

THE NEW ROYAL ADELAIDE HOSPITAL

The new Royal Adelaide Hospital will be Australia's most advanced hospital & the single largest infrastructure project in the history of South Australia.

In undertaking the new Royal Adelaide Hospital, which is the largest infrastructure project Adelaide has ever seen, the Hansen Yuncken Leighton Contractors Joint Venture (HYLCJV) has developed innovative Building Information Technology (BIM) applications. These could potentially change the way major projects are managed in the future, just as the new RAH will change the face of healthcare in South Australia.

The scale of the project is nothing short of colossal. The site itself is 10 hectares in size, and the 10-storey new RAH building footprint occupies 175,000m² of the site, with an additional 76,000m² of car parking space and extensive landscaping and public open space.

The new RAH will provide 800 single bedrooms including 100 same day beds, 40 operating theatres, some with inbuilt MRI facilities and an emergency department capable of treating 25% more patients every year than the existing RAH. In the basement there will be a fleet of automated vehicles to help move equipment and supplies around the hospital which are linked into the new RAH's state-of-the-art ICT system to enable tracking of equipment via digital technology.

This will also be one of the greenest hospitals in Australia, with extensive use of natural light and ventilation, including windows that open in patient bedrooms. Integrated green spaces throughout will improve staff, patient and visitor wellbeing. These spaces will also allow for future expansion if required. Modelling of the new RAH hydraulic and electrical systems predicts the new RAH will be extremely water and energy efficient, and achieve a 40% reduction in CO₂ emissions.

HYLC commenced construction of the \$1.85 billion PPP Project in June 2011 and has a five year program mapped out to complete construction, commissioning and fit-out. To manage the projects' extraordinary level of complexity throughout such a lengthy construction program and ensure thorough information sharing between all stakeholders. HYLC, the client, consultants and subcontractors has seen the adoption of building Information modelling (BIM).

Collaboration was key in establishing a common approach to the delivery of BIM of which all stakeholders has adopted the implementation of the Project BIM Execution Plan (BEP), which provides a cohesive approach to the required systems, the required standards, methods and protocols to help deliver the project.

The traditional boundaries of collaboration have been challenged throughout the project's design process. HYLC in coordination with the lead architects and design teams have facilitated more than 450 client user groups meetings during a 14 month period and a biweekly exchange of more than 220 3D Revit based models during the design stage including issuing Navisworks models for each of the 240 State Discrete Packages.

The collaboration of design data for all forms of design analysis included seismic, solar studies, wind, cooling loads, cfd, lighting, energy and used the base object data to help manage both functional area sizes and numbers of FFE items against the State's functional brief.

Integrated within BIM, HYLC has utilised 4D construction sequencing, by importing base Revit model data to provide detail workflows and the planning and monitoring of the final design and construction deliverables. This data has also been utilised by the cost team for checking 5D base quantities and in parallel with the traditional costing exercise to evaluate the future business potentials.

To ensure added value, HYLC has now integrated specialist contractors into the process to help develop the required seismic solution, remove duplication and improve the overall build ability by the incorporation of offsite manufacturing opportunities into the final design process.

As of January 2014, the HYLC Federated BIM model has issued 1200 3D models and generated 14,518 2D drawings.

Onsite, field BIM is driving innovation via mobile tablets using 3G cards providing access to all the appropriate 2D installation drawings via a link within the 3D model from



each functional area. Each sub contractor has access to live real time data allowing data to be input, reviewed and analysed in the field. The HYLC team estimate this advance and the other BIM-related innovations will reduce the need for rectifications, with up to 12% saving on waste caused by clashes, defects and unforeseen design issues.

According to Dr. Dominik Holzer, Chair of the National BIM Steering Group of the Australian Institute of Architects and Consult Australia, the new RAH Project is the first in Australia to implement Field BIM in Conjunction with Motion Tablets.

HYLC also developed an in-house project-dedicated single point of truth new RAH information centre (SPOTNIC) system, to streamline the management, development and operation of design and construction data across the team of 51 subcontractors and consultants.

It is the only software application available that incorporates a QC Management system, 3D BIM Model, a document management

JOINT VENTURE: Hansen Yuncken & Leighton Contractors
PROJECT END VALUE : \$1.8 billion
COMPLETION : Mid 2016



system and an intelligent reporting system in one place. It is an integrated and collaborative project delivery tool, embedded as part of the project's BIM management process.

Developed in house, SPOTNIC is an industry first management system that brings a cutting edge step change to the Australian construction industry. Integration of the SPOTNIC into systems and processes provides access for subcontractors to consistently capture, manage, maintain and report all completion data in a highly efficient way. Further, it will ensure QC records are accessed from a central location with capacity for retrieval from a 3D model. A glimpse into SPOTNIC's data files gives an indication of the sheer enormity of the management task – with the system storing more than 18,280 documents, 254,798 FFE objects, 675 models and more than 400,000 3D architectural objects alone.

The result of all that data is a hospital which is taking shape and changing the skyline of Adelaide's West End. The footings are complete, and ground floor slabs are largely completed.

Suspended formwork for higher levels is progressing and now are over 50% complete.

The lower south side of the structure and some of the lift cores topped out near the end of 2013 and services installations, fit out and facade are now progressing. The newRAH cogeneration plant has also been installed. The plant comprises two units which between them will generate heat for all of the newRAH hot water supply and also meet an expected 35% of peak load electricity demand.

The workforce is expected to peak with approximately 1,800 workers on site at any one time.

One of the goals of the new RAH project is to build in efficiencies where the old hospital site was lacking – a goal that involved assessing the shortcomings of the former hospital and finding ways to bridge those gaps.

"We tried to step forward in time as to what our world class facility would be in years ahead," says HYLIC Development Director, Chris Pratt.

"In every facet of the facility, one test has been: what are the world's best practices now and what will be the world's best practices in the future? The other test has been: what will allow the facility to still operate under world's best practice standards in the future, when we don't know what those standards will be?"

The innovative BIM approaches and sheer depth of consultation and stakeholder engagement the HYLIC team and the designers, engineers and specialist consultants have been through is certainly the most effective way to ensure in the years ahead, their work now will still represent a leading-edge design and construction achievement.



For more information contact HYLIC Joint Venture, Level 3, 18 North Terrace, Adelaide, 5000, phone 08 8290 6400, email community@hylcjv.com.au, website www.sahp.com.au



AN OUTSTANDING PARTNERSHIP

Set to open in mid 2016 and described as the State's flagship public hospital, the new Royal Adelaide Hospital will harness the latest in architectural design to provide a world class health care facility. It is only fitting that the design for the new Royal Adelaide Hospital is being undertaken by joint venture partners Silver Thomas Hanley and DesignInc, (STHDI).

Silver Thomas Hanley Health Architecture managing director Ernest Girardi said the joint venture was created specifically for the design and delivery of major health projects across Australia.

"It commenced with the \$260M Orange Hospital in New South Wales which was completed in 2010. STHDI are also completing the Victorian Comprehensive Cancer Centre in Melbourne (\$1B), in association with MCR," he said.

"The partnership brings together outstanding creative and technical knowledge through dedicated health facility design teams with extensive local and international design experience.

"STHDI work closely with health care users, management, patients and stakeholders to create facilities that contribute to wellness and healing in world class facilities."

Silver Thomas Hanley, is the pre-eminent health care architectural practice in Australia, employing over 130 people in offices across Australia and has over \$5 billion of health projects in progress internationally.

The hallmark of these projects is humanist environments support by efficient and rational planning solutions.

STH are also currently leading the industry in the application of BIM technology specifically tuned to the delivery of major health care projects.

DesignInc is an international architecture and design practice with a focus on creating quality environments that reconcile natural, social and economic imperatives.

Diversity of talent enables their involvement in a wide range of projects with successful long-term client relationships.

Across Australia and the Asia-Pacific region the practice employs over 200 architects, interior designers, urban designers, and supporting professionals.

An integral part of the DesignInc approach is environmental sustainability, as well as an innovative and client focused process, resulting in over 70 major awards for design and construction excellence.

For more information contact Silver Thomas Hanley, 3 Glenarm Road, Glen Iris VIC 3146, phone 03 9885 2333, email ernestgirardi@sth.com.au, website www.sth.com.au

For more information contact DesignInc, Level 1, 151 Pirie Street, Adelaide 5000, phone 08 8223 2888, fax 08 8227 2688, website www.designinc.com.au