

Reconfiguration Programme – Modern Methods of Construction (MMC) and the Construction Playbook

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Paper E

Purpose of report:

This paper is for:	Description	Select (X)
Decision	To formally receive a report and approve its recommendations OR a particular course of action	
Discussion	To discuss, in depth, a report noting its implications without formally approving a recommendation or action	X
Assurance	To assure the Board that systems and processes are in place, or to advise a gap along with treatment plan	
Noting	For noting without the need for discussion	

Previous consideration:

Meeting	Date	Please clarify the purpose of the paper to that meeting using the categories above
Reconfiguration Programme Cmte	26 th February 2021	Assurance
Executive Board	2 nd March 2021	Assurance
Trust Board Committee		
Trust Board		

Executive Summary

Context

The trust has asked for a briefing on what ‘Modern methods of Construction’ (MMC) actually means, and how this might be applied to the Reconfiguration Programme. Whilst we are awaiting confirmation from the New Hospital Programme on the extent to which are able to deliver this; this paper provides a briefing to the Board on this topic, and includes a review of the new Cabinet Office ‘Construction Playbook’

Questions

1. What the Collaboration Agreement established with the New Hospital Programme means for UHL in the context of MMC and the Construction Playbook?
2. What is MMC and what are the potential opportunities for UHL?

3. What is the construction playbook and what are the potential implications for UHL?
4. Conclusions and UHL next steps

Conclusion

1) What the Collaboration Agreement established with NHSEI means for UHL in the context of MMC and the Construction Playbook?

1.1 The stated vision of NHSE/I is that the New Hospital Programme (NHP) will be delivered within a 'one-team' approach. The Collaboration Agreement establishes a way of working to enable Project/Programme teams to progress with delivery of investment and securing all relevant approvals in a spirit of open-ness and collaboration. All parties have a general duty to co-operate, to act with transparency and must work, exhibiting a high-trust approach to help ensure successful delivery.

1.2 The New Hospital Programme Team recognise that not all of the principles will be appropriate for every project, especially those front running projects. The New Hospital Programme Function, in consultation with each organisation, will be responsible for determining when this is the case. In the short term, and whilst the Programme Function is being set up, NHSE/I and its advisers will work with the Early Trusts to identify opportunities to incorporate solutions based on these principles. The objective is to incorporate componentised solutions for relevant areas in each of the HIP 1 schemes.

As an early project, UHL has engaged with the New Hospital Programme Function to agree how the UHL team will:

- Formally embrace the principles set out within the collaboration agreement
- Contextualise how the priority areas of MMC, Net Zero Carbon (NZC), a Digital hospital, Standardisation and Patient Flows could be applied to the UHL Programme.
- Understand how these principals can be embedded within UHL's design and development processes and what, if any, the implications might be in respect of overall cost envelope and programme

2) What is MMC and what are the potential opportunities for UHL?

2.1 In line with the Government 2019 statement - 'Presumption in Favour of MMC', DHSC and NHSEI have published an interim business case guidance document based on the assumption that all schemes will start out as MMC, considering options at the Strategic Outline Case stage; and having a preferred option by Outline Business Case. This document also makes it clear that each business case submitted should contain a section on MMC

detailing the proposed approach and percentage of the building that represents different types of MMC.

2.2 What is MMC?

Modern Methods of Construction (MMC) are offsite manufacturing and onsite techniques that provide alternatives to traditional building and closely relates to design for manufacture and assembly.

In combination, they replace traditional trade based building methods with factory created and assembled components, which are assembled on site using modern assembly methods.

2.3 How does MMC relate to standardisation and modularisation in design, development and delivery?

Offsite construction using standardised factory-made components has the potential to reduce the current risks to future infrastructure delivery. As seen in the housing and school sector, it offers shorter programmes and reduced costs coupled with higher outputs and more consistent quality. The reduction of head-count on site also improves health and safety.

Whilst offsite construction is well suited to large housing and school schemes, the often linear nature of infrastructure projects and programmes and their greater geographical spread are perceived as barriers to offsite delivery.

In discussion with our design partners BDP, we have identified a number of schemes that fully embraced the concepts of MMC in order to give examples of what MMC means in practice. In each case the MMC principles were deemed viable in terms of programme and where commercially and operationally appropriate, various elements of MMC were introduced into the programme. Case studies are identified in section 2.8.

2.4 Viability of MMC

The viability of MMC is dependent on the principles of 'supply and demand', and whether the volumes associated with a particular programme are sufficient for the supply chain to invest in the necessary manufacturing and logistical implications. It should be noted that in the context of design standardisation and modularisation, certain elements were deemed suitable for this approach (e.g. bathroom pods at the new Alder Hey Children's Hospital) whereas others (bathroom pods at the new Clatterbridge Cancer Hospital) were deemed unsuitable owing to cost, programme and area constraints.

In simple terms the adoption of standardisation and modularisation is, in the majority of cases, subject to site specific conditions and considerations.

2.5 Key Benefits of MMC

- **Safer** – Less people working on construction sites
- **Quicker** – Majority of work done offsite in parallel with preceding works
- **Better quality** – Manufactured in a controlled environment with an established QA process. The Construction Playbook refers to ‘greater predictability and lower maintenance costs’.
- **Greener** - Lower Greenhouse Gas (GHG) emissions
- **Embed Digital Technology** – Better managed digital outputs are more likely to provide a solid base for effective management and retention of the ‘Golden Thread’ of Building Information.

2.6 Consequences

- **Design** - Earlier engagement of detailed design
- **Procurement** - Longer lead in times
- **Information Sharing** – Shared components and model data across sector
- **Early Manufacturer Engagement** – MMC elements to be developed with supply chain.

2.7 NHSEI recommendations on MMC

The government’s Infrastructure and Projects Authority (IPA) guidance ‘Transforming Infrastructure Performance’ (2017) also refers to MMC as ‘smart construction’ defined under the following three categories which covers a range of techniques with greater levels of activity taking place off site and increased levels of standardisation, underpinned by digital design and engineering.

- 1) **Manufactured:** whilst not widely used this offers the greatest opportunities to improve delivery efficiency and boost productivity. This approach enables high levels of customisation by developing and using standard components and assemblies. As such, this approach needs to be considered across a number of projects to achieve greatest efficiency.
- 2) **Volumetric:** e.g. fully fitted modules.
- 3) **Components:** e.g. standardised design elements

In addition, there is;

- 4) **Traditional construction:** e.g. methods that are relatively unproductive, with projects individually designed and constructed with little consistency in either the design solution or construction method, even for similar projects.

The government has also issued guidance on definition framework for The Modern Methods of Construction (MMC) developed by a specialist sub-group of the MHCLG MMC

working group which summaries many of the processes available that aim to increase the 'Pre-Manufactured Value' (PMV).

2.8 Case Studies

In practice, BDP have delivered MMC on major healthcare projects over the last 20 years. The design solutions to achieving MMC do not all follow the same strategy as in our experience; they are site / Trust / Contractor specific.

The overview below reviews strategies used in a handful of Case Study Projects, in chronological order.

Southmead Hospital, Bristol

- Unitised Panelling (Terracotta with built in Glazing)
- Unitised Glazing Modules (including repeated ventilation panels)
- Pre Cast Concrete Frame
- Unitised Roof Glazing
- En-Suite Pods

Alder Hey Children's Hospital, Liverpool

- Pre-Cast Concrete Frame
- Loadbearing Concrete Sandwich panel walling system including windows. Note that the Laing O'Rourke manufacturing system drove floor to floor heights
- Anodised Aluminium modularised cladding
- M&E Riser size and number driven by extent of services distribution zone available in the ceiling void
- Pre-fabricated Glulam Beams
- Bathroom Pods
- M&E Ceiling Modules
- 60% offsite construction in total

Clatterbridge Cancer Centre, Liverpool

- Mixture of Pre-Cast and In-Situ Concrete Columns and cores
- Unitised Glazing
- Modular Rooflights
- Ensuite and bedroom design standardised and repeated. Note that 'pods' were not used owing to cost, programme and area constraints
- Modular Acoustic Panelling

Grange University Hospital, Wales

- Pre Cast Concrete Frame, shear walls, columns and planks
- Bathroom Pods
- Pre-fabricated modularised service risers
- M&E Ceiling Modules

- Skid mounted Plant
- Air Handling Units
- 75% offsite construction in total

2.9 MMC: Early engagement with Tier 1 contractors and supply chain

As part of normal market engagement and programme development 'best practice', the early engagement of the Tier 1 construction market and associated supply chain is identified as being a vital element in sharing knowledge and engaging the market with the range of MMC related concepts and approaches that are being considered and developed within the programme.

As the design progresses through conceptual stages the 'market' would normally be invited to attend a soft market briefing session wherein outline 'strategies' that might include design principles, potential opportunities for the standardisation of elements of design, opportunities for 'just in time' delivery, logistical constraints and opportunities would be shared and debated with the market place. As part of this discussion the supporting supply chain would advise on the concepts, their viability, minimum volumes required, lead times on materials and building elements and possible output rates that in turn would need to be considered within the planning and programming phases.

In many cases, concepts that might have been developed within the initial stages of the programme would be discussed, tested, challenges and either amended, adapted or changed.

3) What is the construction playbook and what are the potential implications for UHL?

3.1 The Construction Playbook is the result of extensive collaboration from across the public and private sectors to bring together expertise and best practices. It builds on the recently published National Infrastructure Strategy and supports the government's ambition to transform our infrastructure networks over the next decade and beyond so we can build back better, faster and greener.

Chief Operating Officer for the Civil Service and Permanent Secretary for the Cabinet Office;

This vision will only be achieved by working together and setting out clear requirements to reform the industry. Government leadership is crucial and we need to align our efforts with the sector to ensure actions are consistent and reinforcing.

3.2 Construction Playbook

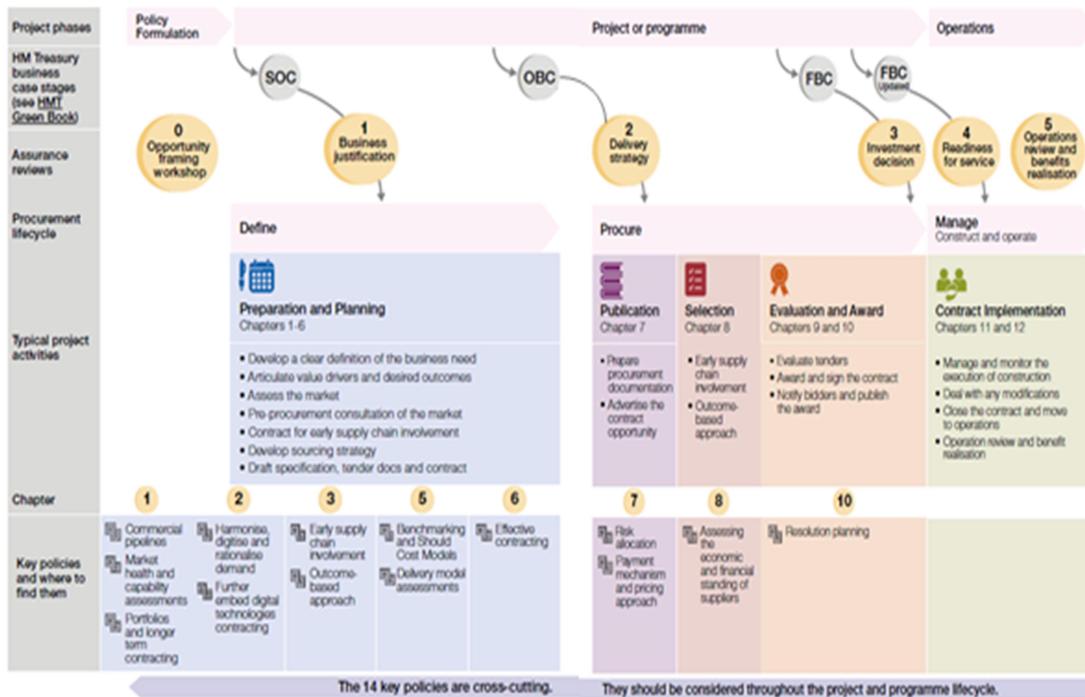
The recently launched Construction Playbook has been reviewed by the UHL team. Its contents and recommendations are welcomed. The Trust has held a number of workshops

internally to review, discuss and explore how and where the team will embed the principles contained within the paper.

It is recognised that there is clear ‘cross-over’ and synergy between the contents of the Construction Playbook and the Collaboration Agreement, and recognise that UHL’s current stage within the HIP Programme aligns with the ‘Define and Procure’ elements of the Procurement Cycle (as outlined within the Playbook Flow Diagram below).

Playbook flow diagram

Figure 1. Where this Playbook fits within a typical procurement process



4) Conclusions and UHL next steps

4.1 The recent development of MMC strategies has been iterative, with improvements made on each project as processes are refined and repeated. An example is at Alder Hey where Laing O’Rourke’s factory remodelled the concrete panels prior to manufacture, whereas at the Grange sufficient knowledge of the modelling requirements were understood to allow modelling parameters to be agreed and the Architectural model used directly, saving time and cost. The most recently handed over ‘listed’ project, Grange University Hospital, has reached the NHSEI target of 75% MMC.

4.2 The important objective at the outset of the project is to ensure that the project is configured for MMC, using a ‘common platform’ approach to suit a variety of MMC technologies. This will also facilitate a truly competitive, broad based Contractor

procurement process. From experience a structural frame and full structural modules allows for future flexibility and potential change, also enabling a reduced programme length as design information can be released progressively in line with the construction sequence.

4.3 UHL fully embrace the principles of MMC in both specific terms of areas that include off site construction and the delivery to site of building components through to the wider concepts of just in time delivery and proactive supply chain management.

4.4 The BDP and UHL Programme team need to understand how the project specific strategies we develop related to MMC will be reviewed and coordinated with other projects and workstreams by the new Hospital Programme e.g. could a number of projects be 'batched' to achieve economies of scale with the supply chain?

4.5 Site constraints and Trust preferred MMC solutions will need to be assessed, but potential for batching should be considered and reviewed in terms of its impact on MMC, which includes the standardisation of rooms.

4.6. The Trust Board will be kept up to date with discussion with the New Hospital Programme on how to optimise the benefit of MMC within our programme.

Input Sought

The Trust Board is requested to:

- NOTE** the content of this report, and acknowledge that further updates on how the programme plans to embrace the MMC agenda will be provided at a future date.

For Reference:

This report relates to the following UHL quality and supporting priorities:

1. Quality priorities

Safe, surgery and procedures	[Yes]
Improved Cancer pathways	[Yes]
Streamlined emergency care	[Yes]
Better care pathways	[Yes]
Ward accreditation	[Yes]

2. Supporting priorities:

People strategy implementation	[Yes]
Investment in sustainable Estate and reconfiguration	[Yes]
e-Hospital	[Yes]

Embedded research, training and education [Yes]
 Embed innovation in recovery and renewal [Yes]
 Sustainable finances [Yes]
 Quality strategy development [Yes]

3. Equality Impact Assessment and Patient and Public Involvement considerations:

- What was the outcome of your Equality Impact Assessment (EIA)? N/A
- Briefly describe the Patient and Public Involvement (PPI) activities undertaken in relation to this report, or confirm that none were required. Part of individual projects
- How did the outcome of the EIA influence your Patient and Public Involvement? Part of individual projects
- If an EIA was not carried out, what was the rationale for this decision? N/A at this stage

4. Risk and Assurance

Risk Reference:

Does this paper reference a risk event?	Select (X)	Risk Description:
Strategic: Does this link to a <i>Principal Risk</i> on the BAF?	X	PR 7 – Reconfiguration of estate
Organisational: Does this link to an <i>Operational/Corporate Risk</i> on Datix Register		
New Risk identified in paper: What <i>type</i> and <i>description</i> ?		
None		

5. Scheduled date for the **next paper** on this topic: [April 2021]

6. Executive Summaries should not exceed **5 sides** [My paper does comply]