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The challenges and opportunities with brownfield hospital developments

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An insight into common budgetary, time and operational constraints associated with brownfield hospital developments

The key to a successful brownfield hospital development is the ability to achieve a modern new facility, while maximising the value of the existing infrastructure, all while ensuring uninterrupted operations of health services for the staff, patients and visitors.

This paper explores how the opportunity for quality facilities can be delivered whilst acknowledging the constraints of an existing site, ultimately generating value for the community.

Bulldoze it and start again?

For the hospital operator, the decision to undertake a redevelopment of an existing health care campus and/or expansion either on the same or on a new site (greenfield) may seem complex and prove difficult. Finding the best value requires a thorough assessment of risk and cost. While there are many factors that may influence what decision is best, often the number one consideration is access to capital—and then, how much capital.

When enough funding is available, greenfield construction seems to be the obvious way to go. Other influencing factors include ageing infrastructure that cannot support today's systems and technologies, a lack of land on the existing site, or the realisation that renovations and extensions will bring a sub-optimal solution to that site.

However, not all hospitals and healthcare providers will find new greenfield construction to be the preferred option, instead capitalising on the existing built investment and choosing brownfield development on their existing campus. Key influencers for significant extensions and renovation can be the community's attachment to the current site, the professional community's (doctors/consultants/staff) preference for the existing site as their workplace location, and the availability (and expense) of new land within the hospital's catchment area.

In this paper, Slattery highlights the optimum approach to establishing the business case and the potential capital outlay in the following discussion, and provides a model cost plan for brownfield development. This can be a blueprint to support the decision-making process for healthcare providers, helping determine the initial figure for capital outlay.

Setting the scene

By 2031, more than 30 million people will call Australia home, with most living in our four largest cities, increasing the need for community services in every way. Hospitals face unprecedented pressure to manage the health needs of patients, in terms of volume, service specialisation, patient expectation and choice.

People want and expect health options close to home. With an increasing population, there are changing care delivery models and industry wide, a push for single-bed patient rooms amongst other evolving trends. Facility upgrades are therefore inevitable for most healthcare providers.

Cabrini Hospital, new Gandel Wing, Malvern VIC
Designed by Bates Smart and DesignInc
Cost managed by Slattery
Image courtesy of Bates Smart

Cover: St John of God, Geelong
Designed by Silver Thomas Hanley
Cost managed by Slattery
Image courtesy of Silver Thomas Hanley



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Essential considerations for brownfield hospitals

Many providers will embark on brownfield developments to ensure their hospitals are operating at maximum efficiency and able to meet current service demands, changing service delivery and future volume growth. In 2016–17, there were more than 11 million hospital admissions which are growing at a rate of 4.35% per year for public hospitals, and 3.6% per year for private—faster than Australia’s rate of population growth at 1.6% (AIHW, May 2018).

Brownfield investments assist in the delivery of positive operating leverage, presenting an opportunity for the health provider to increase the return on invested capital generated by the business. In 2013–14, capital expenditure on hospitals, in real terms, sat at \$9.1B, up from \$4.3B in 2003–04. Currently, private health providers are investing an average of \$928M per year into gross capital expenditure with income from non-government sources increasing to over \$15B, up 21.6% in 2016/17 in four years (AIHW, Sept 2018).

Frequently, the redevelopment of an existing hospital occurs one project at a time as funding becomes available. Ensuring current decisions don’t comprise future development, careful master planning is required to avoid costly mistakes. The right advice during the planning of a campus redevelopment is critical to the overall success of the hospital and will ensure that the many risks involved in building projects, which can add considerable cost, are understood. Proactive, not reactive planning is paramount.



Cabrini Hospital, Malvern VIC—construction of the Gandel Wing
Designed by Bates Smart and Design Inc. Built by Kane Construction
Cost Managed by Slattery. Photo: Slattery

Successful projects are well defined, have good governance structure, are managed by collaborative teams and link project success to organisational objectives.

A robust masterplan is key

At the core of any development works is a robust Strategic Masterplan based on future healthcare needs of the community. The needs translate into service delivery plans, models of care and functional briefs from which the consultant design team can begin to scope the building areas, location and configuration. This becomes the future long-term vision of the hospital campus, ready for implementation consideration. This takes the form of a Feasibility Study and Business Case, which considers staging to match service provision needs, future proofing, funding constraints and continued operations of the campus.

It is therefore critical that brownfield developments are following an overall campus masterplan (and that the masterplan is regularly reviewed as needs change) in order that the hospital campus evolves in an efficient way and one that is flexible to meet future requirements. Once a robust clinical service (and correlating strategic business plan) has been developed, master planning can be undertaken—the formal development and consideration of a variety of solutions that meet both the clinical and business requirements, ensuring what is required on the inside is served well by the eventual building(s) envelope and configuration.

The masterplan should be undertaken for the whole campus and not restricted just to the area of a current development and take a long-term perspective. Master planning provides the framework that helps define and identify future opportunities for the individual development, and development of the whole campus.

CASE STUDY:

Build future expansion in Shell now—fitout out now or in the future?

A client was unsure as to whether to construct an additional level to the hospital building as part of this hospital new build. Slattery assisted with the decision-making process by providing the client with a cost matrix which identified the cost options of constructing a shell only and fully fitting out the floor at the time of the main works or several years later after the completion of the project. This indicated it was much more cost-effective (in construction costs and business operation costs) to undertake the fitout work with the main contract. We also advised the client that the fitout of the floor could be identified as an option within the tender, which could be added or deducted depending on the tender result and final board approval. We provided a Bill of Quantities on the project which identified the cost of the fitout work, ensuring we received accurate prices from the builder. This all worked to the client’s satisfaction and they eventually proceeded with the fit-out option based on the firm price identified in the tender.

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Common challenges

With refurbishment and extension projects, we have found that the early stage of design must be more detailed, i.e. the concept design stage is more like schematic design for a new build and schematic design is more like design development.

Design and operation efficiency can be compromised to suit existing conditions.

Input from all key stakeholders as well as the community and the end users are paramount to aid design and configuration of spaces, and to ensure that spatial design is correctly determined to fully serve its purpose and enable the right workflow.

Refurbishment projects will likely create further complication by the need to provide health services throughout and within the same building, with

additional demand accommodated in other facilities, either onsite or purchased from alternative suppliers. This can add considerable costs overall to a budget, which may not be factored in the early planning stages.

Common project challenges that Slattery has encountered with development on existing health campus are highlighted in the table below.

Challenge	
Scope creep	The extent of refurbishment has a habit of increasing as the design progresses through each design iteration and often during construction, with significant financial consequences.
Capacity of existing older structures to allow vertical extension	This will require a structural engineer to review the As Built drawings, assess and test if existing structures (and their foundations) can hold additional weight of new structures above.
Impact on existing services mains running across the campus	Sequencing of works needs to be planned and managed carefully to ensure power supply is not disrupted, interrupting existing hospital services.
Heritage issues	Heritage issues will need to be identified and a Heritage consultant may be required to review the works.
Unforeseen contamination	Site and existing buildings may have contamination/hazardous material issues.
Connecting new buildings to existing	Linking new buildings with existing buildings may alter compartmentation and may require a review of fire compartmentation by a Fire Engineer or Building Surveyor.
Lack of compliance with contemporary fire standards	Fire services to an existing building often will not comply with current regulation and building codes which must be addressed.
BCA Building Regulations	With a major new build connect to existing, the remainder of the existing building must also comply with the current Regulations.
Varying floor to floor heights between existing and new	Existing buildings may have lower floor to floor heights that need to be linked effectively.
Maintaining existing logistics	Managing access around the builder's compound, material unloading, etc. without conflicting existing site operations or limiting program timelines must be factored.
Decanting of effected operations	Decanting of hospital functions to temporary facilities to maintain service provision requires thorough planning.
Onsite car parking impacts	The existing hospital will need to maintain service which also means car parking needs may be compromised by building works.
New feels better than the old	Management of expectations so that patients and staff don't feel second class in the un-renovated existing facility.
ICT considerations	It may be difficult to expand an existing ICT system with the modern-day update.
The need for early works that are unappreciated	It is common that the initial project in a campus redevelopment are infrastructure projects, such as a new central plant, which enable the future development; however, they don't immediately increase revenue, and have less marketing/branding/political kudos. Opening a new central plant building doesn't resonate with the public compared to 'We are opening new operating theatres / 64 new bed ward'.
Standardisation	Standardisation of the structural grid or materials and finishes can be compromised by the physical restraints of existing buildings.
OH&S	Occupational Health and Safety across the campus needs to be maintained during the building works, for staff, patients and contractors.
Flooding risks	Flooding risks with weatherproofing or works to existing engineering services need to be managed.
Latent conditions	In addition to the Construction Contingency, a Latent Conditions Contingency should be allowed for unknown ground and existing building issues.
Staging to minimise disruption to an operating hospital	This requires careful consideration to minimise the impact of the building works on existing operations, balancing all stakeholder concerns, short term pain for long term gain etc.
Impact of construction works on sensitive facilities	Planning for the impact of extensive structural works on adjoining sensitive facilities such as MRI bunkers, operating theatres etc.

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Establishing a realistic budget for the business case

Considering all challenges, how do we go about establishing a realistic budget for brownfield developments which can inform the business case? What are the key steps?

Cost planning should always be ahead of the documentation, leading the consultant team through the complex maze of alternatives and design decisions which must be considered to ensure the best solution is achieved.

Central to compiling a tested and durable cost plan for feasibility study stages, is for the cost planning team to capture a complete and comprehensive understanding of the project specific circumstances. A key tool is a Capital Cost Risk Register which should capture all risks and potential challenges to a project and their potential costs to mitigate the risk. Once the requirements and risks are known, the assessment and quantification of costs can be undertaken to create a budget.

There is great value in a collaborative project team approach to creating successful project outcomes. Failing to capitalise on the cooperative opportunities is often to a project's detriment.

The healthcare provider's infrastructure lead should begin by gathering all relevant information associated with the site.

They can draw upon the knowledge and experience of current hospital engineers and can discuss the project with previous stages' consultants and builders as well as access and compile existing reports (fire, hazardous materials, building surveyors etc.). This will provide a strong foundation to undertake master planning and feasibility studies ahead of developing the full business case.

Please refer to our model cost plan on page 7 for insight into the range of cost considerations.



Above: St Vincent's Private Hospital, Sydney, NSW
Image courtesy of HASSELL Architects
Cost managed by Slattery

Below: Frankston Hospital redevelopment, Frankston VIC
Designed by and image courtesy of Lyons Architecture
Cost managed by Slattery



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Moving forward: successful project implementation

Following the Masterplan and Feasibility Study—the key ingredients of a successful project implementation phase includes:

- Structured approach to cost planning and risk management: Dynamic change cost capture with milestone cost plans at Schematic Design, Design Development and Pretender gates.
- Understanding volatility and fluctuations in the tender market and making appropriate allowances for cost escalation.
- Eliminate project risks ahead of appointing a contractor.
- Adopting a procurement method appropriate to the scale and complexity of the project.
- Appropriate list of Tenderers: Match project types with capacity and interest of the tenderers.
- Make the tender document package attractive with an appropriate tender period.
- Minimise the number of Tender Options.
- Standardise Contract Conditions with balanced risk allocation.
- Include a Bill of Quantities to assist the Builder's and Subcontractor's estimators with pricing.
- Minimise Tender Addenda.
- Manage surprises with a strategy for Value Management items in the event of a budget overrun.
- Negotiate with preferred tenderers when competitive tension is strong.

CASE STUDY:

Maintaining operations— Northern Hospital Inpatient Unit Expansion Stage 2 (\$163M)

Slattery provided cost planning and management services on this major brownfield redevelopment. This project is the second stage of a master planned, three-stage redevelopment. Built on top of an existing 3 level podium, the scope includes a multi-level tower to house additional 96 inpatient beds, 18 bed intensive care unit (ICU), 3 operating theatres, clinical and non-clinical support. An Early Works package was adopted to commence construction early and to help de-risk the Main Works package.

This project involves a mix of functional areas, creation of shell space for future inpatient beds and infilling existing podium shell for ICU. The full redevelopment is staged and planned around uninterrupted service delivery for Northern Health.

Slattery and the consultant team worked collaboratively throughout the design stages to ensure the scope, quality, program and cost of the project matched the basis of the Business Case and approved funding, all while maintaining operations of The Northern Hospital.

The value additions included:

- Strict adherence to the business case parameters. Following validation of the budget, a strict change control process was adopted with the majority of additional scope request treated as tender options only.
- Where additions put the budget at risk, value engineering opportunities were identified, and savings adopted.
- An early works package of ground level works was adopted to de-risk the main works.
- The early works also included fit-out of an existing podium shell for ICU which brought urgent beds online earlier.
- Slattery established specific and separate latent conditions contingencies to manage the rock and contaminated soil issues which are site specific to the area of Epping.
- With the levels of construction activity increasing, Slattery identified volatility in the tender market and made recommendations for risk management to Victorian Health and Human Services Building Authority around levels of escalation, suitable tier tenderers, use of Bills of Quantities and packaging of the tender documents to minimise tender addenda.
- Strategies presented for risk identification and management including: traditional procurement in lieu of managing contractor, consideration of transferring design coordination risk at tender to mitigate post-contract variations and quantitative risk management analysis.

The project has recently been tendered in line with the project budget and remains on programme. With some funds remaining, this has enabled options for additional works to be included and for greater risk to be transferred to the Contractor. Overall, a successful time and budget outcome for this brownfield hospital.

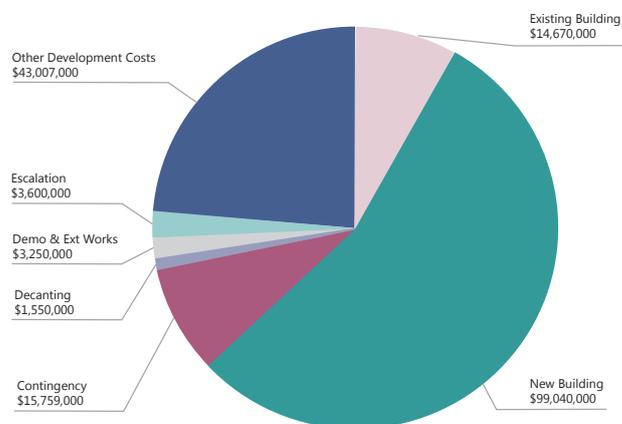


Northern Hospital Expansion, Stage 2, Epping VIC
Designed by and image courtesy of Lyons Architecture
Cost managed by Slattery

Hospital Campus—Brownfield Development
Cost Model—Extension and Refurbishment Project (as at 2nd Quarter, 2019)

Functional Area	Scope	Area (m2)	Rate (\$/m2)	Total (\$)
New Extension				
Level B1 and B2				
Carpark and BOH	150 Cars	6,000	1,400	8,400,000
Rock excavation		Item		250,000
Contaminated soil removal (specialist report estimate 1,000 tonnes)		Item		200,000
Ground Floor				
Entry/Admin/Retail/Pharmacy/Dining/Kitchen		3,200	4,000	12,800,000
Main entry canopy/Porte Cochere		Item		300,000
Kitchen equipment (Group 1)		Item		700,000
Level 1—Operating Theatre Suite/ CSSD		3,200	6,000	19,200,000
Level 2—32 Bed Medical IPU/10 Bed Cardiac Unit/6 Bed ICU/Theatre Plant		3,200	4,800	15,360,000
Level 3—28 Bed Surgical IPU/24 Bed Maternity/Birth Suite/SCN		3,200	4,900	15,680,000
Level 4—Shell Area	Cold Shell	3,000	2,300	6,900,000
Plantroom		1,000	2,000	2,000,000
Plazas and decks		1,500	1,600	2,400,000
Lifts				2,000,000
Central energy system & unique services items				12,600,000
Allowance for ESD Initiatives to achieve TP requirements (not included above)				250,000
<i>Sub-Total —New Building</i>		<i>22,800</i>	<i>4,344</i>	<i>99,040,000</i>
Existing Building				
Basement—Carparking	Light refurb	250	500	125,000
Ground Floor—mergency Department, Pharmacy	Heavy refurb	1,500	3,000	4,500,000
Level 1—Operating suite	Heavy refurb	350	5,000	1,750,000
Level 2—Medical imaging	Heavy refurb	500	2,500	1,250,000
Level 3—Recovery, CSSD	Med. refurb	2,000	2,000	4,000,000
Level 4—circulation	Light refurb	125	600	75,000
Roof plant area	New	200	1,600	320,000
Allowance for BCA Upgrade Works				1,500,000
Asbestos removal (based on HazMat Report)				300,000
Staging allowance				200,000
Allowance for regulation 608 upgrade works				
Allowance for EWIS to existing hospital				250,000
Allowance for fire compartmentation /separation works				100,000
Upgrade to existing stairs				50,000
Upgrade to existing toilets				100,000
Minor upgrades to emergency lights				50,000
Asbestos removal (based on HazMat Report)				100,000
<i>Sub Total —Existing Building</i>				<i>14,670,000</i>
Decant Works (separate small works contract)				
Fitouts within existing building		500	2,500	1,250,000
Temporary reception area		200	1,500	300,000
Replacement of combustible façade cladding				
Specialist reports confirm no issues with existing facades		Note		
Total Building Cost		28,425	4,055	115,260,000

Functional Area	Area (m2)	Rate (\$/m2)	Total (\$)
Site preparation and demolition (excluding asbestos removal)	Item		1,200,000
Asbestos removal related to demolished buildings (based on HazMat Report)	Item		150,000
General external works and landscaping	Item		800,000
External services and infrastructure connections	Item		600,000
Civil works outside site boundary (slip lane and intersection works)	Item		500,000
Total Building and External Works & Services Cost		4,169	118,510,000
Design and planning contingency	Item	5.0%	5,926,000
Contract contingency	Item	7.5%	9,333,000
Latent conditions contingency	Item		500,000
Cost escalation allowance (8 months to tender, 22 month construction)	Item		3,600,000
Total Construction Cost		4,850	137,869,000
Other Development Costs			
Consultant fees	9.5%		13,098,000
Authority & Headwork's charges	0.5%		689,000
Furniture, fittings and equipment (from Hospital prices FFE schedule)	Item		10,000,000
Information communication and technology (ITC consultant's report)	item		6,500,000
Planning, relocation and removal costs	Item		500,000
Alternative car park arrangements during construction	Item		600,000
Client management costs	2%		2,757,000
Legal costs	Item		250,000
Client project contingency	5%		8,613,000
Finance costs	Item		Excluded
Land and leasing costs etc.	Item		Excluded
Goods & Services Tax	Item		Excluded
Total End Cost		6,386	180,876,000



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Summary

With an ever-increasing demand for healthcare services, as well as evolving service delivery models, continued investment in the built environment appears a 'no-brainer'. However, a scarcity of suitable and affordable greenbelt land, means healthcare providers will increasingly have to consider developments on brownfield sites, or the re-purposing of existing facilities.

As discussed in the paper, developing a robust business case to justify the investment can be murky waters to navigate, with brownfield sites being inherently more complex and riskier to develop.

Through the successful delivery of many brownfield redevelopments, we have identified the following key issues to be addressed:

- Surround yourself with the right professional expertise, experienced and outcome focused.
- Allocate adequate time and funds to complete a rigorous business case process.
- Undertake due diligence and de-risk as far as possible prior to commitment.
- Develop clear governance and communication protocols to ensure decisions are made with due process and with the right information to hand.

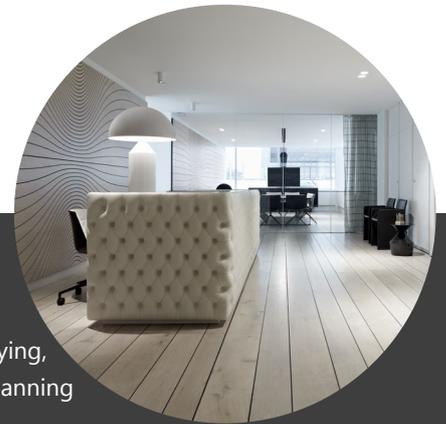
Do this well and the development of brownfield sites can deliver significant health and community returns and commercial efficiencies for years to come.

References

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About Slattery & Kaizen

Slattery is a property and construction advisory firm specialising in quantity surveying, cost management and early phase project advisory, with an outstanding history spanning more than 40 years.

A commitment to excellence and innovation, and an ability to become an integral part of the project team has earned Slattery the trust and respect of clients and project teams alike. Slattery adds value by taking control and ownership of the cost management process from the outset. We understand the importance to drive innovation and productivity.

Slattery's Kaizen Papers focus on sharing knowledge, ideas and pertinent cost information related to our industry. Kaizen is the Japanese word for improvement, and a business philosophy that strives for continuous improvement in process. We produce papers across the sectors we work with, which are shared with our clients and made available on our website for all to view.

We invite you to explore these further at www.slattery.com.au/thought-leadership

A dedicated Health team

Slattery works with public health departments, private health developers and operators, and leading health and community providers to plan, design and construct new and refurbished health and research facilities across Australia.

Our Health team has the capability, capacity and expertise to advise on a variety of projects, leveraging more than 30 years of Australian and international experience in health infrastructure projects.

We provide a dedicated, thorough and considered team approach from initial feasibility and master-planning to project completion onsite, to optimise value for our clients and the community.

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