Hospitals today are an evolution of traditional institutions into 24-hour community-focused health care centres. They now incorporate offices, educational facilities, IT and data centres, cafeterias, outdoor areas, retail, research facilities and labs. They must cater for in-patients and out-patients, flexible visiting hours, staff comfort, security and a raft of other variables.

INTRODUCTION
Bringing together a large number of medical specialties, modern hospitals provide advancements in research and technology and are required to meet patients’ needs while providing an energy efficient state-of-the-art facility. Robust building design is essential to maximising a hospital’s ability to support its staff and patients, ensuring that the building operates with optimal efficiency and effectiveness.

It is critical that hospitals be designed with a future-focused approach, allowing for building adaptability and flexibility that facilitates for a simple transition and minimal disruption to occupants. Our design and engineering consultants future-proof each aspect of our buildings - fit outs need to be easy to maintain and durable with ease of reconfiguration to meet the changing needs of the hospital; building services must design for emerging technology by foreseeing the future standard hospital model; power systems need to work efficiently to reduce energy cost; and building structures need to withstand the effects of climate change.

With the global trend of increasing capital and operational costs expected to continue, we pay close attention to the direct and important relationship between the quality of building services as a capital cost and how it impacts on facility management and in turn business operational costs.

WSP | Parsons Brinckerhoff’s experience is demonstrated through our extensive history of developing state-of-the-art hospitals across Australia and the Pacific and the long relationships we have built with our healthcare clients. We believe from an engineering perspective the following factors are of great significance:

- Knowledge and application of the world’s best practice to provide innovative design solutions and adoption of emerging technologies that support new facilities and provide a healing environment.
- A people centred approach that places the wellbeing of patients and staff at the heart of design.
- The need to create efficient, low energy usage buildings.
- A fully collaborative approach - working with the architect, health planner and other relevant stakeholders.
- Careful review of the site infrastructure and system redundancy policy to support the facility’s infrastructure needs in both the short and long term.
- Comprehensive and current knowledge in providing services estimates and input into cost plan given that approximately 35-45% of the total construction cost is attributed to services costs.
- Proven skills in developing comprehensive staging documents sympathetic to a hospital’s operational needs for instance, infection control, and depicting all required interfaces.

BUILDING SERVICE DESIGN MUST BE FUTURE-FOCUSED, WITH ADAPTABILITY AND FLEXIBILITY AT ITS CORE; THIS ALLOWS FOR SIMPLE TRANSITION AND MINIMAL DISRUPTION TO OCCUPANTS.
BIM
(Building Information Technology)
WSP | Parsons Brinckerhoff are committed to Digital Engineering solutions that are tailored for each project and client. Our global reach provides us with access to an unprecedented suite of the latest software to assist in the design of our engineering services, including direct working relationships with Autodesk, Bentley and other vendors to ensure we are up to date with cutting edge solutions. Harnessing these technologies allows us to design and construct in a holistic manner, where we have access to accurate information throughout the lifecycle of the development, leading to improved productivity, faster decision making and lower cost.

KEY BENEFITS OF USING BIM ON HEALTHCARE PROJECTS:

• Improved quality of outcomes in patient room layouts, patient fall risk minimisation and staff traffic flow
• Harmonization of design team
• Integrated room data sheets and visualisation tools that enhance user group decision making processes
• Effective costing/quantity take-offs can be integrated into BIM workflows
• Early identification of design coordination issues
• Reduction in RFIs and shorter delivery programs
• Risk mitigation through early clash detection
• Reduced project costs and increased project quality
• Improved coordination of complex building systems and the ability to visualise the design in real time
• Software integration for downstream facilitators within Facility Management, Asset Management and Construction Sequencing.
• The ability to create animated simulations of treatment rooms that simulate complex medical equipment, providing visual impact on positioning and functionality of the overall design.

ENVIRONMENTAL PERFORMANCE
WSP | Parsons Brinckerhoff believe that the adoption of good sustainable and innovative strategies provide the foundation for great healthcare projects. We are a highly experienced consultancy and understand the needs of modern healthcare facilities. We utilise the latest computational modelling techniques to visualise and rigorously assess passive design scenarios against agreed project specific metrics. This process has a proven track record in achieving best practice outcomes as exhibited in the Olivia Newton John Cancer and Wellness Centre, the Auburn Hospital Redevelopment and most recently Werribee Mercy Mental Health Expansion (currently under construction).

Our goal is to work with the stakeholders to prioritise their key goals and criteria and then work with them to realise these goals in a cost effective and pragmatic way. Our experience has shown that facilities which prioritise the health and wellbeing of staff and patients deliver proven benefits via increased staff productivity and patient treatment times.

APPROACH TO COST MANAGEMENT
Health Projects increasingly rely on accurate cost information to prove their viability and it is for this reason that we look to push the boundary on services cost planning beyond the traditional unit rates approach. Utilising WSP | Parsons Brinckerhoff’s experience and knowledge of the local market, we work closely in collaboration with cost planners assigned to healthcare projects in an effort to provide accurate costs estimates early on in the programme.
OUR SERVICES

Building Services
- Mechanical
- Medical Gasses
- Electrical
- Hydraulics
- Fire Protection
- Vertical Transportation

Structures
- Structural
- Facades
- Civil
- Transport & Infrastructure

Technology Systems
- Audio Visual
- IT/Communications
- Theatre Integration
- PAC & Imaging
- Building Wide Communication
- Bedside Technology
- Clinical Systems
- Video Teaching & Systems
- Asset Tracking & Management
- Patient Monitoring
- Medical Records

Specialist Services
- Acoustics
- Facades
- Fire Engineering
- Specialist Lighting
- Dangerous Good & Hazardous Areas
- Sustainability

Strategy
- Property Advisory
- Design/Peer Reviews
- Independent Commissioning

OF THE WORLD’S LEADING PROFESSIONAL SERVICES FIRMS

2,050 LOCAL PEOPLE

36,500 EMPLOYEES

500 OFFICES

OF THE WORLD’S LEADING PROFESSIONAL SERVICES FIRMS

01 + 02 Gold Coast Private Hospital, Qld
03 Centre for Children’s Health Research, Brisbane
[Image courtesy of Christopher Frederick Jones]
04 Box Hill Hospital Redevelopment
05 Royal North Shore, Client Services Building
[Image courtesy of Brookfield]
06 Sunshine Coast University Hospital
[Image courtesy of Scott Burrows]
07 Parkes Hospital, NSW
[Image courtesy of Richard Crookes Constructions]
We are proud to support our communities in all parts of the world through the delivery of first-class healthcare facilities that optimize patient comfort and operational efficiency.
07 CLEVELAND CLINIC LOU RUVO CENTRE FOR BRAIN HEALTH, USA
Client: University of Nevada School of Medicine
Keep Memory Alive Foundation
Value: US$800m
Date: 2010

08 THE ROYAL HOSPITAL FOR CHILDREN, GLASGOW, SCOTLAND
Client: Brookfield Multiplex
Date: 2015

09 SURREY MEMORIAL HOSPITAL ACUTE CARE TOWER, CANADA
Client: Fraser Health Authority
Date: 2014

10 GLENEAGLES HONG KONG HOSPITAL
Client: GHK Hospital Limited
Date: Due for completion in 2017

11 ONCOLOGY INSTITUTE OF NIMES, FRANCE
Client: Centre Hospitalier Universitaire de Nimes
Date: 2015

12 QUEEN SILVA’S CHILDREN’S HOSPITAL, GOTHENBURG, SWEDEN
Client: Vastfastigheter
Date: Due for completion in 2020
Box Hill Hospital is a respected and well-known tertiary teaching hospital with a reputation for excellence in providing acute services in Melbourne, admitting 48,000 patients each year. The hospital offers world class clinical services with a community focused and patient-orientated approach. The facility has embraced sustainability undertaking significant initiatives, achieving a 4 star Green Star office design rating for the Box Hill Hospital Spring Street Office Building.

Our approach
Involved in all phases of this redevelopment, the full suite of building engineering services, beginning with the preparation of a Master Plan and Feasibility Study, completed in December 2005. This was the stepping stone for the redevelopment. The facility at Box Hill Hospital offers a substantial extension to the original facilities. The capacity of the hospital has increased by more than 200 beds to 621, with a larger and more efficient emergency department, a new 18-bed intensive care unit and ten new operating theatres, with capacity to expand to an 11th in the future.

The new 50,000m² Gold Coast Private hospital is a seven-floor, state-of-the-art facility from Healthscope, a leading healthcare provider. The new 284 bed hospital incorporates general wards, 17 operating theatres, a central sterilising services department, consulting suites, a maternity centre, an intensive care unit, medical imaging, oncology, renal, a rehabilitation ward, pathology and an emergency department. The building forms part of the Gold Coast Health & Knowledge Precinct, consisting of the recently completed $1.76 billion Gold Coast University Hospital and the $150 million Griffith University Health Centre.

Our approach
Involving all phases of this project, WSP | Parsons Brinkerhoff designed the infrastructure to provide the ability for the hospital to be expanded by up to 400 beds, 20 operating theatres, and 180 ward beds with additional consulting suites to be planned in the future. Chilled water, natural gas, oxygen, HV power, communications and fire/potable water are supplied to the hospital from the infrastructure serving the precinct. Sufficient space provisions for dedicated plant and equipment allow for hospital expansion. The project was also documented in REVIT 3D to ensure a fully co-ordinated design, reducing the risk of additional cost during the construction period.

Originally a greenfield site and located in regional New South Wales, Parkes Hospital provides a range of acute, ambulatory and community health services in the facility. A separate staff accommodation block provides visiting specialist healthcare workers with onsite housing.

Our approach
From an early stage we engaged with the health service provider to develop a scheme that improved on their existing facility through technology upgrades whilst not leaving them with an expensive maintenance legacy due to the remote location. Our experience working on previous regional hospitals was applied to produce a durable facility that benefits the community as a whole.

Early in the construction phase of the project, WSP | Parsons Brinkerhoff worked closely with the mechanical and medical gas contractors to finalise the design whilst preserving the basis of the design that was developed with the local health service.

Olivia Newton-John Cancer Wellness & Research Centre (ONJC) at the Austin Hospital has been recognised as an iconic development in the health sector. Austin Hospital is one of the largest comprehensive cancer care facilities in Australia, with a well-developed culture of pioneering cancer treatments. The ONJ Centre was a result of identifying a need for combining the 11 cancer treatment facilities spread over two campuses into one purpose built facility, offering wellness and support programmes and individualised care to treat the person, not just the cancer.

Our approach
We provided all building engineering and sustainability services, with a holistic approach taken to sustainability and an emphasis on improved wellness and indoor environment quality. The design includes radiotherapy bunkers, ambulatory oncology, inpatient wards, three floors of research laboratories, including a physical containment laboratory. Engineering design delivered to the hospital, chilled technology, no recirculation of air, rainwater collection, solar DHW and capacity for cogeneration in the future stage.

The Hornsby Ku-Ring-Gai Hospital has been providing quality healthcare since 1933. Completed in 2016, the Surgery, Theatres, Anaesthetic and Recovery (STAR) building replaced an aging facility with a new state-of-the-art facility that meets the needs of the community - now and in the future. All seven operating theatres contain fully integrated equipment, allowing for interactive communication with experts around the world during procedures. An interventional operating theatre allows surgical and minimally invasive procedures to be performed in conjunction with radiology services.

Our approach
WSP | Parsons Brinkerhoff provided a suite of consulting engineering services including mechanical, sustainable consulting, electrical, ICT, security and fire engineering. As the principal service consultant, and fulfilling the lead services coordinator role, we provided a design that was fully coordinated to meet the tight construction programme. Utilising Building Information Modelling (BIM) throughout the design enabled our consultants to validate changing areas, provide efficient clash detection of services and exchange data and improve productivity of the overall development.
The 14,100m², nine-level Centre for Children’s Health Research has opened alongside the new Lady Cilento Children’s Hospital and central energy facility in Brisbane. The facility represents the largest single investment in children’s health research in Queensland’s history. Five of the nine floors are dedicated to research, including wet and dry laboratories. The remaining levels accommodate the Lady Cilento Children’s Hospital Pathology service, office areas, retail tenancies and car parking. There is a service tunnel link to the Lady Cilento Children’s Hospital.

**Our approach**

WSP | Parsons Brinckerhoff provided electrical, mechanical, hydraulics, fire protection, security and communication services. The project utilised BIM to assist with the coordination of all our design services alongside the other services elements, structure and the unique architecture of the building.

Located in Penrith, NSW, the Integrated Mental Health Unit is an addition to the existing Nepean Hospital complex that underwent a substantial redevelopment. The building was designed over three levels, however the slope on the site means that the building reads as two-storeys from the south, creating a unique architectural presence. The 64 bed facility included a specialist mental health service for older persons (SMHSOP), acute mental health and high dependency mental health units.

**Our approach**

WSP | Parsons Brinckerhoff provided the suite of building engineering services, sustainability, audio visual and security services.

The project utilised BIM to assist with the coordination of all our design services alongside the other services elements, structure and the unique architecture of the building.

This new private hospital development is co-located on the Sunshine Coast University Hospital campus and comprises of more than 160 beds expandable to 200 beds and includes a range of medical services and clinical spaces, six operating theatres and associated facilities. Specialist consulting suites were also included for radiology, cardiac and cancer specialists. The in-patient accommodation is located on the eastern side of the hospital which has excellent views towards the ocean and the lakes, and views to the hinterland on the west. The patient experience at this hospital was a key focus for Ramsay Health Care, requiring customer-focused processes and a vision for best-practice clinical care.

**Our approach**

WSP | Parsons Brinckerhoff provided an integrated service working closely with Ramsay and John Holland Group to create a high return on investment for the two project partners: Queensland Health and Ramsay Health Care. In addition, the hospital was benchmarked using the Green Star health care tool to achieve best practice in the order of a 4 Star performance.

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WSP | Parsons Brinckerhoff is one of the world’s leading engineering professional services consulting firms. We bring together a unique pool of technical experts and strategic advisors including engineers, technicians, scientists, architects, planners, surveyors and environmental specialists, as well as other design, program and construction management professionals. The depth of our expertise and advice spans across the Property & Buildings, Transportation & Infrastructure, Environment, Industry, Resources (including Mining and Oil & Gas) and Power & Energy sectors as well as project delivery and strategic consulting services. With approximately 36,500 talented people in 500 offices across 40 countries, we are uniquely positioned to deliver successful and sustainable projects, wherever our clients need us.

WE ARE LOCAL
DARWIN
CAIRNS
SUNSHINE COAST
BRISBANE
GOLD COAST
NEWCASTLE
SINGLETON
SYDNEY
CANBERRA
MELBOURNE
ADELAIDE
PERTH
AUCKLAND
WELLINGTON
CHRISTCHURCH