

# BIM in New Zealand — an industry-wide view 2014

Baseline information on the use  
of BIM across the New Zealand  
construction industry

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# BIM benchmark survey foreword

This is the first survey in what is planned to be a five year series that charts the progress of accelerating the introduction of Building Information Modelling into New Zealand's construction industry.

The Building and Construction Productivity Partnership identified the acceleration of BIM's introduction as the key strategy in producing a step change in productivity in the built environment and charged the BIM Acceleration Committee with the responsibility for bringing this about.

The BIM Acceleration Committee has been exceptionally fortunate to have had the continuing support of MBIE, BRANZ and a number of large private sector organisations all of whom share the view of BIM's importance to the construction industry.

We are especially pleased to partner with EBOSS on this initiative, and we thank them for their investment in managing and sponsoring this annual survey, with a commitment to do so for a full five years.

Finally, our sincerest thanks go to the Control Group of this survey who, by nature of their size, represent a significant proportion of the construction activity in New Zealand. This will provide a clear view of how the acceleration of BIM's introduction is progressing, as well as providing a method of identifying obstacles to this acceleration.

Regards,



**ANDREW REDING**

Chair, BIM Acceleration Committee  
Building and Construction Industry Productivity Partnership

## Control Group Organisations

22 Degrees	Maltbys
AECOM NZ	Mott MacDonald
Athfield Architects	MSC Consulting Group
Aquaheat Industries	MWH New Zealand
Archaus Architects	Nauhria Precast & Reinforcing
Architectus	Naylor Love Construction
AS Built	Norman Disney & Young
Assemble	NZ Strong Construction
Auckland University of Technology	Opus International Consultants
Barnes Beagley Doherr	Patterson Architects
Beca	Peddle Thorp
BGT Structures	RCP
Davis Langdon	Stephenson & Turner
Dominion Constructors	Structex
Envivo	The Warehouse Group
Fletcher Construction	University of Canterbury
Ganellen	University of Otago
Hawkins Construction	Victoria University of Wellington
Holmes Consulting Group	Warren & Mahoney Architects
Ignite Architects	Wellington City Council
Jasmax	Woods
Jensen Steel	WT Partnership
KTA	Xigo

Formed in 2006 EBOSS hosts a comprehensive architectural product library, with an active audience of 35,000 architects, designers, main contractors and tradespersons. At EBOSS we are interested in improving the communication of BIM information through the construction value chain and appreciate the opportunity to partner with the BIM Acceleration Committee and sponsor this research initiative.



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# Who are the BIM control group?

The BIM control group is a sample of 46 businesses or individuals who have been identified as key users of BIM technology within the building and construction industry. Representatives of these businesses completed a survey on BIM use. We intend to ask them to complete the same survey annually for five years. The findings will highlight how BIM is used, can be used, and how use changes over time. These findings will illustrate the value of BIM to others within the industry.

This survey was sponsored and managed by EBOSS. It was analysed by an independent researcher (a member of the NZ Research Association, ESOMAR, and Australian Market Research Society, bound by strict codes of research ethics and requirements). The independent researcher gives a view of the value of BIM within businesses that are currently using it.

89% (41 of 46) of these businesses used BIM in the last 12 months.

## A little about the control group businesses:

### Where their businesses are based:

Auckland	23
Bay of Plenty	1
Wellington	5
Canterbury	6
Otago/Southland	1
Other	3
Unspecified	7

### The size of these businesses:

Conglomerate (30+ employees)	26
Large (10-30 employees)	8
Medium (5-9 employees)	4
Small (2-4 employees)	1
Unspecified	7

### Profession of respondents:

Design/Engineer	13
BIM Professional	9
Project Manager	4
QS	3
Construction	5
Other (incl. Government, model creation, etc.)	4
Unspecified	8

# What is the use of BIM within these businesses?

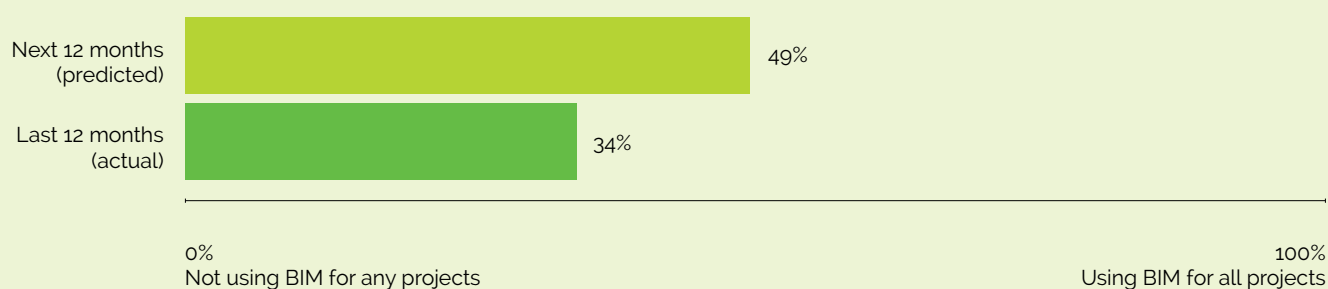
There are varying degrees of BIM use within the control group. Some said they used BIM for all projects in the last 12 months while 11% had not used BIM on a project in the last 12 months. As shown below, on average BIM was used for 34% of projects among this group over the last 12 months, with plans to increase this to 49% on average in the next 12 months.

80% of respondents are planning to increase their BIM use in the next 12 months (the proportion of projects completed by the business that they will use BIM for in some way), while the remainder either plan to remain at the same level or are not yet sure. None have said that they will decrease the proportion of total projects or number of projects they will use BIM for. This indicates that BIM itself is showing enough value in these businesses to warrant continued or increased use.

**Please note:** we asked participants about both the **proportion** of projects they use/will use BIM for AND the **number** of projects they use/will use BIM for. The increased number appears to outstrip the increased proportion (i.e. 8.4 projects or 49% of projects in the next 12 months will use BIM compared to 2.6 projects or 34% of projects in the last 12 months). This is due to the large increase in the number of projects anticipated in the next 12 months (i.e. on average 17.1 projects are expected in the next 12 months compared to 7.6 projects having been completed in the last 12 months).

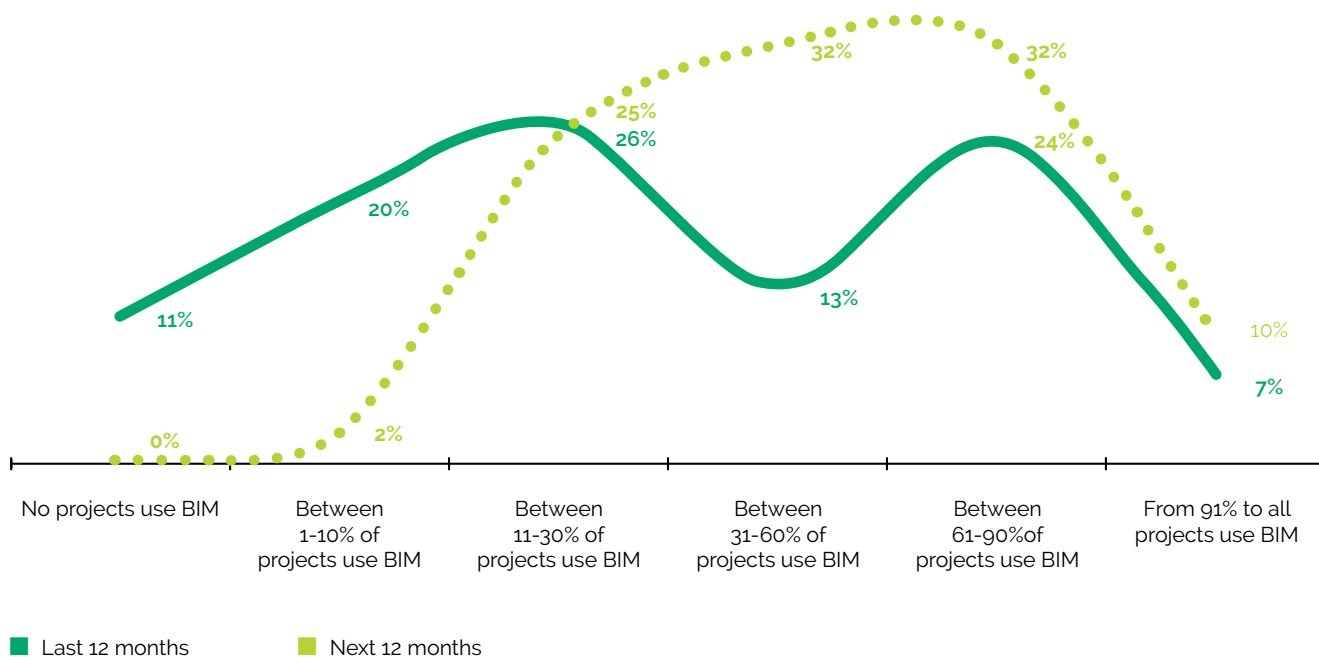
89% of survey participants were aware of the recently released (July 2014) New Zealand BIM Handbook.

## Average use of BIM in the last 12 months and next 12 months (proportion of projects)



## Spread of use of BIM in the last 12 months and next 12 months (number of projects)

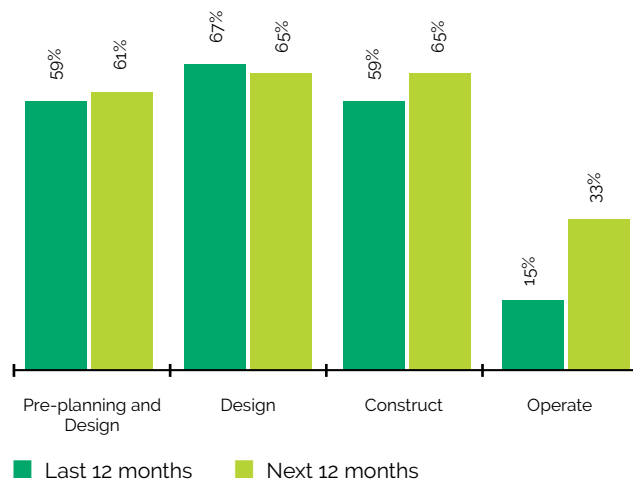
Estimated Proportion of projects using BIM



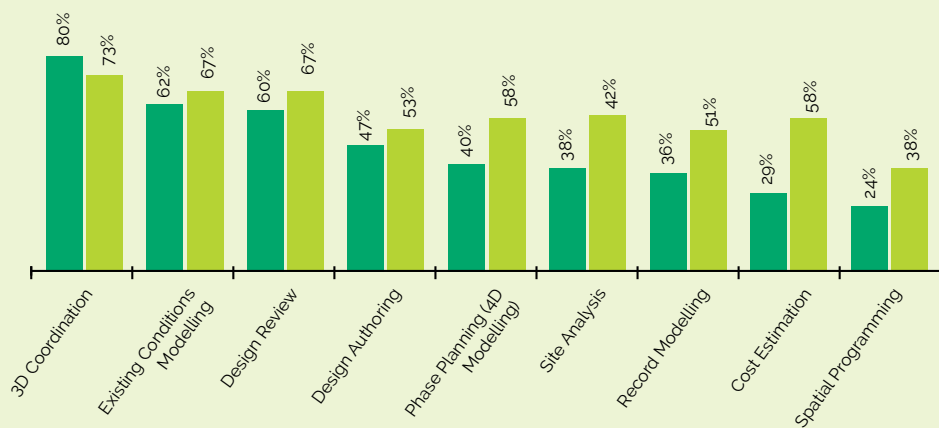
# What is BIM being used for?

BIM is used most frequently at the design phase of a build or project; this may be because about a third (13 of 46) of the participants identify themselves as a design/engineering professional. A further 9 identify themselves as a BIM professional, and 5 participants identify as a construction professional.

## Use of BIM across the project life cycle

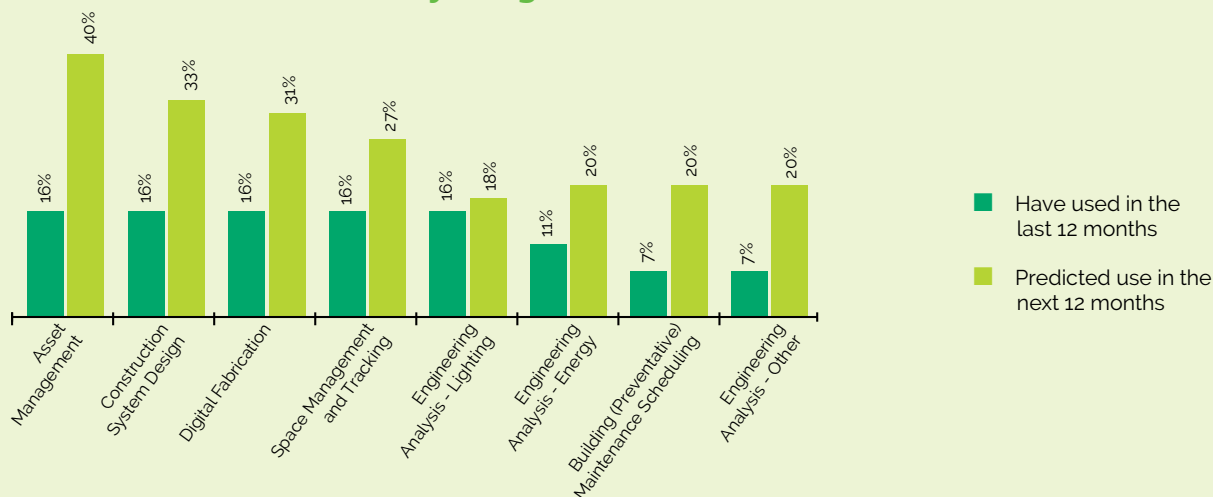


## BIM uses - Most popular



BIM use that ties into design (3D coordination, design authoring and design review, etc.) is currently the most popular, and the most likely to continue to be used in the future. Engineering analysis of various types are the least used among the control group. The charts to the left show those most and least used aspects over the last 12 months, and those most likely to grow in use in the next 12 months.

## BIM uses - Most likely to grow

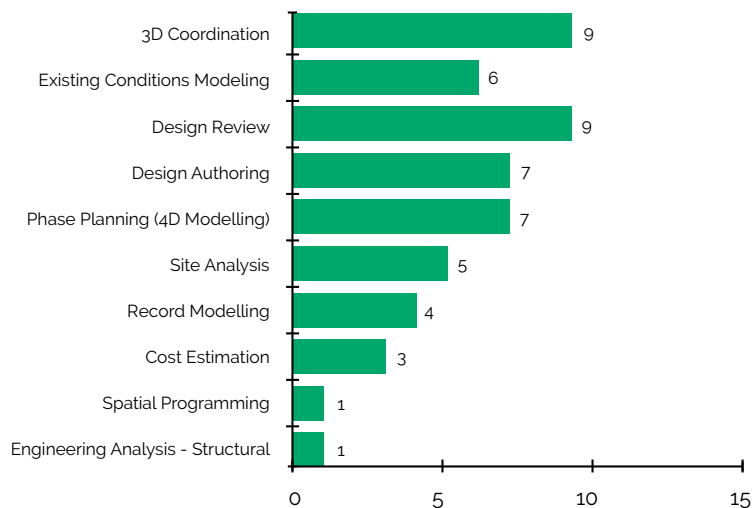


The chart below gives a fuller breakdown of the use of different aspects of BIM based on profession.

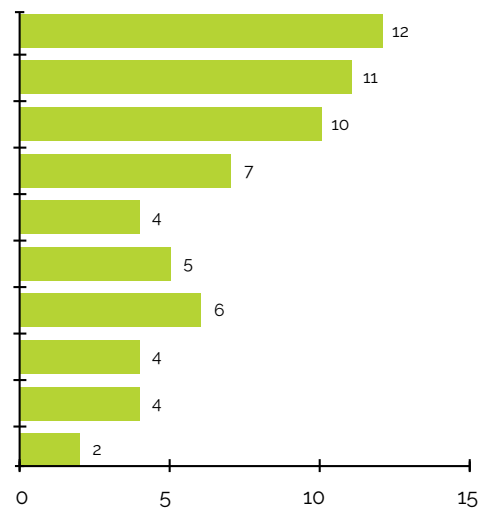
## The top 10 BIM uses in the last 12 months - by profession

**Note: Shows ACTUAL numbers not proportion (due to low sub-sample size)**

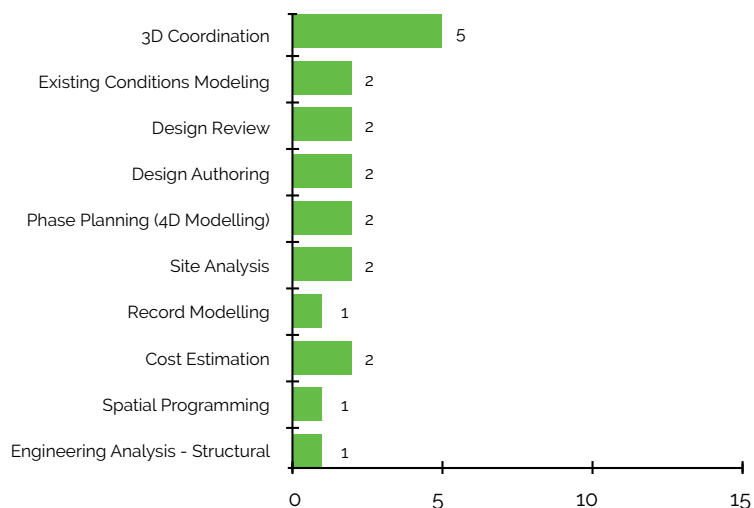
### BIM Professional (9)



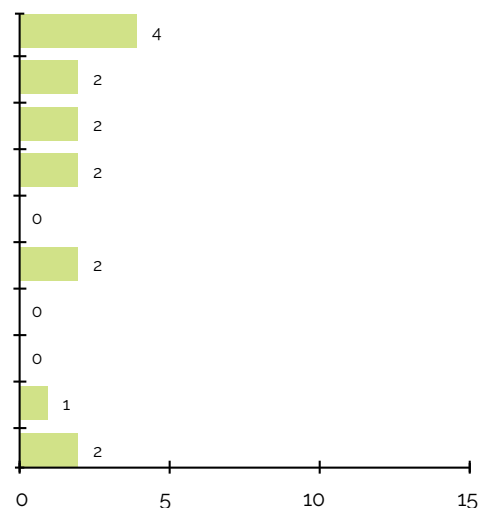
### Design Professional (13)



### Construction (5)



### Project Manager (4)





# Barriers to BIM

The respondents identified a number of up- and down-stream obstacles to realising the full potential of BIM on a project.

## Upstream:

Clients don't necessarily see the value of BIM or have not considered BIM within a project brief, so it is not costed for initial stages. This means not only is it not used for pre-design, it is also not used or not fully used in later stages of the project. It is treated as an added expense with no perceived value by the client.

"Competitive tender market, with clients/consultants unwilling to provide BIM models until contract awarded; this prevents use of the BIM model for pre-construction planning or tender cost estimation."

"Education of clients as to the benefits, proven cases for [facilities management] with BIM in NZ. Clients not going through pre-design stages with BIM in mind, and consultants on board with contracts in place when BIM is tabled as an idea, which consultants haven't costed for."

"Lack of client/industry education results in misaligned expectations of a BIM deliverable. A project BIM brief must be defined if BIM is required, but at present we have not seen a single one. This consistently makes it difficult for the project consultants to define a BIM execution plan, and to know how to deliver BIM on projects."

## Downstream:

Downstream there is a lack of knowledge/expertise and no imperative to realise the full potential of BIM. Clients are not providing briefs with BIM included nor pushing the envelope when it comes to BIM. There is poor motivation for contractors and consultants to upskill and fully understand the technology.

"Limited sub-contractor experience with BIM, let alone anything more advanced than a hand-markup for as-builts etc. Specialist technical subs better at this (ie mechanical, structural steel trades)."

"Difficulty in receiving adequate models from consultants. Models that have been received are often not spatially co-ordinated nor to a constructible form. Inconsistent modelling standards and element data (where provided at all)."

"Main problem is what is drawn by various consultant usually is not what the sub consultants want to do (they have their own ideas). Poor export/import of the information exchange files. Lack of general understanding and willingness, lack of responsibility from other consultants."

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In addition to these issues, there is also a perceived lack of knowledge/expertise and standards according to those surveyed. This means work that is completed isn't always valuable for those using it downstream and some surveyed say the work they have provided to them needs to be redone to be able to create that something valuable enough for them to use in their portion of the construction project. BIM use has not yet reached a point where all consultants need to be well-versed in it and working to industry standards.

"Lack of expertise and knowledge among consultants results in bad modelling/poor BIM practices, creating difficulties in extracting accurate, reliable data, and negating good coordination. Lack of industry standards/processes/workflows to ensure all project teams are working together collaboratively. From our experience most consultants still have an 'every man for himself' approach to collaborating in BIM, and do not take the BIM Execution Plan seriously. Most projects do not have the size/budget to employ a Project BIM Coordinator to enforce or officiate the BIM standards."

"Older staff adopting new processes and technologies have proven to be a barrier. We are addressing this by providing extensive training and a stronger stance from senior management. From a 5D perspective, lack of detail in some consultant's models, or lack of systems in terms of elemental naming procedures etc have rendered some models useless. In some cases we have combatted this by having models re-built by specialist BIM outsourcing companies offshore."

# What would enable greater use?

When survey participants were asked what would need to happen for their company to use BIM more. There were several recurring themes:

Greater collaboration and changes to contracts towards IPD (integrated project delivery).

"More client drive towards use of BIM in integrated procurement methods i.e. IPD or ECI (early contractor involvement)."

.....  
"We need buy-in from all the stakeholders, we need contractors to be up to speed. IPD contracts would also allow us to progress as a one team approach."

Consideration of BIM at costing stage – may mean more collaboration between quantity survey and design, or it may mean that clients have a greater level of buy-in to the value BIM can offer.

"Projects procured on more collaborative basis."

Increasing client and contractor acceptance of BIM – likely through proof and case studies that show the value it can offer when used to its full potential.

"Clear Client demand. Reliable BIM 'accreditation' for project partners to ensure 'big picture' success. Recognition of internal organisation that BIM requires development budget and top down commitment outside of spend on project."

Proof/case studies to show the value of BIM

"The industry in NZ needs to trial a couple of the simpler projects to enable the BIM 5D to be used, analysed, critiqued, improved and amended. At present we would not carry out a project using 5D without a back-up check being done by our traditional methods. This obviously would cost time and money."

Standards and accreditation across the industry.

"Metadata standards for buildings developed and implemented. Design/operate discussions at project commencement to enable capability and interoperability benefits."

Wider adoption of BIM across the industry, which will increase the motivation to upskill.

"Major up skilling of the industry to understand the requirements and benefits obtained from a BIM approach, and how the modelling/documentation needs to be carried out. [For example defining] who "owns" what at which design stage [this] means physically handing over the elements to the actual design owners; architects will not want to, but they must in order for BIM to work."

# Are there wider benefits?

Improved communication is a recurrent theme in the benefits of BIM to the respondents' businesses. Some talked about much better communication internally, with teams within the business collaborating a lot more than previously and a culture change (improved) based on this. Others talk about communication between parties on the project, with a more transparent design phase, the ability to make trade-offs between cost and design, and talk through issues at an earlier stage. BIM also enabled better client consultant communication – improving the brief from the client and/or understanding of design intent.

"Getting our staff to work in a collaborative manner, no one works or should work in silo."

"When firms commit to BIM it becomes a culture building tool internally due to the nature of how integrated it demands the project teams and others to be."

"Improved planning through 4D construction sequence simulation. Vastly improved comprehension of design intent. Vastly improved cross-discipline communication and coordination through clash detection, therefore earlier identification of issues, reduced errors on site, reduced variations and less arguments. Improved cost control. Improved company image – seen as a progressive company that is up with the latest processes and technologies – therefore attractive to existing and prospective clients, existing and prospective employees."

Beyond communication, BIM also reduced some of the risks on projects – enabling the team to identify issues earlier, better co-ordinate the project, reduce errors on-site, and to and manage costs better and earlier in the process.

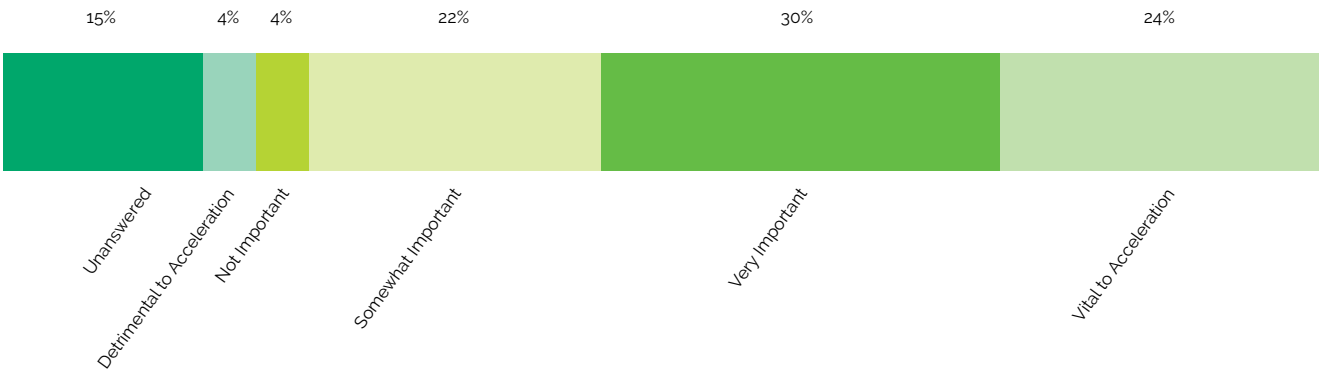
"Better coordinated results. Forces us to extract better briefs and be better project managers."

"Design/site analysis allowing greater potential to identify construction issues and plan accordingly – reduces risk. Better communication medium to explain construction methodologies."

# What role should the government play?

Survey participants were asked about the importance of the government's role as a client in accelerating the development and use of BIM in New Zealand. As the chart below shows, the government's role as a client is seen as critical – government and industry partnerships play a strong role in BIM acceleration and development. 54% stated they thought the government's role was vital or very important to development.

## The importance of the Government's role in accelerating the development and use of BIM within New Zealand



# Conclusions

As this is the first survey in what is intended to be a five-year series of surveys providing comparative data, no definitive conclusion can be reached.

However, some noteworthy messages can be drawn, chiefly:

- The use of BIM in projects worked on by the respondent group is quite widespread (34% of projects worked on by the group involved some use of BIM).
- The use of BIM in projects worked on by the respondent group is expected to show strong growth (49% of future projects as opposed to 34% of current).
- 76% of respondents thought there was a positive role for the government to play in accelerating the introduction of BIM into the New Zealand construction industry.

The overall picture is of BIM, and its processes, is increasing in use and importance among those organisations currently using it. Improving both upstream and downstream awareness and acceptance of BIM is critical, and the government can take a lead role on this as a major client of the construction industry.

We look forwards to being able to compare these results when the next survey is undertaken and published next year.

Finally, our thanks go again to EBOSS for managing and sponsoring this survey, and the control group who participated in the survey, their time and effort is much appreciated.