



**Norman  
Disney &  
Young**

ROYAL COLLEGE OF PHYSICIANS LONDON | 27-28 JUNE 2016

**EUROPEAN  
HEALTHCARE DESIGN**

RESEARCH • POLICY • PRACTICE

**How Things Have Changed –  
A 10 Year Comparison of Three  
Iconic Australian Hospital  
Developments**

**Keith Davis – Director Health Services**  
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# “Children’s Health Partnership”



## Key Consultants



## The New Royal Children’s Hospital (RCH), Melbourne Australia





Government of **Western Australia**  
Department of **Health**

## Key Consultants



**New Children's Hospital (NCH),  
Perth Australia**





# “Exemplar Health”



## Key Consultants



**Bendigo Hospital Project (BHP),  
Bendigo, Victoria Australia**



**NCH**



**BHP**

**RCH**





# Procurement & Briefing





# Procurement & Briefing - RCH

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<b>New Royal Children's Hospital, Melbourne</b>
Balance Performance vs Prescriptive
Functional brief focussed on EDB & FFP
Consultants encouraged to challenge Brief
Iconic world class children's hospital central focus
Client vision unified design focus

<b>New Children's Hospital, Perth</b>

<b>New Bendigo Hospital, Victoria</b>

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<b>New Children's Hospital, Perth</b>
Both performance & prescriptive
Brief informed by RCH
Strict adherence to Brief
Enhance RCH solution
Client vision clear

<b>New Bendigo Hospital, Victoria</b>

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<b>New Bendigo Hospital, Victoria</b>
Non Prescriptive Priority based
Winner able to include most wishlist into scope
Innovation welcomed even if non-conforming
Affordability and Value for Money
Client vision clear with precision-like pragmatism

# Project Overview





# Project Overview - RCH

New Royal Children's Hospital, Melbourne
\$1.1bn
Start: 2006 Complete: 2011 (on schedule)
299 inpatient beds
58 same day beds
15 operating theatres
Helipad (In-situ Concrete)
2500 car parks
Total redevelop – two buildings retained & refurbished

New Children's Hospital, Perth

New Bendigo Hospital, Victoria

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<b>New Children's Hospital, Perth</b>
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Start: 2010 Complete: 2016 (2015)
256 inpatient beds
42 same day beds
11 operating theatres
Helipad (Pre-fab Aluminium)
330 UG & 3000+ multi-storey car park
New CEP developed & old CEP & stack demolished

<b>New Bendigo Hospital, Victoria</b>

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<b>New Bendigo Hospital, Victoria</b>
\$630m
Start: 2012 Complete: 2016
372 inpatient beds + 80 integrated Mental H
72 same day beds
11 operating theatres
Helipad (In-situ Concrete)
1350 car parks on grade
Campus three divided adjoining sites with heritage

# Master Planning





# Master Planning - RCH

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New Royal Children's Hospital, Melbourne
Site plant options limited by park on 3 sides & arterial road
Providing parkland views to all patient accommodation
Residential area opposite – noise restrictions
Traffic access to/from hospital onto Flemington Road
Engineering infrastructure totally renewed – business continuity challenging
Location defined & boundaries by bidders maintained < 4.1Ha

New Children's Hospital, Perth

New Bendigo Hospital, Victoria

# Master Planning – RCH (Before Redevelopment)



# Master Planning – RCH (After Redevelopment)

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# Master Planning - NCH

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<b>New Children's Hospital, Perth</b>
New NCH site boundaries well defined
Kings Park directly opposite provides excellent views
CEP needed relocation/ demolition prior to construction
Service traffic access in/out of new building was challenging
Close coordination needed to interface with new CEP/tunnel
New build boundaries fully defined

<b>New Bendigo Hospital, Victoria</b>



# Master Planning - NCH

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# Master Planning - NCH

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<b>New Bendigo Hospital, Victoria</b>
Dispersed facilities needed integration for limited budget
Roof plant & aesthetics managed to maintain views
Electrical supply to the site limited in capacity
Limited project budget needed to refurbish heritage buildings
Site was divided by two roads, one main arterial.
Major demolition. New hospital site selection by bidders



# Plant Space Negotiation



# Plant Space Negotiation - BHP

New Royal Children's Hospital, Melbourne	
Serves: Entire RCH Site (Central Utility Plant)	
Total GFA 139,969m <sup>2</sup>	
Plant GFA 19.8% or 27,714m <sup>2</sup>	
Central Plant 40.7%	Risers & AHU 59.3%

New Children's Hospital, Perth	
Serves: New Building only	
Total GFA 119,737m <sup>2</sup>	
Plant GFA 15.2% or 18,200m <sup>2</sup>	
Central Plant 0% (Remote CP)	Risers & AHU 100%

New Bendigo Hospital, Victoria	
Serves: New Building only (Central Utility Plant)	
Total GFA 83,127m <sup>2</sup>	
Plant GFA 14.9% or 12,386m <sup>2</sup>	
Central Plant 25.2%	Risers & AHU 74.8%



# Design & Documentation



# Design & Documentation - RCH

New Royal Children's Hospital, Melbourne
Documented in 2D Autocad (Level 6 Plant in 3D)
Coordination manual lightbox overlays – complex & costly
Major trades well able to develop "As Builts" in Autocad
Bid phase documentation limited by late resolution of MP
Design & documentation software tools largely separate

New Children's Hospital, Perth

New Bendigo Hospital, Victoria

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<b>New Children's Hospital, Perth</b>
Documented with 3D Revit/ "Drofus/Codebook" integrated
Excellent coordination using Revit 3D clash detection
Local trades unskilled in 3D Revit for "As Builts"
Stage 1 documentation to 80% to facilitate GCS (1 year!)
Some integration of design & documentation software tools.

<b>New Bendigo Hospital, Victoria</b>

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<b>New Bendigo Hospital, Victoria</b>
Documented in 3D but 2D colour mapping for schematics
High level of coordination achieved
Major trades able to develop "As Builts" in 3D Revit
Bid phase documents vastly more detailed than RCH
New levels of integration in design & documentation tools.



# Construction

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# Construction - BHP

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<b>New Royal Children's Hospital, Melbourne</b>
Large basement excavation provided more time for design
Conventional in-situ reinforced concrete construction.
Multi-stage with 8 to 9 cranes at peak (Cranes named)
Flat slab, concrete columns & band beams (8.4m grid)
Delivered on time

<b>New Children's Hospital, Perth</b>
Fast tracking placed significant pressure on design program
Conventional in-situ reinforced concrete with prefab risers
Multi-stage required with 5 cranes at peak (Named)
Post tensioned concrete with 9,0m grid
Completion delayed (circa 8 months)

<b>New Bendigo Hospital, Victoria</b>
Sloping site and initial excavation in rock costly
Both conventional and prefabricated used
Multi-staged requiring 4 cranes Cranes all named
Flat slab, concrete columns & band beams (8.3m grid)
Will be delivered on time