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## **STRATEGIC ASSET MANAGEMENT: RELATING TO OPEN BUILDING CONCEPTS**

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### ***Abstract:***

*Healthcare services are provided in increasingly complex environments which are driven by multifaceted internal activities along with changing patterns of demands, rising costs and the management of the physical assets is vital for efficient delivery of these services along with improving quality and increasing productivity. Healthcare estates\* planning is supported by a Trusts' programme management and investment appraisal and planning. This paper explores current approaches and develops an approach to Strategic Asset Management using open building concepts that can be applied to healthcare projects to enable a flexible estates response to service redesign, technology innovation and changing business demands. This is achieved through collation and comparison of these approaches to identify existing gaps and inform how open thinking can transform business case procedures for estates planning and assist in the strategic evaluation of healthcare assets.*

***Aim:*** *To investigate healthcare estates planning approaches and assess various decision making criteria around Strategic Asset Management (SAM) in order to develop a SAM framework utilising open building principles.*

### ***Objectives:***

- *Develop a state of the art through a review of literature on estates planning approaches in the UK.*
- *Identify limitations and gaps with current approaches.*
- *Define key terms (Strategic Asset Management).*
- *Devise a framework supporting Strategic Asset Management that compliments open building principles and concepts.*

*\*In UK the National Health Service (NHS) hospital physical asset planning is referred to as estates planning.*

**Keywords:** Strategic Asset Management, Open Building, Business Case, Estates Strategy, Healthcare

## CONTEXT

The National Health Service (NHS) in England is facing a huge financial and capacity crisis. New thinking is needed to meet expanding demand while controlling rising costs, improving quality and raising productivity. Recently the government published *The White Paper, 'Equity and excellence: Liberating the NHS'*, setting a long-term vision for the NHS, realising up to £20 billion of efficiency savings by 2014, which will be reinvested to support improvements in quality and outcomes (Department of Health, 2010). The government plans to reduce NHS management costs by more than 45% over the next four years, freeing up further resources for front-line care. In 2010 the Chancellor identified improvements to NHS estate utilisation as a key saving area in 2010/11-2012/13, potentially reducing in 2010/11 the need for new hospital space by up to £3bn and saving up to £100m per annum of estate costs (DH/NHS Finance Performance & Operations, 2009). The importance and possibility for these kinds of savings have been well articulated in grey literature; however, current estates teams are faced with challenging decisions raised by competing priorities and conflicting policy drivers. Several Department of Health (DH) and Community Health Partnership (CHP) organised initiatives and approaches (such as Commissioners Investment & Asset Management Strategy and Strategic Service Development Plan) have improved this situation, however, many Trusts are only now in the position to better understand the value of their estates. Only a few Trusts have a clear idea of how services are being delivered spatially and how buildings can be adapted for future change or marketed as valuable real estate. The underlying principles for all Strategic Asset Management (SAM) plans are to deliver 'optimum' and efficient estate providing good 'value'. Given the complex nature of healthcare, a one-stop solution may not address the challenges encountered. A framework is thus required to address the current gaps within estates planning approaches along with providing valuable guidance to planners. In the current economic environment, where capital allocations are under pressure, such an approach to SAM (which relates to open building concepts) will enable the healthcare sector to re-appraise asset ownerships along with determining sustainable approaches to asset acquisition, maintenance, refurbishment, reconfiguration or disposal.

## HEALTHCARE ESTATE PLANNING APPROACHES

### Healthcare Estates Planning within the NHS (UK)

The effective planning and maintenance of NHS assets is essential for the provision of safe, secure, high quality services capable of supporting current and future service needs. This should take place at a number of different levels - starting at a strategic level and cascading down to a more operational level. This can be achieved by the systematic management of all decision-making processes taken throughout the life of the physical asset. Using assets effectively can realise improved capital receipts and efficiency savings. Estate planning needs to address critical capacity gaps and establish appropriate demands for accessible service models. Within England, the estates planning process begins with the projection of the demand on the infrastructure (calculated on the basis of volume of patients and resources required). This demand is driven by factors such as: demographic projection; epidemiological changes; and advances in medical technology. Historical trends are projected based on these factors to determine the future national demands. This leads to projections of system level clinical activity, which is factored into different types such as inpatient, outpatient and A&E activities (Neufville *et al.*, 2008). Within the NHS, many hospitals (NHS Trusts) have tended to calculate their anticipated volume of activity on the basis of the previous year's activity

levels and waiting lists, complemented by estimates of the activity levels required to meet the 18-month waiting-time target (Ettelt *et al.*, 2007). There is no central planning of hospital services at the national level per se. They traditionally negotiate anticipated volumes of activity with the Primary Care Trust (PCT), and these figures are then set out in a service-level agreement between the organisations. Demand is then segmented into disease categories which is considered first at a national level and then broken down to: a regional level (Strategic Health Authority); a local level (Primary Care Trust); and finally a hospital (Neufville *et al.*, 2008). This demand is then used to calculate the required hospital capacity. But given the current re-organisation and reform of NHS organisational structure as proposed in *The White Paper, 'Equity and excellence: Liberating the NHS'* (Department of Health, 2010) has meant the abolition of Strategic Health Authorities (SHAs) and PCTs. This entails giving responsibility for commissioning health care to GPs and their practice teams working in consortia; the creation of an independent NHS Commissioning Board to allocate resources and oversee GP consortia; the introduction of an outcomes framework for holding the NHS Commissioning Board accountable in place of targets and performance management and the creation of an economic regulator that will set prices, promote competition and ensure service continuity of essential services (Dixon and Ham, 2010). The lack of detail in *The White Paper* (Department of Health, 2010) makes it difficult to predict how these changes will play out in practice and the effects it will have on estates planning. The traditional measure for hospital capacity has always been inpatient beds which are derived from required target occupancy rates; but this is a complex issue as there are many hospital beds within 'length of stay' category (medium term, long term and short term), along with the type of specialities within each of the hospital departments. This is further compounded by the site specific characteristics such as patient management profiles, structural, political, geographical and organisational environments (Nguyen *et al.*, 2005, Nguyen *et al.*, 2007). Care models are then designed to determine how these services will be delivered through different healthcare providers (Green, 2004). Given the current changes within the NHS the Kings Fund (Dixon and Ham, 2010, Ham *et al.*, 2011) suggest the implementation of a new model of care driven by clinicians working collaboratively to meet the needs of patients and to co-ordinate services with regional level leadership (provided by multi-professional clinically led groups or clinical cabinets working with the NHS Commissioning Board). Alternatives to the tariff are also needed for non-elective, long-term and complex care. These alternatives may include bundled payments, pooled or delegated budgets and capitated budgets. Any payment mechanism adopted needs to ensure that financial rewards are linked to the quality and outcomes of care (Ham *et al.*, 2011).

Over the years, there have been several guidance documents related to capital investment and management of estates and facilities such as: the Capital Investment Manual (NHS Executive, 1994); NHS Estates Code (NHS Estates, 2003); Developing NHS estates strategy (NHS Estates, 2005); World Class Commissioning (Department of Health: Commissioning, 2007); and Transforming Community Services: enabling new patterns for provision (Transforming Community Services Team: Department of Health, 2009). These have tried to address the effect of changing organisational, commissioning and procurement impacts on estates. Tools such as SHAPE (Strategic Health Asset Planning and Evaluation) (Department of Health, 2008c), ADB (Activity DataBase) (Space for Health, 2011), PAM (Premises Assurance Model) (Flory, 2010) deal with various aspects of whole building life cycle from planning and designing of spaces within the building to operation, maintenance and disposal. Other tools such as: DQI, Backlog maintenance, ERIC (Estates Return Information Collection) (Department of Health, 2008b), PEAT (Patient Environment Action Teams) (NHS National Patient Safety Agency, 2011), AEDET (Achieving Excellence Design

Evaluation Toolkit) (Department of Health, 2008a), BREEAM (*Building Research Establishment's Environmental Assessment Method for Healthcare*), NEAT (NHS Environmental Assessment Tool) (Department of Health, 2009) deal with the quality and performance of the estates and services. There are a number of approaches prescribed and adopted for effective estate planning within healthcare. The following approaches were selected as these were recommended by the Department of Health and are widely utilised for estates planning within England and deal with various aspects of asset management.

#### ***Commission Investment Asset Management Strategy (CIAMS) (2009)***

CIAMS, developed by Community Health Partnership, is one of the recent approaches to estates strategy. It was built on existing practice and aimed to promote an alignment between a PCT's commissioning strategy and its plans for the future of primary and community care estate (Community Health Partnerships, 2009a). This was built on the approach set out to achieve the separation of the operational provider services from commissioning functions (Transforming Community Services Team: Department of Health, 2009). This guidance provided a high level approach for a comprehensive estates audit that aimed to enable commissioners to have a complete picture of the quality, use, location and cost of the estate from which primary and community health services could be provided. The process described in this toolkit takes commissioners through a series of questions about their estates (e.g. baseline information, suitability of the property and finance). The output from this process is the production of a strategic document (CIAMS Output Spreadsheet).

#### ***Strategic Service Development Plans (SSDP) (2009)***

SSDP, also developed by Community Health Partnership, is defined as a document that *'brings together the service vision of local public sector organisations to describe a local economy service strategy to radically improve the health and well being of local communities. It should identify the new facilities needed to deliver that strategy and link health and social outcomes with infrastructure development'* (Spence, 2010). A SSDP underpins a LIFT project and adopts a whole-system approach in relation to capacity planning for primary care, acute care and related services. It can also be used by PCTs and SHAs to match premises investment against service plans. CIAMS can be seen as the process that provides the foundation for the development of an SSDP through:

- understanding the current estate;
- analysing the gap between the existing estate and that required to accommodate projected future service provision; and
- bridging the gap through identification of infrastructure solutions (Community Health Partnerships, 2009b).

It deals with wider determinates of the health economy and is suggested to be a 'live' document that has to be updated regularly or at least annually by the participants and reviewed by those required to approve capital investments (such as LIFT Co).

#### ***Developing an Estates Strategy (2005)***

This guidance provides best practice advice on developing a robust estates strategy and also includes example strategies in the form of case studies. According to this manual the key components of an estates strategy are informed around three common strategic questions:

- Where are we now? To cover: current service profile (Up-to-date existing estate appraisal; property schedule and value; estate occupancy costs; physical condition; functional suitability; space utilisation; quality; mandatory fire safety/statutory compliance; environmental management; environmental impact assessment; patient perception surveys; risk-adjusted backlog; and a summary of priorities.)

- Where do you want to be? (A summary of the service strategy, environmental strategy, and estate performance criteria).
- How do we get there? (Implications of service strategy for the estate, preferred strategic option for estate change, implications of local authority development strategies, capital investment programme, a summary of disposal and proceeds of sale, site-based development control strategies, forecast effect of strategy on estate performance, forecast effect of environmental performance improvements, risk management strategy) (NHS Estates, 2005). Amongst the guidance evaluated this was the only one that provided best practice examples.

***Health Building Note 00-08: Estatecode (2007)***

This was designed for providing best practice guidance to NHS organisations on all aspects of managing their estates to inform decisions based on strategic investment procurement, acquisitions, disposal and leasing of land and property (sets out what is mandatory as opposed to discretionary guidance) along with including legal, financial, regulatory, statutory and administrative issues. This was intended to inform day-to-day management issues. It includes detail on town planning (statutory legislation, NHS involvement, application and appeals) along with management of land and property. It refers to a SSDP which should include: innovative methods of service delivery, including those that cut across established organisational boundaries; practical applications of current guidance and initiatives; local expertise (patient, clinical and strategic); contributions from available partners; along with details of anticipated and required workforce changes. It has detailed guidance with regards to asset management (e.g. legal considerations, procurement, acquisitions, leasing, disposal and capital charges).

***Capital Investment Manual (CIM) (1994)***

This is one of the key guidance documents that most PCTs, SHAs refer to during planning and evaluation of their capital schemes and is broadly organized around project organization, Private Finance Initiative (procurement route), business case guide, management of construction projects, Information Management and Technology (IM&T) guidance, commissioning of health care facility and post project evaluation (NHS Executive, 1994). It describes key roles and responsibilities that must be discharged and recommends structures for managing construction and IM&T projects and also recommends the use of PRINCE (Projects IN a Controlled Environment) methodology. It also provides details on appraisal of services along with linking service volumes to demands to provide appropriate facilities along with a gap analysis of capital asset base and affordability of the investment along with detailing out each step of the business case (BC) planning process from the options appraisal and formulating the outline BC through to Full BC. It also recognizes that Trusts may not have the capability and capacity to design and build facilities and to attempt this may be a risk; hence suggests engaging experts in construction project management, architects, quantity surveyors, design contractors, building contractors and equipment suppliers. This guidance also provides templates of documentation required (ranging from project certificates and business case forms through to financial status reports, tender and procurement reports along with quality and performance reports). This can be inferred as one of the 'core' guidance as all other guidance (evaluated in this paper) makes a direct or indirect reference to it. Along with the vast amount of detail provided in this guidance, what sets it apart from the others is the reference to IM&T procurement and implementation along with equipment procurement, identification of competencies and training requirements along with post project evaluation guidance. Table 1 summarizes the findings of the comparison of the various estates planning guidance.

**Table 1: Comparison of Estates Planning Approaches**

	<b>CIAMS*</b>	<b>SSDP*</b>	<b>Estate code</b>	<b>Estates Strategy</b>	<b>CIM</b>
<b>Tools</b>	Multimap, survey tools and techniques, SHAPE, Six Facet Survey, good corporate citizen assessment, BREEAM For Health (B4H), AEDET, SMARTWaste (SWMP) *can be viewed as a tool in itself	Gap analysis, Joint Strategic Needs Analysis (JSNA), options appraisal, cost rent premises analysis *can be viewed as a tool in itself	SHAPE, AEDET option appraisal, financial appraisals, cost benefit analysis, sale methods (formal tender, informal tender, private treaty, late bids, public auctions), risk management, health and safety, transport planning, SSDP	statutory legislation, NEAT, mapping trends, income to asset ratio comparison, patient journey model, site density analysis, guidance for managing backlog and risk management model, quality assurance model for the patient journey	PRINCE, porters five forces, SWOT, cost benefit analysis, financial appraisal, option appraisal, brain storming, weighting and scoring of benefits by options, scenario planning, patient surveys, cost analysis, demand analysis, analyses of disaggregated population data (demographics), competitive analysis
<b>Approach</b>	Strategic (High Level)	Strategic (High Level)	Strategic, Tactical	Strategic	Strategic, Operational
<b>Time Frame</b>	3-5 years	5-10 years	10 years	5-10 years	3-5 years & 10 years
<b>Provision of Best Practice Examples</b>	No	No	No	Yes	No
<b>Structural Decision Making</b>	No	No	Yes	No	Yes
<b>Stakeholder Engagement</b>	Patient Surveys	Public Consultation	Public consultation	Stakeholder engagement (financial, general and business managers, clinicians SHA stakeholders)	GP and patient surveys, internal stakeholder consultation (clinicians, nurses, managers, department head and NHS staff), external stakeholder consultation
<b>Potential Gaps</b>	Focused on front end planning and lacks operational detail on asset management. References are made to guidance for building functionality, suitability and functional condition, but none made for capacity planning and room utilization. No detail is provided on stakeholder or public and patient engagement, only reference is made to patient satisfaction survey for core suitability of the property or estate in term of quality of environment for patients; in order to reveal underlying consistent concerns that need to be considered in assessing the building's quality.	A high level strategic document and lacks detailed costing and financial reviews of the proposed infrastructure solutions. No detail on asset management and broader issues related to estates planning. It promulgates a whole system approach but does not provide the necessary tools and guidance required. Reference to dealing with workforce issues without providing much detail on labour market trends and recruitment and retention issues.	It recommends careful evaluation of space requirements (through utilisation of open-plan office and shared facilities) to secure significant space, energy and ultimately cost savings; but does not articulate other aspects of rationalisation such as sharing flexible spaces which are designed around room adjacencies and shared care pathways. It provides a detail account for the current premises (lifecycle costs of the assets) but does not take into account future scenarios.	A high level strategic document that only sets out the components of an estates strategy. It refers to the chief executives and estate and facilities directors as the key personnel responsible for generating an estates strategy, but does not detail their role or include other stakeholders. Although it refers to stakeholder engagement, it does not entail the key methods utilised for this.	Key roles for management structures defined are too rigid and have a top down approach; traditional roles of estate planners defined may be inadequate and may lead to a lack of project ownership. Organization of the management structure also suggests switching responsibilities between individuals at various points in the project, unless good team working and collaborative practices are established this may lead to a blame culture. This guidance needs to be updated and referred to PRINCE2 (OGC, 2011). Guidance is lengthy and resource intensive; and risk in overspending

## **STRATEGIC ASSET MANAGEMENT (WITHIN THE CONTEXT OF AN ESTATES STRATEGY)**

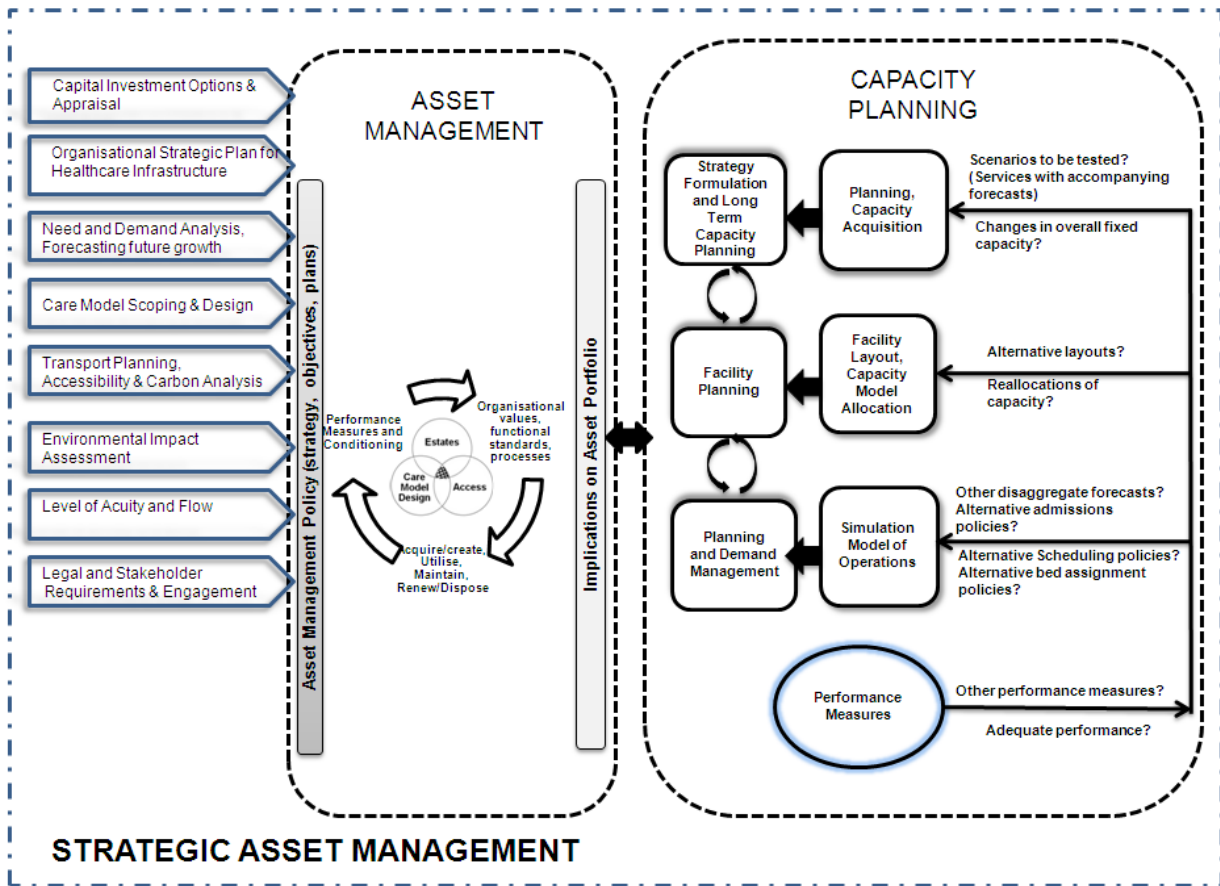
One of the key findings from the above analysis was that many current processes of estates planning are based on a 'top down' approach that evaluate business cases or appraise infrastructure plans for prospective capital investment based on rigid master plans. Most of the guidance provide a comprehensive approach to planning and management of assets along

with delivery of capital schemes, however many of these are based on national policy quality initiative and targets rather than on a robust evidence base. There is no clear understanding of how estates strategic planning and asset management sit within a wider whole systems plan. As a result, Trusts may find themselves ineffectively and inefficiently delivering some aspects, for example, accessibility and transport planning are critical, however there is little guidance or methods to perform these activities and stakeholder involvement process need to be better integrated with the decision making process. Strategic estates planning needs to demonstrate buildings that focus on quality, coordinated care, economic and environmental sustainability along with patient and staff safety. The key message is to build a system based response to manage all the policy drivers in place, along with managing collaboration and competition. Many trusts go through a prioritisation process for investments, driven out by: fragmented and minimal funding streams; changing policy; contentious business case development; and unaffordable minimum standards. There is little guidance on how priorities can be realistically made against national standards and best practice for flexibility and adaptability. Trusts' estates strategies may be improving efficiency and speed of provision but may not be enhancing design quality. As such, a SAM approach should supplement integrated business planning to anticipate change in the estate. There are new ways of organising hospitals (e.g. co-located models and integrated care centres) and new specialist care models and managed networks that all need to be better understood during up-front planning and strategy formulation. There is a need to develop SAM as a facilitating framework. Estates planning approaches are not comprehensive enough (they need to be more than just technical strategic estate planning solutions); the development rationale needs to move from a 'static' to a 'dynamic' approach leading to a more 'agile' infrastructure planning solution.

The terms Asset Management and Strategic Asset Management have been defined by various organisations (Knowledge Group Consulting, 2006, Audit Commission, 2009, Audit Scotland, 2008, BSI, 2008, Institute of Asset Management, 2009, Maheshwari, 2006, Woodhouse, 2001), for the purpose of this research, SAM is defined as 'systematic and coordinated activities and practices that are based on evidence based decision making supported by capacity planning to sustainably plan, manage, maintain and dispose estate through optimum whole life costs with robust risk management plans which deliver the organisation's objectives with effective stakeholder engagement at appropriate levels'. SAM is complemented by: systems knowledge (defining the problems); transformation knowledge (synergies for simulation scenarios); and objective knowledge (strategic planning defining roles and new areas).

The following figure sets out a framework for SAM which is driven by capacity planning at one end and also lists the key factors that should be considered for effective asset planning, maintenance, operation and disposal. This framework adopts a strategic systems thinking approach which considers ever evolving models of care and is complemented with a good estates planning strategy along with accounting for accessibility issues in order to provide capital investment solutions that provide value for money along with effective healthcare service provision. It should also be noted that estates planning, care model scoping and design and access (transport planning, accessibility and issues around co-location etc) (Mills, 2010b) are placed at the heart of SAM as these are seen as essential components for effective healthcare infrastructure planning (Mills *et al.*, 2009, Mahadkar *et al.*, 2010). SAM needs to tackle issues that the current healthcare landscape faces along with quantifying future levels of demand to provide accessible services within flexible premises.





*Figure 1: Framework for Strategic Asset Management  
Adapted from (Butler et al., 1992)*

## OPEN BUILDING APPROACH TO STRATEGIC ASSET MANAGEMENT (SAM)

In open building, the building is seen as a potentially well organized combination of available systems and subsystems (Kendall, 2007a). Healthcare is complex and dynamic, and hospital buildings or assets or estates are complex facilities that are not built and operated as 'whole buildings'. It has long been recognised that hospitals are 'rigid' when subject to changes in demand (driven by demographics, epidemiological patterns), advances in technology and new medical equipment and political and organisational changes which effect the scale and scope of the hospital along with changes in funding of healthcare services (Neufville *et al.*, 2008, Miller and Swensson, 2003, Olsson and Hansen, 2010, Tannis *et al.*, 2005). Open building recognises and appreciates the fact that no party makes all decisions when a building is first constructed and through its lifespan, the building adjusts to new needs and technical requirements and decision making and construction has to be organised in such a way as to reduce excessive dependencies and 'entanglements' among all parties involved (Building Futures Institute, 2011). Kendall (1999) defined system entanglement as '*ad-hoc and disorderly layout of physical systems so that the change of one part disrupts (requires the movement, destruction or change of) many other parts. The greater the number of physical systems and their "entanglement", the greater the chance for conflict among the various parties controlling them. Conflict leads to legal disputes, reduced quality, increased rework, and unsatisfied users and building owners*'. The 'entanglements' that are referred to by Kendall (1999) in open building are also seen within the healthcare estate planning process.

Various stakeholders of the project (clinicians, patient, public, construction managers, builders, suppliers and others) have to organise new ways of working through estates planning, design and procurement methods in order to deliver healthcare while dealing with these ‘entanglements’.

The various levels of infrastructure planning used for the design, build and management of buildings has been organised into ‘principles of levels’ by (Kendall, 1999, Habraken N. J., 2000); these hierarchical levels structure interventions by various stakeholders who control work at each level. Habraken and Kendall (2007) first introduced the term ‘infrastructure’ into open building to describe that a base build infrastructure fits within a ‘higher level infrastructure operating in the city’ (p. 2), where open building has levels of intervention that serve or conflict with some greater ‘three-dimensional urban design’ (p. 4). For Habraken and Kendall (2007) this thinking contributes to longer life spans for the ‘base build infrastructure’ and is instrumental in achieving sustainability, through the uncoupling of the complexity and intricacy of fit-out demands with high performance envelopes, a principle that they state is now recognised by the United States Green Building Council’s LEED rating system. The merits of using open building principles and techniques have been seen in various projects all through the world (Kendall, 2007b, Kendall, 2003, Kendall, 2006) and given the complexity of healthcare infrastructure planning (presence of multiple design firms, contractors, suppliers, construction managers, planners and various other stakeholders that are involved through the life of a hospital), these ‘levels’ can be utilised in order to enable ‘agile’ planning and decision making.

Figure 2 depicts how the SAM framework can relate to open building concepts. The various ‘levels’ are arranged within a pyramid to depict the ‘control’ each level has over the other, the lower levels exert a higher control than the top and similarly the top layers are less ‘constrained’ than the bottom layers. Cuperus (2001) explains that each of these levels are separated yet co-ordinated and there is decision making and consultation between each level. They connect a decision making party or stakeholder to an object under construction or in transformation (Kendall, 2009). We have incorporated the different types of decisions between the levels, for example, ‘ergonomic’ decisions that look at adaptable workplaces with user adjustability that promotes safety will be included within the ‘furniture and equipment’ and ‘fit-out’ level. Similarly decisions based around ‘acuity’ (provision of appropriate level of care that matches variable patterns of acuity in a multitude of settings), ‘capacity’ (the utilisation and a measure of the maximum possible output of a process or system) and ‘flow’ (movement of people and logistics of other infrastructure assets along a process or around a system) are included between the other levels. Further explanation of these concepts can be found in (Mills *et al.*, 2011).

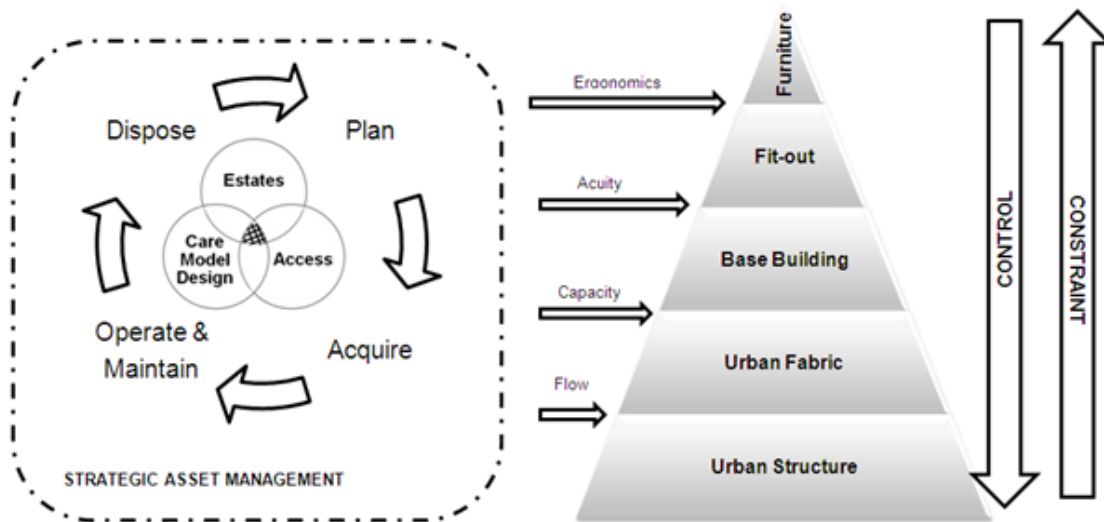


Figure 2: Relating SAM to 'Open Building' principles

Kendall (1999) developed a three tier model of control distribution in which he has divided 'fit-out' level into two categories for products and work and has further overlaid this onto a CSI (Construction Specification Institute) model. A similar approach has been proposed in this paper, where three key components of SAM (Estates Planning, Care Model Design and Access) are organized around the principle 'levels' of open building.

	Urban Structure	Urban Fabric	Base Building	Fit-Out	Furniture & Equipment
	Long Life (50-100 yrs)		Medium (10-50 yrs)		Short (5-15 yrs)
<b>Estates Planning</b>					
<b>Care Model Design</b>					
<b>Access</b>					

<p><b>Estates Planning: Components</b></p> <ul style="list-style-type: none"> <li>•Functional Suitability</li> <li>•Space Utilisation</li> <li>•Joint Strategic Needs Assessment</li> <li>•Physical condition</li> <li>•Fire &amp; Health Safety Regulations</li> <li>•Environmental Regulations</li> <li>•Space Efficiency</li> <li>•Asset Productivity</li> <li>•Asset Deployment</li> <li>•Health Impact Assessment</li> <li>•Workforce Planning</li> <li>•Service Performance Audit</li> <li>•Capacity: size of facilities, hospital episodes housed</li> <li>•Estate Condition</li> <li>•Function &amp; location of estate- fit for purpose?</li> <li>•Value of assets</li> <li>•Estates Management</li> <li>•Ownership issues Restrictions/terms for sale/use</li> <li>•Constraints on transfer/sale/disposal</li> <li>•Difference in estates complexity</li> <li>•Remodelling/refurbishment?</li> <li>•Surplus to requirement</li> <li>•Constraints: property/legal/ refurbish/remodel/dispose</li> <li>•Need for new investment-where?</li> <li>•Disposal &amp; asset management planning</li> <li>•Detailed procurement plans</li> <li>•Allocate capacity based on demand</li> <li>•Obligations/commitments affecting available options</li> <li>•Estate utilisation</li> <li>•Space waste minimisation</li> <li>•Service Capacity Assessment</li> <li>•Environmental Impact Assessment</li> <li>•New technology, care service innovation analysis</li> <li>•Asset productivity</li> <li>•Functional suitability</li> <li>•Environmental &amp; Sustainability issues</li> <li>•Whole life value</li> <li>•Exemplars</li> <li>•Stakeholder consultation</li> <li>•Knowledge management</li> <li>•Multi-organisational integration &amp; incentive alignment</li> <li>•Development data &amp; Population forecasts</li> </ul>	<ul style="list-style-type: none"> <li>•Financial drivers</li> <li>•Legal, Property &amp; Financial Assessment</li> <li>•Breakage costs/other constraints</li> <li>•Finance</li> <li>•Staffing &amp; Skills</li> <li>•Risk Management Strategy</li> <li>•Risk Analysis &amp; plan</li> </ul>	<p><b>Care Model Design: Components</b></p> <ul style="list-style-type: none"> <li>•Service Capacity Assessment</li> <li>•Policy Drivers</li> <li>•Mapping pathways</li> <li>•Development data &amp; population forecasts</li> <li>•Disease prevalence</li> <li>•Scoping of care model</li> <li>•Identifying required benefits</li> <li>•Define levels of service</li> <li>•Predict volume of care</li> <li>•Identify cost of purchase</li> <li>•Equipment and diagnostic modelling</li> <li>•Distribution of spatial adjacencies within &amp; between buildings</li> <li>•Outcomes target to drive redesign</li> <li>•Identify target demographics</li> <li>•Identify required benefits</li> <li>•Model financial &amp; activity data</li> <li>•Model future pathways</li> <li>•Additional demand analysis and population modelling</li> <li>•Implement service change</li> <li>•Joint Strategic Needs Assessment</li> <li>•Health Impact Assessment</li> <li>•Redesign existing care model</li> <li>•Survey clinical team to identify safe &amp; efficient pathways</li> <li>•Stakeholder consultation</li> </ul>	<p><b>Access: Components</b></p> <ul style="list-style-type: none"> <li>•Service Location</li> <li>•Demographic Profile Maps</li> <li>•Landuse Allocation Maps</li> <li>•Development data &amp; Population forecasts</li> <li>•Location of estate- fit for purpose?</li> <li>•Transport and carbon analysis</li> <li>•Map existing modes of travel, journey &amp; demographics</li> <li>•Identify catchment areas</li> <li>•Compare exiting journey times and proposed</li> <li>•Compare existing and future service and estates distribution</li> <li>•Future new development areas</li> <li>•Integration (horizontal/vertical)</li> </ul>
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Figure 3: Tier Model for 'agile' decision making in Strategic Asset Management

Figure 3 above depicts the various components in estates planning, care model design and access that need to be considered against each of the building ‘levels’ i.e. urban structure, urban fabric, base building, fit-out and furniture and equipment. Once each component is mapped, it will enable to see the interfaces between different levels and will help determine which activities can be carried out independently and the interplay between different levels. Consider the following example (Figure 4), in which a few components from Figure 3 (above) have been taken. It can be seen that ‘estates condition’ has a medium and short-term impact on ‘base building’, ‘fit-out’ and ‘furniture and equipment’ levels, this is considered during estates planning and the condition of the estate does not affect the lower building levels. On the other hand, ‘mapping pathways’ and ‘service location’ is considered on a wider neighbourhood and regional planning level. These have a longer life and changes to these will impact estates condition. To explain this further, consider the introduction of telecare for patients with long-term conditions, this will enable them to record vital patient information such as blood pressure and sugar levels, and those details can be sent directly to a nurse, GP or clinician to monitor remotely. This means that the ‘service location’ in this case is changed from a hospital or care home setting to a patient home along with a change in the care pathway i.e. ‘mapping pathways’. This will have an impact on estates condition, as there may not be a need to have certain equipment and the patient beds/rooms within the ‘base building’ can be used for other treatments or providing other services.

Component (EP/CMD/A)	Urban Structure	Urban Fabric	Base Building	Fit-Out	Furniture and Equipment
	Long Life (50-100 yrs)		Medium (10-50 yrs)		Short (5-15 yrs)
<b>Estates Condition</b>					
<b>Mapping Pathways</b>					
<b>Service Location</b>					

*Figure 4: Application of the Tier Model Concept*

Similar tier model diagrams can be drawn for each of the components within estates planning, care model design and access. These will be case specific and should be considered for individual SAM plans. These will enable thinking of new environments along with the impact of commissioning and the implications on estates planning and the ability of the assets to flexibly respond to service re-design. Once these are established the next phase will entail establishing appropriate decision making networks between each of the levels after considering stakeholder consultation and engagement.

## **CONCLUSION AND WAY FORWARD:**

The authors were also involved in investigating the strategic estates planning approach with six Foundation Trusts within England (Milton Keynes, Southampton, Salford Royal, Taunton, St Thomas’s and Guys and Brighton) and have also trialled an open scenario planning approach with them (Mills, 2010a, Mills *et al.*, 2010). This approach was designed using strategic scenario planning concepts developed using open building and planning principles by Kendall (2007b) and Astley (2009) respectively. This enabled the research team to witness first-hand the the multi-intuitive and multi-stream approach adopted by the Foundation Trusts to execute their estates planning processes. The rigidity of estates planning

approaches and techniques was observed at two levels: first, through a detailed document analysis of the guidance recommended by the DH; and second through active engagement with the estates planning teams within the Trusts. Open building concepts and principles provide a strong backbone to deal with the complexities presented during the healthcare infrastructure planning process. This paper has only just begun to explore the relationship between a flexible estates strategy and a contextual Strategic Asset Management plan that can support a Trust's capital investment and procurement appraisal and can be responsive to service, organisational and political changes. The tier model designed for SAM needs to be validated in order to test its suitability and will be developed in line with the open scenario planning approach that will enable planners to create a map of uncertainty and to build a broad visible understanding of the driving forces for change along with achieving strategic objectives of the organization. The next phase of this research will entail trailing this approach with estate planners, asset and facility managers and hospital designers.

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