

**Wolfson Economics  
Prize 2021**

Ab Rogers Design

**Planning & Designing  
the Hospital of the  
Future**



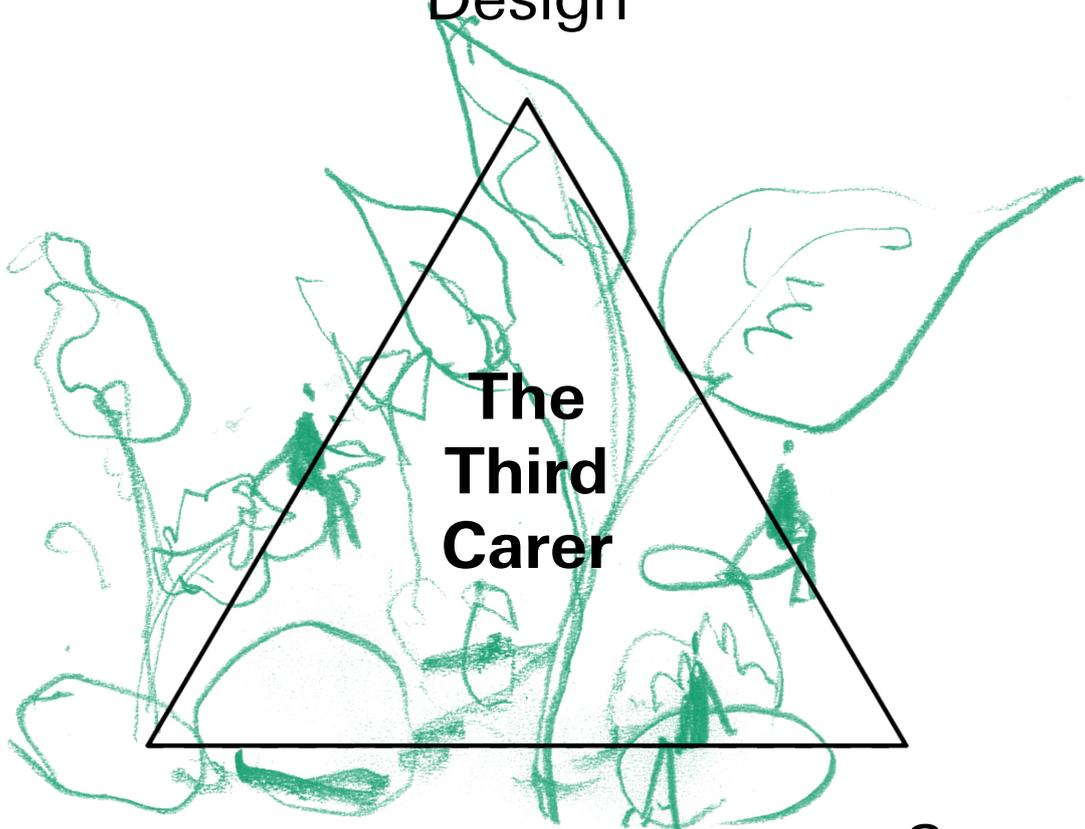
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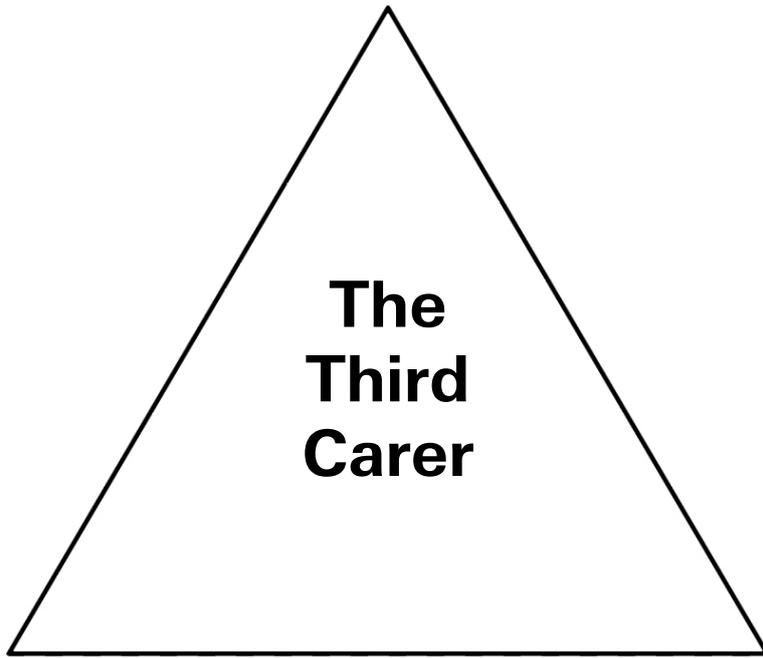
**The  
Third  
Carer**

Medical  
Staff

Support  
Networks



Design



Medical  
Staff

Support  
Networks

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# 1

'Our vision for the hospital of the future celebrates the art of care. We believe the hospital of the future should nurture both body and mind – treating the sick, the well and everyone in between. Inspired by the adaptive qualities of living systems, it is a connected and forward-looking institution that grows and changes in response to its environment and the needs of its communities.'

Ab Rogers





Perspective of Living System; a health centre fuelled by biophilia and a marketplace in its local urban context

# Introduction

## A. Executive Summary: The Living Systems Hospital

**'Architecture should defend man at his weakest.'**

Alvar Aalto

In our first submission we established the hospital of the future must be 'reinvented to ensure it actively supports the sick, the well and everyone in between, opening its arms to the community and rebuilding the faith in its ability to give love and care.' Our approach expands the conception of the hospital's purpose and reconsiders its potential as a public-service institution, while seeking to improve patient experiences, clinical outcomes, staff wellbeing and the wider healthcare system.

We have since refined our vision and developed its materialisation – both in terms of design and economic viability – through a rigorous process of co-design involving a team of clinical experts, professional consultants and hospital users.

The notion of design as the Third Carer is at the heart of our thinking, based on the understanding that doctors and nurses are principle carers and secondary care comes from a network of family and friends. Our manifesto demonstrates our truly holistic approach to healthcare, articulated through four guiding principles: Human-centred, Community focused, Nature driven, Flexible and Future Proof.

Chapter 1 unfolds these principles as the conceptual scaffolding behind any built outcome. Chapter 2 draws on our design expertise to envisage how they can be realised in architectural form.

### Approach

#### Methodology

Co-design is at the centre of our approach, as is the belief in the value of collaboration across sectors and disciplines when addressing global challenges. A constantly evolving collective intelligence informs our design and research methods. We have developed our vision in close consultation with a cross-section of the community, gathering knowledge from both hospital staff, patients and visitors, as well as experts from other fields. All have been instrumental to the design, function and programme of our hospital of the future.

Listening to individuals with lived experience of hospitals has been a priority, garnering their insight and testing the validity and desirability of our proposal. In our interviews and panels, we have given equal weight to the thoughts of the leading clinician and the dedicated nurse, reflecting on the needs of the chronically ill patient as much as those of the homeless citizen.



# Introduction

## A. Executive Summary: The Living Systems Hospital

Our team of professional consultants includes: Max Fordham (Mechanical & Electrical Engineers), Gardiner & Theobald (Quantity Surveyors), Nulty (Lighting), Vie-en-Rose (Acoustics), Elliot Wood (Structures), Expedition (Structures), Publica (Urbanists), Dan Pearson (Landscape Design), David Powell (NHS Hospital Maker), Toby Anstruther (Habitat Maker) and Economists Mariana Mazzucato and Javier Botella. Their individual specialties enable them to view the challenges presented by the hospital with fresh eyes and to propose innovative solutions. Some of these experts have cemented their invaluable perspectives by contributing an essay to this submission (see Expert Essay section of the Appendix).

We would like to acknowledge the generosity of our all our collaborators. Their diverse backgrounds and experiences are united by their fervent desire to make our hospitals better. Their support and dedication have allowed us to view the hospital of the future from micro to macro and inside to out, considering its long-term and short-term impact on its users, its value and contribution to society, and all the ways it can offer support to its local community.

### Inspiration

Our approach is influenced by radical and exemplary institutions of the past and present, from the healthcare sector and beyond.

We have taken inspiration from both national and international hospitals; learning from the empathic design of Alvar Aalto's Paimio sanatorium (completed 1932), the generosity and scale of Piero Palagi Hospital in Florence (completed 1985) and from the work of João Filgueiras Lima in the 1990s for a number of rehabilitation facilities in Brazil, responding to the natural elements and introducing biophilia as part of a programme of positive patient distraction.

We have also drawn on architectural precedents presented by other progressive social and cultural institutions. Some empower users through their design, some utilise modularity to solve problems while others radically redefine their conventional spatial uses.

Our design for the hospital of the future brings together learnings from these ground-breaking institutions into one building. Absorbing and expanding their underlying principles, we have applied them to the specific challenges of our healthcare service in the UK both today and in the future.

### Experience

ARD's practice reflects this same ethos, operating across sectors and disciplines and fluidly transferring knowledge and perspective from one to the other. This experience gives our hospital proposal the benefits of cross-sector learning, applying the principles of good design to achieve a responsive, welcoming environment that seamlessly delivers its operational requirements while empowering the people at its heart.

Our experience in healthcare is exemplified through our work at Maggie's at the Royal Marsden and the London Hospitals of St Mary's, St Thomas's, Queen Charlotte and Charing Cross. In the design of our Maggie's Centre we enacted the true meaning of design as the third carer and harnessed the power of domestic scale and tactile materials to humanise healthcare architecture. Our previous hospital projects have shown us first-hand the struggles involved in trying to improve and update inflexible spaces that are the result of retrofitting solutions on a foundation of hastily implemented short-term plans. These healthcare projects have allowed us to fully appreciate the complexities of the task and to understand the capacity of design to address the underlying issues.

Working with museums and commercial enterprises has given us the ability to design spaces that better able to keep pace with a programme of rapid change, responding to constant shifts in content and operational requirements. In both retail and cultural spaces, design is used to influence behaviour; creating a sense of community and encouraging engagement. A flexible programme of space is key to ensuring the building works hard for its occupants and is an asset in its own right.

# Introduction

## A. Executive Summary: The Living Systems Hospital

This combination of learning, experience and unbiased ingenuity has taught us there is no fixed, stand-alone solution to the design of the hospital of the future. We need to utilise centralised production and support localism; to include clinical spaces that deliver technical operations and others that prioritise care; to use wards that give people privacy while encouraging them to seek support through social interaction; that engage the senses while allowing sleep. These dichotomies and more are the reason the adaptable living system is the answer; its ability to respond to change and switch smoothly between multiple gears ensures all users feel cared for, no matter their requirements.

### 1. Evolving the Vision

This section develops our original concept into a more refined clinical, social and economic proposition. The structure follows the guiding principles of the manifesto, emphasising the need for the hospital of the future that is value-driven as well as functional and robust.

#### Human-Centred: Scale, Rhythm, Senses

We have developed a scale of architecture that enables visitors to feel welcomed and considered, rather than intimidated or overwhelmed by monumental spaces and dramatic spans.

The floorplan of the wards is designed to provide an intimate scale that offers patients privacy while building a sense of community, and dedicated staff welfare spaces on every floor create comradeship and support. A stimulating rhythm of activity and sensorial engagement will combat monotony and isolation, improving sleep, aiding recovery and inspiring interaction with the wider environment.

#### Community Focused: Neighbourhood, Social Access, Collective Intelligence & Co-design

To ensure the hospital focuses on supporting its local community, a tailored programme of social and primary care services target

the insidious societal and health issues specific to the area; aiming to break down barriers, empower individuals and identify problems at the root in order to further a policy of prevention as well as cure. Its flexible interior supports constant evolution, and implementation of changes arising from collective intelligence, knowledge sharing and co-design.

#### Nature-driven: Biophilia

The hospital adopts a biophilic approach, offering every person views out and access to green spaces no matter their mobility, allowing them the freedom to step out to nature when they need an escape. Suspended gardens and balconies with trailing and climbing greenery soften the façade. Internal planting enriches and activates public spaces and inspires a culture of care.

A public park provides space for exercise, social interaction and escape while providing a protective barrier around the building. Its trees and shrubs offer natural shading for heating and cooling of the building as well as attracting wildlife.

#### Flexible and Future Proof: Structure, Programme, Sustainability

Locating the principle structure to the internal and external perimeter has freed up the interior to allow a maximum of flexibility, serving the changing needs of its staff and patients, extending its life span and improving its efficiency.

The design supports a programme of overlapping activities, allowing for multiple uses at different times of day. Relevant facilities, for example the swimming pool and yoga studio, will be shared with the local community outside working hours.

Following the principles of passive design, the hospital minimises energy use while maximising the natural resources provided by the site.

A palette of sustainable, low carbon materials and standardised components minimise waste while supporting flexibility, growth and efficiency of procurement.

## A. Executive Summary: The Living Systems Hospital

### 2. Making it Real

This section develops our proposal into a more architectural and deliverable 'proposition', taking us through how it looks, feels and works.

#### Procurement

Key to the construction of the building is the use of a radical, centralised procurement process via a series of directly contracted vetted and specialised experts. This process will ensure a greater understanding of the hospital's ambitions and economic model across the team, building confidence in delivery.

Our proposal has a practical take on materiality, founded on a structure of pre-fabricated modular components that are able to support the procurement process described above.

#### Economics

Our economic model is based on the understanding that the efficiency of the design will increase long-term savings. An increase in the initial capital investment, as a small proportion of the overall project, will significantly reduce expenditure over time.

Over a series of workshops with property and construction experts Gardiner & Theobald and David Powell (NHS Hospital Maker) demonstrated we can deliver this design, following the current NHS procurement system, within a budget of £10,000 per square metre.

Our economic model for testing the feasibility of our proposal eschews the short-sighted view that capital investment alone is an indicator of what a building costs. Instead we have examined the ratio of construction costs (capital investment) to building maintenance costs and business operating costs (staff salaries) over a period of 5/20 years, following the recognised 1:5:200 capital construction cost ratio.<sup>1</sup> We are confident we can drastically reduce hospital running costs from the outset by actively integrating maintenance into the design and by creating a modular infrastructure to enable changes to the building's interior.

In addition, by designing the hospital as a nurturing workplace, we can reduce staff absences and therefore the operating costs.

#### Value

'The level of civilisation can be measured by the level of care that a society can provide to its citizens. All resources and energy invested in building and operating hospitals need to be driven by a strong vision to deliver care and value for the community. More and more Hospitals have been developed by following construction industry and property market logic. The Hospital of the future need to be designed, procured and built by putting at the heart of the process expertise, local community and users need.'

Ernesto Bartolini, Architectural Director,  
Ab Rogers Design

The impact of the design can be seen in its local investment, increased employment, commitment to urban regeneration, introduction of improved community healthcare facilities and the propagation of social care services.

Its environmental value is delivered through a sustainable approach to materials, construction and maintenance and via the public park and associated green spaces which provide access to natural landscape in the city and help mitigate local air and noise pollution.

The impact of the design on its patients, staff and visitors underpins the entire proposal. It will be quantifiable over time through accelerated recovery, reduction in staff absences and reported instances of mental health issues, as well as better satisfaction ratings across the board.

1. <https://en.wikipedia.org/wiki/1:5:200>

# 2

# Evolving the Vision

## A. The Third Carer – A Manifesto

Our work is founded on the idea that architecture can meaningfully improve the wellbeing of those who use it. Hospital design is perhaps the most important area of architecture in which to demonstrate the potential of this proposition.

The culture of care is incredibly strong throughout the NHS, and this culture needs to be embodied by its physical spaces, enabling them to support doctors and nurses as a 'third carer' and protecting all users from the perils of sick building syndrome and actively supporting programmes of accelerated recovery.

The notion of the third carer is based on the understanding that doctors and nurses are principal carers, administering bodily care in all important ways, whether in hospitals or in primary care, where they can identify the kind of sickness that needs secondary attention. Secondary care then comes from a wider network of family and friends who offer nurturing kindness, support and love in a huge variety of ways

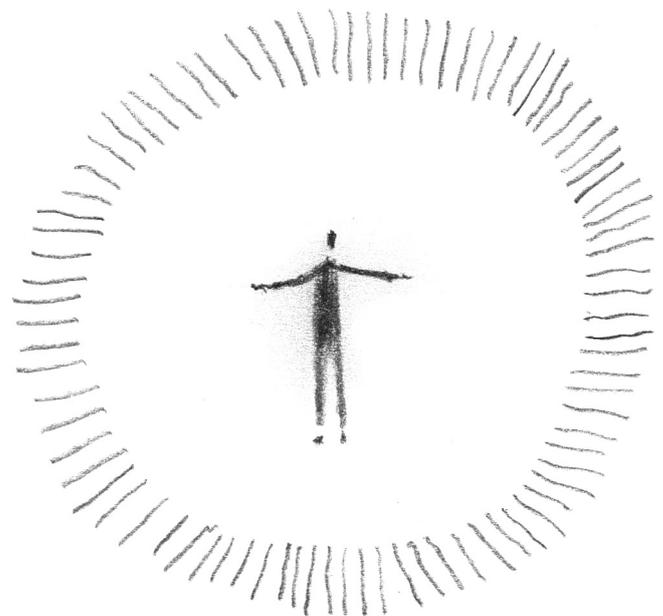
**'We can think of the building itself as a third carer, after a patient's family and their medical team. The building will facilitate nurturing interactions and anticipate the needs of its occupants. When the building functions in this way, as an active part of the healing process rather than as a passive stage on which the theatre of medicine is performed, patients will naturally come to associate the building itself with improved health. Just as temples and cathedrals can create a sense of spiritual calm, even without their attendant rituals, so too can this new type of hospital create a sense of wellbeing independent from and in parallel to the practice of health care.'**

Ash Ranpura, Clinical Neurologist (see Appendix for full essay)

Today we know that patient experience is the most reliable predictor of clinical outcomes and that social, economic and environmental factors are vital to the success of medical treatment. Add our increased awareness of health in general – an emphasis on prevention rather than a cure – and the newfound benefits of giving patients agency, and the case for our hospital of the future is made.

The design outlined in the following pages results from extended consideration of how best to materialise these paradigm shifts. We propose to replace the archetype of the hospital as a hermetic machine with a dynamic healthcare centre that not only fulfils the traditional functions of the hospital but also serves the community by actively engages with its neighbourhood context, operating as a lively civic hub.

In order to improve patient experiences, clinical outcomes and staff wellbeing and integrate it with wider health care, the hospital of the future must be more than a monument to science and efficiency – it must also activate the culture of care. And there is no better way of administering this culture than through design.



## A. The Third Carer – A Manifesto

The hospital of the future will be:

### **Human-centred**

The design will place the human being at the heart of the experience; empowering the individual to take ownership of their mental and physical health, and combatting the detached, inhumane and inflexible nature of contemporary hospitals.

### **Community-Focused**

Operating both as a community in itself and as a vital part of the local community surrounding it, it will be defined by the needs of the people it serves, supporting patients, staff and visitors alike.

### **Nature-Driven**

It will optimise the use of time, space, money, energy and materials, and harness the benefits of biophilia to positively impact on patients, users and staff.

### **Flexible & Future-Proof**

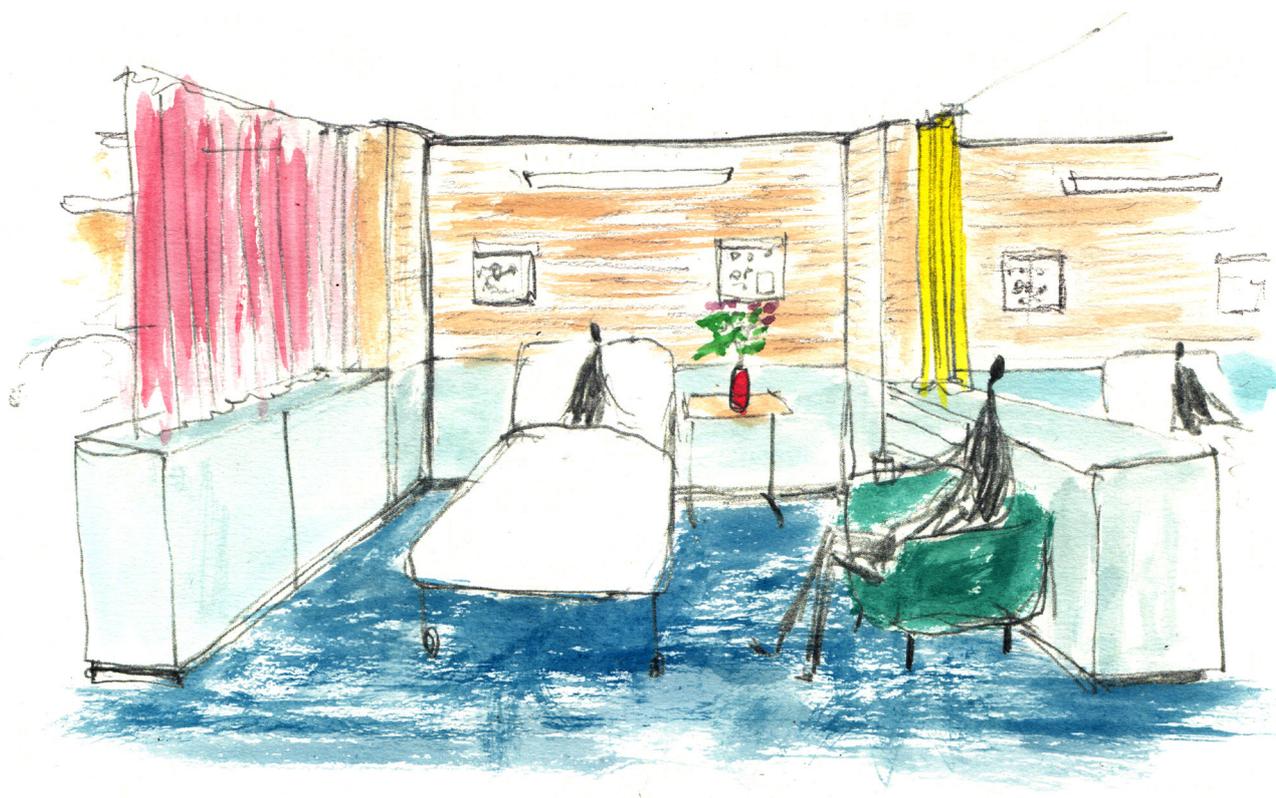
The design will invest in adaptability and sustainability, remaining fit for purpose in an ever-changing world.

## B. Human-Centred

**'Clinical buildings today still reflect the monumental scale and gleaming efficiencies of the industrial and chemical eras. Now that we've arrived at the biopsychosocial model of disease, we need a new type of clinical building to support it. This building must function on a personal scale, offering privacy but also community. It must facilitate health interventions that are biomedical as well as those based on diet, exercise and social needs. The building must reflect a change in the way we deliver health care from an intervention at a point in time (a surgery, a prescription) to an ongoing interaction between an individual and a comprehensive care system.'**

Ash Ranpura, Clinical Neurologist (see Appendix for full essay)

The hospital of the future puts people – not just illnesses – at the centre of its activities by harnessing scale, rhythm, and the senses.



Shared ward bed with visitor

# Evolving the Vision

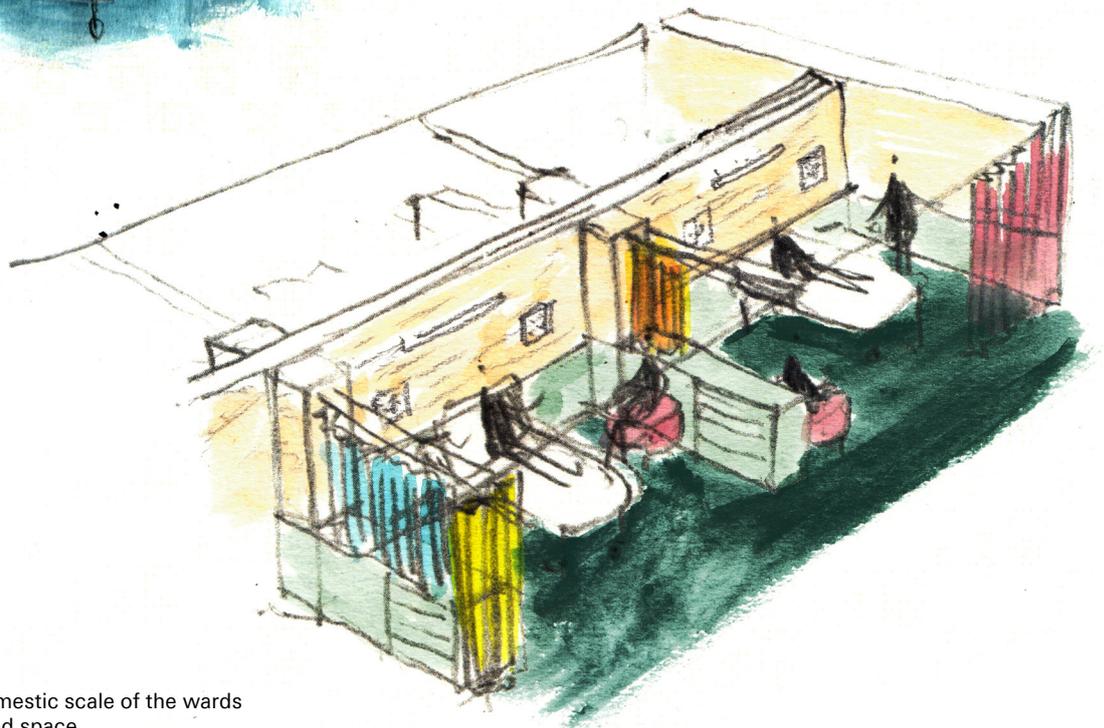
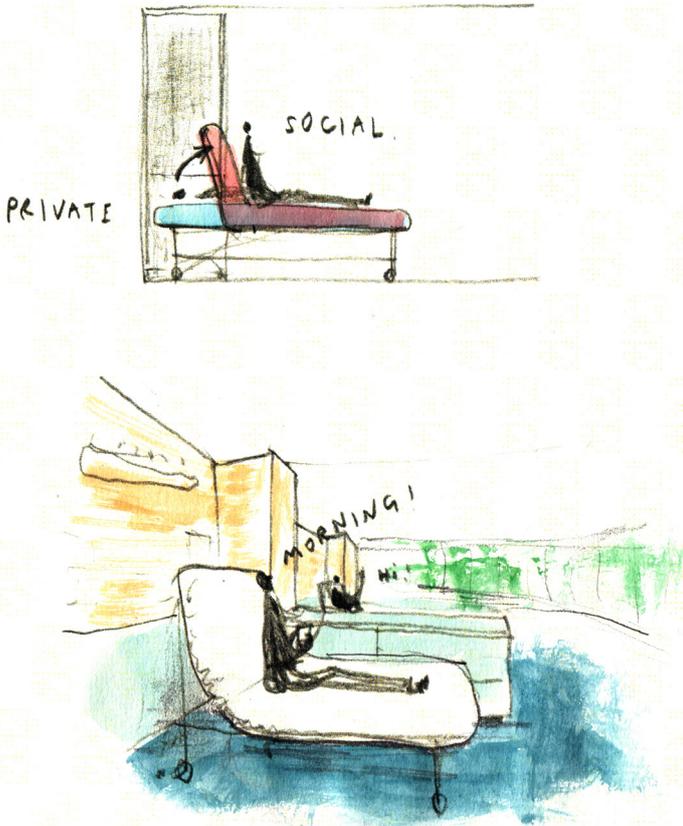
## B. Human-Centred: Scale

**'There is no one right answer for the scale of healthcare. We can make a case for space being appropriate to a particular kind of wellbeing... We can say there is a need to invest more in hospitals of a certain scale because we know that size facilitates safety and community at the same time.'**

Ellie Cosgrave, Director of Research, Publica

Our consultations with clinicians and other medical professionals have revealed a pressing need to make clinical spaces warmer, safer and less intimidating, as hospitals can often make users feel ill at ease. As a studio, we are exceptionally well placed to rectify this, as we specialise in designing hard-wearing public buildings that harness a domestic scale to imbue a sense of place and belonging in their users.

As such, we propose a hospital that is generous yet compact with the capacity to accommodate approximately 200 beds within domestically scaled wards that follow a circular floor plan designed to eliminate long corridors. This approach will also maximise efficiency of circulation, ensuring that most parts of the hospital can be reached in a short distance and that users always feel oriented in the building. This scale seeks to make the hospital feel like a place designed for people rather than one that primarily caters to scientific and technological demands.



Hand drawn isometric showing domestic scale of the wards and transition from private to shared space

## B. Human-Centred: Rhythm

**'I find it boring and soulless being in bed all day. There's nothing worse than just lying there.'**

Grace, Hospital Patient

**'Anything we can do to demarcate the day in a hospital is helpful.'**

Ash Ranpura, Clinical Neurologist

Unstructured time can be disorienting to patients and the design of the hospital must help to differentiate time throughout the day, introducing a hospital clock that nudges and engages in a way that synchronises with users' circadian rhythms. This can be achieved via markers or milestones articulated through changes in light and sound and through activities such as eating, walking, socialising, gardening and spending time outdoors. These activities have the added benefit of normalising the hospital environment, helping users to associate it with enjoyable everyday pursuits rather than with crisis, unpredictability and fear.

An interactive Art programme, that goes beyond commissioning and display including performance and dance, can play an important role in provoking engagement in patients, giving them a voice and an active role in transforming their public spaces.

1. Growth hormones, responsible for physical repair and renewal, are primarily secreted during sleep and, even in healthy people, the immune system is weakened by sleep deprivation.

2. Sleep disturbances frequently occur in patients after surgery. These can stem from factors such as postoperative pain, environmental stress and type of anaesthesia. These sleep disturbances can produce harmful effects, leading to a higher risk of delirium, increased sensitivity to pain and poorer recovery. The benefits associated

with good sleep can help decrease the recovery time of patients post-op, and the improved state of mind that comes with it can increase compliance of patients to treatment, increasing their willingness to accept a doctor's proposal. Medical experts have confirmed that if a treatment is accepted and engaged with positively, it has an improved chance of success, and this can all link back to how they felt when it was first presented to them.

# Evolving the Vision

## B. Human-Centred: Sleep

**'Several studies describe in detail the primary causes of disruption to patients' sleep: noisy equipment and staff, unpleasant lighting, uncomfortable beds, room temperatures and timing of procedures.'**

Ugo Faraguna, Associate Professor, Department Physiology, University of Pisa (see Appendix for full essay)

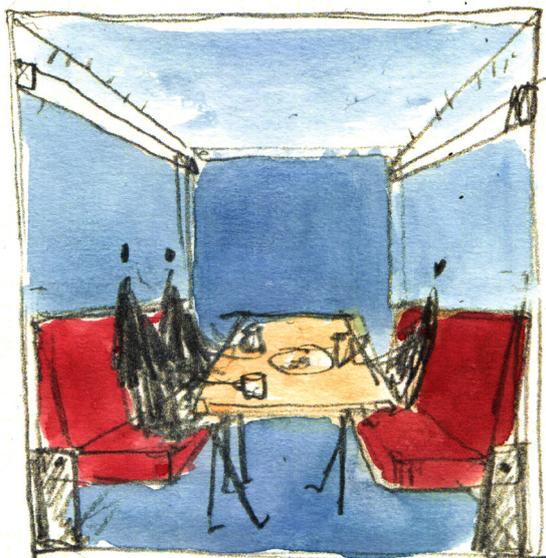
**'I tried to advocate for more protected time in hospital wards, usually about two hours after lunch, when there are no visitors and when doctors are not allowed to interact with patients or go one rounds, it's just quiet time.'**

Laura Benjamin, Neurologist and Principle Clinical Research Fellow, UCL)

The importance of sleep for good health and recovery is well known.<sup>1</sup> The building's design will help to counteract the disturbed sleep cycles patients often experience in hospital,<sup>2</sup> managing environmental conditions such as light levels and acoustics, to support patient rest.

Reducing interruptions throughout the night – such as nurse monitoring and the triggering of patients' bedside alarms – are other ways to support patient rest. The latter can be achieved with remote sensors and soft technology that would obviate the need for intrusive physical interactions at night. Patients' bedside alarms could also be redirected to signal at nurses' stations instead.

For the hospital's shift workers – whose inadequate sleep patterns are known to contribute to medical error<sup>3</sup> – the building's design will help them to balance their own circadian rhythms through an adapted version of the cycle described previously as well as recuperation having onsite local accommodation such as soundproof couchettes or sleeping pods.



Staff couchette which transforms from a silent dormitory for two to a meeting room for six.

3. Research has conclusively concluded that 'failure to obtain adequate sleep is an important contributor to medical error.' With lack of sleep 'significantly impair[ing] speed and accuracy, hand-eye coordination, decision making, and memory'. <https://www.ncbi.nlm.nih.gov/books/NBK2645/>

**'Stimulating other capacities is key to the rehabilitation of someone in hospital who can't walk.'**

Laura Benjamin, Neurologist and Principle Clinical Research Fellow, UCL

Hospitals are often places where the senses are simultaneously overwhelmed by the effects of medical treatment and under-stimulated – by homogenised design.

### Sight

The hospital of the future will utilise colour to animate the building's interior and engage the onlooker. Cool, calming colours will be used in potentially stressful waiting areas, and warm, engaging colours will be used in public, social spaces.

All patient beds and staff breakout spaces will provide access to natural light and views to green space. Carefully framed internal views with minimised visibility of intimidating medical equipment will also help patients to feel more at ease. The beds are arranged in a herringbone pattern so the patients can stare out of the window at the sky and the trees, rather than only at other patients, which is uncomfortable for all. If they want social interaction, they can raise the back of their bed and turn to their neighbour for conversation.

**'Stimulation through light and maintaining a balance of the circadian rhythm are really important. They speed up discharge times and the lack of them has been linked to psychotic episodes.'**

Ash Ranpura, Clinical Neurologist

We will use design to counteract the tedium many patients experience in hospitals' often antiseptic environments and to deal with the hypersensitivity felt as a side effect of their treatment. Modulating users' sensory experience of the hospital is key to making patients feel cared for.

### Hearing

Applying acoustically absorbent materials to increase acoustic comfort between ward beds, creating soundproofed pods for doctors and situating the hospital in a public park will help absorb and filter noise pollution, which is known to be detrimental to people's health.<sup>4</sup> The park will create a natural sound barrier and allow the sounds of nature to permeate the building, supplying habitat and food to local birds to encourage their sounds and activities.

Sound artist and DJ Nick Luscombe will be contributing his research into effects of sound on patients, developed as part of the Tokyo University Otocare Project<sup>5</sup> in Japan, which involves piping in live sounds from islands, hillsides and coasts to a simple sound system placed by the individual beds so the patient can access them at will. (see: <https://www.dropbox.com/s/w4uiktel1vpwyge/OTOCARE%204%20Hour%20Mix%20V2.mp3?dl=0>)

4. Studies have found that prolonged exposure to elevated levels of noise can trigger stress, raise cortisol levels, increase anxiety, raise blood pressure and increase blood viscosity, increasing chances of cardiovascular disease due to its impact on hormone levels and the nervous system.

5. <https://memuearthlab.jp/2021/03/05/otocare-discussion/>

### Smell

**'Smell is our no.1 sense so if we can interact the olfactory part of our brains more and trigger emotions directly through this we can in turn alleviate many ailments and discomforts in our life as well as restoring happiness and pleasure always.'**

Lyn Harris, perfumer and founder of Miller Harris and Perfumer H

Pleasant ambient smells have been proven to decrease stress, support relaxation, and combat anxiety.<sup>6</sup> Hospitals will always smell of disinfectant and that to the mind signals cleanliness. But we can create secondary smells to distract, these can be planted notes from essential oils or perfumes and fresh ingredients being cooked locally. (Olfactory interventions will be tailored to the needs of specific patients who may be experiencing a heightened sense of smell.)

### Taste

**'I hate going to hospital ... everything shuts at 5 o'clock and all you've got is an overpriced Boots sandwich and Sudoku.'**

Grace, Hospital patient

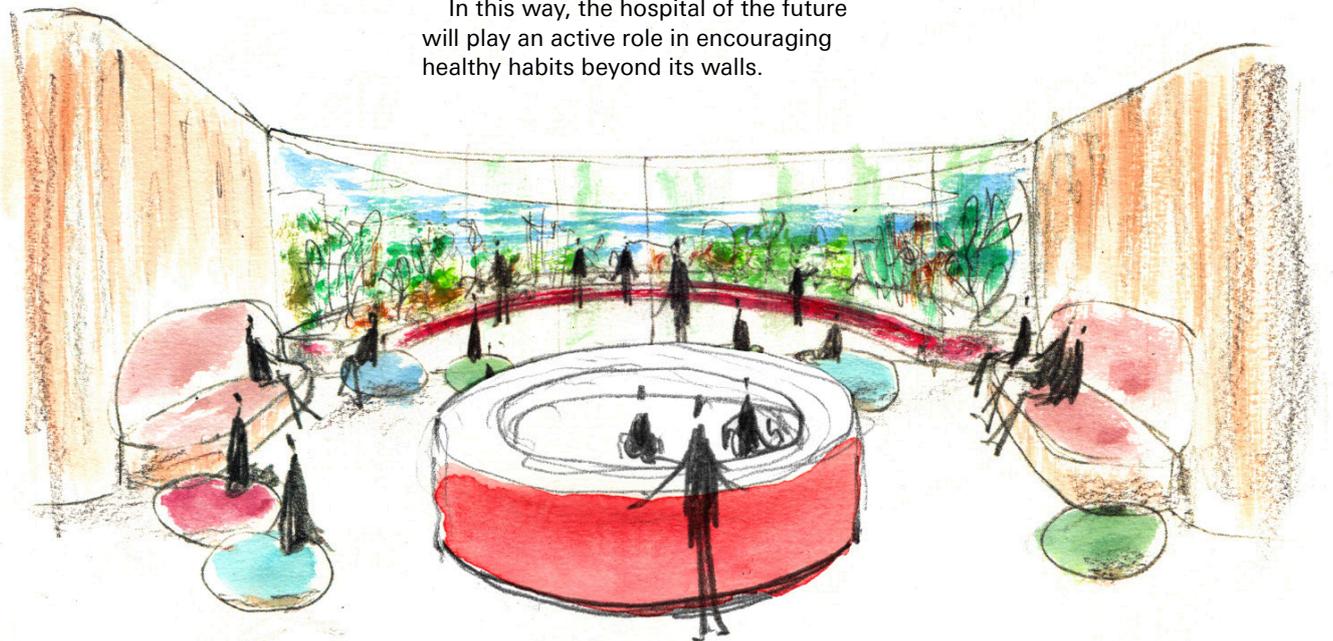
Studies show that poor-quality hospital food increases the risk of malnutrition and negatively affects patient outcomes.<sup>7</sup> The impact of food on staff health and wellbeing is a further reason why targeting hospital users' taste buds is so important.

More than just improving the taste, quality, and nutritional value of hospital food, the hospital of the future will actively participate in the 'food as medicine'<sup>8</sup> movement by offering medically tailored meals to patients and educating the wider community through food and nutrition classes, following the examples of hospitals giving greater focus to the role of food in their patient's health.<sup>9</sup>

In this way, the hospital of the future will play an active role in encouraging healthy habits beyond its walls.

### Touch

The building's interior design will harness the emotional and sensorial potential of materials while maintaining the highest standards in hygiene and performance. Where possible, materials will be highly tactile to help patients feel cared for; crisp cotton bedding, soft curtains made from organic fabric, smooth door handles in naturally antimicrobial wood, and handmade decorative objects in hospital rooms will provide a sense of domestic, familiar comfort. Natural and handcrafted elements which are made to last, will require a level of investment and maintenance, helping to foster a culture of care and commitment across the building.



Outpatient waiting room leading to balcony, showing vibrant colours palette and natural light

6. The use of scent in 'various sectors of the healthcare industry has been widely recognised for its ability to improve how patients feel by having a positive effect on perceptions of service quality, cleanliness, and personal wellness.' (<https://www.airscent.com/hospital-ambient-scenting-odor-control/>)

7. A September 2019 study published in the Journal of Parenteral and Enteral Nutrition concludes that an increased risk of malnutrition in hospitals often leads to poorer outcomes for the patient and the healthcare system. Hospital malnutrition affects 30–50% of patients worldwide, according

to a September 2019 study published in the Journal of Parenteral and Enteral Nutrition. The study recorded that often patients enter the hospital malnourished or at risk of malnutrition and experience nutrition decline during their stay, placing them at higher risk for adverse outcomes following hospital discharge. ([https://www.huffingtonpost.co.uk/entry/bad-hospital-food-healthy\\_n\\_5e5d3de2c5b63aaf8f5b0390](https://www.huffingtonpost.co.uk/entry/bad-hospital-food-healthy_n_5e5d3de2c5b63aaf8f5b0390))

8. 'In the face of the global epidemic of diet-related chronic disease, there is increased experimentation with the use of "food is medicine" interventions to prevent, manage

and treat illness.' <https://www.bmj.com/content/369/bmj.m2482>

9. At Alder Hey Children's Hospital every ward of 36 children has its own chef, dedicated to educating children and their families about benefits of fresh, nourishing ingredients as well as cooking them healthy meals. There is an associated uplift in cost, but this can be offset against longer-term advancement in epidemics like childhood obesity that cost the NHS £6.1 billion a year. <https://alderhey.nhs.uk/parents-and-patients/while-youre-here/facilities-alderhey#Food%20and%20Drink>

# Evolving the Vision

## C. Community-Focused

**'The hospital and the community are closely linked: one needs the other. They meet in the same building. A busy hospital stands at the centre of a community, just as the church once did in a village, marking our passage through life, all the way from birth to death.'**

Mando Watson, Paediatrician, St Marys Hospital  
(extract from First Round essay)

This symbiotic relationship, knit together through the life-defining milestones that take place within its walls, roots the hospital in place, giving it the "potential to become a backbone institution to better the health and long-term welfare of the community in which it is anchored in." (Victoria Jessen-Pike, Principle Projects Director, Publica)

Its power as an institution enables it to act as a catalyst for change and a tool for urban regeneration, making 'a significant difference beyond hospital walls, such as partnering with housing authorities to provide mental health services or with schools to help address asthma and improve school attendance.'<sup>10</sup> or using its critical mass of demand and buying power to justify fresh food distribution into local neighbourhoods, acting as a conscious consumer within its locality.



Social gathering in the park outside

## Evolving the Vision

### C. Community-Focused: Neighborhood Life

The hospital of the future will reinvent its previous identity, transforming from a place of fear, pain and uncertainty into a positive resource, a community asset that enhances the public realm and improves peoples' lives.

To achieve this we have reimagined the street and first levels of the hospital as a burgeoning public space that not only welcomes traditional hospital users – patients, medical staff and visitors – but the general public as well.

In our vision, the first level of the hospital will include a public park and the ground level will be activated as a vibrant health centre including a fresh food market, facilities administering primary and social care and other therapies. By centralising hospital and some primary and social care it is hoped problems can be diagnosed – and treated – more efficiently and economically. By integrating the hospital with the wider community, it is no longer a silo to tend to the sick but a model of healthy living, playing an educational role that filters beyond the immediate hospital walls.



Gardening workshop in progress

## C. Community-Focused: Collective Intelligence & Co-design

**'Just give power to doctors and nurses, instead of to management. Then create constant, agile horizontal communication between the units, because they learn from one other, right?'**

Mariana Mazzucato, Economist and Professor of Economics and Innovation, UCL

Informed by the collective intelligence of staff and patients, and co-designed with the local community to enable the resolution of specific departmental and societal problems, the hospital's interior has been designed to be easily reconfigured. This non-dogmatic approach to architecture conceives of the hospital building as an agile high-performance structure that can be adapted to constantly evolving hospital systems and procedures. Its responsive framework of modular parts will equip hospital staff and stakeholders with the tools to experiment and implement change as well as establishing the processes they know to work best.

It is vital that the hospital function within a centralised network of shared information, through which lessons learned on the ground from this kind of experimentation can be communicated across its wider NHS Trust. Only through facilitating this sharing of information can the collective intelligence of the healthcare system as whole begin to evolve.



## C. Community-Focused: Social Access

Through the inviting porosity and tactile materiality of the ground floor marketplace and park level spaces, with their biophilic interventions and welcoming communal spaces, the hospital will effectively communicate its accessibility to diverse and disadvantaged people, dissolving the perceived barriers it can present to the socially disenfranchised, who, in the current climate, report feeling alienated from institutional surroundings, encountering 'real or anticipated discrimination or challenges' and 'inequitable access' resulting in 'particular groups receiving less care relative to their needs'.<sup>11</sup>

The design principles of the ground floor of the podium; its naturally lit, open plan spaces, will remain fixed from site to site but in each case its programme will be defined in collaboration with the hospital's local community, reflecting their concerns and involving existing local resources.

This collaborative approach will address the question of the hospital's approachability, defining a holistic response to the needs of its community, 'listening to their physical, mental, and social needs'<sup>12</sup> via a programme of use that connects people with the social prescribing services; legal aid, community kitchens and housing services, that can improve physical and mental health and wellbeing. This will help empower less privileged citizens, helping them to negotiate the system and giving them tools for self care, easing the burden on the hospital.

**'You need to give communities the tools to do things themselves. Sex workers, for example, were hard to reach when it came to the Covid vaccine, so we gave some of them vaccines to distribute to other sex workers.'**

Grace, Hospital Patient



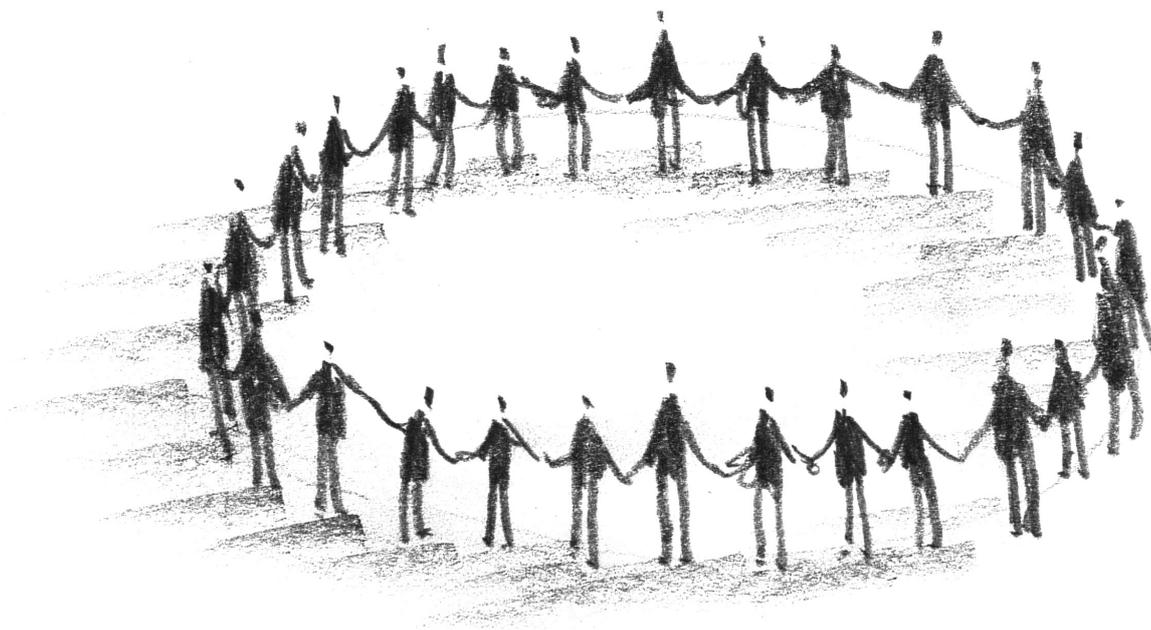
Pocket parks enjoyed by patients, access to natural light and green spaces accelerating their recovery

11. Extracted from the Kings Fund enquiry 'What are health inequalities?' <https://www.kingsfund.org.uk/publications/what-are-health-inequalities>

12. 'Social Determinants of Health', World Health Organization.

### C. Community-Focused: Volunteering

Volunteering programmes – targeting retired staff, patient’s families and friends and locals (who may have been patients at one time) – will help bring people together in pursuit of a common goal, further cementing the bonds between the hospital and its community.



## D. Nature-Driven

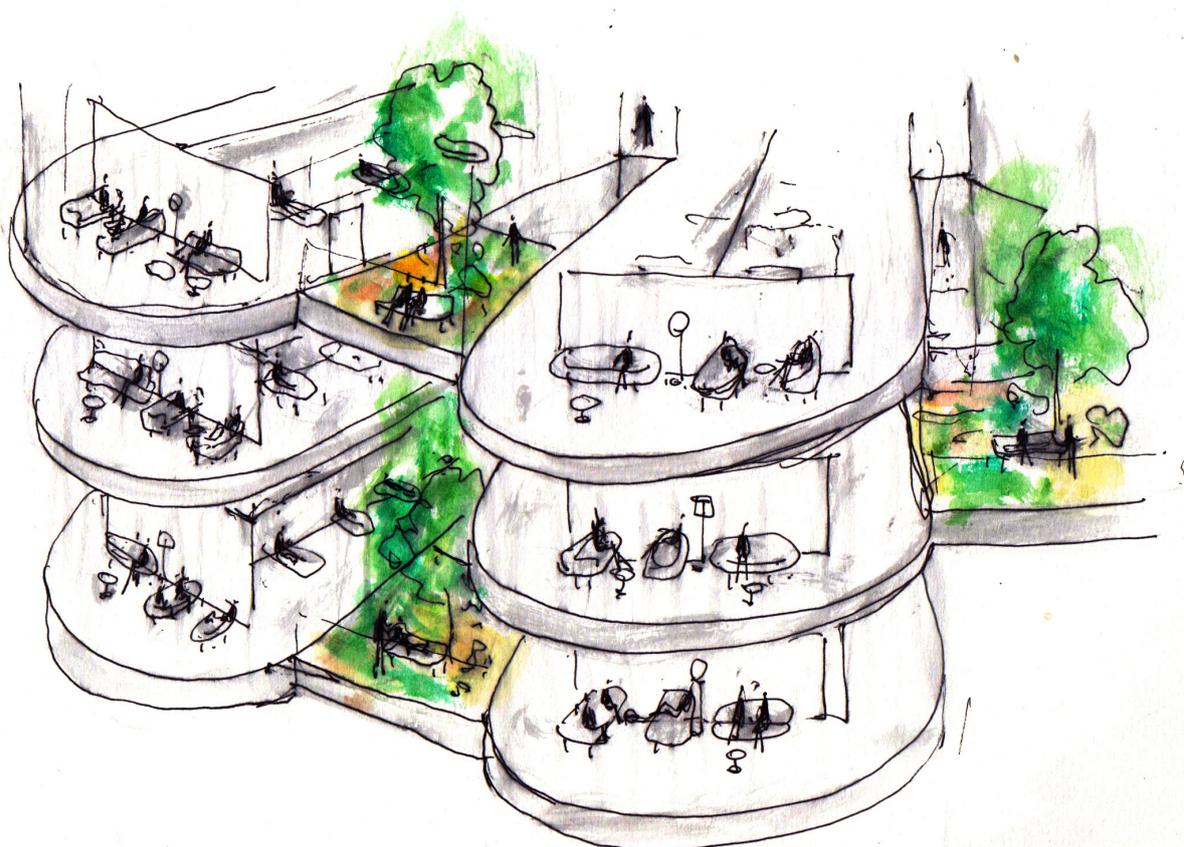
**'The benefits that landscape and gardens offer us when we are healthy– beauty, contemplation, energy, connection, food, contact with natural and seasonal cycles and processes – are magnified a hundredfold when we are ill. We all know every home should have a garden. Therefore hospital design should make access to nature central to their conception so that they become not just somewhere we go to be sick, but places we are happy to call a home away from home.'**

Dan Pearson, Landscape Architect, extract from Round One essay

The hospital of the future fosters the human connection with nature, understanding its power as a unifying principle and as a means through which to improve the experience of patients, staff and visitors.



Climbing vegetation overtaking the columns with bird feeders providing natural habitat to attract wildlife



Pocket gardens and social spaces

## D. Nature-Driven: Biophilia

Biophilia is defined as the innate human instinct to connect with nature and living beings. In hospital terms, it is well known that access and views to nature reduce staff and patient stress levels and speed recovery,<sup>13</sup> aid relaxation<sup>14</sup> and improve clinical outcomes.<sup>15</sup> Through prioritising views out to nature, integrating planting in public areas and providing access to gardens, the hospital of the future will harness these benefits for its users. The building's biophilic design will also offer natural mitigation for many of the negative influences commonly associated with the hospital environment, including noise pollution, long exposure to fluorescent lighting, poor air quality, and a sense of isolation and disconnection from the outside world.

Letting the outside in will positively influence those in otherwise sterile environments helping nudge the body and mind into a healthier state via natural stimulus like the feeling of fresh air on the skin, the sound of birds singing, the sight of plants growing over time, enhancing their feeling of connection to the wider world.

Planting around the exterior of the building will filter light and provide natural shading. This planting scheme treats the hospital like a mountainside, locating warmth-loving plants on the building's southern face and hardier shrubs on its northern face. This shift in mood as you move from one side to the other will establish a journey and facilitate orientation.

Access to 'pocket parks' situated in between wards will enable any patient – no matter their ambulatory abilities – to enjoy fresh air and nature, and provide them with a place to escape the confines of the hospital. The staff welfare facilities on the rooftop (including a bar, quiet workspace and social areas) are located among the greenery of the hospital's urban allotment, the natural landscape creating a retreat where hospital workers can relax when off-duty.

The building's orientation and its maximisation of natural light will help to connect patients and staff to the world outside, allowing natural cycles of light to permeate the hospital.

The hospital's interior spaces are programmed to optimise these cycles, with the wards situated in the south facade to give patients access to maximum sunlight and warmth, and the inpatient and staff spaces in the north, where light is softer and more filtered and therefore better for office and consulting work.

Maintaining this connection will help prevent disorientation and isolation as well as supporting healthy sleep patterns and combating depression.

13. Regarding physiological manifestations of stress recovery, laboratory and clinical investigations have found that viewing nature settings can produce significant restoration within less than five minutes as indicated by positive changes, for instance, in blood pressure, heart activity, muscle tension, and brain electrical activity (Ulrich, 1981; Ulrich et al., 1991)

14. Nakamura and Fujii have carried out two studies in Japan (1990, 1992) that measured brain wave activity as unstressed persons (non-patients) looked either at plants or human-made objects. In an intriguing first experiment,

the researchers analysed alpha rhythm activity as subjects viewed: two types of potted plants, each with and without flowers (Pelargonium and Begonia); the same pots without plants; or a cylinder similar to the pots (Nakamura and Fujii, 1990). Results suggested that persons were most wakefully relaxed when they observed plants with flowers, and least relaxed when they looked at pots without plants. In the second study, they recorded the electroencephalogram (EEG) while persons were seated in a real outdoor setting and viewed a hedge of greenery, a concrete fence with dimensions similar to the hedge,

or a mixed condition consisting of part greenery and part concrete (Nakamura and Fujii, 1992). The EEG data supported the conclusion that the greenery elicited relaxation, whereas the concrete had stressful influences.

15. Well-designed hospital gardens not only provide calming and pleasant views of nature, but can also reduce stress and improve clinical outcomes through other mechanisms, for instance, fostering access to social support and privacy, and providing opportunities for escape from stressful clinical settings. (Ulrich, 1999; Cooper-Marcus and Barnes, 1995).

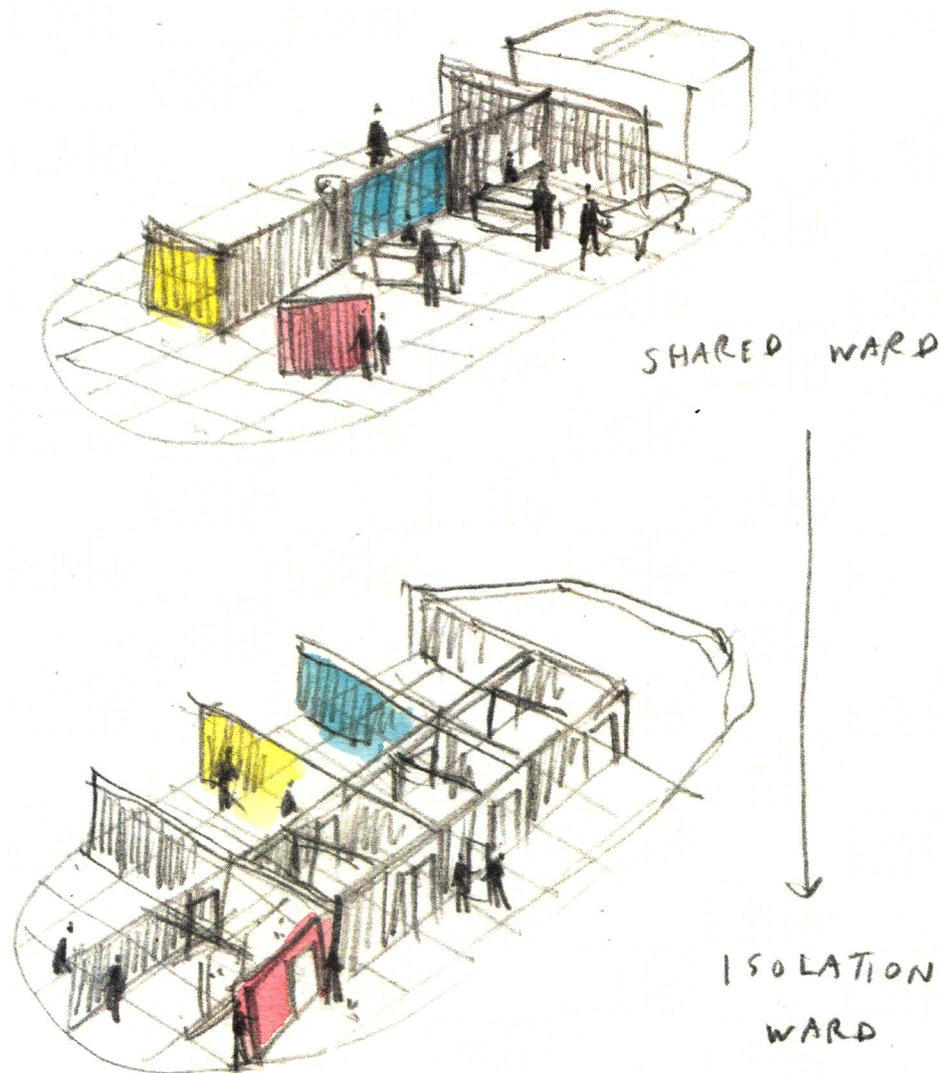
# Evolving the Vision

## E. Flexible & Future-Proof

The hospital of the future is prefabricated, modular and adaptable, tailored to respond to the changing needs of its users.

Progress in healthcare represents the biggest challenge to hospital design today. As hospital services change, and with rapid advances in science and technology, a hospital designed as a rigid structure can easily become obsolete.

We have designed the hospital of the future to be flexible throughout:



Flexible CLT (cross laminated timber) partition system being reconfigured from six bed shared ward to four isolation rooms

## E. Flexible & Future-Proof: Structure

While the cores, heavy plant and the containing perimeter are fixed – the latter through the configuration of steels, columns and large timber beams – a flexible, integrated M&E system will run across the hospital's internal framework to maximise the fluidity of what lies inbetween, allowing for rapid change and transformation.

**'In terms of how you deal with change over time ... the building should have a permanent spine and nervous system, which is there in the long-term multiple spines [...] the spaces ... as regenerative limbs, which you can take back and regrow as necessary as change occurs.'**

Phil Armitage, Senior Partner, Max Fordham

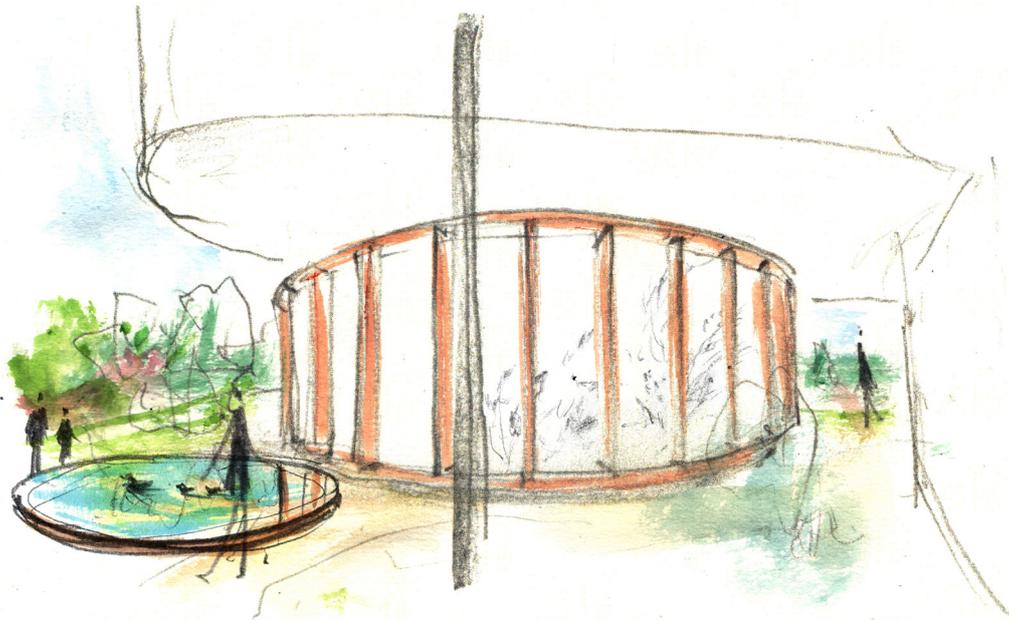
Future-proofing the hospital through integration of flexible components is the most efficient way to avoid waste and allow it to adapt, change and transform, extending its life span and avoiding obsolescence. This flexibility prevents long-term waste, including waste of materials in the demolition of fixed structures, waste of time in the disruption caused by retro-construction, and waste of energy in the application of non-modular solutions.

Internally, the building's compact design is composed of a dry-fix kit of parts that can be reconfigured in many ways while maintaining consistent acoustic and thermal separation between spaces. It also enables rooms to be reorganised through mechanical means (without knocking down walls, generating unnecessary waste or disrupting the running of the hospital). This way, an office could be turned into an operating theatre, or a six-bed communal ward could be transformed into a series of private rooms or isolation units.

# Evolving the Vision

## E. Flexible & Future-Proof: Programme of Use

The hospital's design will support a programme of overlapping activities in its spaces, allowing for multiple uses at different times of day. The facilities of the healthcare centre – the hydrotherapy pool, gym and yoga studios for example – will be available to the community outside working hours, and key spaces (like the doctor's sleep pods) will be available as extra office spaces when not in use. This is part of a general approach that seeks to maximise efficiency and minimise wasted space in the building, ensuring it works as hard around the clock as the people it serves.



Contemplation Space – outside and inside

## Evolving the Vision

### E. Flexible & Future-Proof: Sustainability

**'Planet Earth, our home, is a system. For materials the system is essentially closed, with elements being conserved in cycles of assembly and degradation. For energy, the system is predominantly open, powered mostly by incoming solar energy. A myriad of processes work in tension to produce an equilibrium which creates the narrow range of conditions needed to support life. Life uses energy to increase the level of organisation of components, from atoms to molecules, molecules to cells, cells to organisms and organisms to ecologies, seemingly cheating the second law of thermodynamics, if only briefly.**

**Through our collective vision of a hospital of the future we bring this system level thinking to help address some of the major challenges of our time – countering global warming by decarbonising the construction and use of buildings, using materials in more respectful ways and reversing the decline in biodiversity.**

**Our approach prioritises passive design, the extensive use of naturally produced organic materials and the therapeutic powers of natural light.'**

**The aim of passive design is to create spaces which remain comfortable with the minimum use of active systems. The circular plan of the upper parts of the building has a low form factor creating a thermally efficient envelope with minimal quantities of insulation material.'**

Phil Armitage, Senior Partner, Max Fordham, see Appendix for full essay

**'Our approach is a change of paradigm in the sense that it sees hospital health as a social investment, a long term one.'**

Javier Botella, Economist. See Appendix for full essay



## E. Flexible & Future-Proof: Sustainability

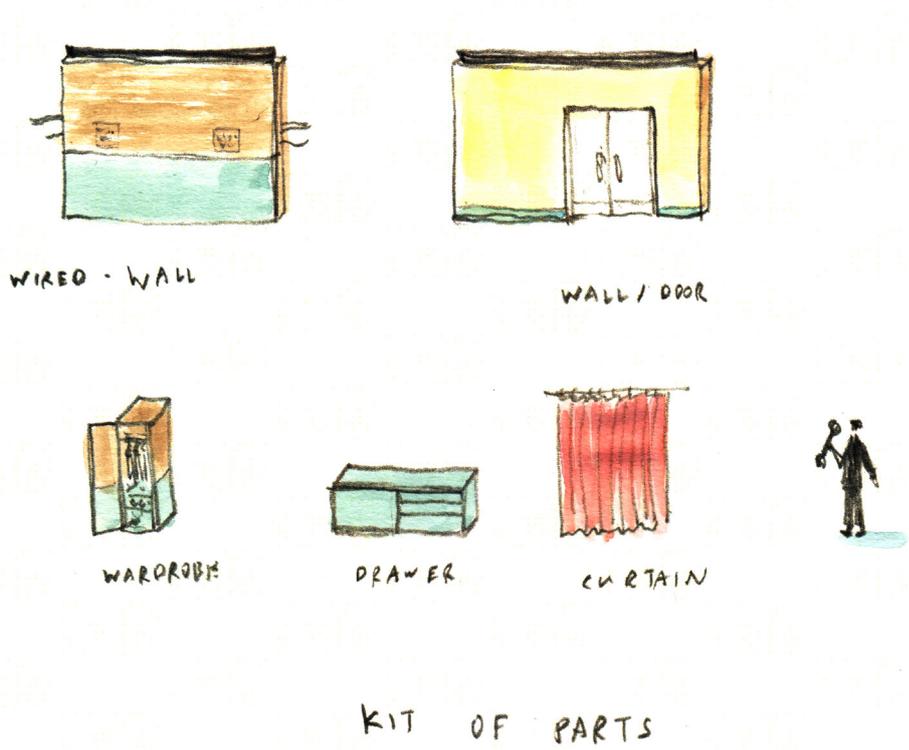
This approach relies on creating the most from the least, minimising waste and prolonging lifespan by investing in the present – in low carbon materials, reuse of existing materials and adoption of low energy solutions; appropriately scaled architecture, minimised spans and high level flexibility – to protect the future both financially and environmentally.

The design maximises natural resources provided by the site. The earth from the raised park will heat and cool the building, while green planting will create shade and offset solar radiation. We will use captured and stored rainwater to hydrate internal plants as well as the crops within the rooftop allotment.

The building will utilise prefabricated, industrial components. Standardisation of these components will allow us to create an efficient supply chain for the structure via a centralised factory and warehouse that will create and house prefabricated components (such as steel columns, wooden beams, curtain walling etc.) that will be sent to site for easy assembly. This approach will maximise economy of scale in production and maximise efficiency, speed and agility. Making use of local labour and skills will support local economy and further minimise waste in transportation of labour while capitalising on local investment in the area.

The living system is an advocate for localism at every level, utilising local kitchens and supply chains to minimise food miles. Inspired by Alder Hey Children's Hospital, where food is cooked on every floor, it will supply fresh food born out of the community that is designed around the patients' needs and tastes and can be tailored to the individual. What waste is generated will be composted on site for use within the building's gardens where possible.

The hospital will offer a limited car parking provision for emergency and accessible parking only. This stance supports our bid that the hospital be fully integrated into the local community, its inner-city location rendering it accessible to a wide-reaching sector of society by foot and public transport, the rest served by either dial-a-ride or local authority provided patient transport services. Limiting car use in the hospital's immediate vicinity will contribute to the creation of a more peaceful environment for healing and recuperation, as well as supporting the hospital's position as a source of education on healthy and sustainable living. In this way, the hospital can help its local area align with the widening list of cities experimenting with limiting car use or pledging to reduce private cars in their centres over the next decade.



# 3

# Making it Real

## A. Urban Context & Environment

The hospital of the future is designed to be adaptable to its urban context and environment.

Building a new hospital is an opportunity for urban regeneration. While the principles of the building's design will remain constant, its programme will be not only be defined by its areas of specialty but by the social, political, geographical, environmental and architectural needs of the communities it serves, engendering focused interconnectivity with its users.

**'The social capital around the hospital's location is really important. The supply chain and tying in local suppliers in some way is a good thing for the hospital.'**

Toby Anstruther, Habitat Maker

The hospital's location is key to establishing it as a vital civic hub. It must be close to its local communities while still providing a safe, protected environment. The site must have minimal sound pollution; it should be a safe distance from motorways, flight paths and train lines yet close to good transport links.

The hospital's design will respond to its local landscape, taking into consideration parks and green spaces, transport connections, roads, and rivers.



# Making it Real

## A. Urban Context & Environment

### 'Building and Designing our Cities for Health' by Publica (Excerpt)

*We asked Publica to consult on specific locations for the hospital of the future, they have come up with 3 potential locations from across the country.*

There are many complex ways in which various aspects of city life interact to shape health and wellbeing. Hospitals play an essential part, not only in providing healthcare and managing illness within hospital walls but in their potential to promote health and transform the neighbourhoods they are anchored in into healthy communities.

#### 1. The hospital as an anchor – social and economic vibrancy

The *community focused hospital* is rooted in place, and has the potential to become a backbone institution to better the health and long-term welfare of the community in which it is anchored in. Hospitals potentially have the resources to make a significant difference beyond hospital walls such as partnering with housing authorities to provide mental health services or with schools to help address asthma and improve school attendance.<sup>1</sup> Furthermore, if hospitals focused activities to benefit the local community, for example through localised purchasing, hiring, investment and incubating new community enterprises hospitals as anchor institutions could have a transformative effect on the lives of people, the health of the community and driving local economic growth.<sup>2</sup>

The *community focused hospital* could be strategically situated amidst other key facilities like places to socialise, libraries and clinics, establishing a set of services within the urban environment. Blurring the boundaries of where health is generated and delivered creates an opportunity to reach more people and influence their health and recovery far beyond hospital walls. The *community focused hospital* is no longer isolated from the community it serves, instead it encourages a mixed-use neighbourhood anchored by health services. In this way, the neighbourhood becomes part of the experience – rather than being confronted with an isolated institutional environment. The *community focused hospital* will become part of a thriving neighbourhood, opening its services and campus, where there is no divide between 'citizen' and 'patient'.

#### 2. The hospital as a healthy neighbourhood – placemaking and the built environment

Planning and designing our cities for health does not only mean building hospitals. While hospitals are incredibly important, health is holistic – the whole person needs to be cared for, listening to physical, mental, and social needs. Our health is therefore not the sole responsibility of doctors and health care professionals. There are a wider set of forces and systems shaping the conditions of daily life that drive health outcomes.<sup>3</sup> For example, the design and layout of our built environment is a significant determinant of human health through its influence on socioeconomic and environmental factors. The *community focused hospital* is encouraged to look outside its walls to consider the social and environmental factors that affect health, which include air quality, noise pollution, green infrastructure, and safety. Good urban planning can not only mitigate the impact health hazards but can also become a tool for generating and promoting health.<sup>4</sup> The design and planning of the places we live, work and socialise is therefore an opportunity for the *community focused hospital* to join to reach beyond its walls and engage in placemaking and street transformation. The *community focused hospital* can create an attractive and welcoming urban environment by ensuring that adjacent streets and public spaces are accessible, safe and support a range of activities including playing, sitting and socialising.

Public space and public life are more important than ever now, as we continue to navigate what mark the Covid-19 pandemic will have on urban planning and our urban spaces. We know that throughout history public health issues have shaped cities and have led to both significant infrastructure and generous moments of civic design and innovation. For example, London's cholera pandemic (1846–60) led to a modern sewerage system and Victoria Embankment - an iconic public space in the city. The significance of community and sense of citizenship has been a lesson learnt from the Covid-19 pandemic. The pandemic has also created a new emphasis on local growth, resiliency and sustainability, which creates an opportunity for future hospitals to be more engaged institutions in the life of their communities.

#### 3. Methods for engagement

Caring for and engaging with the community is an essential component of a lasting, sustainable health service. The *community focused hospital* will listen to its community, gain their trust, identify what the key health problems are and articulate a strategy to address them. This approach will help develop an increased sense of ownership over health and wellbeing in the community. By investing in and working with others locally, the *community focused hospital* can have a greater impact on the wider factors that make cities healthy.

An evidence-based methodology – studying urban neighbourhoods forensically to document their land use, character, social infrastructure and complex identities – is a crucial starting point for decision-making about urban change and growth. From these social, cultural and spatial investigations we can create visually accessible area portraits, which provide base-line intelligence about an area's assets, social networks and character. We can use this intelligence to understand key opportunities and challenges affecting an area, ask strategic questions, address social and economic needs and develop community engagement plans.

*The full report is available in the Appendix.*

1. Norris and Howard, Can Hospitals Heal America's Communities? (November, 2019)

2. The Health Foundation (2020). The role of hospitals as anchor institutions in improving population health, Available at: <https://www.health.org.uk/the-role-of-hospitals-as-anchor-institutions-in-improving-population-health> (Accessed: 19 October 2021)

3. World Health Organisation. European Healthy Cities Network. Available at: <https://www.euro.who.int/en/health-topics/environment-and-health/urban-health/who-european-healthy-cities-network> (Accessed: 19 October 2021)

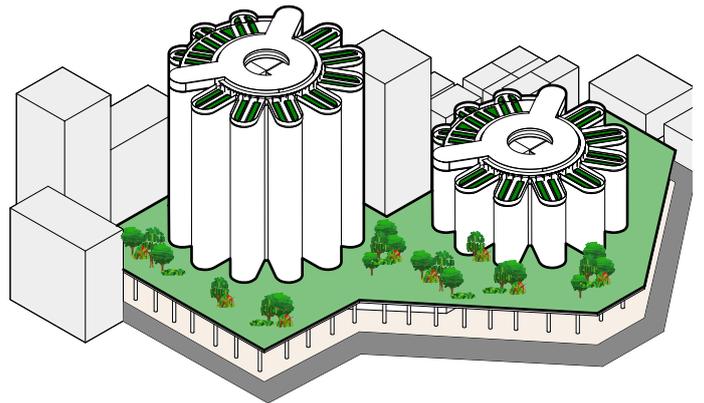
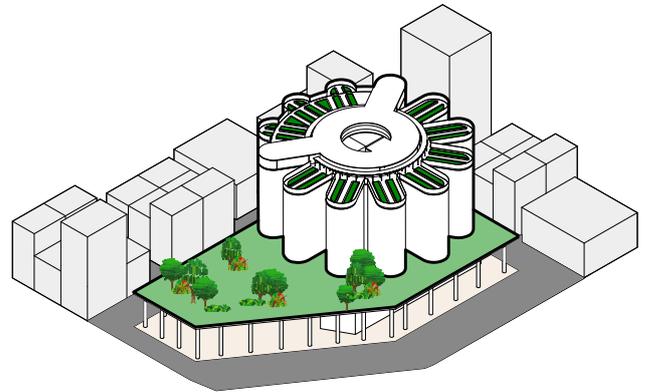
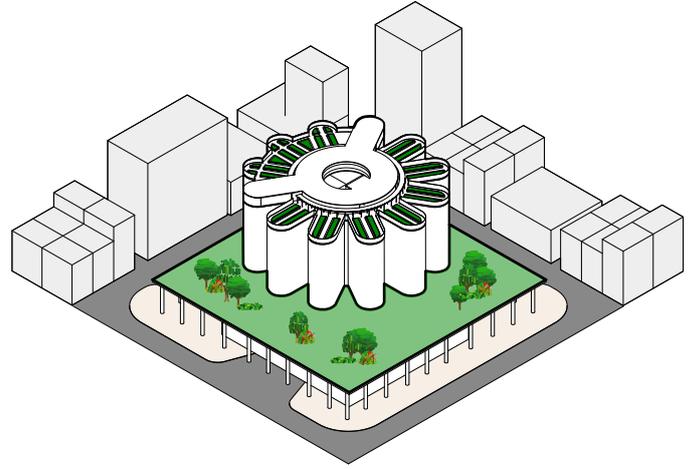
4. Urbact. HEALTHY CITIES: Bridging Urban Planning and Health Available at: <https://urbact.eu/healthy-cities-bridging-urban-planning-and-health> (Accessed 19 October 2021)

## A. Urban Context & Environment: Site Adaptation

The key to standardising the architecture of the Living System is for the podium, park and tower to be designed to integrate with the site so that it can reach out to the local community.

The podium contains a flexible programme which can adapt to different sites; working with existing community groups to break down barriers and welcome the community in.

Below are a series of diagrams exploring how the podium, park and tower can adapt to different sites and contexts, with multiple towers on larger sites.



Adaptability of podium to suit varying socio-economic and geographic briefs

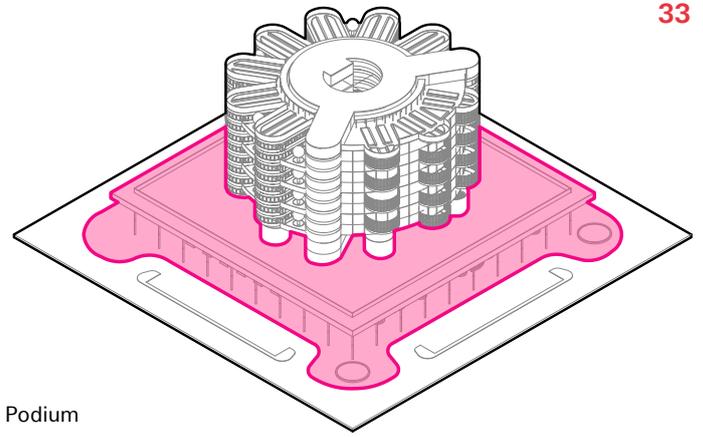
# Making it Real

## B. The Architecture

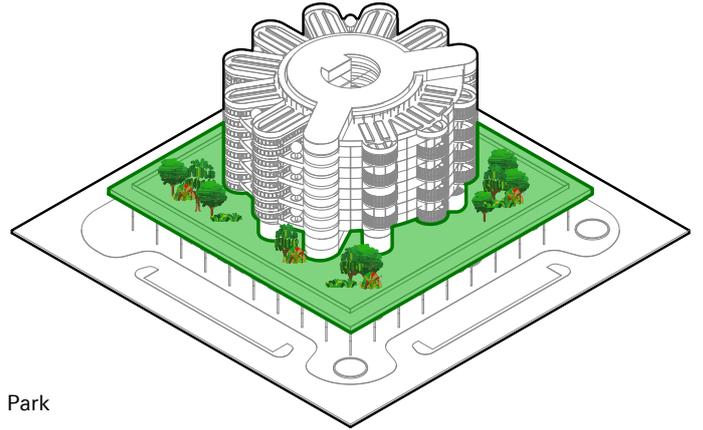
The building's architecture is designed to be efficient, legible, practical, and sustainable, prioritising flexibility and humility over heroism. Thorough consideration of the internal demands and complexities of a hospital, we have designed the hospital of the future from the inside out. This has led to a prototype consisting of a largely open sided podium with a public park on top. These support a tower harnessing a floorplan shaped by a concentric circle of petals.

Responding to the sun's path, the architecture will maximise natural light, drawing on its power to heat, heal and balance those inside. An abundance of natural light will conserve energy and minimise carbon consumption and waste.

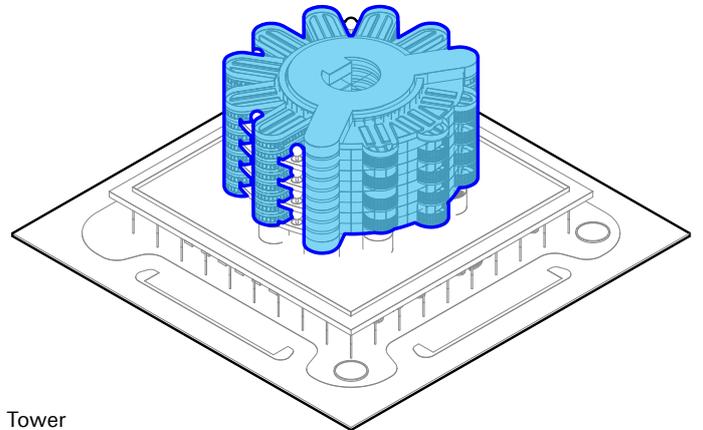
The hospital's structural principles consist of a network of responsive and adaptable enclosures that follow a plug-and-play system. These support the interior's changing programme that works like self-generating cells that can be bolted together and easily dismantled via a series of integrated fixings in the slab and ceiling. These components will be able to form walls, doorways, and fixed structures around service voids so that everything from M&E to rooms will be reconfigurable.



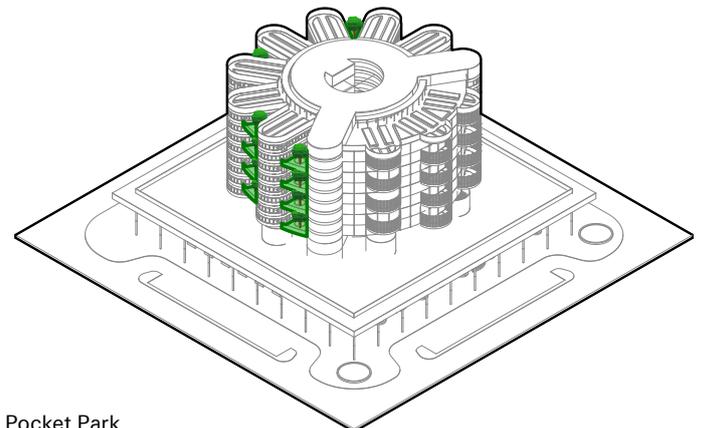
Podium



Park



Tower



Pocket Park

## B. The Architecture: Façade & Cladding

The hospital's exterior is punctuated by pocket parks, planted balconies and trailing greenery, creating a lively façade that enhances its surroundings and supplies them with biophilic energy.

The building's façade is transparent at podium level, revealing its inner workings to the world. It is open along two sides of the ground floor to allow a continuous flow of visitors.

In the tower (to ameliorate the issues of solar and heat gain), the full division of the petals is maintained only on the south side. Here, the sun's warmth will help passively heat the building and natural light will flood the wards. On the north side, the petals will be linked by a curved, glazed façade, with the tips left as open balconies. This will create softer, more filtered light, appropriate for the office and consultation work being conducted on this side of each floor.

The façade will be cleaned via a building maintenance unit (BMU) or cranes positioned on the roof as necessary.

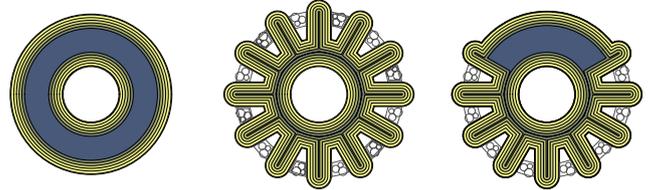


Diagram showing efficiency of natural light penetration through architectural form

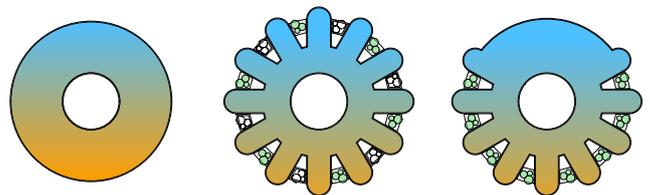
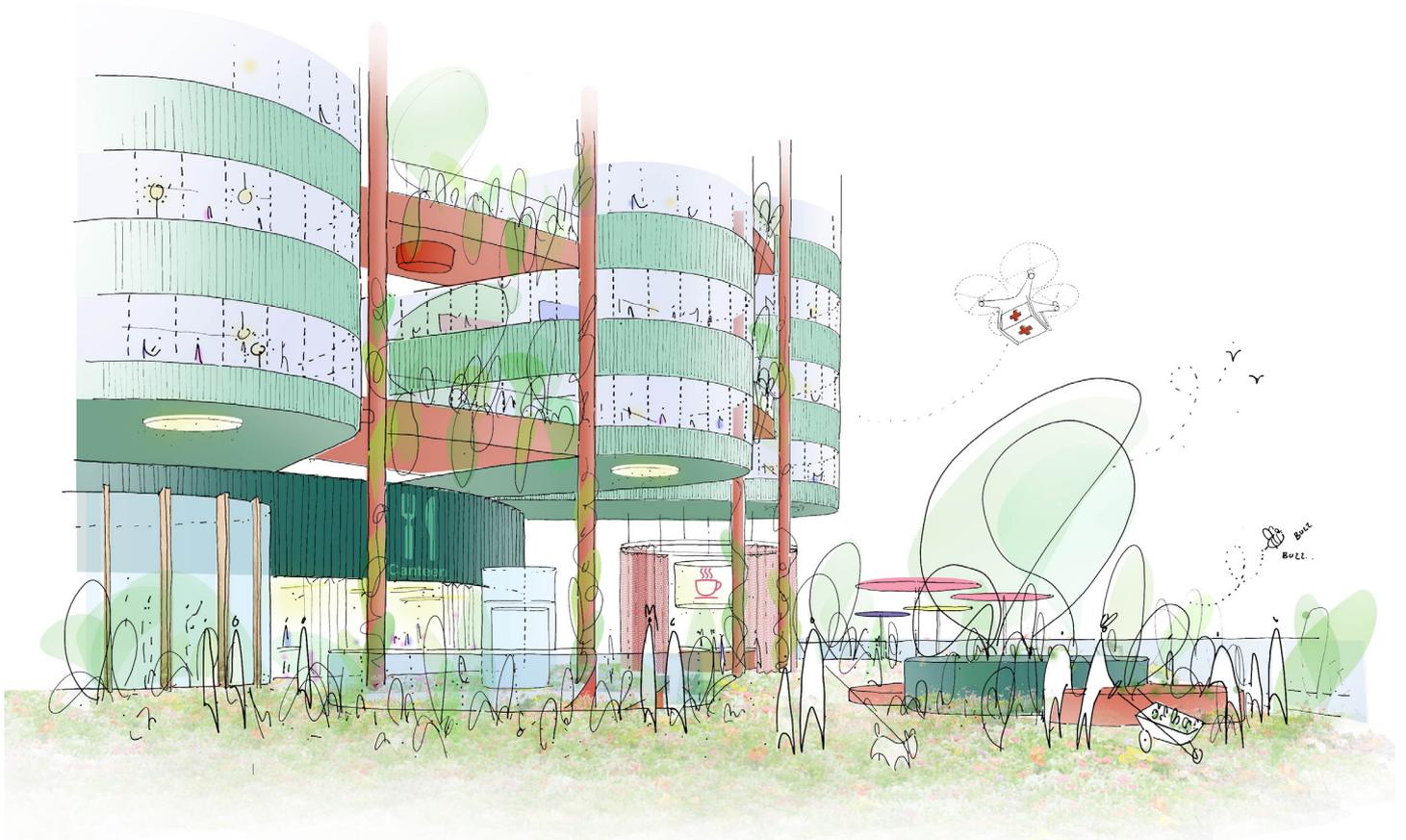


Diagram showing how floorplate has been shaped to optimise ratio between heat gain and facade to floor area



Park meets restaurant-café and refreshment kiosk

## B. The Architecture: Material Palette

The hospital of the future will adopt a non-dogmatic approach to material specification. Materials will be chosen for what is most fit for purpose. We propose terracotta, glass, steel and timber for their resilience, efficiency of construction and sustainability credentials.

The interior will be comprised of cross-laminated timber (CLT), constructed via a kit of prefabricated, modular, dry-fix panelled components with neoprene seals. These panels have the benefits of reduced embodied carbon, biophilia and increased flexibility (they can be easily removed for the addition of new risers, for example).

Our biophilic approach will inform the choice of materials, particularly in the public spaces where natural and organic surfaces and fabrics will help create welcome spaces that feel warm and welcoming rather than clinical.

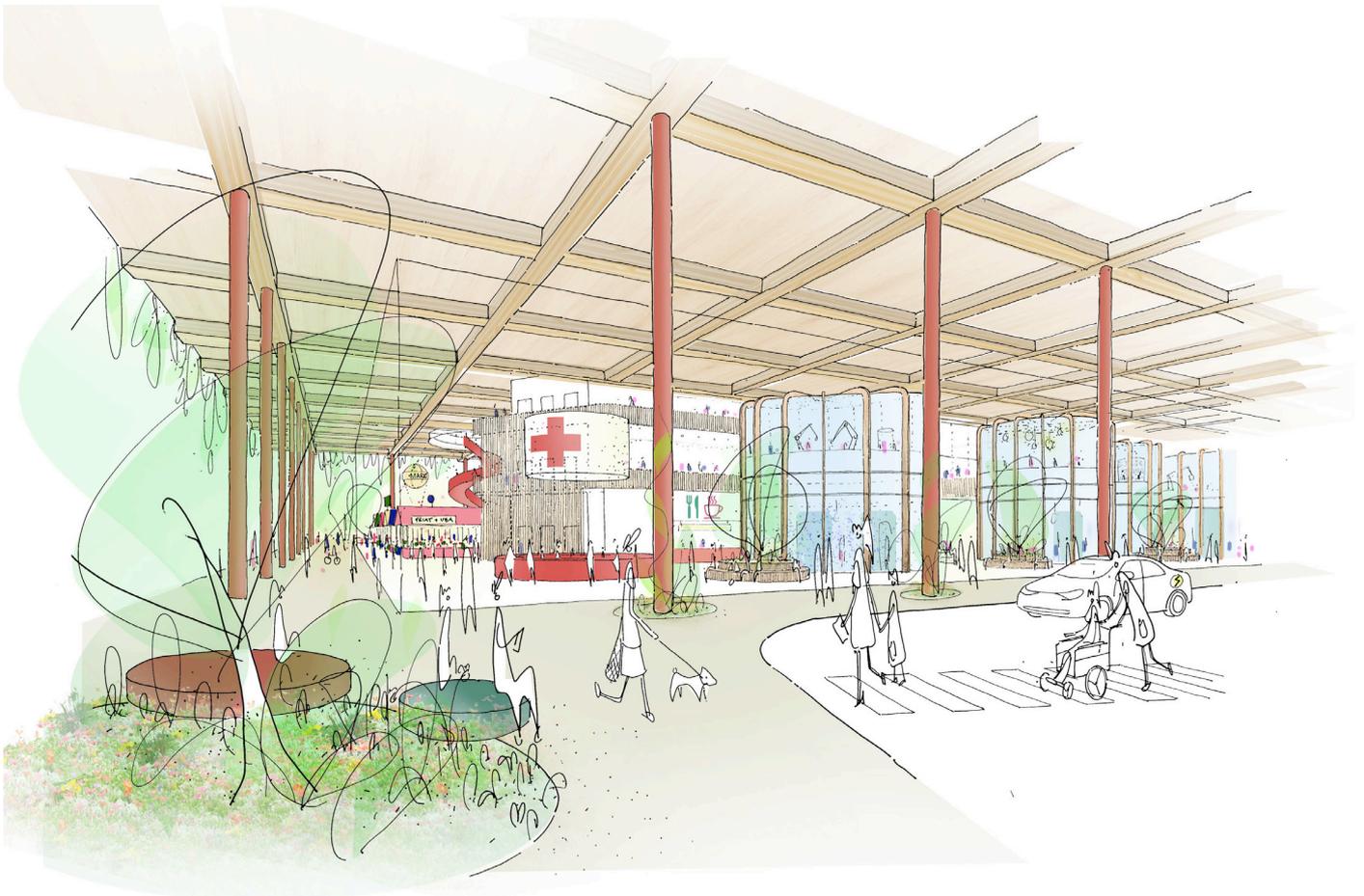
We are committed to specifying materials with naturally antibacterial qualities where possible, including:

**Ceramics** glazed with antibacterial additives that protect against microbial reproduction and growth.

**Wool**, which is naturally water- and soil-resistant, with a surface layer that is repellent to microbes as well as properties that inhibit the growth of some microorganisms including mould, mildew, bacteria, and viruses.

**Copper** and its alloys, such as brass and bronze, which have the innate capacity to efficiently kill a range of harmful microbes.

**Wood**, the extracts of which have been found to have antibacterial properties (such as the lignin that binds the fibres together). In addition, the quick-drying nature of wood puts bacteria at a disadvantage. Oak is particularly hygienic, with antibacterial properties due to a combination of its hygroscopicity (moisture absorbency) and its extracts.



Ground floor entrance, showing reception, marketplace and community support centres

## B. The Architecture: Cores & Circulation

3 vertical cores serve the hospital podium and tower:

**Core 1** for staff and patients admitted from A&E

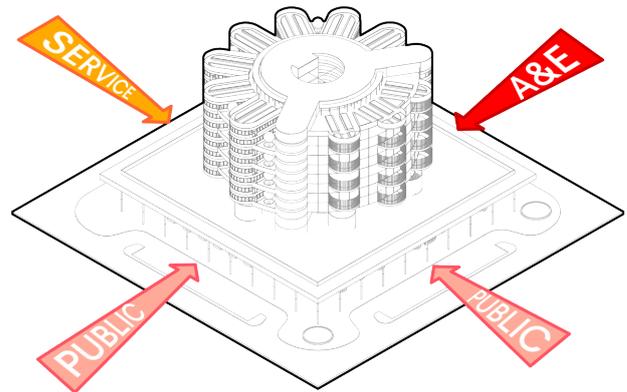
**Core 2** for visiting public and outpatients

**Core 3** for food/laundry delivery and waste removal plus general servicing

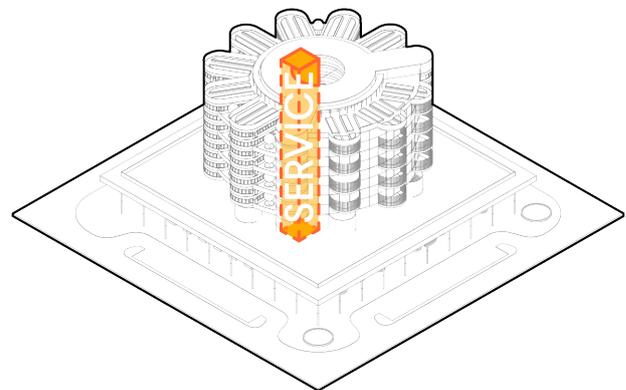
The two main circulation cores (1&2) each contain 3 lift cars that always open towards the facade so that when people exit, they get the benefit of the park view and exposure to natural light on arrival at the wards. A further bed lift exits directly into the wards.

The different orientation of these lifts creates privacy and separation between patients arriving on beds and visitors arriving on foot.

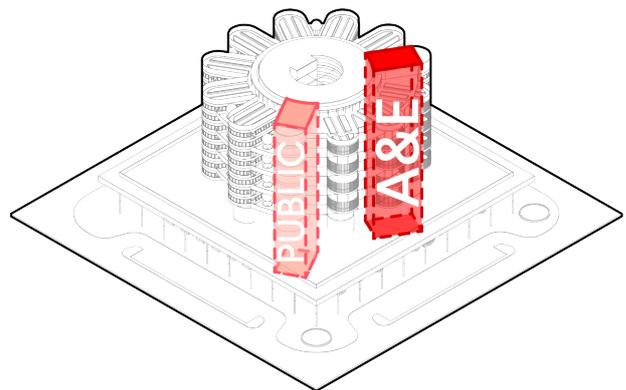
A feature spiral staircase will bring the public from the ground floor up to the park level, creating a dramatic public realm connection between the main spaces open to all. This staircase will also open at the first floor – Innovation Centre – level, giving access to the public pharmacy and an open route past the glazed laboratory spaces to the main lift core. This staircase will be supported by a glazed lift for further public access.



Main points of access, combining services, A&E and public drop-offs



Defining main service core throughout the building



Defining the public and A&E lift cores throughout the building

# 4

# Zoning

## A. Podium

**'We should be looking at urban and suburban regeneration which includes community health hubs at primary level, not just secondary.'**

Stan, Hospital Patient

**'You need to embed the hospital in the community and not have it look like a UFO that has just landed.'**

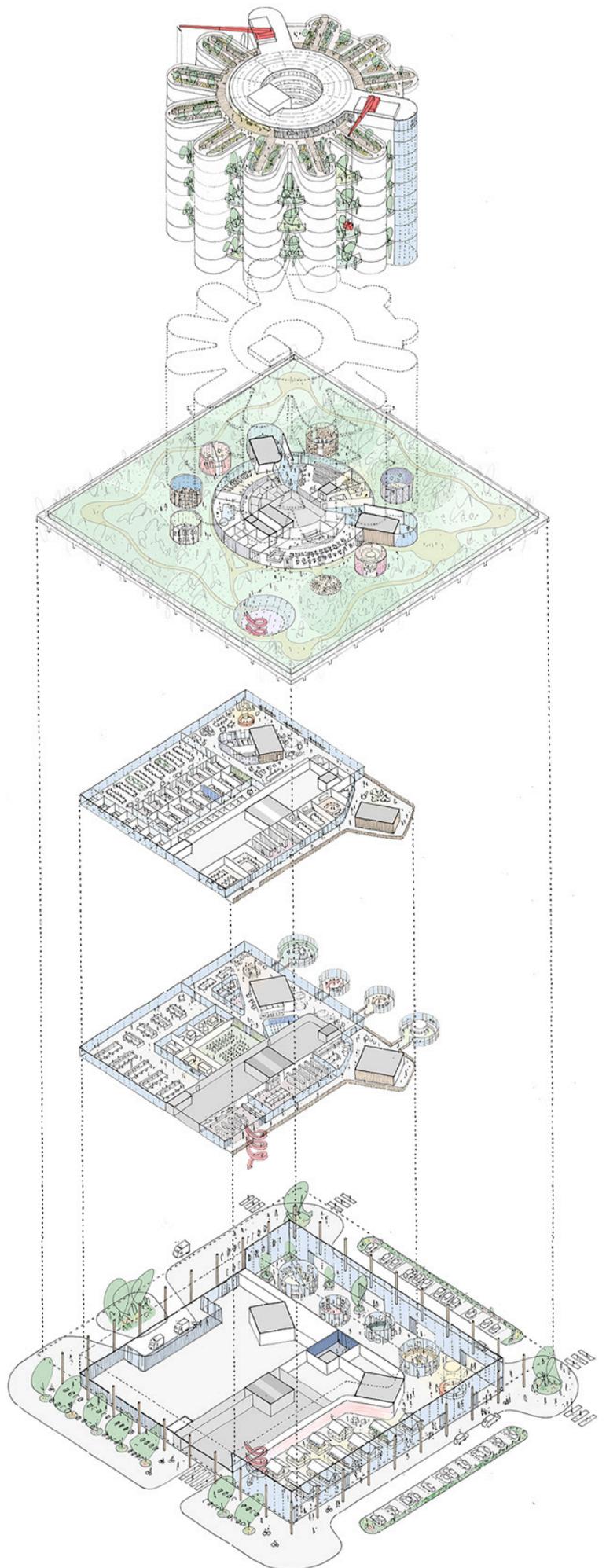
Helen Starr, Cultural activist, Curator and Producer

Open to the general public, the building's podium is key to the hospital of the future's mission to embrace the local community and function as a living system. It will bring the sick and the well together to foster a culture of care.

Based around the idea of an open marketplace, the hospital will strengthen the local economy, giving local businesses access to a wider range of customers and raising awareness about the range of community support services available.

While this marketplace strategy will remain constant, the detail of the programme can be tailored to the needs of the particular community the hospital serves, aiding urban regeneration in the best ways possible.

As the public nerve centre of the hospital, the podium is a prime site for ensuring that the maximum number of people benefit from the building's biophilic interventions. Scented plants can be used in entrance and exit areas, unscented plants can be used elsewhere for their tactile and oxygenating qualities while hypoallergenic plants can be incorporated at closer contact points.



Exploded Isometric analysing the components of the podium.



Section of the living system, revealing the full functionality through the marketplace, innovation centre, hospital support, park and hospital tower.

## A. Podium: Ground Floor

### Entrance & Reception

At the building's northeast corner, the highly visible main entrance and reception area will serve everyone, guiding the general public up to the park and hospital staff, visitors and patients into the main body of the hospital via the lift cores.

Access is via a patient drop off area on the north side of the ground floor, with another public drop off area on the east side.

### Marketplace

Housed in a triple-height void on the north and east sides of the ground floor, the marketplace will be a hive of activity at the heart of the building, featuring stalls selling fresh local produce and dry goods and crafts. A series of standalone pavilions will contain social prescribing and community welfare services including a community kitchen. As the area where community and hospital meet, the marketplace must be safe; it must be well lit, well policed with open sightlines and no concealed corners.

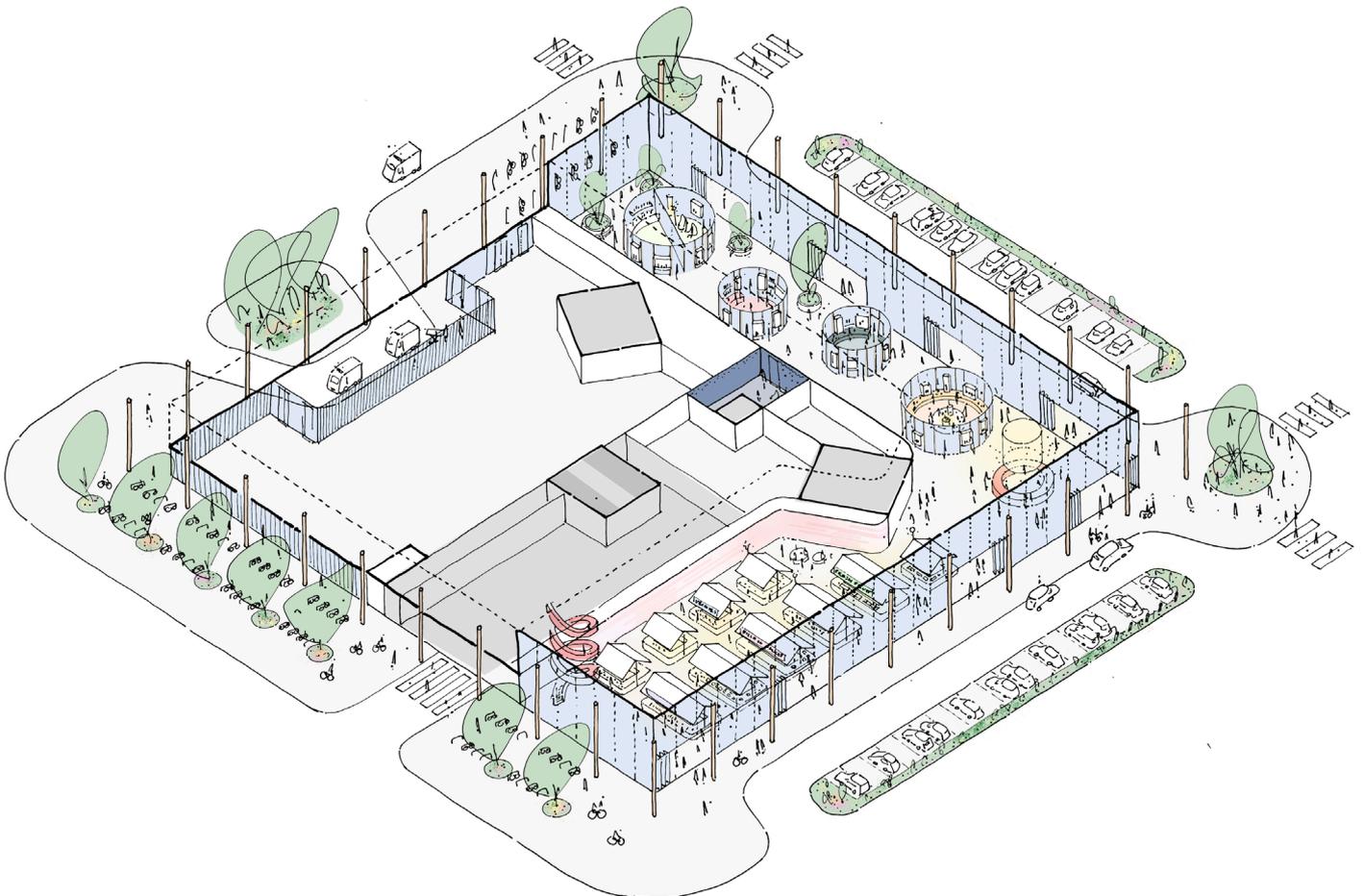
### A&E

Separation between A&E and the public facing marketplace is achieved through back of house zones including the loading bay and service core. The A&E department is served by its own lift core which takes visitors and patients directly into the hospital. Access to the A&E department and ambulance drop off is to the west of the ground floor.

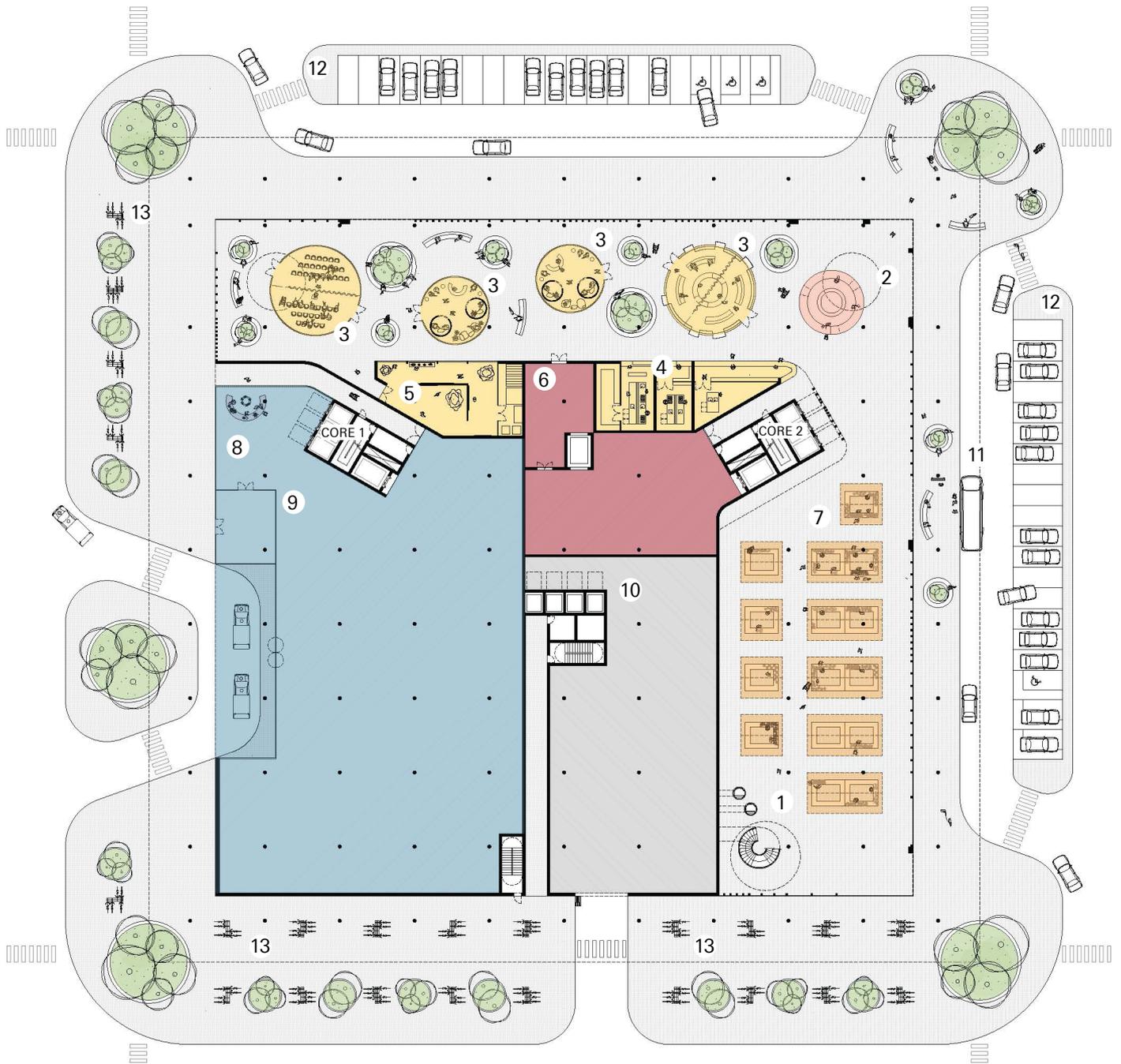
On the north side of the central space is the entrance to the Mortuary which provides visitor access via a dedicated lift that also carries them directly up to the Bereavement Centre at park level.

### Primary & Social Care

The programme of social care housed in the spaces along the north perimeter, will include a doctor's surgery containing a consulting/ exam room, waiting area and nurses office, as well as a community kitchen, counselling and consultation rooms for family and community welfare services such as housing support, debt relief and legal advice.



## A. Podium: Ground Floor



- |  |                                  |
|--|----------------------------------|
| 1. Public Stair & Lift Access                  | 7. Community Market              |
| 2. Main Entrance Reception & Information Point | 8. A&E Reception & Waiting Room  |
| 3. Community Support Centres                   | 9. A&E                           |
| 4. Community Kitchens                          | 10. Loading Bay & Service Access |
| 5. Community Exhibition space                  | 11. Bus stop                     |
| 6. Bereavement & Mortuary Entrance             | 12. Car parking                  |
|  | 13. Cycle parking                |

## A. Podium: First Floor

### Innovation Centre

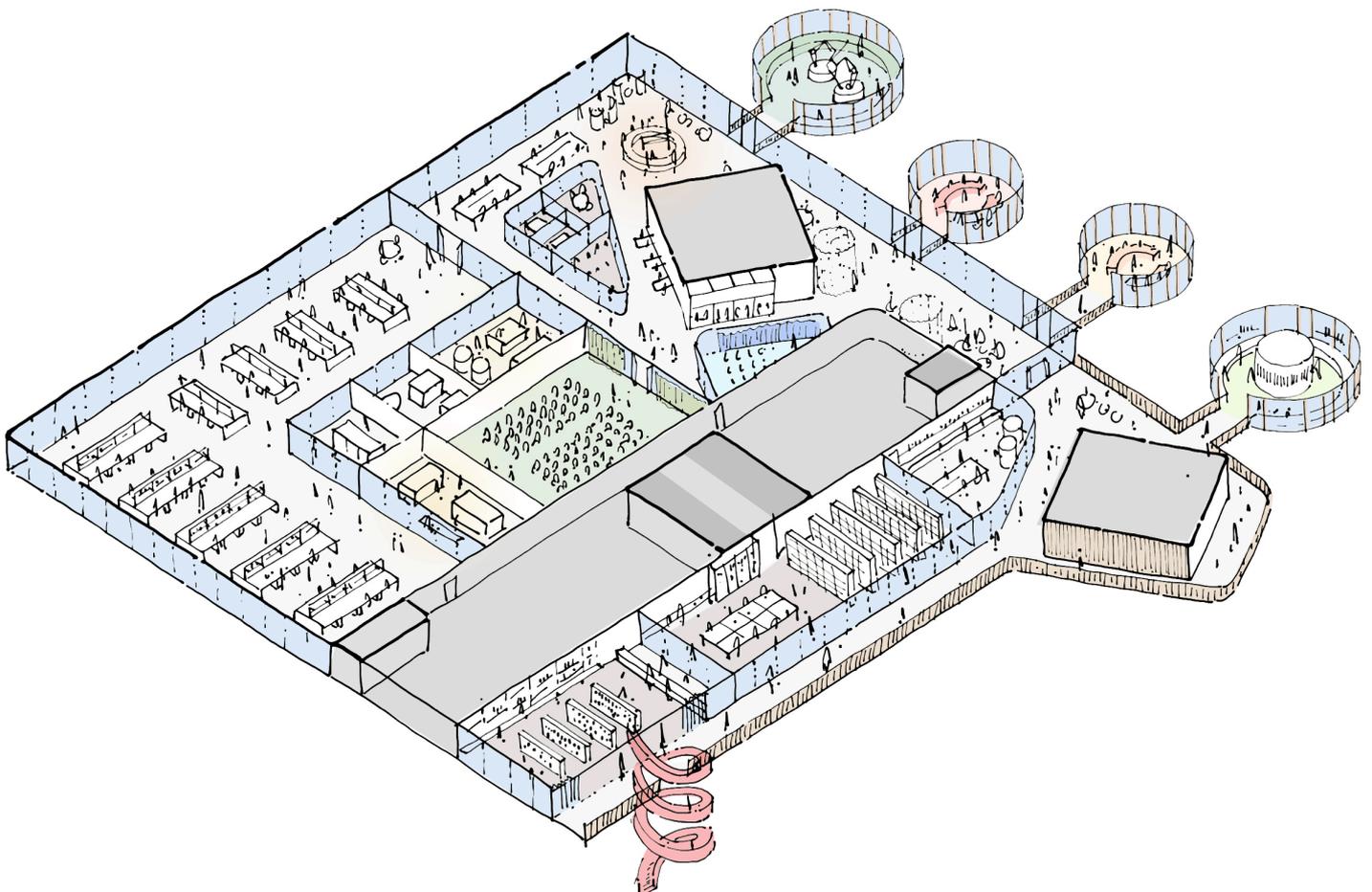
The first floor of the podium occupies a mezzanine level containing the hospital Innovation Centre's laboratories, teaching and research workspaces as well as two pharmacies that will serve the general public and the hospital respectively. Maintaining the visibility of these spaces is essential to demystifying research processes and keeping people connected to medical advances that affect their health. The view of the Innovation Centre as a burgeoning hub will foster a culture of transparency and promote inquiry, discipline, learning and innovation at the core of the hospital's activities.

The façade and internal walls of the Innovation Centre will be fully glazed to let in natural light and reveal the laboratories' inner workings. The floor offers a range of workspaces with varying levels of privacy; from formal and informal meeting rooms and soundproofed phone booths to flexible, open-plan co-working and teaching spaces.

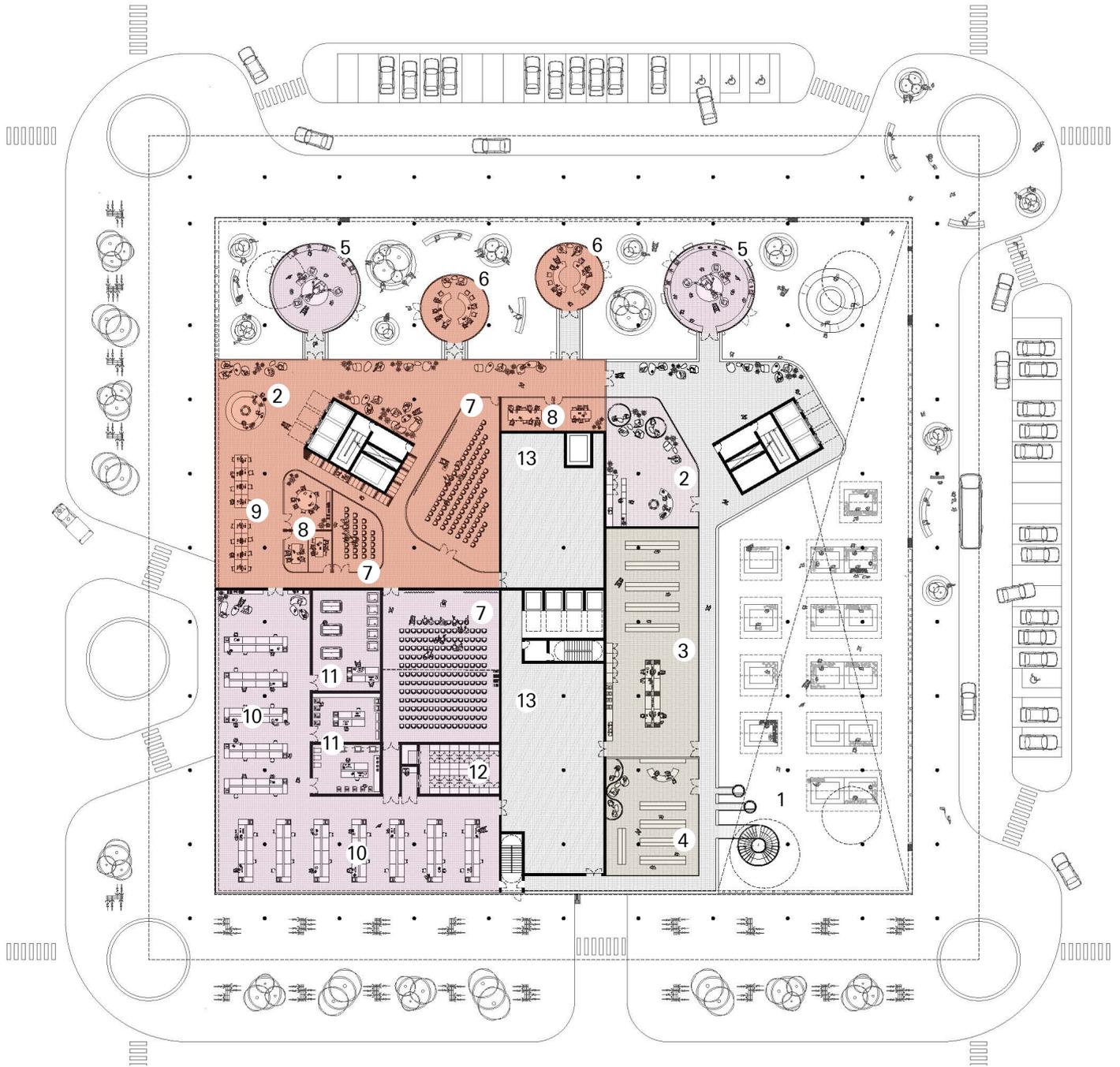
More private spaces (lecture theatres, seminar rooms and spaces for isolated lab work) are located in the centre of the floor plate, while breakout workspaces for staff and students are situated on circular glazed platforms, suspended above the public-facing retail units below. These enclosed platforms are designed to showcase the activities inside.

### Pharmacies

Back of house areas and the service core separate the two pharmacies from the research and teaching area. Unlike the Innovation Centre, the pharmacies can be reached via the main public lift core, or alternatively via the spiral staircase from ground level. The hospital pharmacy is directly connected to the hospital above via the service core creating a potential route for robot-distributed medication.



## A. Podium: First Floor

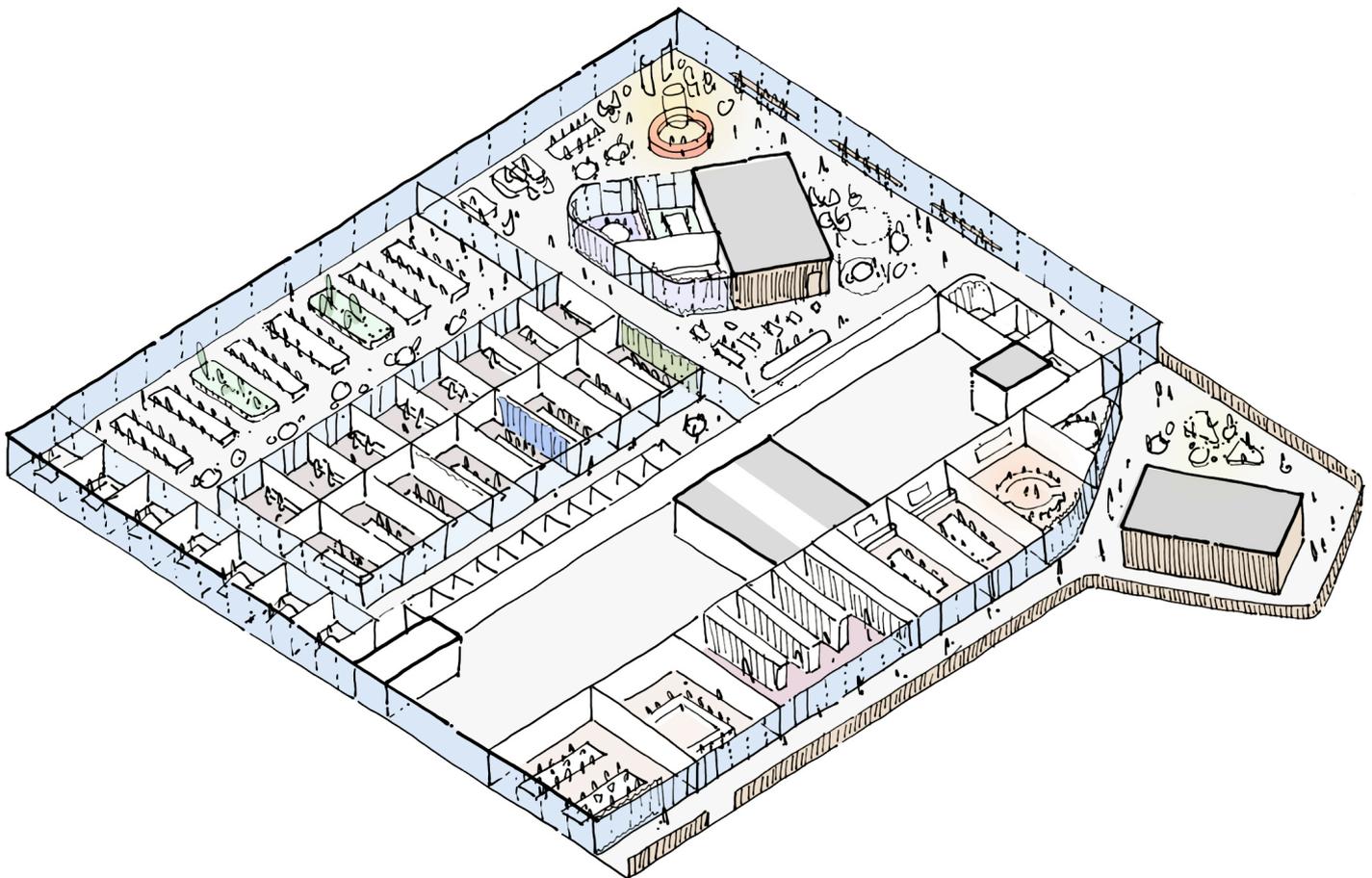


- |                               |                              |
|-------------------------------|------------------------------|
| 1. Public Stair & Lift Access | 8. Meeting Rooms             |
| 2. Laboratory                 | 9. Study Area                |
| 3. Hospital Pharmacy          | 10. Laboratory               |
| 4. Public Pharmacy            | 11. Laboratory Testing Rooms |
| 5. Innovation Space           | 12. Laboratory Cool Room     |
| 6. Seminar rooms              | 13. Back of House            |
| 7. Lecture Rooms              |                              |

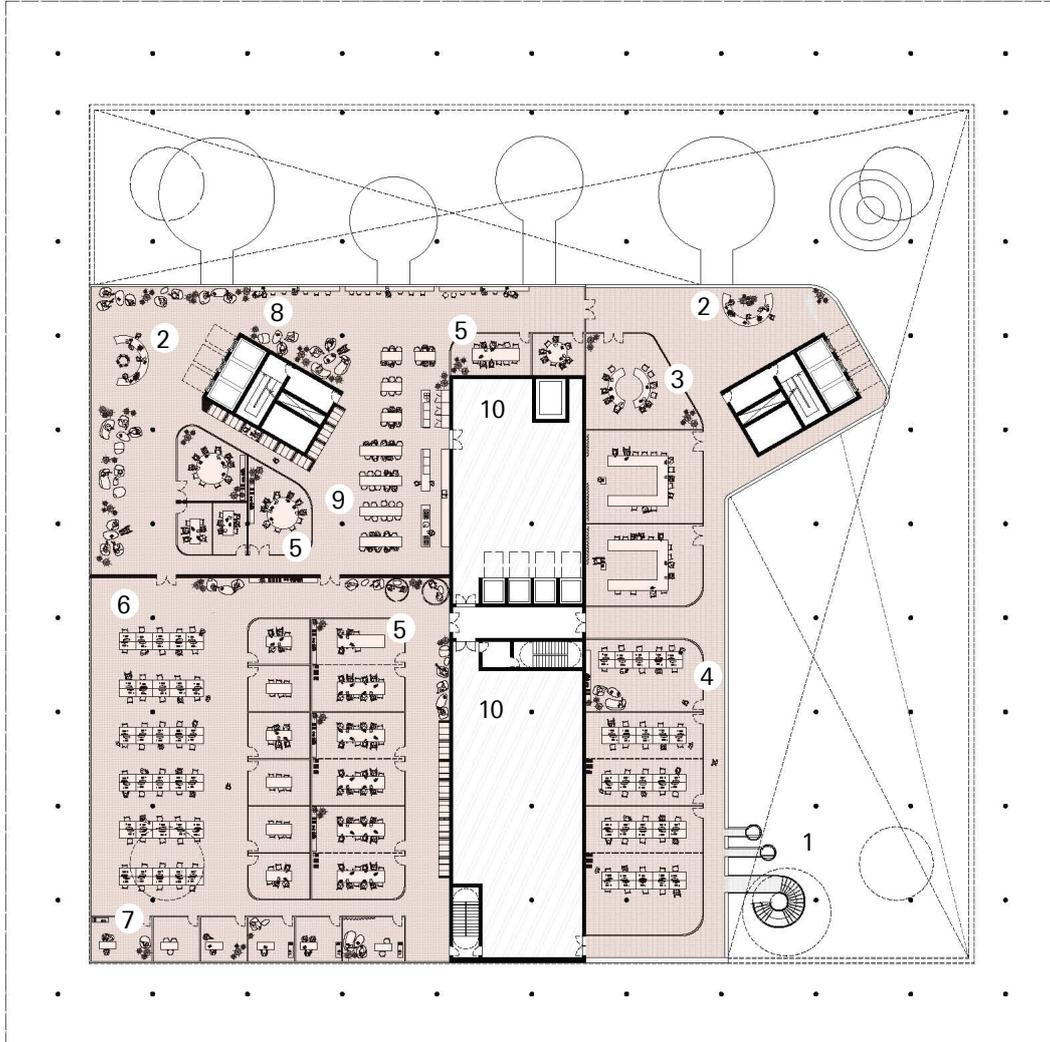
## A. Podium: Second Floor

### Hospital Support

Accessible via Core One, this floor contains hospital support spaces including extra administrative, meeting or staff spaces and storage for additional equipment. Its large, open floor area utilises a flexible grid structure that enables service elements such as lighting or heating to be plugged in or removed and walls or partitions to be easily moved in anticipation of the changing needs of the hospital.



## A. Podium: Second Floor



1. Public Stair & Lift Access
2. Reception
3. Conference Rooms
4. Flexible Office Space
5. Meeting Rooms
6. Open Plan Office
7. Private Office Spaces
8. Co-Work Area
9. Canteen
10. Back of House

## A. Podium: Third Floor

Instead of dedicating the roof space to plant machinery, we have located M&E on the third floor of the hospital. Sitting between two most highly serviced spaces (Podium and Tower) it can be reconfigured to suit changes in either without affecting significant parts of the remainder of the building.

This location will enable centralised distribution of power and water via a simple three-core system that allows for flexible movement of people, food, and waste.

Its ventilation will be configured to intake and exhaust from the perimeter of the floor, avoiding the need for large risers throughout the upper floors.

### The Park & Pavilions

Open to all, the public park is a city retreat that will give the local community a place to meet, exercise and interact with nature. Containing a series of interlocking gardens, it will offer a contrast to the hospital's clinical functions while supporting shared health goals through interventions like markers on pathways to highlight progress and give a sense of achievement.

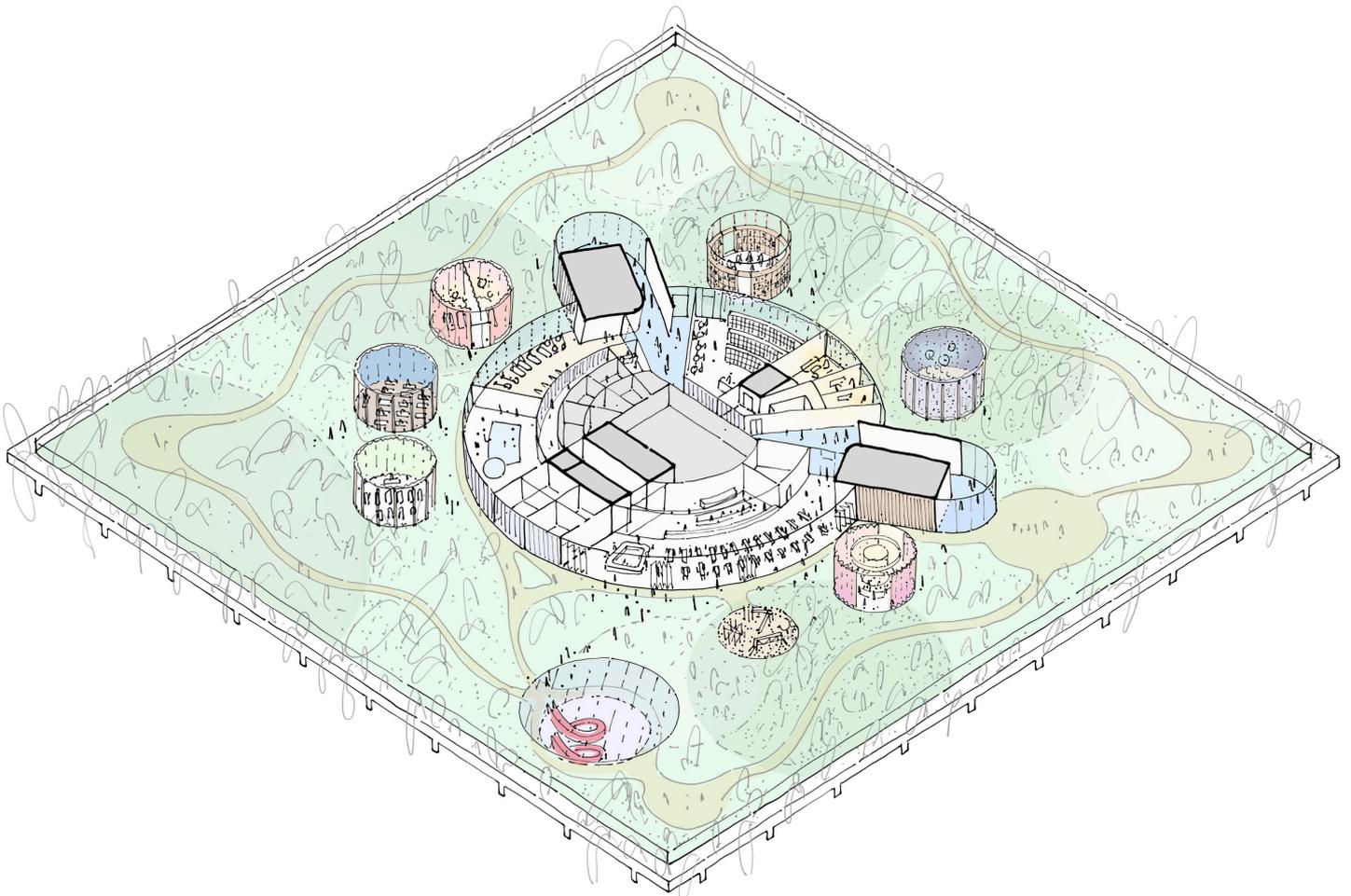
The park's landscape will be designed to deliver a colourful, engaging environment of exploration, encouraging biodiversity and showcasing tangible seasonal changes – "Blossoming cherries for moments of seasonal celebration, English Oak to instil a sense of longevity, Rowan for brilliance of autumn colour and fruits" (Dan Pearson, Landscape Designer)

Nature-focused interventions like bird and bat boxes will animate the park and fuel its health.

The park is accessed via a spiral staircase and lift at the southeast corner which leads to the day care centre and café and restaurant space, and via a lift in Core Two, accessed from the main entrance.

Separate from the main building, the park also contains a cluster of stand-alone pavilions that offer specific services – such as acupuncture, osteopathy and counselling – as well as a kiosk for takeaway food and drink and studio spaces for art classes and therapy groups.

Removed from the clinical space of the hospital, pavilions will offer a space in nature for peace and reflection.



**‘Even as the hospital continues to function around those who must come to terms with the end of life, we must still make room for grief in the running of the contemporary hospital.’**

Hammad Khan, Consultant Neonatologist St Thomas’ Hospital (see Appendix for full essay)

As part of the hospital’s Bereavement Centre, one of the park’s pavilions will contain a non-denominational chapel for all hospital users. This Contemplation Room will be a place where people can go in difficult or happy times to reflect, pray, remember, grieve or give thanks no matter their religion or beliefs.

Each pavilion is shaded by the overhang of the petal-shaped wards above. Their flexible nature means they can be easily repurposed, whether as private consultation rooms, or play spaces for children. Their services will be available to patients as well as to the general public through a programme of out-of-hours sessions and classes. These services will support continuity of care for patients post-discharge. The design of each pavilion can be informed by its function, the degree of openness to the landscape dependant on the level of privacy required by its function.

### Café & restaurant

**‘Somewhere to go, just to feel a bit of normality, even if you got to go downstairs in a wheelchair with your oxygen for a fresh cup of coffee, would be nice.’**

Katie, Hospital Patient

Serving delicious, healthy food and offering views out onto the park, the hospital of the future’s café and restaurant will be cultivated as one of the local area’s desirable health food destinations. Food will come via the service core from a central kitchen that also serves food to hospital patients. In stark contrast to the traditional hospital canteen, the café and restaurant will offer dishes made with fresh, seasonal produce, some of which will be grown in the rooftop garden allotment or provided by local suppliers in the hospital’s marketplace.

### Gym & Physio

The gym will house exercise spaces, fitness studios with specialised rehabilitation equipment, physiotherapy treatment spaces and changing rooms. Primarily for use by patients, its facilities will be available to the public outside peak hospital hours.

### Library

Located on the same level as the park, the public library will cater to both patients and the wider community. It will offer patients a space to frequent other than their rooms, providing a valuable source of stimulation and promoting an active approach to recovery. A mobile offshoot will bring books to those who are bedridden. The library will house a separate reading area and rooms for writing workshops, storytelling sessions and poetry recitals.

### Day care

The hospital’s day care centre will give parents a safe place to leave their children while they wait for test results or visit an ill family member or friend.

### Bereavement Centre

**‘In a hospital, the immediate aftermath of death involves tears and paperwork in equal measure.’**

Hammad Khan, Consultant Neonatologist, St. Thomas’s Hospital

The Bereavement Centre will offer both practical and emotional support for grieving families. Small rooms will provide privacy while larger ones will allow families to come together or make administrative arrangements.

## Zoning

### C. Flower-Shaped Tower

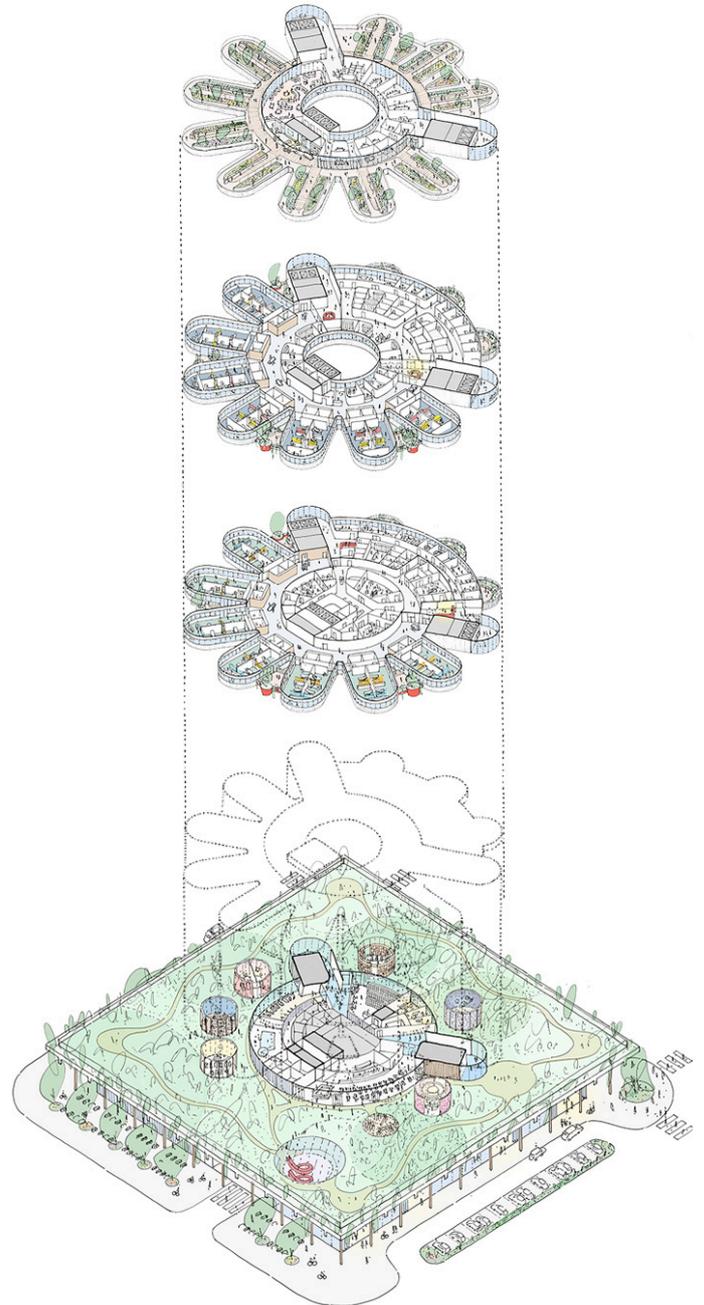
Levitated above the park, the flower-shaped tower of the Hospital comprises of 9 floors including the ICU, Wards, Rooftop Allotment and Staff Forum.

**'Designing a space where clinical staff can have continuous interaction with patients is key to providing a nurturing environment.'**

Natasha Prime, Emergency Charge Nurse

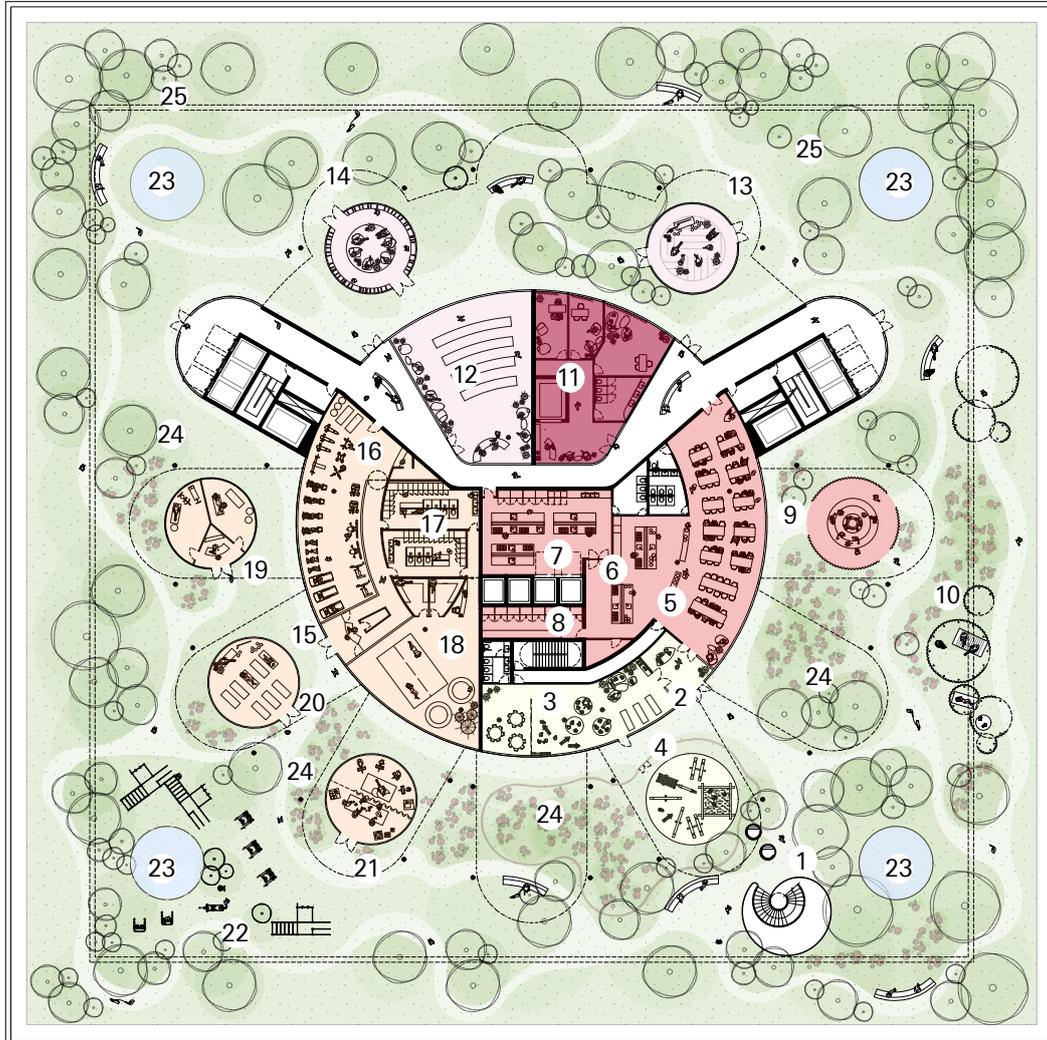
The form of the tower's petal-like wings has been determined by a commitment to bringing domestic scale, natural light and views to every patient. Each ward floor is its own self-contained neighbourhood. Their layout and configuration will balance the dual needs for privacy and social interaction. They include dedicated staff rooms and spaces for social interaction between patients, family and friends. The circular floor plan and continuous views encourage walking and mean users will always know where they are and never get lost.

The hospital of the future will utilise reconfigurable ward layouts enabling private rooms for patients who are seriously ill or highly infectious, and shared wards for less severely ill patients to lower the demands on staff.



Exploded Isometric exploring make up of hospital tower including; park, cafe and pavilions, out patients, intensive care, ward floors, roof top gardens, staff forum and bar.

## C. Flower-Shaped Tower



- |                                       |                             |                               |
|---------------------------------------|-----------------------------|-------------------------------|
| 1. Public Stair & Lift Access         | 10. Picnic Area             | 19. Physiotherapy Studio      |
| 2. Reception for Restaurant & Daycare | 11. Bereavement Centre      | 20. Yoga Studio               |
| 3. Daycare Centre                     | 12. Library                 | 21. Art & Crafts Studio       |
| 4. Playground                         | 13. Contemplation space     | 22. Outdoor Gym               |
| 5. Restaurant                         | 14. Reading Room            | 23. Skylights                 |
| 6. Restaurant Kitchen                 | 15. Reception for Gym & Spa | 24. Edibles for Foraging      |
| 7. Hospital Kitchen                   | 16. Gym                     | 25. Hibernaculum for Wildlife |
| 8. Cold Room & Pantry                 | 17. Changing Facilities     |                               |
| 9. Coffee Shop                        | 18. Hydrotherapy Spa        |                               |

## C. Flower-Shaped Tower: Fifth Floor

### Operating theatres & ICU

The hospital's operating theatres and intensive care unit (ICU) are located on the first floor of the building's flower-shaped tower.

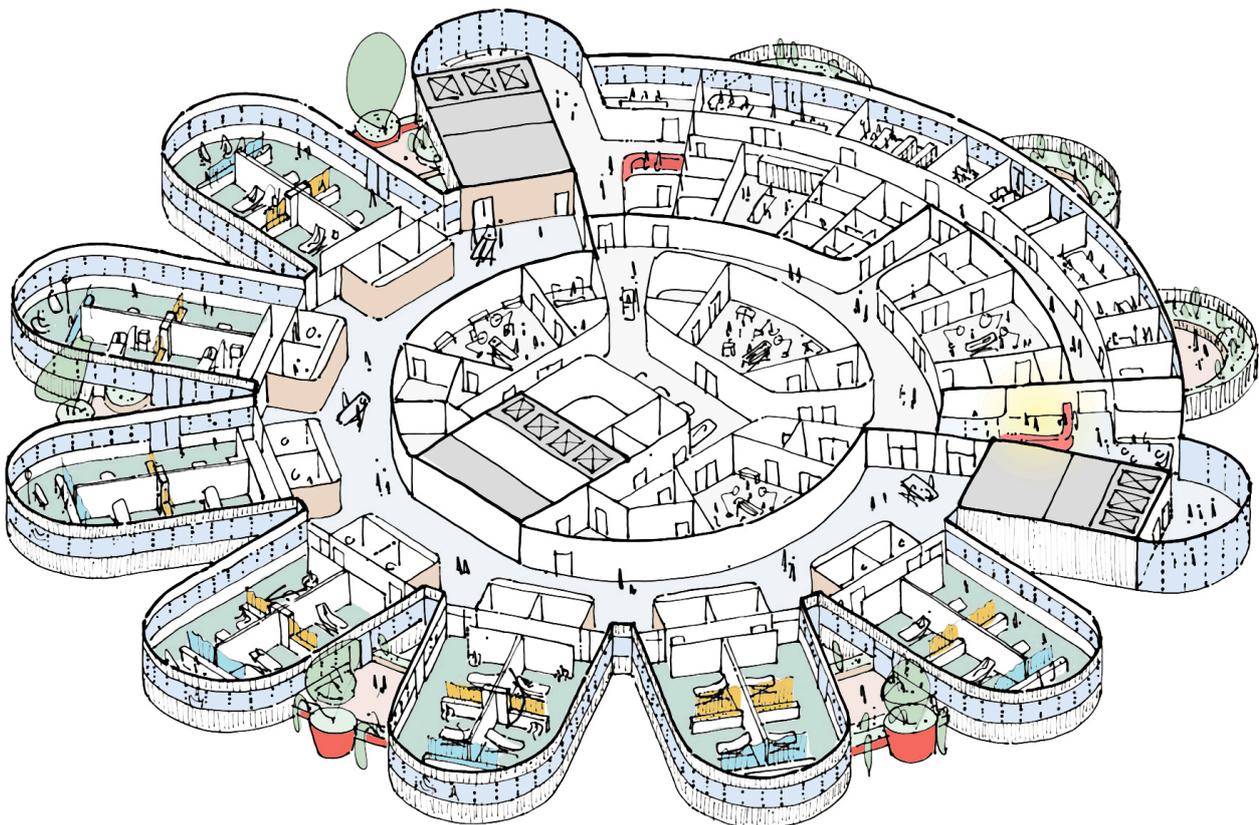
Divided from the petals on the building's perimeter by a ring-shaped thoroughfare, the operating theatres (along with storage and trolley areas) are located in an inner circle of the floor plate, where natural light is not needed. Surgical staff can access fresh air and daylight after long procedures via quick access routes to the balconies and rooms on the floor's perimeter which overlook the park.

To the north of this central area are staff and office spaces for the ICU including meeting rooms, staff breakout spaces and a staff library. All receive good natural light and are served by three balconies.

On the south side, the petals house the post-op recovery rooms and critical care units, with four beds in each. Fully glazed, the petals benefit from access to natural light and views out to the park, while an upstand to bed height prevents the sun from shining directly in patient's faces.

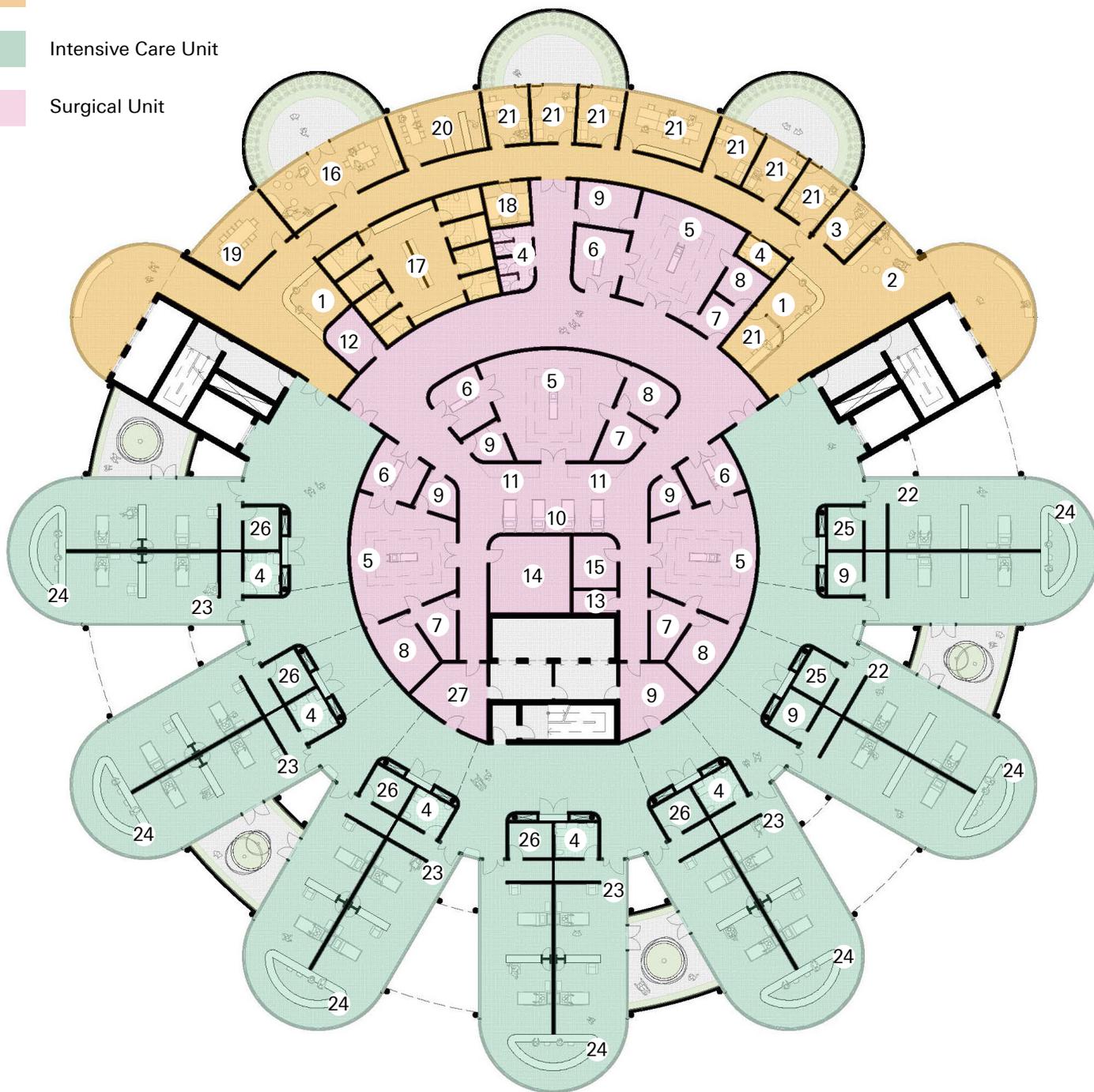
The nurses' stations are located at the tip of the petals, enabling sightlines across the beds and a looped route around each group of four beds for closer observation. Access to the pocket parks for staff and visitors is close to the nurses' stations, while bathrooms and storage spaces line the ring-shaped thoroughfare.

Access to the fifth floor is via lifts in Cores One and Two from the ground floor: one for staff and patients coming up from A&E for surgery, the other for visitors, outpatients and those coming down from the wards. The outpatient and visitor lifts open onto a covered platform overlooking the park, and the floor is served by a generous reception and waiting area.



## C. Flower-Shaped Tower: Fifth Floor

- Staff Facilities & Office
- Intensive Care Unit
- Surgical Unit



- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>1. Reception and Communication Base</li> <li>2. Waiting Area</li> <li>3. Interview and Counselling Room</li> <li>4. WC and Shower, WC and Wash</li> <li>5. Operating Theatre</li> <li>6. Anaesthetic Room</li> <li>7. Scrub up and Gowning Room</li> <li>8. Preparation Room</li> <li>9. Dirty Utility</li> <li>10. Trolley Area</li> </ul> | <ul style="list-style-type: none"> <li>11. Exit / Parking Bay</li> <li>12. Near Testing / Status Laboratory</li> <li>13. Satellite Pharmacy and Store</li> <li>14. Bulk Supplies Store</li> <li>15. Clinical Equipment Store</li> <li>16. Staff Rest Room</li> <li>17. Staff Changing &amp; Showers Male &amp; Female</li> <li>18. Couchette</li> <li>19. Meeting Room / Seminar &amp; Training Room</li> <li>20. Library and Study Room</li> </ul> | <ul style="list-style-type: none"> <li>21. Staff Offices</li> <li>22. Recovery Room</li> <li>23. Critical Care Bay</li> <li>24. Staff Communication Base / Staff Spaces</li> <li>25. Clean Utility and Dirty Utility Rooms</li> <li>26. Near Patient Testing and Storage</li> <li>27. Pantry / Refreshment Room.</li> </ul> |
|--|---|---|

# Zoning

## C. Flower-Shaped Tower: Sixth Floor

**'Lack of easy accessibility to staff rooms and canteens means clinicians who are short of time are denied vital self-care. Providing a space for them to optimize their break and rest times would allow them to return to work primed to better care for their patients'**

Natasha Prime, Emergency Charge Nurse

**'The fact that neurosurgeons, neuroradiologists and neurologists can sit together improves patient's outcomes. Its' during the casual chitchat around the computer, when people are typing up their notes, that really good things happen. That's when you build a team, exchange knowledge.'**

Ash Ranpura, Clinical Neurologist

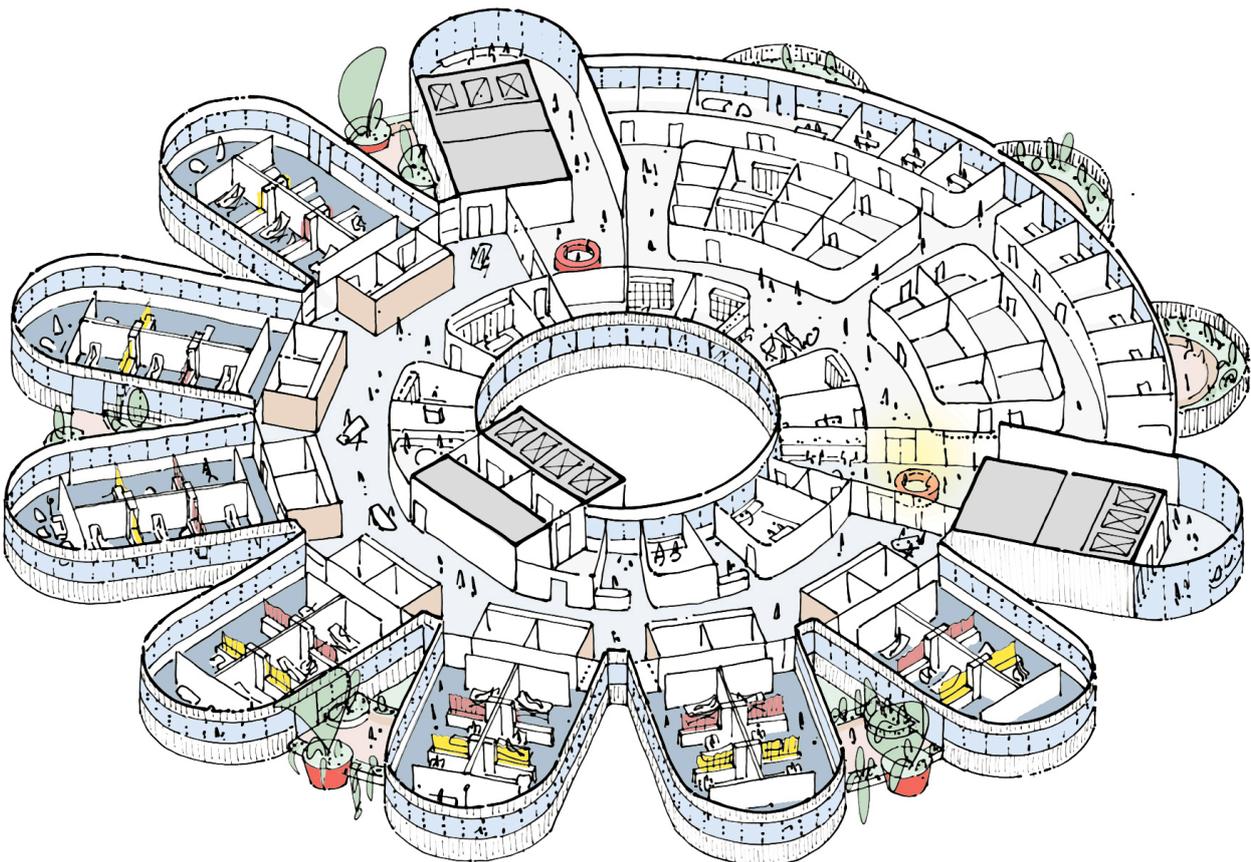
### Outpatient zone

Located directly behind the continuously curved northern façade, the outpatients zone houses the offices, comfortable seating and waiting areas, staff rooms, bathrooms and consulting rooms that support each ward.

A lightwell in the centre of the floor allows natural light to permeate the offices, nurses' stations and sitting areas around the internal perimeter, as well as offering continuous sightlines across the floor.

The rooms located between these inner and outer ring spaces will be dedicated to functions that do not require natural light, such as staff changing rooms, storage, sleep couchettes, private consulting rooms and imaging equipment.

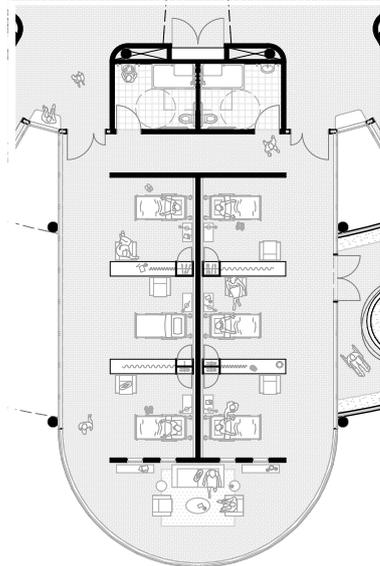
Access to the wards for outpatients and visitors is from the main entrance on the ground floor via a lift in Core Two, and for staff and patients coming from A&E (who may need more privacy), a lift in Core One. On exit from both sets of lifts, patients and visitors will be welcomed at the ward reception by a dedicated host.



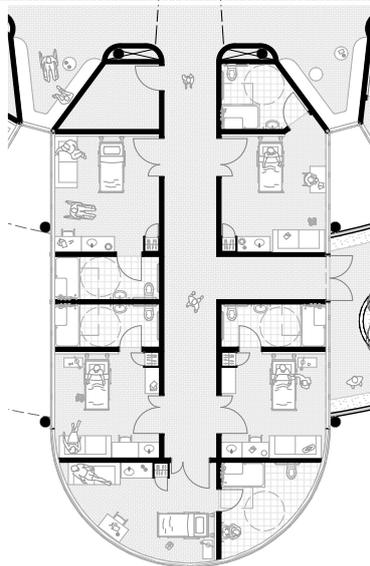
## C. Flower-Shaped Tower: Sixth Floor

### Inpatient Zone

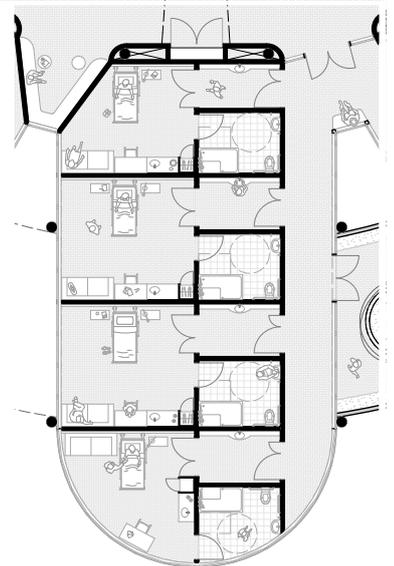
Located in the petals of the south façade, the general wards give their occupants maximum exposure to the sun's light and warmth. The wards are constructed from a kit of prefabricated, modular panels and an unfixed floorplate. This means the interior can be easily transformed to configure different room types, including shared wards, single and isolation rooms.



Shared Wards



Private Rooms



Isolation Rooms

## C. Flower-Shaped Tower: Sixth Floor

**'Is there somewhere in the hospital you could go to feel safe? It makes a hell of a difference if you get treated right in a hospital when you're homeless'**

Bug, Hospital Patient

### Shared Wards

In the shared ward configuration, each petal houses six beds. The petal shape allows each ward to have natural light, cross ventilation and a view out to nature. In the centre of each petal, two rows of three beds lie back-to-back to ensure that patients do not face one another directly. A suspended curtain and joinery (comprising drawers and a desk) delineate each bed's zone. The bed area also has a hand sanitising unit and a comfortable chair for visitors and doctors.

Each row of three beds shares a bathroom, containing a sink, shower, and toilet.

At the petal's tip is a common area looking directly out to the park. Here, patients can spend time out of bed and socialise with one another, their families, or other visitors.

Nurses' stations are located on the inner circle of the floor, giving nurses a clear view of the wards, and facilitating observation without the need to patrol each bed.

Access to the wards is via the ring thoroughfare between the nurses' stations and the wards.

### Private Rooms

In this configuration, each petal houses four private rooms, each with its own adjoining bathroom. A central corridor bisects the floor area of the ward creating access to two rooms on each side. The nurses' stations in this configuration are half-way down the corridor on either side. An optional fifth bedroom is possible at the tip of the petal, in which case, the common areas will be reduced to both sides of the petal entrance.

### Isolation Rooms

In this configuration, the petal houses four isolation rooms, each with its own vestibule, for visitor cleaning and decontamination, and a private bathroom.

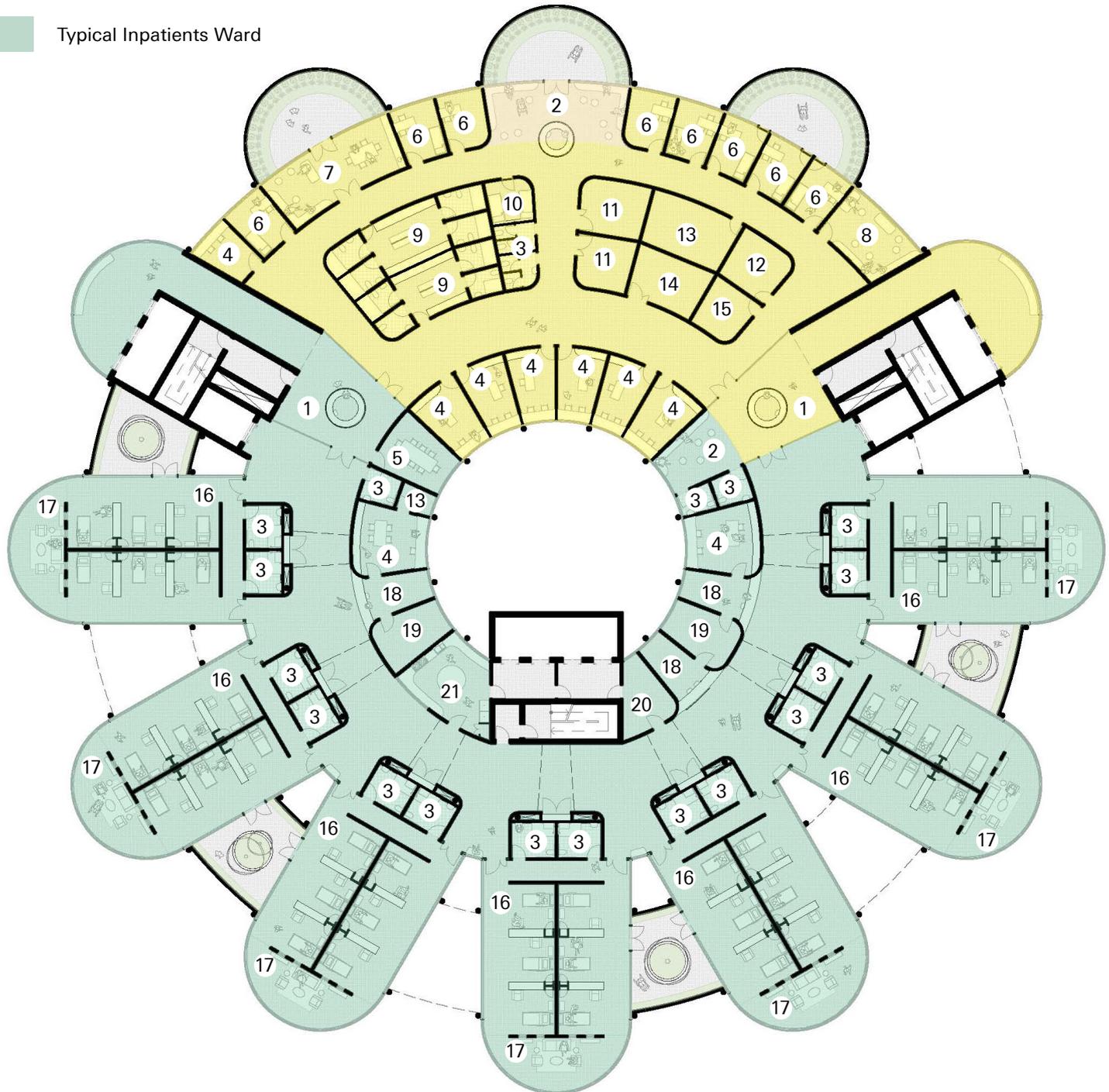
Common areas for visitors will be to the left of the petal entrance and the nurses' station will be on the right. Access to the rooms is via a single corridor along the right perimeter.



## C. Flower-Shaped Tower: Sixth Floor (Typical Ward Floor)

Outpatients

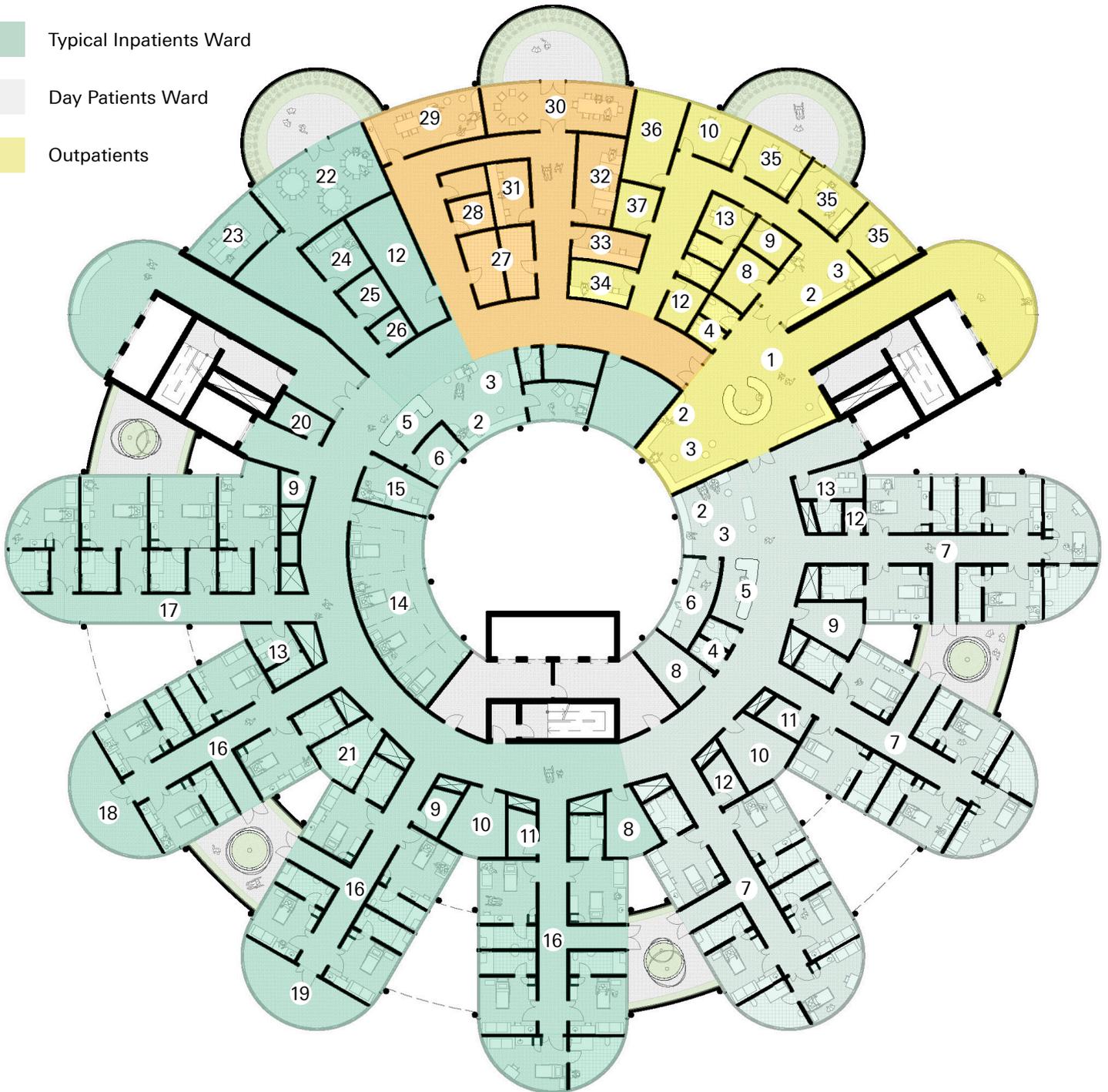
Typical Inpatients Ward



- |   |  |   |
|---|--|---|
| 1. Reception                                      | 8. Interview and Counselling Room              | 17. Patient Recreation / Breakout out space |
| 2. Waiting Area                                   | 9. Staff Changing and Showers<br>Male & Female | 18. Staff and Communication base            |
| 3. WC or Shower, WC and Wash                      | 10. Couchettes                                 | 19. Clean Utility                           |
| 4. Outpatient and Administration<br>Staff Offices | 11. Large Equipment Store                      | 20. Dirty Utility                           |
| 5. Seminar and Training room /<br>Meeting Room    | 12. Pharmacy                                   | 21. Patient meal preparation Kitchen        |
| 6. Consultation, Examination &<br>Treatment Rooms | 13. Medical Supply Store                       |   |
| 7. Staff Rest Room                                | 14. General Store                              |   |
|   | 15. Cleaners Room                              |   |
|   | 16. Bedroom / Shared Wards                     |   |

## 3. Flower-Shaped Tower: Sixth Floor (Optional Paediatrics Layout)

- Staff Facilities & Office
- Typical Inpatients Ward
- Day Patients Ward
- Outpatients

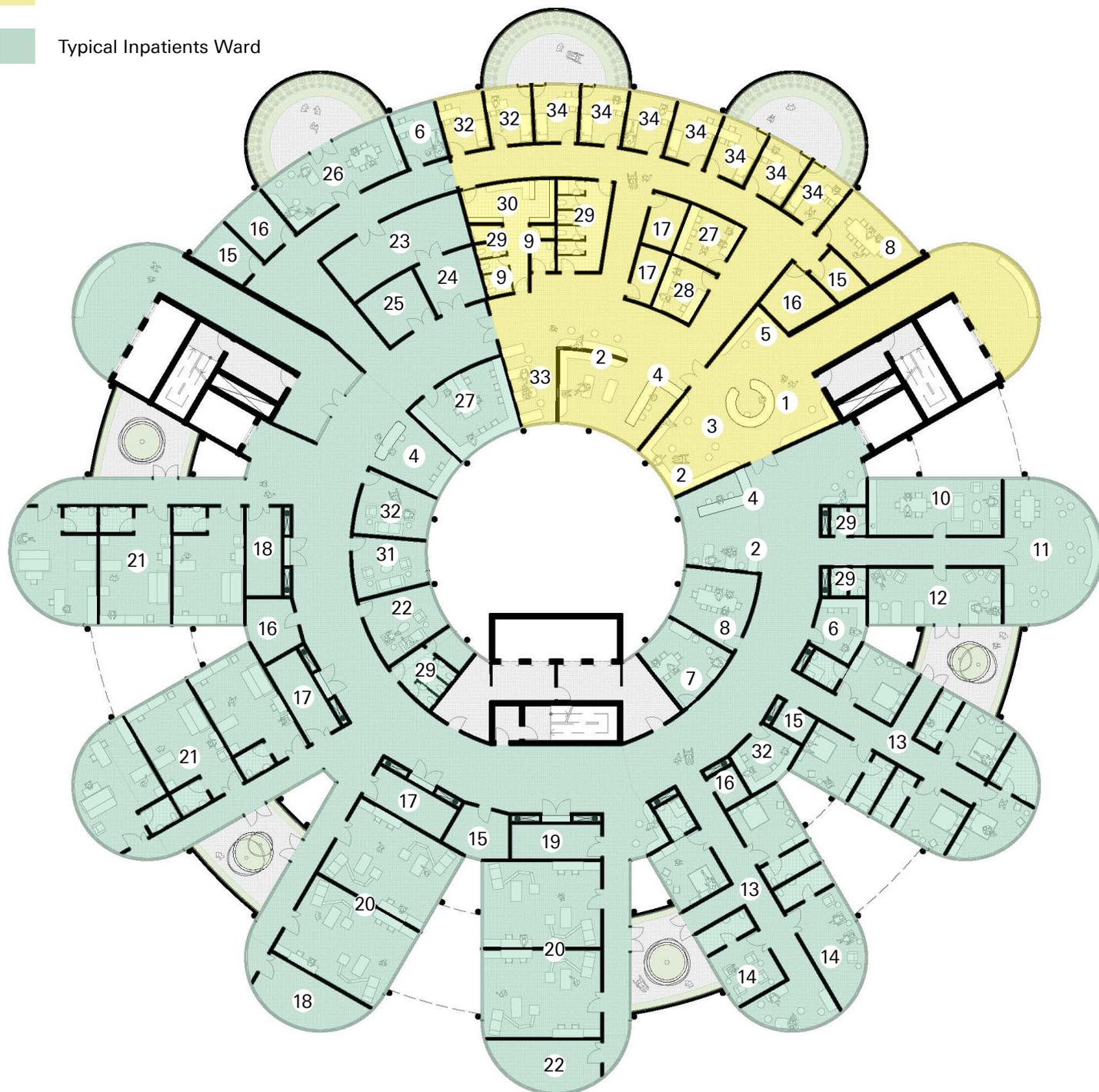


- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>1. Reception</li> <li>2. Waiting Areas</li> <li>3. Play Areas</li> <li>4. WC &amp; Handwash – Accessible</li> <li>5. Staff &amp; Communication base</li> <li>6. Staff Office</li> <li>7. Day Patient Bedrooms w/ Shower, WC &amp; Wash x15</li> <li>8. Dirty Utility</li> <li>9. Clean Utility</li> <li>10. Treatment Room with Preparation Area</li> <li>11. Linen Store</li> <li>12. General/Bulky Store</li> <li>13. Interview &amp; Counseling Room</li> <li>14. Paediatric Assessment for Emergency</li> </ul> | <ul style="list-style-type: none"> <li>Patients</li> <li>15. Admission Room for Well Elective Patients</li> <li>16. Inpatient Bedrooms w/ Shower, WC &amp; Wash x13</li> <li>17. Isolation Bedrooms w/ Shower, WC &amp; Wash x4</li> <li>18. Patient Playroom</li> <li>19. Recreation Room with Beverage &amp; Snack Preparation</li> <li>20. Near Patient Testing/Status Laboratory</li> <li>21. Bath, WC &amp; Wash</li> <li>22. Patient Dining Room &amp; Pantry</li> <li>23. Patient Study Room</li> <li>24. Calm Room</li> </ul> | <ul style="list-style-type: none"> <li>25. Snoezelen Room</li> <li>26. Breast Pump Room</li> <li>27. Staff Changing &amp; Shower Male &amp; Female</li> <li>28. Accessible Changing &amp; Shower</li> <li>29. Staff Rest Room with Kitchen</li> <li>30. Meeting Room/Seminar &amp; Training Room</li> <li>31. Outreach Staff Office</li> <li>32. Clinical Staff Office</li> <li>33. Administration Staff Office</li> <li>34. Out Patient Staff Office</li> <li>35. Consulting, Examination &amp; Treatment Rooms</li> <li>36. Assessment &amp; Therapy Room</li> <li>37. Observation Room</li> </ul> |
|--|---|--|

## 3. Flower-Shaped Tower: Sixth Floor (Optional Neonatal Layout)

Outpatients

Typical Inpatients Ward



- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>1. Reception</li> <li>2. Waiting Area</li> <li>3. Play Area</li> <li>4. Staff &amp; Communication Base</li> <li>5. Hand Wash Area</li> <li>6. Staff Office</li> <li>7. Rest Room with Staff Beverage &amp; Snack Preparation</li> <li>8. Interview and Counseling Room</li> <li>9. WC &amp; Hand-wash – Accessible</li> <li>10. Restroom with Kitchen</li> <li>11. Playroom</li> <li>12. Parents Room</li> <li>13. Relative Overnight Stay Double Room ‘Rooming-in Room’</li> </ul> | <ul style="list-style-type: none"> <li>14. Expression Room</li> <li>15. Dirty Utility Room</li> <li>16. Clean Utility Room</li> <li>17. General Store</li> <li>18. Near Patient Testing Room</li> <li>19. Freezer Room</li> <li>20. Multi-Cot Nursery – HDU</li> <li>21. Single Cot Nursery – ICU</li> <li>22. Bereavement Interview Room</li> <li>23. MRI Scanner Room</li> <li>24. Patient MRI Trolley, Wheelchair &amp; Equipment Parking Bay</li> <li>25. MRI Scanner Control Room</li> <li>26. Meeting Room/ Seminar &amp; Training Room</li> <li>27. Administration Office</li> </ul> | <ul style="list-style-type: none"> <li>28. Inpatient Office</li> <li>29. WC and Hand-wash</li> <li>30. Staff Changing &amp; Showers Male &amp; Female</li> <li>31. Examination Room</li> <li>32. Treatment Room with Preparation Area</li> <li>33. Information/ Resource Centre</li> <li>34. Consulting, Examination and Treatment Rooms</li> </ul> |
|--|---|---|

## 3. Flower-Shaped Tower: Green Spaces

Pocket parks and a series of open balconies on the fifth and sixth floors will give staff, patients, and visitors – regardless of their mobility and including those in intensive care – access to fresh air and greenery.

**'If you're laid up in a hospital bed for weeks, a hospital can be an unpleasant place to be. Being able to go downstairs and get fresh food, or having somewhere green to go and sit would be nice.'**

Bug, Hospital Patient

Accessed via the wards, the pocket parks will link each petal on the south façade to the next. Each will have a tree in a sunken planter with its own dedicated drain, terracotta tiled flooring and a garden bed with integrated seating.

The garden beds will be sited to allow plants to cascade down or climb up the building exterior, softening the façade.

**'Pockets akin to cliff ledges for things to feel like they are perched and pioneering, seizing their opportunity. Trees on the balconies must be able to withstand exposed conditions – sea buckthorn, honey spurge, myrtle, rosemary, figs, strawberry tree. Seating places for conversation and contemplation to be nestled in groves of evergreen strawberry trees.'**

Dan Pearson, Landscape Architect

### Balconies

Curved balconies will be spaced at intervals along the façade on the north side, where the outpatient and staff spaces are located. Vertically, the balconies will be spread out over every other floor so there is always a double-height gap overhead.



Rooftop urban allotments growing seasonal produce for the hospital

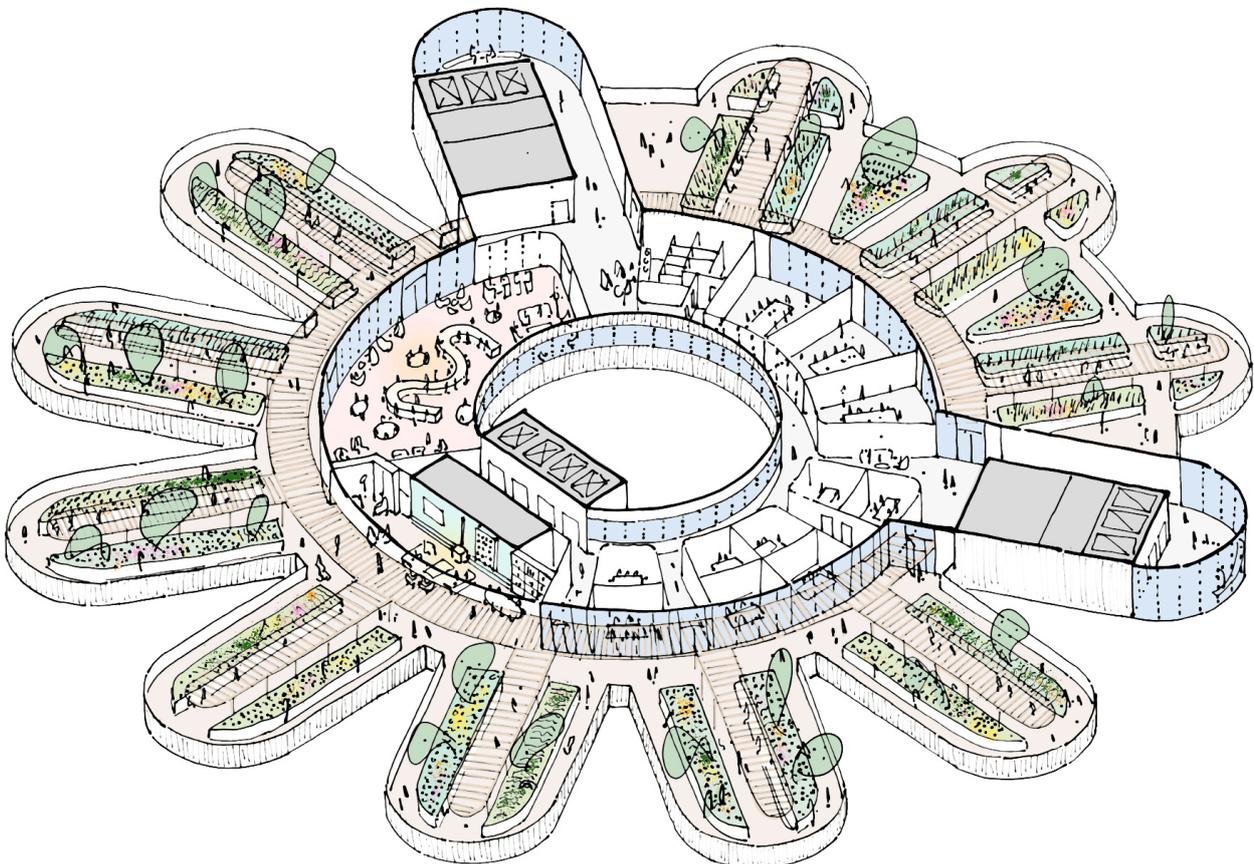
The hospital's rooftop is primarily for the use of hospital employees. Benefitting from spectacular views over the city, the rooftop will provide holding offices, meeting rooms, and relaxation and event spaces, including a bar/lounge and canteen area.

Access will be through both main lift cores from the ground floor but will be restricted to staff, volunteers, and guided patient visits only.

### Allotments

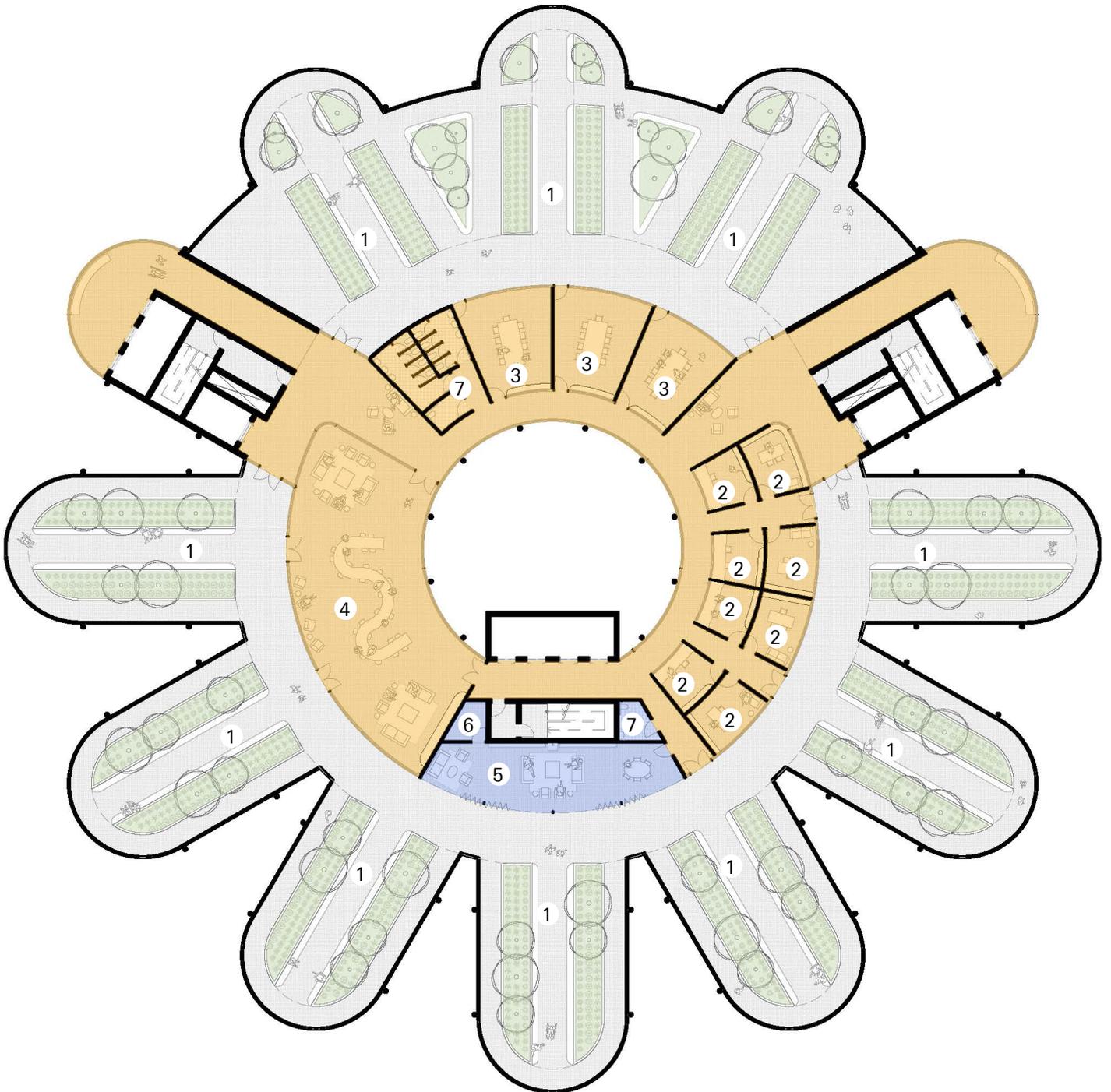
The hospital's rooftop allotments (planted and maintained following the principles of permaculture) will provide fresh produce that can be turned into the meals consumed by patients, staff, and visitors. The allotment's raised garden beds will be situated in the rooftop's petals, with seating areas integrated throughout. The south facing beds will be planted with seasonal food crops and the north facing ones with blossoming and fruit trees for foraging; cherry plum, bird cherry, hawthorn, rowan, elder and hazel.

Managed access to the garden allotment will support a wider programme of education on diet and lifestyle, explaining the importance of natural food sources, the benefits of fresh ingredients and encouraging people to grow vegetables at home.



# Zoning

## 4. Rooftop



- 1. Allotment / Garden
- 2. Forum Meeting Rooms
- 3. Forum Large Meeting Rooms
- 4. Staff Bar
- 5. 'Shed' / Garden Room
- 6. Storage
- 7. WC

## E. Area Schedule Summary

Below is the area schedule looking across the whole of the Living System, including the podium, park and tower.

The standout numbers are – the ratio of architecture to site is 4:1 while ratio of green space to architecture is 1:1. due to the Rooftop Allotments, Park and Pocket parks.

It is a small hospital accommodating 200 beds which overall works out at 152sqm per bed.

<b>Area &amp; Beds schedule</b>		Hospital GEA sqm	Non Hospital GEA sqm	outdoor amenities sqm	av number of beds
GF	A&E - Lobby - Market	4,300	2,500		
Level 1	Innovation centre	300	4,000		
Level 2	Support areas	4,000			
Level 3	Park	1,800	300	7600	
Level 4	Plantroom	2,200			
Level 5	ICU	3,700			28
Level 6	Ward/outpatients	3,000		200	35
Level 7	Ward/outpatients	3,000		200	35
Level 8	Ward/outpatients	3,000		200	35
Level 9	Ward/outpatients	3,000		200	35
Level 10	Ward/outpatients	3,000		200	35
Level 11	Ward/outpatients	3,000		200	35
Level 12	Hospital forum	2,000		1200	
		36,300	6,800	10,000	238
Plot area				sqm	
				10,000	
Density				sqm	ratio plot/sqm
Built area				43,100	4.31
Green spaces				10,000	1

# 5

## Max Fordham

Planet Earth, our home, is a system. For materials the system is essentially closed, with elements being conserved in cycles of assembly and degradation. For energy, the system is predominantly open, powered mostly by incoming solar energy. A myriad processes work in tension to produce an equilibrium which creates the narrow range of conditions needed to support life. Life uses energy to increase the level of organisation of components, from atoms to molecules, molecules to cells, cells to organisms and organisms to ecologies, seemingly cheating the second law of thermodynamics, if only briefly.

Through our collective vision of a hospital of the future we bring this system level thinking to help address some of the major challenges of our time – countering global warming by decarbonising the construction and use of buildings, using materials in a much more respectful way and reversing the shocking decline in biodiversity.

Our approach prioritises passive design, the extensive use of naturally produced organic materials and the therapeutic powers of natural light.

The aim of passive design is to create spaces which remain comfortable with the minimum use of active systems. The circular plan of the upper parts of the building has a low form factor creating a thermally efficient envelope with minimal quantities of insulation material.

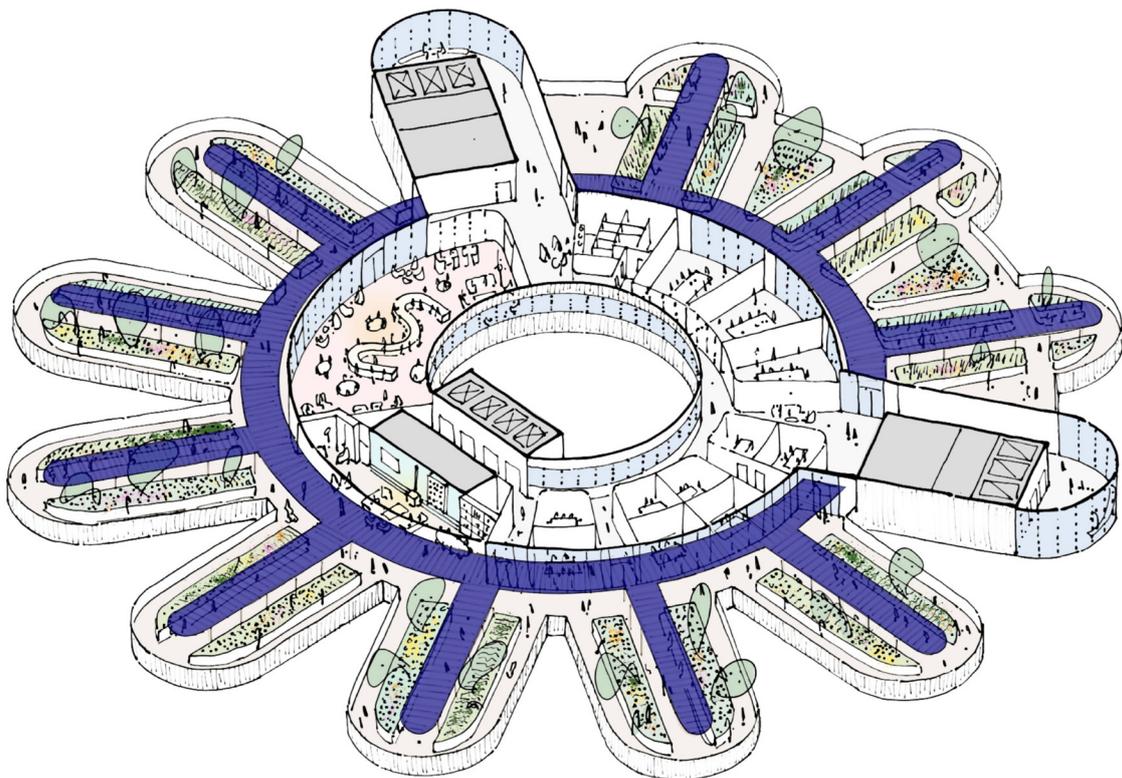
The petals provide a shallow plan allowing excellent access to natural light, views and ventilation in the bed and working spaces. The balance between daylighting, sunlighting, solar gain and glare is met using a combination of balconies, shading devices and planting in a way which responds to the different orientations of the façade. The podium garden is porous, allowing light and fresh air into the spaces below. Access to natural light, with all its variability in intensity, direction and colour provides a fundamental connection with the natural world. Much research has shown that access to daylight reduces the average length of a hospital stay, quickens post operative recovery, reduces requirements for pain relief and quickens recovery from depressive illnesses.

The materials have been selected to have inherently low embodied carbon.

The structure is predominantly of timber, engineered for durability and fire safety. The spine and rib design of the services distribution minimises the volume of materials. Internal structures and finishes are predominantly of organic materials. Although in its infancy, the reuse of materials from other buildings at the end of their life will be prioritised over new.

We have set ourselves challenging quantitative targets that the design development should achieve. We are aiming for zero carbon in both construction and operation. We would rather aim for real zero and share the learning and limitations than rely on masking the shortfall with carbon offsets. This is not to say that external carbon reduction measures are not useful or worthwhile, but we should be striving to avoid the long term negative impact of a less efficient building. We will also achieve Passivhaus certification for the building which guarantees a high thermal performance and quality of construction.

The ability of a building to adapt and change over time underpins a long and useful life. The building is modular in concept and serviced with vertical



spines of long term infrastructure which provide all the needed connectivity between spaces. The individual spaces are conceived as regenerative limbs where components can be disassembled and re-used to create new configurations and functionality. Each pair of petals at every floor level is locally serviced with heating, ventilation, power, and communications and can be adapted without impacting the use of surrounding spaces. The high intensity use spaces such as the ICU, operating suite and outpatients are located above and below a re-configurable plant floor containing specialist equipment. Locating the plant internally allows the roofs to be used for high value amenity and therapeutic activities.

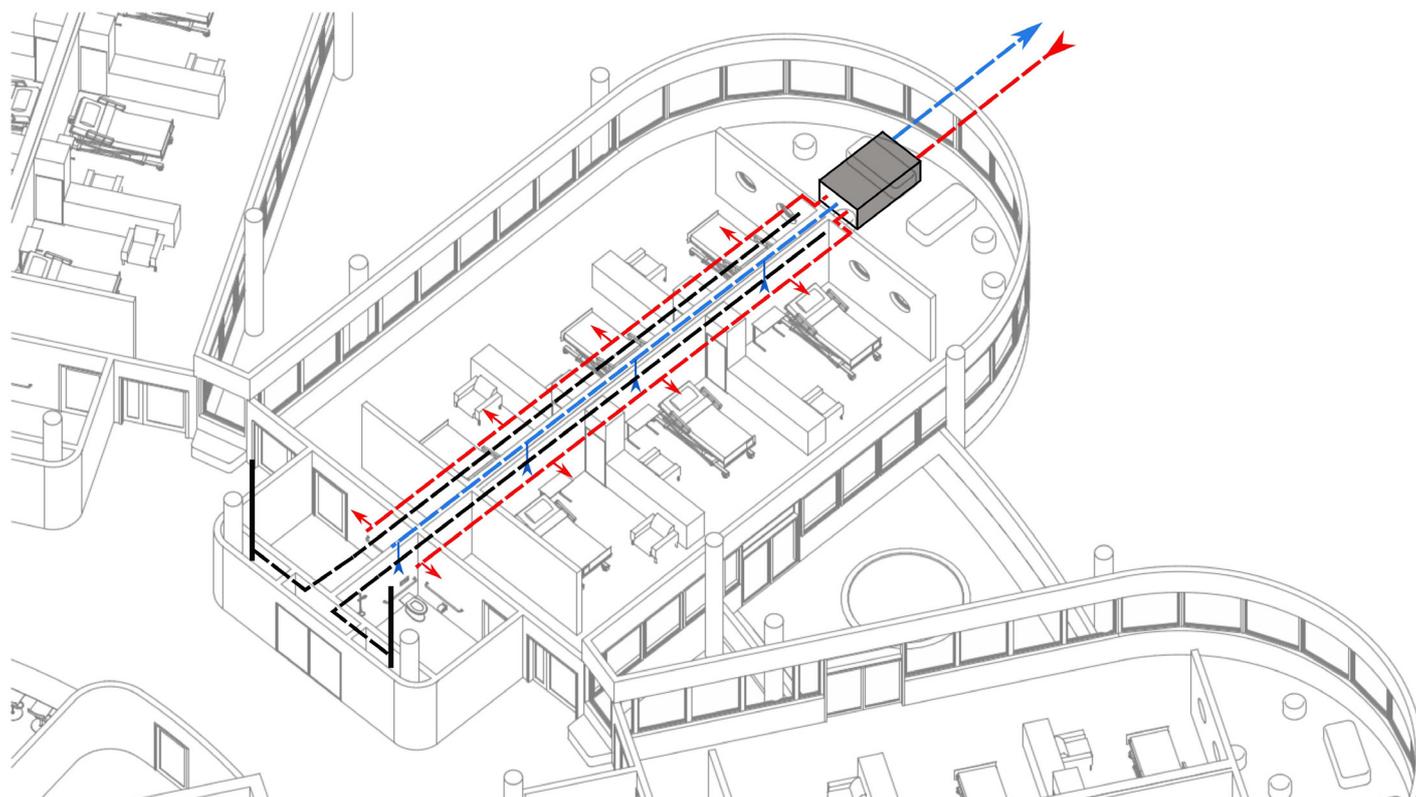
Passive design alone is not sufficient to meet the comfort and environmental quality needs of all spaces all the time. We propose an efficient, all electric approach where heat energy is recycled within the building to minimise the overall needs for heating and cooling. Heating and cooling will be generated by water to water heat pumps located in each module of spaces, connected

to an external heat exchanger via a loop of pipework containing water at close to ambient temperatures. Heating and cooling will be provided generally via an underfloor system which is well known for comfort and efficiency. In cold weather, ventilation will be provided by small scale mechanical ventilation systems incorporating efficient heat exchange serving each module.

Our building will also incorporate electrical and thermal storage to facilitate its integration into the smart grid, an essential part of an all electric future.

It is unreasonable to expect an individual city centre hospital to generate all its own energy needs. We propose PV sheltered walkways within the rooftop garden as a genuinely useful structure but recognise that this will only generate a tiny proportion of the electricity used by the building. Rather than relying on individual buildings to generate energy inefficiently, a much more cost effective strategy would be for the NHS to develop an estate-wide renewable energy generation portfolio to provide sufficient zero carbon electricity at optimal efficiency to supply all of their buildings.

The building provides a foundation for planting which is at a sufficient scale to support urban ecology and a link between green corridors. Appropriate planting would be selected for each location and managed to promote a rich diversity of fauna. In addition to enhancing the quality of space and improving local biodiversity and microclimate, the growth of plants and soil bacteria directly removes CO<sub>2</sub> from the air through the accumulation of biomass, further reducing the carbon emissions of the project as a whole.



### Structural form

The core principles of the structural frame revolve around flexibility, sustainability, reuse and the circular economy.

While the building form is bespoke, the structural frame is still simple. We have minimised inefficient features such as cantilevers and transfer structures in order to keep embodied carbon levels down.

The podium is arranged in a regular 9m x 9m grid. This provides a balance between open, flexible spaces and relatively constrained levels of embodied carbon. This structural grid varies only around the building perimeter, in the retail and entrance areas where larger column-free spaces are needed.

A single transfer level is detailed at the top of the podium under the rooftop gardens. This allows the regular structural grid of the podium to switch to the more bespoke grid of the wards, which is crucial to achieving the views offered by the tower.

The perimeter columns of the tower are all expressed externally. This frees up the internal façade, maximising views and the flexibility of the wards. Thermal breaks are kept to a minimum with 4 points of connectivity on each petal requiring thermal break detailing. We envisage the raised balcony gardens as precast elements to be lifted onto the external steel frame.

### Built for Flexibility and the Circular Economy

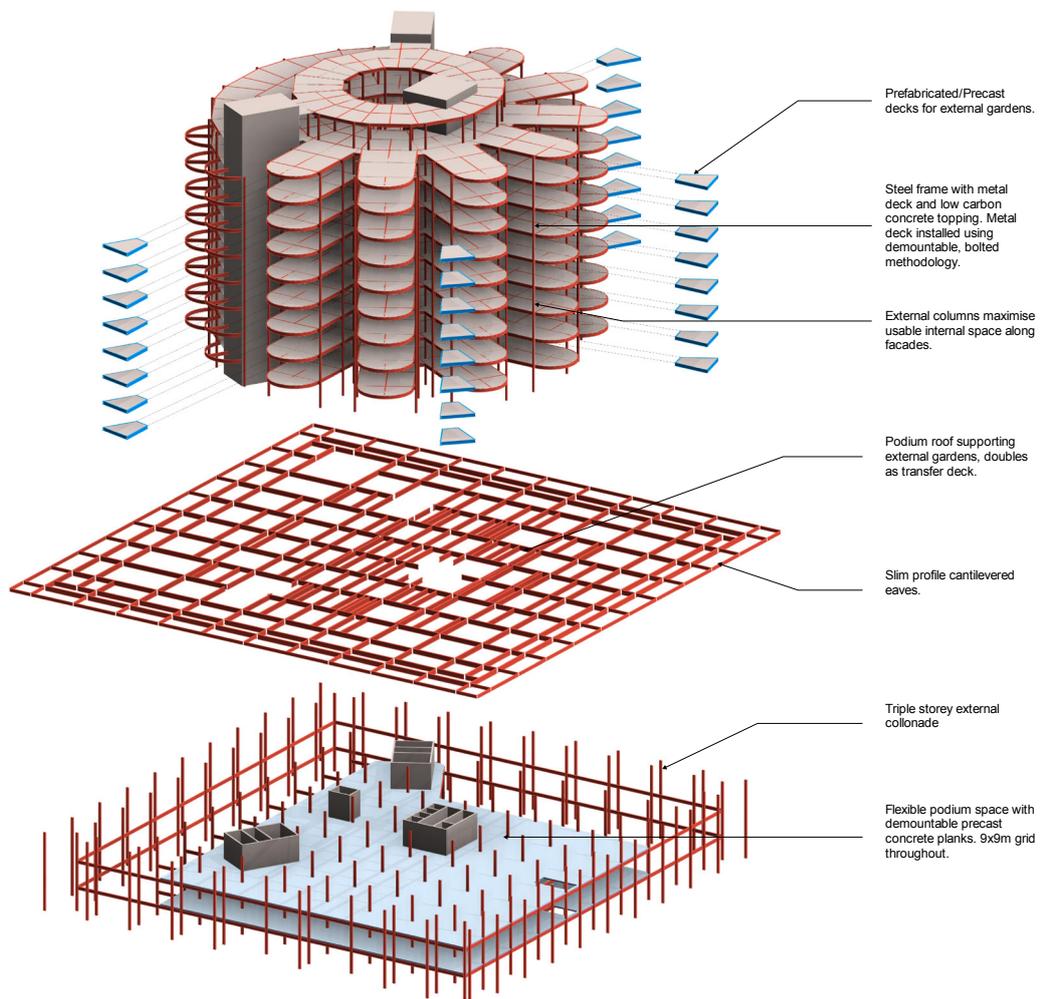
Almost all hospitals must adapt over their lifetime as they respond to changing technologies and methods of healthcare. It is therefore crucial that this hospital be prepared for these adaptations. We have designed it so that these can be undertaken with maximum ease and minimal waste.

The building frame uses circular economy principles throughout and is designed to be demountable. Precast flooring systems can both be efficiently constructed and deconstructed should

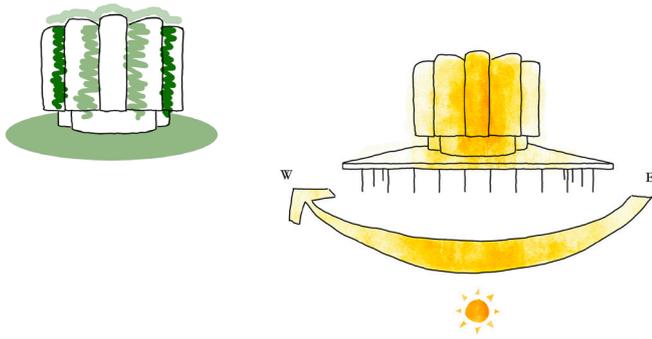
there be requirements for connectivity between floors (eg. risers, atria etc). The floor system may be reused elsewhere in the building or taken off-site for use in other developments.

Similarly, the exposed steel frame will use demountable, bolted connections throughout. The 9m x 9m grid of the podium is common in developments across the UK so there will be no shortage of demand for reused steelwork at the end of the building's life. Alternatively, the steel frame can be easily adapted on-site to accept additional connections should the building be extended in its lifetime.

As the circular economy grows it may even be possible to source and construct significant parts of the hospital from reused steel framing. This will drastically lower the embodied carbon emissions of the building and further demonstrate the potential for developing public healthcare facilities using sustainable methods.

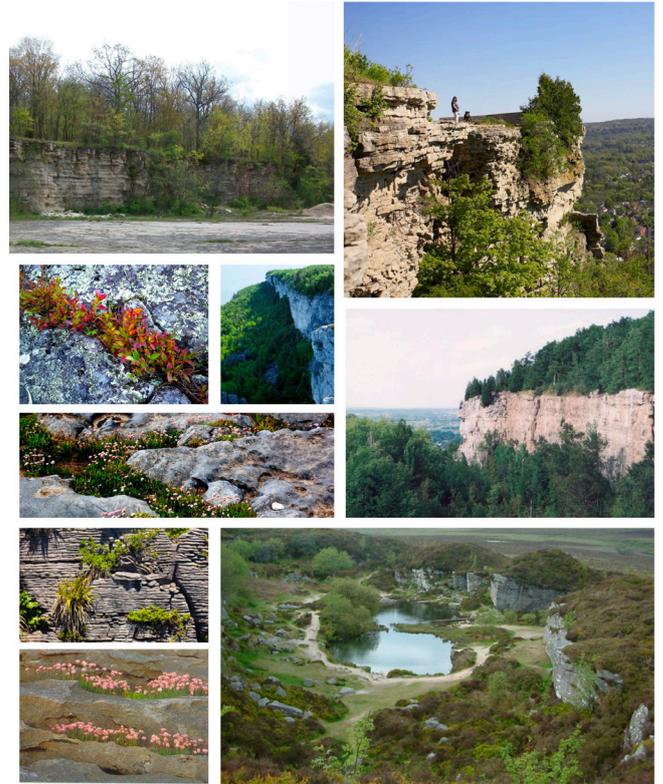


Dan Pearson



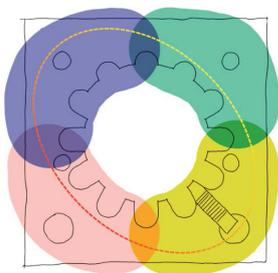
The hospital landscape would take inspiration from a cliff, where vegetation grows when favourable micro-climatic conditions allow. These being the sun (temperature), soil, shelter and water. Plants have evolved to cope with different levels of stress creating a wide variety of different ecosystems.

The landscape is a key component in the design of the hospital, integrating landscape on multiply levels, mimicking how plants grow on a cliff - at ground level where the cliff offers shelter and protection, on ledges and perches, in crevices and cracks, as the cliff rises upwards. With more abundant planting on the southern aspect and cooler more shade tolerant species to the north and at the top of the cliff, where soil conditions become more stable, a more complex multi-layered environment.



The planting at 'ground level' provides the space and opportunity to ground the building, as a forest would grow at the foot of a cliff.

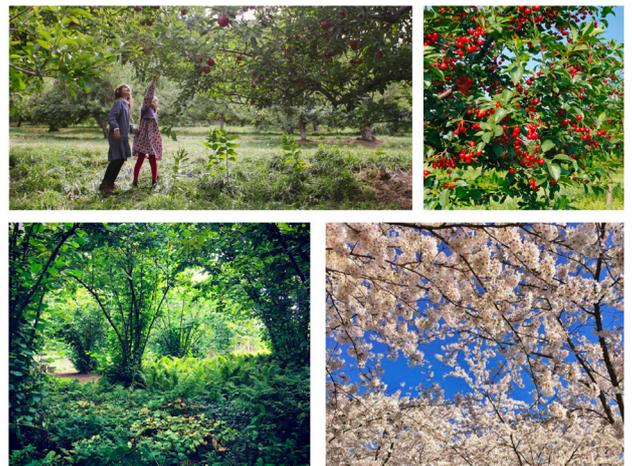
The building programme on this level is divided into four distinct functions, the landscape that wraps around these functions would provide spill out areas and breathing space. In addition to these four zones, there would be pavilions sitting in the landscape which would have a variety of uses, these would look out onto landscape from all aspects. All these spaces would be linked by a circular woodland walk, with special moments along the journey with places to pause, meet, sit and reflect. cooler more shade tolerant species to the north and at the top of the cliff, where soil conditions become more stable, a more complex multi-layered environment.



Zoning Plan

The forest garden would contain:

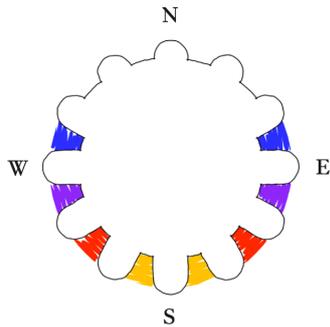
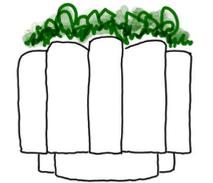
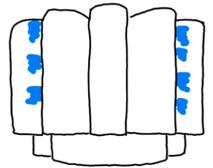
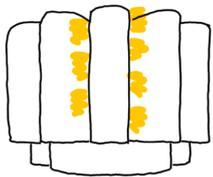
- Edibles for foraging
- Fruiting hedges
- Orchard trees
- A nuttery
- Seasonality - spring blossom trees and bulbs
- Autumn berries for birds
- Hibernaculum for wildlife



## Dan Pearson

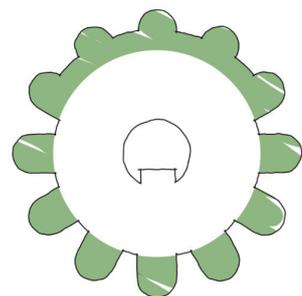
The balcony gardens would be concentrated where the building receives most sun and extends towards the east and west. No balcony gardens are proposed on the north elevation. The most abundant planting would appear where the growing conditions are most favourable, just as they would grow on a cliff face.

These balcony gardens would contain plenty of edibles to provide produce for the hospital, such as vegetables, salad crops, fruit, herbs as well as seasonal flowers for cutting. These sunny, sheltered gardens will allow a range of exotics and scented aromatics to grow to ensure moments of delight and wonder for all.



On the roof the planting would be split into two distinct zones, in the south facing balconies these would contain vegetable gardens, to the north the five connected balconies would be a fruiting forest garden, which would provide a visual connection to the forest garden on the ground and reference the forests growing on the top of cliffs.

These balcony gardens provide an important physical connection to landscape for patients, visitors and staff, in the form of picking produce to eat and helping to care for these planted spaces throughout the year.



Landscape Areas Roof Plan



# 6

## Introduction to our Economic Approach

Our approach is designed to reduce the costs in the long term for the Department of Health, meanwhile putting the people at the core of what the hospital does and redefining sustainability in healthcare.

It requires the hospital to ask itself what its key role is and if it can play a more meaningful part in the health of our society and planet. The protagonist must pause and think where it goes next and the type of suit this requires.

We believe that funding headroom and economic viability can be achieved by acting on five pillars. Many of the efficiencies described are closely aligned with NHS's 10 point efficiency plan which we see as a positive. We go beyond these and take a Doughnut model approach, an economic model that situates economic goals in a framework of planetary and social needs. Ultimately, this entails measuring the hospital's economic prosperity in terms of local, global, social and ecological benefits.

In some ways, our approach is a paradigm shift, as it appreciates hospital health as a long-term social investment rather than focussing on immediate cost savings, as this is often a Sisyphean task

### 1. Prevention – a new role

- At their core, operational costs are driven by case volume and case 'severity'.
- The first of the pillars of our economic model is prevention, as a means to mitigate the growth trend in demand and thus lower the reliance on the NHS.
- We envision each visit as an opportunity to work on prevention and to inspire patients to lead a healthier lifestyle.
- Our hospital would play a role in prevention by providing patients with tailored advice on nutrition, exercise or mental health. Any visit to a hospital is most often a reminder of how vulnerable we are and how important health really is. This provides a window of opportunity to inspire patients, and their entourage, by opening up the hospital to the community.
- The Yoga and Gym sections serve as places to get exercise advice, start new routines and make them the new normal by breaking down barriers to knowledge and motivation.
- education and inspiration would be supported through a number of ways. For example, through the hospital's media, within the marketplace's 'how to make' recipes, and included into the discharging

process. This will give more importance from a prevention perspective. At discharge, technology (patient wearables, online portals, etc.) would support the nutrition and exercise plans provided at minimal cost.

- An attractive design, improved acoustic approach and better integration of the community into the hospital will lead to a better hospital experience and in turn support mental health.

### 2. Capital expenditure optimisation – live assets for lives

- Capital expenditures is very much determined by the hospital's spatial needs, building costs and healthcare equipment.
- We envision freeing up space and surface to build a multi-lever approach for which modularity, the circular approach to ward floor design, technology, free flow between spaces and technology are key.
- If we think about space utilisation, our modular design approach is the base for creating consultation rooms of different sizes and flexing them based on the patient/client contact space requirements. Why use a big room prepared to accommodate a patient and a relative/friend if the patient has come on his/her own?
- The hospital's space would adapt and 'live' like an organism, based on the type of contact and the patients' personal circumstances. This can help, for example, increase the amount of rooms for a given space, or reduce the space for a similar amount of rooms. The operational metric changes from classic room utilisation to space utilisation.
- The circular approach to the ward layout allows for the reduction of corridor space.
- The size of rooms from which to do telehealth consultations would be smaller than the traditional primary consultation rooms, therefore freeing space.
- Some processes would also be revisited: for example, today, many patients are discharged but still occupy the room as their medicines are not ready at the hospital's pharmacy. By having the medicines sent home or scheduled for collection, the room can be freed earlier.
- We also challenge the traditional preference for single rooms and believe that many patients would want to be offered the option of co-sharing with one

or more patients. Our hypothesis is that in many cases sharing and not suffering in loneliness could also have long term positive mental health implications. This offers 'space around the bed' opportunities.

- Waiting in the park, market, café or gym and being called a few minutes before the doctor or nurse are ready implies a reduced need for waiting area space as well as provide an enhanced patient experience.
- From a healthcare equipment capital expenditure optimisation perspective, the question we think hospitals need to ask themselves is whether they need to own or lease all of their equipment.
- We propose to conduct research to review the utilisation rates and cost of the equipment and adopt 'sharing economy' principles where relevant.
- The sharing of medical equipment among nearby hospitals would allow the hospital to expand into new procedure areas or provide access to more minimally invasive robotic surgical equipment at a much-reduced cost, as well as positively influencing theatre productivity.

### 3. Operational costs – focus to make a positive difference

- On absenteeism and staff retention, a hospital environment that looks after you, that you love and admire for its integration in the community can be a positive catalyst. This would lead to lower reliance on more expensive external staff and improve productivity.
- A design that fosters the embracing of technology offers efficiency opportunities across the full hospital visit and administration cycle. Below are some examples.
- Starting with the first stage, giving patients the option to complete a pre-assessment could save time for nurses and doctors while allowing for more focused consultations and time spent on communication clarity and compassion.
- Some patient wearables could allow to detect grave cases earlier. If connected with the hospital, the hospital could prepare admissions, teams, etc., saving precious time for patients and minimising the degree of intervention and thus cost required.
- Non-show ups could be reduced by giving patients the option of doing telehealth consultations.

## Introduction to our Economic Approach

- Leverage of artificial intelligence to automate some of the services a hospital provides, from transportation of items between departments to analysis of oncology scans, will also lead to reduced costs.

### 4. Shadow costs – not ignored

- If we were to value the time spent by visitors 'waiting' rather than 'being seen' or 'treated', what would be the true budget of hospitals? What is the environmental cost of hospitals' standard building materials or of the single use plastics used in hospital catering, when considering these materials' full life cycle?
- The 2019 review of NHS standards proposed including average waiting time in A&E and time to initial clinical assessment. We believe this should be complemented with a cost-benefit analysis of waiting times that looks at the wider costs to the UK economy and productivity.
- Our design and investment in technology that allows for 'calling patients a few minutes before' so there is no need to stay in the waiting area and patients can 'continue with their life while waiting' is fundamental to addressing that cost-benefit equation.
- Our suggested building materials and our vision for their procurement would help lead the way in terms of ecological costs.

### 5. With the community, for the community

We see reintegrating the hospital into the community and into the fabric of the city as a value generator catalyst at multiple levels.

At a global level, the hospital can be a force for good environmentally by setting the trend through its linkage with nature. There is an opportunity to create a multiplier effect if other hospitals around the world replicate this approach.

The pocket parks and the rooftop allotment play a role in carbon sequestration. Vegetables are grown on site and a self-supporting eco-system help with food miles, as well as local traffic. Our use of Glulam structures and the approach to second-life building materials would set standards to be followed to build more sustainably.

At a national level, our hospital can show sector leadership internationally

and has the potential to become an example of knowledge export and basis of soft power for the UK. By showing the world how the NHS is proactively working on testing different approaches to healthcare efficiency could be a case study to show gilt or bond long term investors how health budgets, and thus UK debt, is proactively positively managed. If we succeed in showing patients that prevention is fundamental and that regular tests are vital, this could spur the UK's laboratory testing industry.

Given the dual function of the space, council partnerships could be explored to fund the hospital park. Sponsorship from for example health insurance groups, nutrition companies or the fitness industry could be easier to obtain, given the new role of the hospital. Patients with positive hospital experiences would also encourage donations or endowments.

At a local and social level, we see the relationship with the council as key. The council should be part of the governing board of the hospital to influence its policy and shape the local ecosystem. The hospital can regenerate the local area through employment, teaching of local healthcare students, access to park or gym, sponsoring of local food producers, etc. providing the community with pride in its new urban landscape.

We also see an important relationship between the hospital, the community and the council. As an example, secondary schools could visit the hospital and listen to doctors retell their experiences dealing with smoking, knife crime or obesity related operations. This has the potential to change a teenager's behaviours for life. Clearly, there is a lot of social value in this.

This integration into the community can also foster volunteering. A better hospital experience would lead patients to be more open to returning there to support others. Patients will feel better looked after, and the volunteers will receive the satisfaction and sense of purpose derived from helping others. Volunteering also opens the hospital up to a greater diversity of people, contributing to an open and inclusive community and fostering behaviours that are essential to the fabric that many councils try to achieve.

7

Since working with Cancer Charity Maggie's we have become more and more immersed in healthcare design but only since beginning our work for the Wolfson Economics Prize have we truly become activists; talking, thinking, working, living and breathing hospitals.

We have looked at hospitals from past, present and future, talked to a diverse range of people about their experiences of working, visiting and receiving treatment there and considered them from every angle, becoming super passionate about how best to apply what we have learnt to their design and delivery.

If we were to win the 2021 Wolfson Economics Prize, we would establish a combined research unit, think tank and pressure group dedicated to creating a new generation of hospitals in the image of a living system, devoted to accelerated recovery and to prevention as much as to cure.

This unit would work proactively in collaboration with the NHS to pursue our vision of the hospital of the future as a living system. We would pioneer the creation of a centralised brain, a hub focused on the transparent sharing of knowledge and information throughout the hospital sector. We see the fuelling of this collective intelligence as the catalyst for ensuring our hospitals continue to improve.

The first task of the unit would be to look for existing hospitals to test the feasibility of our design in contemporary clinical spaces. We would also apply our design to existing buildings such as disused retail, warehouse and office spaces, with the aim of refining the process required to convert them into Living Systems. It is the task of design to make both the hospital and the people who inhabit it agile and responsive. Only then will the hospital as an institution flourish and grow.

## Expert Panel



**Laura Benjamin**  
Wellcome Trust Career Development Fellow at University College London's MRC Laboratory of Molecular and Cell Biology and Honorary Consultant Stroke Neurologist



**Javier Botella**  
Economist at Tesco PLC



**Dr Ellie Cosgrave**  
Director of Community Interest Company and Research at Publica



**Ugo Faraguna**  
Associate Professor of Human Physiology, University of Pisa Medical School



**Luna Gargani**  
Cardiologist and Senior Researcher at the Institute of Clinical Physiology for the National Research Council, Pisa, Italy



**Victoria Jessen-Pike**  
Principal Projects Director at Publica



**Dr Hammad Khan**  
Consultant Neonatologist at the Evelina London Children's Hospital



**Nick Luscombe**  
Broadcaster, Radio Producer and Sound Collector



**Dr Kate Mayer**  
GP



**David Powell**  
Project Director / Development Director at Velindre University NHS Trust / Alder Hey Children's NHS Trust



**Natasha Prime**  
Emergency Department Charge Nurse



**Dr Ash Ranpura**  
Neuroscientist and Clinical Neurologist



**Patience Renias-Zuva**  
Biomedical Research Centre Patient and Public Involvement Manager UCLH.



**Helen Starr**  
Afro-Carib Worldbuilding Curator and Founder of The Mechatronic Library



**Chris Wise**  
Senior Director at Expedition Structural Engineering



**Jane Withers**  
Design Curator and Consultant

## Design Team



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Senior Designer



**Ernesto Bartolini**  
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**Ania Chorzepa**  
Designer



**Danielle Fountain**  
Designer



**Julia Moraes**  
Senior Designer



**Ab Rogers**  
Creative Director



**Cameron Short**  
Associate



**Sabrina Summer**  
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**Dean Walker**  
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**Yosuke Watanabe**  
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**Feng Yang**  
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**Gary Elliot**  
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**Sergio Luzzi**  
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**Alex Manning**  
Fire Safety Engineer and Associate at Warringtonfire



**Paul Nulty**  
Architectural Lighting Designer and Founder of Nulty lighting



**Dan Pearson**  
Landscape Designer, Gardener and Journalist (Photo: Huw Morgan)

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**Stuart Bertolotti-Bailey**  
Graphic Designer



**Francesca Bertolotti-Bailey**  
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Creative Producer, Programmer and Cultural Strategist



**Emma Capps**  
Editor



**Elizabeth Glickfeld**  
Design Writer and Editor



**Philippa Wyatt**  
Associate Writer

**Thank You**

# 8

## A. First Round Proposal

See [Here](#)

## B. Panel Conversations: 1

In October 2021, we hosted a round-table discussion with a group of experts and other hospital users. During the session we presented our proposal for the Hospital of the Future with the aim of obtaining feedback to inform the development and refinement of the design.

Participants were Ab Rogers; Philippa Wyatt; Helen Starr; Toby Anstruther; Dr Ellie Cosgrave; Victoria Jessen-Pike; Amanda Sharp; Hammad Khan; Laura Benjamin and Ash Ranpura.

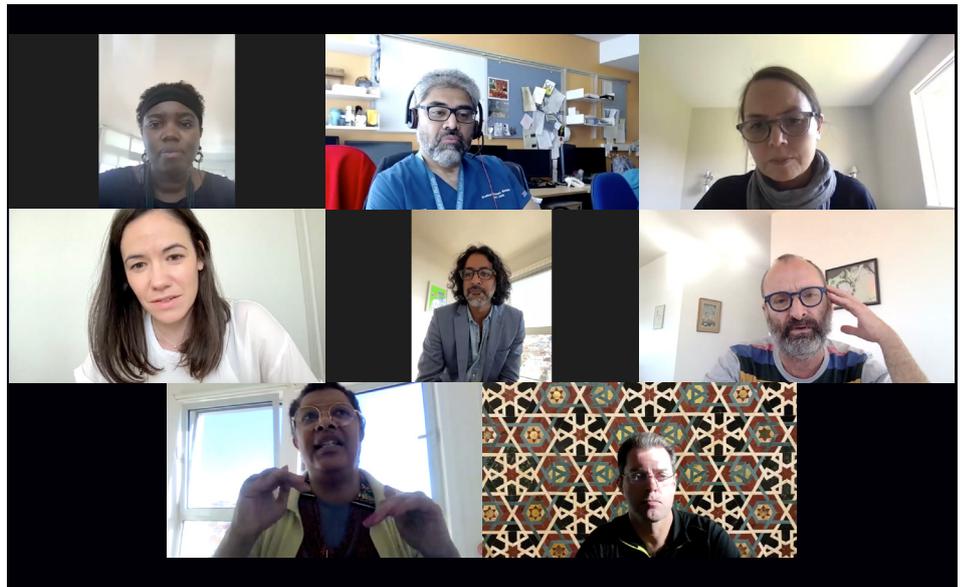
Ab: Thank you for coming today. Most of you know our design already, but we're always developing it along the way. I have a series of questions and issues to discuss. As you know our hospital really starts at the market on the ground level. How can we make this hospital as inviting as possible to the complex community that surrounds it?

We're needing to think much more about social engagement as a tool to try to encourage people in to the hospital. How can we break down the barriers so it's less institutional?

Ellie: One of the key things is that it's fantastic to have a visual cue to say that this is somewhere for you, that there is a sense of familiarity, like 'I know what this space is and I know what I can do in these spaces'. It's really important to think about the modes and mechanisms of engaging with existing community groups and more organized forms of connection. How can you bring the organization or group into the space? Thinking particularly about sex workers, if there are communities of people who hold that space already, is it possible to invite that organization in so that people come with a trusted community, that they know that they already belong to? You need to make the organizations feel they belong in that space. There needs to be a structured programme around that.

Ab: Someone we spoke to said it was vital for her to be given tools rather than to have to go to institutions. How you can extend that capital?

Ellie: Organisations can support that. For example, the organization that I run about access to sexual health care for survivors of sexual violence is always thinking about the ways in which we can do self-testing for HPV. At the moment you have to come in for some testing but are there ways that we can work with community to bring those services out? But importantly, you need an organization



that can create that access, which sits separate to or in parallel with the central organization of the hospital – it's about partnership.

Ab: And can we have a medical perspective?

Amanda: A balance is extremely important here. While you're trying to make the hospital more attractive, what you don't want to do is undermine the resources that are not in the hospital, whether they're from the voluntary sector, the local authority, or from primary care. I noticed you have incorporated primary care ...

But one of one of the biggest challenges for the health system at the moment is that people think their GPs are no good and that the hospital is full of expertise. So manifesting the hospital resource in a community non-hospital setting is a great idea. It links to the concept of the anchor institute, where the hospital is a trusted place to be for many even if it's the enemy for sex workers. We need to go in the direction of the hospital adding to its brand by putting its weight behind health initiatives that are not traditionally in the hospital such as early intervention and prevention.

Ab: Its also about how you can get primary care to work more in partnership eith the hospital? At the moment, primary care feels like a barrier to getting people to the hospital.

Amanda: Yeah. But if you've got good resources out there, you don't want to attract them in to the hospital because

you create a desert around it. You want to take the hospital and push it out.

Hammad: Looking at this current design, I can see a moat around the hospital. There's a barrier. And that barrier is the road. As a cyclist, I don't like it. As a pedestrian, I don't like it. It is intimidating. It creates a barrier between me and the hospital. The questions around air pollution and health and the impact of the urban environment on health really needs to be considered. Any entrance into the hospital needs to be primarily an entrance sought on foot or by bicycle or by some other means that is significantly more accessible than just roads around the hospital. And if you're going to have space for cars to be able to come in, then that's got to be at a level lower. You need to create that safe space around the hospital that isn't so intimidating.

Ab: We've removed the car park from the hospital specifically for those reasons

Laura: I know we're talking about accessibility in terms of decentralisation

But there's also accessibility in the sense of waiting times because that's another barrier has a big effect on the community, because they need a service they can't get . It makes the hospital a pariah. How can we improve that accessibility so that the communication is more effective, which ultimately would benefit the community?

Helen: I was just thinking about the way they have pedestrianized the V&A.

I'm not sure if it's physically have a building like the hospital without roads

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around it but maybe we could make the hospital more accessible in a similar way? What you want to do is embed the hospital into the community and not have it look like it's a UFO that's landed. Pedestrianising the road could achieve this.

Victoria: Yes, the public realm around hospitals is essential. We've been doing work around the Royal London Hospital. Obviously that whole area is huge and very different scale, but it's important the spaces blend into the community. They're pedestrianized and they have some activity on them. Even though there are green spaces inside buildings and everyone knows the value of nature, patients, visitors, people want to actually meet in a real-world space sometimes as a break from being in a hospital environment. They want to go into spaces where there are other things going on. The hospital can actually provide generous enough spaces so that community events and other things can happen there.

One can also balance in the scale of a hospital, both vehicle accessible entrances, for people who do need to come by taxi or by car, with other areas for people coming by bike and on foot. The submission should find a way of showing something that's always going to be more complex than a building just sitting in a block. We can design variation around the building.

Ash: The scale of the space is a real issue. When we talk about this design, I think it's good to emphasise that we're looking at a large building on a human scale. So people feel invited to do things in that space. The fact there's food there gives people a reason to come into this comfortable building.

I had a patient who developed calciphylaxis, which is an incredibly painful calcium deposition in her limbs. She wouldn't take morphine. We sent in our ethics committee and religious leaders to talk to her. She refused morphine until finally the dialysis nurse from the outside clinic who's been treating her for 25 years, came in and within five minutes she agreed. Outside providers are often very, very trusted. You have to invite outside providers into the hospital. So often in medicine, we create structural organization barriers.

Ab: We're very much what we're trying a forum where other activities can happen. The ideas of pedestrianisation

and making people feel at home in the hospital leads to the question of scale. Many hospitals are giant cities in their own right – people get lost in them. We are trying to create something more on a domestic scale. Because we believe that is a more correct scale. The question is what is the correct scale? Making people feel less frightened is key to getting them inside so domestic scale seems like a solution. But we're not doctors...

Ellie: There are a suite of opportunities in terms of scale. We can think about appropriate scale for any given activity or mode of care. We can think about that right down to the neighborhood community corner shop, intimate one-to-one spaces, all the way up to the need for vast hospitals, massive machine-type places. There is no one right answer for a scale of healthcare. We can make a case then for this space suiting a certain type of wellbeing. We don't say, all hospitals must be at this scale. We can say there is a need to invest more in hospitals of this scale because we know that the size gives us certain qualities such as safety and community.

Small is not always better. To people affected by sexual violence, a domestic scale can be quite traumatic because people feel more observed. Sometimes a larger space makes people feel more anonymous and therefore safer. In other instances, intimacy is required.

Toby: Coming back to the question of community, I think we need to clarify whether we're talking about communities of interest or communities of place... When we talk about sex workers, we have a very clear community of interest. People in that community of interest feel welcome because they know they're part of the club. Similarly with specialist hospitals that deal with particular issues. If you go to the Royal Marsden or the Brompton and Harefield then you know why you're there. Then we've also got communities of place, like the traditional cottage hospital, where you need accessibility at street level to be able to come and go. This distinction is important for the design.

Ab: The idea of being intimidated by being too local is really interesting. We spoke to a homeless woman who asked 'Where do I hide in hospitals like this? I feel rejected by society. I'm too exposed.' We also need an integrated system. We need both cottage hospitals and super hospitals. An intertwined solution is vital.

Helen: In every city there are baggy spaces. Baggy spaces are based on the understanding that there are always, when you're building a city, there are always lawless spaces, where people go to get their drugs etc. Baggy spaces serve a social function. What would a baggy area look like and how would it manifest in a hospital?

Victoria: It's complicated.

Ab: I suppose we should go on a bit into the hospital. We're talking a lot about different levels of stimulation. We've done a lot of work in our design around getting people moving. I spoke to a cancer patient last week who was talking about needing cues to get around post-operation. What we can do on a more local basis in order to get people moving? Again, I suppose it's about designing about nudges and prompts...

Ash: Helen's virtual reality may really help. There's good evidence that the mental rehearsal of movement will help people move in the end. And it would be great when we can do this as a real experiment to see if mental rehearsal of movement shortens the discharge requirements of patients. Bedbound patients can have virtual reality to encourage movement. The other defining feature of this hospital is the access to the gardens. And a lot of the problems we're talking about out are solved by gardens. They're a good way of encouraging people to move without really telling them to do anything. If you let them go outside, and there are lovely things there, people will tend to move. If we can wheel beds outside we can do some of the clinical functions in these gardens as well. I don't mean treatment but consultation. So maybe someone's outside in a chair and the medical team goes to meet them there.

Ab: I know from Lucy's experience, who is confined to one room because she has to be isolated, the most important thing for her is to run her day as if it's a functioning day and to stay empowered and not become impotent. How can we keep the hospital empowering us and not pulling us back. It's much harder when you are stuck in one room.

Virtual reality is really interesting, because you can go somewhere else without leaving your body.

Helen: There are many easy ways to use it. For example, when Ash was talking

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about the outside provider helping the patient who wouldn't take her medicine, they could actually have done that via virtual reality. It's more immersive and intimate than someone calling in, because you have what's called co-presence in virtual reality where you actually physically feel as if the person is physically in the same space as you.

Laura: We need to think about other kinds of movement: movement of mind, movement through sound, through touch – they're all stimulating. Sometimes they get approved dogs to come into the hospital and people just stroke them. It's therapeutic. A lot of people can't walk in hospital, but stimulating other components to gets them ready and motivated. It's key to rehabilitation.

Ellie: Virtual reality has great potential for bringing all sorts of consultations to different types of spaces. We also have to acknowledge the kinds of experiences that you cannot have virtually. We've felt that through the pandemic.

We also need to expand human contact and connection – connection with animals, with nature, and make sure we are being imaginative. We can't just replace traditional types of care with virtual reality. The tangible, joyful connection offered by physicality is really important.

Ellie: From a personal perspective, I think about joy in movement. I think about wouldn't it be wonderful if we had, for example, I would go to this as a dancer myself, but I would go to dance artists to think about like, why we move, how we move, noticing the joy of just raising your arm, if you can. These can stretch some of these kind of physical things and take it a step further. Rather than just being with, we can be super imaginative about the type of knowledge there is out there about movement. And one of those of course is dance and culture.

Ab: There's a great precedent in the Bristol children's hospital where they run a very live arts pre and they bring in .... they do a lot of performance with the kids in order to do exactly what you're saying.

Ellie: I would place that alongside a narrative around tech innovation and virtual reality. While you are pushing the tech innovation of virtual reality, you're

also pushing the movement innovation and physical reality.

Ab: It is imperative that we have all these different components. We're certainly not prescribing a purely virtual world. Virtual becomes really interesting when you start looking at pain management, when you start looking at the sense of escape. Also potentially for staff. When you are in these very stressed, tense places, to jump in a swimming pool or be by the sea would be fantastic.

Toby: It's important we think about about a hospital as a physical place or a hospital as a service. If we think about a hospital as a service, then suddenly something that's distributed becomes important. We've talked about communities and physical locations, but also of course, the virtual becomes hospital as a service because it can take place anywhere. And we're not limited into the space.

I completely agree with what you're saying about pain management. I was talking to someone yesterday who had suffered some trauma and was being brought back to relive that trauma as part of the process through virtual reality. And someone else I was talking to who just had just sold a virtual apartment in New York for \$18 million to someone who wanted, I don't know why he wanted it, but he was happy to pay \$18 million for a completely virtual apartment. And so that sense of how that world will evolve, I think is quite interesting and gives the possibility which perhaps isn't a priority for us of thinking about virtual wards or virtual rooms, that some patients might want to be part of here, or we might want to make available to all sorts of patients, depending what they've got and what they need.

Ab: This leads me onto the next question which is really about the senses, which is something we talk a lot about within our hospital, the future of the living system and the idea of biophilila and the idea of sensory stimulation through sound, through smell, through taste. But I suppose how far can you push it? Because some of these things have to be shared. We don't want to spend our lives with headphones. If we're all piping sounds around, is there a risk of rotation? Smell, I guess, is more controversial to an extent.

Ash: A lot of hospitalized patients will struggle with nausea. Smell becomes

a bit tricky. So for some patients who are at the right stage in the hospital journey, smell and provoking smell will be really nice because they're transitioning to discharge. But I think anyway, my only point was that I think nausea is a, surprisingly, wouldn't you feel that? Nausea is a huge, huge issue in bedbound patients.

But stimulation through light and particularly circadian rhythms is really important. And that's been shown to be linked to psychotic episodes in hospital and to speeding up discharge. So I think that again, these garden spaces, because there's a natural day and night cycle, that's important. It's functionally important to the garden. That can become part of the hospital ward as well.

And hospitals are getting a lot better at dark at night, quiet at night. I think most major hospitals now, which is fairly new, have a no consultations before 6:00 in the morning, no loud noises after 10:00 at night. So this kind cycle I think of light and dark is really important, but also making it functional. I think that's really useful with the garden. There's a reason that it's light. There's a reason that it's dark, there are activities that, like you said, with Lucy, there are structured activities that you do at different times of day because it's light and because it's dark.

Ab: We've done a lot of work on the invention of the hospital clock and trying to create prompts throughout the day. Making things quiet in the afternoon or having birds singing in the morning as you wake up. We try to coordinate the lighting. So even when the sun goes down, we use very warm lighting. So that there's the feeling of security.

Laura: I had to have minute to think about that. And I think of different compartments. I think of the compartment of the patient in the hospital, in the ward, where you want to try to stimulate healing. And with that, you probably want to be soft in sound and soft in lighting and I guess that's what's adopted. In the daytime, dark in the place for them to sleep. And then you have a communal area, which I suspect you'd want be more uplifting, joyful, inviting. Inviting for the community, but also inviting for the people who are anxious and waiting appointments. And there's a contrast between those two places.

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Ash: I listened to Nick Luscombe's nature sounds, the whole four hours of it actually. I thought they would fit well in hospital. The sounds wasn't too alerting or aggressive. It was also not like whale sounds or too new-agey. It was really natural. It seemed like the kind of thing you would hear outside. I was surprised because I wasn't expecting it to be as peaceful and pleasant as it was.

Ab: Nick Liscombe composes soundscapes for specific spaces. He's working in Tokyo with the hospital there, creating soundscapes in order to stimulate healing. The next evolution of that is trying to pipe in sound directly from the countryside. So he's planting microphones in fields of cows. You press a button and suddenly you have all these cows mooing in your in space. Amanda thought it was a horrendous idea. She did not want to hear cows mooing in her room but she liked the idea of putting a microphone in the middle of the earth and hearing the earth breathing. These things are so personal. You need to have control.

Ellie: It a very playful idea. And the idea that you could choose is really important. Maybe if I had options to choose from, I would feel I had control over the sounds I was listening to, and that I was part of something, that I was connecting with different parts of the world. The idea is more compelling if it has that playful and agency part of it.

I wanted to go back though to the smell. Because for me, hospitals really already really smell. I can even call to mind now the smell of a hospital. And it brings back previous experiences. Quite a lot. For me, it's not a pleasant smell either. It's a smell I don't like. And so I think we need to ... We can think about a smell a bit more subtly than doing smell to someone. Because there's always going to ... there is always smell. Is there a way we can just neutralize some of the smells? Are we aiming for no smell? What would that be like? What would be the challenge around that? Could we switch off the smell around the disinfectant smell, or something that we say is a clinical smell? I don't know how to describe the smell of a hospital, but there's a sort of a mustiness as well as a cleanliness for me. Anyway. So if we—

Ab: It's all these disinfectants fighting with each other, isn't it. Then you get these ... So I think when we talk about

smell, I think what you're saying is absolutely right. But we're interested in whether we can mask that smell or how we can ... We've been talking to Lynn Harris, the perfumer, on one level just about one, creating therapeutic smells, and on the other hand, this idea that you can mask the smells that are already there.

Victoria: I think all of it comes back to that. I don't know. I haven't been a patient for a long time in a hospital. I haven't had that experience, but from being in a hospital a lot, it's just the needs ... having those spaces where you can just go be out and be in what's real. I think it's such an artificial environment in a hospital. Everything is controlled. Every bit of air is artificial. Every bit of sound is. And I think those opportunities to get into the outside world.

Some people like having earphones in all the time. When I'm outside, I don't want those. I want to know what's around me. So I think it goes back to the model of the hospital, having those opportunities, not just necessarily at ground floor, but kind of throughout the building. Maybe just to get back out into the real world and be outside. That's just a personal, I don't know from a clinical point of view what people might think about people's needs for that.

Helen: So in response to a lot of this, I would second Ash's comment that what's pivotal about this design is the gardens. So I can't really see a way around getting rid of smells, but there's something which is really good for your sense of agency. If you can go for 15 minutes and have a breath of fresh air, it's ... With hospitals, it's that feeling that you are sort of trapped in this stuffy overheated place. So the idea that you don't have to be, even if it's for 15, 20 minutes, you can safely step out into a different environment and literally have a breath of fresh air before you go back into the hospital.

One thing I would say about virtual reality is that they've found that the positive impact of virtual real is as effective if it's 15 minutes long as if it's two or three hours long. So that means, for example, if you have a virtual reality experience that's very relaxing. So you're by sea looking at waves, 15 minutes of that is enough to just calm you right down. And that effect lasts for 24 hours. So I think again, with this garden, what the garden provides is literally a sort of moment of respite from your situation,

and having that would bring a lot of agency and purpose to a patient.

Ab: Toby, you must have thoughts on sensory simulation in the hospital?

Toby: I completely endorse what other people have said about the need for some sense of agency in there. We're probably also moving to a point where instead of trying to get rid of all microbes and germs, we are looking at how we use them or what the balance is between them. I suspect that sort of environment and getting nature back in is very important. Smell is such a cue, isn't it?

Ab: In the Children's Hospital just outside Liverpool every ward of 36 children has its own chef or cook. And of course, Liverpool has one of the highest rates of obesity, of malnutrition, of eating disorders. It costs a little bit more in the short term, but long term starting to educate the family and the children about about fresh food. will pay for itself.

And of course that must really change the smell because when you talk about the smells that you remember from the hospital, for me it's always this repellent oiled food or these white soggy sandwiches that come out and appear.

So, in my fantasy, you have these beautiful smells of tomatoes and garlic cooking, but I'm sure as those drift through the hospital, I'm sure those are going to probably make some people sick.

Ash: Sorry. Just one other point on covering smell. I think a lot of the disinfectant, it's important for us, as a design group, to remember that a lot of these problems are because of the caustic irritation of the nasal epithelium. It's not really the smell of the disinfectant, it's that it actually causes a little bit of a burn of the nasal epithelium. So we can't really cover that up. Even if you layer a smell on top of it, and you're unaware of the smell of the disinfectant, it still causes a lot of nasal irritation. But I agree with Toby's point that we probably would just need to move away. I mean, eventually we'll move away from this idea that we can disinfect every surface. I don't think we need to do that as aggressively as we do in hospitals.

Laura: I hear what you're saying. There's also that reassuring feeling of the disinfectant. When you go to hospital, it's reassuring to know that things are clean. So we can't say that for granted.

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Most people who go to a hospital when they think about smell, most of them would say that disinfectant smell. Which is maybe not a bad thing because you want to know the hospital is clean. So yeah, it's a fascinating thing. But the smell of foods, definitely. It's a cue for I'm going to have food. And that's actually something that's actually quite exciting sometimes, I'm going to get ... No matter how bad the food is.

Ash: We could do a thing where we do a cycle of smells, so the smells become meaningful. Because you're absolutely right, we typically use smells as cues. So there could be a smell which cues you for morning, a smell which cues you for lunchtime and cues you for a nighttime thing. And that becomes just a very, very subtle background too, the day is changing in the hospital. Anything we can do to demarcate the day in a hospital is really, really helpful.

Laura: Exactly, that mental agility, the activity. Cue-ing can be really helpful in the rehabilitation process.

Ab: Which then takes you to taste. And again, our dear friend, Lucy, who's been going through terrible leukemia, and I talked to her about her palette, and she only wants to taste really bland things. Putting a chef on every ward can only be a positive thing. disagrees. But I suppose how we can cater for the many palettes and the mouth ulcers and all these horrendous things which go with the hospital experience.

Laura: Taste and smell go in hand in hand. I wonder whether the garden could stimulate smell. We see a lot of it now with COVID and people lose their sense of taste and smell. They're having to train them using pungent smells like mint and things that we know they can smell. The building could contribute in that sense. And we may not be able to mitigate taste, but we can work on smell, it's more accessible.

Ab: I thought the reason you lose your taste with Covid is because you lose your smell.

Laura: No, it's to do with receptors.

Toby: One of the problems with existing hospitals is that they work at scale. They aim for maximum output for the minimum diversity to get economies of scale. What you've designed expressly

pushes against that.

It plays back into smell, into taste, but it also perhaps into the design of the food, something that is much easier to customise by yourself rather than being given a whole dish. And we may not have a chef on every ward, but perhaps we can have a choice of how to constitute our meal.

One thing I was slightly worried about when looking at your design is it is, which is also joy, is that it's naturally grown. Seasonality plays out. I wondered what your hospital images would look like in the middle of February. And you've got rid of the car park. I wondered whether an LED farm, a vertical farm with LED lights might be a way to cover some of that gap and use the space, which is dark and down in the bottom. And also plays quite well into the sterilization of hospitals in there. And that might allow us to bring in ... you can change the flavour of foods and herbs, depending what light you give them. So different colored lights will change the flavor of what you grow. And so we'd be able to play around with taste through the lighting of those vertical farms.

Ab: We got rid of the basement due to it consuming too much concrete.

Toby: Vertical farms can happen inside containers, it doesn't really matter where they happen. I don't think we should be hung up about the physical space.

Ab: It's a brilliant idea. And I love this idea of tuning the flavors through the types of light. Because our worry is always the Dutch tomatoes having no flavour.

Victoria: The garden and growing things is also part of the therapy, isn't it? I mean, that's part of the idea.

Ab: Completely. But I think Toby's worry is when it's winter and we just have cabbages, and the smell of boiled cabbage is not great. And when we're talking about engaging our senses, it's a bit problematic along the way.

That probably leads into my final question, which is really about how one can improve the supply chain? Because the concept is to try to keep everything as super local as possible. Obviously we're building a hospital out of timber, the timber's not coming from Hackney. We need to bring it in. But beyond that, I suppose it's how we can create a very local market and how to try to break everything traveling from everywhere in

this over complexity. So, who wants to talk about locality?

Toby: I think locality is something that makes us feel very good, but it creates clear practical limitations on what you can do, particularly if you're in an urban context. But I think that the social capital around locality is really important. And particularly coming right back to the beginning of this conversation around the community and engagement, a sense of tying in local suppliers in some way is a really, really good thing for the hospital. So even if it is not about growing coffee beans in Hackney, it might be about roasting them and where they come from through there. So that map of the supply chain, I think is really key.

The notion that what we are doing is the idea of a hospital as a service, and therefore can be distributed in terms of where things are got. But that we are trying to be very explicit out that locality and about the community that it serves.

Victoria: And the whole process of the hospital from the beginning to the end, I mean the amount of people involved, and that ability to evolve, to make a positive contribution in terms of employment through construction and all those stages, I mean, that's what everyone is trying to do in development terms. And so it's not necessarily just the materials, but it's all the human resource used on this and how that's localized.

Toby: If you look at Sagrada Familia, it has a school on site because it's been built for a hundred years and there are kids who've gone to school there who are now working on it. Now, hopefully this hospital won't take a hundred years to build, but that properly knits it into its community.

Ab: We hope this hospital will be very, very speedy to build. And I think we very much see it as a tool for urban regeneration, and completely has a hub for employment. And in order to do that, to try to make things as local as possible, so it's a really key part of that.

Victoria: Can I raise one other thing that I don't know relevant it is, but I went to hear ... talking about someone who was building buildings in timber now. And he said one of the things that struck him is that during the construction process, the difference with timber is that it's a quiet process. You don't have hammering and drilling to the same extent as on a

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concrete or steel building. And actually that period, when you build a hospital, for the workers who are building it, the construction workers, building out of materials that aren't noisy, locally or in the neighborhood, is also really important. I think that's all part of the environmental agenda of the building. And to what extent, again, in the materiality of this, you can think about, yeah, the environmental quality of that process. And I was just really interested, he was saying that a timber building is a calm building site. And also the acoustic qualities of certain materials afterwards, all of that contributes to that sensory experience in the end as well.

Ab: I've never thought about the quiet building, I think that's really, really interesting. I think part of the thing also is the volume of prefabrication that comes with timber. So there's less, you're dealing with components rather than ... But of course it makes absolute sense. And we're very interested in ... the interior has no plasterboard, it is all made out TLC partitions that can be moved around and rebolted. And the resonance of acoustics in that situation is so much more pleasant than bouncing hard surfaces.

Ellie: Just to add an anecdotal experience on top of that. At UCL we've built a new lab called Pearl. And part of the purpose of that building in to be able to create any type of environment. It is a massive airport hanger size building. But they've managed to get the acoustics so it feels like you are in just a room. In a normal size residential bedroom or living room. And it is extraordinary. I visited there when it was still a building site, but it felt like there was no echo. It was an extraordinary place to be. And the sense of courtesy and peacefulness in that building site and gentleness was palpable with the people working on site. And my sense is that it was to do with the lack of aggression in the atmosphere and environment. That is anecdotal and just my personal experience, but it felt very profound to me.

Ab: It's a proper nudge to have that level of calm. It's the opposite of 180 The Strand, where everything is just nuts and everyone is falling over each other and smashing things and making loads of noise.

Ellie: But as well, this is my bid for having a variety of options, because we

also go to raves where that tension is appropriate and exciting. I don't want to live in an entirely courteous and gentle atmosphere all the time – it's about what is appropriate where.

Ab: Completely. I don't think you want to have a rave necessarily in the hospital. Unless it's in Toby's illuminated basements.

Ellie: A garden rave. Perfect.

# Appendix

## B. Panel Conversations: 2

In October 2021, we hosted a round-table discussion with a group of patients and other hospital users. During the session we presented our proposal for the Hospital of the Future with the aim of obtaining feedback to inform the development and refinement of the design.

Participants were Ab Rogers; Dean Walker; Philippa Wyatt; Rachel; Grace; Bug; Joan; Luca; Katie; Monica; Tracy; Tony.

[The session begins with a presentation from Ab Rogers Design on their vision for the Hospital of the Future and how they would realise it.]

Ab: Let's open to questions here. I'd love to get your thoughts on the idea of the hospital opening its doors to the community. Instead of it being an off-putting hostile place why not make it a centre for health, where you come for a massage, where you come to buy a tomato, where you come to go to the GP, where you come to go to the gym?

Grace: I really like it. It reminds me of when I was at Great Ormond Street. In the middle of Great Ormond Street there is a massive place where they put all the trees and things for people to do. Because let's face it when you're in hospital, all you can do is get out for a fag on the park bench outside.

There was one other thing I was going to say in regards to the community – you need to give the tools to the actual communities. So for example, let's take sex workers and vaccines. We realized they were a really hard-to-reach group so we gave vaccines to sex workers to deliver to other sex workers. Because hospitals just didn't know bloody how to. It empowers the community to deliver health interventions themselves. Why don't you just give us the tools to do it and we can do it?

Ab: I love giving back tools to the community is essential. We also have to adapt to the local community ...

Rachel: It's a brilliant idea because the hospital can be a very lonely place, so it would be very good for people's mental health and wellbeing.

Ab: We're going to take you in the hospital shortly, this is really about trying to gauge on the market sitting underneath the hospital rather than it being a standalone place.



Bug: I've been a patient in UCL and having something like that downstairs is going to be ideal. Because when you're a patient in a hospital, and the hospital feels not very nice and things like that, to go down and being able to get fresh food from downstairs is a really, really good idea. And also having green spaces, if you laid in a hospital bed for weeks or months on end, having somewhere where you can go and sit where it is nice, it does help the patient.

Joan: I'm taking off my UCL hat for a minute and come in as a patient as well. What about the patient who just wants a nice quiet place to get well and recuperate? Won't this market bring in a lot of hustle and bustle?

Ab: Yep. But we have direct cores that can take you straight into the hospital as well as of course the accident and emergency side. But it's more the idea of having a town to come into rather than a car park, trying to create an environment. So when people go shopping, they're more likely to come and visit you because this becomes a center in itself. It becomes part of the community and maybe we're less scared of it.

Also we're all sitting in London which is full of hustle and bustle, but in many of Britain's cities with the recent plight of retail, the city centers are feeling quite empty. So we want to bring some bustle back to them. So we can see it as a way of activating the local community.

Tony: But shouldn't we be wasting less money building hospitals and more money improving the hospitals that we

already have.

Ab: That is a very good point, to adapt the existing hospitals. But we have a lot of problems with how the existing hospitals perform. There aren't not enough hospitals so we need to build new ones. And often it is more expensive to refit existing hospitals, although part of our work to look at how we can refit the existing hospitals and improve the way they perform and feel.

Grace: I fucking hate going to hospital, I find it boring, soulless – you're in bloody bed all day. Whereas if the doctor's like, oh, there's a better hospital, you can at least relax and go somewhere. I'd be like, maybe it's not that bad. It's a little bit pre-occupying because there's nothing worse than just laying there. And all you've got is an overpriced Boots sandwich and Sudoku book and everything's shut after five o'clock. It's just soulless. It's one of the reasons I hate going to hospital. Your proposal tries to reduce that a bit.

Ab: Something's quite wrong about having these profiteering companies like Boots selling second rate sandwiches in hospitals. And we've seen the rise of the community during COVID with a different way of working. There must be a way that we can find local vendors who are interested in providing a proper service to the patients.

Luca: When I was in hospital, I was treated really badly. Yeah. Cafeteria's in the hospitals, they need to look into more hygienically because some of them hospital, they're not hygiene enough. They need to ... I'm just saying balancing

## B. Panel Conversations: 2

everything instead of working on one thing.

Tracy: It's a good idea to have the shop underneath. And me personally, I haven't been in hospital, but my partner was in hospital for seven months and he was so bored, and they didn't look after him very good. And to have lights, games, and things like that would be a great idea. Katie: Being in hospital can be really boring and somewhere you can go just to feel a bit of normality, even if you got to go down in a wheelchair with your oxygen or whatever, just enough get a fresh cup of coffee.

Monica: My Nan was in hospital for nearly six months, sadly, before she passed away. But the way she was treated in hospital was diabolical. Only one family member was allowed in at a time to see her, and she would always be phoning one of us to complain that she was bored, that she'd only had a sandwich to eat, or she had had some soup to eat. I think it would be a good idea.

[The presentation from Ab Rogers Design continues ...]

Ab: Now that we've begun to discuss the relationship between the hospital and the community we should focus more on what you think of the patient experience that our design proposes.

Rachel: Okay, so two things, in the park, would there be gym facilities, you know how they do in the other parks? They're actual just metal things and they just put a couple of things in obviously to keep fit. And also which safety measures would be put at the top where you're growing vegetables? As some people do get lonely and very isolated in hospital and things happen? Which kind of safety measures would be put in place to prevent that from happening? Well, those are not going to be nice on the top of the building, but obviously ...

Ab: Two really good points, Rachel. I think firstly, we have these pavilions which contain gymnasiums inside them, but maybe you're right, we should be thinking about having equipment in the park itself. And I think of course, one of the risks of having all these high level external spaces is, as you say, that people get desperate ...

Rachel: A hundred percent.

Ab: So we do have high level garden in the form of partitions, but yeah, we need to look more at that level of security, we also see it as being quite a policed place. But we're not so naive as to believe that if we make the space beautiful, no one will want to jump.

Rachel: I think there should be a check before someone does go up to the garden, so you know exactly who's going up there, if they're vulnerable or not, or if they're actually stable.

Ab: Yeah. In our thinking, it's by invitation only at the moment. But also we're hoping to get, when your partner comes to visit you and then he likes gardening and he becomes a volunteer for the garden ...

Grace: Smacking the bereavement center next to the kitchen. And next to the day care center, particularly if they've had a child pass away, might be a bit difficult.

Ab: We didn't talk about bereavement at all. What we're really trying to do is get the bereavement out of the back of the hospital. Because so often it's found to be in the depths of the hospital. And we think it's very important that death becomes part of the conversation.

Grace: Absolutely, it needs to be open, but next to the kitchen might be a bit loud, with people shouting and stuff.

Ab: We need to relook at that. But the adjacencies are really complicated. It's the place we've spent a lot of time moving around.

Dean: Yeah, sure. We did put it on, we moved it, we had a more discrete entrance on the ground floor taking you directly up to the lift. So you would come out of the lift and then see the park level. There was a degree of privacy that we were looking to achieve through the landscape as well. So at the moment you have a very public side of the park where the restaurant is, and you come [00:34:00] round to a much quieter park, and the bereavement center is located next to the library and to the north side. But you're right, we'd have to make sure there was enough acoustic separation. So it would make sure it was a quiet, obviously contemplation space between the two areas and make sure there was no issues between the two there.

Grace: Does it flood? Or if you've got someone below and above you, does it

drip down. So, if you're out there and it's rained, does it drip down? Speaker 1: It has quite nice internal drainage.

Grace: I was just thinking of rainy arsed Britain.

Grace: Also if you've eliminated parking, what about parking for staff?

Ab: These are about inner cities, I think it's really hard to use a car in the city and there are many ways of transport. If we are building new hospitals, they need to be about getting people better rather than parking cars. So much space is consumed by car parking in hospitals at present.

Grace: I'm thinking of Leeds. Leeds is a big city, tiny city actually, in terms of the city center, but its urban area's fucking massive. So if you live in LS15, it's about an hour's cycle and I just can't imagine-

Ab: But the trains work, I spent a few years teaching in Leeds, so I know the trains work quite well. But Leeds is classic, Leeds is full of car parks. And they really destroy the city framework.

Bug: Where you've got the little gardens in between the wards, if you've got patients that are hard to work with, because of the stigma of the homeless or anything like that, won't want to mix with other people in the ward. Because they feel they're going to be talked down to or people will be funny. Would you consider a little quiet area where people who don't want there to be a load of people, can just go there on their own?

Ab: It's very important to have quiet space. I think we have private rooms and we have public rooms but it's hard to start hiding people from one other. We need to be a more inclusive society and we hope that by treating people with respect, they can forge more relationships. But maybe that is being naïve ...

Bug: What I'm saying is that for someone's who's homeless if they get treated badly they'll clam up. And they don't want to be around anybody else, they'll be unsocial, they'll be hard to work with. And that's not fair on them or the other people. So is there going to be something in place where you can turn around and say, 'Look, I know you don't want to be around a lot of people, but you can go here.' And then gradually

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you could introduce them into group situations.

I know what it's like. If you're homeless and you're an addict, the only thing you caring about is your habit. You don't care what you look like. And people see you walk around hospital in the same clothes for four or five days after they've messed their selves. And they refuse to clean their selves up. All the other patients are moaning. And then they are turning around and say 'If you don't do it, we've got to kick you out.'

The reason why she was in there was because the police broke her arm. So it's hard. That's why I'm saying, if there was a place where she could just go to be on her own wouldn't that have been better?

Ab: That's more about a change of human culture, isn't it?

Bug: What I'm saying is, if you're in a hospital and you get treated right when you are homeless, it makes a hell of a difference. If you've got somewhere where you can go with where you feel safe, and you can get to talk to someone.

Katie: Is this hospital just for medical needs? What provision is there for mental health patients?

Ab: The hospital is designed around care and the specifics can be adjusted depending upon the wards that are there. We try to avoid sound pollution. We try to maximize natural light. We try to give space for the individual patients. We are very interested in creating an environment for mental health issues, as well as physical health. For us, it's about improving health. And whether that is walking in the garden, whether that is sitting in the pocket park or lying in your bed and looking outside, we are keen to encourage movement. We are working to break the mundaneness of time. So it doesn't feel like you're in this monotonous environment, in a never ending world, you're in a much more domesticated, smaller, more caring environment.

Tracy: Sorry. If patients were in hospital a long time and they're getting better, would they be able to do the gardening on the roof?

Ab: Absolutely. That's very much what the garden is for.

Ab: I fear there is a risk of then confining that anti-social person to their bed in

the end. So, if maybe there was that little room where someone can go – it might even be like a little glass cubicle or something where an individual can walk out of their bed and go and be by themselves and read a book or something.

Ab: It's true, everything is very open. We need something like a little reading room.

Joan: Yes. The individual needs somewhere to go to be alone so it's not just a choice of being with with people or in bed.

Joan: The majority of people would like to be part of a group and to share. But even on the best of days, everyone needs a bit of head space.

Tony: Is your design just a concept or does it come from the government?

Ab: No, this is just a concept with the idea of the winner will form a paper which goes to influence the government on how they build hospital. The problem is what happens today is, in their eagerness to save money, they spend much more money on the long term. So, we're trying to find solutions which create long-term savings. Part of that is about creating a greater sense of care.

Monica: I was just reading about the homeless being, again, discharged back to the streets after being classed as bed blockers. Because I've been with one of my clients who was basically chucked out within a space of 20 minutes of us being there because they didn't want to give the person a bed. So, that person was then again headed back to the streets because they weren't willing to give that person to bed. And then sadly, they passed away two days later.

Ab: That's shocking.

Monica: It was absolutely devastating. The person was in so much pain. Yet they didn't want to give them a bed because the homeless are classed as second-class citizens, and they don't give a damn about the homeless in the hospitals. They released her and then two days later, I get that phone call to say that the person had passed away. If she'd have been in the hospital and had the right treatment in the first place, it wouldn't have happened.

Luca: My question is about the vegetables you plan to grow in the

hospital – is this going to be cooking for the hospital or just for the community?

Ab: For the hospital. Of course, it means in the winter the hospital will be eating a lot cabbage, but the idea is to try to shorten the delivery chain.

Stan: I've got Peter on the phone now. He says it doesn't really matter what the hospital looks like; it's the treatment that you get. I think though that, as always, the government are pitching the ball in the wrong park. We should be looking at urban and suburban regeneration, which includes community health hubs at primary level and not secondary level. If you think about it, people go to GP surgeries to live and to hospitals to die. And the reason they do that is because hospitals are very much the end of secondary care. And when you end up in hospital, the chances of you surviving are lower than that than if you end up in primary care. Your ideas of urban and suburban regeneration, about a health system that's part of and the center of a community hub, are fantastic. If you combine that with good quality housing, education, transport infrastructure, and healthcare systems, end up doing reducing the need for secondary healthcare until, people are much older. And transforming some hospitals is far simpler than transforming the whole of societal thinking. We should be creating much more council housing. We should be creating much more of a community spirit and you should stop living your life as a selfish individual. That's going to take a lot longer to change. I'm not sure about the garden on the top. I think the risk of someone jumping off would be real. And healthcare systems are generally risk averse.

Ab: I couldn't agree more. We're trying to use the hospital as a tool for urban regeneration, but it's only one part of a much more complex story. And we're trying to tie primary care ... At the moment, [00:53:00] primary care acts as a protector of the hospital, when it needs to be working with the hospital, there needs to be much more connectivity. As well as secondary care and other alternative therapies. But the hospital is an area which needs improving. And we need to improve the quality of how we treat both the staff and the users of it. And we hope that, by improving the quality for the staff, they will be more caring to the patients, because part of the problem is this notion of overworked,

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under loved, everything working against you. So, if we can create a system which is more holistic. But I cannot thank you enough for your time this morning. It's been really insightful. We've learned a lot about it and we will use your information to help create a better solution.

## Appendix

### C. Expert Essays: 'The Third Carer' by Ashish Ranpura, MD, PhD, October 2021

Our conception of disease has always shaped our clinical approach. When we thought that disease was a formless evil, we turned to witch doctors and priests to exorcise it. When it was an imbalance of humours, we drank coloured fluids. When we thought it might be malodourous vapours we took in the sea breeze and the mountain air. In the industrial age we imagined jammed-up gears and mis-connected wires and we developed surgical techniques to cut out and rebuild. In the chemical age we imagined a complex interplay between molecules and receptors and popped pharmaceuticals to raise or lower their levels.

Clinical buildings reflect this cultural understanding of disease. They have ranged from dark and secretive apothecaries to bright, metallic temples of hygiene. The architecture of these spaces suggests social hierarchies within the world of health care. Is the healer a ruler or a servant of the sick? Are the ill supplicants or customers?

Today our most articulate conception of disease is the biopsychosocial model. In this framework, illness is the combined effect of a biological vulnerability with a psychological state within a social context. For example, a person who works varying night shifts may be extremely tired with a weakened immune response due to disrupted circadian cycles. When exposed to a cold virus, this person is likely to develop a respiratory infection. If they are then unable to take time off work, their disease may progress. If they are eventually hospitalized with pneumonia, we would miss nearly all of the causative factors predicting disease if we were to focus only on the viral pathogen. In order to treat and prevent disease, we have to see the entire picture.

Clinical buildings today still reflect the monumental scale and gleaming efficiencies of the industrial and chemical eras. Now that we've arrived at the biopsychosocial model of disease, we need a new type of clinical building to support it. This building must function on a personal scale, offering privacy but also community. It must facilitate health interventions that are biomedical as well as those based on diet, exercise and social needs. The building must reflect a change in the way we deliver health care from an intervention at a point in time (a surgery, a prescription) to an ongoing interaction between an individual and a comprehensive care system.

In this sense we can think of the building itself as a third carer, after a patient's family and their medical team. The building will facilitate nurturing interactions and anticipate the needs of its occupants. When the building functions in this way, as an active part of the healing process rather than as a passive stage on which the theatre of medicine is performed, patients will naturally come to associate the building itself with improved health. Just as temples and cathedrals can create a sense of spiritual calm, even without their attendant rituals, so too can this new type of hospital create a sense of wellbeing independent from and in parallel to the practice of health care.

This conditioned response to a designed environment is one of the most powerful tools available to the health care architect. The cultural associations we make with these environments are deeprooted, and they have a tremendous transformative power both in the literal sense, in that they can alter disease states through placebolike conditioning, and in the imaginative sense, in that they enable us to envision being well again. We must stop making monuments to those who fund and build hospitals, and return to a time when we built places to heal the sick.

*Dr. Ash Ranpura is a neuroscientist and clinical neurologist who has been active in brain research for over 25 years. He received his bachelor's degree from Yale University, his MD from the Medical College of Ohio, carried out PhD research at the Institute of Cognitive Neuroscience in Queen Square, London, and completed his residency in clinical neurology at the Yale-New Haven Hospital. He has recently co-authored a book on mindfulness and neuroscience with Ruby Wax and Gelong Thubten entitled *How To Be Human: The Manual*.*

## Appendix

### C. Expert Essays: 'Design for Dementia' by Ashish Ranpura, MD, PhD, October 2021

There isn't a lot of empirical research on how design features in clinical spaces affect patients with dementia and other forms of cognitive impairment. Likely this is because first, it would be difficult to conduct randomized controlled experiments on architectural features, and second, because patients vary widely in their capabilities and their cultural expectations surrounding design. In the absence of empirical evidence, the research literature offers expert opinion. The best work on this topic surveys a range of clinical specialists including doctors, nurses, occupational therapists and care workers to produce something like a professional consensus view on how design can be used to help patients.

There are a few clear themes that emerge in this consensus view. First and foremost, familiar domesticity really helps patients navigate otherwise threatening clinical spaces. This means that those health and safety measures which are institutional rather than domestic tend to cause confusion. Torrington 2006 makes this explicit, writing that 'quality of life was shown to be poorer in buildings that prioritise safety and health; buildings that support activity positively by providing good assistive devices, giving people control of their environment and affording good links with the community have a positive association with well-being.' (Torrington, Judith, 'What has architecture got to do with dementia care? Explorations of the relationship between quality of life and building design in two EQUAL projects,' Quality in Ageing and Older Adults, March 2006). Safety is maximized when clinical environments evoke domestic spaces.

Another theme emerging from the literature is the importance of light, colour and contrast. There is a conflict in the expert views here, because while patients with limited visual acuity need brighter lights and higher colour contrasts, those who are unwell or confused need restful visual environments which don't clamour for their attention. The reliable conclusion is that unnecessary visual clutter, and in particular institutional visual clutter like staff notices and equipment storage, should be minimized, and that wherever possible natural light should be maximised. Again, safety emerges from familiarity and comfort rather than as an explicit design goal.

It is striking that many of the papers in this field discuss the importance

of gardens. From the perspective of low-level vision alone, a garden might be a chaotic and unpredictable space. However every paper which discusses gardens and green spaces concludes that patients navigate these spaces confidently and comfortably, and that the inclusion of significant green spaces improves the quality of life for patients with cognitive or sensory impairments, over and above nearly any other design feature of a building.

Ultimately, though, clinical experts are not necessarily experts in architecture and design. Clinicians see their patients interact with health care facilities as they exist today, but they may not have the training required to re-imagine these spaces in the future.

Furthermore, concepts like familiarity and domesticity are dependent on culture and social class. The role of clinicians and of clinical research should be to articulate problems that then require architects and designers with the training to create inclusive and flexible solutions. We shouldn't be looking for prescriptive solutions in the research. Instead, our design should be led first and foremost by compassion and humanity. The challenge is to meet institutional design needs while absolutely prioritising human design preferences.

# Appendix

## C. Expert Essays: by Luna Gargani

The hospital I envision is open and friendly. It is friendly to the patients, it is friendly to the families, it is friendly to the healthcare personnel.

Patients and their caregivers fear hospitals because they feel rejected in a place which usually enhance, instead of supporting, their vulnerability and frailty.

We can make the difference at any level: from structural design to the colours of the walls; from the disposition of the rooms, to the cut of the uniforms; from the environmental sound to the green spaces; from the meals to the light outside and inside.

Why cannot we listen to our favourite music, read inspiring books, watch funny movies while we are spending some of our time in a hospital?

We become the place we work in. We are humans, and our attitude varies according to the context we are living: a kind, comfortable, peaceful atmosphere will make us warmer, more empathic and caring. This is not an esthetical pose; this is part of the treatment, it is part of the cure, which is the results of the effects of a drug or therapy, together with all the rituals, gestures, words, feelings, environmental awesomeness.

The Hospital is a community, a living organism, a complex system, where different people with different needs gather, and where the same person can experience very different emotional situations. It is a place of birth and death, of hope and despair, of fatigue and friendship, of conflict and love.

A successful community is able to fulfil all these circumstances, supporting the human being who live there and need a sympathetic habitat to give their best, from both sides of the bed.

The light, the colours, the space, the nature, the sound, the smell, the touch, the words, the feeling will heal or will assist to endure the disease and the pain.

The hospital I envision is open and communicative. Communication is the ground, the foundation of the relationship between patients, doctors, nurses, families. What we hear and feel in a hospital will likely live in our memories forever, and will influence our way of reacting to a new situation, to a disease, to the hope of recovery. There cannot be too much care in the way information are communicated in a hospital, from basic signboards helping you to find that ambulatory office or the cafeteria, to the heartfelt words of another human who has to tell you that that drug hasn't worked as expected. Effective communication between healthcare

providers may mean life or death, may cause serious complications of synergize the cure.

This is the place where we want to be born, where we want to die, where we want to keep the hand of our closest relatives in pain, where we want to work, grow and help others.

*Luna Gargani is a Cardiologist and Senior Researcher at the Institute of Clinical Physiology for the National Research Council in Pisa, Italy. She is a recognized expert and pioneer in lung ultrasound.*

## Appendix

### C. Expert Essays: 'Why Build a Beautiful Hospital?' by Dr Mando Watson

The hospital and the community are closely linked: one needs the other. They meet in the same building.

A busy hospital stands at the centre of a community, just as the church once did in a village, marking our passage through life, all the way from birth to death.

In the centre of the community, this building – the hospital – allows and fosters all the connections and communications that surround our life events. Everyone, no matter who we are, passes through it at some stage.

This building holds a space where amazing things take place: some events are scary, some thrilling; some are tragic, or joyful, or heroic, or ordinary – many are just the everyday events that make us human.

For some, the hospital is a place of healing; for others, it's where we go to work, where we meet our colleagues and join together in teams.

A hospital is a place built to be occupied and used as efficiently as possible, often under testing circumstances. A patient may arrive at A&E, need to be assessed, then be moved swiftly to theatre for an operation, and after that into intensive care for recovery. At every stage, the hospital building itself enables a unique support network where all can do their best.

Patients are not the only ones who need support: staff do too. And patients have families who need looking after, to be comforted, consoled or reassured. They want to feel that their loved ones are in an environment that lets them know: 'you're in a good place.'

Design matters. Transparency helps everyone. Some architects thought they were being kind to keep the entrance to A&E separate and hidden from patients seated in the waiting area, not wanting to disturb them with the constant coming and going; but they underestimated how frustrating it can be, having to wait for hours in a big room, with no sense of what's going on. But when you see hospital staff actively dealing with emergencies, where the space is clearly laid out, everyone can understand why some patients require higher priority, and then there are far fewer complaints.

The most rewarding spaces are those where patients and hospital staff collaborate, working in a joint endeavour: everyone shares a common purpose, understanding that nearly all healthcare challenges are better faced together.

Hospitals link up with other parts of the community, such as schools. In one

project, children regularly visited geriatric wards, both old and young discovering an uplifting two-way exchange. Sensitive hospital design makes it possible for different generations, from the very old to the very young, to find the best in each other.

Just as churches were once designed to cater to the eye as well as the soul, sensitivity to beauty in a hospital, whether through a view of the sky or the colour of a wall, means that the building itself can foster recovery. Good building design creates an environment where patients and staff can thrive, whether they need calm, respite, recovery, re-energising or relaunching back into life.

*Dr. Mando Watson is a General Paediatric Consultant, working clinically at St Mary's Hospital, Paddington (Imperial College Healthcare) and working as Clinical Director at Central London Community Healthcare. Through the Connecting Care for Children programme in North West London she has developed holistic care and increased emphasis on prevention and the patient perspective.*

## Appendix

### C. Expert Essays: 'Meaning in the Blossom of a Magnolia' by Dan Pearson

When I created my first hospital garden in 1996 at Worthing and Southlands Hospital the idea that a garden could offer respite or aid healing was still on the fringes of healthcare thinking. The commission came from a visionary public art consultant, whose experience with siting art and sculpture in hospital environments had made the value of gardens clear to her. Within days of completion it was found to breathe new life into the hospital and quickly became a welcome place for contemplation and respite.

In 2004 my practice created a roof garden for the new Evelina Children's Hospital at St. Thomas' Hospital. Commissioned by the Director of Art and Heritage, the garden was still considered an add-on rather than an intrinsic part of a hospital's design, and as a still-new idea, issues of weightloading, value engineering and maintenance meant that the space could never realise its full potential. Even so, to know that children on dialysis would be taken out into the fresh air and feel the sun on their faces made it all worthwhile.

That same year I was approached by the Maggie's Centres to design a landscape setting and internal gardens for the first centre at Hammersmith Hospital in West London. Although the building had been conceptualised we were brought in early enough to be able to develop a meaningful dialogue with the architects and Maggie Keswick's dream of a home set within a garden, where visitors would feel comfortable, relaxed and protected, became a reality.

While working there I was introduced to Cath Knox, who had been living with cancer for 12 years and getting to know her made the project very real for me. 'When you are told you have cancer, every moment counts,' she told me. 'To have those moments captured in the blossom of a magnolia that you may not see the following year, to stumble across perfume caught on the breeze or the scent of mint crushed between your fingers becomes incredibly meaningful.'

The ability for centre users to engage physically with the gardens has also been central to the designs of all the Maggie's centres. At the Manchester centre there is a greenhouse designed into the building that has encouraged more men, in particular, to feel comfortable in this supportive and caring environment.

I have always intuitively known that intimacy, sensuality and sanctuary in a garden are key to creating a sense of wellbeing, but at Maggie's it has

been made so much more vivid seeing it through the eyes of someone who is seizing life with a new intensity. That intense connection with nature is something from which we can all benefit.

The Maggie's approach has been a game changer in current thinking about hospitals, and it is heartening to see the influence of their philosophy and thinking on places like Horatio's Garden, the charity supporting those with spinal injuries, and on new ICU units at King's and at Chelsea and Westminster Hospitals, all of which put gardens at the centre of the patient experience.

The benefits that landscape and gardens offer us when we are healthy – beauty, contemplation, energy, connection, food, contact with natural and seasonal cycles and processes – are magnified a hundredfold when we are ill. We all know every home should have a garden. Therefore hospital design should make access to nature central to their conception so that they become not just somewhere we go to be sick, but places we are happy to call a home away from home.

*Dan Pearson is a landscape designer, gardener, journalist, and television presenter. Known for his painterly, naturalistic perennial planting, Pearson, and his London-based studio, work globally. Key projects include the Tokachi Millennium Forest, a 240-hectare public park in Hokkaido, Japan, the courtyard gardens at photographer Juergen Teller's studio and the Garden Museum, also in London.*

## Appendix

### C. Expert Essays: 'Bereavement and Remembrance in Hospital' by Hammad Khan

Death is painful to deal with in any circumstances. In a hospital death can be drawn out, unexpected, even caused by medical failure. When death occurs in a hospital, the hospital becomes a liminal space, separated from home and from the everyday reality of life. In a hospital, the immediate aftermath of death involves tears and paperwork in equal measure. This can make the bereavement process challenging for both clinical staff and families. Just as the hospital must institute better processes to facilitate recovery so must it provide space and time for acknowledging the reality of death.

When a child dies in hospital the impact on families and staff is particularly acute. Parents have to deal with the tragedy of a life cut short. Staff must manage the combination of clinical detachment and empathy necessary to do their jobs well. Often the brevity of a life culminates in efforts to capture it in some way. It is not uncommon for parents to ask for photographs, or even tiny footprints, of their child, to be taken.

The act of remembering at these times is particularly important. In some newborn intensive care units babies who have died are remembered with a "tree of life", a mural of a tree on which each leaf represents a child who has passed through caring hands and onwards. Other units memorialise the stories of children through collages. I have had the privilege of attending the annual multi-denominational remembrance service The Evelina Children's hospital holds for children who have died there. Held in a hall packed with parents, grandparents, siblings, friends, doctors, nurses, pastors and imams, the service includes readings and prayers, songs and stories, tears and joy. It's an opportunity to celebrate being touched by these short lives and ultimately to remember what a hospital is for.

Whether through, space, colour, time or stories, these acts of remembering need to be elevated in the hospital. Even as the hospital continues to function around those who must come to terms with the end of a life, we must still make room for grief in the running of the contemporary hospital.

*Dr. Hammad Khan is a Consultant Neonatologist at the Evelina London Children's Hospital. He is passionate about providing excellent neonatal care at one the UK's busiest neonatal units. He is an advocate for family-centred and family integrated care in neonatal units and has strived to provide compassionate healthcare for families through good design in both the physical and digital space. He volunteers for the charity Humanity First and works to improve health infrastructure in the developing world, including in Pakistan and The Gambia.*

## C. Expert Essays: 'The Healing Power of Water' by Jane Withers

Recently I met a friend at the V&A, and we found ourselves gravitating towards a temporary pavilion erected over the pool in the museum's garden. Sitting on a small bench we lost ourselves companionably in the liquid reflections playing around us. Although we were in a public space with kids paddling and people milling nearby, the presence of water helped create a sense of calm and seclusion, easing the door to intimate conversation. It was a powerful reminder of the soothing and connective powers of water.

This is one example of the many ways that water could be woven both imaginatively and practically into the design of hospital environments and made an active protagonist in supporting healthcare and human and environmental wellbeing. Others might include bathing and water therapies, celebrating drinking water and hygiene rituals, or reimagining the role of blue infrastructure in sustainable design.

**Water therapies** are an obvious example. Historically the healing power of water was widely recognised and it is only comparatively recently that water and wellbeing have been estranged in the public sector. Rome was famous for its fountains, aqueducts and monumental baths which were as much about rejuvenation as cleansing – a space for balancing mind and body ('mens sana in corpore sano' – a healthy mind in a healthy body) where water was a purifying, healing and integrating force. Other examples include the Nordic sauna and the hammam or Turkish bath, as well as ancient communal bathing cultures in Japan and Korea that still flourish today. Although not strictly accurate, the word Spa is often said to derive from the Latin 'salus per aqua' (healing through water), and spa towns flourished across Europe in the 18th and 19th centuries as resorts for health and relaxation. In all of these traditions we find elaborate bathing rituals supported by intricately designed facilities and water technologies, as well as restorative routines that usually combine exercise and massage. Many however declined in the 20th century with the waning interest of the medical establishment in water cures. But today resurgent interest in communal bathing is supported by recent research into the therapeutic benefits of water and bathing in reducing stress and the risk of cardiovascular and neurodegenerative disease, developing better immune responses and improved sleep. With the shift in hospital design to balance clinical

care with wellbeing, spaces designed around communal water therapies could help define a new healing environment for patients and staff as well as visitors and the wider community.

Another area undergoing reinvention is **blue infrastructure**. Arguably by piping water invisibly into our lives modern technology has weakened water's cultural and social role, turning it into what Ivan Illich memorably describes in *H2O and the Waters of Forgetfulness* as an 'industrial cleaning fluid' that we take for granted. In the context of the climate emergency, it's clear that many of the ways we use and abuse water no longer make sense and reimagining blue infrastructure can make water an active protagonist in sustainable design: harvesting rain to feed gardens and grow food, supply water for bathing and pools which as well as offering a space for respite and for contemplation help cool the environment. Designers are also looking to ancient technologies for passive cooling using water to reduce our reliance on energy intensive air conditioning. Future hospitals might be inspired by the Islamic garden or Roman cities to foreground water infrastructure as part of a holistic approach to sustainable design and wellbeing.

Another example is rituals for **hydration and hygiene**. The resurgence of interest in drinking water fountains is supported by health advocates, environmentalists and city planners globally. At the same time the pandemic has initiated new behaviors for handwashing and we need to devise new typologies to support hygiene in the public realm. Surely there could be a reinvention of the fountain in a hospital foyer or garden offering water for drinking and hand washing, a rejuvenating health ritual for both hygiene and hydration. I recently set this as a brief for master students at ECAL, Switzerland's leading university of art and design, and keenly anticipate their first concepts at the end of the year.

Clearly, the benefits that water can offer and the roles it can play in healthcare are multidimensional and, as with food and plants, there is scope to bring this elemental resource into the heart of the 21st century hospital and health care environment in ways that benefit both people and the environment.

*Jane Withers is a leading design curator, consultant and writer. Her London-based studio works with public and private organisations to shape strategies that bring innovative design thinking to address social, cultural and commercial challenges. Jane has long been interested in water and the role design can play in shaping a more sustainable future. She has initiated a series of projects exploring the role of design in addressing the global water crisis including *1% Water and Our Future at Z33, Belgium* and the *Water Futures* research programme at A/D/O New York.*

## C. Expert Essays: Natasha Prime

The traditional model of a hospital environment continues to evolve. It was once a corridor of distinctly clinical and minimalist white walls but technological advances and our increasing knowledge of the connection between our environment and wellbeing continues to shape its role.

A hospital remains an integral part of society and a source that binds us together in fear, joy, relief and grief. Designing a space to deal with processing these significant stages in life can contribute to a positive patient outcome. Breaking bad news or providing end of life care to patients deserves time and empathy of the clinician. A bereavement suite that is placed right opposite the resuscitation room with critically ill patients will elicit feelings of pain and trauma for the patient's family as well as anxiety for the clinician waiting for the call that takes them away without closure.

The functionality of space in the emergency department is often prioritized over experience. Patient flow is given precedence at every stage with speed and efficiency in clinical outcomes leaving patient experience trailing behind. This unilateral approach excludes patients, families and friends that need that support throughout the journey. Comfort and space for sensitive encounters, food and drinks accessible within the department, relaxing music and art to distract. All these can contribute to a calming and healing environment. Walking into a hospital that doesn't provide any sign of being loved can illicit the same human response.

Designing a space where clinical staff can have a continual interaction with patients is key to providing a nurturing and reassuring environment. Lack of information, honesty and transparency can provide cracks in the confidence of clinical services. Using technology to stream live data on waiting times and triage keeps patients up to date on their journey and provides some control amid the chaos. Increasing clinical efficiency by tracking medical equipment and using patient wearable sensors will increase how much time clinicians can spend on direct patient care and allow clinicians to deliver effective patient-prioritised care.

We must also realise that the wellbeing of the patient community is intrinsically linked to the capability and efficiency of the healthcare staff. Lack of time, accessibility to ill-placed staff rooms and far away canteens means vital self-care for clinicians is lost.

By providing a space for clinicians to optimise their break and rest time in a quiet environment allows them to return rested and ready to deliver excellent patient care.

Often emergency departments are on the ground floor but the windows are small, the air stifling and the room artificially lighted. Sometimes there is no distinction between day and night. By incorporating biophilic design may be key to improving the overall wellbeing of the hospital community of patients, their families and staff alike. Overlooking green spaces, incorporating nature in art, sunlight and fresh air will help us all feel part of the same ecosystem and with common goals of aiding healing and wellbeing.

*Natasha Prime is an emergency charge nurse with over 10 years of hospital experience working in a central London hospital. She has volunteered in nursing across the world and worked in Malawi setting up the first public emergency department. She is living and nursing in Switzerland and completing an MSc in Public Health.*

# Appendix

## C. Expert Essays: Ugo Faraguna

Hospitals are not places known to be conducive to sleep. Yet sleep is a core function. A large body of evidence suggests sleep is necessary to boost proper immunological responses and healthy recovery, and that medical and surgical treatment only partly contribute to recovery. The mood of the patient, his/her motivation, and other modifiable environmental parameters are significant factors. Sleep is central to the homeostasis of both mood and motivation. Environmental parameters of the hospital should therefore be designed to promote this.

But hospital environments seem currently designed specifically to disrupt sleep. Several studies describe equipment, noisy personnel, unpleasant lighting, uncomfortable bedding, inadequate room temperature and the timing of procedures as the primary causes.

Some of these disruptions are easy to overcome. For instance, light exposure as well as unnecessary noise are environmental parameters we can control to achieve the conditions conducive to the physiological rhythm of recovery.

Hospital lights are hallmarks of sterile, cold environments. They are often kept on 24/7. Where continuous visual monitoring is required, this is justified in some medical environments. It is completely unnecessary in many others. Lights can be controlled to minimize sleep disruption and circadian misalignment. Melatonin - the hormone of sleep and darkness - is inhibited during the day by a specific blue light wavelength (460-500 nm). When light is necessary at night, blue light should be filtered out so as not to interfere with melatonin secretion.

Environmental noise can also be controlled. A well-conducted study carefully investigated the sources of noise disrupting patients' sleep. The most common were staff conversation (65%), roommates (54%), alarms (42%), intercoms (39%) and pagers (38%).

Alongside our awareness of sleep's importance in the recovery process, miniature, sustainable environmental sensors could provide invaluable information on how to improve the hospital on a daily basis – to make it a place of care conducive to sleep and health.

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*Ugo Faraguna is an Associate Professor of Human Physiology at the University of Pisa Medical School; he is also President and Cofounder of sleepActa srl a spinoff company operating in the field of sleep medicine. His main research interest focuses on the homeostatic regulation of the sleep-wake cycle and its impact on daily performance.*

## C. Expert Essays: 'On Placebo' by Ashish Ranpura, MD, PhD

Clinical spaces always imply an understanding of medicine. In the simplest sense, the proportions and the accessibility of the spaces require assumptions about how the bodies of the sick function, how mobile they are or whether gurneys or wheelchairs are required. The space always incorporates some intuition about the needs of the body. Our physical intuitions about this are usually sound.

But the design of the clinical space also depends on whether we think a medical encounter is a product (a patient comes into the hospital to get healthy like a consumer goes into a shop to get a toaster) or a process (the patient comes into the hospital for an experience that facilitates recovery). Our intuitions about this have been distorted by centuries espousing a mechanical view of the brain and body. We imagine that health care is something that can be provided, rather than something which is achieved.

It's easy to see why a product-driven approach to health care is dominant. In an era of evidence-based practice, there is a justified emphasis on measurement and quantification. Prescription medications can be counted, surgical procedures can be documented. Patient experiences are much more difficult to analyse – crude survey-based scores fail miserably – so structurally the patient experience has been sidelined in favour of quantifiable health care products.

However, the patient experience is the most reliable predictor of clinical outcomes. In nearly every clinical trial, the control arm – typically a placebo group – does far better than average patients. Why does the simple fact of enrolling in a clinical trial produce such positive outcomes? Because although the healthcare 'product' in a clinical trial is standardised to typical practice, the patient experience is far from typical. Clinical trials offer top quality patient experiences. This is why they have such good health outcomes.

Instead of creating hospitals that deliver services, we should create hospitals that facilitate a therapeutic encounter between healers and the sick. The therapeutic encounter is a cultural product composed of rituals and artefacts, and these are the aspects of clinical care that should inform the building's design.

Spaces which are designed around the therapeutic encounter should maximise the value of the rituals and artefacts surrounding the practice of medicine. Hospitals could be conceived

as cathedrals rather than spas, spaces where the design of the building directly communicates the philosophical outlook of the people who use that building.

If we believe that food and plants are at the centre of the design of this building, then those elements should also be central to the philosophy of healthcare practiced in the building. Diet, nutrition and plant growth should be part of the treatment regimens that the hospital employs during a patient's stay, and certainly at the time of hospital discharge the patient should be given a meal plan and a packet of seeds. This ties the design of the building to the way medicine is practiced in it.

If we believe that light and greenery and nature are core concepts in the design of the building, then we should also incorporate those elements into the function of the hospital. Artificial lighting systems should vary seasonally, so that summer days have bright interior lighting and winter days utilise dim interior lights and focused spot lighting. The colour of the lights and the interior spaces might vary in response to the seasons. Sunrise and sunset could be represented within the hospital routines for opening and closing curtains, meal times, etc. The rhythm of the natural world, and variations in that rhythm, should be reflected in the working practices of the hospital.

This functional connection to the design goals of the hospital – an active adoption of a design – will help patients to feel more connected to the outside world and to their internal body rhythms. Hospitalisation creates a tremendous risk for disorientation and depersonalisation, even in the young and healthy but especially in the elderly and the sick. Disorientation occurs when the environment is uniform and unchanging, and in many cases this leads to some level of delirium. In extreme cases this requires treatment with antipsychotic medications, but even in mild cases it prolongs hospital stays and leads to poor overall outcomes. Hospital-acquired delirium is easily reduced with improvements in the built environment.

So I'm really advocating for integrating the design of the clinical space with its functional philosophy. I think that kind of integration can dramatically improve both patient outcomes and staff experiences.

## Appendix

### C. Expert Essays: 'Reflections on Healthcare Space Design' by Dr Hammad Khan

Twenty years ago, I remember, as a newly qualified junior doctor, the first time I had to give bad news to the relative of a patient. I sat with them in a side room. When I faced a woman in her late 70s, who could have been my grandmother, I had been trained to ensure I had given my pager to someone else so I wouldn't be interrupted. I explained we had been concerned about some of her husband's symptoms and had performed some tests on fluid taken from his lungs. The results of those tests had come back and sadly they showed he had lung cancer. I remember the silence and the tears. At the end of the conversation, she thanked me and I sat a little stunned myself. She said 'You did that so nicely. It was like someone came up behind me and very gently hit me on the back of the head with a hammer.'

I have thought on those words many times since. I couldn't take away that hammer blow but the way I delivered it mattered.

I think often about how that conversation could have been better. I think of the grey walls of the room, the support she lacked from other family members, the absence of a box of tissues. Nothing in patients' and families' healthcare experiences happens in isolation. Every encounter, every conversation, every space is significant.

As a consultant neonatologist (doctor of newborn care), I have the privilege of caring for some of the most vulnerable and smallest patients in the hospital. Half of my job is caring for their parents. These parents find themselves in their worst nightmare. Their child is sick and they feel helpless. My job is to guide them through everything that happens to their child, be it a long journey or a short one, whether the outcome is joyous or heartbreaking. They experience a spectrum of emotions spanning from loss to grief, through anger and hopelessness. Thankfully I work with an amazing healthcare team that supports families throughout their stay.

The conversations we have with parents require enormous sensitivity, careful explanation, empathy and patience. They need support from the entire healthcare team to take through this emotional journey to a resolution that leaves them able to parent in a new and unknown world.

As they work their way through this journey, for the most part their children go on a journey of their own, a journey of growth through to wellness and independence from medical support. Our

aim as a team is that at the end of the journey, the babies are well and strong enough to go home and their parents are well and mentally equipped to care for them on their own.

Every family is unique and their journeys are unique and rarely smooth. There are often many ups and downs along the way. Occasionally, the outcome of this journey is not happy. Some of our patients don't make it home. The neonatal unit becomes the only home they will have ever known. Helping parents through that situation is one of the most difficult and heartbreaking parts of our job. It requires enormous empathy from the whole team: every word and every touch becomes significant. The space in which all of this happens also has a lasting impression on our families.

How do we do all this well? How do we ensure that the patient and family experience of healthcare is one that is sympathetic and conducive to growth and wellbeing?

For healthcare staff having a culture that reinforces our attitudes and an environment that supports this expanded sense of wellbeing is key. The story we tell ourselves about the work that we do needs to be positive and that culture and narrative needs to be reflected in the space in which we work.

The entrance to the ward should be welcoming and reassuring, the stories on the walls should speak to a journey of progress, wellbeing and hope. The space in which difficult words are spoken needs to give the same gentle support and empathy that we aim to provide through our words and actions.

The sounds, smells and sights in a room in which a family is looked after during the last hours of their child's life needs to be sympathetic to their situation. It needs to echo the conversations that staff are having with those parents. It needs to provide comfort and reassurance.

Decisions about the design of healthcare spaces are often made without a vision of the experience we want patients and families to have. If we can achieve that we can build hospitals, wards and clinics that promote health and wellbeing and that are above all synchronous with the kind of care we want to provide.

## C. Expert Essays: 'Lighting Hospitals' by Paul Nulty

So often we see functionality at the forefront of hospitality lighting design. Of course, this is important and a crucial factor in the way a hospital and its staff need to operate, but the emotion can get left behind. We have to remember why hospitals exist. We need hospitals to make people feel better, to keep patients safe and to envelop them in warmth and security while they go through something frightening. We all want hospitals to make people feel comfortable and sterile design and lighting does quite the opposite. Lighting in hospitals is key and plays an important part in cultivating a safe and collaborative environment for both staff and patients.

Through the use of layers of light, varying levels of illumination can provide both functional and aesthetically pleasing qualities of light.

The quality of light used in a hospital is really important. Different ages have different requirements for light and if you're over 60, on average, you will need three times the amount of light as you do if you're in your 20s. It's a big difference and one that lighting designers need to be aware of when implementing a lighting scheme in a hospital. For example, the location of a light source is important in reducing glare to which many elderly patients are sensitive.

Directional light is also really important. These days we talk about 'a melanopic lux', which is basically the amount of light delivered from a certain angle. You have rods and cones in your eye, which are the two receptors: one sees in colour and is for daylight, while the other sees in black and white. Anything below 1 lux and you tend to see in grey. So this means that with different levels of light you have different abilities to see and process that light. Research done a while ago found we have a third receptor in the eye, which reacts specifically to blue light and regulates hormone production in the body, such as of melatonin, serotonin and cortisol. If you have too little or too much of this then one can experience a seasonal affective disorder and the body won't function properly. This shows that in a space like a hospital, where doctors need to be able to operate, patients need to be able to feel rested and all the people in the space need to be taken care of, a balance of different layers of light can be very important.

Although there are many ways we can light a hospital, it's imperative to remember the role daylight plays in health. Not only can daylight and vitamin

D prevent illnesses such as scurvy and rickets, but natural daylight is also a great way of creating a calm and comfortable atmosphere. It provides a welcome break from artificial light, especially for patients who are spending a long stint on a ward. This is also important for the staff who work extensive hours in the hospital. They too need various types of light for the benefit of their eyes, productivity and mental health.

Hospitals are illuminated the way they are in order to be always prepared for emergencies. Whether you're in a hospital ward, emergency room, or even the hospital corridor; the overall layer of illumination needs to be practical so that the doctors and nurses can do their jobs effectively. But this doesn't mean there has to be just one layer of functional lighting. There could also be more personalised or localised light that changes colour temperature throughout the day to give a sense of time passing from day to night. You could also implement small gobo projectors in downlights to create dappled light on the floors of the hospital, to mimic moving trees or plants, or to recreate moonlight. If there are interesting objects in the hospital space, these could be illuminated properly to create focal points. It's great from a functional perspective to have uniform panels of light in the ceiling but these can be quite dull and mean that the eye doesn't have anything to look away from. Instead bouncing light off walls or allowing it to change and be dynamic in the space, encourages different emotional responses to each area of the hospital. This will achieve a warm, rather than a clinical and sterile, environment.

It seems strange to think about feeling at home in a hospital, but for staff and patients, creating an environment that feels as close to home as possible helps morale. Lighting could again play a huge part in making this conception of a hospital come to life. Bedside lamps could be placed next to each hospital bed to create a sense of being in a bedroom rather than a ward. Pendant lights, shades and localised lighting solutions above beds can make a space feel more domestic. When combined with more functional overhead lighting but, it would make the patient feel more comfortable in the space that they're in.

*Paul Nulty is founder of Nulty lighting. He is an award-winning architectural lighting designer and has been involved with many prestigious projects in a career spanning 21 years. His theatrical lighting background provides a unique understanding of the relationship between space and light. He is a professional member of the International Association of Lighting Designers (IALD), a professional member of the Society of Light and Lighting (MSLL) and a Professional member of the Institute of Lighting Professionals (ILP).*

# Appendix

## C. Expert Essays: 'The Merits of Virtual Reality in Healthcare' by Helen Starr

### Concept

To provide a trauma informed digital layer to aid and support hospital care. In the form of interactive new media experiences such as VR (Virtual Reality), AR (Augmented Reality) and online multiplayer experiences.

- Pain relief (eg during painful procedures)
- Distraction therapy (eg during chemotherapy sessions)
- Boredom relief for bed-bound patients

Virtual reality therapy (VRT), is also known as virtual reality immersion therapy (VRIT), simulation for therapy (SFT), virtual reality exposure therapy (VRET), and computerized CBT (CCBT).

Virtual reality technology is increasingly being used for psychological or occupational therapy and in affecting virtual rehabilitation. Patients receiving virtual reality therapy navigate through digitally created environments and complete specially designed tasks often tailored to treat a specific ailment. Virtual Reality is designed to isolate the user from their surrounding sensory inputs and give the illusion of immersion inside a computer-generated, interactive virtual environment. This technology has a demonstrated clinical benefit especially as an adjunctive analgesic during burn wound dressing and other painful medical procedures. (see Rebecca Allen) It is widely used as an alternative form of exposure therapy, in which patients interact with harmless virtual representations of traumatic stimuli in order to reduce fear responses. It has proven to be especially effective at treating PTSD, and shows considerable promise in treating a variety of neurological and physical conditions. Virtual reality therapy has also been used to help stroke patients regain muscle control, to treat other disorders such as body dysmorphia, and to improve social skills in those diagnosed with autism

### Mechanism

Virtual Reality is an excellent approach to pain management. It captures the mind's attention and blocks pain signals from reaching the brain. It's almost like a form of active hypnosis. VR provides tactile and sensory feedback and allows the patient to rally the neurotransmitter mechanisms that decrease pain. 'If you tell a nurse that you're a 7 or 8 on that pain scale, you'll most likely get fentanyl or morphine, but if you say you're a 3 or 4, you'll receive Tylenol,' Dr.

Robert Louis, neurosurgeon and Director at Neurosciences Institute at Hoag Hospital, Louis explains.

qBeing able to lower the pain in a non-invasive, risk-free way can be instrumental in avoiding potential opioid addiction.

In a VR study, published in 2017 by JMIR Mental Health, fifty patients received virtual reality therapy consisting of wearing VR goggles to watch calming video content such as helicopter rides over scenic portions of Iceland, or imagery of swimming in the ocean with whales. Those patients reported a 24 percent drop in pain scores after using the virtual reality goggles.

"Results indicate virtual reality may be an effective tool along with traditional pain management protocols," said Brennan Spiegel, MD, director of Cedars-Sinai Health Services Research. "This gives doctors and patients more options than medication alone."

While it remains unknown exactly how VR works to reduce pain, Spiegel attributes the benefit to what he calls "immersive distraction." In other words, when the mind is deeply engaged in an immersive experience, it becomes difficult, if not impossible, to perceive other stimuli, including pain.

"We believe virtual reality hijacks the senses, but in a good way," Spiegel said. "It creates an immersive distraction that stops the mind from processing pain, offering a drug-free supplement to traditional pain management." Participants in various settings who were immersed in VR experienced reduced levels of pain, general distress/unpleasantness, and reported a desire to use VR again during painful medical procedures.

### Engaging the support of National Portfolio Organisations

To provide the immersive distraction necessary to deeply engage the mind in an immersive experience will require top quality content makers – there is a specific artistry involved around immersion technique. A key concern will be making sure these experiences are accessible and affordable for all.

National Portfolio Organisations are leaders in the UK field of artistic production with a collective responsibility to protect and develop our national arts and cultural ecology. Two NPOs leading on the intersection of Art and Technology are FACT (Foundation for Art and Creative Technology) in Liverpool and QUAD,

Derby. FACT and QUAD are international centres for engagement in contemporary art and film, focusing on the creative use of emergent digital technologies such as Virtual Reality.

In the museum world ethics are seen as a set of guiding principles of good practice adopted by museum professionals in their various activities. Public investment brings public accountability for the Arts Organisations that Arts Council England invests in. The funding remit for ACE is to reach communities that currently have little cultural provision. Within this remit is the desire to ensure that every person can enjoy a relationship with art and culture. This is reflected in ACE's expectations.

In recent years there has been a growing concern in addressing ethical issues in museums as cultural workers have developed greater sensitivity and social responsiveness. Most codes of ethics urge museums to give appropriate consideration to represented groups or beliefs. In light of this, it has been recognised that exhibition of sensitive material, for example, must be done with great tact and respect for the feelings of religious, ethnic or other groups represented.

*Helen Starr is a Afro-Carib cultural activist, curator and producer. She founded The Mechatronic Library in 2010, to enable artists and museums to create artworks using new media technologies, such as Virtual Reality (VR), Augmented Reality (AR), Game Engines and 3D Printing. She has funded projects at the South London Gallery and the Digital Manufacturing Unit of the Bartlett School of Architecture (UCL) in London, and curated for FACT (Foundation of Art and Creative Technology), in Liverpool.*

## C. Expert Essays: 'Building and Designing our Cities for Health' by Publica (Full)

*We asked Publica to consult on specific locations for the hospital of the future, they have come up with 3 potential locations from across the country.*

There are many complex ways in which various aspects of city life interact to shape health and wellbeing. Hospitals play an essential part, not only in providing healthcare and managing illness within hospital walls but in their potential to promote health and transform the neighbourhoods they are anchored in into healthy communities.

### 1. The hospital as an anchor – social and economic vibrancy

The *community focused hospital* is rooted in place, and has the potential to become a backbone institution to better the health and long-term welfare of the community in which it is anchored in. Hospitals potentially have the resources to make a significant difference beyond hospital walls such as partnering with housing authorities to provide mental health services or with schools to help address asthma and improve school attendance.<sup>1</sup> Furthermore, if hospitals focused activities to benefit the local community, for example through localised purchasing, hiring, investment and incubating new community enterprises hospitals as anchor institutions could have a transformative effect on the lives of people, the health of the community and driving local economic growth.<sup>2</sup>

The *community focused hospital* could be strategically situated amidst other key facilities like places to socialise, libraries and clinics, establishing a set of services within the urban environment. Blurring the boundaries of where health is generated and delivered creates an opportunity to reach more people and influence their health and recovery far beyond hospital walls. The *community focused hospital* is no longer isolated from the community it serves, instead it encourages a mixed-use neighbourhood anchored by health services. In this way, the neighbourhood becomes part of the experience – rather than being confronted with an isolated institutional environment. The *community focused hospital* will become part of a thriving neighbourhood, opening its services and campus, where there is no divide between 'citizen' and 'patient'.

### 2. The hospital as a healthy neighbourhood – placemaking and the built environment

Planning and designing our cities for health does not only mean building hospitals. While hospitals are incredibly important, health is holistic – the whole person needs to be cared for, listening to physical, mental, and social needs. Our health is therefore not the sole responsibility of doctors and health care professionals. There are a wider set of forces and systems shaping the conditions of daily life that drive health outcomes.<sup>3</sup> For example, the design and layout of our built environment is a significant determinant of human health through its influence on socioeconomic and environmental factors. The *community focused hospital* is encouraged to look outside its walls to consider the social and environmental factors that affect health, which include air quality, noise pollution, green infrastructure, and safety. Good urban planning can not only mitigate the impact health hazards but can also become a tool for generating and promoting health.<sup>4</sup> The design and planning of the places we live, work and socialise is therefore an opportunity for the *community focused hospital* to join to reach beyond its walls and engage in placemaking and street transformation. The *community focused hospital* can create an attractive and welcoming urban environment by ensuring that adjacent streets and public spaces are accessible, safe and support a range of activities including playing, sitting and socialising.

Public space and public life are more important than ever now, as we continue to navigate what mark the Covid-19 pandemic will have on urban planning and our urban spaces. We know that throughout history public health issues have shaped cities and have led to both significant infrastructure and generous moments of civic design and innovation. For example, London's cholera pandemic (1846–60) led to a modern sewerage system and Victoria Embankment - an iconic public space in the city. The significance of community and sense of citizenship has been a lesson learnt from the Covid-19 pandemic. The pandemic has also created a new emphasis on local growth, resiliency and sustainability, which creates an opportunity for future hospitals to be more engaged institutions in the life of their communities.

### 3. Methods for engagement

Caring for and engaging with the community is an essential component of a lasting, sustainable health service. The *community focused hospital* will listen to its community, gain their trust, identify what the key health problems are and articulate a strategy to address them. This approach will help develop an increased sense of ownership over health and wellbeing in the community. By investing in and working with others locally, the *community focused hospital* can have a greater impact on the wider factors that make cities healthy.

An evidence-based methodology – studying urban neighbourhoods forensically to document their land use, character, social infrastructure and complex identities – is a crucial starting point for decision-making about urban change and growth. From these social, cultural and spatial investigations we can create visually accessible area portraits, which provide base-line intelligence about an area's assets, social networks and character. We can use this intelligence to understand key opportunities and challenges affecting an area, ask strategic questions, address social and economic needs and develop community engagement plans.

### 4. Study Sites / Mapping exercise

It is essential to understand the social infrastructure surrounding any area a *community focused hospital* could be anchored in. The *community focused hospital* will not operate in isolation, but will be designed in response to what is around it with a programme bespoke to the community it will support. We have mapped the social infrastructure across three sites in the UK – Queen's Park (London), Burnley (East Lancashire) and Finnieston (Glasgow) – to begin to understand the potential role of a future community focused hospital.

#### i. Queen's Park (London)

Queen's Park is one of Westminster's most demographically diverse areas. It is in the north-west of the borough, at the border with Brent and Kensington and Chelsea. Queen's Park is a largely residential area with less than 1000 people working within the ward with very little public space. The area faces a number of challenges, the greatest are associated with the loss of retail on the Harrow Road and Kilburn Lane but also on smaller residential streets.

## C. Expert Essays: 'Building and Designing our Cities for Health' by Publica (Full)

There is considerable street drinking and antisocial behaviour still evident in the area, especially on Harrow Road.

Queen's Park has a number of Victorian civic buildings that were built as part of the Avenues Estate such as the Library and St Jude's Community Hall. For the past 30 years, there has been a legacy of good social infrastructure provision in the area to address the disadvantages that many of the residential population face including sports centres, libraries, health centres, and schools.

There are a few community gardening and food growing projects including the Friends of Queen's Park Gardens and the Paddington Development Trust. The Queen's Park Community Council host several public events including the Summer Festival and Winter Fair. These events are well attended and valued occasions for local residents.

Potential engagement opportunities:

### *The hospital as an anchor*

- Support the local community through building relationships and partnering with existing and well-established social services and networks including community councils, health centres and schools to support shared approaches locally. These could include the Half Penny Health Centre, Queen's Park Children's Centre and the Dart Street Community Centre.

### *The hospital as a healthy neighbourhood*

- Create a temporary programme of engagement events and/or public classes in empty shop units on the high street (Harrow Road) to help residents tackle health issues in their day-to-day life. Consider hosting an event in Queen's Park Gardens with the Queen's Park Community Council, who host a number of public events including the Summer Festival and Winter Fair. These events are well attended and valued occasions for local residents.

### ii. Burnley (East Lancashire)

Burnley is a town in East Lancashire, England at the confluence of the River Calder and River Brun. During the Industrial Revolution, it became one of Lancashire's most prominent mill towns and one of the world's largest producers of cotton cloth and a major centre of engineering. Over the last few years, there have been many pledges to help to 'level up' Burnley; however, with little

attention being paid to public health, benefits, housing, and schools.

In October 2020, Burnley registered the highest rate of Covid-19 infections in England, something partly traced to its high levels of poverty and overcrowded housing. The area has therefore suffered disproportionately during the pandemic and its economy is predicted to be among the ten most heavily impacted in the UK.

During the pandemic, social infrastructure has been an important underpinning of community resilience. A network of community-based groups sprang up across the UK to provide support to many who felt isolated and vulnerable. An example of this in Burnley is Church on the Street in the town centre, which helps and supports people affected by homelessness and addiction. Predominantly the church has been working on food distribution, pastoral support, and collecting and distributing medication during the Covid-19 lockdown.

Partners across the public, private and voluntary sectors have also set up a community hub, Burnley Together, to co-ordinate help and support for residents across the borough during the pandemic. To date services include mental health support, dog walking, collecting prescriptions and meals on wheels amongst others.

Potential engagement opportunities:

### *The hospital as an anchor*

- Co-locate, coordinate, and integrate healthcare and wellness services with housing and other social services such as Church on the Street Ministries, Burnley Jobcentre and Lancashire Women.

### *The hospital as a healthy neighbourhood*

- Many of the residential streets in the area are quiet and calm. Some of the streets in residential estates are parking access-only, which could make a good environment for temporary street play schemes. The introduction of traffic controls would help improve air quality and reduce congestion, prioritising walking and cycling and making safer streets for residents.

### iii. Finnieston (Glasgow)

Finnieston is an area in Glasgow, Scotland, situated on the north bank of the River Clyde, between the city's West End and the city centre. The area borders the neighbourhoods of Anderston,

Kelvingrove, Kelvinhaugh, Overnewton and Sandyford. It was once a thriving area of heavy industry on the north bank of the River Clyde, but in the 21st century the wider area has become a popular tourist destination and leisure hub, mirroring Shoreditch in Greater London. The area has a diverse mix of residents, from long-standing residents to young students - five leading academic institutions are within commuting distance.

Following a recent increase in visitors to the area and number of local businesses, the local Community Council, Yorkhill & Kelvingrove, have put forward a vision for improved cycling and pedestrian infrastructure, which includes improved footways, crossing points, segregated cycle lanes, improved public realm with seating.

In 2020, a temporary emergency critical care hospital and vaccination centre was set up within an exhibition and conference centre to support Scotland's response to the Covid-19 pandemic. Valuable community groups in the area include the Mel – Milaap Centre, a community resource and safe environment for the promotion and furtherance of multiculturalism and The My Body Back Project, a volunteer-run organisation providing sexual and reproductive health services for people with sexual abuse history.

Potential engagement opportunities:

### *The hospital as an anchor*

- Working with the local community council, set up a governance structure such as advisory council made up of people who live or work in the area to integrate community feedback into planned or proposed initiatives.

### *The hospital as a healthy neighbourhood*

- Provide opportunities for further play spaces, tree planting or small allotment sites along the edges of existing housing developments and streets, or some of the pavements in the area to increase access to open, green space. Create partnerships with existing community gardening and food growing projects such as the Woodland Development Trust and Kelvingrove Square.