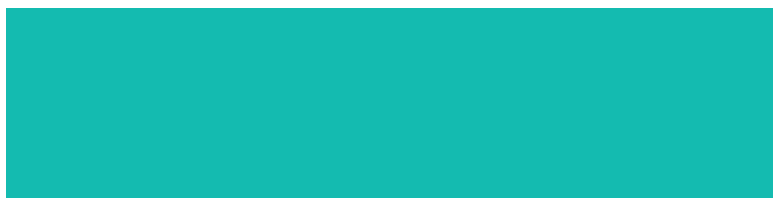
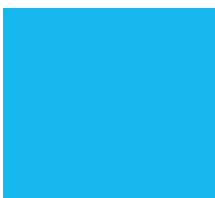
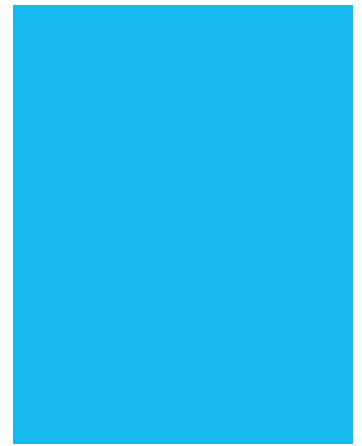


2013 Australian Construction Achievement Award

The new Royal Children's Hospital, Melbourne
Stage 2: Submission – Technical Paper



2013 ACAA Stage 2 Submission – Technical Paper

The new Royal Children’s Hospital, Melbourne



Client

State Government’s ‘Partnerships Victoria’

Duration

Commenced: December 2007

Completed: November 2011

Size

140,000m² (excluding the carpark)

Contract

Public Private Partnerships (PPP)

Consultants

Architects: Billard Leece and Bates Smart Joint Venture

Structural: Irwinconsult

Civil: Irwinconsult

Services: Norman Disney & Young

ESD Credentials

- 5 Star Green Star Health PILOT

Highlights

- 85% of all rooms are single rooms, providing patients and their families with privacy, without comprising staff visibility or patient safety.
- The new hospital is surrounded by parkland with 80% of all patient rooms having views of the park, courtyards and gardens
- The highest standards in sustainability for the design of a hospital facility building were targeted.
- Environmental initiatives to reduce energy and water usage on the project include: rainwater collection from 75% of new roof areas, a blackwater treatment plant, a 10% reduction in overall energy use (compared to a normal hospital), a 2.8MW gas-fired trigeneration plant, chilled beam air conditioning, a biomass boiler, solar panels and parking for 500 bikes.

Brief Summary

The new Royal Children’s Hospital project is the largest hospital redevelopment to be undertaken by the State of Victoria and one of the largest hospital projects underway in Australia. The new Royal Children’s Hospital has been purpose built for kids and the way they are cared for today and into the future.



Scope

The new Royal Children’s Hospital (RCH) in Melbourne is a 357 bed hospital with outstanding facilities, innovative models of care and leading edge research and education, providing the best health care and environment for patients, families and staff. The hospital has around 90 different departments and 4,500 rooms.

The new RCH project was the largest hospital redevelopment to be undertaken by the State of Victoria and one of the largest hospital projects undertaken in Australia. It has been purpose built for the children in the way they are cared for today and into the future.

The hospital was delivered under the State Government’s Partnerships Victoria policy. Lend Lease is a key member of the Children’s Health Partnership, responsible for financing, designing, building and then maintaining the building for 25 years. Lend Lease’s role also included the commissioning and transition of the hospital.

Stage one of the project involved the construction of a new 165,000m² hospital facility over seven levels, with 75,000m² of car parking space over three basement levels.

Construction works commenced in November 2007 and were successfully completed in December 2012.

The RCH is one of the world’s leading paediatric hospitals and it was imperative that the new hospital design and build reflected the very complex, ground breaking work the hospital performs.

With a peak construction workforce of over 2,100 the sheer scale and complexity presented coordination and logistical challenges. Constructed adjacent to the then existing hospital, and working within the existing operational facility, the project commenced excavation one month after contract close and the design process had only just commenced.

Lend Lease’s role also involved the selection, procurement, integration and commissioning of more than 60,000 items of medical and non medical equipment, from the interpretative MRI to the bed linen. We established our own biomedical testing area to specifically test 4,500 specialist medical items.

Commissioning and validating the 140,000m² of clinical space required a 12 month series of user inspections and

an independent review of over 5,000 commissioning tests over the fully integrated facility.

The moving of over 10,000 individual equipment items and more than 4,000 staff in the three week transition period required more than 18 months of detailed planning by Lend Lease and The Royal Children’s Hospital prior to completion, culminating in the successful patient move on the 30th November 2011.

Maintaining high standards of safety and quality throughout the project was paramount to the team. This was particularly challenging due to the many construction work faces being constructed at any one time, overlaid with an extensive workforce. Detailed management systems were in place and supported and monitored by the project team throughout the project.

With three hospital campus partners, 70 user groups and around 90 departments to be relocated to the new hospital, building and fostering relationships with these project stakeholders was integral to achieve the successful completion of this iconic project.

Indicative of the hospital’s significance on an international scale, it was officially opened by Her Majesty the Queen.





Design Challenges & Innovation

With significant innovation requirements described in the Brief the RCH team’s response was to seek maximum conformance to the principles outlined with clear and direct solutions to the problems raised. The team sought to enhance the Brief with additional spaces in specific areas of the hospital, in the main those that reinforce the aims of the family-centred care models. As part of the In Patient Units, where families are likely to dwell longer than any other area of the hospital, additional breakout, relaxation, education, chill-out spaces were proposed in order to give families the maximum opportunity for participation in the care of their child, while attempting to maintain some level of normality for the remainder of the family.

The procedural area of the perioperative unit is clustered into pods of fast stream, general and slow stream theatres to suit the staffing and operational structure implied in the Brief. To support this

model it was important to minimise the crossover of anxious children and families with trolleys/instruments/equipment. The dual corridor/sterile core plan proposed to each pod is not common in Australia (common in the USE), and overlaid with the desire for maximum natural light within the facility, not only added meterage to this department, but best reflected the model of care principals of a clan environment for the families. From Lend Lease’s experience building hospitals of similar size in the UK, we learnt that prefabrication of various services systems and assemblies can expedite the installation of elements that can often be time consuming and an Occupational Health & Safety risk. Wherever structurally possible we prefabricated a number of structural elements on the project including vertical concrete shafts, columns, beam and slab elements. Lend Lease looked for innovative construction techniques that reduced on site labour and increased production and quality.

Lend Lease utilised prefabricated wall systems with services pre-roughed in to expedite the finishes cycles on the floors. Prefabrication was extensively used for the services installations. This included skid mounted plant and horizontal distribution throughout the main corridors. Given the large scale of the project, there was also opportunities to develop innovative façade systems that were pre-assembled off site with complete flashings, trims and connections to them. Where possible, façade cassette units/panels were used with sunshades, etc already attached to them.

Innovation in materials handling, use of purpose built cranes and hoists and the like were also an area that Lend Lease developed systems for. This was particularly necessary for coordination and construction of the plant rooms and the fact there were multiple layers of services within these rooms.

The ESD solution adopted made a major positive impact on water conservation; minimisation of energy use; significant reduction in greenhouse gas emissions; and the provision of improved indoor air quality. The biomass boiler (unprecedented in Australia) and IPU solar domestic hot water preheating together made a significant contribution to the required use of renewable energy sources. The heat-led cogeneration plant with dual fuel capability provided base load power to the hospital and reduced RCH’s dependence on grid-sourced electricity.

The Atrium/Street area has been provided with natural ventilation openings, operating in conjunction with a below ground concrete intake duct. The below ground concrete duct acts as a thermal labyrinth utilising the relatively stable ground temperature, as a thermal store, and provides cooling and heating to the incoming outside air. When ambient conditions do not permit natural ventilation to achieve comfortable internal conditions (i.e. when external temperatures are excessively hot or cold), AHU’s draw outside air through the ‘labyrinth’ incurring as much pre-cooling/heating of air as possible, with further cooling/heating provided by Chilled Water or Heating Hot Water coils. The installation of a large capacity worm farm supports key sustainability objectives including maximising recycling, water conservation, and waste and pollution prevention. The worm farm waste system is designed to process wastewater and organic garbage in a single non-mechanical chamber using worm technology. All organic non-recyclable waste matter, whether solid or liquid form, can be disposed of directly into the worm farm.

2100 At its peak, the project workforce reached in excess of 2100 people

Construction Challenges & Innovation

At its peak, the project workforce reached in excess of 2,100 people, which presented some coordination challenges. The sheer scale of the excavation (450,000m³) presented logistical challenges, relating in particular to materials handling and the movement of vehicles around the site. The services and equipment installation and the commissioning and transition of the existing hospital to its new location are technically complex and will require careful coordination and planning.

Leadership in Sustainability

Environmental initiatives to reduce energy and water usage on the project include: rainwater collection from 75% of new roof areas, a blackwater treatment plant, a 10% reduction in overall energy use (compared to a normal hospital), a 2.4 megawatt gas-fired trigeneration plant, chilled-beam air conditioning, a biomass boiler, solar panels and parking for 500 bikes.

Leadership in Safety

Lend Lease has been honoured with the Excellence in Health and Safety award at the Master Builders Association of Victoria (MBAV) 2010 National Excellence in Building and Construction Awards for its work on the new Royal Children’s Hospital (RCH). The 17th Annual MBAV 2010 National Excellence in Building and Construction Awards were held recently at the Grand Hyatt Melbourne, to recognise Victoria’s top performers in the commercial and industrial construction sector.

The Lend Lease team at the new RCH was recognised for its commitment to safety across all aspects of this major, technically complex project. At the commencement of the project, the team’s pre-construction focus was managing the logistics of the immense site and carefully planning for all safety implications of movements around the site. This resulted in a range of innovative traffic management and site management initiatives that have contributed to the strong safety record of the project.

Geoff Moore, recent General Manager for Lend Lease VIC/SA/TAS said: “We are very proud of the entire team at the new Royal Children’s Hospital. Its commitment to safety and innovative approach to identifying and addressing risks have been deservedly recognised by this prestigious award.”

The focus on safety was further exemplified by Lend Lease’s innovative approach to ensuring the safety of workers using scaffolds. Project team members developed a base design of a Scaffold Fall Protection Screen (SFPS) which has now gone on to be adopted on other Lend Lease projects around the country. In addition, the RCH team developed a base model for portable truck deck protection rails to protect workers when unloading trucks.

The new RCH is being delivered by the State Government of Victoria as a Public Private Partnership (PPP). The Children’s Health Partnership is the consortium responsible for financing, designing, constructing and maintaining the new hospital. The consortium consists of International Public Partnerships as equity holders and Spotless Group as facilities manager, with Lend Lease responsible for project management, design and construction.



Awards

- 2012 Australian Property Institute (API) Awards – Property Development of the Year
- 2012 Australian Property Institute (API) Awards – Environment Development of the Year
- 2012 Australian Institute of Architects Victorian Architecture Awards – Victorian Architecture Medal
- 2012 Australian Institute of Architects Victorian Architecture Awards – William Wardell Award Public Architecture
- 2012 Australian Institute of Architects Victorian Architecture Awards – Melbourne Prize
- 2012 Australian Institute of Architects Victorian Architecture Awards – Commendation for Interior Architecture
- 2012 Design & Health International Academy Awards – International Health Project (over 40,000m²)
- 2012 Design & Health International Academy Awards – Interior Design
- 2012 Design & Health International Academy Awards – Sustainable Design
- 2012 Design & Health International Academy Awards – Commendation for Use of Art in the Patient Environment
- 2012 Australian Interior Design Awards – Premier Award for Interior Design Excellence and Innovation
- 2012 Australian Interior Design Awards – Public Design Award
- 2012 Infrastructure Partnerships Australia (IPA) National Infrastructure Awards – Project of the Year
- 2012 Dulux Colour Award – Commercial
- 2012 Dulux Colour Award – Grand Prix
- 2011 Victorian Landscape Awards Commercial Landscape of the Year over \$500k
- 2010 Master Builders Association of Victoria (MBAV) Excellence in Health and Safety

“The project was delivered on time and within budget and the end result has exceeded our expectations. The feedback from staff, patients and their families has been overwhelmingly positive, and I have no hesitation in acknowledging the enormous contribution made by Lend Lease in ensuring the success of this project” - Tony Lubofsky, Project Director, The new Royal Children’s Hospital Project, Department of Health, State Government of Victoria

