

Kathleen Kilgour Centre

Innovative design and operation through BIM.

The project

The Kathleen Kilgour Centre is a new radiotherapy clinic at Tauranga Hospital. Procured by the Bay of Plenty DHB under a Public Private Partnership (PPP), it is setting New Zealand project management and design precedents through its use of Building Information Modelling (BIM) processes and technologies, combined with integrated project delivery methods.

The building's design and construction have been co-ordinated with virtual models and BIM will also aid in its operation, maintenance and management over its lifetime.

The 3,000m² healthcare facility houses three treatment spaces, along with supporting clinical and administration areas spread across three levels. From the high-tech medical equipment to the internal environment and construction methods, it is an innovative centre of excellence.

The underlying philosophy for this project has been to provide a high quality environment for the patients who use it and the staff who work there. The building is seen as an integral part of treatment with the aim of making the patient experience as stress free and comfortable as possible. This is realised by a sophisticated quality and a 'non-clinical' feel, achieved with the assistance of virtual modelling.

“The Kathleen Kilgour Centre is an innovative centre of excellence. Its planning, construction, form and services all contribute to the better treatment of cancer patients at their most vulnerable time.”

Mark Fraundorfer,
Kathleen Kilgour Centre General Manager

What is BIM?

“BIM is a digital representation of the physical and functional characteristics of a building. As such, it serves as a shared knowledge resource for information about a building, forming a reliable basis for decisions during its life cycle from inception onward.”

The National Building Information Model Standard Project Committee



THE
BUILDING
INTELLIGENCE
GROUP

Duration

The project has taken approximately two years and is due for completion in December 2014.

Project partners

Project manager: The Building Intelligence Group

Architecture and interior design: Wingate + Farquhar, Assemble

Structural engineering: Redco

Services engineering: Innerscape

BIM Uses

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

- Existing conditions modelling
- Design authoring
- Design review
- Engineering analysis
- 3D co-ordination
- Digital fabrication
- Record modelling
- Facilities/asset management.

Process

BIM was used as a collaborative planning tool on this project, providing for a high level of communication and information sharing between the project partners and client.

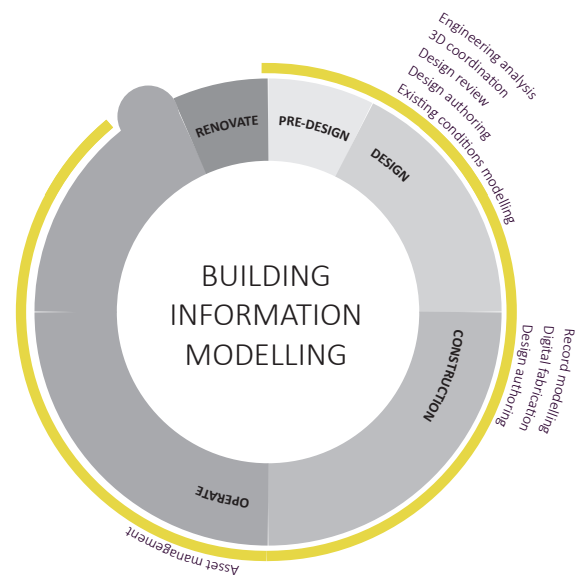
In the early stages of the project, a BIM Execution Plan was developed by the architectural team to manage BIM deliverables and this was shared with representatives of all of the project stakeholders at a BIM Initiation Workshop. The workshop was used to gain consensus on shared objectives and agree a clear path forward. This was key to clarifying the outcome deliverables and maximising the benefits of BIM.

The design consultants all used Revit software to design their own 3D models. Architectural, structural, interior and service models were developed. These models were combined regularly into a federated model that was analysed for co-ordination and clash detection. Web based model review meetings brought together key members of the project team with the client to fine-tune the design.

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 pre-design, design and operate stages of the project life cycle.

Presentations to user groups using 3D models instead of the usual 2D drawings had the advantage of giving people a clear picture of how the building would actually look and a real feel for how it would work in practice.

Throughout the construction phase the main contractor and sub-contractors developed as-built models and these were combined with the digital operations and maintenance data.

See time lapse movie of project construction at: <http://www.snowgrass.co.nz/cust/tbig>



Challenges and constraints

Although not grand by scale, the building is technically complex. It was important to work through the design details with user groups to ensure their requirements were met and to agree the optimum configuration of work spaces, patient care areas and the placement of high value medical equipment, such as CT scanners. The virtual models created with BIM greatly assisted this, enabling the client and users to visualise the end result. A lack of accurate model object libraries was a challenge that needed to be worked around.

This complex project involved input from more than 60 consultants. Virtual online design meetings made it easy for the geographically dispersed team to have input. Cloud based software was used for issuing, sharing and tracking models, drawings and specification documentation. Greater experience in using BIM across the project team would have expanded the opportunity for modelling in 4D (for construction scheduling) and 5D (for cost estimation).

The Kathleen Kilgour Centre needed to be built within a tight timeframe. This was achieved with collaborative and integrated project delivery methods enabled by BIM.

“To get maximum benefit from BIM it’s important to use it from the very start of a project and for every member of the project team to commit to value-added BIM deliverables and shared objectives.”

Dave Ebbett, The Building Intelligence Group,
Kathleen Kilgour Centre Project Manager

It was further assisted by the use of capped lump sum procurement which allowed early engagement of the main contractor in a staged and fast-tracked programme and consenting process.

Results and benefits

BIM has underpinned an innovative approach to the design, construction and operation of the Kathleen Kilgour Centre. Most importantly, BIM reduced the risks on the project. It was designed with fewer clashes and issues than could be expected on a technically complex project. Better co-ordinated building and data sharing using BIM technologies reduced re-work.

BIM provided a high level of visualisation that could be missed by traditional design methods. The term “build before you build” best describes how digital prototyping with BIM was used to test the design. It provided the opportunity to explore different options with the client. Better understanding of the plans encouraged better feedback and a fit-for-purpose result.

BIM will continue to add value to this project beyond construction through the use of YouBIM, a cloud-based, facilities management tool (see <http://youbim.com/video.html>). YouBIM puts the power of BIM into the hands of the owner to reduce operating and maintenance costs.

All of the subcontractor as-built digital models developed for the Kathleen Kilgour Centre are being supplied to YouBIM to become part of an integrated database. This means the design, fabrication, construction and asset data are captured forever to support operations and facilities management. YouBIM gives the owners instant access to this data for the operation and ongoing maintenance of the building through an easy-to-navigate, web-based 3D/BIM interface.

In the future when something at the Kathleen Kilgour Centre needs to be repaired, any authorised person can log on, go to the model, click on the relevant model

element and record what's wrong and YouBIM will send the relevant information about the job to the appropriate subcontractor. For instance, if a window is broken, YouBIM will provide the glazier with all of the required information, such as the size of the window and the type of glass, eliminating the need for a measure-up and call out fee. Over the life of the building, the potential savings that YouBIM can deliver are significant.

It is believed that this is the first project in New Zealand to use YouBIM.

Estimated cost

Total cost of the project was \$35 million. Using BIM for project design required an earlier commitment of funds and cost about the same as a traditional process but produced a better tested design. YouBIM costs \$US10,000 per 3,000m² and an annual service fee of \$US2000. The small cost of the YouBIM software platform will be more than offset by savings in operation and maintenance for the whole life of the facility.

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Further information on BIM in New Zealand

www.buildingvalue.co.nz/BIM-in-NZ