m2/annum
Option B	1,770	30	£13,391,999	£446,400	£252
Option C	2,904	30	£21,379,502	£712,650	£245
Option D	2,791	30	£20,400,348	£680,012	£244
Option E	2,841	30	£20,923,862	£697,462	£245
Option F	2,948	30	£21,840,298	£728,010	£247
Option G	3,293	60	£45,873,780	£764,563	£232

4.7.5 Quantitative Risk Appraisal

The project team has held regular workshops to identify and assess the risks associated with the shortlisted options. A risk register has been developed (attached in Appendix 7D) which is discussed more in the Management Case.

Following the qualitative scoring of all the risks, the risks were then quantified by the project team with the cost consultant. Each risk was reviewed to consider whether it would have a capital or revenue cost impact should the risk occur. The potential cost impacts were then estimated, and multiplied by the probability for each of the shortlisted options. This analysis is provided in Appendix 4G and the totals are shown in the table below.

Table 4.14 Quantitative risk assessment

	Capital contingency sums £	Revenue contingency during construction period (recurring) £	Revenue contingency sums (recurring) £
Option B	385,539	25,000	547,000
Option C	901,920	25,000	547,000
Option D	882,962	25,000	547,000
Option E	893,231	25,000	547,000
Option F	902,343	25,000	547,000

Option G	1,245,722	0	547,000

The capital cost quantification has been used in the capital cost estimates and included in the GEM, and the revenue costs have been added as recurring annual sums in the GEM.

Overall Option B has the lowest capital risk allowance due to its reduced scope and has a fewer number of phases and intrusion than the other PMoK options. Option G has the highest capital risk sum, mainly due to size of the facility and the early stage of scoping and design of the option.

Revenue contingency during construction has been applied to all options requiring works in PMoK. This is risk associated with the disruption to service in the construction period.

The ongoing revenue contingency is estimated as the same for all options and reflects the opportunity cost of lost income should the number of surgical beds not be available. This would lead to cancelled operations and the inability to process the surgical activity.

4.7.6 Equivalent Annual Cost Findings

As required by Treasury guidance, the costs of each of the options have been considered over the whole estimated life of the building, using the generic economic model (GEM) which is provided in Appendix 4H. The assumptions upon which it is based are detailed below.

- Sunk costs have been excluded
- No opportunity costs have been identified
- As per Green Book guidance, NHS income, VAT, capital charges and inflation are excluded.
- Refurbishment options have been appraised over a 30 year period and Option G, new build, has been appraised over 60 years, reflecting the expected life of the asset.

The table below sets out the Equivalent Annual Cost of each of the options

Table 4.15 Results of the economic appraisal

Option	Equivalent Annual Cost (EAC) £m	Risk Adjustment £m	Risk Adjusted EAC £m
B	3.94	0.35	4.29
C	4.16	0.37	4.53
D	4.07	0.37	4.44
E	4.15	0.37	4.52
F	4.25	0.37	4.63
G	4.83	0.55	5.39

4.8 Cost Benefit Analysis

In order to determine which option represents the best value for money, the financial and non-financial appraisals have been combined to generate an equivalent annual cost (EAC) for each option. This is shown in the table below:

Table 4.16 Cost benefit analysis

Option	Risk-adjusted EAC (£m)	Benefit points	EAC cost per benefit point (£m)	Rank (VFM terms)
B	4.29	425	0.01010	6
C	4.53	670	0.00676	5
D	4.44	700	0.00634	3
E	4.52	825	0.00548	2
F	4.63	850	0.00544	1
G	5.39	805	0.00669	4

This demonstrates that Option F has the lowest cost per benefit point, very closely followed by option E.

4.9 Sensitivity Analysis

Sensitivity analyses were undertaken to the EAC and benefit scores, identifying the variations that would be required to the EAC or benefit scores to enable a different option to demonstrate a comparable level of benefit for the cost as the preferred option. The table below show the percentage change in cost required to alter the outcome of the options appraisal.

Table 4.17 Switching point analysis – EAC

Option	**EAC (£m)**	**EAC required to switch preferred option (£m)**	**Variation required to EAC to alter preferred option (£m)**	**Percentage change in EAC to alter preferred option**
B	4.294262	2.31	1.98	-46.14%
C	4.530266	3.65	0.88	-19.52%
D	4.437112	3.81	0.63	-14.15%
E	4.518636	4.49	0.03	-0.65%
F				
G	5.385619	4.38	1.01	-18.66%

The switching point analysis shows that option E would need to have a 0.65% reduction in EAC for it to become the preferred option. This is a very sensitive result, indicating that either option E or F could be the preferred option in value for money terms.

The table below shows the outcome of the benefit score switching point analysis.

Table 4.18 Switching point analysis – benefit score

Option	Benefit score	Benefit score required to switch preferred option	Variation required to benefit score to alter preferred option	Percentage change in benefit score to alter preferred option
B	425	789	364	86%
C	670	833	163	24%
D	700	815	115	16%
E	825	830	5	1%
F				
G	805	990	185	23%

Similar to the EAC switching point analysis, this shows that the result is very sensitive to option E or F being the preferred option.

4.10 Preferred Option

The option appraisal and sensitivity analysis identifies Option F as the preferred option, but with options E and F providing a similar level of value for money.

Given the capital expenditure for option E is approx. £0.75m less than option F, the Project Team recommend that Option E is selected as the preferred option. This acknowledges the strategic context of the investment and the uncertainties around the configuration of the Watford Hospital site which will emerge from the Acute Transformation project.

5. Commercial Case

5.1 Introduction

This case describes the commercial arrangements that the trust plans to put into place to deliver and respond to the required works.

5.2 Scope of Procurement

The following is required to be procured within the scope of this OBC:

1. Works to level 6 theatre complex
2. Enabling works include
    a. Works to Level 7 PMoK for the Integrated Decontamination Team to store their instruments
    b. Works to Levels 4 and 5 PMoK for offices to move from level 6.
    c. Works to Shrodells to accommodate office space

The contractor will be required to finalise design and undertake necessary construction works for these facilities.

5.3 Procurement of Built Solution

5.3.1 Procurement options

The Procurement strategy is located in Appendix 5A. To ensure that the right procurement process was selected, a procurement workshop was undertaken at the Trust's offices on the 13th July 2016 with the following leads present:

- Kevin Howell, Director of Environment and Theatres Project Director, WHHT
- Claire Galvin, Project Manager, WHHT
- Patrick Hennessey, Deputy Director of Environment, WHHT
- Mark Taylor, Estates Project Manager, WHHNT
- David Evershed, Herts Procurement Lead
- Ian Mitchell, Cost Consultant, Currie & Brown

The purpose of the workshop was to:

- Review the available procurement route options (long list)
- Establish and agree criteria against which to shortlist
- Review shortlisted options against time, cost, quality and risk
- Agree preferred way forward and rationale

The options evaluated are set out below, with their key characteristics.

Table 5.1: Long list procurement options

	Procurement Option	Key Features
1	Traditional (Bills of Quantities)	• The selection of the contractor is made on the basis of tender pricing of Bills of Quantities • Definitive measurements of the major elements of the building. • Monetary allowances can be made for unforeseen or un-designed work, or those done by sub-contractors which are yet to be tendered • Trust responsible for design • Defined scope tendered to contractors at a fixed price lump

		sum.
2	Traditional (Specification and Drawings)	• Contractor is appointed as a response to a comprehensive specification document which defines the scope of the work to be allowed for. • Includes allowances for unforeseen or un-designed work or specialist works. • Trust responsible for design • Fixed price lump sum from a contractor
3	Design and build	• Employer's Requirements (ER's sets out the specification of the building required and defines the planning and other restrictions. • Contractor responsible for design team
4	Two-stage Tendering Approach	• Early appointment of contractor to provide programming and buildability advice • Earlier on-site start • Single stage tender- detailed design completed prior to works being tendered. • Two stage tender- flexible, early contractor input Trust retaining control of design process and cost certainty.
5	Management Contracting	• Management contractor is appointed to manage the construction of the project rather than just build it. • Trust appoint the design team • Contractor tenders a fee for pre-commencement services and construction services airing and after the project. • Lump sum or guaranteed maximum for site staffing and facilities • Works are divided into separate trade packages tendered by sub-contractors
6	Construction management	• Client organises the management of the construction activities in-house. • Works are divided into separate trade packages tendered by trade contractors. • Client employs the selected trade contractors.
7	Design, Manage and Construct	• Design and manage contractor is appointed to manage the construction of the project rather than build it. • Contractor also responsible for programming and procuring design information. • Design consultants employed by the design and manage contractor.
8	Target Cost Contracts	• Contractor is appointed in competition or by negotiation • Based on pricing of preliminaries and simplified Bills of Quantities or agreement and validation of project cost plan for design and build.
9	Procure 22 (P22)	• • Framework provided by the Department of Health for the procurement, development and refurbishment of NHS facilities. • Delivers the advantages of a Two-stage procurement approach. • Went live in October 2016 for the next 4 years and has 6 national contracting organisations on it. • PSCP can be appointed at any stage of the project • No financial penalties for a Trust from the PSCP should the Trust decide not to proceed to the next stage.
10	Southern Construction Framework (previously known as IESE)	• Unique opportunity for authorities to work with a reduced number of contractors and consultants to ensure that efficiencies are indeed passed from one project to the next. • Fully OJEU compliant • Obviate the need for complex procurement processes

		• Collaborative working and early contactor engagement ensures the minimum out turn overall project cost can be achieved. • Local engagement with SMEs and improved construction skills are promoted.
11	SCAPE framework	• Split between minor and major works. • Kier >2m to max of £4m • Willmott Dixon for works >2m. • OJEU compliant for public sector clients to procure work via a single provider within the two capital cost bands • Contractor is appointed at project inception and develops brief, signs the scheme, agrees Target Cost and undertakes construction works on site.
12	PFI / PF2	• Uses private sector capacity (funding) and public resources to deliver public sector infrastructure/ services according to a specification defined by the public sector. • PFI contracts are typically for 25-30 years • 'Output specification' sets out what the consortium is expected to achieve. • Public sector authority is entitled to terminate the contract, compensate the consortium where required, and take ownership of the project.
13	LIFT	• LIFT is a new form of PPP that invests in new build primary care estate in England. • Creates a more standardised market of private sector investment • Aims to improve and expand on the services through co-location of services • Offers services traditionally only available to hospitals.

5.3.2 Discounted Procurement Options

A number of procurement routes were discounted at the workshop as they did not meet some of the Trust's fundamental key criteria. Further detail is given below.

Table: 5.2 Discounted procurement options

	Procurement Option	**Reason for discount**
1	PFI/PF2	• Does not fit the Trust's current funding preferences or criteria relating to time • PFI option should be discounted if public funds are available.
2	LIFT	• Not suitable for an acute Trust as it is directed towards primary care
3	Management Contracting, Construction Management, and Design, Manage and Construct	• Do not guarantee cost certainty before construction works started
4	Target Cost Contracts	• As P22 implements a target cost contract, which is a tried and tested procurement route, with processes and contract amendments linked to NHS requirements, it would be a waste of resources and money to develop an individual target cost contract.

5.3.3 Evaluation of the Shortlisted Procurement Options

As part of the procurement workshop, each shortlisted procurement route was tested against

project criteria, which was later inputted within a scoring matrix by Currie & Brown to identify the most appropriate solution. The criteria were:

- Nature of the project
- Scope of the work
- Client control
- Design responsibility
- Price certainty
- Programme
- Risk
- Market conditions
- Anticipated change
- Quality

The outcome of the workshop, evaluating each option against key criteria is shown below:

Table 5.3 Summary Procurement Comparison Matrix

Rank	Procurement route	Weighted Score (out of 320)	Total Score (%)
1	P22	305	95
2	Two Stage D&B	251	78
3	SCF or Scape	244	76
4	Single Stage Traditional	189	59
5	Single Stage D&B	186	58

Please see Appendix 5A for the full procurement strategy which contains the full comparison matrix.

This evaluation identified that P22 scored most favourably, followed by the Two Stage D & B and then the SCF or SCAPE. A further breakdown of the scores is given in the table below:

Table: 5.4 Summary of Reasons for Scores

Procurement Option	Reason for score
Single Stage Design and Build	Ranked 5th- • Unlikely to be attractive to contractors in the current market and has limited benefits to the Trust
Single Stage Traditional with Bills of Quantities	Ranked 4th • Not suited to optimising the Trust's time constraint or transfer risk to the contractor • Greater potential for claims and disputes
Southern Construction Framework/ Scape	Ranked 3rd • As the only contractors with an established track record of delivering healthcare project as Kier, BAM and Galliford Try, there is no advantage gained by the Trust utilising the SC framework • Using SCAPE, the Trust would be restricting options in relation to preferred partners with a scheme of the size and nature of the Theatre Reconfiguration, it is important to provide a wider spectrum of contractors the opportunity to undertake the works as capacity and available expertise will be important considerations in choosing a suitable partner.
Two-stage Design and Build	Ranked 2nd • The Stage 1 process usually takes place when planning drawings, the disposition of rooms and aesthetic treatment of elevations is defined sufficiently to allow a contractor to price the preliminaries content.

	• The Stage 2 involves designing and pricing all the subcontract works trade packages based on competitive quotations which when aggregated with the stage one tender will form the basis of a lump sum contract or a guaranteed maximum price (GMP). • Favoured by the market place as tendering costs and risks are minimised • Allows engagement with a contractor after the first stage process is complete and permits ongoing active involvement in the detailed design, logistics planning and procurement of the trade work packages (second stage)
Procure 22	Ranked 1st • Uses an established nationally agreed framework, promoted by the Department of Health • Engages with contractors on a more collaborative basis to avoid the negative aspects of traditional procurement. • This project would be the first to use this framework • Keen interest from all PSCPs and should attract 'A-teams' from those PSCPs that are new to this framework and keen to establish themselves

P22 is capable of delivering against all of the above criteria and would also facilitate an even earlier appointment of a contractor. P22 is more suited to a collaborative working approach to the logistics and inherent risks of undertaking a complex refurbishment of the existing theatres.
If the P22 procurement route is select, the two-stage design and build methodology could be adopted at any point if the P22 process was seen to be failing. It would be considerably more difficult and expensive to change if the two-stage design and build route was adopted first.

Therefore, it is concluded that ProCure22 is the preferred procurement route.

5.3.4 Benefits of ProCure22

P22 is a framework provided by the Department of Health for the procurement, development and refurbishment of NHS facilities. A Principal Supply Chain Partner (PSCP) is appointed for detailed design development, FBC and construction. This procurement route has the following advantages:

- the process provides a guaranteed maximum price (GMP), providing considerable cost certainty
- consistent with Government policy, the Public Contract Regulations 2006 and 2009, the National Audit Office guidance on use of centralised frameworks and the OGC Common Minimum Standards
- better design decisions due to integrated approach, collaborative working and experience and expertise of PSCPs
- embedded flexibility of approach
- defect free delivery
- risks are apportioned by agreement to the party most appropriate to carry the financial consequences
- improved buildability and innovation in design due to Design-and-Build arrangement
- not privately funded – private funding not required as significant capital receipts will be generated from land sales
- auditability due to open book accounting with clear demonstration of actual costs and full access to accounting systems and payroll as required
- PSCP fees – detailed activity schedules and benchmarked against previous projects
- involvement of key subcontractors

- implementation and transparency of process and regular reporting to enable informed financial decisions.

The Project Board agreed to proceed with a P22 procurement methodology and PSCP selection has therefore progressed. The costs and programme in this OBC are based upon this procurement route.

5.3.5 Process and Timescale

The standard P22 procurement process was followed, with the DH P22 Implementation Advisor present at all key scoring and interview sessions.

The table below sets out the key milestones in the procurement process and contract arrangements.

Table 5.5 Key dates in procurement process

Task	Date
High Level Information Pack issued	29th November 2016
Trust open day	2nd December 2016
Deadline for PSCP Expressions of Interest	23rd December 2016
Trust shortlisting process	9th January 2017
Formal interviews, scoring and final selection	18th January 2017
Trust approval to appoint PSCP	TEC – 1st February 2017

The project team has experience in Procure 21+ (the predecessor of Procure 22).The selection panel consisted of the following individuals:

Table 5.6 Selection panel

Individual	Role
Kevin Howell	Technical Lead
Patrick Hennessy	Estates Lead
Jeremy Livingstone	Project Director, Clinical lead, Divisional Director
Jason McKee	Deputy Divisional Director
Soheb Rafiq	Finance lead
Mark Lydall	AHP Architects
Andrew Panniker	Director of Capital & Estates, Royal Free London NHS FT
Helen Pickering	Procurement manager/OBC writer, Currie & Brown (Not an assessor)
Graham Bell	P22 Implementation Advisor (Observer - not an assessor)

The High Level Information Pack (HLIP) was issued on 29th November 2016 providing the bidders with background information on the project, the overall Trust budget and the qualitative selection criteria which are set out in the table below.

Table 5.7 Qualitative selection criteria

	Weighting
Relevant experience	100
Cost management	95
Strength of team and leader	90
Care quality and productivity	85

Working with your supply chain	80

Three Expressions of Interest (EOIs) were received and were scored by the selection panel against the criteria. At a meeting on 9th January 2017, individual scores were reviewed and then a consensus agreed. Separate to EOI scoring, a commercial score was calculated by DH and awarded to each bidder.

Following EOI scoring, it was agreed the IHP and Kier would be taken forward to interview stage on the basis that Graham had scored significantly less in the EOI evaluation. Interviews were conducted on 18th January 2017 with IHP and Kier. Qualitative scores were moderated as appropriate by the selection panel and final scores are shown below.

Table 5.8 PSCP Scores

PSCP	Quality Score (following interview moderation)		Commercial		Combined	
	Score	Weighted 70%	Score	Weighted 30%	Score	Rank
Kier Health	71.64	50.15	100.00	30.00	80.15	1
Integrated Health Projects (IHP)	73.28	51.29	94.96	28.49	79.78	2
Graham (EOI only)	66.46	46.52	84.36	25.31	71.83	3

Based on these scores, Kier have been selected as the preferred PSCP. DH has provided written confirmation that the process undertaken to select the PSCP was as prescribed by DH.

5.3.6 Market Interest Statement

The market conditions in the construction industry have changed significantly over the last three years. The contraction of principal contractors and their supply chain during the recession has resulted in a very selective contractor base as construction activity increased in 2014, 2015 and 2016. Single stage traditional tendering is a thing of the past and two stage and negotiated tendering are the preferred procurement routes. Main contractors are declining to tender if the competition is too great and the cost to bid is too high with small chance of securing the project. This selective tendering position is also taken by the principal contractors supply chain. In the current market a number of trade contractors are only providing prices to principal contractors who have already secured the project and prices are limited to short acceptance periods and defined programme periods due to supply chain available capacity.

The vote for Brexit did not induce the immediate economic shock predicted. Despite a post-Brexit dip, construction output in 2016 was 2.4% higher than 2015. Construction activity has held up well as projects are dusted off after a period of pause. Projects already underway are at risk of impact from continued labour shortages, capacity pressures and the fall in the value of sterling. However, indicators suggest that the steep rise in tender costs post-downturn may at last start to soften as contractor pipelines ease from 2017. This easing will continue following the government's decision to hold a snap election on the 8th June 2017, as uncertainty leading up to the general election and post-election will affect public sector funding and procurement.
Frameworks

The procurement route for the Watford Theatres project is P22. ProCure22 (P22) is a framework provided by the Department of Health for the procurement, development and refurbishment of NHS facilities. Based upon the principles set out by NHS Estates with regards to the overriding objectives of ProCure22, coupled with experience gained through the Pilot Schemes and the

recent roll out throughout England, it can be argued that ProCure22 delivers the advantages of a Two Stage procurement approach with reduced risk through P22 supply chain commitment and open book tendering.

Inflation

Indicators show the recent construction surge is abating. The Public Sector prices indices (PUBSEC) has construction tender price inflation peaking at 1st Quarter 2017, levelling throughout 2017, falling one point at the end of 2017 and rising at the end of 2018. In accordance with the Department of Health guidance and outlined in the Capital Investment Manual (CIM), the OB cost forms include minimal inflation of 0.44% based on the latest PUBSEC indices. However, inflation is a potential price risk that has been included within the contingency sum to reflect Currie & Brown's inflation forecast of 2.1% increase in 2017 and 2.2% increase in 2018. Currie & Brown do not believe that London and the South East will have such a dramatic stabilisation of construction inflation and therefore the contingency allows for a 4% price increase to the construction costs.

Location factors

Location factors change regularly to reflect the nuances of the local construction markets, which is determined by, level of activity, mobility of the construction industry, political environment and volume of local construction and trade providers. The location factor for Watford within the OBC is 10% (110), based on the BCIS location indices that are recommended to be used for business cases. Changes to the local markets are affected quickly by fluctuations in demand and supply of labour, plant and materials. The current location factor for Watford is 7% (107), which is a reflection of the steady construction activity in the area, but may change again in the forthcoming months.

5.3.7 Procure21+ Standard Components

Although no Procure21+ repeatable rooms have been developed yet for theatres, this scheme will benefit from the Standard Components work undertaken by ProCure21+ which should contribute to cost reduction.

5.3.8 Government Construction Strategy

The Government Construction Strategy issued in May 2011 states the need for 'designers and constructors to work together to develop an integrated solution that best meets the required outcome' and for 'contractors to engage key members of their supply chain in the design process where their contribution creates value'. The paper also further validates the approach for frameworks whilst assessing the effectiveness of exiting arrangements. Other key elements of the strategy outline the need for incentivising cost and programme efficiency via pain and gain share, encouraging off site fabrication and genuine integration of tier 1 supply chain partners. These are most effectively delivered via a well-structured framework environment. It also highlights the need for an integrated approach, engaging supply chains and incentivisation. This has been considered fully in the procurement review in order to maximise the benefit to the trust in relation to the procurement approach and it has been highlighted how value for money will be enhanced.

The approach and procurement strategy has been written with a key driver 'to obtain the best possible value for money (VfM) from the market place that is compliant to an agreed and signed off design' whilst recognising that best value is derived through a combination of the following criteria:

- design robustness

- purchase and installation cost
- build quality
- lasting quality
- ability to commission
- ease and cost of maintenance
- adaptability in future use
- effect on delivery programme

The PSCP will work closely with the designers and the Trust's P22 project manager and cost advisor providing full visibility to achieve and demonstrate the very best possible value for money from the market place. At agreed stages within the tendering process the PSCP will provide all the necessary information that will assist the trust's project manager and cost advisor to fully review, consider and provide where necessary any input to ensure that every aspect of that package is audited and verified for technical compliance, affordability and best value for money.

5.3.9 Benchmarking

At FBC stage, when the GMP is being produced, package returns will be competitively tendered and each package will be benchmarked against similar recently completed projects to provide comparisons and validate the commercial offer. The project costs will also be compared to other healthcare projects via data collated via the national framework. This will give the Trust some assurance about the commercial and programme offer to complete the theatre reconfiguration project.

5.3.10 Government Soft Landing and Building Information Modelling (BIM)

All publicly procured projects are by 2016 required to deliver projects using Building Information Modelling (BIM). This will enable multiple benefits in quality of buildings and efficiency of delivery including reduced waste, better clash detection, more coordinated design, clarity of stakeholder and end user sign off, ease of programming, phasing, and potential for asset management. A competency in appointing PSCPs on the P22 framework is their BIM experience and knowledge, and that their Principal Supply Chain Members (PSCM) are familiar with delivering via BIM compliant software. There is potential to integrate within the BIM model Government Soft Landings (GSL), which in essence enhances post completion operational efficiency by effective handover, training, monitoring and aftercare from the designers and contractors. GSL is an approach that should be adopted to improve the building operational efficiency, and with the aspiration of including GSL within the BIM model, this will improve methods of working. Importantly both BIM and GSL will facilitate higher quality buildings and ensure we get the best out of our estate.

5.4 Sustainability/BREEAM

BREEAM is a market-focused tool aimed at encouraging significant improvements in the performance of buildings through the recognition and demonstration of improvements made to those buildings.

5.4.1 Pre-assessment Summary

Currie & Brown have undertaken the BREEAM Design Stage Pre-assessment for the preferred option which is included within Appendix 3D. The pre-assessment is based on the verbal and written expressions of intent by the design team during the BREEAM pre-assessment meetings.

The scope of refurbishment works is limited to core services, local services and interior design; the fabric and structure remain untouched. Therefore, the project has been assessed against Part 2, Part 3 and Part 4 of the BREEAM refurbishment and fit out 2014 scheme.

The Minimum Standards requirements to achieve a Very Good rating will be securely met with this proposed scheme. The pre-assessment undertaken, and included within Option E, demonstrates that should all of the opportunities be pursued the building will achieve a score of 58.47%, securely over the 55% threshold for BREEAM Very Good. A number or combination of these opportunities may be selected for the final assessment, however for the purpose of this report all opportunities are presented for information.

5.4.2 Pre-assessment Details

The assessment covers a range of environmental sections and each consists of a specific number of credits.

Table 5.9 below lists each of the credits, identifies those which the West Herts Theatre refurbishment could achieve and the category scoring.

Table 5.9: BREEAM Pre-assessment Rating

Credit	Credits available	Credits targeted	Weighted value (%)	Uplift credit	Uplift score	Potential total score
Management	21	16	11.6	3	2.18	13.78
Health & Wellbeing	19	7	6.05	5	4.33	10.38
Energy	16	7.4	5.4			5.4
Transport	10	2	1.7			1.7
Water	8	3	2.53	2	1.69	4.22
Materials	13	7	8.54	2	2.44	10.98
Waste	11	4	3.17			3.17
Land use and Ecology	2	0	0			0
Pollution	12	3	2.93	4	3.91	6.84
Innovation	10	1	1	1	1	2
Total Credit	**122**	**50.4**	**42.92**	**17**	**15.55**	**58.47**

A summary of actions to achieve the additional points can be found in the BREEAM report at Appendix 3D.

5.5 Key Commercial and Legal Issues

5.5.1 Construction Contract

The construction work will be completed under NEC3 Option C contract in line with the DH ProCure22 Framework. It is not anticipated that there will be any non-standard legal issues.

5.5.2 Proposed Contract Length

The construction work is currently programmed to take 111 weeks, once the construction team is on site. The detailed phasing will be explored with Kier, the PSCP, and the clinical teams during FBC stage.

5.5.3 Commercial Issues

There are no significant commercial issues anticipated as part of this project. The anticipated allocation of risk between parties is shown below.

Table 5.10 Risk allocation table

Risk Category	Potential allocation		
	Public	**Private**	**Shared**
1. Design risk		X (clinical functionality for Trust)	
2. Construction and development risk		X	
3. Transition and implementation risk			X
4. Availability and performance risk			X
5. Operating risk	X		
6. Variability of revenue risks	X		
7. Termination risks			X
8. Technology and obsolescence risks			X
9. Control risks			X
10. Financing risks	X		
11. Legislative risks			X

5.6 IM&T

The design has taken into account IM&T requirements as per the Room Data Sheets. Wiring up to the socket is included within the scope of the contractor.

5.7 FM Services

Facilities Management services will continue to be provided to the sixth floor as per the current arrangement. The FM service provider, Medirest, has been engaged in developing the design to ensure sufficient space has been allocated for their needs. They will continue to be engaged and consulted as the details of the phasing plans are agreed.

5.8 Equipment Strategy

An equipment strategy has been developed by the Trust's equipping advisors, MTS, and is attached at Appendix 5B. The objective of the equipping strategy is to ensure that the Trust has fully equipped theatre and support facilities that keep pace with technological developments whilst also securing best value for money once the development is completed. MTS have also taken into account the importance of maintaining continuous availability of equipment to avoid service disruption.

The strategy identifies the scope and responsibility for equipping and how this will be managed by the Trust during the development of the scheme. It also considers the process that will be followed to identify the options available for the provision of equipment and the tasks required to complete the process.

5.8.1 Equipment Costs

A fully itemised equipment schedule has been developed based on the current design, which has then been costed by MTS. These are provided in detail in section 4.7.

MTS have undertaken an audit of existing equipment to ensure the equipment budget takes into account equipment that the Trust already has. The audit identified that there is the opportunity to reduce the equipment requirements for the scheme by £472,241 by utilising existing equipment. The equipment budget has therefore been adjusted to reflect this and is therefore £938,184 ex VAT for option E.

5.8.2 Equipment Procurement Strategy

The equipment strategy will continue to be developed exploring the procurement options available, accommodating existing equipment and analysing forecasts of future activity taking account of clinical developments and technologies. The assumption in this business case is that the equipment will be procured by the Trust (except Group 1 items) using capital which is included in the overall cost of the project. Options for a Managed Equipment Service (MES) will be considered again at FBC stage.

A full equipment procurement programme will be developed at FBC stage, identifying lead-in times aligned to the detailed construction programme.

5.9 Town Planning Requirements

The requirement for town planning permission has been considered and is not required for this project.

5.10 Personnel Implications (including TUPE)

It is anticipated that the TUPE – Transfer of Undertakings (Protection of Employment) – Regulations 1981 will not apply to this investment.

There will be the need to recruit additional staff in line with the increased theatre activity and this is described more in the workforce strategy section of this OBC.

6. Finance Case

6.1 Introduction

The financial case evaluates the impact of the development on the Trusts' Income & Expenditure account, the Balance Sheet and the Cashflow Statement. The net present cost (NPC), separate to the economic case and the payback period are also considered. The preferred option is Option E; 6 Theatres in PMoK. (One hybrid enabled, using space on level 4, 5 and level 7 and lightwell on level 6)

This is based on projected activity levels for all clinical specialties, incorporating specific reductions relating to complex vascular activity.

6.2 Summary of Financial Position

The Trust is in a difficult financial position at the present time, having committed to achieving a deficit of no more than £22.6m in the 2016/17 year at the same time as noting the need for major capital investment, e.g. theatre reconfiguration. Risk-assessed plans are in place to maximise the chances of achieving this target, which also assumes record achievement of CIP plans (£12.3m in 2015/16 versus a target of £18.3m in 2016/17, and while short of the current year total has already exceeded the prior year).

Funding for such investment will come from public sector sources, most likely an application to the Independent Trust Financing Facility (ITFF) in the form of an interest-bearing loan repayable over a fixed period. The Trust carries a number of existing loans on its books, and is expected to service them alongside any new borrowing. The Finance Case must therefore bear such costs in mind.

Substantial deficits are not resolved overnight, despite record achievement of CIPs. They occur out of intelligent and considered service developments, which combine increased efficiency with more manageable service delivery. This case is one such development.

6.3 Past Financial Performance of the Trust

In 2015/16 the Trust reported an overall deficit of £41.2m, compared to £13.8m in 2014/15. There are many reasons for this deterioration, many of which have been rectified and resulting in a smaller deficit for 2016/17. Service developments are a key part of this process, alongside Trust-wide initiatives around agency staff costs and implementation of recommendations from the Carter Review on unwarranted variation.

6.4 Summary of Capital Costs

The total capital outlay required for the preferred option is shown below

Table 6.1 Summary of capital costs

Option	Description	Initial Capital Outlay	Equipment	Total Capital Outlay
E	6 Theatres in PMoK (One hybrid enabled, using space on level 4, 5 and level 7 and lightwell on level 6)	£13,192,901	£1,125,821	**£14,318,722**

6.5 Net Present Cost of Option E

Table 6.2 NPC – Option E

	1	2	3	4	5	6	7	8	9	10
	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Capital cashflows										
Capital Investment	3,205,656	6,849,973	4,263,093							
Total Capital										
	1	2	3	4	5	6	7	8	9	10
Revenue cashflows	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Income										
NHS Revenue	- 355,461	- 744,775	- 1,557,256	- 2,369,738	- 2,335,885	- 2,742,125	- 3,114,513	- 3,960,848	- 4,841,036	- 5,755,078
Total Income	-355,461	-744,775	-1,557,256	-2,369,738	-2,335,885	-2,742,125	-3,114,513	-3,960,848	-4,841,036	-5,755,078
Pay										
Substantive										
Medical Pay	0	0	119,037	118,192	104,769	165,525	225,142	138,837	279,040	423,629
Non-Clinical Pay	0	0	2,616	2,597	2,302	3,637	4,947	3,051	6,131	9,308
Nursing Pay	0		125,590	124,698	110,537	174,637	237,535	146,480	294,401	446,950
Other Clinical Pay	0		20,767	20,620	18,278	28,878	39,278	24,222	48,681	73,907
Scientific, Technical & Profes			3,149	3,127	2,772	4,379	5,956	3,673	7,382	11,207
Theatre Hour Increase (1)			823,680	823,680	823,680	823,680	823,680	823,680	823,680	823,680
Theatre Hour Increase (2)							823,680	823,680	823,680	823,680
Weekend Working										
Medical Pay		130,896	166,652			0		0	0	0
Non-Clinical Pay		2,876	3,662			0		0	0	0
Nursing Pay		138,102	175,826							
Other Clinical Pay		22,836	29,074							
Scientific, Technical & Profes		3,463	4,409							
Total Pay	0	298,174	1,474,462	1,092,914	1,062,338	1,200,736	2,160,218	1,963,621	2,282,995	2,612,360
Non Pay										
Increase in radiology/pathology										
IT Infrastructure										
Utilities & Soft Facilities Management	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Non Pay Consumables	35,546	74,477	155,726	236,974	233,588	274,213	311,451	396,085	484,104	575,508
Other										
Overheads	81,777	63,398	252,028	206,983	201,889	228,742	378,250	361,456	422,565	485,680
Total Non Pay	167,323	187,875	457,754	493,957	485,477	552,955	739,702	807,541	956,668	1,111,188
Total Expenditure	167,323	486,049	1,932,216	1,586,871	1,547,815	1,753,690	2,899,920	2,771,162	3,239,664	3,723,548
Net Cashflows	-188,137	-258,726	374,960	-782,867	-788,070	-988,435	-214,593	-1,189,686	-1,601,372	-2,031,530
Capital Charges - 3.5%										
Total Cashflows including Capital	**3,017,519**	**6,591,247**	**4,638,053**	**-782,867**	**-788,070**	**-988,435**	**-214,593**	**-1,189,686**	**-1,601,372**	**-2,031,530**
Discounted Cash flows (3.5%)	*0.934*	*0.902*	*0.871*	*0.842*	*0.814*	*0.786*	*0.759*	*0.734*	*0.709*	*0.685*
Present Value Cash flows	**2,816,886**	**5,944,927**	**4,041,795**	**-659,153**	**-641,095**	**-776,901**	**-162,965**	**-872,910**	**-1,135,243**	**-1,391,488**
Net Present Value over a 10 year Period	7,163,854									
Net Present Value over a 30 year Period	-12,662,337									

6.6 Impact on Income & Expenditure Account

Table 6.3 Impact on I&E account

	1	2	3	4	5	6	7	8	9	10
Impact on I&E	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**	**2026/27**
Income	-355,461	-744,775	-1,557,256	-2,369,738	-2,335,885	-2,742,125	-3,114,513	-3,960,848	-4,841,036	-5,755,078
Pay	0	298,174	1,474,462	1,092,914	1,062,338	1,200,736	2,160,218	1,963,621	2,282,995	2,612,360
Non Pay	167,323	187,875	457,754	493,957	485,477	552,955	739,702	807,541	956,668	1,111,188
Contribution to operating costs	-188,137	-258,726	374,960	-782,867	-788,070	-988,435	-214,593	-1,189,686	-1,601,372	-2,031,530
Depreciation			640,298	640,298	640,298	640,298	640,298	640,298	640,298	640,298
Dividend			489,950	467,540	445,129	422,719	400,308	377,898	355,487	333,077
Cost of capital	0	0	1,130,248	1,107,838	1,085,427	1,063,017	1,040,606	1,018,196	995,786	973,375
Additional Overheads	0	0	0	0	0	0	0	0	0	0
Net I&E	-188,137	-258,726	1,505,208	324,971	297,358	74,582	826,013	-171,490	-605,587	-1,058,155

6.7 Key Assumptions

6.7.1 Income

Income has been calculated in line with the assumptions detailed in the activity analysis in the strategic case. A summary of the fixed assumptions can be found below;

- The baseline data used reflects the calendar year 2016
- Demographic growth of 1.2% has been applied
- Emergency theatre utilisation at 67.5%
- Elective theatre utilisation at 85%
- Theatres operate for 48 weeks per year

6.7.2 Impact of Expected Changes to Care Pathways

1. Vascular activity – As Watford will not be the designated Hertfordshire Vascular Centre, it is anticipated that complex vascular activity will be redirected from WHHT to the designated provider within the next decade. This has been factored into the activity numbers and shows the impact as 242 complex vascular procedures by year 5.
2. Interventional Radiology - non-complex vascular activity will continue. Some of this activity will transfer into main theatres. This has been estimated as 327 procedures by year 5.

The remaining activity has been apportioned out in line with existing activity being performed and an average tariff per specialty has been used to calculate the income generated.

6.7.3 Expenditure

Pay

The expenditure is linked to the increase in the overall activity levels and the majority of the expenditure relates to an increase in staffing. The total annual numbers of staff required in relation to resourcing an additional theatre are shown below:

Table 6.4 Pay costs

	Option E	
Staff Type	£	WTE
Medical Pay	£902,880	10.50
Non-Clinical Pay	£19,838	0.80
Nursing Pay	£952,582	21.10
Other Clinical Pay	£157,517	6.27
Scientific & Technical	£23,885	1.00
Total	**£2,056,702**	**39.67**

For the purposes of the financial case the staffing requirements have been adjusted to reflect the levels activity being carried out by year.

Due to the length of this project all additional staffing has been calculated at a substantive rate.

The number of theatres required at the Watford site is summarised by the table below;

Table 6.5 Numbers of theatres required

Theatres required (Year)									
1 2016/17	2 2017/18	3 2018/19	4 2019/20	 2020/21	6 2021/22	7 2022/23	8 2023/24	9 2024/25	10 2025/26
4.96	5.10	5.26	5.13	5.12	5.18	5.25	5.15	5.31	5.47

6.7.4 Non-Pay

A similar approach has been taken for non-pay. Key assumptions include:

- Direct non pay expenditure represents approximately 10% of the income generated.
- An additional 15% has been factored in for overheads
- A £50k allowance per annum has been factored in for utilities and soft facilities management
- The building has been depreciated over 25 years and Equipment has been depreciated over 10 years.

6.7.5 Timeline for Delivery

The completion time of the build has been estimated as December 2019. Until this date, it has been assumed that the demand is managed through weekend working.

6.7.6 Cost Improvement Plan (CIP) Target

This investment is being undertaken for a number of reasons, specified earlier in this business case. In making the investment it is intended that flows through the theatre complex will improve to the extent that cost savings can be made compared to current activity.

However, explicit contributions to the Trust's CIP target have not been assumed in this business case. In theory the net impact of the annual cashflows could be treated as CIP but this is heavily dependent upon the contract commissioned with the CCG and the methodology applied during the Trusts' annual Budget Setting process.

The assumption that theatre utilisation remains constant at 85% means any productivity gains will be captured as CIP.

6.7.7 Balance Sheet, Capital Investment and Cashflow

Capital expenditure will create an asset on the balance sheet, which will depreciate over its useful life (Asset value decreases, Charge depreciation to the I&E account). That is, cash is paid immediately from the Trust's bank account, and its effect is spread across the I&E over a number of years, the asset reducing to zero value as the I&E is fully charged.

Where loan funding is provided for capital expenditure, a liability is created on the balance sheet. As principal repayments are made the loan reduces and cash is paid from the Trust's bank account. As interest payments are made the I&E account is charged and cash is paid from the Trust's bank account.

For normal revenue expenditure, and for the sake of simplicity, it is assumed that charges to the I&E account occur at the same time as cash outflows. This simplification therefore ignores

the time period between incurring a liability (e.g. service provided) and paying the related invoice (e.g. standard payment terms a number of days or weeks after issue).

6.8 Overall Affordability Conclusions

This development adversely affects the Income and Expenditure (I&E) position of the Trust. This is mainly due to the cost of capital associated with a high value capital build. The I&E position of the Trust shows a benefit from the contribution associated with growth in year's 2017-18 and 2018-19. In 2019-20 the new build goes live and outflows are introduced in relation to capital charges. This results in the bottom line of the Trust being adversely affected for the next 5 years until 2023-2024. The I&E account recovers in 2024-25 which is Year 8 of the project and from this point forward the development generates a positive annual impact on the I&E position of the trust.

From a Net Present Cost perspective, the investment to resolve urgent environmental compliance issues the preferred option to improve capacity and provide a hybrid enabled theatre shows a negative £7.2m million net present value, with a payback period of 16 years.

Capital funding in the region of £14.3 million is required to support this change, and will require external finance.

The capital asset would remain on the Trust's balance sheet.

6.9 Impact on Statement of Financial Position (SoFP)

6.9.1 Non-Current Assets (10 years)

This investment requires capital investment in a number of areas, each of which will have their own unique characteristics and useful lives.

- **Buildings:** Assumed life of 25 years with depreciation beginning when the building is in a state whereby it can be used for its intended purpose. Until that point it is held as an Asset Under Construction, i.e. an asset on the balance sheet funded by cash outflows.
- **Equipment:** Varies by type, and in the absence of specific requirements at this stage of the process, assumes a useful life of 7-10 years. It is assumed that equipment will be purchased as near as possible to their date of first use, rather than stored for a significant period of time. Depreciation therefore starts in the first relevant period immediately after purchase.

Each step will have an impact on the SoFP, and they are summarised below:

Table 6.6 Impacts on SoFP

Action	Debit	Credit
Purchase Asset	Fixed Asset (SoFP – increase value of Trust assets)	Cash (SoFP – money out of the Trust's bank account to pay for the asset)
Depreciate Asset	Depreciation Expense (I&E)	Accumulated Depreciation (SoFP – decrease value of Trust assets)

Loan Received	Cash (SoFP – money into the Trust's bank account)	Loan Liability (SoFP – reflects a liability which will need to be repaid at some point)
Loan Principal Repaid	Loan Liability (SoFP – reflects a reduction in the liability as some of it has now been paid)	Cash (SoFP – money out of the Trust's bank account to pay off the loan)
Loan Interest Paid	Interest Expense (I&E)	Cash (SoFP – money out of the Trust's bank account)

It is assumed that non-capital expenditure is a cash movement at the time it is incurred, and this is reflected as such in the calculation of the project's Net Present Cost.

6.10 Financing of Capital Investment

Loan funding will be needed from the Department of Health to fund the project. Interest costs will be incurred across the period of the loan, based on a proportion of the outstanding balance at any given time.

In addition, the increased asset value of the Trust will be such that an additional PDC dividend charge will be made at 3.5% of the net increase. It is important to note that the increased asset value (buildings and equipment) is offset to a great extent by the increased liability due to loan funding. Over time this offset may vary as the loan repayment profile (i.e. the schedule by which the loan decreases) is can differ from the depreciation profile (i.e. the schedule by which asset values decrease). Typical loan periods are up to 25 years, and the capital spend will be on buildings and equipment with 25 and 10 year lives respectively.

It is not possible to apply for the loan at this stage of the process. Given that the bulk of the capital spend is on building work with a 25 year life, and the typical loan period being up to 25 years, the financial model has been simplified by assuming that the loan is issued at 3.5% (same as the dividend rate) and the theatre assets depreciate at the same rate that the loan principal is paid, i.e. the asset generating a dividend payment decreases in value at the same rate as the loan liability offsetting that payment.

When the Trust is in a position to clarify these assumptions or replace them with actual loan conditions it will do so. Any differences arising are not expected to be material.

6.11 Impact on Debt Capacity of Trust

The Trust intends to make other investments, which will be the subject of their own business cases. In addition, financing of its deficit position is also by means of regular loans, and a persistent deficit position will inevitably result in a balance sheet where liabilities exceed assets.

This unacceptable situation does have a bearing on this business case, but only in as far as it requires the case to be a financial success to justify the calculated risks being taken. Other relevant measures are also undertaken to improve the debt capacity of the Trust.

6.12 Impact on Statement of Cashflows

The Statement of Cashflows will initially be negatively affected. Capital expenditure outflows will be weighted towards the start of the evaluation period, with buildings coming first, followed by equipment as the building nears completion and is ready for use.

Additional income through capacity and pathway changes will follow completion of the reconfiguration. Please refer to the Net Present Cost calculations and payback periods for further details on the cashflow impact of this case.

The impact of the annual cash flows, including capital outflows are shown below:

Table 6.7 Impact on annual cashflows

	1	2	3	4	5	6	7	8	9	10
	2017/18	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**	**2026/27**
Cash In										
Income	-355,461	-744,775	-1,557,256	-2,369,738	-2,335,885	-2,742,125	-3,114,513	-3,960,848	-4,841,036	-5,755,078
Total Cash In	**-355,461**	**-744,775**	**-1,557,256**	**-2,369,738**	**-2,335,885**	**-2,742,125**	**-3,114,513**	**-3,960,848**	**-4,841,036**	**-5,755,078**
Cash Out										
Capital	3,205,656	6,849,973	4,263,093							
Pay	0	298,174	1,474,462	1,092,914	1,062,338	1,200,736	2,160,218	1,963,621	2,282,995	2,612,360
Non Pay	167,323	187,875	457,754	493,957	485,477	552,955	739,702	807,541	956,668	1,111,188
Dividend			489,950	467,540	445,129	422,719	400,308	377,898	355,487	333,077
Total Cash Out	**3,372,979**	**7,336,022**	**6,685,259**	**2,054,411**	**1,992,944**	**2,176,409**	**3,300,228**	**3,149,060**	**3,595,151**	**4,056,625**
Net Cashflows	**3,017,519**	**6,591,247**	**5,128,003**	**-315,327**	**-342,940**	**-565,716**	**185,715**	**-811,788**	**-1,245,885**	**-1,698,453**

* (-) = Surplus

6.13 Impairment

An impairment may arise from this project if, as a result of it, an existing asset is no longer capable of being used for its intended purpose.

In the case of equipment it may be that a new facility cannot accommodate equipment beyond a certain age, or existing equipment cannot fit into a new space. In these cases the Trust would investigate all options to transfer or dispose of the equipment to maximise cash income, and the assets themselves would be impaired, i.e. the remaining value (initial cost less depreciation to date) is charged to the I&E account.

In the case of buildings it may be that an existing structure is demolished, or altered to the extent that it bears little relation to its original form and / or cannot be used for its original purpose. An assessment will be required to determine the extent to which this has happened, and some or all of the asset impaired in a similar way to the equipment described above.

6.14 Risk Assessment

The main risks associated with the financial case are;

- It should be noted that the net present cost of the project delivers a negative NPC over the 10 year appraisal period. Therefore should the Trust decide to discard the use of the PMoK building then this project will not reach its payback period.
- The build involves the need for additional substantive staff including Theatre ODPs.

Historically the Trust has found it difficult to recruit to these roles and therefore needs a robust recruitment timetable in order to avoid agency premium.

- Whilst there has been support from the CCG regarding the activity modelling the Trust is still awaiting a formal signoff by the CCG.

6.15 Comparison of the Preferred Option against the Do Minimum

The preferred option, Option E has a capital cost of £14.3m, which is £7m higher than the do minimum option which has a capital cost of £7.3m. The higher capital cost increases the Net Present Cost in comparison to the do minimum option and therefore option E takes 4 years longer to pay back. The table below summarises Option E against the do minimum option in real terms:

Table 6.8: Comparison of Do Minimum with Option E

	Do Minimum	Option E
Capital Cost	7,320,533	14,318,722
Net Present Cost (NPC)	1,967,896	7,163,854
Payback Period (years)	12	16

In terms of affordability, the higher capital cost of the Option E means an I&E deficit over a 10 year period and lower net cash flows for the Trust. The net I&E position of option E is £2.8m worse off over a 10 year period when compared to the do minimum option and cash flows under option E will be £7m lower than the do minimum option. The table below summarises the affordability of Option E against the Do Minimum option.

Table 6.9: Affordability over a 10 year period

	Do Minimum	Option E
I&E Postion	-1,959,667	746,036
Impact on Cashflows	9,942,373	2,944,017

* (-) = Surplus

7. Management Case

7.1 Introduction

The management case details the project management and governance arrangements that WHHT has put in place. It sets out the following arrangements:

- Project Management
- Project Plan
- Change Management
- Business Continuity
- Benefits Realisation
- Risk Management

7.2 Project Management Arrangements

A Theatres Reconfiguration Project Board has been established and members are shown below:

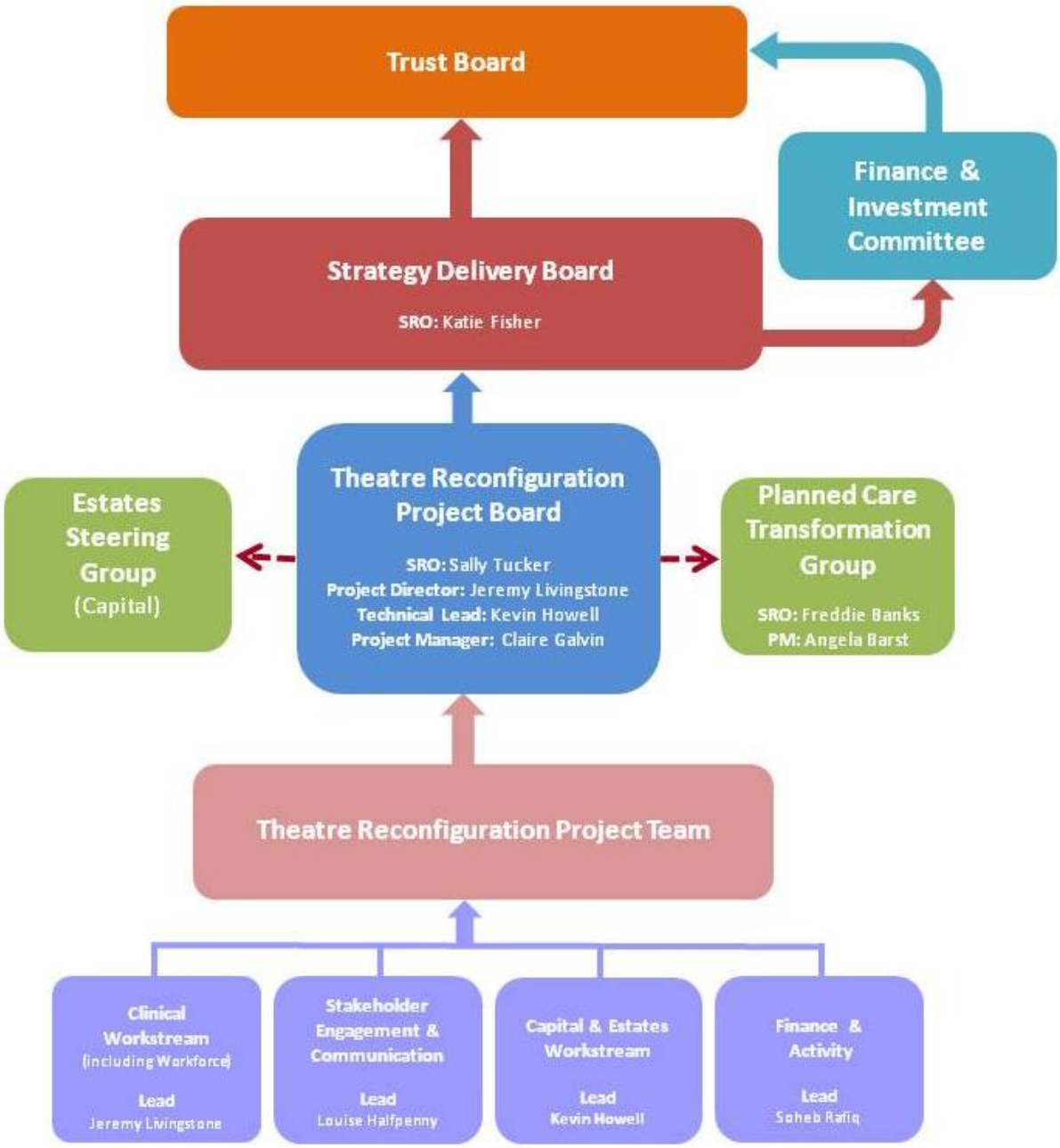
Table 7.1: Watford Theatres Reconfiguration Project Board Members

Position / Role	Name
Sally Tucker	Chief Operating Officer (SRO)
Jeremy Livingstone	Divisional Director for Surgery, Anaesthetics and Cancer, (Project Director)
Kevin Howell	Director of Environment (Technical Lead / Senior Supplier)
Helen Brown	Director of Strategy & Corporate Services (Advisor, Strategy)
Don Richards (as required)	Chief Finance Officer
Louise Halfpenny	Communications Director
Stephanie Johnson	Divisional Manager for Surgery, Anaesthetics Cancer
Soheb Rafiq	Finance Lead for Surgery
Jason McKee	Deputy Divisional Manager for Surgery, Anaesthetics and Cancer
Esther Moors	Head of Service Planning
Claire Galvin	Senior Programme Manager (Project Manager)
Tom Stambach (as required)	Head of Anaesthetics
P22 Capital Manager	To be confirmed.
Helen Pickering	OBC writer (Currie and Brown)

Given the scale of the capital development and the risks inherent in redeveloping an existing clinical area, adjacent to the ICU and directly above other wards, the Chief Operating Officer is the SRO, and the Divisional Director is the Project Director for the Theatres Project.

PRINCE2 methodology has been adopted to achieve effective planning, control and reporting throughout the development and delivery of the project. The project governance structure is set out below.

Figure 7.2: Reporting arrangements and project governance



Terms of Reference are in place and are attached in Appendix 7A.

7.2.1 Outline Project Roles and Responsibilities

The following key roles are set out below:

Table 7.3: Key project roles and responsibilities

Individual	Role	Responsibilities
Sally Tucker, COO	Senior Responsible Owner (SRO)	• Takes overall responsibility for delivery of programme objectives. • Has authority to resolve issues and remove obstacles to progress. • Provides first-line support and advice for the clinical leads and project managers. • Confirms milestone plan and responsible for benefits

		realisation / final review.
Jeremy Livingstone. Divisional Director, Surgery, Anaesthetics and Cancer	Clinical Workstream Lead / Project Director	• Provides clinical leadership and key representative / champion for change. • Represents views of clinical teams and ensures all multidisciplinary views considered. • Leads the clinical workstream which sets the clinical brief, determines the service model in the reconfigured building and the functional content required to deliver that service • Responsible for confirming that the design proposals meet clinical requirements. • Accountable for the programme's governance arrangements by ensuring the programme, including its investment, is established and managed according to appropriate requirements and quality. • Responsible for delivering an approvable business case. • Manages key strategic risks.
Kevin Howell, Director of Environment	Capital and Estates Workstream Lead / Technical Delivery	• Is accountable for the quality of all products delivered by the suppliers. • Ensures that any technical proposals or designs are realistic and practical and meet the brief. • Ensures that control is maintained under Trust's SFI's and SOP's and that procurement regulations are maintained.
Stephanie Johnson, Divisional Manager, Surgery, Anaesthetics and Cancer	Clinical workstream member	• Supports the clinical workstream lead in championing the project and establishing a brief, supporting design development and managing operational changes.
Claire Galvin, Senior Programme Manager	Project Manager	• Ensures the project produces the required products, to the required standards of quality and within the specified constraints of time and cost. The Project Manager is responsible for the project producing the result that is capable of achieving the benefits defined in the project brief. • Responsible for developing the programme of activities, issuing work packages to each of the workstreams and reporting progress to the Project Board • Responsible for ensuring that risks are identified, recorded and regularly reviewed via a risk management plan. • Generates monthly highlight reports, maintains project documentation, and ensures work streams are functioning appropriately, in liaison with capital lead. • Report on progress to the Programme Director.
Soheb Rafiq, Divisional Finance Lead	Finance and Activity Lead	• Chair of the finance and activity work stream which identifies the long term affordability of the scheme in the context of the Trust's long term financial model. • Responsible for obtaining the loan from the ITFF as set out in the business case.
Jason McKee, Deputy	Clinical Representative, member	• Responsible for delivery of key work packages for operational policy and design sub group. Provides day to day leadership for the project within the Division

Divisional Manager, Surgery, Anaesthetics and Cancer	of clinical workstream	• Assists Programme Lead to ensure the changes will be implemented smoothly, through effective communication between the clinical teams and the project team.
Paddy Hennessey	Capital Project Manager	• Responsible for delivering a 'fit for purpose' facility. • Liaises with contractors and suppliers, ensures audit trail / governance is in place. • Liaises closely with service teams and users to ensure issues resolved. • Liaises closely with Project Manager (service lead), to ensure building plans link with service transition. • Manages capital project budget. • Manages any decants required for building works to proceed. • Responsible for commissioning of new facilities.

7.3 Resourcing Strategy

7.3.1 External Advisors

The Trust has appointed the following external advisers to assist in the production of the OBC and the design of the Watford theatres reconfiguration:

Table 7.4: External Advisers

Position / Role	**Name**
OBC writer	Helen Pickering, Currie & Brown
Health planner	Maura Kelly, Currie & Brown
M&E engineer	Andy Hill, CPW
Structural engineer	Steve Clarkson, Aspin
Quantity surveyor	Ian Mitchell, Currie & Brown
BREEAM and sustainability advice	Azita Dezfouli, Currie & Brown
Equipment advisor	Andrew Frost, MTS
Architect	Mark Lydall, AHP

External adviser appointments were competitively tendered through the NHS Shared Business Services Construction Consultancy Framework.

The local Radiation Protection Advisor will be consulted in the detailed design of the hybrid-enabled theatre.

7.3.2 Costs of Programme Implementation

Forecast expenditure on resources is set out in the table below and is aligned with the overall capital cost of the project.

Table 7.5 Estimated fee breakdown

Discipline	**Fees for detailed design to FBC / GMP**	**Fees during construction**
PSCP		
PSCP Fees	£126,281	£0
Architect	£229,047	£87,961
M&E Consultant/Installers	£118,442	£64,447

Structural Engineers	£30,482	£41,803
Cost Consultant	£22,643	£0
BREEAM Consultant/Sustainability Advice	£6,967	£5,225
Equipment Advice	£6,967	£0
Acoustic Advice	£2,613	£4,355
Fire Consultant	£5,225	£3,484
Access Consultant/DDA	£2,613	£0
PSCP Sub-Total	**£551,280**	**£207,274**
Trust Direct Fees	**£153,890**	**£306,785**
TOTAL EXCLUDING VAT	**705,170**	**514,059**
TOTAL INCLUDING CONTINGENCY (9%)	**768,635**	**560,324**

Trust direct fees include the following:

- P22 NES Project Manager
- P22 NEC Supervisor
- Trust cost advisor
- FBC writer
- Healthcare planner

The estimated fee budget to FBC is therefore £768,635.

7.4 Project Programme

The project programme in Appendix 7B has been compiled from a schedule of the main activity milestones, dependencies and constraints, in order to meet the project objectives.

Key milestone dates have been summarised below and will be reported against as part of the standard project highlight reports by the project manager. The programme assumes that development of the FBC and detailed design will commence once NHSI have approved the business case in July 2017, allowing 2 months for receipt of the monies.

Table 7.6: Key Milestones

Date	Milestone
February 17	Appointment of PSCP
June 17	OBC Trust Board approval
July 17	NHS Improvement approval for OBC (to be confirmed with NHSI)
February 18	FBC Trust Board approval
February 18	Agreement of Guaranteed Maximum Price with PSCP
April 18	NHS Improvement approval for FBC (to be confirmed with NHSI) and confirmation of loan funding from ITFF
April 18	Construction contract signed

May 18 – June 20	Theatres reconfiguration works undertaken (to be confirmed)

Any significant revisions to the project milestones will need to be formally agreed by the Project Board.

7.5 Change Management

Change management is the process through which all requests to change the baseline scope of a project, programme or portfolio are captured, evaluated and then approved, rejected or deferred.

A change management protocol has been developed by the project manager which is documented in the Project Initiation Document.

Once in contract with the PSCP, changes will be discouraged as they can be costly, however if they are identified as being a high priority and offering significant benefit, the ProCure 22 change management process will be implemented to contractually manage changes with the contractor.

7.6 Business Continuity

As described in section 3, business continuity has been a key driver behind the phasing plans. Risk assessments will be agreed for each phase as they are finalised by the PSCP contractor.

7.7 Communications Plan

A communications plan has been developed that identifies the key messages of this project, the key stakeholders, and how they will be communicated with. It is attached at Appendix 7C.

7.8 Risk Management

7.8.1 Introduction

WHHT has identified the risks that may affect delivery of the project, has undertaken a risk assessment to identify the major areas of risks and highlighted the controls to minimise and/or mitigate the risks. Project risks are managed through the risk register that has been developed which is attached at Appendix 7D. The project team monitors the risks and actions, and escalates red risks to the Project Board for action and recommendation.

7.8.2 Risk Management Strategy

WHHT's approach to risk management, in accordance with its own board assurance framework, the Capital Investment Manual and the Treasury Green Book, is designed to ensure that the risks and issues are identified, assessed, and mitigation plans developed in a risk management plan. All risks have a responsible owner identified.

The risk management approach for the programme is in accordance with PRINCE II

methodology. A workshop attended by key trust staff identified and assessed the risks to the project. The Trust risk rating process is shown below. The risks associated with the preferred option continue to be reviewed to monitor the development of risks and implementation of mitigation actions, as well as identifying new risks as they arise.

Table 7.7: Risk rating process

Consequence		Likelihood				
		1	**2**	**3**	**4**	**5**
		Rare	**Unlikely**	**Possible**	**Likely**	**Almost certain**
	5 Catastrophic	5	10	15	20	25
	4 Major	4	8	12	16	20
	3 Moderate	3	6	9	12	15
	2 Minor	2	4	6	8	10
	1 Negligible	1	2	3	4	5

For grading risk, the scores obtained from the risk matrix are assigned grades as follows

1 - 3	Low risk
4 - 6	Moderate risk
8 - 12	High risk
15 - 25	Extreme risk

Risks are regularly reviewed by the project team and escalated to the Project Board. The highest rated risks and mitigation / management actions are shown in the table below. The full risk register is attached at Appendix 7D.

Table 7.8: Top risks identified and mitigating actions

Description	Conse-quence	Likeli-hood	Risk Score / Rating	Risk Management Action	Risk Lead
RISK: Unexpected and unavoidable disruption to a working department during construction creating capacity problems and causing disruption to the service and / or extensions to timeframes. This could result in theatre lists being cancelled or rescheduled. **IMPACT:** - Reduction in RTT performance. - Poorer theatre utilisation.	4	4	16	Plan work that is likely to cause issues outside of main working day i.e. 08:00 and 20:00 hours subject to it not disturbing adjacent clinical areas, noting that this is likely to incur additional costs. Set up Project Operational Management Group to oversee and plan each phase of scheme to ensure risks are understood and mitigated where possible - to include Theatre Management, Infection Control, and Senior Nursing representatives.	Kevin Howell
RISK: OBC underestimates costs to deliver 6 theatre suite due to lack of detailed engineering, structural or condition surveys being completed on the area which may increase construction costs. **IMPACT:** Financial overrun	4	4	16	Detailed intrusive infrastructure and asbestos surveys to be brought forward to ensure full understanding of systems are gained prior to commencement of scheme, thus reducing time delays, infrastructure uncertainty, asbestos risks, subject to early response of	Kevin Howell

				funding.	
RISK: Possible delay to programme if funding cannot be identified to progress the detailed design work ahead of NHSI approval **IMPACT:** Delay in delivering project benefits which results in increase in RTT breaches, cancelled operations.	5	3	15	Bid has been submitted for STP capital but if approved might not be available for some months. Alternative approach will be to fund from revenue and capitalise which would enable the design work to begin quite quickly.	Sally Tucker
RISK: Modelling assumptions are over optimistic / pessimistic with demographic and non-demographic growth not representative of surgical / health demand. This would lead to undersized / oversized facility with under sizing being the greater risk given the uncertainties surrounding capital to build new hospital. **IMPACT:** Trust will not have sufficient theatre capacity to meet demand in advance of new hospital facilities being delivered.	4	3	12	Sensitivity testing shows that 6 theatres will still provide adequate capacity to meet demand up until 10 years if a 60 hour per week schedule continues from Year 8 and historical growth rates continue.	Sally Tucker
RISK: Insufficient inpatient surgical beds to support the additional activity generated by the 6th theatre (NB gradual increase in requirements). **IMPACT:** cancellation of operations, increase in RTT breaches.	3	3	9	Bed Reconfiguration Project established Data analysis looking at Length of Stay and bed utilisation by ward and speciality to re- design how wards are allocated to deliver efficiencies (and improved outcomes). Theatre scheduling and job plans will be planned to minimise the number of IR patients requiring an overnight stay post operatively.	Sally Tucker
RISK: Net present cost of the project delivers a negative NPC over the 10 year appraisal period if decision is made to cease using the PMOK building when the redevelopment of the Watford Hospital site goes ahead. **IMPACT:** Project not reaching its payback period**.**	4	2	8		Don Richards

RISK: A lack of robust Change Management processes during scheme. **IIMPACT**: Potential to lead to project cost overuns and time overuns.	4	2	8	Stringent change management procedures to be implemented prior to commencement of scheme, and to be maintained for duration of the project.	Kevin Howell
RISK: OBC/FBC delays (due to extended approval processes from external bodies) **IMPACT**: Additional theatre capacity not delivered in 2020 which leads to increased RTT breaches, cancelled operations.	4	2	8	Introduce longer opening hours M-F earlier than planned. Introduce 6 day working earlier than planned.	Sally Tucker

7.8.3 Gateway Review Process

The impact and risks associated with the project were assessed using the Health Gateway Risk Potential Assessment (RPA) tool. The assessment, attached at Appendix 7E, determined the scheme was medium risk. This is mainly because of the importance of the project in dealing with the capacity and compliance issues.

As the DH Gateway team no longer exists, the Trust team have requested an independent review from the Royal Free London NHS Foundation Trust, a neighbouring Trust who have experience of multiple capital projects. This will take place during FBC stage.

7.9 Benefits Realisation Plan

A Benefits Realisation Plan (BRP) is provided in Appendix 7F and includes detailed plans for each benefit covering the following:

- A description of the benefit;
- The baseline and target measure of the benefit;
- A summary of how the benefits will be achieved;
- Details of the timescale over which the benefits will be realised; and
- Identification of the lead director(s) responsible for delivering benefits.

Some of the key benefits identified are:

- Shorter length of stay for trauma patients
- Reduced number of cancelled operations
- Reduce waiting time for planned surgery
- Increase in patients going through CEPOD. Improved productivity.
- Improve the number of operations starting on time
- Reduce theatre staff turnover at Watford Hospital
- Reduce agency costs due to improved retention of staff
- Ventilation to comply with legislative requirements
- Provide a facility with appropriate separation of children and adults
- Improve level of fire safety
- Provide adequate and appropriate staff changing and staff rest rooms

7.10 Arrangements for Post Project Evaluation (PPE)

The Trust is committed to ensuring that a thorough and robust post project evaluation is undertaken at key stages in the process to ensure that positive lessons can be learnt from the project.

The project will be evaluated by undertaking the following investigations:

- a review of the project implementation to learn lessons for future
- a review of the benefits detailed in the Benefits Realisation Plan and confirmation that they have been met
- a review of the capital and revenue costs to confirm that the capital costs were robust and adhered to and that the actual and projected revenue costs were realistic
- a review of the Project Programme and adherence to it throughout the life of the project.

These investigations will focus on the perspectives of service users, staff and the project team, using stakeholder consultation meetings, staff focus groups and evaluation of data around the benefits realisation.

The arrangements for the Post Project Evaluation will be established in accordance with best practice. In addition, as part of the P22 process, the PSCP must have a number of post contract activities to aid customer satisfaction and capture learning for future projects. These involve the activities described below.

- lessons learned – based on feedback and a workshop arranged for this purpose
- KPI review involving analysis and the collation of a KPI workbook
- satisfaction surveys will be undertaken and the results issued to the Trust.

The planned participants in the evaluation will be as follows:

- Project Director
- Project Manager
- Senior Responsible Officer
- Director of Finance
- Director of Strategy
- Director of Nursing
- Clinical lead – Divisional Director for Surgery
- Staff Groups
- Patients/Patients' Representatives

In accordance with the DH's Good Practice Guide Learning Lessons from Post Project Evaluation, the PPE will be conducted in accordance with the following milestones:

Table 7.9 PPE key milestones

Stage	Activity	Timing
1	Undertake interim reviews of processes, handover and communication to learn from works at each phase	Mid 2018
2	Produce detailed plan for undertaking the PPE	Late 2019
3	On completion of the works, evaluate initial outputs and undertake review of the processes followed to identify lessons learned	Mid 2020
4	Undertake initial evaluation of the project outputs following completion of the works	Mid 2020
5	Evaluation of achievement of benefits and project objectives for entire project one year post completion	2020/21

This will be carried out by the Project Manager with support as appropriate. Copies of the final report will be circulated to NHS Improvement.

8. Recommendation

It is recommended that this Outline Business Case for the reconfiguration of the Watford Theatres Complex is approved by West Hertfordshire Hospital NHS Trust.

The WHHT Trust Executive Team, Finance and Investment Committee and Trust Board are asked to approve this OBC, thereby approving the following:

1. Option E is the preferred option for progressing to Full Business Case (FBC) stage. This has an estimated capital cost of £14.3m, compared with the Do Minimum estimated cost of £7.3m.

2. The project proceeds to FBC stage with an estimated development cost of £768,635 (which is included within the £14.3m). This enables the completion of detailed design, the FBC and the agreement of a Guaranteed Maximum Price (GMP) for the works with Kier, the PSCP P22 partner.

3. This OBC is submitted to NHS Improvement (NHSI) for their review and approval.

Glossary

A&E	Accident & Emergency
AAA	Abdominal Aortic Aneurysms
BREEAM	Building Research Establishment's Environmental Assessment Method
BIM	Building Information Modelling
CEPOD	National Confidential Enquiry into Perioperative Deaths
CIP	Cost Improvement Plan
CQC	Care Quality Commission
CSSD	Central Sterile Services Department
DCP	Development Control Plan
DH	Department of Health
DTOC	Delayed Transfers of Care
DQI	Design Quality Indicator
EAC	Equivalent Annual Cost
E&NH	East & North Hertfordshire NHS Trust
ESAU	Emergency Surgical Admissions Unit
FBC	Full Business Case
FM	Facilities Management
FMOC	Future Model of Care
GMP	Guaranteed Maximum Price
GP	General Practice
GSL	Government Soft Landings
HBN	Health Building Note
HDU	High Dependency Unit
HH	Hemel Hempstead Hospital
HLIP	High Level Information Pack
HTM	Health Technical Memorandum
HVCCG	Herts Valleys Clinical Commissioning Group
ICU	Intensive Care Unit
IESE	Improvement and Efficiency South East
IM&T	Information Management and Technology
I&E	Income & Expense
IR	Interventional Radiology
IVC	Inferior Vena Cava
ITFF	Independent Trust Financing Facility
KPI	Key Performance Indicators
LABV	Local Asset Backed Vehicle
LIFT	Local Improvement Finance Trust
LTFM	Long Term Financial Model

NEC	New Engineering Contract
NHSI	National Health Service Improvement (previously TDA and Monitor)
NPC	Net Present Cost
OBC	Outline Business Case
OGC	Office of Government Commerce
OJEU	Official Journal of the European Union
P21+	ProCure21+
P22	ProCure22+
PAM	Premises Assurance Model
PDC	Public Dividend Capital
PFI	Public Funded Investment
PLACE	Patient-Led Assessments of the Care Environment
PMoK	Princess Michael of Kent Building (Watford Hospital)
PPE	Post Project Evaluation
PSCM	Principal Supply Chain Member
PSCP	Principal Supply Chain Partner
PRINCE 2	Projects in Controlled Environments
RPA	Risk Potential Assessment
RTT	Referral to Treatment
SACH	St Albans City Hospital
SOC	Strategic Outline Case
SoFP	Statement of Financial Position
SRO	Senior Responsible Officer
STF	Sustainability and Transformation Fund
STP	Sustainability and Transformation Plan
TUPE	Transfer of Undertakings (Protection of Employment) Regulations
VAT	Value Added Tax
VfM	Value for Money
WGH	Watford General Hospital
WHC	Watford Health Campus
WHHT	West Herts Hospitals NHS Trust
YCYF	'Your Care, Your Future'