CONTEXT AS A DRIVER FOR SUSTAINABLE HEALTHCARE DESIGN

a case study of the sunshine coast university hospital

ronald hicks

hdr principal, head of health australia

EHCD conference

royal college of physicians, london, uk | 17-19 june 2019
CONTEXT AS A DRIVER FOR......

- socio-economic advances
- placemaking + expression
- clinical planning concepts
- sustainability initiatives
sunshine coast university hospital

- largest non-replacement public hospital built in Australia in 25 years
- first public health PPP project in Queensland
- clearly defined brief – unambiguous specification of MOC and functional brief
- highly competitive commercially focused PPP
- demanding + very specific expansion strategy 507 [2017] – 738 [2021] + beyond up to 900
- project co – Exemplar Health – Lend Lease; Capella Finance; Spotless; Siemens
- project delivered as SCA Architects (HDR + architectus)
sunshine coast awards received

- 2019 PCA Innovation & Excellence Awards – Award for Best Public Building
- 2018 WAF Shortlisted – Health (Completed Buildings)
- 2018 Healthcare Design Award of Merit (Phoenix Arizona USA)
- 2018 Aurecon Industry Awards – Winner: Queensland Engineering Excellence Award
- 2018 International Federation of Hospital Engineering (IFHE) – Healthcare Building of the Year
- 2017 AIA National Award – Public Architecture
- 2017 Architecture and Design Sustainability Awards: Sustainability Award – Public Architecture
- 2017 AIA Queensland Architecture Awards – Public Architecture – F D G Stanley Award
- 2017 AIA Queensland Architecture Awards – Urban Design – Karl Langer Award
- 2017 AIA Sunshine Coast Regional Award – Gabriel Poole Building of the Year
- 2017 AIA Sunshine Coast Regional Award – Regional Commendation

- 2017 AIA Sunshine Coast Regional Award – People’s Choice Award
- 2017 Awards for Excellence in Concrete QLD
- 2017 AVT Best Project Award – Hospitals
- 2017 Master Builders National Excellence in Building & Construction Awards – National Health Facility Award
- 2017 Master Builders Association Housing & Construction Awards QLD – Sunshine Coast Major Awards – Project of the Year
- 2017 Master Builders Association Housing & Construction Awards QLD – Sunshine Coast Construction Awards – Health Facilities over $20 million
- 2016 Construction Skills Queensland Excellence Awards
- 2013 Infrastructure Partnerships Australia – Financial Excellence Award
- 2012 Project Finance International – Asia–Pacific Healthcare Deal of the Year
QUEENSLAND
- Queensland Population – 4.90 million
- Density 2.64 people per sqkm
- Queensland area – 1,853,000 sqkm
- Australian annual health spend - AU$ 171 billion
- 70% federal and state governments
- Average AU$ 6,900 per capita

UNITED KINGDOM
- 66.04 million
- 272 people per sqkm
- 242,000 sqkm

All figures refer 2016 – 2017
Source Australian Institute of Health + Welfare
Queensland Hospital + Health Boards

- Queensland annual health spend AUS 35 billion
- Average AUS 7,150 per capita
- State ranking 3/7
- Divided into 16 Hospital + Health Boards

Sunshine Coast Hospital + Health Board (SCHHB)

- Population 407,000 (2018)
- Growth rate 22% (state average 23%)
- 21% over the age of 65
- 5 main hospitals
- Regional referral roles
the economics of the PPP

- Ongoing facilities management for 25 year period – key indicators determine fee abatements
- Operation of carparking and retail
- Project delivered on time and on budget
- Local employment target – 80% of all construction workers from within 50km radius
- Lend Lease initiative “The Work Shop” created 807 new construction jobs
- 1 in 7 workers on site hired through The Work Shop

The Work Shop’s economic impact through construction has been 1,822 additional jobs in the region, $115M in local wages and $184M in gross regional product.

NIEIR 2015
National Institute of Economic and Industry Research
CELEBRATING 807 JOBS!
33 occupations > 89 contractors

- 197 Young people (15-25yrs) 13%
- 665 LOCALS 82%
- 151 Previously unemployed 18%
- 42 Women 5%
- 180 Mature (45+yrs) 22%
- 59 Trainees and Apprentices 7%

Sunshine Coast economic impact of 807 construction jobs

- 1,822 Additional jobs in the region
- $115.3m Local wages and salaries
- $183.5m Gross regional product (GRP)

Source: National Institute of Economic and Industry Research (NIEIR) 2020
**location** – glass house mountains
location – noosa, sunshine coast
location – sunshine coast national park
This project is a demonstration of the value of patient centred hospitals, responding here both in form and content to its place in subtropical Queensland.

Michael Keniger
Architecture Australia October 2017
- royal college of physicians
- St. Paul's Cathedral
- Sunshine Coast University Hospital
site analysis

- bushland reserve
- SCUH SITE
- private hospital
- SCHI
- natural wetlands
- kawana way
- waterways
- proposed rail line

SUNSHINE COAST HEALTHCARE INSTITUTE
- Sunshine Coast Hospital + Health Service
- University of Sunshine Coast
- TAFE Queensland East Coast
- Griffith University
site analysis – pedestrian

kawana way

natural wetlands

bushland reserve

SCUH ENTRY

1

Stockland Birtinya Shopping Centre

2

Oceanside Health Hub

3

Medium Density Residential

proposed rail + bus interchange

mixed use kawana town centre

5 minute walk

5 minute walk

1

2

3
site analysis – vehicular

- SCUH ENTRY
- bushland reserve
- mixed use kawana town centre
- natural wetlands
- kawana way

1. Stockland Birtinya Shopping Centre
2. Oceanside Health Hub
3. Medium Density Residential
zonal analysis

- fmc
- parking
- mental health
- technical
- expansion zone
- east building
- the hub SCHL
- private hospital
- parking

The diagram illustrates various zones and buildings, including the fmc, parking areas, mental health facilities, technical zones, expansion zones, east buildings, and the hub SCHL, with designated parking spaces and private hospital sections.
zonal analysis

- fmc
- parking
- mental health
- technical
- expansion zone
- east building
- parking
- private hospital
- the hub
- SCHI

The diagram illustrates a zonal analysis of a hospital campus with various zones and buildings labeled.
zonal analysis

- fmc
- parking
- mental health
- technical
- expansion zone
- east building
- the hub
- SCHI
- private hospital
- parking
public space

A – outdoor room
B – the courtyard
hierarchy of entries

logistics tunnel

emergency link to carpark

ambulance

cancer services

identity
planning order

courtyards

expansion

hospital street

expansion
ipu strategy
SCUH service profile

- major tertiary referral hospital in SCHHB
- 165,000 sqm clinical space
- 11,000 sqm academic and research facility SCHI
- 4,000 sqm mental health
- 6,800 sqm facilities management centre
- 3,500 car spaces
- 100 place child care facility
- emergency medicine
- nuclear medicine
- integrated cancer centre
- medical imaging
- ambulatory care centre
- interventional hot floor
- ICU + CCU
- discrete staff centre
- women’s + children centre
sectional analysis

- optimized clinical chassis – reduced travel times – max travel time of 5 minutes across 165,000 sqm clinical footprint
- patient room design standardized + size increased – flexibility, functionality
- “super” interventional hot floor – 26,000 sqm – 24 OR’s; 6 interventional labs; 4 minor procedure; 40 ICU; 12 CCU
- informed building chassis – shared space with access to light and fresh air
- differentiated circulation pathways with reduced travel times
- optimal departmental functional relationships
clinical chassis – public
clinical chassis – staff / patients logistics
clinical chassis – combined
SCUH timeline

- PPP bid August 2011 – February 2012
- PPP Financial Close – July 2012
- Opened doors to patients – March 2017

"The scale speed and complexity of the project required the development of unique strategies to ensure the design team could plan and execute user consultation and design development with certainty."

Jo Campbell
General Manager Healthcare LendLease
Design features such as connectivity, natural light and biophilia are all elements that can reduce the turnover of medical professionals.

Gail Vittori
Co Director, Center for Maximum Potential Building Systems
- 6,400 sqm of user respite space (indoor and outdoor)
- 49,000 sqm of green space across entire development
PPP briefed sustainability goals

- deliver best practice in sustainable design principles, construction + operation
- renewable and energy efficient
- low emissions and minimal ecological impact
- minimize recurrent operating costs
- achieve 4 green star design + as built

Design to aid in the healing process and enhance the general wellbeing of visitors and users, increasing the buildings effectiveness. Long term operational efficiency and sustainability.

SCUH Design Brief
July 2011
SCUH is the largest healthcare building in Australia to achieve 6 star green star design + as built healthcare v1 ratings of GBCA (LEED Platinum equivalent), signifying ‘World Leadership’ in environmentally-sustainable building practices.
Organic response lighting
Largest commercial use of Organic Response (OR) lighting systems in Australia. Some 60,000 m² of lighting is controlled by 13,000 nodes.

Energy consumption
Significant reductions in 'business as usual' energy consumption (-25% energy, -40% peak usage, -20% embodied energy).

Rainwater harvesting
Rainwater harvested from approximately 80% of SCUH's 38,000 m² roof, with a storage tank capacity of 1.5 million litres. 90% of all water harvested is reused.

Air leakage
Air leakage rate measured at 3.2 m³ per hr · m² in the first large-scale air tightness test of a hospital facade in Australia.

Electric car parking
LED carpark lighting, 20 electric charge stations and 139 electric-ready parks.

Construction waste
Approximately 98% of construction waste was recycled, equating to a 'waste to landfill' ratio of 3 kg per square metre of gross floor area.
Indoor air quality
A 15% improvement over BCA requirements for daylight and thermal performance, together with high levels of fresh air.

Ventilation
Levels 50% higher than code with twin duct HVAC, CO2 monitoring, naturally ventilated carparks

Renewable hot water
The solar hot water heat exchange with gas boost system utilizes 440m² of photovoltaic collectors

Material selection
Low VOC and low emission formaldehyde products.
Reduced cement usage + 39% manufactured sand (non virgin materials).
Sustainable timbers, readily available + locally sourced + fabricated.
Sustainable furniture + fittings – third party certified (EPD, GECA + Green Tag)