Project Title:

Upgrade and Development of Paediatric Intensive Care Unit with Provision of Co-located High Dependency Unit at the Imperial College Healthcare NHS Trust on the St Mary's Hospital site

Full Business Case – Cover Sheet

The PICU Full Business Case was approved by the Trust Development Authority (TDA) on the 18th March 2016. Due to the delay of almost a year between issue of tender figures on 9th April 2015 and approval, the main contractor has subsequently had to re-assess their exposure to inflation and risk. This resulted in a revised submission being issued on the 13th May 2016 following further negotiations and the final contract price being agreed on 23rd June 2016. The revised costing has been approved in the appropriate forums within the Trust, and the Estates Department were instructed to proceed towards contract sign off with the main contractor on 24th June 2016.

The start date has also been subject to delay due to decant complications which resulted in part of the build works being re-sequenced. Following the contractor's mobilisation period, the project commenced on 26th September 2016.

Imperial College Healthcare NHS Trust

Project Title:

Upgrade and Development of Paediatric Intensive Care Unit with Provision of Co-located High Dependency Unit at the Imperial College Healthcare NHS Trust on the St Mary's Hospital site

Full Business Case – Trust Development Authority Submission

15th July 2015

Purpose of this Document

This document is the Full Business Case (FBC) in support of capital investment.

This FBC presents the case for change and the preferred way forward for the Paediatric Intensive Care Unit (PICU) to establish the option which optimises value for money and affordability, and demonstrate that the proposed scheme is deliverable.

This document is based on the "5 case model" and conforms to the requirements set out in the business case checklist (v3, May 2015) provided for this purpose by the Trust Development Authority (TDA):

- Strategic Case: the issues with the current position and reasons for changing;
- Economic Case: an investment appraisal of the options for achieving the required changes assessed for financial and non-financial benefits;
- Financial Case: affordability of the investment and ongoing costs that arise;
- Commercial Case: the procurement approach;
- Management case: the capacity to deliver the project.

The document is provided for submission to the appropriate internal and external approval bodies for review and confirmation of support to the scheme.

Once approval has been given by the Trust Board and TDA, the construction project will be taken forward in order to create the consequent improvements as stated in this FBC.

Version History

Version	Date Issued	Brief Summary of Change	Owner's Name
0.1	20.11.14	Initial version of FBC issued	BE
0.2	19.03.15	Additional sections of FBC created and populated	BE
0.3	12.04.15	Comments included from HL	BE
0.4	21.04.15	Comments included from SN	BE
0.5	27.04.15	Comments included from AT, HL and revised workforce model included from LH/SO	BE
0.6	05.05.15	BE/AT changes	BE
Draft Submission to Exco	07.05.15		BE
Final Submission To Exco	14.05.15	Sign off by all core team members	BE
Final Submission to FIC	14.05.15		BE
Final Submission to Trust Board	21.05.15		BE
TDA version created	27.05.15		BE
Revised TDA version	15.07.15	New version created following initial TDA comments	BE
Submitted to TDA	03.08.15		

Contents

Appendices

Tables & Figures

Acronyms

A&E	Accident and Emergency
AHSC	Academic Health Sciences Centre
BMS	Building Management System
BMT	Bone Marrow Transplant
C&W	Chelsea & Westminster Hospital
CAPEX	Capital Expenditure
CATS	Children's Acute Transport Service
CC	Critical Care
CC4C	Connecting Care 4 Children
CCG	Clinical Commissioning Group
CDM	Construction Design and Management
COSMIC	Children of St Mary's Intensive Care Charity
CQC	Quality Care Commission
DDA	Disability Discrimination Act
DGH	District General Hospital
DoH	Department of Health
EBITDA	Earnings Before Interest Taxes Depreciation and Amortization
ENT	Ear, nose and throat
EU	European Union
FIC	Finance and Investment Committee
FBC	Full Business Case
FRS	Financial Reporting Standards
GEM	Generic Economic Model
GMC	General Medical Council
GMP	Guaranteed Maximum Price
GOSH	Great Ormond Street Hospital
GP	General Practitioner
H&S	Health & Safety
HAI	Healthcare Associated Infection
HBN	Health Building Notes
HCA	Health Care Assistant
HDC	High Dependency Care
HDU	High Dependency Unit
HIV	Human Immunodeficiency Virus
HM Treasury	Her Majesty Treasury
HTM	Health Technical Memoranda
IC	Imperial College
ICHT	Imperial College Healthcare Trust
ICT	Information Communications and Technology
ICU	Intensive Care Unit
ID	Infectious Disease

IRR	Internal Rate of Return
ITT	Invitation to Tender
KPI	Key Performance Indicator
LPA	Local Planning Authority
LTV	Long term ventilation
M&E	Mechanical & Electrical
MDT	Multi-Disciplinary Team
MTC	Major Trauma Centre
NHS	National Health Service
NHSE	National Health Service England
NICU	Neo-natal intensive care unit
NIHR BRC	National Institute for Health Research Biomedical Research Centre
NPC	Net Present Cost
NPV	Net Present Value
NSF	National Service Framework
NWL	North West London
OBC	Outline Business Case
OBD	Occupied Bed Day
OJEU	Official Journal of the European Union
PHDU	Paediatric High Dependency Unit
PIC	Paediatric Intensive Care
PICAnet	Paediatric Intensive Care Audit Network
PICS	Paediatric Intensive Care Society (UK)
PICU	Paediatric Intensive Care Unit
POPD	Paediatric Outpatient Department
PPE	Post Project Evaluation
PRINCE	Projects in Controlled Environments
PRU	Paediatric Research Unit
PSCP	Principle Supply Chain Partner
QEQM	Queen Elizabeth Queen Mother (Building)
R&D	Research and Development
RBH	Royal Brompton Hospital
RCN	Royal College of Nursing
RLH	Royal London Hospital
SaHF	Shaping a Healthier Future
SIG	Strategic Investment Group
SFI	Standing Financial Instruction
SMH	St Mary's Hospital Trust
SRO	Senior Responsible Officer
TDA	Trust Development Authority
TUPE	Transfer of Undertakings Protection of Employment
V&A	Victoria & Albert (Wards)
VAT	Value added Tax
VFM	Value for Money
WTE	Whole Time Equivalent

Approvals

Full Business Case

Approval for the Outline Business Case (OBC) was received on the 26th March 2015 by the TDA.

This Full Business Case (FBC) for the St Mary's Hospital (SMH) re-development of the Paediatric Intensive Care unit (PICU) has been submitted and approved at the relevant internal Trust approval bodies prior to onwards submission to the Trust Development Authority (TDA) for approval:

Executive Committee – Approved on 19th May 2015.
Finance & Investment Committee – Approved on 20th May 2015.
Trust Board – Approved on 27th May 2015.

Stakeholder Support

A broad range of stakeholders ranging from clinical teams to patient user groups have been fully involved in the development of the proposals included in this FBC. The activity proposals have been fully supported by the lead Commissioning organisation, National Health Service England (NHSE).

On behalf of Imperial College NHS Healthcare Trust

Prof Tg Teoh

Senior Responsible Owner
Women's and Children's Divisional Director
27th May 2015

1 Executive Summary

1.1 Introduction

This FBC outlines the proposal to upgrade and redevelop the PICU at ICHT to modern standards, with new provision of co-located high dependency unit (HDU), on the 7th floor of the Queen Elizabeth the Queen Mother (QEQM) building on the SMH site. The case seeks approval to invest the gross capital requirement of £9.6m, of which £4.3m will be through charitable funding. The net capital request is therefore £5.3m over two years along with the associated revenue funding.

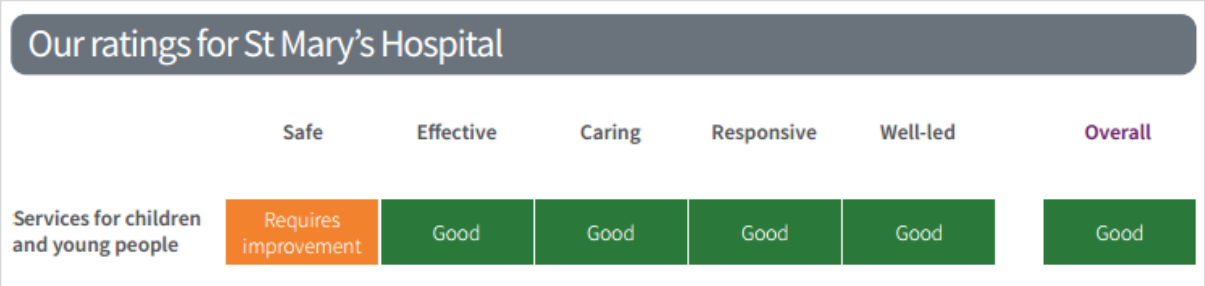
This total value compares to a net requirement of £6.7m (£8.7m capital, £2m charitable funding) at OBC stage. The variation in cost is predominantly due to the mechanical, engineering and ventilation requirements necessary to reach modern day clinical needs within an ageing estate. The requirements are not unique to PICU, any change in the use of the estate would result in the requirement of this remedial work.

Table 1.1: Reconciliation of Capital Costs of Preferred Option

Reconciliation of Capital Costs of Preferred Option	£
OBC CAPEX	8,725,817
Construction costs and associated design solutions *(M&E costs for PRU, ventilation costs for PICU and associated design adjustments)*	1,475,000
Fees, uplifts and adjustments	(604,617)
FBC CAPEX	**9,596,200**

Since approval of the OBC by the both the ICHT Trust Board and the TDA, the outcomes from ICHT's recent inspection by the Care Quality Commission (CQC) have been published. The CQC feedback in relation to Children's Services was positive and reflects the high quality care provided to patients. Collectively Children's and Young People's Service's at SMH were awarded an overall rating of 'good'. However, the estate in which children's services are provided drove a rating of 'requires improvement' under the 'safe' domain of the CQC inspection. In particular, the PICU and the adjacent Grand Union Ward environments were identified as unsafe for children as there was a risk of the transmission of multi-resistant organisms amongst critically ill children on PICU and insufficient numbers of cubicles for the immunosuppressed children that are treated on Grand Union Ward. The Trust is required to address the environment for these two areas as per the Trust's CQC action plan.

Figure 1.1: CQC Ratings for St Mary's Hospital



Paediatric Intensive Care Society (PICS) standards define the staffing, training, equipment and facility requirements to deliver critical care to patients. The standards are evidence based and are endorsed by all the Royal Colleges of Paediatrics and Child Health, Nursing, Anaesthetics, and Emergency Medicine, NHSE Specialist Service Commissioners, and also by the CQC. Currently the PICU environment is not compliant with the PICS recommendations on configuration and size as:

- Bed spaces are 50% less than current national PICS standards;
- Patients are not optimally protected from cross-contamination due to the reduced space between beds;

- There is only one designated isolation cubicle without hygiene facilities.

The redevelopment will significantly reduce risk of nosocomial infection transmission and greatly improve the patient, family and staff working environment and experience. It enables the service to meet local demand needs and supports North West London's (NWL) Shaping a Healthier Future (SaHF) and NHSE's specialist commissioning intentions. The preferred option has a favorable net present value (NPV) of £3.6m over twenty years, with a payback period of more than thirteen years.

The proposal to improve the existing service has strong patient, commissioning and Executive Team support. In addition, the ICHT Charity and COSMIC charity are both highly supportive of this proposal. The ICHT Charity raises charitable funds for ICHT and awarded a total of £6.8m to projects across the Trust in 2013/14. There are reserve funds already committed by ICHT Charity to support the project and as agreed by their Trustees, both charities will undertake a major fund raising campaign on behalf of the project; the fundraising campaign officially commenced in January 2015. Please see Appendix 20 for confirmation of the charity funding.

This business case is outside the scope of the SaHF OBC, as the SaHF OBC does not remove or reconfigure the QEQM building where this development is planned to take place; in addition, this development is required in advance of implementing the SaHF changes for the clinical reasons outlined in this business case. The development will be a fixed point within the future estates strategy in which the 7th Floor of the QEQM building is expected to provide specialist paediatric services.

The Trust and TDA is requested to approve this FBC in order to proceed to construction and build phase of this proposal.

1.1.1 Structure and Content of this Document

This FBC has been prepared using the agreed standards and format for business cases, the Five Case Model, which comprises the following key components:

- The strategic case– sets out the strategic context and the case for change, together with the supporting business strategies and resulting investment objectives for the scheme;
- The economic case –demonstrates that the organisation has selected the choice for investment which best meets the existing and future needs of the service and optimises value for money (VFM);
- The commercial case –outlines the content and structure of the proposed contract(s);
- The financial case –outlines financial viability and affordability and explains any impact on the balance sheet of the organisation;
- The management case –demonstrates that the scheme is achievable and can be delivered successfully to cost, time and quality.

This executive summary consolidates key messages from each component of the 5 case model, the full body of the case discusses in more detail.

1.2 Strategic Case

1.2.1 The Strategic Context

The Trust's long term vision for Children's Services at ICHT is defined clearly within the clinical strategy (2014) (Appendix 39); it places SMH as the acute hospital site within ICHT. Improvements in the provision of paediatric intensive and high dependency care will enable ICHT to build on strengths which combine specialist clinical care, research and education, promoting innovation and improving outcomes for sick children. With this development and the redevelopment plans for the adjacent specialist children's ward (Grand Union Ward), the 7th floor of the QEQM building would provide a sustainable estate for specialist children's services, subject to the finalisation of the Imperial College Healthcare Trust redevelopment and estates strategy.

Children's services are provided across four hospital sites within NWL, to access services patients often have to travel between hospitals and on occasion care can only be provided out of sector. There is the potential and drive within the team to work collaboratively with partners in commissioning, primary and secondary care to improve the quality of care experienced by patients, reduce the current fragmentation of specialist paediatric services, and ensure patients receive the right care in the right place at the right time.

The paediatric intensive care (PIC) service is a flagship service within children's services and currently provides support to a number of paediatric specialist services. Without this support our position as a commissioned specialist provider for a number of tertiary services such as Major Trauma and Bone Marrow Transplant (BMT) would become unsustainable.

1.2.2 The Case for Change

The existing PICU at SMH is an 8 bedded facility located on the 7th floor of the QEQM building. It requires refurbishment to meet modern service standards, as defined by the PICS standards and the clinical service specifications published by NHSE (Appendix 41). For the purpose of this executive summary the case for change is summarised into three main themes, each of which require improvement critical to sustaining the provision of Children's services at ICHT.

Patient Care Facilities

The current unit does not comply with PICS standards for bed space, patient isolation or unit ventilation requirements. This compromises patient safety as it increases the risk of cross-transmission of nosocomial infection, particularly as there is only one isolation facility in the current unit. The inadequate estate has led to a serious incident in 2013 with regards to infection control which has driven the team to develop this business case. These significant risks along with the robust mitigations that are currently in place are recorded in the Divisional and Trust corporate risk registers. There are robust infection prevention control policies and procedures in place within the unit, nosocomial infection rates are low as reported in the Matching Michigan data for catheter-ralated blood stream infection rates. To mitigate risk, patients are on occasion required to be isolated within a multi-bedded bay, reducing capacity to maintain safety. Continuing the service without addressing the environmental deficiencies within the facility is a high-risk strategy for the Division and the Trust. The outcome of the external review of the PICU environment by the CQC in September 2014 identified the intensive care unit as one which must be reviewed to ensure compliance to national standards and ensure patient safety.

The reduced space surrounding each bed compromises patient and parent privacy and dignity. This is reflected in patient experience feedback for the unit collected though both national and local patient surveys for the service (please see Appendix 21).

Currently, paediatric patients that require high dependency care (HDC) are managed either within the PICU (20% of patients treated in the unit require high dependency care) or are risk assessed to be placed in adjacent level 1 beds as and when required. This can impact patient, parent and staff experience and can lead to a reduction in level 1 admitting capacity which can consequentially impact on patients in paediatric Accident and Emergency (A&E).

Progressive Workforce Development

Children's critical care nursing is a highly specialist area, it is a specialty that is recognised nationally as being challenging to recruit to; the current unit team echo this challenge and despite numerous recruitment drives over the years have sustained a number of vacancies within the current establishment. This is due to a combination of failure to recruit suitably skilled staff and the high turn-over rates which are typical of the transient London population. There is reliance on staff to support the unit through internal bank shifts and if required to book agency staff which is both expensive and

unsustainable. This has, on occasion limited the number of paediatric intensive care beds open within the unit.

The PIC team currently offer simulation training to across the multidisciplinary team within ICHT and across London. There is limited space within the unit and training is limited to summer months as the space is used clinically during periods of high activity.

Future Sustainability of Children's Services/Growth

Currently, there is limited capacity within the unit to service local demand for acute PIC, 337 children were refused admission between 2013 and 2015. A proportion of these patients were local patients who after being refused from their local unit were admitted elsewhere and on occasion outside London. Patient and parent experience is unacceptably poor in these situations.

The wider impact of limited capacity within the service is not only on patients that require emergency care, but is also experienced by specialist service teams as the PICU is unable to increase support to specialist services which limits the ability of service growth in these areas. Specialties that are particularly affected are paediatric surgery, paediatric Ear Nose and Throat (ENT), paediatric BMT and paediatric clinical haematology.

The limited capacity within PIC allows little scope for ICHT to support additional commissioned critical care activity as per NHSE's growth projections (please see PICU surge report, Appendix 5). It also limits ability to expand specialist services in the future and engage in sector wide rationalisation of paediatric services. These limitations impact upon the future sustainability of ICHT's position as a commissioned specialist paediatric service provider.

The case for change led to the development of business strategies by the team as part of the OBC and FBC development process. From this, the team were able to identify clear business needs and develop investment objectives relevant to this project. This ensured that choices and decisions made in latter stages of the project development were clearly aligned back to the initially identified service needs and goals.

The benefits that this investment will bring have been mapped to our investment objectives as shown in Table 1.2. These are expanded and explained further in the main body of the business case:

Table 1.2: Investment objectives and benefits criteria

Investment Objective		Benefits Criteria
1.	Maintaining and enhancing provision of critical care (PICU and HDU) for children in and around London, particularly within our own sector of NWL.	• Quality of clinical care • Strategic Fit • People, handling and management • Staff training/Research and development • Flexibility
2.	Enhanced clinical quality and patient experience through facilities redesign, increasing patient volumes, reducing overcrowding, improving ventilation, and eliminating Health and Safety and Infection control risks	• Quality of clinical care • Strategic Fit • Patient experience and environment • Flexibility • Implementation
3.	Adequate capacity for increase in demand and market share in commissioned services for critical care and support for other paediatric specialist services.	• Flexibility • Strategic fit • Quality of clinical care • Staff training/Research and development
4.	Increased capacity will reduce refused admissions, allow increased activity and reduce transfer of critically ill children out of area.	• Flexibility • Patient experience and environment • Quality of clinical care
5	Co-location of HDU services improves efficiency, reduces bed pressure on Paediatric wards and increases A&E and specialist access.	• Flexibility • Quality of clinical care • Strategic Fit
6.	Increased activity will allow improved potential for education, training and patient recruitment to high quality, ethically approved research.	• Staff training/research and development • Quality of clinical care • Strategic fit
7.	Improved environment and increased activity allows better staff recruitment and retention and a reduced reliance on bank and agency staff.	• Strategic fit • Quality of clinical care • People, handling and management

1.3 The Economic Case

1.3.1 Critical Success Factors

To determine the preferred option and preferred supplier the core team defined critical success factors for the project in line with the investment objectives and the benefits criteria. The critical success factors for the project were agreed as:

- Improved clinical quality and patient experience;
- Improved unit capacity;
- Completion of the project in a timely manner;
- Clear value for money.

1.3.2 The OBC Options

A long list of options was drawn up which aimed to cover all reasonable options available to achieve the project objectives. This included a “do nothing” option and a “do minimum” option, against which the remaining options could be compared. Please see Section 3.3. Appendix 24 provides a representation of the where these different options are situated on the SMH site.

The following short list of options emerged following the initial evaluation at OBC stage:

Table 1.3: Short List of options

Option	Title	Detail
Option 1 (8 beds)	Do nothing	-No change to current facilities - Does not address CQC mandate to improve environment -Unmitigated patient safety risk -Does not meet statutory compliance (PICS standards) -Does not meet NHSE clinical service specification -Poor patient and parent experience -Potential deterioration of existing Children's Services -No capacity for growth (8 beds) -No change to PRU and clinical research activity
This option does not mitigate any of the risks associated with delivery of the current 8 bed service including concerns associated with the quality of care, patient and family experience and the estate.		
Option 4 (15 beds)	Utilisation of Victoria & Albert (V&A) wards on the triangle site	-Removes patient safety risk -Addresses CQC mandate to improve environment -Meets statutory compliance (PICS standards) -Improved patient and parent experience -Meets NHSE clinical service specification -Potential growth of existing Children's Services -Capacity for growth (11 PICU beds and co-location of 4 HDU beds). -No disruption to PRU and clinical research activity -Disrupts current V&A occupants
This option delivers 11 PICU beds with 4 HDU beds co-located. This option consists of the conversion of 1st floor V&A to a POPD and PICU relocation to the 6th Floor of QEQM. This option requires decant of V&A existing occupants (inpatient wards and the Haven[1]) and a sq.m reduction in the size of POPD in V&A[2]. It assumes the electrical power requirements of POPD are no more than the current occupants. This option facilitates an increase in market share. *This development is however dependent on the future of the V&A building on the SMH site. Various options are being drawn up with regards to the future of the V&A as part of the Trust's response to SaHF so this case must take that into consideration.* *The decant of V&A to Samaritan Ward will require both structural floor strengthening works & full refurbishment of the existing areas to bring in line with current standards. The current Samaritan Ward is mostly an old open 'Nightingale' type layout with light floor loading design. The structural engineers report determined the floor is currently operating at its full capacity and any future refurbishment works will require associated floor strengthening. The current layout is not suitable and requires refurbishment in order to bring it up to required HTM and HBN standards. The cost and programme implications of these decant works are unavoidable as the Samaritan Ward is not suitable in it's current state.*		
Option 6 (8 beds)	Do minimum-plus	-This option involves enlarging PICU to include 20% of adjacent PRU space. -Marginal mitigation of patient safety risk -Marginal compliance to CQC mandate to improve environment -Marginal compliance to statutory requirements (PICS standards) -Marginal compliance to NHSE clinical service specification -Difficult PICU space configuration to manage clinically -Marginal improvement in patient and parent experience -Potential deterioration of existing Children's Services

[1] Sexual Assault Referral Service

[2] It should also be noted that during the design process when assessing options that utilised the V&A facility at SMH, it was discovered that the quadrant of the SMH site where the V&A ward is located was deficient in power capacity, that is to say that anything over the status quo that required extra power capacity, the UK power networks would be unable to provide. This would therefore involve considerable investment by the Trust regardless of who occupies the Trust space.

		-No capacity for growth (8 beds). -Reduction of PRU space
This option decreases the foot print for paediatric clinical research activity and would most likely require PICU to decant or close during building works, as the build would be difficult to complete in piecemeal fashion. There are also substantial problems regarding decant of both PRU and PICU while works are taking place. There is no increase in HDU capacity and maintains the current inefficiencies of HDU patient nursed on general wards.		
Option 7 (8 beds)	PICU-PRU Swap	-PICU moves to the full space occupied by PRU, and PRU moves to the space previously occupied by PICU. -Some mitigation of patient safety risk -Some improvement in compliance to statutory requirements -Potential deterioration of existing Children's Services -No capacity for growth (8 beds). -Reduction in available space to support research activity
This option offers a better clinical ward design for PICU, but with only 8 beds there is no scope for increasing market share or co-location of HDU beds. This option significantly decreases the foot print for paediatric clinical research activity and would require PRU to decant or close for the duration of the build works. There are also substantial problems regarding decant of both PRU and PICU while works are taking place		
Option 8 (15 beds)	PICU L7 with enlarged footprint	-PICU remains on the 7th floor of QEQM and utilises all of PRU and current PICU space and PRU relocates to a fully refurbished facility in Samaritan ward. -Addresses CQC mandate to improve environment -Meets statutory compliance (PICS standards) -Meets NHSE clinical service specification -Improved patient and parent experience -Potential growth of existing Children's Services -Capacity for growth (11 PICU beds and co-location of 4 HDU beds). -3 stage process: decant and refurbishment of the Samaritan Ward, then move of PRU to the Samaritan Ward; refit of PRU as first half of new PICU and move of PICU into PRU; refit of current PICU area and then PICU opens to full new size.
This option delivers 11 PICU beds with 4 co-located HDU beds. The new PICU facility will utilise all of the existing PRU space and PRU relocates to a fully refurbished facility in Samaritan ward. This option will significantly increase the PICU footprint and will also facilitate an increase in market share. *Due to the age and design of the building, for options that utilise the QEQM building, the proposed mechanical design solution is complex and costly as the new air handling plant needs to be installed both on QEQM roof and in 5th floor plant room for the ventilation to comply with the latest HTM's. Alternative solutions for the ductwork route from the proposed plant on the roof of QEQM were developed and costed. This exercise looked at two options, firstly to run the ductwork inside the building utilising one of the smoke shafts and secondly to run the ductwork down the outside of the building in a recess in the façade and then cladding this to match the façade. The outcome of this exercise established that the more cost effective option would be the second option (external to the building), though this does have associated planning risks.* *The requirement to undertake floor strengthening work to Samaritan ward has now been designed and programmed, resulting in a need to decant the ward below (Thistlewaite) for a period of 14 weeks.* *The design solution and it's associated cost, is dependent upon various factors outlined in the Wilmott Dixons Mechanical & Electrical (M&E) design solution. This is likely to apply to all other shortlisted options (to a varying degree), but these have not been worked up in as much detail as option 8.*		

1.3.3 Economic Modelling

The key findings from the economic appraisals are set out in the Tables below:

Table 1.4: GEM Summary

	Option 1	Option 4	Option 6	Option 7	Option 8
	£m	£m	£m	£m	£m
Net Present Cost	83.2	77.2	83.1	84.4	74.5
Cost of Risk Retained	0.0	0.0	0.0	0.0	0.0
Risk Adjusted NPC	**83.2**	**77.2**	**83.1**	**84.4**	**74.5**
Qualitative Benefits Appraisal	30.0	73.5	37.5	42.0	81.0
Cost per Benefit Point	**2.8**	**1.1**	**2.2**	**2.0**	**0.9**
RANK	**5**	**2**	**4**	**3**	**1**

Table 1.5: NPV Summary

Option	Description	NPV (£m)	IRR (%)	Payback period (Years)	Cumulative Contribution (£m)	Net Cash Benefit (£m)
1	Do Nothing	(5,819)	No IRR	No Pay Back	(8,005)	(8,005)
4	Relocate POPD, PICU and parent accommodation. PRU as existing, PICU expanded	(2,190)	0.63%	No Pay Back	12,335	(3,344)
6	Do minimum plus - expand PICU partially into PRU	(5,825)	No IRR	No Pay Back	(7,892)	(11,508)
7	PICU/PRU swap	(5,929)	No IRR	No Pay Back	(6,655)	(12,187)
8	PICU L7 Enlarged footprint	3,539	7.26%	13.08	13,497	3,068

The overall outcome of the economic analysis is that Option 8 remains the preferred option. The results are set out in greater detail in Section 3.

1.3.4 Overall Findings: the Preferred Option Summary of Overall Results

Following completion of appraisals for all short listed options, the overall findings are summarised below:

Table 1.6: Overall Findings

Evaluation Results	Option 1 Do Nothing	Option 4 V&A Utilisation	Option 6 Do minimum-plus	Option 7 PICU-PRU Swap	Option 8 PICU L7 enlarged footprint
Economic appraisals	5	2	4	3	1
Benefits appraisal	5	2	4	3	1
Risk appraisal	4	1	3	5	1
Overall ranking	**5**	**2**	**3**	**3**	**1**

1.3.5 Overall Conclusions

At OBC stage, following the completion of the various appraisals, option 8 was the preferred option. The do nothing and do minimum options are still ranked the lowest in appraisals and are therefore not options which can be deemed to meet the business or clinical need; they meet none of the investment objectives that are outlined in this FBC. Option 8 still ranks highest overall when completing the financial and benefits and risk appraisals and is therefore the preferred option to be presented in this FBC. This option meets all of the investment objectives which are outlined in this FBC.

1.4 Commercial Case

1.4.1 Procurement Strategy

The Trust, in looking to obtain best value for money through its contractual arrangements has developed this project using the SCAPE procurement route as the best value procurement method.

The preferred option is now at the end of Stage E design using SCAPE and build contractor (Wilmott Dixon). This Standing Financial Instructions (SFI) compliant, Official Journal of the European Union (OJEU) approved route is a recognised alternative to P21+. Wilmott Dixon is the SCAPE nominated contractor for all construction projects over £2m. The design team have been appointed by Wilmott Dixon. The design has been reviewed at key stages, before sign off by Wilmott Dixon, the clinical group and other key stakeholders (Infection Control, Fire Safety, Estates maintenance, Information technology, Facilities etc.). After Trust and TDA FBC approval, Wilmott Dixon would be instructed to mobilise and proceed to construction phase. See Appendix 15 SCAPE project process map.

1.4.2 Potential for Risk Transfer and Potential Payment Mechanisms

The organisation intends to make payments in relation to the proposed products and services as follows:

Wilmott Dixon's quantity surveyor will undertake and issue a monthly assessment (valuation of works completed in the period) to the Trust's cost consultant who will verify it is correct. This will in turn be passed on to the Senior Project Manager for final approval and on that basis; an invoice is issued by Wilmott Dixon to the Trust for payment. Under the SCAPE agreement no retention is withheld by the Trust.

The main areas of risk are (See Appendix 17):

- Financial (covered by optimism bias)
- Operational (Service needs to be delivered during works)
- Approvals (TDA, planning, building regulations)
- Design and Construction phase (e.g. unforeseen issues with the fabric of the building, access issues, works stoppages due to noise). Stage E design target construction costs will include some construction risks. Some risks will remain with the Trust (e.g. changes to the brief, noise related stoppages) and included in the FBC CAPEX costs.

1.4.3 Key Contractual Arrangements

The contract will be based upon the NEC 3 option A (lump sum) form of contract. There are no personnel implications and Transfer of Undertakings for Protection of Employment (TUPE) does not apply.

1.5 Financial Case

1.5.1 Financial Expenditure

A summary of financial appraisal of the preferred option can be found in Table 1.7.

Table 1.7: Summary of Financial Appraisal

Option 8 (Preferred Option) PRU to Samaritan, PICU expanded to PRU						
Incremental Income & Expenditure 5 Year Summary (£)	**YEAR 0 (2015/16)**	**YEAR 1 (2016/17)**	**Year 2 (2017/18)**	**Year 3 (2018/19)**	**Year 4 (2019/20)**	**Year 5+ (2020/21+)**
Income	5,113	5,113	7,552	8,666	8,666	8,666
Pay	4,585	4,585	6,068	6,413	6,413	6,413
Non-Pay	904	904	1,390	1,466	1,466	1,466
Contribution	***(376)***	***(376)***	***94***	***786***	***786***	***786***
Depreciation and Capital Charges	0	0	242	478	468	457
Net I&E impact	***(376)***	***(376)***	***(148)***	***308***	***319***	***329***

Capital	**YEAR 0 (2015/16)**	**YEAR 1 (2016/17)**	**Year 2 (2017/18)**	**Year 3 (2018/19)**	**Year 4 (2019/20)**	**Year 5 (2020/21)**
Construction	0	2,989	5,775	0	0	0
Equipping	0	59	774	0	0	0
Total Capital Requirement	***0***	***3,047***	***6,549***	***0***	***0***	***0***
Charities	0	3,047	1,253	0	0	0
Trust	0	0	5,296	0	0	0
External	0	0	0	0	0	0
Total Funding	***0***	***3,047***	***6,549***	***0***	***0***	***0***

The preferred option has an initial gross build cost of £9.6m in capital. Once completed, it is expected that the annual net contribution will increase by £1.2m to £0.8m per year. The analysis is set out in greater detail in Section 5.

1.6 Management Case

1.6.1 Project Management Arrangements

Implementation of the project will be managed overall by Martina Dinneen, Divisional Director of Operations for the Women's and Children's Service and Prof Simon Nadel, lead clinician for PICU through a PICU Core Team which convenes weekly so that project decisions can be reviewed by all key stakeholders in a timely manner. This core team will report by exception to the Women's and Children's Management Committee.

The Estates Senior Project Manager, (Anthony Threlfall) is the Trust's primary contact for Wilmott Dixon and is responsible for ensuring the design and construction follows due process. Wilmott Dixon appoints and manages the design team (and will ultimately deliver the construction phase). The financial control of the scheme will be under the duties of the Quantity Surveyor (Christopher Smith Associates) and hence under the supervision of the Estates Senior Project Manager. A project variation system will be imposed to control change to the design and hence expenditure within the parameters of the contract. Any changes to design must be agreed by all key stakeholders.

Internal monthly reviews will be held both with the design team and Trust finance to ensure control of the budget is maintained.

Key dates in the programme are as follows:

Table 1.8: Key programme dates

Milestone Activity	Date
Internal OBC Approval process	Sept '14
TDA OBC Approval	March '15
FBC Approval by Trust	May '15
TDA FBC Approval	Aug '15
Start on Site (first Phase)	Aug '15
Decant Samaritan ward for PRU enabling	Aug '15
Decant Thistlewaite for floor strengthening	Sept '15
Recommission Thistlewaite	Dec '15
Complete and commission PRU in Samaritan Ward	Sept'15
Decant PRU from 7th floor QEQM	Jun '16
Complete and commission Phase 1 PICU in 7th floor QEQM	Jun '16
Decant Existing PICU into Phase 1 PICU	Jan '16
Complete and commission Phase 2 PICU in 7th floor QEQM	Jan '17
Practical completion (final phase)	Aug '17
Commissioning and "go live" (final phase)	Aug '17

1.6.2 Benefits Realisation and Risk Management

A review of the risks will take place at fortnightly core team meetings led by the General Manager during implementation; mitigations and actions will be agreed at each meeting.

Evaluation of the achievement of benefits set out in this business case will take part on a monthly basis by the PICU core team and will be summarised for the Divisional Management Committee on a quarterly basis.

1.6.3 Post Project Evaluation Arrangements

Post-project evaluation reviews to ascertain whether the anticipated benefits have been delivered will take place six months and twelve months after implementation. A project evaluation review to appraise how well the project was managed and delivered compared with expectations will take place three months after implementation and is owned by the general manager and the estates senior project manager.

1.7 Conclusion & Recommendation

The Division of Women's & Children's are committed and feel the proposed development of the PICU and co location of high dependency care (HDC) when tested through the 5 case model presents a strong case for approval and investment by the Trust. The business case is underpinned by a strong strategic case which offers improved services for children in London. The economic case developed provides assurance that the preferred option both delivers desired service changes and provides value for money. The commercial case demonstrates that the case is commercially viable and the development of the financial case has enabled the team to select a financially viable solution that meets the business needs for the service. By developing the management case, the core team can provide assurance that the selected option can be delivered successfully against agreed project timelines.

With this in mind, the Division of Women's and Children's formally makes the recommendation for approval for a capital spend of £9.6 million for the development of the new PICU facility on the SMH site. This total value compares to £8.7 million at Outline Business Case stage.

The refurbished unit will ensure statutory & regulatory compliance and improve clinical quality and

patient and staff experience, as well as providing critical support to other key clinical services and reducing the current level of patient refusals.

On behalf of Imperial College NHS Healthcare Trust

Prof Tg Teoh

Senior Responsible Owner
Women's and Children's Divisional Director
27th May 2015

2 The Strategic Case

2.1 Introduction

This FBC has been written to articulate the resource and infrastructure necessary for PICU upgrade and development at the SMH site bringing essential improvements to clinical quality, patient and staff experience, and facilitating an increase in market share.

The OBC was approved by the TDA on 26th March 2015. This approval is attached at Appendix 34. Willmott Dixon has been appointed to lead the detailed design phase and procure and manage the construction phase of the project. The design has been progressed to enable a guaranteed maximum price (GMP) to be provided and the FBC produced for formal approval. The assumptions underlying the project have been confirmed by our commissioners as stated in Appendix 23.

The proposal to improve the existing service has strong family, carers, parent support, commissioning and Executive Team support. In addition, the ICHT Charity and COSMIC charity are both highly supportive of this proposal. The ICHT Charity raises charitable funds for ICHT and have awarded over £7m to grants since 2009. There are reserve funds already available from the charities to support the project and as agreed by their Trustees, the charities will undertake major fundraising campaigns on behalf of the project; the fundraising campaign officially commenced in January 2015. Please see Appendix 20 for confirmation of the charity funding.

This Section, summaries the strategic context surrounding the re-development of PICU as previously detailed in the OBC and highlights any changes and progress made since OBC approval by the TDA.

Part A: The Strategic Context

2.2 Organisational Overview

ICHT was formed on October 1st, 2007 by merging St Mary's NHS Trust and Hammersmith Hospitals NHS Trust and integrating with the faculty of medicine at Imperial College (IC) London. With more than one million patient contacts each year, it is one of the largest acute Trusts in the country and, in partnership with IC, is the UK's first Academic Health Science Centre (AHSC).

Trust vision and objectives

The Trust has been developing plans for the future of its healthcare services in order to meet changing needs and expectations. As part of this work, we sharpened and simplified the Trust's vision and strategic objectives. The intention was to develop more accessible and impactful versions which demonstrate more clearly the strategic context for our developments.

Our Trust's vision and strategic objectives are:

Vision:

"To be a world leader in transforming health through innovation in patient care, education and research."

Objectives:

- To achieve excellent patient experience and outcomes, delivered efficiently and with compassion;
- To educate and engage skilled and diverse people committed to continual learning and improvement;
- As an Academic Health Science Centre, to generate world leading research that is translated rapidly into exceptional clinical care;
- To pioneer integrated models of care with our partners to improve the health of the communities we serve.

At its July 2014 public meeting, the Trust's board of directors approved the document "Clinical Strategy 2014-2020: unlocking our potential to transform health and care" setting out our clinical strategy (Appendix 39) which is the central element of our five-year clinical and site transformation programme. The strategy is designed to improve clinical outcomes and patient experience, to help people stay as healthy as possible and to increase access to the most effective specialist care.

This clinical strategy reflects the well-evidenced principles of what good future NHS care will look like. This means more local and integrated services, to improve access and help keep people healthy, and more concentrated specialist services where necessary, to increase quality and safety. We've already seen many more lives saved by centralising major trauma, stroke and heart attack centres across the capital, including at our hospitals.

Improvements in the provision of paediatric intensive and high dependency care will enable ICHT to build on strengths which combine clinical care, research and education, promoting innovation and improving outcomes for sick children. This development along with the redevelopment of the adjacent specialist ward (Grand Union Ward) will improve our estate and provide a sustainable solution for the provision of children's specialist services at ICHT subject to the finalisation of the ICHT redevelopment and estates strategy. It will build on the current all age synergies within ICHT as a major acute, academic hospital and consolidate our position as the specialist paediatric and neonatal hub in NWL, providing:

- PICU and collocated HDU care, in a modern purpose built unit, for the sickest children, including those with surgical conditions and major trauma;
- The largest level 3 neo-natal intensive care unit (NICU) service in the regional network, linked to tertiary foetal medicine providing expert care for extreme premature infants, specialist neurological care, and supporting the needs of the maternity services;
- Academically led, NHSE commissioned services for children including Critical Care, Allergy, BMT, Clinical Haematology, Infectious Diseases (ID), Nephrology, Neurology, Sleep, ENT, Surgery, Urology and Ophthalmology;
- Innovative new pathways for general paediatrics across primary and secondary care, including "Connecting Care 4 Children" (CC4C) and supporting A&E for children;
- Co-design work with young people with chronic diseases (e.g. allergy, diabetes, sickle, Human Immunodeficiency Virus (HIV), epilepsy etc) to improve transitional care for adolescents, linking paediatric and adult services, as well as maximising care out of hospital;
- Building on our recognised expertise in education and simulation for all healthcare staff; training the local multidisciplinary children's workforce of the future;
- Expanding clinical research in intensive care, allergy, infection and neonatology recruiting children to clinical trials, and improving access to new treatments, within the unique academic resource of the clinical Paediatric Research Unit (PRU);

2.3 Existing Arrangements

PIC is a service for children aged 0 -16 years old with potentially recoverable, life threatening conditions who can benefit from more detailed observation, intensive treatment and technological support than is available in general wards or high dependency facilities. The current PICU at ICHT is located on the 7th floor of the QEQM building on the SMH site as is shown in Figure 1.1. It is an 8 bedded facility and was commissioned in 1996. (Appendix 24 shows where PICU is situated in the QEQM building) (increasing to 10 in winter by extending to an adjacent ward area). The PRU can also be currently found on the 7th floor QEQM as shown in Figure 1.1 (please see Appendix 38 for more information on the PRU and Section 2.4).

Children who require high dependency care at ICHT are treated either in PICU beds or are risk assessed to be placed in adjacent level 1 beds as and when required. This can impact patient, parent and staff experience and can lead to a reduction in level 1 admitting capacity which can consequentially impact on patients in paediatric A&E.

Figure 2.1: 7th Floor QEQM layout

The PICU admitted approximately 655 patients over 2013 – 2015 and delivered 5025 bed days of critical care to patients. The unit is staffed by a team of 50 nurses, 5 consultants and 16 junior doctors dedicated to PICU and is further supported by a number of allied health professionals, administrative and clerical staff along with the wider children's clinical team.

The service quality standards are reported through the PICU specialised service quality dashboard (please see Appendix 42). The reported outcomes reflect the high quality of care delivered by the team:

Figure 2.2: PICU Service Quality Dashboard

IMPERIAL COLLEGE HEALTHCARE NHS TRUST

Q2 2014/15

Spine Charts: Lower Limit 3SD, Lower Limit 2SD, Acute Trust Value, National Mean, Upper Limit 2SD, Upper Limit 3SD

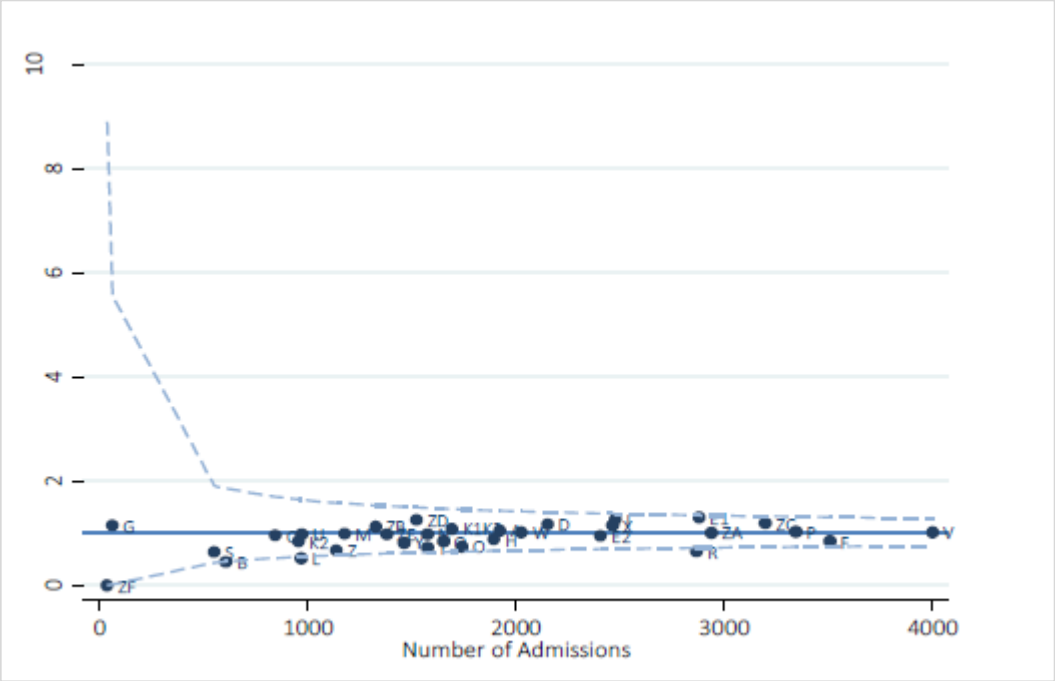
SPC Sparklines: Lower 3SD, Acute Trust Value, National Mean, Upper 3SD

Dom	Thm	Quarterly Indicators (Q2 1415)		Num	Denom	Value	National Mean	Chart	Trend
5	CO	PIC02	Refusal rate for emergency admissions	16	90	17.8	11.0		
4	CP	PIC03	Cancellation of elective surgery due to bed unavailbility	0	12	0.0	3.8		
5	CO	PIC04	Emergency readmissions to PICU within 48 hours	0	71	0.00	2.0		
5	CO	PIC05a	PICU bed occupancy rates	496	552	89.9	81.6		
5	CO	PIC08	Rate of accidential extubation of patients	0	286	0.0	0.4		
5	CP	PIC09	Percentage of death reviews conducted within 3 months	<5	<5	100.0	90.4		
4	CP	PIC10	Percentage of data submissions within 3 months of discharge	82	82	100.0	76.9		
4	CP	PIC13	Percentage of refused requests for retrieval of a patient within defined catchment	NULL	NULL	0.0	6.0		
1	CP	PIC14	Timely mobilisation of PIC retrieval team	NULL	NULL	0.0	64.5		
		Annual Indicators (2012/13)		Lower CI	Upper CI	Value	National Mean	Chart	Trend
1	CO	PIC01	Risk adjusted mortality *Data from PICANET 2013 Annual Report,* *STANDARDISED MORTALITY RATIO, PIM2r Adjusted (95% CI)*	0.65	1.49	1.01	1.0		

The case-mix of patients within the PICU shows that ICHT admits a higher proportion of emergency patients. These have on average a higher severity of illness and mortality, despite this the risk adjusted mortality has improved year on year within the unit. The risk adjusted mortality is 0.85 in 2013 against a national average of 1.0 and previous adjusted mortality of 1.04 in 2011. The unit also demonstrates

below national average rates of accidental extubation and emergency readmission. The service scores adversely against metrics measuring bed occupancy and refusal rate, data shows that over 300 patients were refused from the unit between 2013 and 2015. Further to this the service supports a number of specialist paediatric services that in total generate ~£6m in income in addition to the ~£5m generated by the PICU itself (average SLAM values 13/15).

Figure 2.3: PICU Standardised Mortality Ratios by Health Organisation, with 99.9% control limits, 2011-2013 PIM2r Adjusted



Part B: The Case for Change

The case for change is themed into three main areas for discussion; patient care facilities, progressive workforce development and future sustainability of Children's Services.

Patient Care Facilities

The current PICU facility was built nearly 20 years ago, the environment no longer meets modern day clinical service standards. There is a risk of cross-transmission of nosocomial infections due to sub-optimal ventilation and the provision of only one adequate isolation facility in the unit. A serious incident with regards to infection prevention control was reported by the service in 2013. The risk of transmission is mitigated as required by robust infection prevention control policies and procedures within the unit and the isolation of patients in multi-bedded bays as and when required. This reduces admitting capacity to maintain patient safety. Increases in multi-drug resistant infections in children with chronic illnesses, has increased the requirement for optimised isolation facilities over time. Currently the unit has lost capacity for significant periods; this has had an adverse impact on the sustainability of the service, which in turn puts the rest of specialist paediatrics and major trauma at risk (as discussed later in the case). The PICU environment and subsequent risk of transmission of nosocomial infections was highlighted by the CQC on their inspection in September 2014 and the estate was identified as an area the Trust must action to ensure adherence to national standards. The PICU poor estate and nosocomial infection risk is the top paediatric risk logged on the Division of Women's and Children's risk register.

The reduced space surrounding each bed compromises patient and parent privacy and dignity. This is reflected in patient experience feedback for the unit collected though both national and local patient surveys for the service. Overall feedback for the unit is positive, however, parents have explicitly highlighted that limited space within the unit as an area for improvement. Appendix 21 provides

detailed feedback based on patient/parent experience of the existing facility.

Paediatric Intensive/High Dependency Care is the provision of close observation, monitoring and therapies to children who are, or have significant potential to become physiologically unstable to a level which is beyond the capability of a general paediatric ward to safely manage. Children who require high dependency care at ICHT are treated either in PICU beds or are risk assessed to be placed in adjacent level 1 beds as and when required. This can impact patient, parent and staff experience and can lead to a reduction in level 1 admitting capacity which can consequentially impact on patients in paediatric A&E. In winter months, the simulation facility in the adjacent ward (Grand Union Ward) is converted to clinical space to provide increased capacity to accommodate the "winter surge" in activity for the sector. The space is therefore lost for education and simulation for a third of the year, with associated loss of educational activity and income. Approximately 20% of PICU bed days are used to deliver high dependency care to children who are too sick to be cared for in level 1 beds.

Progressive Workforce Development

Following the publication of the Francis Enquiry (2013) and the subsequent Berwick report (2013), the emphasis on ensuring clinical areas have the appropriate nursing staff numbers and skill mix relative to patient numbers and acuity and the clear link to safe, high quality standards of care provision has been explicitly highlighted. For children and young people's services, the Royal College of Nursing (RCN) published new standards for staffing in 2013, and these include reference to PICS (2010) standards for PICU and HDU levels of care provision.

To meet PICS staffing standards units are required to staff PICU beds at a ratio of 6.67 nurses per intensive care bed. It is a specialty that is recognised nationally as being challenging to recruit to; the current unit team echo this challenge and despite numerous recruitment drives have sustained a number of vacancies (up to 20%) within the current establishment. There is reliance on staff to support the unit through additional bank shifts and if unsuccessful through agency staff which is both expensive and unsustainable, average fill rates for the service are between 70%-90% with the lowest fill rates reported over the winter months. The high dependency on bank and agency staff, current environmental constraints, challenged recruitment, and the variable bank and agency cover result in a high turn-over rate of 22% (band 5 and 6 staff) against a Trust target of 7.5%. These factors have, on occasion limited the number of paediatric intensive care beds open within the unit.

Future Sustainability of Children's Services

The Department of Health (DoH) published guidance in 2008 which stipulated the core clinical services required to support specialist paediatric activity including: PIC; paediatric specialist anaesthetics, ENT (airway) and surgery, all of which are NHSE commissioned at ICHT. PICU support is also defined as a critical adjacency for several specialist services including ID / Allergy / Immunology, Major Trauma, Clinical Haematology and Paediatric BMT. Without a functioning PIC service, these services risk NHSE commissioner derogation which would weaken the Trust's position as a specialist paediatric hospital that supports the needs of the local population and provides tertiary support across the sector and beyond for its specialist services. These complex specialist paediatric services also support the high levels of recruitment into clinical trials that the Division currently achieves.

The core team built on the case for change and progressed to develop business strategies that supported the required improvement in PIC facilities. Business strategies are discussed in the next Section of the case and they go on to inform the business needs and investment objectives for this business case.

2.4 Business Strategies

The Trust's long term vision for Children's Services at ICHT is defined clearly within the clinical strategy for the Trust (2014). SMH is designated as the acute hospital site within ICHT and paediatric services, particularly paediatric intensive care is a core constituent required to support acute services such as Paediatric A&E and the all-age Major Trauma Centre (MTC).

The PIC service is a flagship service within children's services and currently provides support to a number of specialist services. Without this support our position as specialist provider for a number of tertiary services would become unfeasible. To sustain PIC services key areas for consideration are identified below:

1. Improving clinical outcomes and patient experience ;
2. A fit for purpose PICU, with a world class environment for patients, families, staff, and enabling research, training and development;
3. Appropriate capacity for increasing market share and demand;
4. Provisions in place to support a sustainable service;
5. Providing a service that supports paediatric specialist services and major trauma.

These key areas are expanded and discussed in more detail below.

1. Improving clinical outcomes and patient experience

Clinical outcomes – Improving clinical outcomes for our patients is a key driver for change within the Children's team. In relation to this PIC service, there are two areas where there is scope to improve clinical outcomes for our patients. The first is through providing improved ventilation and isolation facilities and sufficient space between patient bays within the unit. There is a significant detrimental impact on patient outcomes in the rare instance that an infection is transmitted between patients on the unit. Improvements in environment to achieve compliance to national standards will significantly reduce the likelihood of transmission of infections between patients. The second potential improvement in clinical outcomes for patients relates to primarily patients who require HDC. A study of use of HDU beds in Yorkshire[3] found that about 10% of all hospitalised children required HDC, a level consistent with the DoH who estimated that 5–15% of children admitted to a District General Hospital (DGH) required high dependency care. In 2009, it was reported nationally that 76 (24%) of PICU beds were designated for high dependency care in 17 (53%) PICUs, an increase from 33 (13%) beds in 13 (42%) PICU's in 2005. Despite the proportion of designated HDU beds, 28% of admissions to PICU did not require invasive ventilation (associated with PIC). Evidence confirms that HDU care is frequently delivered on PICUs. The centralisation of PIC delivered in designated beds and units has improved outcomes for all critically ill children. The absence of dedicated HDU capacity in tertiary centres has resulted in the use of PICU beds for HDU. In addition, the lack of long term ventilation (LTV) facility where children could be nursed with a domiciliary ventilator and associated tracheostomy also compelled children to stay on the PICU; both factors displaced acute admissions from the PICU and contributed to a high refusal rate. The colocation of HDU and PIC beds within the PIC unit offers patients the benefits of centralized care, effective step down and improved admitting capacity for acute admissions. Children who require high dependency care at ICHT are treated either in PICU beds or are risk assessed to be placed in adjacent level 1 beds as and when required. This can impact patient, parent and staff experience and can lead to a reduction in level 1 admitting capacity which can consequentially impact on patients in paediatric A&E. Patient experience feedback can be found in appendix 21.

Patients – PICU, built in 1996, does not comply with current NHS building or PICS standards for space, facilities or ventilation. The estate is no longer fit for modern day clinical care. When PICU was

[3] Rushforth K, Darowski M, McKinney PA. Quantifying high dependency care: a prospective cohort study in Yorkshire (UK). Eur J Pediatr. 2012 Jan;171(1):77-85

built, bed-space requirements were approximately half current standards. More advanced treatment modalities developed in recent years, require additional equipment and more bed space. In addition, changing epidemiology of critical illness and patterns of disease have increased the requirements for PIC: for example, there are increasing numbers of patients surviving with severe immunodeficiency, including increasing numbers of patients having BMTs as well as long term survivors of other chronic diseases including extreme prematurity. This has also led to increasing demand for isolation facilities for highly infectious and/or susceptible cases. Increased pressure on isolation facilities is also due to the emergence of multi-drug resistant infections in severely compromised patients. Limited isolation cubicle capacity of the unit has led to transfer of our own BMT patients to other PICUs with very poor patient experience, significant cost and loss of reputation. During times of increased activity HDU patients are occasionally required to be nursed on either the general or specialist paediatric ward. Stepping down from PICU to a general ward is often distressing for patients and families, a co-located PICU and HDU would improve patient experience for this cohort of patients.

Families – Patient feedback is captured through a number of different mechanisms within the unit which include national patient surveys, the friends and family test, patient stories and feedback received in patient focus groups. Parents report that whilst overall patients experience is good, there is a lack of privacy in the current PICU environment. This feedback is reflected in both local and national patient surveys for the area; Appendix 21 details patient feedback for the unit. In addition to this the lack of capacity means that many patients are refused and admitted to other PICUs, often out of area, which increases stress on families who may have to travel many miles from home. The service aim to embed a robust cycle of feedback, action and audit within the unit to ensure that patient feedback drives positive change within the unit. This refurbishment will improve family facilities in the unit, increase privacy at the bed side and reduce the number of patients required to travel out of area.

A PICU compliant with space and ventilation requirements with co-located HDU will significantly improve clinical outcomes and the experience for numerous patients and families per year strengthening ICHT's position as a major acute, academic hospital and consolidate its position as the specialist paediatric and neonatal hub in NWL.

2. Fit for purpose PICU, a world class critical care environment for training, research and development

Supporting Staff development – The increased staff establishment afforded by the proposed new unit provides new opportunities to develop rotation and development programmes for nursing staff to support newly qualified and senior band 5 nurses, and to create a more flexible and highly skilled ICHT children's nursing workforce across PICU/HDU, NICU and ward areas. This will promote retention of staff and attract new recruits, producing a number of entry routes to PICU nursing. The development of the advanced nurse practitioner role within the PICU offers staff clear career progression opportunities starting from band 5 and progressing to band 7 and above. Education opportunities on offer to staff include a combination of bedside teaching, university delivered courses to improve clinical decision making, and advanced resuscitation and advanced assessment skills. This workforce development strategy incorporates many elements of the ICHT Nursing and midwifery strategy, 'Everyone Counts' (2013) which aims to attract and retain a high calibre workforce to provide the highest standards of care to our patients (Please see Appendix 40).

Training - The paediatric department at ICHT has an outstanding reputation for education and training and has led a number of initiatives with significant impact across London and nationally. This has been recognised through winning the London Deanery Elizabeth Paice Award for Educational Excellence as the 'Best Clinical Department' across the whole of London (2010) and in being awarded Lead Provider status for pan-London postgraduate training for senior ST6-8 medical trainees in direct competition with Great Ormond Street Hospital (GOSH) and the Evelina Children's Hospital (2013).

Paediatric trainees on PICU have reported the best learning and training experience in London, according to the 2014 General Medical Council (GMC) trainees survey when comparing trainees

attitudes on the 3 main PICUs – SMH, GOSH and Evelina. The department has also led on the development of a London-wide approach to paediatric simulation training and simulation faculty development training. The expansion of PICU, the co-location of HDU care and the improved working environment will significantly increase opportunities for learning and education. This will have a positive impact on postgraduate training, learning and development for nurses, doctors and allied health professionals in multi-professional settings and provide opportunities for undergraduate students to participate in specialty choice modules on PICU. The facilities will also allow us to develop our simulation work with General Practitioners (GPs) and other colleagues in primary care on early recognition and management of seriously ill children. In addition, improved working conditions will help to attract the best multidisciplinary trainees to join the PICU team.

Research and Development – The PIC service at ICHT also has an international reputation for research in the management of critical illness and life threatening infection in children. Pioneering clinical research, led by Professor Mike Levin, Dr Parviz Habibi and Professor Simon Nadel has significantly reduced mortality from meningococcal disease and established the role of the "mobile PICU" for the transport of severely ill children. In addition, the unit is world renowned for the development of treatment guidelines for the management of life-threatening infection in children, and for respiratory and infectious disease research.

The nursing team are key in ensuring that the unit operates on evidence based practice and are actively engaged in research and innovation to improve patient care. Teams are actively encouraged to engage with clinical audits within the unit and to appraise latest research outcomes. The unit collaborates with the National Institute of Health Research (NIHR) in competing for research grants.

The PRU at ICHT, first opened in 2007, is a ring-fenced clinical area for translational research in children. The PRU was the UK's first unit devoted solely to paediatric clinical research and is world renowned, focusing on conditions that affect children in the local population with the overall aim to translate research into clinically relevant interventions to improve the lives of children. It has all the facilities of a small "in and out" patient unit as well as state-of-the-art polysomnography and lung function testing. Biological specimen processing and storage prior to transport to research labs can be undertaken in the PRU laboratory. It has ongoing inpatient and outpatient clinical research programmes in the following areas: allergy; sleep; respiratory; ID; haematology and neuromuscular disease. The continued promotion and development of paediatric research at ICHT, in an appropriate environment, is essential to the mission of our service. For further information around PRU function and activity, please see Appendix 38 which provides an overview of the unit as well as the latest PRU newsletter.

An improved facility will enable progressive workforce development through enhanced recruitment, retention through development of expertise and drive for innovative research opportunities.

3. Providing appropriate capacity for increase in market share

The recently released national commissioners Paediatric Intensive Care Surge Report 2014 (Appendix 5) concludes that PICU provision should be planned on an overall average annual occupancy of around 80% and projected growth in demand for services should be modeled between 3-5% each year. The report recognizes that there is considerable seasonal variation in demand and services are especially susceptible to winter pressure arising from increases in severe respiratory infections (especially bronchiolitis). Although additional funding has been consistently released by NHSE to support the provision of additional capacity, we are limited by the current environment and are unable to meet local patient needs which results in a large volume of patients being turned away from the service.

The national Paediatric Intensive Care Audit Network (PICANet) has collected national data for all NHS commissioned PICUs since March 2003. This data shows a clear increase in demand:

- That the overall number of PICU admissions is increasing, with a 16.7% rise from 13,814 in 2004 to 16124 in 2012;
- Bed days delivered increased by 25.7% from 78,359 in 2005 to 98,486 in 2012;

Market Share and SaHF – although specialist paediatric services are not within the scope of SaHF, it is recognised that high dependency care for children in the NWL region is problematic and fragmented. Local hospitals will have increasing difficulty in the future maintaining an adequate workforce to support local HDU care. A new facility at ICHT enables us to build on relationships with local hospitals and provide HDU care alongside PICU care, the most cost effective model supported by both local and specialist commissioners.

More than 80% of our PICU activity is emergency activity. This is higher than our peers and the service generally experience activity across a seasonal profile. Improved capacity overall would permit increased elective activity (e.g. general surgery, ENT, orthopaedics, plastics etc), both NHS and private and allow more efficient use of our workforce.

The current service does not have the capacity to meet demand and grow market share nor to meet commissioner projected surge.

4. Providing a sustainable service

Published evidence suggests that the optimal size for a PICU facility is at least 10-12 beds. Larger clinical specialist units are associated with improved efficiency providing some benefits through economies of scale and improved clinical outcomes. This volume–outcome relationship has been demonstrated for surgery, neonatology, and paediatric oncology but is less obvious in adult and pediatric critical care. Clearly, the larger the referral centre, the greater availability of multiple specialist clinical support (neurosurgeons, paediatric surgeons, ID, nephrology, neurology etc) will be. Studies have suggested that children at high risk are more likely to survive when managed in larger tertiary units. Although the literature is heterogeneous, it appears that, overall, volume is an important determinant of quality in paediatric critical care[4].

The existing PICU at SMH is an 8 bedded facility (increasing to 10 in winter). PIC is a specialist service supported by highly skilled workforce, specialist equipment and is a critical adjacency for several specialist services. It is recognized as a relatively low volume, high fixed cost service in which sustainability improves with increased activity volumes. Reductions in bed capacity and associated activity to achieve compliance to PICS space and ventilation requirements would put the long-term sustainability of the unit at risk. This would have a major detrimental impact on the Trust's ability to provide a number of specialist services as PICU is a core service for the provision of specialist paediatrics. In addition, PICU is a requirement for the provision of major trauma services, and SMH is one of only 4 MTCs in London, providing all-age major trauma services. Loss of PICU would put the MTC at SMH at risk.

Increasing PICU and HDU capacity improves the sustainability of the service.

5. Providing a service that supports paediatric specialist services, and major trauma

According to the DoH (2008), the core clinical services for a specialist children's hospital include, PICU, paediatric anaesthetics, ENT and surgery, all of which are commissioned at ICHT. These services are essential to support complex specialist paediatric activity.

Specialist Services provided at ICHT for children include: Allergy; Immunology; ID & HIV; Clinical Haematology; BMT; Neurology; Neuro-disability; Nephrology; Diabetes; ENT; Surgery; Urology;

[4] Wetzel RC, Sachedeva R, Rice TB. Are all ICUs the same?
Paediatr Anaesth. 2011 Jul;21(7):787-93.

Ophthalmology; Plastic Surgery; Trauma & Orthopaedics; Dentistry; Interventional Imaging; and Neonatology. Most services are built on regional networks with out-reach clinical support to local hospitals and in-reach delivery of complex care. A proportion of high complexity care could not safely be undertaken without PICU support, the table below demonstrates the services currently provided by ICHT that rely on PICU support, the degree of reliance is indicated by the RAG rating, with red denoting an absolute dependency that requires co-location, amber 3 indicates that PICU consultant intervention would be required within 4 hours and amber 2 is within 24 hours.

Table 2.1: Specialist Service Dependency on PICU

Specialist service dependency on PICU (DH, 2008)																
BMT	Clin Haem	Immuno	Oncology	ID	Resp	Cardiology	Neuro	Major Trauma	Ortho & Spinal	Nephrol	Uro	Endo	Gastro	ENT	Neonates	Spec Surg	Spec Anaes
	2	1		2	3				3*			1	1				

Specialist paediatric services are commissioned by NHSE and excluding PICU (~£5m) and NICU (~£11m) generate £6m NHS income. Increased PICU size will provide the opportunity to increase market share of emergency and elective activity for both NHS and private patients.

The all age MTC for NWL opened on the SMH site in January 2011. Although the number of children with major trauma is small (around 200 per year), PICU is essential to support this high intensity commissioned activity along with high acuity activity from ICHT's paediatric A&E department.

Currently across NWL, the PICU, the surgical hub, neonatal level 3 care and cardiac and respiratory centre are provided across four different hospital sites (SMH, Chelsea and Westminster (C&W), Royal Brompton (RBH), and Queen Charlottes (QCCH)). By improving PIC provision at SMH as well as the longer term plan to co-locate ICHT level 3 NICU on the same site, there is the potential to improve provision and reduce fragmentation of specialist paediatric services across NWL and thus reduce the requirement for acutely sick children to be transferred between hospitals.

An expanded PICU at ICHT puts us in an optimal position to support and expand specialist services and support rationalisation of paediatric services in the sector.

2.5 Business Needs

To support the business strategies outlined above the core team distilled the business needs into six key areas to be considered:

Table 2.2: Business Needs

Business Strategy	Business Need
1, 2, 3, 4, 5	A facility that complies with current commissioner, PICS and CQC standards for space, ventilation and isolation
1, 3	The ability to increase capacity and accommodate refused admissions and reduce the number of patients transferred out of area and delays to care
1, 2, 3	A facility that has sufficient capacity to enable the co-location of PICU and HDU beds
3, 4, 5	Capacity to service increased demand in commissioned critical care and increased support for other commissioned specialist services
1, 2	An improved facility that supports patient and parent privacy and dignity and improved staff recruitment, retention and experience
1, 2	A facility that supports education, training, and research

2.6 Investment Objectives

This Section describes the main outcomes and benefits associated with the implementation of the potential scope in relation to business needs. As specified in the OBC, the investment benefits criteria fall under seven main headings which are mapped to our investment objectives in Table 2.3. Our objectives have not changed since approval of the OBC.

- Quality of clinical Care;
- Strategic fit;
- Environment and patient experience;
- Flexibility;
- People, handling and management;
- Staff training, Research and Development;
- Implementation.

Table 2.5 provides a detailed description of the benefits criteria.

Table 2.3: Investment Objectives

Investment Objective		Benefits Criteria
1.	Maintaining and enhancing provision of critical care (PICU and HDU) for children in and around London, particularly within our own sector of NWL.	• Quality of clinical care • Strategic Fit • People, handling and management • Staff training/Research and development • Flexibility
2.	Improved clinical quality and patient experience through facilities redesign, increased patient volumes, reducing overcrowding, improving ventilation, and eliminating Health and Safety and Infection control risks	• Quality of clinical care • Strategic Fit • Patient experience and environment • Flexibility • Implementation
3.	Adequate capacity for increase in demand and market share in commissioned services for critical care and support for other paediatric specialist services.	• Flexibility • Strategic fit • Quality of clinical care • Staff training/Research and development
4.	Increased capacity will reduce refused admissions, allow increased activity and reduce transfer of critically ill children out of area.	• Flexibility • Patient experience and environment • Quality of clinical care
5	Co-location of HDU services improves efficiency, reduces bed pressure on Paediatric wards and increases A&E and specialist access.	• Flexibility • Quality of clinical care • Strategic Fit
6.	Increased activity will allow improved potential for education, training and patient recruitment to high quality, ethically approved research.	• Staff training/research and development • Quality of clinical care • Strategic fit
7.	Improved environment and increased activity allows better staff recruitment and retention and a reduced reliance on bank and agency staff.	• Strategic fit • Quality of clinical care • People, handling and management

The objectives are discussed in more detail below:

Objective 1: Maintaining and enhancing provision of critical care (PICU and HDU) for children in and around London

The existing PICU at SMH is an 8 bedded facility, by use of adjacent ward space the service is able to offer an additional 2 beds over winter. PIC is a specialist service supported by highly skilled workforce, specialist equipment and is a critical adjacency for several specialist services. Reductions in bed capacity and activity would put the long-term sustainability of the unit at risk. This would have a major effect on the Trust's ability to provide a number of specialist services as PICU is a core service for the provision of specialist paediatrics. In addition, PICU is a requirement for the provision of major trauma services and SMH is one of only 4 MTCs in London, providing all-age major trauma services. Loss of PICU would put the MTC at SMH at risk.

Objective 2: Improved clinical quality and patient experience through facilities redesign, reducing overcrowding and eliminating H&S and infection control risks

As highlighted by the CQC visit 2014, PICU does not meet modern standards for space, ventilation or isolation. It is a poor environment for families, and a difficult working environment for staff. A modern, improved environment would improve clinical outcomes by reducing the risk of nosocomial infection transmission by providing adequate space between beds, adequate unit air flow and appropriate isolation facilities. It would also improve the experience of families by providing increased privacy and dignity within the unit. More space within the unit and around the bedside improves the working and learning environment for staff which in turn improves staff recruitment, retention and experience.

Objective 3: Adequate capacity for increase in market share for critical care and support for other paediatric specialist services

Commissioners have estimated that as birthrate is increasing at 3.5% per year and PICU demand has increased 20% over the last 9 years, this growth trend is likely to continue as more children with chronic diseases survive. Therefore it is increasingly likely that there will be a requirement to increase overall PICU capacity across London. When considering the geographical location of SMH in relation to other units and the size of the current facility in comparison to the other units, the proposal to increase critical care (CC) provision at SMH offers a favorable outcome for London; it provides increased capacity in a unit that currently serves predominantly emergency admissions which improves sustainability and also improves resilience in the event of a major incident across London. The current unit does not have capacity to support any growth or increases in market share for paediatric critical care or other commissioned specialist services. Increased capacity enables ICHT to service any growth in demand and potentially support rationalization of children's services across NWL which may lead to increased activity at ICHT.

Objective 4: Increased capacity will reduce refused admissions and allow increased activity and reduce transfer of critically ill children out of area.

The Trust currently provides predominantly non-elective paediatric critical care services for children in and around London. This set's the unit aside from other PICU's who are required to balance elective surgical and emergency admissions through the year. Currently, a significant proportion of critically ill children in NWL are admitted to PICU's out of region due to limited capacity within the unit which significantly impacts on patient and parent experience. The NHSE quality dashboard for PIC includes quality metrics that monitor refusals for admission and patients transfers out of region. We'd expect improvement in performance against these metrics by increasing capacity in PICU and HDU.

Objective 5: Co-location of HDU services improves efficiency, care of patients on the general paediatric wards and income

There is evidence to demonstrate that the absence of dedicated HDU capacity in tertiary centres has resulted in the use of PICU beds for HDC (approximately 20% at ICHT). In addition, the lack of long term ventilation (LTV) facilities has required children to stay on the PICU; both factors displace acute

admissions from the PICU and contributed to a high refusal rate for the service. The colocation of HDU and PIC beds within the PIC unit offers patients the benefits of centralized care, effective step down and improved admitting capacity for acute admissions. A recent report from the RCPCH – High Dependency care for Children – Time to move on (Nov 2014) highlighted that children meeting HDC HRG criteria managed on paediatric wards consumed significantly more staff time than other ward patients and demonstrated greater physiological derangement on Paediatric Early Warning Score (PEWS) monitoring. Evidence suggests that children looked after on level 1 wards who meet HDC HRG criteria consume 2.5 to 3.0 times the medical and nursing staff resource compared to other children on the ward. At present a significant proportion of activity that occurs in PICUs is high dependency. The proportion of PIC activity that maps to high dependency, rather than intensive care, varies considerably from unit to unit with the national average being 25.3% (range 16 to 79%) (PICANet report 2012).

Within the ICHT PICU, approximately 20% of PICU bed days are used to deliver HDC along with a number of patients cared for on level 1 wards who would benefit if admitted to a HDU. HDC patients within PICU impacts the PICU's admitting capacity and often acute intensive care patients are refused. At times of high levels of activity, or in children who are not deemed to require the level of care delivered in a PICU, a child may receive high dependency care on a general ward. Each patient is risk assessed and on occasion will be admitted to a level 1 area. This has a consequential impact on paediatric A&E. Evidence suggests that it is more efficient to care for patients that require high dependency care within a HDU co-located with a PICU than on a general level 1 ward.

Objective 6: Increased activity allows improved potential for education, training and patient recruitment to high quality, ethically approved research

The department has led on the development of a London-wide approach to paediatric simulation training and simulation faculty development training; currently the simulation training space is closed to provide additional capacity within the unit for 4 months every year. An improved facility will allow expansion of our simulation training to include work with General Practitioners (GPs) and other colleagues in primary care on early recognition and management of seriously ill children. In addition, improved working conditions will help to attract the best multidisciplinary trainees to join the PICU team and enable the team to offer specialty choice modules within the unit.

Increases in activity provide potential to increase the number of patients recruited into clinical research trials which will enable the team to build on their international reputation as leaders in research in the management of critical illness and life threatening infection in children.

Objective 7: Better environment and increased activity allows better staff recruitment and retention and a reduced reliance on bank and agency staff

PIC is recognised as a highly specialist service that requires skilled staff to operate effectively. Recruitment and retention of skilled PIC nurses is accepted nationally as a challenge. Expansion of the unit to a sustainable size increases training opportunities for staff which overall improves staff experience and subsequently the service's ability to recruit and retain workforce. There is the added benefit of increased opportunity for education, training and development of specialist roles such as advanced nurse practitioners. The increased numbers of staff allow diverse and innovative ways for the team to manage work patterns within the unit which we anticipate will reduce the reliance on bank and agency staff.

2.7 Potential Business Scope and Key Service Requirements

The potential business scope is limited to the expansion of PICU service provision by developing the SMH site. This will facilitate the continued delivery of a PICU service that is current and fit for purpose for patients referred to ICHT.

This Section describes the potential scope for the project in relation to the above business needs. The options within these ranges are considered within the economic case.

Table 2.4: Business Scope and Key Service Requirements

	Minimum	Intermediate	Maximum
Potential business scope	Essential requirements To meet the investment criteria by ensuring adequate provision of PICU services.	Essential and Desirable The minimum plus enhancement of the overall patient and staff experience	Essential, Desirable & Optional As for the intermediate option but with further expansion of the service to increase revenue
Key service requirements	Development of a PICU facility that fully conforms to commissioner and regulatory requirements. Minimal disruption to research activity	The minimum plus addressing all patient experience concerns through improvements in PICU design. Minimal disruption to research activity	As for the intermediate but will full design options implemented to provide a state of the art service with scope to grow in size and provides HDU co-location. No disruption to research activity

2.8 Main Benefits Criteria

This Section describes the main outcomes and benefits associated with the implementation of the potential scope in relation to business needs. Satisfying the potential scope for this investment will deliver the following high- level strategic and operational benefits. In addition, in order to realise the Benefits Realisation Plan, the following criteria need to be achieved:

Table 2.5: Definition of Benefits

Benefits Criteria	Definition of Benefits
Quality of clinical care	• Assurance of clinical safety / corporate governance • Assurance of clinical effectiveness of services provided • Compliant with PICS and CQC standards for children • Reduction of risk of penalties applied • Good functional suitability and optimal space utilisation Facilitates operational efficiencies
Strategic Fit	• Consistent with Trust estates strategy and other planned capital schemes • Consistent with Trust Clinical Strategy and objectives • In line with commissioner intentions (Co-located HDU)
Environment and patient experience	• Consistent with statutory regulations – health & safety/fire/Disability Discrimination Act (DDA) • Compliant with PICS • Minimise cross infection • Good functional suitability • Efficient space utilisation • Good links to public transport
Flexibility	• Responsiveness to changes in service requirements / performance targets • Responsiveness to changes in activity levels • Integration with existing equipment • Facilitates increase in market share
People handling and management	• Safe disposal of clinical and non-clinical waste • Recruitment and retention of skilled professional staff • Bedside Ergonomics
Staff training/research and development	• Optimum integration with service delivery • Provision of adequate training facilities • Appropriate access to research and teaching opportunities • Supports wider advances of ICHT as a centre of excellence and an AHSC
Implementation	• Provision of new / refurbished facilities by providing additional capacity in a phased approach • Minimal disruption to clinical services • Minimum risks to the implementation timetable • Minimal disruption to research activity • Maintenance of services/research throughout project implementation

2.9 Main Risks

The main business and service risks associated with the potential scope for this project are shown below, together with their counter measures. Please see Appendix 17 for the more detailed Risk Register and Section 6.8 which provides further information on the management of risk.

Table 2.6: Main Risks and Counter Measures

Main Risk	Likelihood (L/M/H)	Impact (L/M/H)	Counter Measures
Design risks: ▪ Planning Risk	Low	High	Project team has experience in these types of planning applications with prior success. If planning permission is rejected, an alternative design solution for the ventilation will be sought with lower associated planning risk but potential additional cost.
Development risks: ▪ Supplier ▪ Timescale ▪ Specification and data transfer ▪ Change management and project management	Low	Low	Change management and project management risk are low as these elements are controlled internally
Implementation risks: ▪ Supplier ▪ Timescale ▪ Specification and data transfer ▪ Cost risks ▪ Change management and project management ▪ Training and user	Medium	Medium	Change management and project management risk are low as these elements are controlled internally
Operational risks: ▪ Supplier ▪ Availability ▪ Performance ▪ Operating Cost ▪ Project management	Low	Medium	There is confidence in the ability in increase market share.
Financial	Low	Medium	Design works undertaken for the Provisional Sums. Stage E design has reduced the level of sums to a minimum
TDA Approval: ▪ Volume of schemes processed by TDA may delay ability to consider this scheme and increase the approval time	Medium	High	Maintain dialogue and ensure FBC raises minimal comments

2.10 Constraints & Dependencies

The project is subject to the following constraints and dependencies:

1. Likelihood of affordability;
2. Time to approve and implement due to phasing of the build;
3. Service Reconfiguration that could impact upon proposals (e.g. SaHF);
4. Electrical supply risk to SMH site (if options utilising V&A);
5. QEQM building has a number of mechanical and electrical related issues that need to be addressed at significant expense to ensure the scheme complies with the current HTM's;
6. Remedial structural works will need to be carried out if relocating the PRU facility to the Samaritan Ward.

3 The Economic Case

3.1 Introduction

In order to select the preferred option and preferred supplier the following steps were taken:

Upon definition of the critical success factors (CSF) of this project, a long list of options were drawn up which aimed to cover all reasonable options available to achieve the project objectives. This also included a 'do nothing' and 'do minimum' option, against which the remaining options could be benchmarked. The best of these options were then selected for the short list.

An options appraisal process was conducted on the shortlisted options as part of the OBC process, in accordance with the Capital Investment Manual and requirements of HM Treasury's Green Book (A Guide to Investment Appraisal in the Public Sector). This Section of the FBC summarises the process undertaken to determine the best value for money option and the rationale for selecting the preferred option.

Since approval of the OBC and review of the appraisals that have been undertaken, the preferred option has not changed and a preferred procurement route and subsequent preferred supplier have been identified.

3.2 Critical Success Factors

The CSFs are as follows:

Table 3.1: Project Critical Success Factors

Critical Success Factor	Comments
Clinical quality and patient experience including sufficient response to CQC concerns	• Increased space around beds • Increased space for patients and family • Meets statutory requirements • Improved ventilation and isolation • Reduced risks
Capacity	• Increased capacity for PICU and HDU patients • Increased capacity for general paediatric patients due to less need for closure of general paediatric beds for HDU cases
Timescales	• Completion by mid - summer 2017 or sooner. There is an urgent need to upgrade the current environment, due to high level of clinical risk as specified in the text, and the real possibility of continuing bed closures due to inadequate/obsolete estates and infection control. • In addition, the lack of bed capacity, particularly in winter months provides an ongoing problem for patients, families and commissioners. There is therefore an urgency to provide increased capacity
Costs	• Clear value for money

3.3 The Long-listed Options

As presented in the OBC, a long list of options was drawn up which aimed to cover all reasonable options available to achieve the project objectives. This included a "do nothing" option and a "do minimum" option, against which the remaining options could be compared. At it's meeting on 17th March 2015, the PICU core team reviewed the selection of options as part of the process for the FBC and confirmed that all reasonable options have been considered and shortlisted where appropriate. The long listed options are shown in Table 3.2; please see Appendix 24 which provides a representation of the where these options are situated on the SMH site including the location of the existing PICU.

Table 3.2: Long listed options

Option		High Level Option Summary	Comments to support Shortlisting	Short List
No	Description			
1	Do Nothing	Will provide no increase in market share (8 PICU beds)	Does not address any of the investment objectives but has been shortlisted to illustrate the effect of "doing nothing" Advantages • Minimum financial outlay • No effect on PRU activity Disadvantages • Financial risk (equipment and repair costs, loss of services). • Current equipment and environment need urgent replacement. Bedside equipment and monitoring pendants are becoming obsolete; ventilation is inadequate; isolation facilities are inadequate; bed space is inadequate. • Clinical risks on going, especially nosocomial infection risk to patients. • Patient and family environmental experience remains poor with low satisfaction impacting the ICHT brand. • Frequent closure of bed spaces for planned and unplanned repairs with reduction of capacity, risks loss of income and reputation. • In the competitive London Paediatric environment risks loss of commissioner support, and decommissioning of the PICU. • Further risks decommissioning of all other specialist services which depend on PICU adjacency (e.g. Major Trauma, BMT, ID, Allergy, Neuro, Renal, NICU etc). • Unsustainable • Does not address CQC concerns	✓
2	Do minimum option Refurbishment of existing PICU space	This option will allow for the short term maintenance of the service but offers a reduced service capacity (6 PICU beds)	Does not provide anything other than a short term solution and does not meet the majority of investment objectives. The solution provides a reduced service capacity. Advantages • Minimal financial outlay • No effect on PRU activity Disadvantages • Refurbishment would require phased closure of bed spaces • Reduction of a PICU bed base to fewer than 8 beds is internationally recognised to be clinically and financially unsustainable. • Risk financial losses, loss of commissioner support, and subsequent decommissioning.	X

			• Poor patient experience (low patient satisfaction, integrity and Imperial brand)	
3	Alternative site at ICHT	NO alternative has been identified		X
4	Upgrade PICU and increase no. of beds (PICU / HDU). POPD move to 1st floor V+A wards (or elsewhere in the Trust), PICU moves to POPD space on L6 QEQM	This option will facilitate an increase in market share (11 PICU beds and 4 co-located HDU beds)	This option meets all of the investment objectives. However, the future of the V&A building is unclear as part of SaHF reconfigurations on the SMH site. In addition, no decant space for the HAVEN[5] has been located and decanting POPD will be difficult. Advantages • Increased inpatient space on 6th and 7th floor to accommodate increased paediatric inpatient requirements • Conform to correct PIC, National Service Framework (NSF) and intensive care standards • Conform to capacity requirements seasonality • Improved staff recruitment and retention. • Increase world class research and development, and education. • Co-location of HDU provides SaHF compliance, commissioner income and general ward relief. • Improved patient flows and efficiency due to flexible use of bed spaces. • Reduced repair and equipment costs • No loss in activity during relocations • Improve patient experience • Increase efficiencies • No effect on PRU activity Disadvantages • Investment required • Strategic fit – possibility of V&A space being utilised for other clinical need • No confirmed alternative space identified for POPD • Option 8 equivalent space (894 sq. m) is required for 11 PICU beds and 4 co –located HDU beds on level 6, QEQM. V&A 1st floor existing footprint is 762 sq. m, POPD needs to reduce in size to vacate space for the PICU build • The Haven occupies 90 sq. m of existing V&A 1st floor foot print and would also need to be re-located. • Costly decant of V&A into Samaritan Ward	✓
5	POPD move to V+A, PICU moves to PRU	This option provides no increase in	This option has not been shortlisted because it does not offer any increase in bed capacity or provide HDU provision Advantages	X

[5] The Haven Paddington is a sexual assault referral centre

	level 7, PRU moved to POPD	market share (8 PICU beds)	• Conform to correct PIC, NSF and intensive care standards • Increase world class research and development, and education • Reduce repair and equipment costs • No loss in activity during relocations • Improve patient experience • Increase efficiencies • Vacated PICU space available for other inpatient activity Disadvantages • Investment required • No increased bed capacity • Does not meet increased PICU demand in winter period • Does not improve HDU provision • Additional move costs of PRU to POPD. • IC negotiations and costs regarding space swap	
6	Do minimum-plus option Take over adjacent PRU space (<20%) to accommodate increase in estates for PICU	This option provides no increase in market share (8 PICU beds)	This option has been shortlisted as it partially meets the investment objectives. It has been shortlisted to take forward as the do minimum comparator. Advantages • Conform to correct PIC and intensive care standards • Improve patient experience Disadvantages • Investment required • Reduced PICU and PRU activity while works are in progress. PICU would need to close or decant • IC negotiations and costs regarding space • No increased capacity as no increase in beds • Does not meet increased PICU demand in winter period • Does not improve HDU provision • Poor family, staff and storage space • No increased ability for research and development, and education • Poor layout and lack of medical and patient rooms for rest/interview • Reduced PRU activity during building work and possibly additionally long term impact	✓
7	PICU-PRU swap option PICU moves	This option provides no increase in	This option has been shortlisted as it partially meets the investment objectives Advantages	✓

	to full space occupied by PRU and PRU moves to PICU –	market share (8 PICU beds)	• No additional space required • Improves current estate and provides increased capacity • Meets PIC, NSF and NHS standards • Increase world class research and development, and education • Reduce repair and equipment costs • Improve patient experience Disadvantages • Investment required • IC negotiations and costs regarding space • All PICU activity halted while works are in progress • No increased capacity as no increase in beds • Does not meet increased PICU demand in winter period • Does not improve HDU provision • PRU activity halted during building work and additionally likely reduced long term due to reduced foot print of activity	
8	PICU, 7th floor QEQM enlarged footprint option, PICU includes full space occupied by PRU, plus additional adjacent doctor's MDT/ office & staff change space. PRU moves to Samaritan ward. PICU phase 1 is built into	This option facilitates an increase in market share (11 PICU beds and 4 co-located HDU beds)	This option has been shortlisted as it meets all of the investment objectives. While the relocation of PRU may be problematic, a location has been defined with approval from IC. The relocation of PRU has been complicated by the need for further building works in the Samaritan ward. However, once this is accomplished, extending the current PICU space is relatively straight forward two phased process. Advantages • Meets PIC, NSF and NHS standards • Provides for increased seasonal / non-seasonal activity with flexible use of PICU/HDU beds • Supports SaHF requirement for co-located HDU provision • Improves current estate and provides increased capacity/flexibility, with increased efficiencies • Staff retention • Increased patient participation in scientifically robust research and education • Reduce repair and equipment costs • Improve patient experience • No loss of activity during works. Disadvantages • Investment required • IC negotiations and costs regarding space swap - new PRU facility in Samaritan ward. • Samaritan ward would require floor strengthening works to take place prior to the main construction phase which may	✓

	existing PRU footprint and additional 7th floor QEQM space. PICU phase 2 is built into existing PICU footprint.		result in the need to decant the ward below for several weeks • Potential disruption of PRU project activity • No improvement in POPD facilities so no scope for improved private outpatient income	

3.4 Short-listed Options

The following short list of options emerged; these options have not changed since approval of the OBC:

Table 3.3: Short List of options

Option	Title	Detail
Option 1 (8 beds)	Do nothing	-No change to current facilities - Does not address CQC mandate to improve environment -Unmitigated patient safety risk -Does not meet statutory compliance (PICS standards) -Does not meet NHSE clinical service specification -Poor patient and parent experience -Potential deterioration of existing Children's Services -No capacity for growth (8 beds) -No change to PRU and clinical research activity
This option does not mitigate any of the risks associated with delivery of the current 8 bed service including concerns associated with the quality of care, patient and family experience and the estate.		
Option 4 (15 beds)	Utilisation of Victoria & Albert (V&A) wards on the triangle site	-Removes patient safety risk -Addresses CQC mandate to improve environment -Meets statutory compliance (PICS standards) -Improved patient and parent experience -Meets NHSE clinical service specification -Potential growth of existing Children's Services -Capacity for growth (11 PICU beds and co-location of 4 HDU beds). -No disruption to PRU and clinical research activity -Disrupts current V&A occupants
This option delivers 11 PICU beds with 4 HDU beds co-located. This option consists of the conversion of 1st floor V&A to a POPD and PICU relocation to the 6th Floor of QEQM. This option requires decant of V&A existing occupants (inpatient wards and the Haven[6]) and a sq.m reduction in the size of POPD in V&A[7]. It assumes the electrical power requirements of POPD are no more than the current occupants. This option facilitates an increase in market share. *This development is however dependent on the future of the V&A building on the SMH site. Various options are being drawn up with regards to the future of the V&A as part of the Trust's response to SaHF so this case must take that into consideration.* *The decant of V&A to Samaritan Ward will require both structural floor strengthening works & full refurbishment of the existing areas to bring in line with current standards. The current Samaritan Ward is mostly an old open 'Nightingale' type layout with light floor loading design. The structural engineers report determined the floor is currently operating at its full capacity and any future refurbishment works will require associated floor strengthening. The current layout is not suitable and requires refurbishment in order to bring it up to required HTM and HBN standards. The cost and programme implications of these decant works are unavoidable as the Samaritan Ward is not suitable in it's current state.*		

[6] Sexual Assault Referral Service

[7] It should also be noted that during the design process when assessing options that utilised the V&A facility at SMH, it was discovered that the quadrant of the SMH site where the V&A ward is located was deficient in power capacity, that is to say that anything over the status quo that required extra power capacity, the UK power networks would be unable to provide. This would therefore involve considerable investment by the Trust regardless of who occupies the Trust space.

Option 6 (8 beds)	Do minimum-plus	-This option involves enlarging PICU to include 20% of adjacent PRU space. -Marginal mitigation of patient safety risk -Marginal compliance to CQC mandate to improve environment -Marginal compliance to statutory requirements (PICS standards) -Marginal compliance to NHSE clinical service specification -Difficult PICU space configuration to manage clinically -Marginal improvement in patient and parent experience -Potential deterioration of existing Children's Services -No capacity for growth (8 beds). -Reduction of PRU space
This option decreases the foot print for paediatric clinical research activity and would most likely require PICU to decant or close during building works, as the build would be difficult to complete in piecemeal fashion. There are also substantial problems regarding decant of both PRU and PICU while works are taking place. There is no increase in HDU capacity and maintains the current inefficiencies of HDU patient nursed on general wards.		
Option 7 (8 beds)	PICU-PRU Swap	-PICU moves to the full space occupied by PRU, and PRU moves to the space previously occupied by PICU. -Some mitigation of patient safety risk -Some improvement in compliance to statutory requirements -Potential deterioration of existing Children's Services -No capacity for growth (8 beds). -Reduction in available space to support research activity
This option offers a better clinical ward design for PICU, but with only 8 beds there is no scope for increasing market share or co-location of HDU beds. This option significantly decreases the foot print for paediatric clinical research activity and would require PRU to decant or close for the duration of the build works. There are also substantial problems regarding decant of both PRU and PICU while works are taking place		
Option 8 (15 beds)	PICU L7 with enlarged footprint	-PICU remains on the 7th floor of QEQM and utilises all of PRU and current PICU space and PRU relocates to a fully refurbished facility in Samaritan ward. -Addresses CQC mandate to improve environment -Meets statutory compliance (PICS standards) -Meets NHSE clinical service specification -Improved patient and parent experience -Potential growth of existing Children's Services -Capacity for growth (11 PICU beds and co-location of 4 HDU beds). -3 stage process: decant and refurbishment of the Samaritan Ward, then move of PRU to the Samaritan Ward; refit of PRU as first half of new PICU and move of PICU into PRU; refit of current PICU area and then PICU opens to full new size.
This option delivers 11 PICU beds with 4 co-located HDU beds. The new PICU facility will utilise all of the existing PRU space and PRU relocates to a fully refurbished facility in Samaritan ward. This option will significantly increase the PICU footprint and will also facilitate an increase in market share. *Due to the age and design of the building, for options that utilise the QEQM building, the proposed mechanical design solution is complex and costly as the new air handling plant needs to be installed both on QEQM roof and in 5th floor plant room for the ventilation to comply with the latest HTM's. Alternative solutions for the ductwork route from the proposed plant on the roof of QEQM were developed and costed. This exercise looked at two options, firstly to run the ductwork inside the building utilising one of the smoke shafts and secondly to run the ductwork down the outside of the building in a recess in the façade and then cladding this to match the façade. The outcome of this exercise established that the more cost effective option would be the second option (external to the building), though this does have associated planning risks.* *The requirement to undertake floor strengthening work to Samaritan ward has now been designed and programmed, resulting in a need to decant the ward below (Thistlewaite) for a period of 14 weeks.*		

The design solution and it's associated cost, is dependent upon various factors outlined in the Wilmott Dixons Mechanical & Electrical (M&E) design solution. This is likely to apply to all other shortlisted options (to a varying degree), but these have not been worked up in as much detail as option 8.

3.5 Options Appraisals Overview

3.5.1 Introduction

This Section provides a detailed overview of the main costs, benefits and risks associated with each of the selected options. Importantly, it indicates how they were identified and the main sources and assumptions. More detailed information is shown for each cost and benefit line within the economic appraisals in Appendix 6.

3.5.2 Estimating Benefits Methodology

The benefits associated with each option were identified during a workshop held with the stakeholders and customers for the scheme.

Description, Sources and Assumptions

The benefits identified fell into the following main categories. In each case, the sources and assumptions underlying their use are explained.

Table 3.4: Main Benefits

Type	Benefit
Quantitative (or quantifiable)	Increased activity driving increase in revenue and increase in market share
Cash releasing	A modern PICU and associated facilities would remove the need for increased spend on maintenance and the incurrence of financial penalties associated with the delivery of a poor service. A more operationally efficient facility would be provided
	The above are accounted for in the financial case appraisals
Non-cash releasing	Opportunity cost of staff time
	All of the above are accounted for in the economic case appraisals
Qualitative (or non-quantifiable)	Improved patient experience, family experience and staff morale. Increase in ICHT reputation
	Subject to weighting and scoring shown in Section 3.6

3.6 Qualitative Benefits Appraisal

A workshop was held at SMH on 17th March 2015 to review the qualitative benefits associated with each option as originally determined at OBC stage. The workshop consisted of participants from the core team as follows:

Dr Hermione Lyall – Chief of Service
Prof Simon Nadel – Lead PICU consultant
Lynda Hassell – Deputy Divisional Director of Nursing, Children and Safeguarding
Martina Dinneen – Divisional Director of Operations
Doyin Ogunbiyi – Finance Business Partner
Anthony Threlfall – Estates Senior project manager
Dr Brunel Eiliazadeh – Senior Business Planning Manager
Sophia Hami – General Manager
Debra Matich – Divisional Research Manager, IC
Scott O'Brien – PICU Modern Matron

3.6.1 Methodology

The appraisal of the qualitative benefits associated with each option was undertaken by:

- Identifying the benefits criteria relating to each of the investment objectives;
- Weighting the relative importance (in %s) of each benefit criterion in relation to each investment objective;
- Scoring each of the short-listed options against the benefit criteria on a scale of 0 to 9;
- Deriving a weighted benefits score for each option.

3.6.2 Qualitative Benefits Criteria

The benefits criteria were weighted as follows for each investment objective (Please note that the investment objectives and the weight associated with the respective benefits criteria have not changed since submission of the OBC):

Table 3.5: Qualitative Benefits Criteria

Investment Objectives/Benefits Criteria	Qualitative Benefits Summary	Weight
Quality of clinical care	Meets all clinical requirements and assurance of clinical safety and operational efficiency	25%
Strategic fit	Consistent with ICHT strategic objectives and Commissioner intentions	20%
Environment and patient experience	Improved patient/family experience	15%
People, handling and management	Recruitment and retention of skilled professional staff	5%
Flexibility	Sufficient beds to facilitate an increase in market share and flexible demand management	15%
Staff training/Research and development	Increased capacity for patient and staff training and research and development which attracts high calibre staff	10%
Implementation	Maintenance of services throughout project implementation	10%
Total		**100%**

3.6.3 Qualitative Benefits Scoring

Benefits scores were allocated on a range of [0-9] for each option and agreed by discussion by the workshop participants to confirm that the scores were fair and reasonable.

3.6.4 Analysis of Key Results

The results of the benefits appraisal are shown in the following table:

Table 3.6: Benefits Appraisal Results

Benefit Criteria and Weight		Option 1		Option 4		Option 6		Option 7		Option 8	
Raw (R) & weighted (W) scores	Weight (%)	R	W	R	W	R	W	R	W	R	W
Quality of clinical care	25%	3	7.5	9	22.5	6	15	6	15	9	22.5
Strategic fit	20%	2	4	4	8	4	8	4	8	9	18
Environment and patient experience	15%	1	1.5	9	13.5	4	6	6	9	9	13.5
People, handling and management	5%	1	0.5	9	4.5	4	2	5	2.5	9	4.5
Flexibility	15%	1	1.5	8	12	1	1.5	1	1.5	9	13.5
Staff training/Research and development	10%	6	6	8	8	5	5	5	5	6	6
Implementation	10%	9	9	5	5	0	0	1	1	3	3
Total	**100%**		**30**		**73.5**		**37.5**		**42**		**81**
Rank			**5**		**2**		**4**		**3**		**1**

The key considerations that influenced the scores achieved by the various options were as follows:

Option 1 – do nothing. This option ranks 5th

This option presents significant risk for the PICU service at ICHT and may result in the service being decommissioned. The key consideration influencing the score is the poor quality of clinical care. The unit offers no capacity increase to facilitate an increase in market share and no flexibility to accommodate seasonable variation; aspects of people, handling and management score poorly. In addition, the CQC report on SMH (2014) has mandated that the PICU environment is improved to meet modern standards.

Option 4 – This option ranks 2nd

This option scores highly as it addresses all of the investment objectives. This option does not affect PRU space or activity and releases old PICU space for other activities. However, this option may not be in line with SMH site reconfiguration plans for the future utilisation of the V&A wards; it requires significant investment, requires relocation of the HAVEN space and may require significant rebuilding of the V&A building to accommodate paediatric outpatients.

Option 6 – This option ranks 4th

This option does not provide HDU co-location and does not facilitate an increase in market share and implementation will lead to reduced activity. This option also reduces the foot print of the PRU; this option is not supported by the academic team.

Option 7 – This option ranks 3rd

This option provides no increase in capacity and no provision for HDU co location. It is also a difficult option to implement due to the disruption that it will cause but it does provide for a better patient and staff experience and also scores well against people, handling and management. This option significantly reduces the footprint of the PRU. This option is not supported by the academic research team.

Option 8 – This option ranks 1st

This option is ranked the preferred benefits option. It meets all investment objectives and scores well against nearly all of the benefits criteria. However, it requires relocation of the PRU to a refurbished space in Samaritan ward. This option is supported by the academic team.

Following the review of the benefits appraisal for the FBC, option 8 is still ranked 1st.

3.7 Economic Appraisal

At OBC stage, an economic appraisal was conducted to determine an estimated cost for each of the short-listed options. This was subsequently used to identify which option would provide best value for money. The cost estimates presented in the OBC have been re-visited following confirmation of capital costs and review of revenue costs, and have now been calculated based upon the frozen design. This Section sets out cost impacts that have been refined since approval of the OBC and seeks to demonstrate that in light of these changes, there is no change to the preferred option.

The economic appraisal combines generic economic modelling (GEM), as required of any case subject to TDA approval, with NPV, payback and internal rate of return (IRR) (as required by the Trust's internal assurance process).

3.7.1 General Costs Estimation Methodology

Capital costs for Option 8 are now confirmed following the tendering process and ratified by the project cost consultant (QS). These costs include VAT, fees, optimism bias, contingency, group 2 and 3 equipment and Wilmott Dixon fees plus other Trust direct costs associated with project management, surveys etc. Capital costs for all other options are refreshed to "best and final offer" equivalents using the same methodology as those outlined in OBC.

All revenue streams have been determined following detailed consultation with the PICU management team with specific input as required from professional leads and management colleagues in relation to staffing models, cost behaviour and activity assumptions.

NHS activity has been modelled on data from the Trust's SLAM reports and CATS refusals. Owing to the cyclical nature of PICU activity, a blended average of the activity over the last three years has been used to form the baseline. Future activity estimations are based on the Trust's ability to service and charge activity which is currently refused or accommodated in non-PICU wards resulting in sub-optimal charging pathways. Predominately this data is taken from CATS, supported by local data interrogation in relation to non-CATs refusals and outlying patients. These refused admissions are modelled based on existing length of stay depending on seasonality. As PICU activity is a locally agreed price with commissioners (not a main PbR tariff), this activity has been priced using local prices. Non-NHS income has been based on the average of the last three years.

Pay costs have been modelled aligned to bed capacity using to established staffing ratios for critical care adjusted where appropriate for specific provisions of PICS standards.

A detailed review of the nursing staffing model is documented in Appendix 37.

Non-pay costs have been modelled based on prior year financial outturn data specific to the service incorporating relevant supporting services.

3.7.2 Description, Sources and Assumptions

NPV analysis has also been assessed over 20 years but differs to the GEM in that it contains all costs chargeable to the Trust including VAT except where it is recoverable and all full income flows.

3.7.3 Reconciliation of Net Present Cost (NPC) to Net Present Value

In order to demonstrate the relationship between the two analyses, Appendix 6 summarises the key movements between NPC and NPV.

3.8 Generic Economic Model

GEM appraisal has been undertaken to evaluate the economic impact of the shortlisted options from a

health sector and public funding perspective, rather than from the Trust perspective. The detailed GEM is attached in Appendix 6a.

3.8.1 Net Present Cost

GEM analysis incorporates NPC assessment and has been prepared within the following parameters:

- All options have been appraised over a 20 years
- VAT and all intra-government cash flows has been excluded from all capital and revenue costs with the exception of NHS income of which the incremental component has been included
- The site is owned and this development, which is on the second floor of an existing building, has no impact on land values and which have therefore been set to zero
- The default 3.5% Treasury guided discount factor is applied

The detailed model is attached in Appendix 6 and the results of this analysis are summarised in the table.

Table 3.7: Summary of GEM NPC Appraisal

	Option 1	Option 4	Option 6	Option 7	Option 8
Currency £'m	**Sum of Discounted Cash Flows**	**Sum of Discounted Cash Flows**	**Sum of Discounted Cash Flows**	**Sum of Discounted Cash Flows**	**Sum of Discounted Cash Flows**
Property and Opportunity costs	0.0	0.8	0.4	1.9	2.2
Capital Costs (Incl Optimism Bias)	0.0	11.1	2.8	4.2	8.1
Charitable contribution to CAPEX	0.0	(4.0)	(3.2)	(4.0)	(4.1)
Clinical Revenue Costs	82.2	111.0	82.2	80.0	113.2
Non Clinical Revenue costs	1.0	1.1	1.0	1.0	1.1
Externalities (Incremental Income)	0.0	(42.7)	0.0	1.4	(46.0)
Net Present Cost (NPC)	**83.2**	**77.2**	**83.1**	**84.4**	**74.5**
RANK	**4**	**2**	**3**	**5**	**1**

According to NPC assessment, Option 8 has the lowest NPC and is therefore the highest ranked option. Based on NPC assessment Option 8 remains the preferred option.

3.8.2 Cost Benefit Analysis

The output of the NPC assessment has been combined with the qualitative benefits scoring. The output is ranked according to a risk adjusted cost per benefit point. The results of the cost benefit analysis are summarised in the table below.

Table 3.8: Summary of Cost Benefit Analysis

	Option 1	Option 4	Option 6	Option 7	Option 8
	£m	£m	£m	£m	£m
Net Present Cost	83.2	77.2	83.1	84.4	74.5
Cost of Risk Retained	0.0	0.0	0.0	0.0	0.0
Risk Adjusted NPC	**83.2**	**77.2**	**83.1**	**84.4**	**74.5**
Qualitative Benefits Appraisal	30.0	73.5	37.5	42.0	81.0
Cost per Benefit Point	**2.8**	**1.1**	**2.2**	**2.0**	**0.9**
RANK	**5**	**2**	**4**	**3**	**1**

According to cost benefit analysis, Option 8 remains the highest ranked option and, therefore, remains the preferred option.

3.8.3 GEM Sensitivity Analysis

In order to assess the resilience of the respective options, the GEM also tested each option against the following sensitivities:

1. No charitable funding as a result of poor fundraising
2. Additional activity funded at marginal rates (70% of tariff)
3. A 5% cost increase in costs

Table 3.9: Results of Sensitivity Analysis

	Option 1	Option 4	Option 6	Option 7	Option 8
	£m	£m	£m	£m	£m
Baseline Net Present Cost	83.2	77.2	83.1	84.4	74.5
Cost of Risk Retained	0.0	0.0	0.0	0.0	0.0
Risk Adjusted NPC	**83.2**	**77.2**	**83.1**	**84.4**	**74.5**
Qualitative Benefits Appraisal	30	73.5	37.5	42	81
Cost per Benefit Point	**2.77**	**1.05**	**2.22**	**2.01**	**0.92**
RANK	**5**	**2**	**4**	**3**	**1**
Sensitivity 1					
NPC - No Charitable contribution to Capital	83.2	81.2	86.3	88.4	78.6
Cost of Risk Retained	0.0	0.0	0.0	0.0	0.0
Risk Adjusted NPC	**83.2**	**81.2**	**86.3**	**88.4**	**78.6**
Qualitative Benefits Appraisal	30	73.5	37.5	42	81
Cost per Benefit Point	**2.77**	**1.10**	**2.30**	**2.11**	**0.97**
RANK	**5**	**2**	**4**	**3**	**1**
Sensitivity 2					
NPC - Increased Activity at 70% Income	83.2	90.0	83.1	84.0	88.3
Cost of Risk Retained	0.0	0.0	0.0	0.0	0.0
Risk Adjusted NPC	**83.2**	**90.0**	**83.1**	**84.0**	**88.3**
Qualitative Benefits Appraisal	30	73.5	37.5	42	81
Cost per Benefit Point	**2.77**	**1.22**	**2.22**	**2.00**	**1.09**
RANK	**5**	**2**	**4**	**3**	**1**
Sensitivity 3					
NPC - 5% Increase on Revenue costs	83.2	82.8	87.3	88.5	80.2
Cost of Risk Retained	0.0	0.0	0.0	0.0	0.0
Risk Adjusted NPC	**83.2**	**82.8**	**87.3**	**88.5**	**80.2**
Qualitative Benefits Appraisal	30	73.5	37.5	42	81
Cost per Benefit Point	**2.77**	**1.13**	**2.33**	**2.11**	**0.99**
RANK	**5**	**2**	**4**	**3**	**1**

The sensitivity analysis confirms that the effect of the changes identified has little effect on the overall ranking of the options, with option 8 remaining the most favorable in all instances.

3.9 Further Economic Analysis

Further economic analysis has been carried out to evaluate the economic impact of the shortlisted options from the perspective of the Trust taking account of all relevant cash in-flows and outflows. The detailed modelling is attached in Appendix 6b.

3.9.1 Option Ranking

The additional economic analysis carried out includes the following tools:

- NPV – an assessment of all capital and revenue cash inflows and outflows adjusted for the time-value of money;
- IRR – a calculation of the level at which the cost of capital would make the investment unsustainable rates would need to reach;

- Payback Period – the time taken for capital investment to be repaid, accounting for the time-value of money;
- Cumulative Contribution – the net cost or benefit of all future revenue cash flows;
- Net Cash Benefit - the net cost or benefit of all future revenue cash flows after adjusting for capital expenditure.

Similar to GEM analysis, the economic analysis has been prepared within the following parameters:

- All options have been appraised over a 20 years;
- All relevant cash flows have been included;
- The site is owned and this development, which is on the second floor of an existing building, has no impact on land values and which have therefore been set to zero;
- The default 3.5% Treasury-guided discount factor is applied.

The detailed model is attached in Appendix 6 and the results of this analysis is summarised in the Tables below:

Table 3.10: Summary of Further Economic Analysis

Option	Description	NPV (£m)	IRR (%)	Payback period (Years)	Cumulative Contribution (£m)	Net Cash Benefit (£m)
1	Do Nothing	(5,819)	No IRR	No Pay Back	(8,005)	(8,005)
4	Relocate POPD, PICU and parent accommodation. PRU as existing, PICU expanded	(2,190)	0.63%	No Pay Back	12,335	(3,344)
6	Do minimum plus - expand PICU partially into PRU	(5,825)	No IRR	No Pay Back	(7,892)	(11,508)
7	PICU/PRU swap	(5,929)	No IRR	No Pay Back	(6,655)	(12,187)
8	PICU L7 Enlarged footprint	3,539	7.26%	13.08	13,497	3,068

Table 3.11: Rank of Further Economic Assessment

Option	Description	NPV	IRR	Payback Period	Cumulative Contribution	Net Cash Benefit	Average Rank
1	Do Nothing	3	3	2	5	3	3
4	Relocate POPD, PICU and parent accommodation. PRU as existing, PICU expanded	2	2	2	2	2	2
6	Do minimum plus - expand PICU partially into PRU	4	3	2	4	4	3
7	PICU/PRU swap	5	3	2	3	5	4
8	PICU L7 Enlarged footprint	1	1	1	1	1	1

Since the submission of the OBC and further to the above economic appraisal, option 8 is still ranked 1st.

3.9.2 Switching Values

Switching values identifies the degree of change required in each option in order to make each option at least as desirable as the preferred option. The Table below summarises the switching values of each option against the preferred option as identified by the output of economic analysis above.

Table 3.12: Changes (%) Required to Equate with the Preferred Option

Change in Costs (%)	Option 1	Option 4	Option 6	Option 7	Option 8
Capital costs	100%	(50%)	65%	47%	0%
Current costs	159%	9%	158%	149%	0%
Total costs	32%	(2%)	30%	31%	0%
Cash releasing benefits	100%	5%	99%	94%	0%
Non releasing cash benefits	0%	0%	0%	0%	0%
NPV	264%	162%	265%	268%	0%

This analysis confirms that options 1, 4, 6 and 7 are materially less resilient both in relation to each other and to option 8 which is still the preferred option. Whilst options 1, 6 and 7 are cheaper than Option 8, they do not provide the optimal solution as identified by the qualitative benefits scoring.

The switching values between Option 4, the second ranked option, and Option 8, outlined in the Table above are material and as the change in revenue costs is not matched by a corresponding increase in revenue contribution, there is no evidence in that would suggest that serious consideration should be given to options beyond Option 8.

3.10 NPV Sensitivity Analysis

The following sensitivities have been modelled in the GEM to assess the impact that changes in these values would have on the overall ranking of the options:

1. No charitable funding as a result of poor fundraising;
2. Additional activity funded at marginal rates (70% of tariff);
3. A 5% cost increase in revenue costs.

The sensitivity analysis undertaken across the options is shown in the Table below and attached in Appendix 6.

Table 3.13: NPV sensitivity analysis

Option 8 (Preferred Option) **PRU to Samaritan, PICU expanded to PRU**							
Discounted Cashflows **20 Year Summary (£'000)**	**YEAR 0** **(2015/16)**	**YEAR 1** **(2016/17)**	**Year 2** **(2017/18)**	**Years 3-20** **(2018/36)**	**NPV**	**IRR**	**Payback Period**
Baseline Scenario - Assumed	(374)	(361)	(4,856)	9,130	3,539	7.3%	13.08
Scenario 1 - No charitable contribution	(374)	(3,289)	(6,026)	9,130	(558)	2.2%	-
Scenario 2 - Incremental income at 70% tariff	(374)	(361)	(5,539)	(3,992)	(10,265)	0.0%	-
Scenario 3 - 5% cost variation	(613)	(592)	(5,160)	4,953	(1,412)	0.5%	-

Outcome assessment:

- Scenario 1 – In this scenario, the preferred option would have a small, negative NPV. As the revenue contribution remains positive, the Trust would consider proceeding with this development. The capital demand on the Trust would increase by £4.3m. To mitigate this, the Trust would need delay other schemes in its capital programme in order to deliver the PICU development;

- Scenario 2 – In this scenario, the preferred option would have a negative NPV and negative contribution. The capital programme would be unaffected and would remain affordable. As an unviable PICU would have material consequences for the provision of children's services at the Trust and in the region, extended settlement discussions would be entered into with commissioners in order to secure a sustainable arrangement. As the PICU redevelopment has flexible capacity, the options for the unutilised (and consequently, not modelled) additional bed capacity in the summer would be considered in relation to additional, net contribution activities in order to make the case financially viable;

- Scenario 3 – As with Scenario 1, if this scenario were to occur, the preferred option would still have a positive revenue contribution once constructed and fully operational, however the benefit would be greatly reduced and would not payback within the period of assessment. As the net revenue contribution remains positive, the Trust would consider proceeding with this development. To mitigate the adverse impact of this scenario, the Trust would utilise cost control measures to ensure that cost variations were understood and suitable actions taken to return them to expected levels. The capital programme would be unaffected and would remain affordable.

3.11 Changes Between OBC and FBC

The Table below summarises the differences between the positions at OBC and FBC for the preferred option:

Table 3.14: Summary of changes in key financial indicators between OBC and FBC

Option 8 (Preferred Option) **PRU to Samaritan, PICU expanded to PRU**				
Summary of Changes	**OBC**	**FBC**	**Change (unit)**	**Change (%)**
Initial Capital Cost	8,725,817	9,596,200	(870,382)	(10%)
NPV @Year 15 (for OBC comparison)	1,777,549	1,419,795	(357,755)	(20%)
Payback Period	12.87	13.08	(0.20)	(2%)
IRR	6.0%	7.3%	1.3%	22%
Contribution (Recurrent, Year 5+)	917,714	786,382	(131,332)	(14%)

Although there have been changes in a number of key indicators since OBC, these changes do not materially affect the viability of the preferred option relative to other options nor in its own right.

The initial capital costs have increased due to mechanical and engineering complexity and age of the QEQM building. The issues were only identified on completion of intensive survey and investigation. In conclusion, these issues are not unique to PICU and any change in use to QEQM is likely to result in this kind of additional remedial work. Additionally, the increased cost is directly offset against the increased charitable contribution this has reduced the net demand on Trust resources from £6.7m (OBC) to £5.3m (TBC).

Although contribution has reduced, on account of a revised income assumptions based on 2014/15 actual activity, this is mitigated through the increased capital contribution which reduces demand on the Trust's resources as reflected through NPV and payback output.

The degree of change in the payback period and IRR is not material enough to drive re-appraisal.

3.12 Risk Appraisal – Unquantifiables

A workshop was held at SMH on 17th March 2015 to review the risks associated with each option as originally determined at OBC stage. The workshop consisted of participants from the core team as follows:

- Dr Hermione Lyall – Chief of Service
- Prof Simon Nadel – Lead PICU consultant
- Lynda Hassell – Deputy Divisional Director of Nursing, Children and Safeguarding
- Martina Dinneen – Divisional Director of Operations
- Doyin Ogunbiyi – Finance Business Partner
- Anthony Threlfall – Estates Senior project manager
- Dr Brunel Eiliazadeh – Senior Business Planning Manager
- Sophia Hami – General Manager
- Debra Matich – Divisional Research Manager, IC
- Scott O'Brien – PICU Modern Matron

3.12.1 Methodology

Risk appraisal has been undertaken and involved the following distinct elements:

- Identifying all the possible business and service risks associated with each option
- Assessing the impact and probability for each option
- Calculating a risk score

3.12.2 Risk Scores

The workshop assigned the risk scores shown in the following table on the basis of participants' judgment and assessment of previous procurements. A more detailed assessment of the individual risks is shown in the risk register.

The range of scales used to quantify risk was as follows:

Impact

- 1 – Negligible
- 2 – Minor
- 3 – Moderate
- 4 – Major
- 5 - Catastrophic

Probability

- 1 - Rare
- 2 - Unlikely
- 3 - Possible
- 4 - Likely
- 5 – Almost Certain

Table 3.15: Summary of the Risk Appraisal Results

Summary of Risk Appraisal Results	Risk category no.	Impact	Option 1 – Do Nothing		Option 4 –		Option 6 –		Option 7 –		Option 8	
(Pr = probability)			Pr.	Total	Pr.	Total	Pr.	Total	Pr.	Total	Pr.	Total
Equipment failure	Operational/performance targets	5	5	25	1	5	1	5	1	5	1	5
Patient experience/pathways	Partnership	5	5	25	2	10	3	15	3	15	1	5
Too little capacity	Operational/performance targets	4	5	20	1	4	5	20	5	20	1	4
Over provision	Operational/ Performance Targets	1	1	1	2	2	1	1	1	1	2	2
Additional recruitment needs	Patient Safety	4	2	8	3	12	2	8	2	8	3	12
Training of staff	Patient Safety	2	2	4	3	6	1	2	1	2	3	6
Planning permission rejection	Partnership	5	1	5	2	10	2	10	2	10	2	10
Staff experience	HR targets	3	4	12	1	3	3	9	3	9	1	3
Inability to commence works due to lack of capital funding	All	5	1	5	3	15	2	10	3	15	3	15
Reputation	All	4	5	20	1	4	4	16	4	16	1	4
Infection Control/Prevention	Patient Safety	4	5	20	1	4	3	12	3	12	1	4
Loss of activity during works	All	4	1	4	1	4	5	20	5	20	1	4
Impact on Clinical Research Activity	Research Targets	5	1	5	1	5	5	25	5	25	2	10
Total				**154**		**84**		**153**		**158**		**84**
Rank				**4**		**1**		**3**		**5**		**1**

The key considerations that influenced the scores achieved by the various options were as follows:

Option 1 – do nothing – This option ranks 4th

This option has high risk. This option presents significant risk related to equipment failure, patient experience, poor capacity, reputation and high risks associated with infection control. This option does not address the CQC mandate to improve the environment.

Option 4 – This option ranks jointly 1st

There is relatively low risk associated with this option however it is very likely that V&A will not be available for refurbishment. It is unknown how the V&A will be utilised in the future with regards to SaHF site reconfiguration plans. In addition, there are high capital costs associated with this option and it is relatively hard to implement due in part to the decant solution required.

Option 6 – This option ranks 4th

This option has high associated risk. This option presents significant risk related to patient experience and staff experience and there is high risk associated with activity loss during implementation of the project. This option also risks reduction in paediatric research activity.

Option 7 – This option ranks 5th

This option has the highest associated and there are significant issues associated with capacity. This option has high risks associated with a reduction in paediatric research activity.

Option 8 –This option ranks joint 1st

There is relatively low risk associated with this option; however, it has more a more complex implementation plan, together with the remedial works that will need to take place due to the need to relocate PRU.

Following the review of the risk appraisal for the FBC, option 8 is still ranked jointly 1st.

3.13 The Preferred Option

The results of all of the investment appraisal are as follows:

Table 3.16: Summary of Overall Results

Evaluation Results	Option 1 – Do Nothing	Option 4	Option 6	Option 7	Option 8
Economic appraisals	5	2	4	3	1
Benefits appraisal	5	2	4	3	1
Risk appraisal	4	1	3	5	1
Overall ranking	**5**	**2**	**3**	**3**	**1**

Since submission of the OBC, Option 8 still remains as the overall preferred option at FBC stage because it meets all of the investment options outlined in this FBC and ranks the highest in all of the appraisals employed. This option:

- Address the CQC mandate to improve the environment to meet modern standards;
- Fully addresses the risks associated with the current delivery of the service;
- Increases PICU capacity, reducing refused admissions, providing increased PICU activity with maximal financial return;
- Increases chargeable HDU capacity, reducing HDU activity currently undertaken in the wards which leads to general paediatric bed closures due to increased nursing demands of high

acuity patients. Co-locating a 4 bedded HDU area with PICU meets commissioner demands, reduces stress on wards and increases general ward bed available. This option also reduces the risk of A&E breaches and patients transferred from A&E due to optimising general paediatric bed capacity;

- This increased flexible PICU/HDU capacity will reduce patient flow bottle necks and maximise patient flows to and from PICU/HDU, from A&E to wards and from referring hospitals to specialty services;
- In the future, commissioned HDU beds are required to be co-located with PICU beds, thus allowing optimal financial return. Increased HDU capacity and co-location supports HDU provision for the NWL region according to the requirements of SaHF, supported by NWL commissioners;
- Supports all paediatric specialist services, including paediatric major trauma;
- Optimises nursing ratios on PICU/HDU and in the wards, reducing the need for bed closures and additional bank and agency nursing shifts;
- Offers improved facilities for patients, families and staff, improving patient experience, ICHT reputation and staff retention;
- Offers excellent opportunities for clinical research, training and education;
- Facilitates increase in market share;
- Ensures sustainability and accommodates changes in clinical activity (e.g. for paediatric surgery);
- Meets agreement between IC and ICHT regarding continued research activity in the PRU, relocated in a refurbished and fit for purpose Samaritan ward.

Option 8 is future proofed and sustainable as it provides increased capacity for emergency and elective admissions, improved infection control and an improved working environment. Improved staff recruitment and retention, will be an additional benefit, which will ultimately maintain the long term position of ICHT as a centre for specialist paediatrics.

This option has full commissioner support as referenced in Appendix 23.

This option is supported by the PRU team led by Professors Andrew Bush and John Warner. The space swap has also been agreed at the Executive level within IC. Please see Appendix 19 for confirmation of the PRU option.

Proposed layouts for the PICU development and the relocation of PRU are shown in Appendix 9,10 and 14; The proposed outline design complies with building regulations and firecode; the appraisal of the fire protection strategy has been worked up during Stage E design.

3.13.1 BREEAM Statement

The Trust is committed to a sustainability agenda and programme for all of its estate and has strategies for carbon reduction, green transport, recycling and other aspects of sustainability which are required to be followed in all new projects. These encompass buildings and building services along with energy consumption and conservation. Sustainability and the environmental performance of NHS buildings are increasingly a priority not only for new developments but also for existing buildings in operation.

The Trust realises that one of the major factors in providing sustainable buildings is to create a building that not only complies with Building Regulation requirements but exceeds that level of energy conservation and strives to obtain a Building Research Establishment Assessment Methodology (BREEAM) rating of ‘Very Good’ in its refurbishment and alteration projects. Please see Appendix 35 for the Pre-Assessment BREEAM Report carried out by the independent advisor.

The Pre-assessment BREEAM score is 58.23%, which falls within the ‘very good’ rating. This score is only just above the 55% required to achieve the ‘very good’ rating and there are a number of ‘at risk’

and additional credits that should be considered to strive to achieve a sore of 60%+ to give some margin. The PSCP team are committed to delivering the highest score available.

3.13.2 Design Evaluation Tools

An Achieving Excellence Design Evaluation Toolkit (AEDET) review was undertaken and the results attached as Appendix 33.

A number of sections of the AEDET were not applicable to this project because it is not a new build. Those sections that did apply, generally scored well with good stakeholder participation during the design process. It was clear from the review that the design, as well as following the guidance of the HTM/HBN, reflected the feedback from the stakeholders with a great deal of consideration for the patient and working environment. Consideration was also given to relatives and visitors to the unit, with facilities designed to meet their needs.

3.14 The Selection of our Preferred Supplier

Willmott Dixon is the main contractor who is engaged under the Scape Framework. Tender packages were prepared by Willmott Dixon, in liaison with the design team and issued to subcontractors for pricing.

On receipt of the returned tender packages, subcontractors for the various elements of work were chosen based on the cost, their track record for delivering similar schemes, their technical competence and their health and safety record.

Please see Appendix 36 for list of sub-contractors for each of the work packages.

3.15 Appraisal Conclusions

The Trust and Willmott Dixon has developed a project which is based upon a clinical evidence base, is consistent with the agenda for patient care and supported by patient engagement. It will significantly improve the facilities for patients requiring PIC care support and offers VfM.

4 The Commercial Case

4.1 Introduction

This Section of the FBC outlines the proposed deal in relation to the preferred option outlined in the economic case. This is for the provision of developments to provide an improved facility for PICU on the SMH site under a SCAPE National Procurement Framework design and build contract (using NEC3 Option A form of contract). This Section provides an update as to how the commercial workings of the project have developed since approval of the OBC.

4.2 Required Services

There is a high capital investment required for this program with some associated revenue implications as detailed in the financial case.

4.3 Potential for Risk Transfer

The general principle is that risks should be passed to the contractor as part of the NEC3 option A form of contract.

This Section provides an assessment of how the associated risks might be apportioned.

Table 4.1: Risk Transfer Matrix

Risk Category	Potential Allocation		
	Public	Private	Shared
Design risk		✓	
Construction and development risk	✓		
Transition and implementation risk	✓		
Availability and performance risk		✓	
Operating risk	✓		
Variability of revenue risks	✓		
Technology and obsolescence risks	✓		
Control risks	✓		
Residual value risks	✓		
Financing risks	✓		
Legislative risks	✓		
Other project risks	✓		

4.4 Proposed Charging Mechanisms

The organisation intends to make payments in relation to the proposed products and services as follows:

Wilmott Dixon's quantity surveyor will undertake and issue a monthly assessment (valuation of works completed in the period) to the Trusts cost consultant who will verify it is correct. This will in turn be passed on to the Estates Senior Project Manager for final approval and on the basis of that; an invoice is issued by Wilmott Dixon to the Trust for payment. Under the SCAPE agreement no retention is withheld by the Trust. This process is in accordance with the requirements of the Housing Grants Construction and Regeneration Act 2009 (local democracy amendment 2010).

4.5 Proposed Contract Lengths

The proposed build contract length for the preferred option is approximately 94 weeks including decants between the 3 build phases and commissioning periods of all plant and services testing.

4.6 Proposed Key Contractual Clauses

The SCAPE Design and Build process uses the NEC3 option A contract which is available on request.

4.7 Personnel Implications (including TUPE)

TUPE Regulations 1981 will not apply to this investment.

4.8 Procurement Strategy

The Trust, in looking to obtain best value for money through its contractual arrangements, has developed the project using the SCAPE procurement route as the best value procurement method as outlined in the OBC and this FBC. The procurement strategy is as follows:

The ICHT estates department conducted a project review meeting on the 6th February 2014 where various procurement options were discussed including P21+ and SCAPE. It was agreed that SCAPE would be best placed to address the urgent clinical requirement as SCAPE allows for the immediate appointment of a single contractor whereas P21+ has an initial Principle Supply Chain Partners (PSCP) selection phases (4-6 weeks) prior to the selection of a preferred contractor.

The urgent clinical need was the primary reason for using the SCAPE process as it is faster than P21+. The added benefit of SCAPE is free feasibility, reduced OH&P, open book procurement and it also allows the use the of NEC 3 Option A (lump sum) whereas P21+ only allows for use of NEC Option C (target cost). Option A is a design and build contract with the build risk being taken on by the Contractor. Scape frameworks are designed to provide general construction works and consultancy services to the whole of the public sector (i.e. they are not tailored to any sector or client group). Accordingly, they incorporate best practice principles and their competitiveness reflects their cumulative buying power (each Scape framework is based on delivering £1,000m of construction work over a four year term).

Whilst Scape frameworks demand cost and programme are key measures of project success (both are the subject of Key Performance Indicators (KPIs)), Scape place emphasis on value added benefits such as local sustainability, employment and skills opportunities etc. One of the unique features of Scape frameworks are that it offers the widest range of single supplier frameworks, based on the buying power of multi billion pound spend, which are actively managed and audited. Further information can be found in Appendix 28 where a procurement report produced for South Staffordshire and Shropshire NHS FT detailing the difference between SCAPE and P21+ has been included on page 4 of the document.

All of Scape's frameworks are fully compliant with European Union (EU) and public procurement requirements. They all involve a two stage procurement process. This involves an initial "Expression of Interest stage", open to any organisation who considers they meet the criteria stated in the published notice. The submissions received are evaluated and a shortlist is compiled for the "Invitation to Tender (ITT) stage". Evaluation of this stage includes both quality and cost elements. The quality evaluation includes the scoring of written submissions and an interview. Scape manages the whole procurement process. As far as at all possible, the evaluation of both stages is undertaken by non-Scape personnel, generally volunteers from client organisations to ensure the process is totally impartial. Scape has been operating framework agreements since 2006 and has never been subject to a successful procurement challenge. A report summarising the procurement of the Major Works framework is attached in Appendix 29. The organisations to which the Major Works framework is available are listed in the attached OJEU contract and contract award notices in Appendix 30; these include NHS Trusts.

The preferred option is now at the end of Stage E design using a SCAPE national procurement framework design and build contractor. Wilmott Dixon is the SCAPE nominated contractor for all construction projects over £2m. As previously described, the SCAPE route has been implemented to

reduce timescale from design to construction: the anticipated combined cost of all phases of the construction works for option 8 would be over the EU limits and therefore standard tendering would not be possible (OJEU advertisement would be necessary). In addition, the TDA approval process is likely to trigger a request to use a national procurement route. Taking into account past experience, it was deemed necessary to start this process early in the design phase to avoid novation of Trust appointed design consultants to the national procurement framework contractor.

The design team have been appointed by Wilmott Dixon. The design is reviewed at key stages, before sign off by Wilmott Dixon, the clinical group and other key stakeholders (Infection Control, Fire Safety, Estates Maintenance, ICT, Facilities etc. After Trust and TDA FBC approval, Wilmott Dixon would be instructed to mobilise and proceed to construction phase. See Appendix 15 SCAPE project process map.

4.9 The Design of the Preferred Option

The Design has been developed in accordance with relevant HBN/ HTM requirements or otherwise to agreed derogations. At a high level, the following principles are followed to develop the design:

- Define the phase brief and agree deliverables;
- Establish phase costs and obtain Trust approval;
- Identify, assess and allocate ownership of project risk;
- Lead the supply chain in responding to the Trust brief;
- Control expenditure - 'open-book' reporting & timesheets;
- Monthly cost forecasts and programme updates;
- Notify the Trust of any unforeseen events;
- Agree actions to mitigate;
- Follow and use prescribed SCAPE documentation;
- Work as a team, communicate and collaborate;
- Regular BREEAM reviews to capture "at risk" and additional BREEAM points.

4.10 Equipment Strategy

ICHT has a full MSSE Equipment plan that forms part of the Trust Capital Plan. Equipment costs in relation to this project forms part of both. The group 2 and 3 equipment costs are on a needs-only basis and assumes some existing clinical and ICT equipment will be transferred. However it is worth noting that some assets may be beyond their useful life and would need to be considered for replacement through.

4.11 Financial Reporting Standards (FRS) 5 Accountancy Treatment

It is envisaged that the assets underpinning delivery of the service will be on ICHTs balance sheet.

4.12 Planning Permission

The requirement for planning permission has been considered in conjunction with the Architect and planning approval will only be required for the plant that will be sited on top of both the QEQM building and The Cambridge Wing at SMH. Planning consent has now been sought for both The Cambridge Wing and QEQM with decision dates of 28/05/2015 and 12/06/2015 respectively.

The date for the planning decision for QEQM is later than that for The Cambridge wing because the Local Planning Authority (LPA) requested a noise survey and report to support this application. This has now been completed and the application validated.

5 The Financial Case

5.1 Introduction

This Section sets out the anticipated financial implications of the preferred option as identified out in the Economic Case (Section 3).

In summary, the preferred option, Option 8, has an initial gross build cost of £9.6m in capital. Once completed, it is expected that the annual net contribution will increase by £1.2m to £0.8m per year.

5.2 Estimation Methodology

5.2.1 Capital

Please see the table below for the summary of Capital Costs:

Table 5.1: Summary of Capital Cost

Option 8 (Preferred Option) Equipment			
Comparative Revenue 5 Year Summary (£'000)	**PRU**	**PICU**	**Total**
Works and Equipment	2,658	5,764	8,422
Location Adjustment	0	0	0
Fees	263	512	775
Trust Risk	0	0	0
Optimism Bias	51	110	161
Inflation Adjustment	0	0	0
Trust Contingency	76	162	238
VAT Abatement	0	0	0
Total	**3,047**	**6,549**	**9,596**

Appendix 7 sets out the detailed breakdown of capital costs. Capital costs for design, build and project management of the preferred option have provided by Wilmott Dixon on a tendered cost basis. Wilmott Dixon have produced layout drawings, room data sheets and have undertaken survey works and investigations to provide an expected capital cost for the preferred option. For the other options, a detailed cost per sq.m has been provided for construction accounting for all expected fees and uplifts.

The Trust's cost advisors have confirmed that the FB and OB forms have been compiled in accordance with CIM and have applied the appropriate PUBSEC and location adjustment factors based upon the current guidelines.

The group 2 and 3 equipment costs are on a needs-only basis and assumes some existing clinical and ICT equipment will be transferred.

5.2.2 Revenue

Please see the table below for the summary of Revenue costs.

Table 5.2: Summary of Revenue Costs – Current v Future

Option 8 (Preferred Option) **PRU to Samaritan, PICU expanded to PRU**			
Comparative Revenue **5 Year Summary (£'000)**	**YEAR 0** **(2015/16)**	**Year 5+** **(2020/21+)**	**Change**
NHS income	5,013	8,566	3,552
Non-NHS income	100	100	0
Total Income	**5,113**	**8,666**	**3,552**
Admin & Clerical	33	33	0
Medical	1,766	1,888	122
Nursing	2,715	4,244	1,529
Scientist, Therapist and Technician	71	249	178
Pay Summary Total	**4,585**	**6,413**	**1,828**
Variable non-pay costs	841	1,402	562
Fixed non-pay costs	64	64	0
Non-Pay Summary Total	**904**	**1,466**	**562**
Contribution	**(376)**	**786**	**1,162**

Revenue costs have been determined based on Trust information sources relevant to PICU.

NHS activity has been modelled on data from the Trust's SLAM reports and CATS refusals. Owing to the cyclical nature of PICU activity, a blended average of the activity over the last three years has been used to form the baseline.

Future activity estimations are based on the Trust's ability to service and charge activity which is currently refused or accommodated in non-PICU wards resulting in sub-optimal charging pathways. Predominately this data is taken from CATS, supported by local data interrogation in relation to non-CATs refusals and outlying patients. These refused admissions are modelled based on existing length of stay depending on seasonality.

As PICU activity is a locally agreed price with commissioners (not a main PbR tariff), this activity has been priced using local prices. Non-NHS income has been based on the average of the last three years.

Pay costs have been modelled aligned to bed capacity using to established staffing ratios for critical care adjusted where appropriate for specific provisions of PICS standards. A detailed review of the nursing staffing model is documented in Appendix 37.

Non-pay costs have been modelled based on prior year financial outturn data related to the service incorporating relevant supporting services.

5.3 Impact on the Balance Sheet

A significant amount of the development cost will be capital expenditure in the form of new equipment and capitalised estate changes and will therefore impact the balance sheet.

Table 5.3: Summary of Balance Sheet Impact

Option 8 (Preferred Option) PRU to Samaritan, PICU expanded to PRU							
Balance Sheet	**YEAR 0 (2015/16)**	**YEAR 1 (2016/17)**	**Year 2 (2017/18)**	**Year 3 (2018/19)**	**Year 4 (2019/20)**	**Year 5 (2020/21)**	**5 year total**
Building Asset	0	2,989	5,775	0	0	0	8,763
Equipment Asset	0	59	774	0	0	0	833
Total Assets	***0***	***3,047***	***6,549***	***0***	***0***	***0***	***9,596***
Charities	0	3,047	1,253	0	0	0	4,300
Trust	0	0	5,296	0	0	0	5,296
External	0	0	0	0	0	0	0
Total Funding	***0***	***3,047***	***6,549***	***0***	***0***	***0***	***9,596***

Capital funding for this development will be through the commitment of resources from the charities supporting the Trust (£4.3m) with the remainder funded through internal resources. The initial net requirement of the Trust (£5.3m) is accommodated within existing Trust capital plans and therefore there would be no impact on current financial plans or have any further impact on the Trust's balance sheet.

During construction, the asset will be classified as an asset under construction. The spend profile will follow that outlines in the FB forms in Appendix 7.

As with all projects, a detailed review of the split of costs between capital and revenue will be undertaken to ensure that appropriate financial reporting standards are adhered to. Spending will be kept under constant review in order to ensure that expenditure is correctly capitalised in the year of purchase.

5.4 FRS 5 Accountancy Treatment

It is envisaged that the assets underpinning delivery of the service will be on Imperial College Healthcare NHS Trust's balance sheet.

5.5 Impact on the Organisation's Income and Expenditure Account

For the preferred option, the anticipated cash flows for the development is set out in the table below at today's prices. The table also includes the revenue consequences of capital expenditure.

Table 5.4: Summary of Revenue Impact

Option 8 (Preferred Option) PRU to Samaritan, PICU expanded to PRU						
Incremental Income & Expenditure 5 Year Summary (£)	**YEAR 0 (2015/16)**	**YEAR 1 (2016/17)**	**Year 2 (2017/18)**	**Year 3 (2018/19)**	**Year 4 (2019/20)**	**Year 5+ (2020/21+)**
Baseline Income	5,113	5,113	5,113	5,113	5,113	5,113
Incremental Income	0	0	2,439	3,552	3,552	3,552
Total Income	*5,113*	*5,113*	*7,552*	*8,666*	*8,666*	*8,666*
Baseline Pay	4,585	4,585	4,585	4,585	4,585	4,585
Increase Pay	0	0	1,483	1,828	1,828	1,828
Total Pay	*4,585*	*4,585*	*6,068*	*6,413*	*6,413*	*6,413*
Baseline Non-Pay	904	904	904	904	904	904
Incremental Non-Pay	0	0	486	562	562	562
Total Non-Pay	*904*	*904*	*1,390*	*1,466*	*1,466*	*1,466*
Contribution	***(376)***	***(376)***	***94***	***786***	***786***	***786***
Baseline Depreciation and Capital Charges	0	0	0	0	0	0
Incremental Depreciation and Capital Charges	0	0	242	478	468	457
Total Depreciation and Capital Charges	*0*	*0*	*242*	*478*	*468*	*457*
Net I&E impact	***(376)***	***(376)***	***(148)***	***308***	***319***	***329***

The baseline reflects the principles of those set out in Section 5.2.2. Following these assumptions, PICU is anticipated to have a negative contribution of £376k in 2015/16 if the activity assumptions were to reflect an average of the three years.

The preferred option would be ready to admit in August 2017. The first full year of operation would be 2018/19. On completion (Year 2), PICU would give a positive contribution and would make a positive I&E impact, allowing for depreciation and capital charges, the following year (Year 3).

Between 2015/16 and 2018/19, the net contribution would increase by £1.2m to £786k.

5.6 Overall Affordability

At this stage, the PICU development can be considered financially affordable. The capital requirement can be funded through a combination of charitable and existing Trust resources.

The increased pay and non-pay costs are in line with increased, profiled activity changes and are to be funded from resources within the Divisional revenue position. As income is accounted separately to expenditure, the Division will need to receive an increase of £2.4m in revenue funding net of expenditure already funded in Divisional budgets to account for estimated costs. This will be offset by a planned increase to the centrally held NHS contract income plan of £3.6m.

Commissioners have stated that contracted changes will be agreed through the annual contract negotiation process. At this stage, Commissioners are supportive of the case, accept the activity assumptions within it and are working with the Trust to develop the commissioning plans to fund the activity changes.

5.7 Financial Sensitivities

The preferred option has been 'stress tested' against three different scenarios to assess the net impact to the income and expenditure account of four potential uncertainties:

1. No charitable funding as a result of poor fundraising;
2. Additional activity funded at marginal rates (70% of tariff);
3. A 5% cost increase in revenue costs.

As set out in Section 5.5, the preferred option is expected to make a positive contribution of £0.8m and make a net positive impact to the income and expenditure account (accounting for the impact of depreciation) of £0.4m once fully open.

The impact outcome of the other scenarios is outlined in the table below and supported by detailed analysis in Appendix 6b.

Table 5.5: Summary of Scenario Revenue Modelling

Option 8 (Preferred Option) **PRU to Samaritan, PICU expanded to PRU**						
Net Revenue Impact **5 Year Summary (£'000)**	**YEAR 0** **(2015/16)**	**YEAR 1** **(2016/17)**	**Year 2** **(2017/18)**	**Year 3** **(2018/19)**	**Year 4** **(2019/20)**	**Year 5+** **(2020/21+)**
Baseline Scenario - Assumed	(376)	(376)	(148)	308	319	329
Scenario 1 - No charitable contribution	(376)	(544)	(456)	(46)	(28)	(9)
Scenario 2 - Incremental income at 70% tariff	(376)	(376)	(879)	(758)	(747)	(736)
Scenario 3 - 5% cost variation	(619)	(619)	(473)	(31)	(20)	(10)

Table 5.6: Summary of Scenario Capital Modelling

Option 8 (Preferred Option) **PRU to Samaritan, PICU expanded to PRU**						
Net Capital Impact **5 Year Summary (£'000)**	**YEAR 0** **(2015/16)**	**YEAR 1** **(2016/17)**	**Year 2** **(2017/18)**	**Year 3** **(2018/19)**	**Year 4** **(2019/20)**	**Year 0-4** **Total**
Baseline Scenario - Assumed	0	0	5,296	0	0	5,296
Scenario 1 - No charitable contribution	0	3,047	6,549	0	0	9,596
Scenario 2 - Incremental income at 70% tariff	0	0	5,296	0	0	5,296
Scenario 3 - 5% cost variation	0	0	5,296	0	0	5,296

Outcome assessment:

- Scenario 1 – In this scenario, the preferred option would have a negative revenue impact. As the negative impact is small (less than £10k) and the service is a key enabler for other Children's services, the Trust would consider proceeding with this development. The capital demand on the Trust would increase by £4.3m. To mitigate this, the Trust would need delay other schemes in its capital programme in order to deliver the PICU development;

- Scenario 2 – In this scenario, the preferred option would have a negative revenue impact. The capital programme would be unaffected and would remain affordable. As an unviable PICU would have material consequences for the provision of children's services at the Trust and in the region, extended settlement discussions would be entered into with commissioners in order to secure a sustainable arrangement. As the PICU redevelopment has flexible capacity, the options for the unutilised (and consequently, not modelled) additional bed capacity in the summer would be considered in relation to additional, net contribution activities in order to make the case financially viable;

- Scenario 3 – As with Scenario 1, if this scenario were to occur, the preferred option would still have a positive revenue contribution once constructed and fully operational, however the benefit would be greatly reduced and would not payback within the period of assessment. As the negative revenue impact is small (less than £10k) and the service is a key enabler for other Children's services, the Trust would consider proceeding with this development. To mitigate the adverse impact of this scenario, the Trust would utilise cost control measures to ensure that cost variations were understood and suitable actions taken to return them to expected levels. The capital programme would be unaffected and would remain affordable.

6 The Management Case

6.1 Introduction

This Section of the FBC addresses the 'achievability' of the scheme. It's purpose is therefore to build on the OBC by presenting the actions that will be required to ensure the successful delivery of the scheme.

6.2 Programme Management Arrangements

The scheme is an integral part of the capital programme for 2014/15, 2015/16 and 2016/17 over the various design and build phases which comprises a portfolio of projects for the delivery of clinical quality, patient experience and capacity improvements throughout ICHT.

6.3 Project Management Arrangements

Project Management will be based on PRINCE 2 methodology.

The project will be managed by the estates team with input from the Women's and Children's Division. There will be a Project Core Team, chaired by the Children's General Manager with representation from Estates and Facilities, PICU Clinicians and the wider management team as and when required. The Estates Senior Project Manager will assign task responsibilities within the team.

The Estates Senior Project Manager (Anthony Threlfall) is the main point of contact for Wilmott Dixon ensuring the design and construction follows due process and is responsible for ensuring that the capital works are completed to time and deal with Wilmott Dixon issues on a day to day basis.

Wilmott Dixon appoints and manages the design team (and will ultimately deliver the construction phase).

The financial control of the scheme will be under the duties of the Quantity Surveyor (Christopher Smith Associates) under the supervision of the Estates Senior Project Manager. A project variation system will be imposed to control change to the design and hence expenditure within the parameters of the contract. Internal monthly reviews will be held with Estates Senior Project Manager, Wilmott Dixon and Trust Quantity Surveyor to ensure control of the budget is maintained.

The project will commence with a Project Team and appointed main contractor pre-start meeting, followed by a Project Commencement meeting then bi-weekly formal Project Progress meetings. These meetings will ensure the works programme, finance matters, health and safety and agreement to variations are managed through an approval and instruction processes.

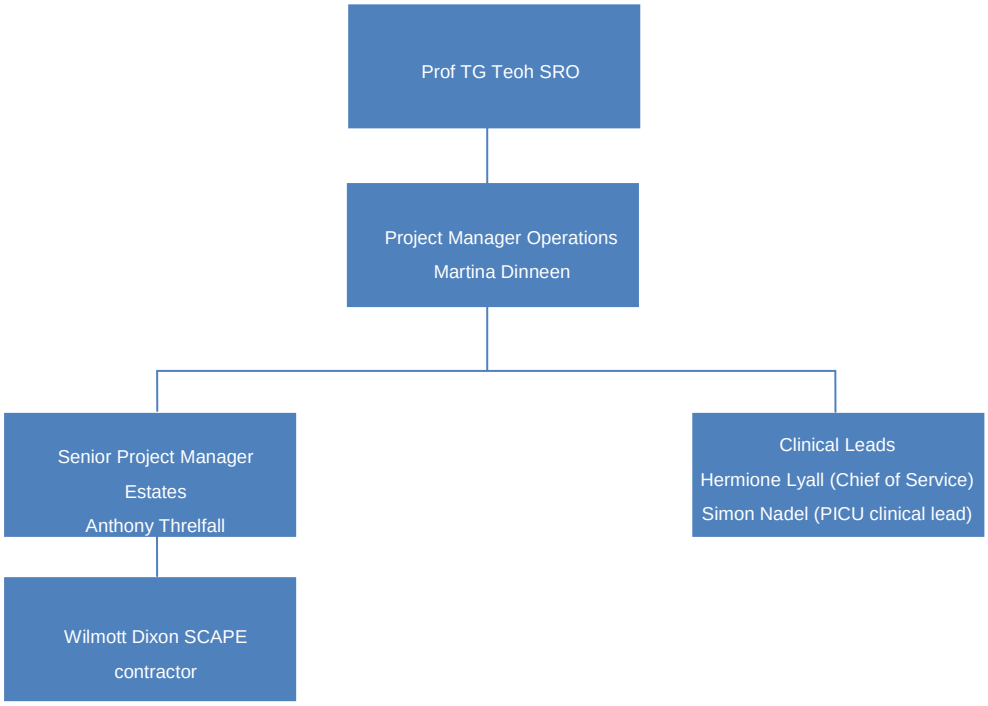
Wilmott Dixon's quantity surveyor will undertake and issue a monthly assessment (valuation of works completed in the period) to the Trusts cost consultant who will verify it is correct. This will in turn be passed on to the Estates Senior Project Manager for final approval and on the basis of that; an invoice is issued by Wilmott Dixon to the Trust for payment. Under the SCAPE agreement no retention is withheld by the Trust.

The main contractor will attend regular internal meetings with both site staff and sub-contractors to manage the work progress and conduct regular meetings with the project design team whilst achieving the project.

6.3.1 Project Reporting Structure

The reporting organisation and the reporting structure for the project are as follows:

Figure 6.1: Reporting Structure of Project



The reporting structure for the project will be through the operations project manager who will be responsible for liaising with the Women's and children's division, and the Estates Senior Project Manager. All issues and risks will be managed through the operations project manager who will escalate to the Senior Responsible Owner and Project Board as necessary.

6.3.2 Project Roles and Responsibilities

These are as follows:

- Senior Responsible Owner (SRO) – Overall responsibility for delivery of project.
- Senior Project Manager Estates – Responsibility for ensuring that the capital works are completed to time and deal with issues from the contractors on a day to day basis.
- Project Manager Operations – Responsibility for ensuring that the effect on patients is communicated and any negative impact of moving location is minimised.
- Clinical Lead – Responsibility for ensuring that quality of clinical care is maintained throughout, especially when patients are moved to the new unit.

6.3.4 Project Plan

This is as set out in the following table; see also Appendix 8, project programme

Table 6.1: Project Plan

Milestone Activity	Date
Internal OBC Approval process	Sept '14
TDA OBC Approval	March '15
FBC Approval by Trust	May '15
TDA FBC Approval	Aug '15
Start on Site (first Phase)	Aug '15
Decant Samaritan ward for PRU enabling	Aug '15
Decant Thistlewaite for floor strengthening	Sept '15
Recommission Thistlewaite	Dec '15
Complete and commission PRU in Samaritan Ward	Sept'15
Decant PRU from 7th floor QEQM	Jun '16
Complete and commission Phase 1 PICU in 7th floor QEQM	Jun '16
Decant Existing PICU into Phase 1 PICU	Jan '16
Complete and commission Phase 2 PICU in 7th floor QEQM	Jan '17
Practical completion (final phase)	Aug '17
Commissioning and "go live" (final phase)	Aug '17

6.3.5 Decant Arrangements

Decant arrangements are set out in the following table:

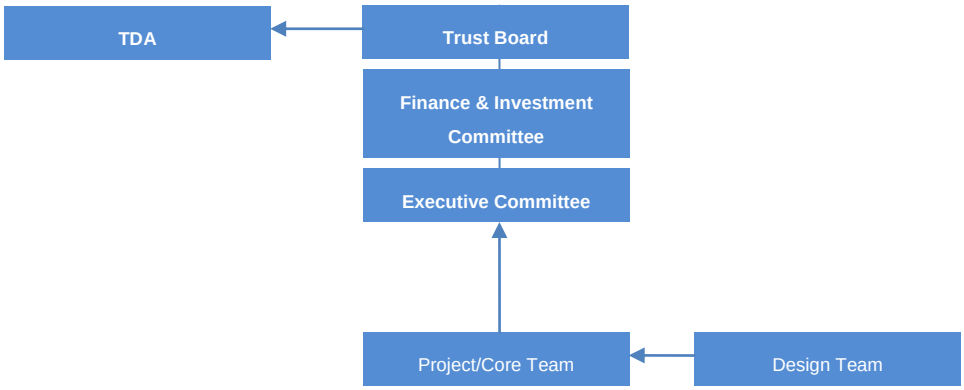
Table 6.2 Decant Arrangements

Areas to be decanted	Purpose	Type of Space Required	Space Identified	When
Thistlewaite ward space directly under Samaritan Ward (8-10 beds)	To allow the floor on Samaritan Ward to be strengthened	Inpatient acute bed space	Decant Ward	11 Sept – 23 Dec 2015 provisional
Haem lab space		Small diagnostic area	TBC	
Clinical activity within PRU 7th floor QEQM (paed allergy)	Outpatient and daycase activity (5000 attendances FYE)	Clinical Outpatient and daycase	POPD 6th Floor QEQM	From June 2016
Junior doctor space 7th floor QEQM	Clinical Decisions and discussions as ward space compressed	Clinical adjacency preferred to avoid inefficiencies	POPD 6th Floor QEQM	From June 2016
Consultant offices within current PICU	Consultant office space	Consultant office space	Bays space	From Jan 2017

6.4 PICU FBC Approvals Process

The following Figure describes the governance and approvals process for this project:

Figure 6.2 ICHT Governance and Approvals Process



6.5 Use of Specialist Advisors

Wilmott Dixon appoints and manages the design team. The M&E design consultants, Architect and Structural Engineer appointed by the Trust (via the Trusts framework) which commenced at the very early stage of design (prior to February 2014) have also been appointed by Wilmott Dixon. There is confidence in the ability of these consultants to perform to a high standard. The financial control of the scheme will be under the duties of the Quantity Surveyor (Christopher Smith Associates) under the supervision of the Trusts own Estates Senior Project Manager (Anthony Threlfall). There are other specialist advisers directly employed by the Trust; please see below for the full list of specialist advisors:

- CDM co-ordinator – First Safety (UK) Ltd – Paul Cunningham
- Asbestos Management – ENV Ltd – Quenton Davis
- BMS design – NDA Consulting Ltd – Nick Dunford
- Mechanical Ventilation Validation – Comfort Commissioning Services Limited – Andy Green (via Wilmott Dixon)

A project team and design team were set up and consist of the following members. Many of these members have also taken part in both the Benefits and Risks Appraisals for both the OBC and FBC as detailed in Sections 3.6 and 3.12 respectively:

Project Core Team Members

- Dr Hermione Lyall – Chief of Service
- Prof Simon Nadel –Head of Specialty for PICU
- Lynda Hassell – Deputy Divisional Director of Nursing, Children and Safeguarding
- Scott O'Brien – PICU Charge Nurse
- Martina Dinneen – Divisional Director of Operations
- Doyin Ogunbiyi – Finance Business Partner
- Anthony Threlfall – Estates Senior Project Manager
- Dr Brunel Eiliazadeh – Senior Business Planning Manager
- Sophia Hami – General Manager for Children's Services
- Debra Matich – Divisional Research Manager, IC

Design Team Members

- Dr Hermione Lyall – Chief of Service
- Prof Simon Nadel – Head of Specialty for PICU
- Anthony Threlfall – Estates Senior Project Manager
- Colin Bradshaw – Head of Projects
- Meena Paul – Senior Clinical technologist
- Dr Brunel Eiliazadeh – Senior Business Planning Manager
- John Jackson - Fire Safety and Risk Manager
- Paul Cunningham – CDM Co-ordinator
- Pamela Workman – Security Manager
- Moya Alexander – Infection Control
- Alan Davis – Waste Manager
- John Stevenson – ICT
- Debra Matich – Divisional Research Manager, IC
- Professor John Warner, IC
- Bob Boyle, IC
- Andrew Bush, IC
- Wilmott Dixon – SCAPE contractor

6.6 Stakeholder Management and Engagement

The following stakeholders and communication methods have been identified:

Table 6.3: Summary of Stakeholder Management and Engagement

Stakeholder	Communication Method
Facility users and patients	-Details of the development shared at Paediatric Parent Focus Group -COSMIC fully involved (made up of parents and families and friends) -HELIX have conducted a survey of staff and patients regarding environmental issues
Clinical and non-clinical staff	-Regular meetings with design team throughout design phase. -Project core team includes senior clinicians who will use facility. -Other medical specialties consultant whom may be impacted by PICU redevelopment. -Formal sign off at each stage of project -Presentation at Women's & Children's open session -Full briefing and involvement of senior management team
IC	PICU OBC discussed at ICL/MRC/ICHT Monthly Strategy/Operational Meeting on 7th August 2014. Confirmation provided that the Faculty of Medicine has consulted with its various stakeholders regarding the PICU initiative and supports the proposed moves. (Please see Appendix 19 for further information)
Trust Board	Board papers circulated buy Trust management team
Local Commissioners and NHSE	Discussions with Commissioners to share data and gather support. (Please see Appendix 23 for more information)
BREEAM	Wilmott Dixon to ensure that BREEAM process is correctly managed
Charity	-Presentation to Charity to secure charity funding. Fundraising by charity to commence after OBC approval -COSMIC/ICHT charities working in partnership -Involved in the sign off of the room data sheets.
Trust Development Authority	OBC approved by TDA on 26th March 2015, FBC to be submitted to TDA after Trust Board approval

6.7 Outline Arrangements for Change and Contract Management

The strategy, framework and plan for dealing with change and associated contract management is as follows.

From the approval of the feasibility, the Trust appointed a senior project manager from within the Estates Department. Architects, Quantity Surveyors, Mechanical and Electrical Engineers, were initially appointed directly by the Trust to prepare detailed design and cost information, seek tenders, appoint a contractor and manage the contract to completion. In February 2014, Wilmott Dixon (SCAPE National Procurement Design and Build contractor) were appointed to manage this process going forward to submission of the OBC and FBC. Estates have monitored the progress of the detailed design and specifications, including more latterly the work on site using their knowledge of the design development carried out to OBC stage. This involvement will ensure continuity of design management pre and post feasibility and OBC/FBC.

The SCAPE National Procurement Design and Build NEC3 option A contract is proposed in this instance for reasons given in the commercial case and this form of contract allows for close monitoring of quality, time and cost management during the construction phase of the project. In the event of any changes to the original contracted work being required, there will be the opportunity to cost these prior to any instructions being given.

6.8 Risk Management

The Divisional Board will review risks on a monthly basis and will escalate any red risks as necessary.

The allocation of risk has been a key area of focus. Please see Section 4.3 for further information with regards to the transfer of risk. The general principle is that risks should be passed to the contractor as part of the NEC3 option A form of contract.

Please see Appendix 17 where all project risks have been assessed for likelihood and probability with mitigating activities. The following table indicates the highest which have been identified at the time of FBC submission:

Table 6.4: Top ten project risks (as per Appendix 17 at the time of FBC submission)

Risk Ref no	Risk Score	Summary of Risk
45	15	Inability to commence works due to lack of capital funding
35	12	Stages not signed off in accordance with programme meaning business case submission date not met and subsequent delays to start on site and completion
40	12	Additional recruitment needs not met
44	12	During building works access to patient isolation facilities will be reduced
48	10	Impact of clinical research activity
55	9	Clinical space within the refurbished PICU has been maximised, this has reduced the non-clinical office space provided within the new unit from the current provision. The office space will need to be provided elsewhere within the Division's footprint.
19	8	Lack of available options for the following decants: 1. Thistlewaite ward and part Haematology - for strengthening works to Samaritan ward above. 2. Clinical activity within PRU 7th floor QEQM (paed allergy). 3. Junior Doctor space 7th floor QEQM. 4. Consultant offices within current PICU
1	8	Crane type, size for roof Plant equipment. Limited vacant location for crane. Potentially imported crane (German crane with long reach). Impact: additional costs & time.
4	8	PRU Floor Structural strengthening. Impact: Additional costs & time. Impact: additional costs & time.
5	8	Limited ICT Information. Impact: additional costs & time.

6.9 Outline Arrangements for Benefits Realisation

The benefits realisation plan can be found in Table 6.5 which is based upon the definition of benefits as found in Section 2.8. Responsibility for the delivery of the benefits will fall to the Paediatric and Neonates Chief of Service, who will report to the Divisional Board on an exception basis.

Table 6.5: Benefits Realisation Plan

Benefits Criteria	Criteria	Measure	Financial year/quarter
1. Quality of clinical care	• Assurance of clinical safety • Fit for purpose facility • Reduced maintenance costs for outdated equipment	• Survey all patients on unit opening and as new patients arrive • Plans signed off by estates department • Successful clinical risk assessment • Improved throughput and operational efficiency • Improved patient flows	• Ongoing after opening • Design stage • Post completion of works and pre opening of unit
2. Strategic fit	• Consistent with Shaping a Healthier Future initiative • Consistent with NHSE commissioner requirements • Supporting specialist paediatric services • Consistent with ICHT strategic objectives	• Business case signed off by Chief of Service and PICU Clinical Lead • Sign off by TDA	• At sign off of OBC/FBC
3. Environment and patient experience	• Removal of risk from Divisional Risk Register • Improved facilities for staff and families • Improved space around beds • Improved privacy and dignity	• Improved Patient experience • Reduction in the number of patient complaints • Improved patient survey results • Division agrees to remove risk from risk register • Staff survey results	• 3 months post commissioning • First Divisional board meeting after opening
4. Flexibility	• Sufficient capacity for increase in market share • Commissioned HDU bed capacity which can flex up or down • Reduced loss of income from refused admissions • Reduced loss of income from HDU patients	• Number of beds matches local demand (or exceeds to provide capacity for patients outside catchment) • Optimal bed utilisation levels	• At sign off of OBC/FBC and quarterly
5. People, handling and management	• Recruitment and retention of skilled professional staff	• Nursing staff recruited on first round of recruitment • Turnover rate below Trust average	• Each recruitment round • Annual
6.Staff training/research and development	• Increased provision of training opportunities for staff • Increased accrual to clinical trials • Increased educational opportunities for staff	• Staff survey/experience • Research income and output	• Annual
7. Implementation	• Maintenance of clinical services and research activity throughout project implementation	• Continued provision throughout building works	• Weekly during building works

6.10 Outline Arrangements for Post Project Evaluation

The outline arrangements for Post Project Evaluation (PPE) have been established in accordance with best practice.

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 lessons learnt will be of benefit to:

- The Trust – in using this knowledge for future projects including capital schemes;
- Other key local stakeholders – to inform their approaches to future major projects;
- The NHS more widely – to test whether the policies and procedures which have been used in this procurement were effective.

Post project evaluation to ascertain whether the anticipated benefits have been delivered will take place at six months and twelve months after implementation by the project team, led by an independent member of ICHT's Planning and Business Development team. The team will report to the Divisional Board. The PPE will focus on service users, clinical users and staff and the project team and evaluated by undertaking the following investigations:

- A review of the strategic case made for the project to confirm that it is still relevant;
- A review of the benefits detailed in the Benefits Realisation Plan and confirmation that they have been met;
- A review of the Full Business Case 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.

6.11 Gateway Review Arrangements

A gateway review risk assessment has been carried out. Confirmation has been received from Health Gateway team that the gateway review is not required as the project has been assessed as low risk. Please see Appendix 22 for confirmation.

6.12 Contingency Plans

In the event that this project fails, the service will continue to be provided within its current environment. Further mitigation plans against existing clinical and operational risks will need to be developed in line with the Divisional Board.

On behalf of Imperial College NHS Healthcare Trust

Prof Tg Teoh

Senior Responsible Owner
Women's and Children's Divisional Director
27th May 2015

Appendices

1. DH Commissioning Safe Services for Paediatrics

1. DH Commisioning Safe Services for Pae

2. Standards for the Care of Critically Ill Children

2. PICS_standards 2010.pdf

3. Appendices to Standards for the Care of Critically ILL Children

3. PICS Appx 4th Edn 2010.pdf

4. ICHT PICU Activity Data

4. PICU (FBC) Activity Data.xlsx

5. Paediatric Intensive Care Surge Report – 2014

5. Paediatric intensive care surge r

6. PICU Business Case Financial Model

6a. PICU (FBC) GEM.XLS

6b. PICU (FBC) GFM.XLSX

6c. PICU (FBC) NPV to NPC Reconciliation

7. CAPEX Cost Estimates for Shortlisted Options

7a. PICU & PRU (FBC) CAPEX, 12 MAY

8. Project Programme

8. WD programme.pdf

9. PRU Proposed 2nd Floor Mezzanine Revision E

9. PRU Proposed layout FBC Option 8 2

10. PRU proposed Main Floor Revision E

10. PRU Proposed layout FBC Option 8 2

11. Cambridge Wing 2nd Floor Mezzanine Existing Layout

11. Cambridge Wing 2nd floor mezzanine e

12. Existing layout 7th Floor QEQM

12. Existing Layout 7th floor QEQM.pdf

13. Optimism Bias for all Shortlisted Options

13a. Option 8 PICU - FBC Optimism Bias 12

13b. Option 8 PRU - FBC Optimism Bias 12

14. PICU Proposed Layout Option 8 Revision H

14. REVN H PICU PROPOSED LAYOUT.p

15. SCAPE Process Map

15. SCAPE - Process - Map.pdf

16. Record of Drawing Sign Off

16a. PICU Record of drawing sign off OBC

16b. PRU Record of drawing sign off OBC

17. Risk Register

17. Copy of Risk Register PICU edit 12

18. Procurement Approval letter

18. Denis Keliher email SCAPE complian

19. Confirmation of PRU relocation from ICL

19a. Strategy-Operational - ICL-MR

19b. PRU relocation confirmation email .pc

20. Confirmation of Charity Funding

(to be inserted after Charity Board approval on 1st July 2015)

21. Families Survey Report – St Mary's London

21Site ID 16 (St Mary's) PICANet PIC

22. Gateway Review Risk Assessment

22a. gateway review risk assessment.pdf

22b. Gatway Review Confirmation.pdf

23. Confirmation of Commissioner Support

23. Imperial PICU FBC Letter July 15V2

24. St Mary's Site Hospital Map(s)


24a. 3D SMH site plan markup.pdf


22b. Gatway Review Confirmation.pdf

25. PICU Equipment Cost Estimates (Group 2 & 3)


25. Group 2 and 3 equipment PICU v1.x

26. Trust Board Minutes Extract for FBC


26. Authorised extract from draft bo

27. Derogation Schedule


27a. Derogations FBC.xlsx


27b. img-512144048-0001

28. South Staffordshire & Shropshire NHS FT Procurement Report


28. SSS FT Procurement Report

29. The Procurement of Major Works Framework


29. How the contractor was select

30. OJEU Contract and contract award Notices


30a. Contract Notice 2012-OJS204-335457


30b. Award Notice 2013-OJS093-157625

31. SCAPE Summary of key contract terms


31a. Sch 3 - Model Delivery Agreement.p


31b. Delivery Agreement rev A.pdf

32. Examples of Helix Projects

32. HELIX-projects.pdf

33. Summary of Design Process

33b. 141221 SUMMARY OF DESIGN

33c. Aedet cover note.pdf

34. Confirmation of OBC approval by TDA

34. 150326 Imperial OBC Development of

35. PICU BREEAM Pre-Assessment Report

35. St Marys Hospital PICU BREEAM 2008 P

36. List of sub-contractors for each of the work packages

36. Tender package table.pdf

37. PICU, staffing options and recruitment options considered

37. Workforce Model and Recruitment Opti

38. PRU Function and Activity

38a. NIHR BRC_Paediatric Resea

38b. The_PRU_Report_Au

39. ICHT Clinical Strategy

39. ICHT clinical Strategy.pdf

40. Nursing & midwifery strategy 2013-2016

40. id_037542 NM strategy 13 - 16.pdf

41. NHSE Service Specification

41. e07-sa-paed-inten-ca

42. PICU Specialised Service Quality DashBoard

42. IMPERIAL COLLEGE HEALTHCAI