6

Design proposals

6.1 Introduction

Key concepts underpinning the design:

— Creating a new public realm that welcomes everyone into the heart of the building and reinforces Oriel's sense of place. The form of the building and the way it relates to its site, urban context and routes will give it a clear identity as part of the knowledge quarter.

— Creating a place of collaboration and interaction between staff, clinicians, researchers, support staff, students, patients and the public, facilitating chance encounters and serendipitous 'water cooler' moments.

— Meeting changing needs through an adaptable building that is inherently flexible and future proof.

— Centred on people and creating the best possible patient experience including addressing the needs of all those with visual or other impairments, disabilities and particular needs.

Other principles infuse the internal design:

— Visual, thermal and acoustic comfort and a calm, compassionate but also stimulating, multi-sensory environment.

— Displaying and representing heritage to "reinforce messages of optimism, confidence and progress".

— Communicating inspirational stories of research, and the value of the integration of science and medicine together with the Institute's and Hospital's world-wide leading stature.

This section describes how the design responds to these design principles and ambitions. It does so in three parts. The first describes the 'shell and core' design - those aspects of the design that cut across the whole building. The second describes the overall site and public realm strategy in response to both the existing context and the emerging masterplan for the wider C&I site. The third part describes the internal organisation and departments within the building. It should be noted that at this stage of design, the detailed layouts and exact configuration are provisional and subject to further engagement with Oriel's user groups in January 2021.

6.2 The adaptive building

The design embraces the principles of an adaptive building. This has led to the building being designed in two parts - the shell and core - comprising the public realm aspects, structure, façade, cores and building-wide plant, and the internal fit out - comprising the departmental layouts, internal finishes and department-specific MEP.

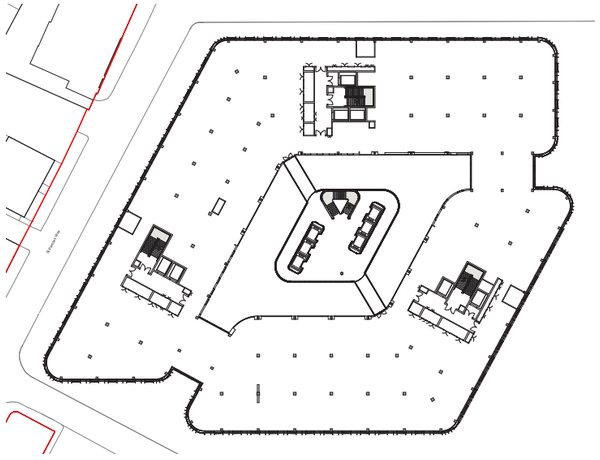
There are a number of compelling reasons for this approach. The first is a need to make the building responsive to future technological advancements in healthcare, research and education. Predicting change is difficult and it is highly probable that significant steps forward will have been made in how these different workstreams are undertaken by the time Oriel is handed over to its users. For example, the building may need to be adapted to reflect how mobile devices are transforming wayfinding to guide users to the building and waiting areas, to reflect new pedagogical methods or in response to greater uptake of tele-medicine, already seen during the current Covid-19 crisis.

Thus Oriel will need to adapt in various different ways over its lifetime, ranging from small adaptations to individual departmental layouts to the reduction or expansion of a department, through wholescale adjustments to the building. With the diversity of use incorporated into Oriel, the structural grid and floor-to-floor height must be resilient enough to allow the diversity of uses to occur anywhere within the building, subject to MEPH requirements.

A further form of adaptability enables a whole floor of the building to be stripped out and refitted for a different but compatible use. For example, fitting office accommodation or additional research space in place of surgery.

The other over-arching reason for considering adaptability is in response to the increasingly urgent climate crisis and the need to minimise waste and maximise the potential for reuse and recycling of elements or indeed the whole building. For example, if the entire facility needs to be re-purposed at the end of its life, the frame of the building can be used for a new function, say as a hotel or residential use. This concept of the circular economy lies at the heart of the design principles and is outlined in the separate Circular Economy Statement as part of the planning submission.

Indicative Outpatients layout



Shell and core floorplate

The shell and core approach allows for both short term flexibility and long term adaptability. The flat slab concrete frame provides the optimum grid and floor heights for the range of activities housed within the building.

Indicative Surgery layout

Indicative Labs layout

Shell and core design

The approach of an adaptive building is to develop the shell and core such that it allows for maximum flexibility over time. The key components of this approach comprise:

Structural frame

The structure of the building is a flat slab concrete frame. This allows maximum flexibility in current and future service runs. With the high levels of carbon embodied in the structure it is critical that the frame is built to last and accommodate many different changes over its long lifetime.

Structural grid

The structural grid of 7.2 x 7.5m was developed through exploring a number of test-to-fit plans for clinical and surgical layouts as well as research labs layouts. This grid provides the most flexible and optimal layout for a wide range of different departments, allowing for short term changes and long term adaptability.

Floor-to-floor heights

A benchmarking exercise analysing similar building types established 4.2m as an optimum floor-to-floor height for the range of different spaces from teaching spaces to clinical consulting rooms to operating theatres to laboratories. Main service runs down the corridors enable higher ceilings in the more highly serviced spaces.

Plant strategy

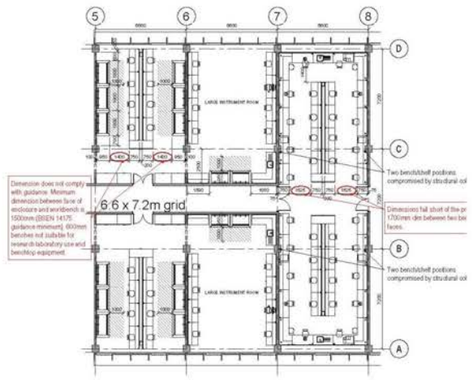
With its diverse range of uses, different parts of the building require different plant demands. The Biological Services Unit and Cells for Sight research laboratories have the highest servicing requirements and are thus located on the uppermost floor where they can be serviced from above. Similarly, an interstitial plant floor services the operating theatres directly below. These uses may change, however, and the plant strategy enables future flexibility in the servicing of the building.

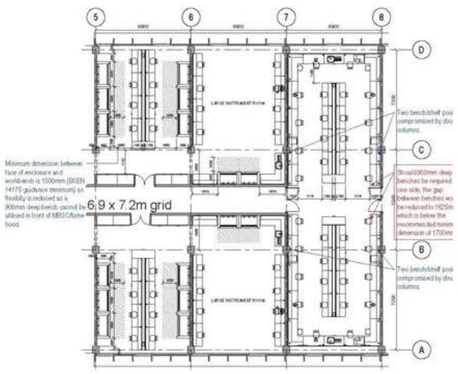
Cores

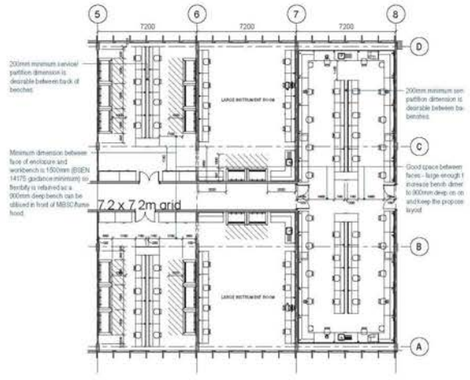
The cores of the building, comprising lifts, stairs, toilets and risers, have been developed in conjunction with the servicing, structural and fire strategy to enable optimal planning across various departments within the building as currently programmed, while providing flexibility for future adaptability of the shell.

Façade

The façade has been developed as a kit of parts that can be changed or adapted over time. The unitised system, prefabricated and assembled on site, allows for long term change to the internal arrangement of the spaces and plant.







7.2 x 7.2m grid (test to fit using 13.5m2 C/E rooms)

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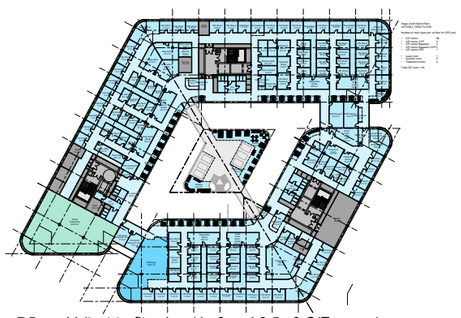
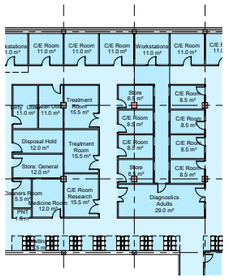


7.2 x 7.5m grid (test-to-fit using 11m2 and 8.5m2 C/E rooms)

A 7.2m longitudinal grid creates C/E rooms of 3.6 x 3.75m and provides well proportioned rooms with good internal flow. The 7.2m lateral greed accommodates three clinical rooms within the middle of the plan, with a strip of waiting around the atrium.

A 7.5m lateral grid allows for additional storage and other space within the middle of the plan with a wider strip of waiting around the atrium.



The 7.5m grid also accommodates the new C/E room areas of 11m2 and 8.5m2 as discussed and agreed at the outpatients user engagement meetings. *(Note: plans are work in progress)*

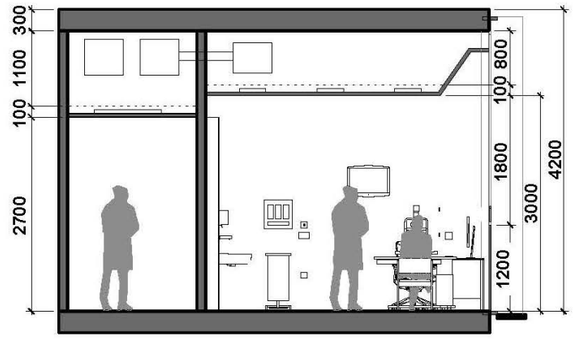
During RIBA Stage 1 a number of different structural grids were tested to determine the optimal dimensions to cater for the range of spaces and activities within the building.

Structural Zone	300mm	TOTAL 4200mm	The structural slab for the project requires a zone of 300mm as noted in A01 of Appendix A.
Building Services Zone (Ceiling Void)	1100mm (1400mm)		The ceiling void for the Oriel clinical, research and laboratory areas needs to be generally 1100m. However, down corridors and adjacent to risers there may be a need for a 1400mm services zone. This will be developed during stage 3.
Ceiling Zone	100mm		This allows for a ceiling and light fittings.
Ceiling Height	2700mm (2400mm/ 3200mm)		The ceiling height for Oriel has been set as 2700mm. However, in some areas adjacent to plantrooms or risers it may need to reduce to 2400mm. In some areas such as theatre or labs we will aim to increase the height of ceilings to 3200mm. The ceiling height includes a nominal floor zone for finishes.
Floor Zone	0mm		In line with similar building type there is no "raised floor" electrical and ICT services are distributed from the ceiling void.

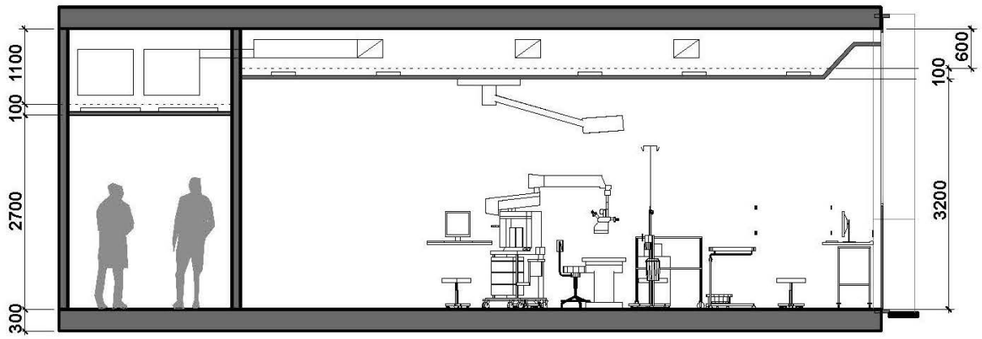
Ceiling height requirements for different spaces

Building	Building type	Structure	Floor to floor height
Liverpool School of Tropical Medicine	Labs	Concrete	4500mm
Royal Liverpool University Hospital	Hospital	Concrete	4500mm
QEII	Day hospital	Concrete	3900mm
Guys Cancer Centre	Hospital	Steel	4500mm
UCLH Phase 5	Hospital	Concrete	4000mm
St Mary's Paddington Outpatient/ Ophthalmology	Hospital	Concrete	4200mm
Eli Lilly Biochemistry	Laboratory	Concrete	4200mm
GOSH, London	Hospital	Various	3850mm
Midland Metropolitan University Hospital	Hospital	Concrete	4080/4420mm
TCC Clatterbridge	Hospital	Concrete	4500mm
Alderhey Children's Hospital, Liverpool	Hospital	Concrete	4200mm
Brighton Children's Hospital	Hospital	Concrete	4200mm

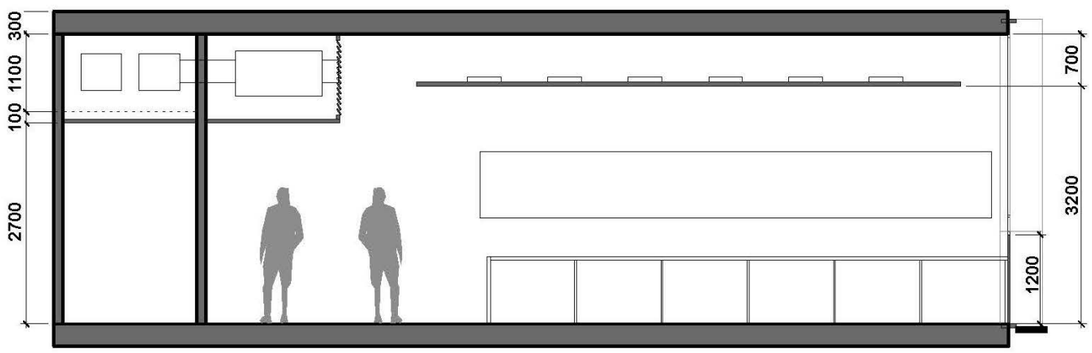
Benchmarking exercise against similar types of buildings to assess structural solution and floor to floor heights.



Typical consulting room



Typical operating theatre



'Wet' lab

Early studies exploring typical sections through key spaces

6.3 Sustainable, low carbon design

The illustration below and the narrative alongside briefly summarise Oriel's approach to sustainable, low carbon design. Please see separate Sustainability Statement, Circular Economy Statement, together with Biodiversity Net Gain and Ecological assessments for further details of the proposals.

In line with the client brief and with the design team's own commitment to sustainability, we intend to make the building as low carbon and resource efficient as possible. The high demand on heating and cooling due to the vulnerability of occupants and the very large large ventilation rates required for safety, especially in operating theatres and research facilities, presents a big challenge in reducing energy demand to achieve low, let alone zero carbon hospitals. We have followed the low energy/carbon design hierarchy - *be lean, be clean, be green* - starting with the making the building form and fabric as energy-efficient as possible. The current design is projected to show a 25% reduction in carbon emissions over the current Part L of the Building Regulations.

As the environmental systems are further developed and refined, we anticipated increasing the carbon savings towards the 35% set out in the anticipated London Plan, with the residual carbon emissions offset in line with GLA requirements.

6.3.1 The energy hierarchy

Be lean The 'fabric-first' approach to the building started with a high floor area to envelope ratio of c. 40% while maintaining relatively well-daylit 22.5 m deep floor plates enabled by the atrium design. The envelope itself is designed to maximises thermal efficiency primarily by

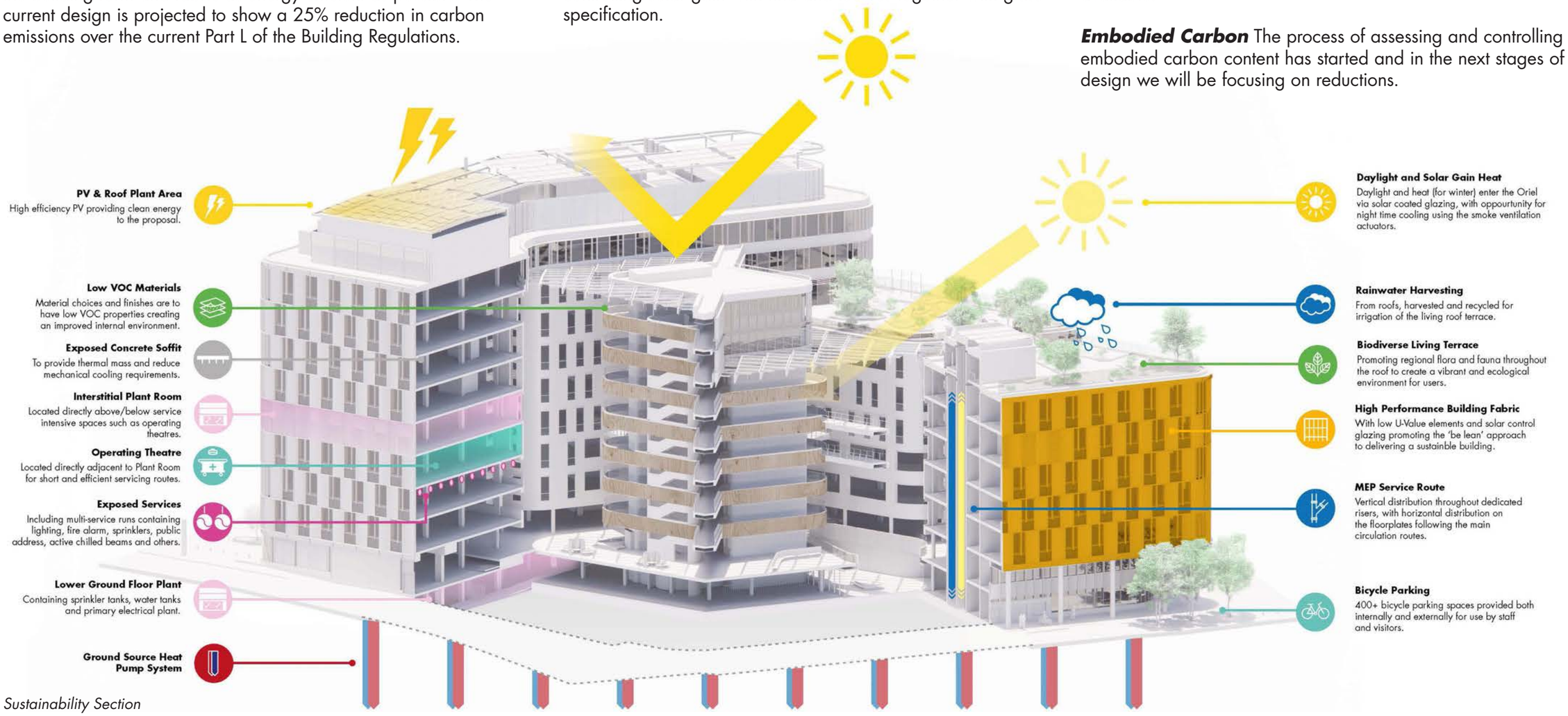
— limiting the window area generally to about 30%;
— employing a unitised cladding system generally with high levels of insulation;
— achieving air permeability of 3 cu m/hr/sq m @ 50pa;
— controlling solar gain with find and louvres together with glass specification.

During detailed design cold bridging will be controlled, with the unitised approach helping achieve high performance.

Be clean The building's systems will all be powered solely by electricity, with gas/oil as emergency back-up only. Thereby the building is ready for a post fossil fuel power grid. A combination of ground source heat pumps and air source heat pumps will provide the building with clean, energy efficient heating and cooling. The Oriel team is also in discussions with the Canals and Rivers Trust to explore the use of the Regents Canal for the ground source loop. The building will have energy efficient artificial lighting throughout.

Be green Opportunities for on-site energy generation are limited. The design incorporated some 850 sq m of photovoltaic panels mounted on a steel frame across the roof using all the area available.

Embodied Carbon The process of assessing and controlling embodied carbon content has started and in the next stages of design we will be focusing on reductions.

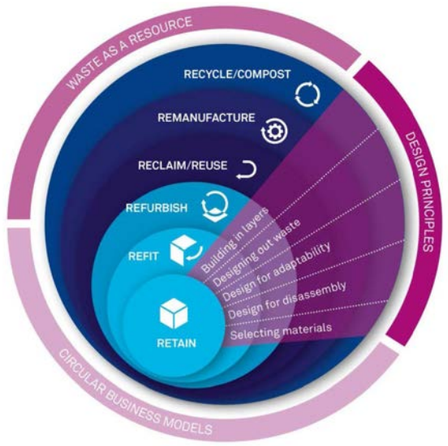


Sustainability Section

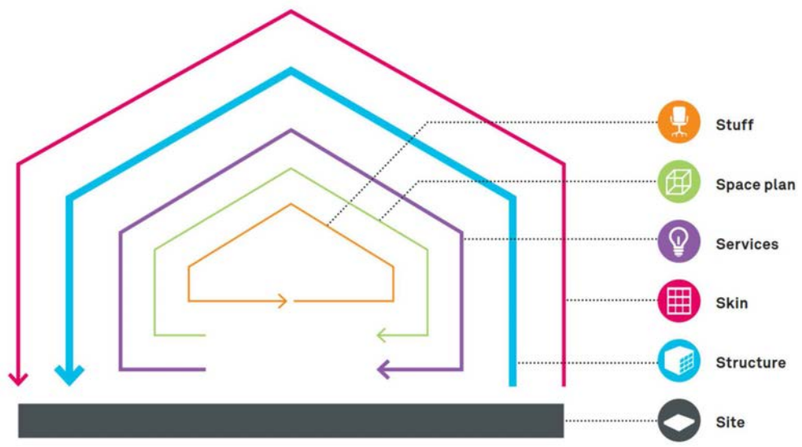
6.3.2 Design for a Circular Economy

As outlined in Section 6.2, the concept of the adaptive building is fundamental tot he design and aligns with the principles of the circular economy. These include:

— designing in layers, acknowledging of the different lifecycles of different parts of the buildings.
— designing out waste through prefabrication, good construction practice, use of recycled materials and careful detailing.
— the use of prefabrication and preassembly, such as the unitised facade, MEPH equipment and modular partition systems.
— designing for disassembly - reducing the use of adhesives and bonding agents to enable elements of the buildings - curtain walling, glazing, floor finishes, e.t.c. to be easily removed at the end of their life.

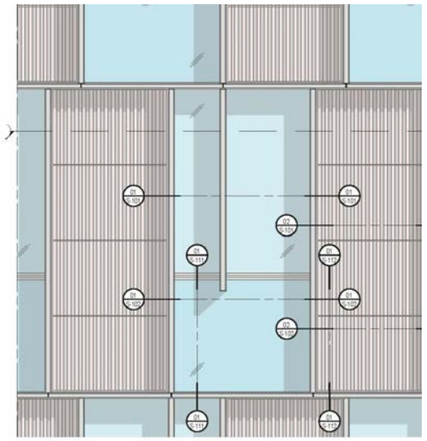


A long-life loose-fit design enables the building to flex and change over time as service delivery, operational and programmatic needs change. It retains its use-value at the highest level for the longest time, which is the first principle of resource use for a circular economy.



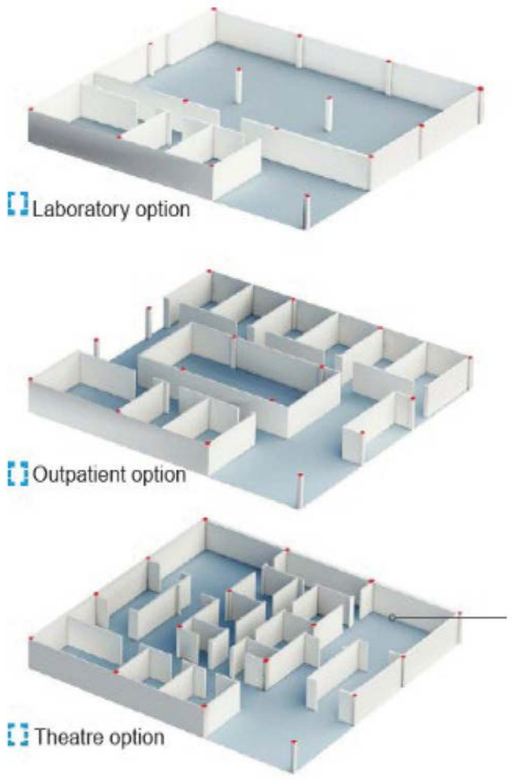
Circular economy principles - building in layers

Modular systems - MEPH, partitions, structure

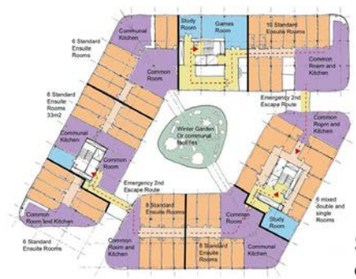


Unitised cladding system

Design for manufacture and assembly



Flexible floor plates



Change of use

Design for short term and long term change

6.4 Urban response

Future masterplan

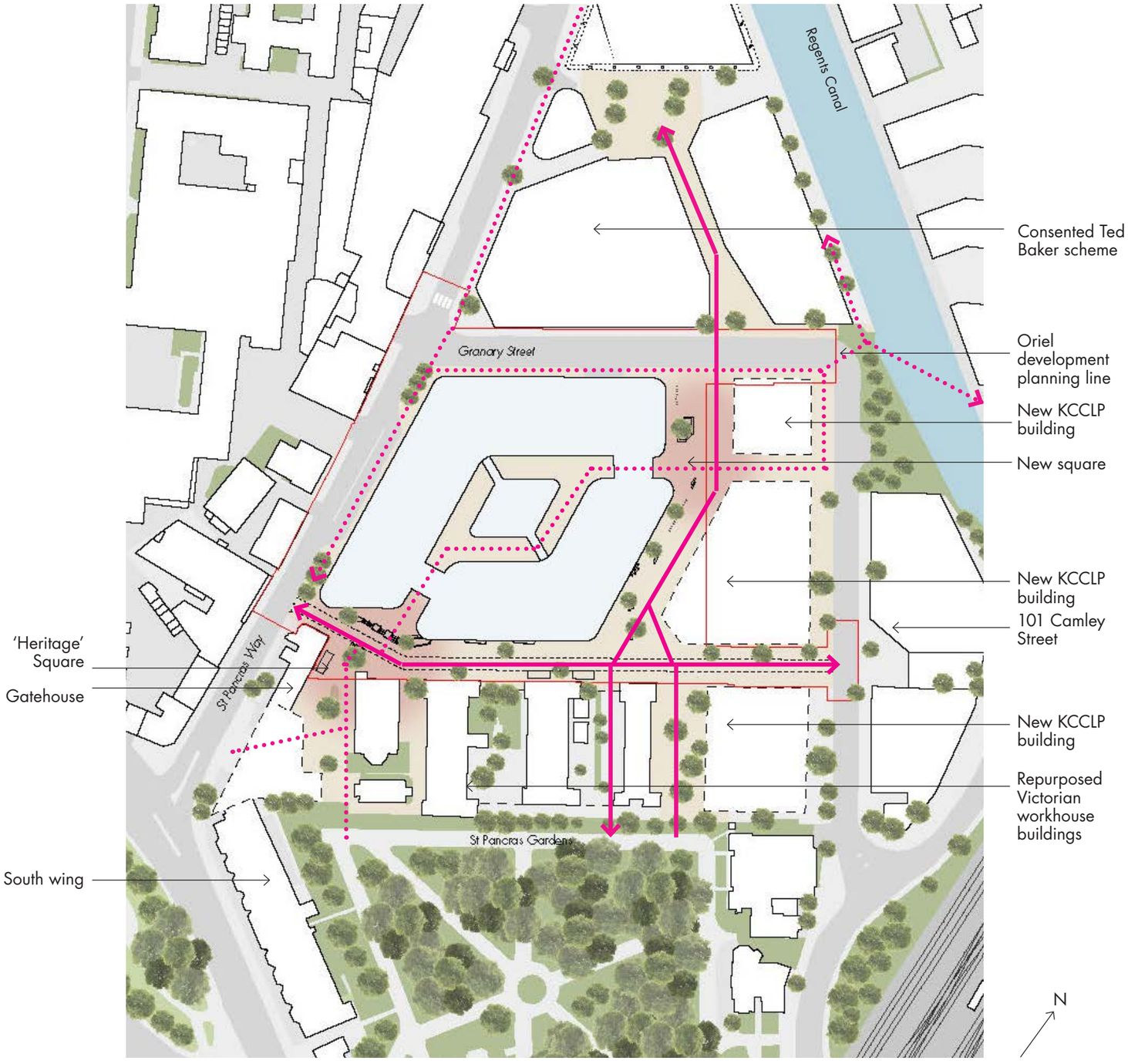
The southwest corner of the site has long been associated as the gate to St Pancras Hospital. The design places an entrance 'square' for the building and the rest of the masterplan at this point, also bounded by the existing Gatehouse and the two former chapels. This square will also link through to St Pancras Gardens. This indicatively named 'Heritage Square' leads to the lower entrance into the building.

A second square will be created to the northeast of the site, leading to the upper entrance one storey higher. This new square forms a crossroads with Granary Street and has routes leading south from the consented Ted Baker development as well as connecting through to the canal and over, via a new bridge, and leading through to the redeveloped King's Cross area to the east.

A new urban realm

The ground plan of the building is arranged on the axis between the southwest and northeast squares, with the public atrium embraced by the two wings. The outer edge of the northern wing hugs the streets, maximising the amount of pedestrianised public realm within the masterplan site. This allows for direct access to patient drop off and pick up along St Pancras Way and deliveries directly into the building off Granary Street. The outer edge of the south wing will front two new pedestrian streets bisecting the site and will be shared with the adjoining mixed use development.

Once the masterplan is built out, the whole St Pancras Hospital site will be opened to the surrounding neighbourhood and wider city. A new north-south route will connect the consented Ted Baker development through the site down into St Pancras Gardens, providing a pedestrian-only route parallel to St Pancras Way. A new pedestrian priority route will also be created and opened from St Pancras Way in the west through to Granary Street and the canal to the east. Secondary routes will criss-cross the site, including a covered internal route through the atrium of the building itself. What is currently a closed and impermeable piece of the city will become an open, pedestrian-friendly neighbourhood, designed to accommodate all who use it.



Proposed wider site connections and routes

Arrival

People arriving to the new centre can enter the building from one of two entrances - the lower entrance to the southwest accessed off the new Heritage Square, and the upper entrance located to the northeast accessed off the new square, which in turn will connect to a new public realm on the canal. Both entrances are equal and lead to the reception area in the heart of the atrium.

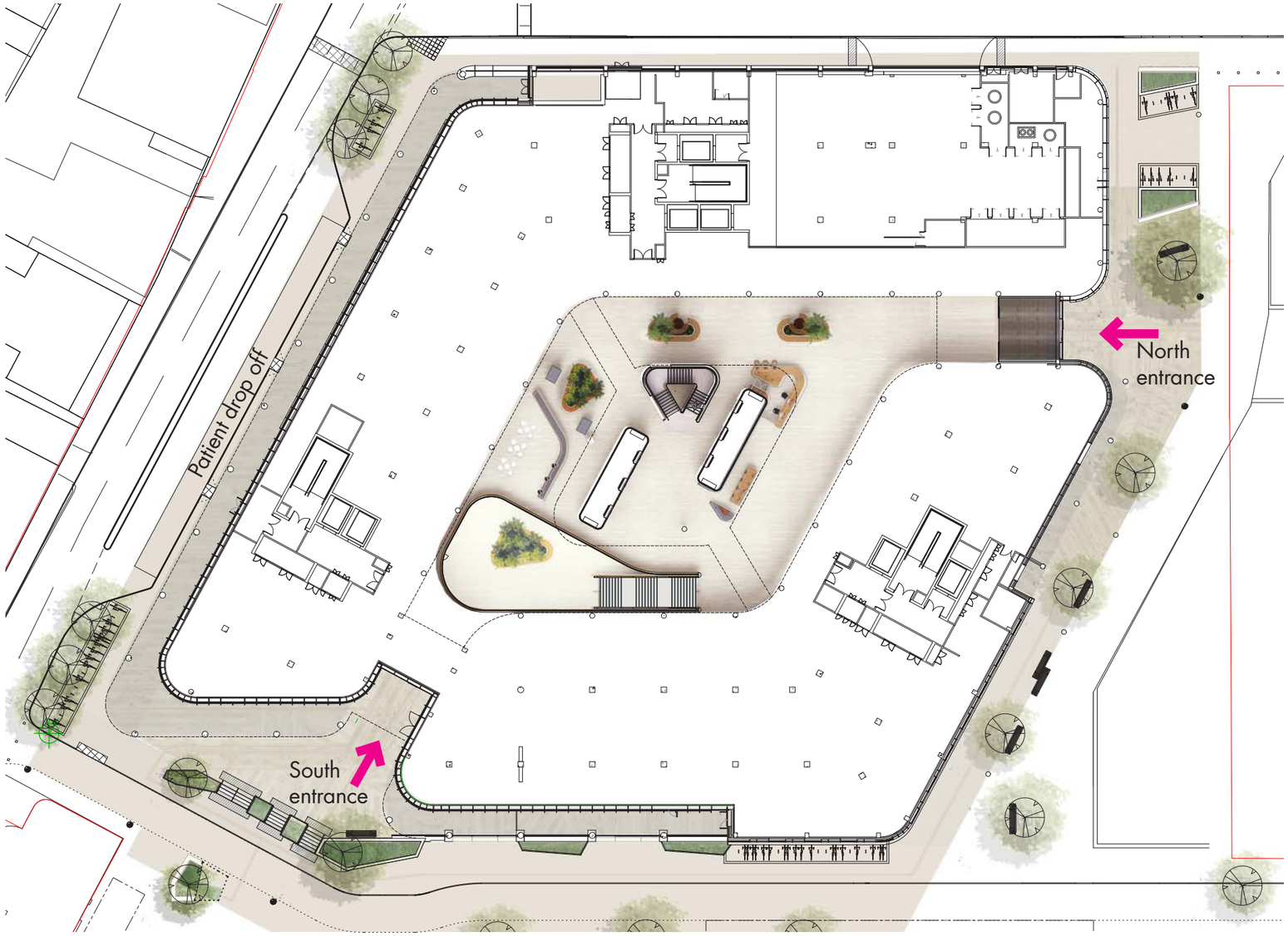
The atrium provides a secondary route through the wider side and is conceived as part of the public realm, inviting not just patients and staff, but members of the public as well. The landscape flows from outside to inside and out again.

Passengers arriving by taxi or organised patient transport will be dropped off and picked up alongside the colonnade along St Pancras Way. From here a covered route leads to the lower southwest entrance. A secondary taxi drop-off zone is provided at the northeast of the site, close to the upper entrance.

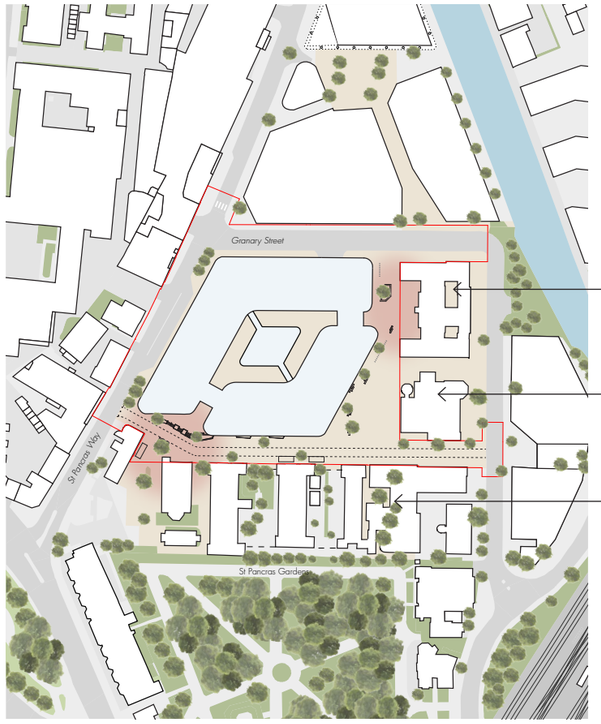
Temporary condition

Illustrative parameter plans will be submitted on behalf of Kings Cross Central Limited Partnership (KCCLP) as part of this planning application. These will indicate the framework within which the masterplan will be developed in more detail. The build-out programme for the masterplan will be subsequent to the construction of the new centre so for a period of time it will stand amidst the existing lower scale St Pancras Hospital buildings.

The drawing below illustrates the temporary condition.



Site plan with entrances



Scheme within existing St Pancras Hospital buildings