ESD Design Report

University of New South Wales

Health Translational Hub

State Significant Development

Revision 4, April 2021

atelier ten

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Prepared

Prepared by:	D, Mendez
Signed:	DM
Date:	03/ 02 / 2021

Checked

Checked by:	E. Moore
Signed:	EM
Date:	03/ 02 / 2021

Approved

Approved by:	L. Finn
Signed:	LF
Date:	01/ 04 / 2021

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Atelier Ten
Level 1 / 79 Myrtle Street
Chippendale NSW 2008
Australia
T +61 2 9262 4500
W atelierten.com

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Contents

1 Introduction

The University of New South Wales Health Translation Hub (HTH) Building will stand as an exemplar of sustainability achievement and collaboration within the University, across Australia, and for global higher education peers.

This report supports a State Significant Development Application (SSDA) for the proposed Health Translation Hub (HTH) at the Randwick Hospitals Campus (RHC) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (the Act). Health Infrastructure on behalf of Health Administration Corporation (HAC) is the applicant for the HTH SSD submission. The HTH will be delivered and operated by the University of New South Wales (UNSW).

The HTH project will bring together educational and medical researchers, clinicians, educators, industry partners and public health officials to drive excellence, and support the rapid translation of research, innovation, and education into improved patient care.

1.1 Description of Proposed Development

The SSDA seeks approval for:

- Relevant site preparation, excavation and enabling works.
- Construction and use of a new, 15-storey (RL 124.80) building and link bridge accommodating research and education uses, comprising:
  - One basement level; and
  - A total GFA of 35,600sqm, including health-related research, education and administrative floor space.
  - Pedestrian link bridges connecting the UNSW Kensington campus to the Randwick Hospitals Campus, via the Wallace Wurth building to the HTH and through to the Sydney Children's Hospital Stage 1 and Children's Comprehensive Cancer Centre (SCH Stage 1 and CCCC).
- Landscaping and public domain works, including the creation of over 2,500m^2 of new publicly accessible open space within the eastern portion of the site, sitting between the HTH and the SCH Stage 1 and CCCC redevelopment.
- Services and utilities augmentation as required.

1.2 Operation and Function of the HTH

The HTH will accommodate new health related education, research, and administrative facilities. It will include:

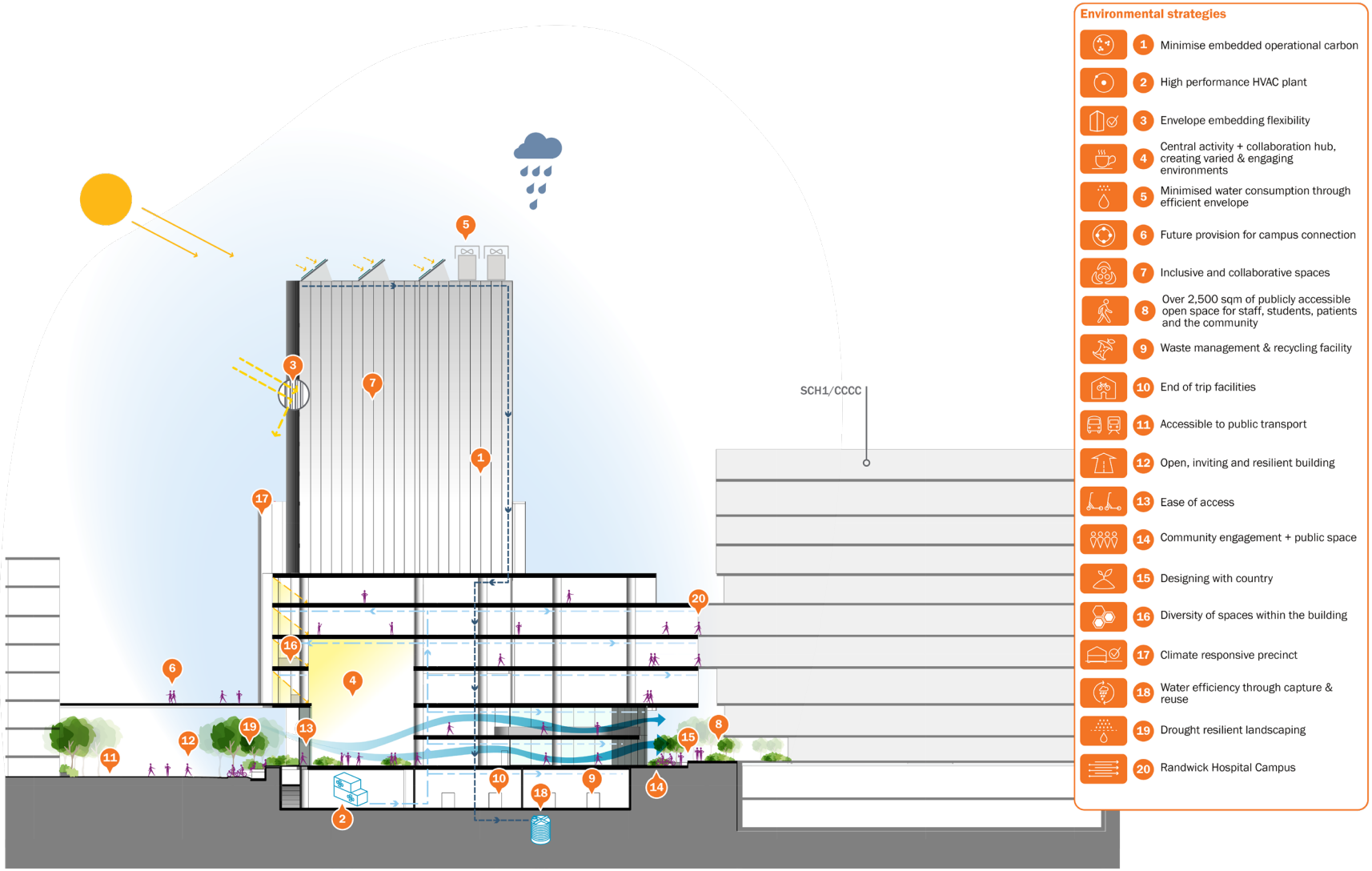
- Purpose-built spaces for health educators and researchers to work alongside clinicians;
- An education hub, including education and training rooms allowing hospital staff to educate and train UNSW medical students;
- Spaces for internal hospital seminars and clinician training events;
- Clinical schools for the Women's and Children's Health, Psychiatry and Prince of Wales Hospital;
- Ambulatory care clinics; and
- Supporting facilities including retail premises.

1.3 Site Description and Location

The site is located approximately 6 kilometres (km) from the Sydney Central Business District (CBD), within the Randwick Local Government Area (LGA). It is located approximately 4km from Sydney Airport. Figure 1 provides a regional context map of the site showing its location in relation to the Sydney CBD and surrounding centres.

This block sits in between the existing Prince of Wales Hospital and the Randwick Hospitals Campus, and directly adjacent to the CBD and South East Light Rail service which runs along High Street (Figure 2). The site of the proposed HTH has an area of 8,897square metres (sqm).

The HTH site has been cleared and is devoid of any development or vegetation. It has been subject to some site preparation and early works associated with the broader development of the block. Adjacent to the site, along the High Street and Botany Road frontages, runs a 6-metre (m) wide stormwater and sewage easement.



Environmental strategies

1. Minimise embedded operational carbon
2. High performance HVAC plant
3. Envelope embedding flexibility
4. Central activity + collaboration hub, creating varied & engaging environments
5. Minimised water consumption through efficient envelope
6. Future provision for campus connection
7. Inclusive and collaborative spaces
8. Over 2,500 sqm of publicly accessible open space for staff, students, patients and the community
9. Waste management & recycling facility
10. End of trip facilities
11. Accessible to public transport
12. Open, inviting and resilient building
13. Ease of access
14. Community engagement + public space
15. Designing with country
16. Diversity of spaces within the building
17. Climate responsive precinct
18. Water efficiency through capture & reuse
19. Drought resilient landscaping
20. Randwick Hospital Campus

2 Sustainability Brief

The University of New South Wales Health Translation Hub (HTH) Building will stand as an exemplar of sustainability achievement and collaboration within the University, across Australia, and for global higher education peers.

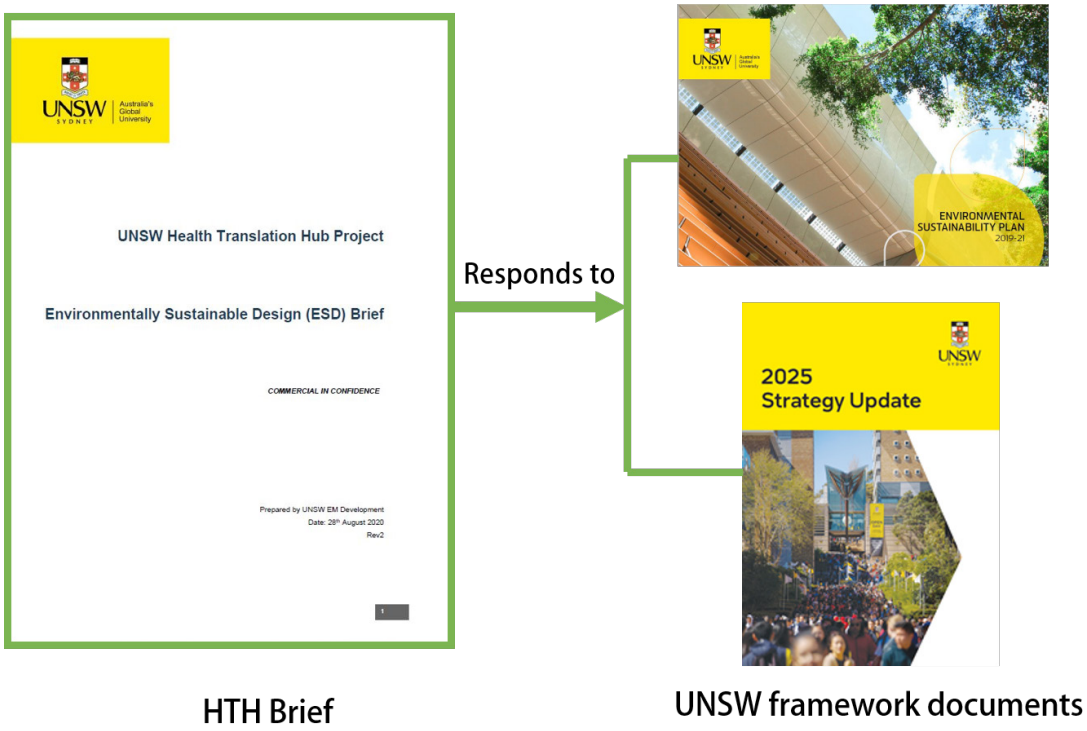


Figure 1.1 UNSW HTH ESD brief is a standalone document which is independent and responds to the University's framework documents

2.1 Sustainability at UNSW

This sustainability vision document for the new UNSW Health Translation Hub (HTH) building begins the process of developing the ambitious requirements set out in the brief into a series of tangible but achievable actions for the project team.

This vision aligns with the ESD objectives of the UNSW, as set out within their sustainability plans being:

- UNSW Environmental Sustainability Plan 2019-2021, and
- UNSW 2025 Strategy Update

Additionally, guiding the HTH development are the proposed project goals that the development will be:

- Collaborative
- Flexible
- Healthy, and
- Carbon efficient.

2.2 HTH: ESD targets

The project will include outstanding environmental and well-being outcomes through the application of the standards and tools best suited to the needs of the project equivalent to or beyond the above minimum standards

Below is the summary of the sustainability targets for the project, aligning with the UNSW Environmental Sustainability Plan 2019-2021;

- Climate Action
  - Transition to renewable energy and reduce net greenhouse gas emissions.
- Buildings and Campus
  - Embed leading environmental sustainability principles and practices throughout the planning and operation of buildings and campus.
- Energy and Water Efficiency
  - Continually improve energy efficiency and reduce potable water use
- Waste & Recycling
  - Close the loop,improving resource efficiency and responsible waste management.
- Travel and Transport
  - Ensure our community are supported to make active and sustainable transport choices
- Goods and services
  - Integrate sustainability principles and circular economy thinking into procurement practices
- Engagement & Interaction
  - Opportunities for engagement with building occupants and the local community
- Learning & Teaching
  - Foster collaboration
- Research & Advocacy
  - Likelihood of research at UNSW that can impact building design
- Beauty
  - Integrate cultural heritage, biophilia and art into the spaces
- Spirit
  - Design the built environment to reflect the indigenous culture

Additionally UNSW Strategy Update 2025 outlines a refined vision, strategic priorities, themes, objectives and measures to reflect progress as a university focusing on the following important priorities to address key challenges:

- Academic Excellence
  - Creating inspirational and invigorating spaces for the student experience to foster development and contributing to the society within a collaborative community.
- Innovation and Engagement
  - Ensuring innovation through social engagement and knowledge exchange between various streams of research and practice.
- Social Impact
  - To shape and progress a just society by mobilizing our community's expertise to lead debate, sustainably address global challenges and foster equity, diversity and inclusion

The HTH has set a range of high level sustainability targets which are being developed through the design development process.

These targets are explored though this document, with specific design responses identified and clarified in Section 7 Design Responses at the end of this report. .

3 Project Visioning

Through the collaborative efforts of all the teams involved the project vision and the interest areas of each of the sustainable goals for the new Health translation Hub were developed.

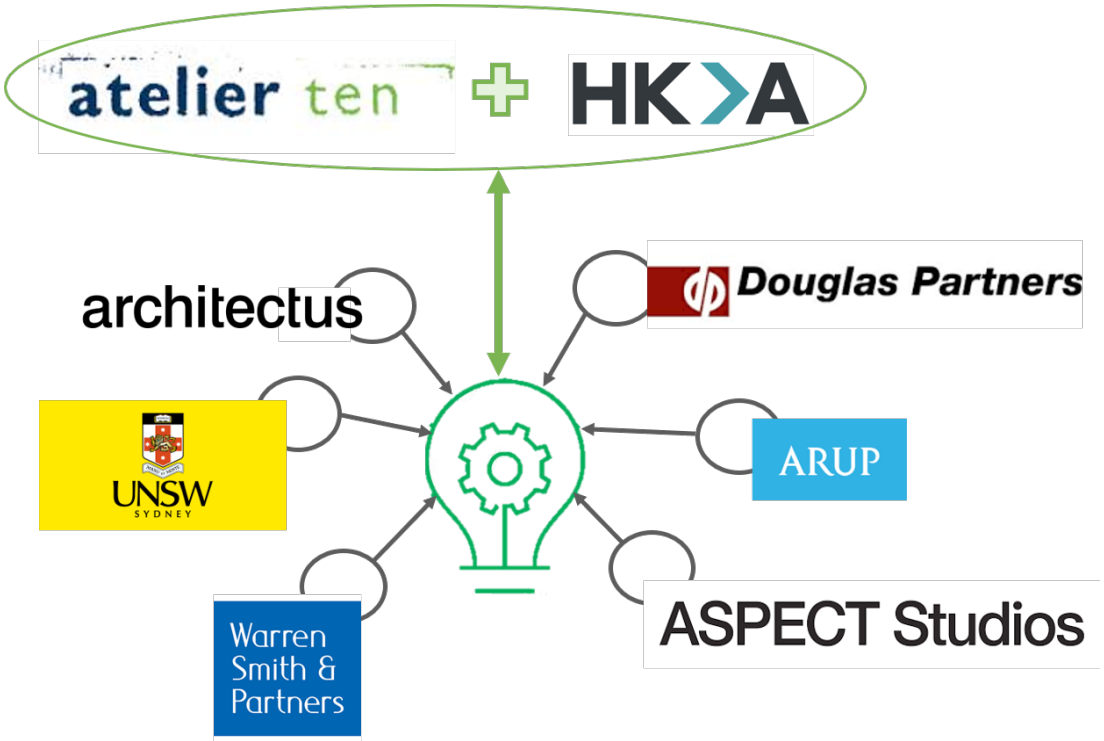


Figure 1.1 The ESD brief goals were set and refined through the collaborative efforts of the broader design team.

3.1 Central vision of the sustainability design

Atelier Ten and HKA conducted a workshop with the broader design team to gather the thoughts and ideas of the different individuals about the various design objectives and opportunities using the key headings of the UNSW Environmental Plan 2019-2021 as a framework for areas of interest.

Every discipline had a chance to brainstorm on all the areas of the framework, allowing each focus area to be informed from different viewpoints with initial target setting, reviewing and refining the target setting.

From this process, a framework has been created, identifying the central ethos of the sustainability story around which the design has focussed being'

- Collaborative
- Flexible
- Healthy, and
- Carbon conscious.

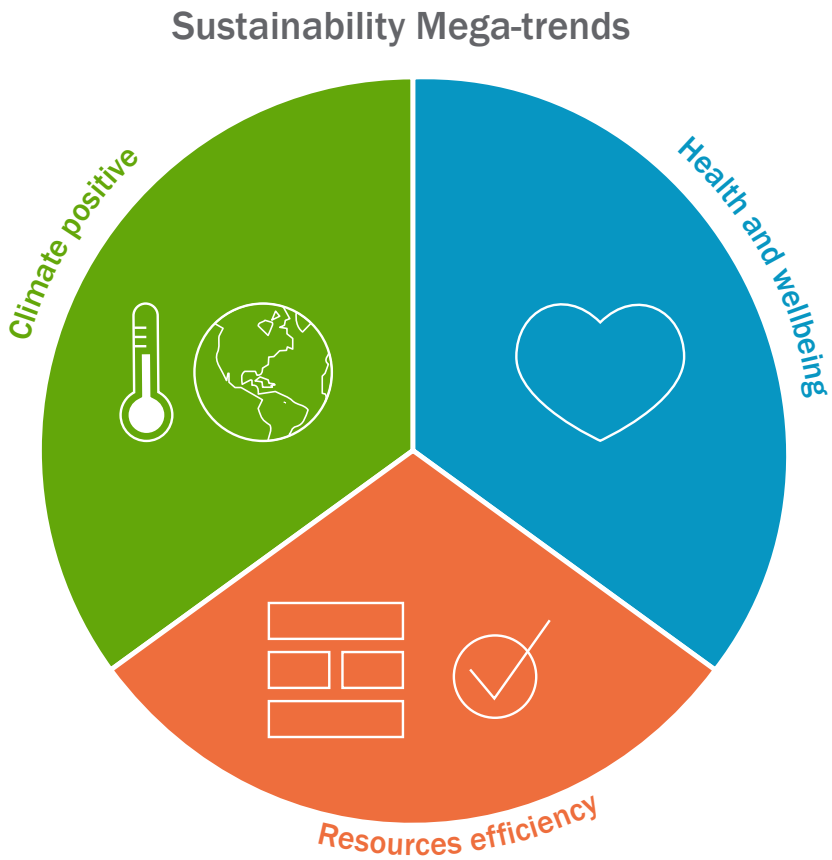


Figure 1.1 Current sustainability mega trends

3.2 Sustainably vision for UNSW HTH

Beyond the four central pillars of the environmental design, the team envisage a vibrant building precinct and working environment. In achieving these goals for the University the vision encompasses the design that:

- Showcases the University as a respectful and inclusive environment, acknowledging being custodians and reviving the ecology of the site, the biodiversity and water flows.
- Facilitates forward thinking enabling research by knowledge and innovation through collaboration contributing to a just society.
- Designed to respond to the changing conditions and need of the future, making the building resilient through the years.
- Provides a healthy engaging environment enabling a positive community response inspiring curiosity and discovery.
- Minimises it's global footprint by sequentially minimising demand, supplying efficiently, utilising site resources, and then finally offsetting where needed to achieve carbon positive operation.
- Uses the University's procurement and maintenance strategies to leverage products that help identify and target products that minimise environmental impact and foster product stewardship, following circular economy principals.

Finally, by the use of benchmarking tools such as Green Star, the University will be able to assess, communicate, and compare the effectiveness of their environmental commitments.

4 Core design drivers

The strategy of UNSW HTH revolves around four important sustainability pillars being Collaboration, Flexibility Health&Well-being, and Carbon Conscious. The project seeks to embed these main principles in all aspects of its design enabling to create a development exemplar.

4.1 Collaborative

- Creating a sense of openness - transparency to the lower level creating a connection to the outside
- Design of spaces that foster interaction
- Designing spaces according to the conditions they face will help it respond to the climate rather than constrained by it
- Natural ventilation of spaces encouraging places of congregation

4.2 Flexible (and Resilient)

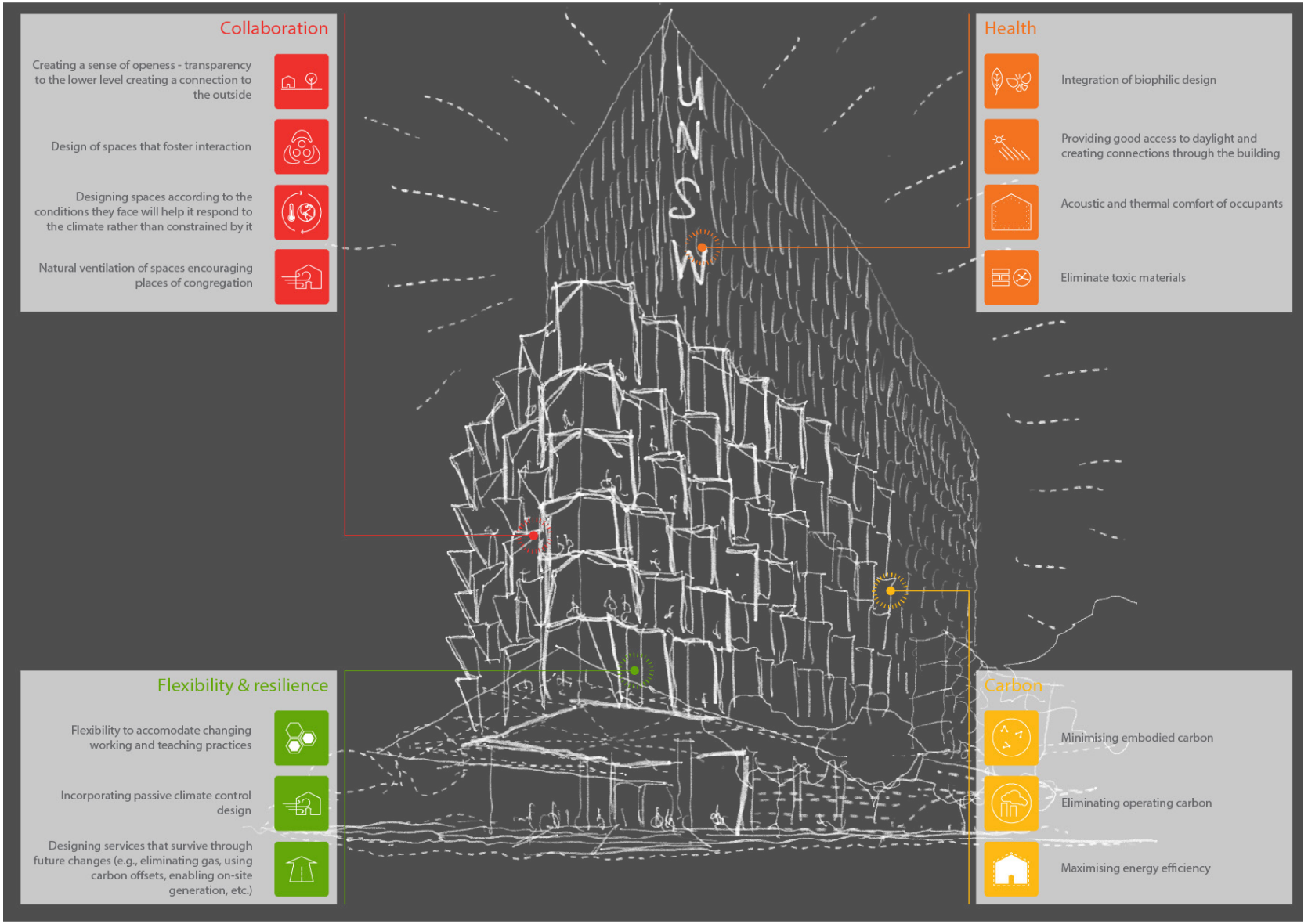
- Natural ventilation of spaces encouraging places of congregation
- Incorporating passive climate control design
- Resilience to short term shocks (extreme weather, utility failures), and long term stresses (climate change, reporting and regulatory changes).
- Flexibility to accommodate changing learning and working practices, changing program uses.
- Demonstrate ability to reconfigure and building services.
- Undertake project resilience assessment.
- Passive climate control through facade tuned for maintaining indoor thermal comfort.
- Building systems configured to accommodate extreme storm events (probable maximum flood, extreme wind) and consequent water flows and winds.
- Building services sized to accommodate future weather (increased peak temperatures, decreased night cooling).
- All critical building electrical and mechanical services are protected from flood waters.
- Landscape cooled naturally through substantial vegetation, especially trees with substantial canopy coverage

4.3 Healthy & Engaging environment

- Create a diverse range of healthy, pleasing working and learning environments
- Provide a biophilic environment, full of connections to nature
- Eliminate direct polluting product and materials, and eliminate those that generate toxic pollutants through the manufacturing or extraction process.
- Facilitate human-powered living through end-of-trip facilities, attractive and usefully located stairs
- Facilitate other elements of a healthy lifestyle
- Celebrate natural and cultural heritage and diversity
- Ensure building and landscape are connected to Country

4.4 Carbon conscious campus

- Building construction minimises embedded greenhouse gas emissions
- Building operation minimises greenhouse gas emissions
- Pursue climate positive operations through a strategic hierarchy of reducing carbon demand, supplying services efficiently, harvesting resources renewably on-site
- All energy flows are metered and reported to the BMS for real-time monitoring.
- Generate renewable energy on site through the provision of roof area suitable for solar PV integration.
- Target a substantial reduction in embedded carbon, relative to BAU, through careful design and procurement.
- Procure operating energy from renewable sources.


Collaboration
Creating a sense of openess - transparency to the lower level creating a connection to the outside
Design of spaces that foster interaction
Designing spaces according to the conditions they face will help it respond to the climate rather than constrained by it
Natural ventilation of spaces encouraging places of congregation
Health
Integration of biophilic design
Providing good access to daylight and creating connections through the building
Acoustic and thermal comfort of occupants
Eliminate toxic materials
UNSW
Flexibility & resilience
Flexibility to accomodate changing working and teaching practices
Incorporating passive climate control design
Designing services that survive through future changes (e.g., eliminating gas, using carbon offsets, enabling on-site generation, etc.)
Carbon
Minimising embodied carbon
Eliminating operating carbon
Maximising energy efficiency

5 Energy, Water & Waste

5.1 Operational Energy and Carbon Performance

The HTH is seeking an energy performance which is equivalent to a NABERS Energy rating of 5.5 Star.

The National Australian Built Environment Rating System (NABERS) is a performance based rating suit. The tools The actual environmental impact due to the space operations are assessed and a rating is awarded. The UNSW HTH development does not fall under the set space typologies for the official NABERS guidelines and as such cannot achieve an official rating.

UNSW defines it's own minimum energy performance requirements through their Design Guidelines - Section H which details a methodology for normalising the energy demand of academic building typologies, and benchmarking this against the NABERS rating for offices.

An energy simulation will be conducted with the best practice inputs, principles and available design information to arrive at a rating.

5.1.1 All electric design

A resilient building should be designed to accomodate an all electric system so gas can be transitioned out of the building.

The HTH will be designed with the provision to use all electric systems for heating and hot water and allowing for the transition to a Net Zero Carbon building as the electricity network in NSW transitions to carbon free energy generation.

In the mean time, the University of New South Wales has a Power Purchase Agreement (PPA) for 100% carbon free electricity. The HTH will be supplied by power falling under this PPA.

SECTION H – ENERGY EFFICIENCY – TABLE OF CONTENTS

UNSW DESIGN & CONSTRUCTION REQUIREMENTS – WEB ENTRY PAGE

Figure 1.1 UNSW Design Guidelines - Section H setting out methodologies for assessment of a NABERS equivalence for academic buildings

5.2 National Construction Code, Section J

The NCC updates the code every 3 years and the last update (NCC 2019) represented a significant uplift in minimum standards by around 30% reduction in energy with the majority of this uplift in performance being assigned to building envelope performance improvements.

The HTH envelope will surpass the 2019 NCC energy performance requirements by a margin of 4% when assessed using the same mechanical services.

The envelope of the HTH has been designed to balance the often competing requirements of energy demand, transparency & connectivity, thermal comfort daylight access, and visual comfort. Transparency and openness has been prioritised at the lower levels of the building while shading canopies have been integrated in upper and more exposed areas of the podium levels. An appropriate level of opacity has been used on the upper levels where visual connection into the building is less of a driver, and where the design seeks to minimise material use and embedded carbon.

5.3 Water

The HTH will achieve a significant reduction in Water consumption when measured against a comparable building.

The water savings within the building will be achieved through a range of measures including;

- Use of the UNSW bore water system
- Use of highly efficient fixtures and fittings

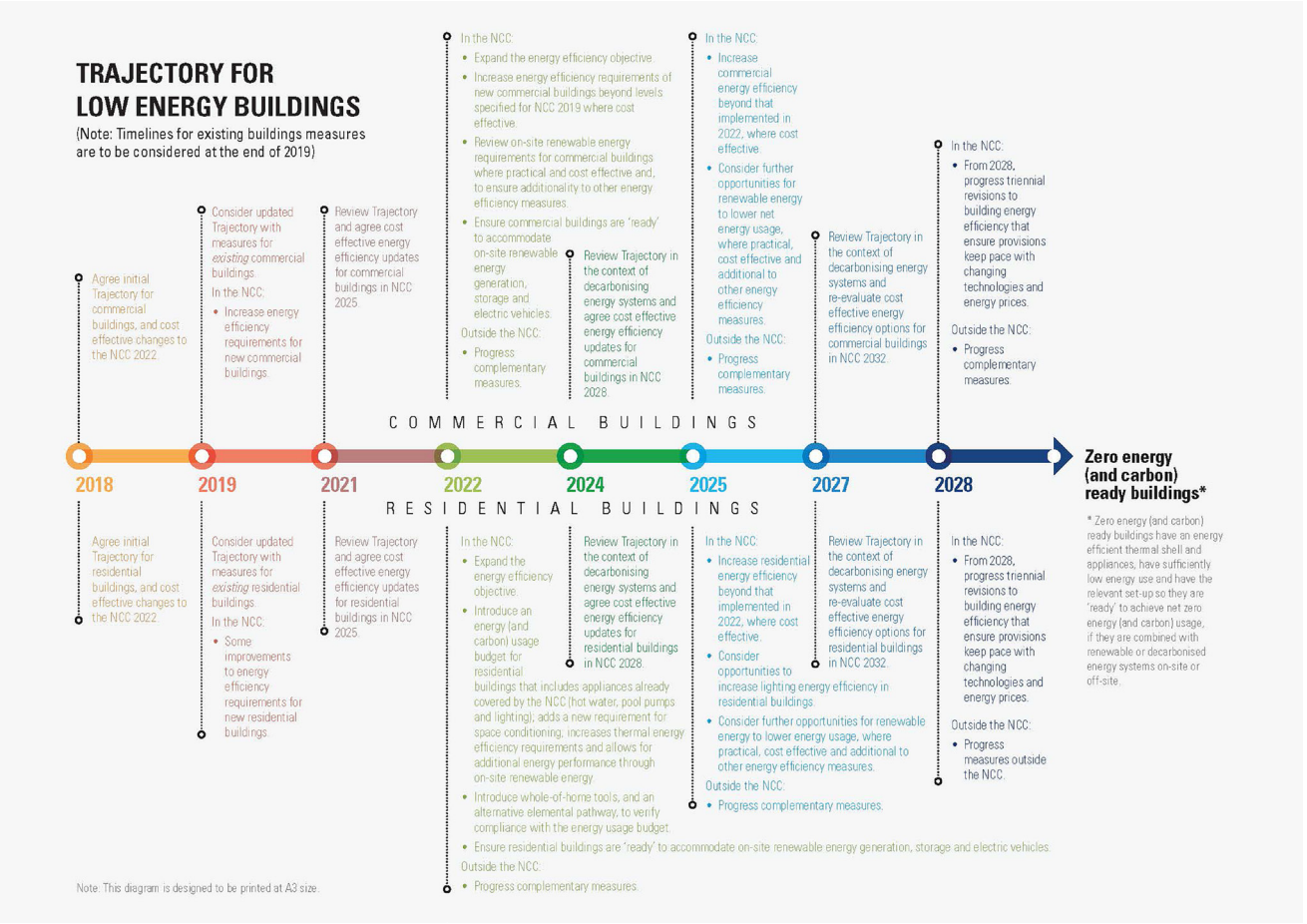


Figure 1.1 Trajectory for low energy buildings according to the report *Achieving Low Energy Commercial Buildings in Australia, November 2018* against UNSW HTH project time-line

- Water resilient landscaping and use of sub-soil irrigation with moisture meters to assess the need for irrigation.
- The integration of water capture and re-use systems including the integration of dual reticulation to toilets for flushing.
- A highly efficient building envelope, designed around passive design and reducing demand on the mechanical systems
- The use of high efficiency conditioning plant, reducing the parasitic losses due to equipment cooling.
- The use of adiabatic heat-rejection systems, providing substantial savings in annual water demand while preserving energy efficiency and embedding resilience to potential future water restrictions.

5.4 Waste

The design of the HTH has integrated an appropriate level of waste collection and separation facilities in the basement levels.

Beyond this, the design team and actively seeking out opportunities to minimise on-site waste through of-site manufacture. Further, the UNSW will embed the requirements of the following Green Star credits into their design and procurement processes:

- 2. Responsible Construction where alignment with achieving 1 point will be integrated into the construction process seeking to divert demolition and construction waste from landfill.
- 4. Operational Waste where appropriate waste collection and separation facilities will be provided.

6 Design targets, responses and tracking

The HTH has been designed to respond to a range of current and emerging environmental design issues which holistically consider this site and the HTH's impact. Where the environmental, social and financial sustainability of the project have been considered in equal measure.

To track environmental performance against established benchmarking systems, the HTH will pursue a Green Star Design & As Built 5 star equivalency.

The Schedule on the following pages responds to the projects sustainability brief and its commitment to perform in the areas of:

- Climate Action
- Buildings and Campus
- Energy and Water Efficiency
- Waste & Recycling
- Travel and Transport
- Goods and services
- Engagement & Interaction
- Learning & Teaching
- Research & Advocacy
- Beauty
- Spirit

Brief target	Design target interpretation	Design measures/inclusions
Resilience/ Climate Action	De-carbonisation of the grid	Provision for a fully electric design
		100 kWp PV system installed on site
		Passive climate control achieved through façade with the design to achieve an energy performance of NCC +4% through the building envelope alone
	Climate resilience	Filter plant space considered in case of future bushfire events
		Critical systems are protected from flood waters with all systems protected from the ARI 100
		Undergo a review of building systems against future weather
		Landscape cooled naturally through vegetation, especially trees with substantial canopy.
	Responds to current standards	Demonstrates alignment with Resilient Sydney- a strategy for City resilience 2018
		Assess outdoor comfort using UTCI for both current and future standards
		Urban heat island achieving alignment with Green Star Heat Resilience credit.
	Reacts to change of in the future	Responds to Green Star new buildings
		Large span floor plates with ample floor to floor heights allowing a range of fit-out configurations
		Service risers with 20% additional capacity
		Plant spatial provision for 20% spare capacity
		Electrical systems with 30% spare capacity

Brief target	Design target interpretation	Design measures/inclusions
Energy and Water efficiency	Alignment with Section H of UNSW design Guidelines	NCC Section J+15% building energy performance.
		NABERS 5.5 Star
		CO2 sensing
		Heat recovery for high load spaces
		Demand management through gen-set and load shedding (including consideration of relaxed temperature set points). Consideration of battery systems as part of energy management
		Well sealed and pressure tested façade systems
	Water efficiency	Utilise Water Sensitive Urban Design (WSUD) features
		High efficiency water fittings and fixtures
		Install rainwater capture tank to retain water for non-portable uses including toilet flushing
		Capture, filter and reuse water resources where possible
		Reduce water use in cooling tower through the use of adiabatic cooling towers
		Provide a water leak detection system and report to BMS

Brief target	Design target interpretation	Design measures/inclusions
Waste and Recycling	Minimise waste of materials	Avoid single-use products and materials
		Target a considerable % of construction waste diversion from landfill aligning with the Green Star Responsible Construction credit.
		Facilitate best practice waste management policies
	Adopt a circular economy approach	Design building materials and products that can be disassembled, recycled or up cycled
		Specify previously used products where appropriate
		Specify rapidly renewable natural materials
	Adhere to codes and standards	Achieve Green Star Operational Waste credit
		Achieve Green star Responsible Construction credit
		Achieve Green star sustainable sourcing credit
Travel and Transport	Active Transport facilities	Provide bicycle parking facilities in line with Green Star Movement and Place minimum requirements
	Design for openness and campus integration	Pedestrian connectivity in all directions to the campus and the hospital
		Creating a vibrant space easily accessible by the community
		Ensure campus is easily accessible by multiple modes of transport

Brief target	Design target interpretation	Design measures/inclusions
Goods and Services	Sustainable materials and procurement	Minimise packaging of materials and deliveries
		Ensure procurement from local community and suppliers where possible
		Use recycled materials for public domain spaces
		Non-combustible and non toxic materials in the built environment
Engagement and Interaction	Interaction between building occupants and the local community	Activate common areas and atrium spaces to be usable in a multi-tenant environment
		Design responds to aboriginal community
		Enable outreach to local learning hubs and inspire children
Learning and Teaching	Foster collaboration	Hard wiring infrastructure to enable events and curation
		Providing infrastructure enabling digital collaboration

Brief target	Design target interpretation	Design measures/inclusions
Research and Advocacy	Actively and continuously learn from the project to help subsequent developments achieve substantially higher sustainability outcomes	Partner with UNSW Built Environment faculty to conduct before and after surveys of HTH building occupants to assess improvements in working and learning environment at HTH relative to other facilities on campus.
		Install open BAS that allows interaction with external data tracking, display, and control systems.
		Implement Soft Landings type building start-up and performance tuning program through initial few years of building operations.
		Pursue whole-of-life studies for key building materials, products, and services to ascertain best value options for project.
		Track and report sustainability costs and value as per Green Star Design & As Built financial transparency innovation credit.
	Implement UNSW generated innovative materials, products, or services within building and landscape.	Partner with UNSW researchers to identify a limited number of building product and services in development on campus to be tested within HTH building and landscape (noting any failures must be safely contained).
	Enable continuous innovation by enabling areas within to act as Living Labs.	Partner with UNSW Built Environment faculty to conduct before, after, and 2 year after surveys of HTH building occupants to assess improvements in working and learning environment at HTH relative to other facilities on campus.
		Partner with University research office to identify any researchers that could engage with HTH design, delivery, or operation to support ongoing, viable research projects.
		Provide a limited number of additional sensor location points (screw-in support points, power and data access) in select building and landscape areas that will enable future in-situ research in and around HTH.
	Position building and landscape for future Green Star Performance or other operational rating systems.	Implement any design measures required to enable future participation on Green Star Performance or other similar operational benchmarking programs.

Brief target	Design target interpretation	Design measures/inclusions
Spirit & Beauty	Celebrate natural and cultural heritage and diversity	Use stakeholder engagement processes during design and construction to help build a healthier campus community.
		Ensure landscape and building are welcoming to visitors and campus community members from a diverse range of backgrounds and cultures.
		Celebrate indigenous culture and history through building and landscape elements.
		Celebrate UNSW culture and history through building and landscape elements.
		Integrate areas of productive indigenous landscape.
		Include Aboriginal and Torres Strait Islander people in the project design and delivery teams.
		Require skills training, internship, or apprenticeship programs of the construction team.