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CASE STUDY:

# North Shore Hospital's Elective Surgery Centre

Jasmax

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PHOTO CREDIT: SIMON DEVITT  
PHOTOGRAPHER

## WHAT IS BIM:

Building Information Modelling (BIM) is a digital representation of physical and functional characteristics of a build asset – everything from bridges to buildings. A building information model is a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle; defined as existing from earliest conception to demolition.

The key principle is that BIM is not any single act or process. It is not creating a 3D model in isolation from others or utilising computer-based fabrication. It is being aware of the information needs of others as you undertake your part of the process.

## BIM advancing more efficient and streamlined delivery of healthcare design.

This case study highlights how Building Information Modelling (BIM) streamlined the design and construction of a state-of-the-art surgical centre at North Shore Hospital in Takapuna. Modelling every aspect of the building – from user engagement to shop drawings – enabled easy understanding and transfer of design and construction information between members of the project team and assisted the project's delivery on time and to budget.

More than just a 'new facility', North Shore Hospital's Elective Surgery Centre (ESC) facilitates the delivery of a radically different surgical model, supported and approved by the Ministry of Health. It enables the client Waitemata District Health Board (WDHB) to provide faster patient assessment, reduced waiting times and shorter hospital stays, with the result that more patients can be treated at a lower cost per procedure. The Elective Surgery Centre's model of care is based on a highly successful pilot conducted at Waitakere Hospital.

BIM was used to optimise the layout. A complex project covering 5,983 square metres, this two-storey building allows for fast turnaround of surgical services. The ground floor accommodates four operating theatres, recovery and consulting rooms, and one of the country's most advanced sterile supply units. The upper level houses a 40-bed ward, a two-bed high dependency unit and 18 single bedrooms with ensuite facilities. All bedrooms are located on the perimeter of the building with a central core housing communal service areas. Plant rooms are situated at the southern end of both levels.

**PROJECT DETAIL:**

**DURATION**

The project commenced in 2008 and was completed in 2013.

**PROJECT PARTNERS**

Owner and developer: Waitemata District Health Board

Construction company: Argon Construction

Architect: Jasmx, MSJ

Structural engineer: BGT Structures

Mechanical engineer: Aurecon

Quantity surveyor: Rider Levett Bucknall

Project manager: Ncounter Group, RCP

**BIM USES**

The New Zealand BIM Handbook Appendix D defines 21 distinct BIM Uses. On this project BIM was used for:

**Spatial programming**  
– room data sheets

**Design review**

**Design authoring**

**3D coordination.**



WDHB CEO Dale Bramley anticipated that, based on this model, operations would cost approximately 20% less than average through improved facility design, consultation, surgery and recovery times, and by ensuring that most patients would need only visit the hospital once prior to surgery.

**The Process**

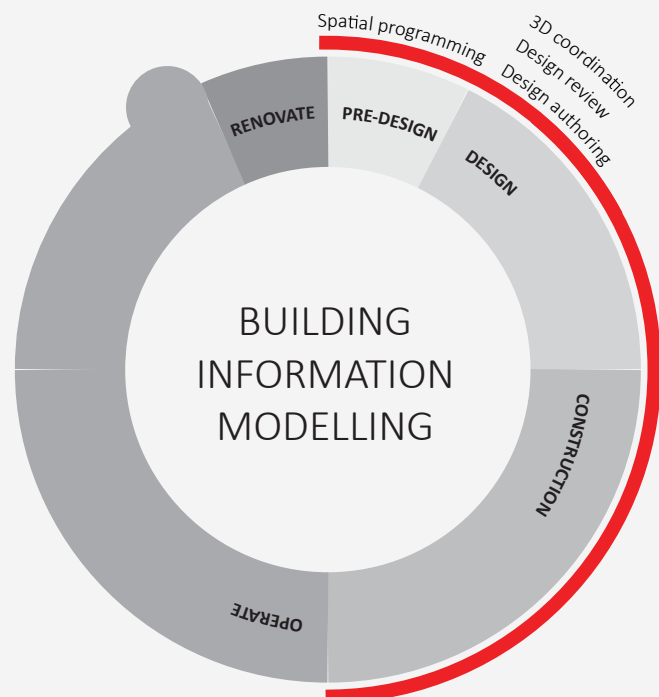
BIM was used to create a virtual 3D prototype of the building prior to construction. Modelling the base-build from early site works through to substructure, precast implementation and enclosure stages, the project team was able to individually model the mechanical, electrical and plumbing (MEP) systems in 3D. These separate models were layered to create a single integrated model containing all of these services, including everything from supporting beams, floors and walls to partitions, powerpoints and ducting. It enabled the project team to easily identify clashes between these elements. Slices of the building in 3D were then taken to produce 2D drawings to refine details such as insulation to ensure Building Code compliance. These details were fed back into the 3D model. Using BIM as a tool, planning sessions were held with each of the different departments using the Elective Surgery Centre to help design internal space layouts.

**WHAT IS A BIM USE?**

“BIM Use – a unique task or procedure on a project which can benefit from the application and integration of BIM into that process.”

THE NEW ZEALAND BIM HANDBOOK.

THIS CASE STUDY HIGHLIGHTS THE VALUE OF USING BIM IN THE PREDESIGN, DESIGN AND CONSTRUCTION STAGES OF THE PROJECT LIFE CYCLE.



The design models provided the design intent that was then transferred to the construction team for implementation.

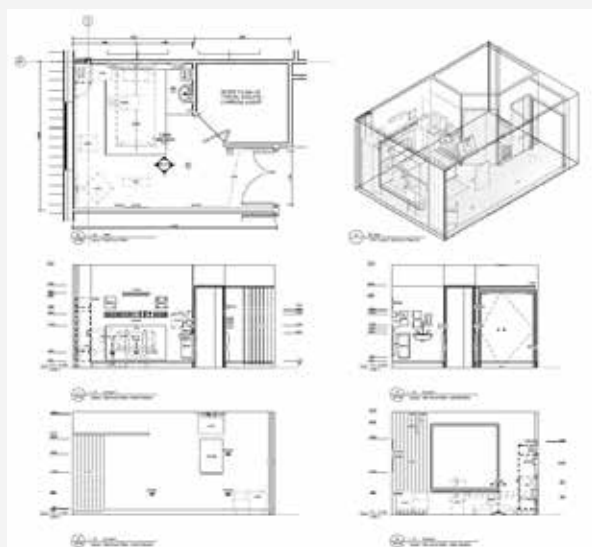
The Jasmx architectural team managed the BIM process across the project, completing quality control checks following construction. Quantity surveying and contract administration were undertaken in a traditional manner.

## Challenges and constraints

BIM was limited to the architectural and mechanical, electrical and plumbing design elements of the construction process. Extending its application to all aspects would enable its full potential to be realised. Using BIM effectively requires all members of the project team to continually update their respective BIM models throughout the process. This is time consuming but greatly enhances the value BIM can deliver.

**“I have been involved in three recent hospital design/implementation projects now and this facility is by far the best of the lot. It is a striking looking facility, simple, yet effective in its flow and certainly a real jewel in the DBH’s crown.”**

**MARK WATSON, GROUP MANAGER,  
ELECTIVE SURGERY CENTRE – NORTH  
SHORE HOSPITAL.**



3D ROOM DATA SHEETS WERE PRODUCED FOR ALL ROOM CONFIGURATIONS. THIS EXAMPLE SHOWS A 1 BEDROOM WARD-ROOM.

**“The outstanding benefit of using BIM on this project was the time saved in communicating design.”**

**EUAN MACKELLAR, PRINCIPAL, JASMAX**



SIMON DEVITT PHOTOGRAPHER



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## Results and benefits

BIM facilitated in the delivery of the North Shore Hospital's Elective Surgery Centre on time and to budget.

Creating a model in the early design stage highlighted critical junctions and sped up the detailed design. It resulted in significant time savings, particularly at documentation stage. It is estimated that it saved several weeks in project time, compared with the usual process.

BIM assisted collaboration between project team members, communication with the client, and co-ordination of services on the project which all contributed to identifying risks and jointly developing effective solutions.

Communicating with BIM enabled Jasmax to design spaces to better meet user needs and accelerated the sign-off process. Producing 3D room data sheets of all room configurations meant users could quickly understand spatial relationships between critical features. BIM gave them a preview of how things would work in practice so changes could easily be made before construction started.

Greater visibility of architectural and MEP systems improved the workflow between these teams and enabled early clash detection. A key example was the ability of MEP engineers to ensure that ducts and electrical systems didn't penetrate fire walls, avoiding the need to install fire dampers, with resulting savings.

#### CONTACT:

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WITH THANKS TO



**BIM  
ACCELERATION  
COMMITTEE**



Funded from the  
**Building Research Levy**



**MINISTRY OF BUSINESS,  
INNOVATION & EMPLOYMENT**  
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