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NZ Wood Design Guides

CONSENTING TIMBER BUILDINGS

Chapter 6.1 | February 2020

Wood Processors & Manufacturers Association of New Zealand

NZ Wood Design Guides

A growing suite of information, technical and training resources, the Design Guides have been created to support the use of wood in the design and construction of the built environment.

Each title has been written by experts in the field and is the accumulated result of years of experience in working with wood and wood products.

Some of the popular topics covered by the Design Guides include:

- Quantity Surveying Guide for Timber Buildings
- Designing for Prefabrication
- Cassette Panels for Floors, Roofs and Walls
- Standard Connection Details
- Acoustical Design and Detailing
- Fire Safety Design in Timber Buildings

To discover more, please visit http://nzwooddesignguides.wpma.org.nz

NZ Wood Design Guides is a Wood Processors and Manufacturers Association (WPMA) initiative designed to provide independent, non-proprietary information about timber and wood products to professionals and companies involved in building design and construction.

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IMPORTANT NOTICE

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Funding for the NZ Wood Design Guides is provided by our partners:

1. INTRODUCTION

The global innovation in Engineered Wood Products (EWP) and advances in fastener and connector design and manufacture has enabled timber to be used in applications traditionally associated with steel and concrete construction. New Zealand has and continues to play a pivotal role in the development of damage avoidance seismic restraint systems in timber structures which has seen uptake both here in NZ and overseas. Equally New Zealand has embraced overseas innovative technology and methodology particularly in commercial and multi-tenancy (Medium Density Housing/mid-rise) timber construction.

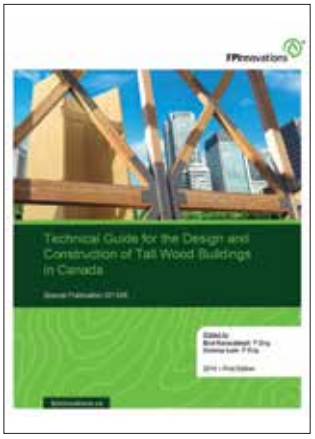
Improving availability of overseas construction products has aided adapted adoption of taller and bigger timber structures beyond its traditional residential construction in New Zealand. Updated design standards also reflect this globalization in closer alignment of NZS standards with Australia and Europe in particular.

Theoretically our performance based regulatory framework enables acceptance and hence uptake of locally developed and overseas adopted design and construction methodology, joining other jurisdictions around the world in recognising that wood construction creates a sustainable built environment. International and local research supports the technical changes captured in updated design standards which are used as a means of compliance with the NZ Building Code. Further work is being undertaken to add new prescriptive provisions for wood construction in the form of Acceptable Solutions beyond NZS3604.

The Canadian and Australian regulators have embraced timber in MDH/Mid-rise construction by establishing 'deemed to satisfy' compliance pathways through Building Code changes. The National Building Code of Canada (NBC) now permits the construction of six-storey residential, business, and personal services buildings using traditional combustible construction materials. Similarly does the Australian National Construction Code (NCC) facilitate the use of timber structural elements in mid-rise construction.

British Columbia (BC) is arguably leading the charge in mid-rise construction with more than 100 five- and six-storey light timber frame buildings completed in BC since 2009, and many others either designed or under construction. There appears to be market confidence in this new type of building with their municipalities appreciative of timber mid-rise providing affordable and sustainable ways to accommodate their growing populations, as well as creating more complete and resilient communities.

New Zealand still remains at the cusp of taking advantage of the opportunities that MDH/mid-rise timber construction presents. Taking learnings from completed local and overseas mid-rise developments, builders, architects, engineers, and developers continue to expand their knowledge and best practice for mid-rise timber construction in New Zealand.

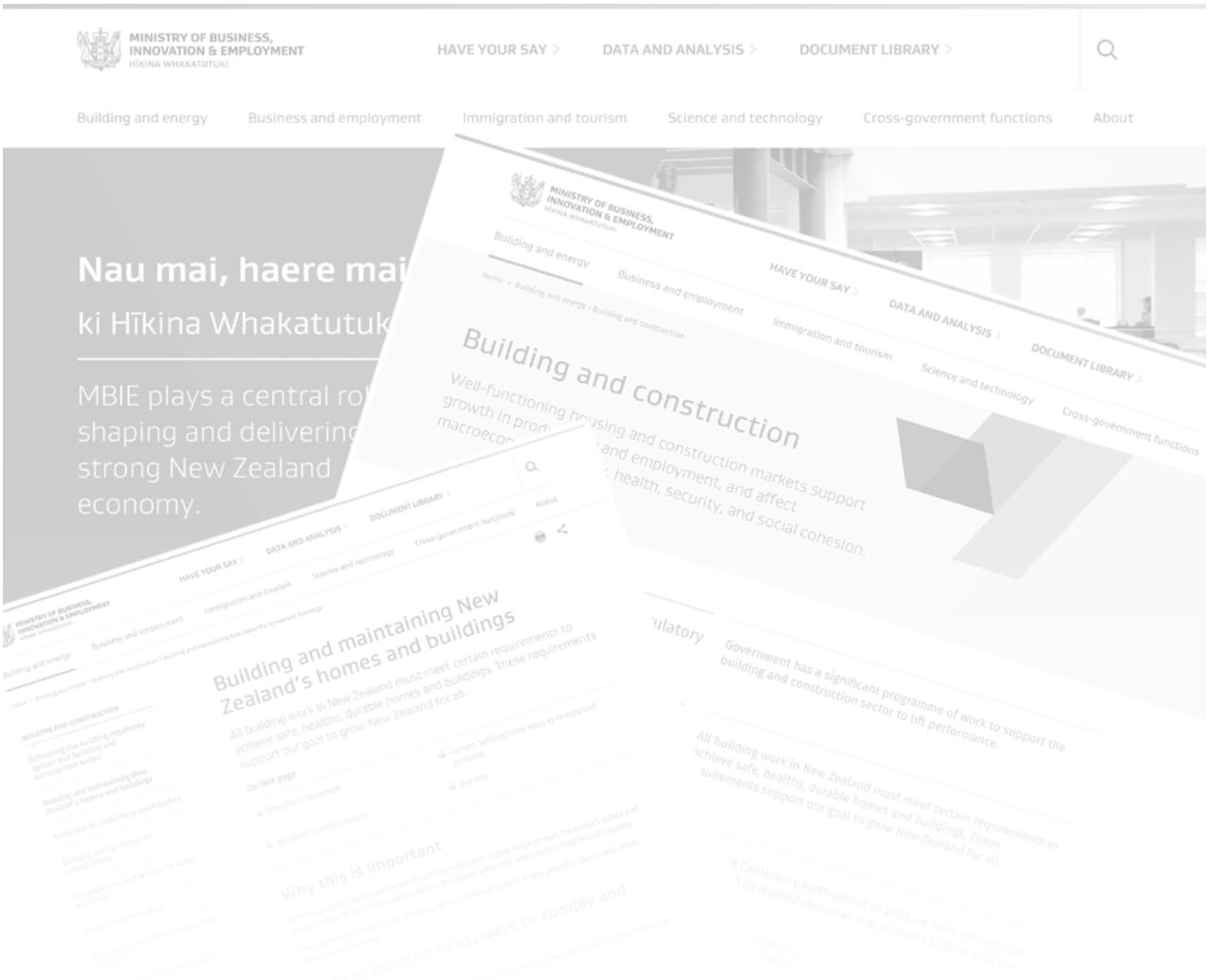


2. COMPLIANCE OF TIMBER BUILDINGS AND MATERIAL

New Zealand's building regulatory framework, associated building consent process, and product assurance are not specifically unique to timber. The application of and building typology in which timber is being increasingly used however challenges our 'status quo' in both commonly accepted practices and in familiarity beyond the traditional timber framed residential housing.

Establishing Building Code compliance can be a difficult hurdle to overcome and this guide aims to provide some background to our regulatory framework and key Building Code clauses of particular interest to timber buildings for which compliance must be demonstrated to assist in navigating the various compliance pathways.

While the building regulatory framework and compliance pathways are not unique to timber, the guide provides a ready overview of aspects most relevant to timber buildings and materials. Much more detailed information on New Zealand's complete regulatory framework can be researched on the Ministry of Business Innovation and Employment's (MBIE) website. The content of this guide has also been kept relatively generic to avoid information becoming obsolete or irrelevant, and again the MBIE website should be consulted to find the latest Building Code and Regulations, and other industry organisations' websites be referred to for the most up to date information.

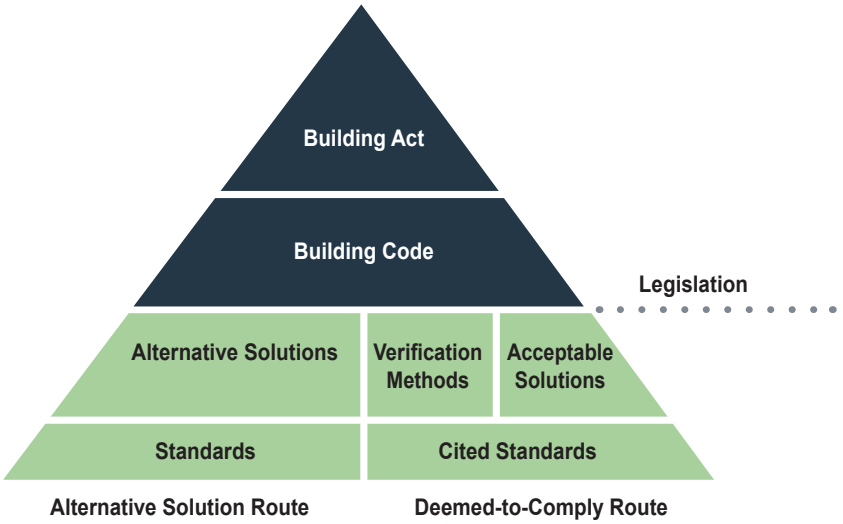


3. THE BUILDING REGULATORY FRAMEWORK

3.1 ROLES AND RESPONSIBILITIES

Our construction sector is governed by law which under the oversight of our regulator is enforced by Territorial Authorities or Building Consent Authorities. Legislation and regulations work in unison as the building performance system under the following hierarchy:

- Building Act 2004 – the primary legislation governing the building and construction industry
- Building Regulations – detail for particular building controls (for example prescribed forms, list of specified systems, levies, fees and infringements)
- Building Code – contained in Schedule 1 of the Building Regulations 1992, sets the minimum performance standards buildings must meet.



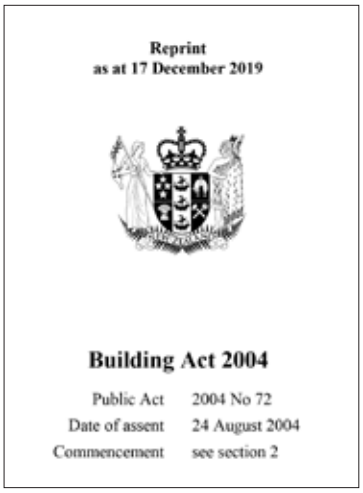
Regardless of whether building consent is required for building work, all building work must comply with the Building Code. Where building consent is required, a Building Consent Authority will assess evidence of compliance with the Building Code as presented by the applicant, and if satisfied will issue a building consent. Various pathways are available to applicants to establish compliance with the Building Code, including the use of Verification Methods, Acceptable Solutions, Determinations, Product Certification, MultiProof Certificates, or Alternative Solutions.

The Ministry of Business, Innovation and Employment (MBIE) is the over-arching regulator providing leadership of the building and construction sector. As the regulator its role is to manage the system that controls and monitors building work, and includes reviewing the Building Code and producing documents that show how to comply with it. MBIE also oversees the performance of BCAs, with the ability to investigate complaints and making determinations on building related disputes.

Territorial Authorities (TAs) (District and City Councils) also have a range of building and construction related responsibilities above and beyond those of their Building Consent Authorities. TAs keep records of properties in their area, issue Project Information Memoranda and Certificates of Acceptance and monitor compliance schedules. They also manage earthquake-prone buildings in their area as well as having policies to deal with dangerous and insanitary buildings. They also have powers to address breaches of the Building Act including issuing of infringement notices.

3.2 BUILDING ACT 2004

The Building Act 2004 sets out the requirements for the construction, alteration, demolition and maintenance of new and existing buildings in New Zealand. It is the primary legislation governing buildings and building work, and its aim is to provide for performance of buildings and to improve control of and encourage better practices in building design and construction to provide greater assurance to consumers.


Reprint
as at 17 December 2019

Building Act 2004

Public Act	2004 No 72
Date of assent	24 August 2004
Commencement	see section 2

Design and construction of any structure in New Zealand must be undertaken under legislated requirements stipulated in the Building Act 2004. The legislation is law that is set by government and has further documents that relate back to this legislation. These further documents might be under the control of the regulator but could equally be general guideline documents that often capture typically accepted methodology relating back to the legislation itself.
It also contains provisions to ensure existing buildings are incrementally improved, particularly regarding means of escape from fire, sanitary facilities, access and facilities for people with disabilities and in relation to buildings which are earthquake-prone.

Late 2004 the Building Act 2004 repealed the Building Act 1991, which in turn had replaced a number of previous Acts, Regulations and Territorial Authority bylaws in 1991. The introduction of the Building Act 2004 included a transition period from 2004 until March 2005, followed by a subsequent Building Amendment Act 2005 to clarify interpretation and other transitional aspects.

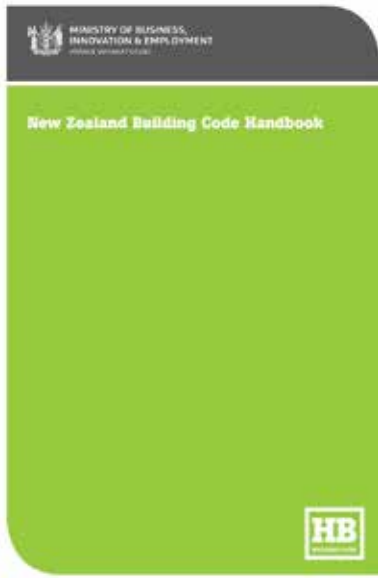
3.3 BUILDING REGULATIONS

Around the same time that the Building Act 2004 was introduced, a number of other building related regulation came into effect. There are numerous Building Regulations each focusing on specific aspects of the building work itself, establishing or verifying compliance with the Building Act, or in respect of those that administer or effect the Building Act.

While some building regulations can specifically affect design and construction of more unique or bespoke timber structures, like the Building Act and Building Code, building regulations apply generically to all building work rather than being timber specific. The most relevant building regulations include:

- Building (Forms) Regulations 2004 and subsequent Building (Forms) Amendment Regulations 2005 and Building (Forms) Amendment Regulations (No2) 2005 guide the forms and processes of Building Control
- Building Levy Order 2005 guiding levies paid to the regulator (MBIE) and Building (Fee for determinations) Regulations 2005 guiding fees set for determinations requested from the regulator.
- Building (Specified Systems, Change of Use, Earthquake-prone buildings) Regulations 2005 and subsequent Building (Specified Systems, Change of Use, Earthquake-prone buildings) Amendment Regulations 2005.

3.4 BUILDING CODE



The introduction of the Building Act 1991 was followed by the Building Code (or NZ Building Code), which sets out the performance criteria that building work in NZ must adhere to. The Building Code is a set of minimum requirements for buildings that address objectives of safety, health, accessibility, property protection, resource conservation, environmental integrity and conservation of buildings. These minimum requirements are set on a performance based approach, providing flexibility in how functional requirements might be satisfied.

The Building Code is presented in eight sections;

- Section A General Provisions,
- Section B Stability,
- Section C Fire Safety,
- Section D Access,
- Section E Moisture,
- Section F Safety of Users,
- Section G Services and Facilities, and
- Section H Energy Efficiency.

Each of these broad sections is then further defined by a number of different clauses within it, referenced by its principle section letter followed by the clause number. Ie. Section A has three general provision clauses documented as A1, A2, A3 – being classified uses, interpretation and building importance levels respectively. Similarly for the remaining seven (B to H) sections, all of which combined capture a total of 38 technical clauses. Further detail on the Building Code clauses is provided in section 4 of this guide.

3.5 ACCEPTABLE AND ALTERNATIVE SOLUTIONS

With the Building Code requirements being performance based rather than prescriptive, MBIE publishes documents known as “Acceptable Solutions” which provide more prescriptive (and some performance) design solutions which if met, establish conformance with the minimum performance level of the Building Code itself. MBIE also publishes verification methods which are calculative or test based methods of compliance.

Where acceptable solutions or verification methods do not exist to establish Building Code compliance (eg. a proposed building is outside the scope of an acceptable solution or verification method), other means of compliance pathways are available to designers. These include use of Product Certification, National MultiProof Certification, or in a limited number of cases determination from MBIE. In using these defined means of compliance, evidence is needed to show that the requirements of the relevant document have been met. If none of these are available, then an “Alternative Solution” can be used to provide evidence to Building Consent Authorities, and can use non-referenced or overseas documents, testing, or methodology, related back to NZ Building Code context and performance requirements. Here the requirement is to provide evidence of compliance with the performance clause of the building code. As the performance clauses are not prescriptive, acceptable solutions in particular can provide useful insights into compliance.

While “Acceptable Solutions” are legally deemed to be compliant with the Building Code, “Alternative Solutions” can be scrutinized by Building Consent Authorities to provide them the required confidence on reasonable grounds that the proposed solution meets performance requirements of the Building Code. “Alternative Solutions” may address a specific aspect (or clause) of the Building Code or multiple requirements across different clauses.

3.6 DESIGN STANDARDS

Standards can be cited in legislation or regulation, or they may be published to provide guidance or represent industry best practice.

Where standards are cited or referenced in legislation or regulation they are a means of establishing compliance with that legislation, regulation, or parts thereof. Whether cited standards are the only means of compliance – ie. are mandatory – will depend on the extent to which they have been cited in the legislation or regulation. Often they are not the only means of compliance and hence other standards can be used as an alternative solution if desirable. Cited standards typically are prescriptive in format and can be more conservative in nature.

Standards that are not cited are not mandatory, and do not form a legal part of the regulatory framework. These standards however are still created through a robust development process involving expert committees and including public comment, and publish agreed industry best practices to ensure safety and quality of products or application.

Not all standards are unique to New Zealand, and indeed joint standards particularly with Australia are becoming more prevalent. Joint Australia/New Zealand Standards can be beneficial in promoting the uptake of timber innovation across both jurisdictions, and aid in achieving greater harmonization which can have cost benefits through scale. Development of joint standards can be more complex logistically given the vested interests of multiple countries, however where good synergies exist in content the development cost shared across countries provides for more cost effective standard development than single country standards.

3.7 VERIFICATION METHODS

Verification Methods are identical to Acceptable Solutions in that they provide methods which if followed establishes compliance with the performance criteria of the Building Code. Verification Methods however do not provide pre-determined solutions but rather they define calculation or test methods that prescribe one way to comply with the Building Code requirements. Verification methods therefore can include analytical methods and mathematical models, laboratory testing of prototype components or systems (often destructive), or in-situ testing (non-destructive) specifically suited to prescribed related Building Code requirements.

3.8 PRODUCER STATEMENTS

Producer statements are well-established and widely used, though they have no particular status under the Building Act 2004. Their purpose is to help support building consent applications (and code compliance certification), as a professional opinion based on sound judgment and specialist expertise.

A producer statement is neither a product warranty nor a guarantee of compliance. Producer Statements are used as a source of information which the Building Consent Authority may rely upon if deemed accurate and reliable, to determine whether there are reasonable grounds to conclude that the work complies with Building Code requirements.

In considering whether to accept a producer statement, a Building Consent Authority will normally assess the credentials of the author to ensure the individual has the appropriate experience and competence in their particular field of expertise and that the individual or company also hold adequate insurance cover.

Because Producer Statements have no status under the Building Act, they are assessed on their own merits. Engineering NZ holds and shares information about its members which BCAs can access to help establish an individual's credentials and competence. While many BCAs are satisfied with the information ENZ publicly share, others have created their own registers of Producer Statement Authors. This allows them to record and track authors experience, field of expertise, insurance, and currency to provide them with the confidence required to rely on Producer Statements issued by those Authors. While arguably these BCAs' own registers are duplicates of the information held by ENZ, with ENZ only being a professional body for, rather than regulator of engineers the BCAs often seek more detailed information from individual engineers to capture in their own registers than they might be able to extract from the publicly available information ENZ publish.

Producer statements are typically used for specialist work, such as engineering, or where there is a proprietary product which is installed by appointed contractors. Aspects of this work are often outside the Building Consent Authority's in-house expertise and a producer statement can assist in determining whether the building work complies with the Building Code. Building Consent Authorities exercise judgement when considering producer statements and how much weight to give them.

There are currently four types of producer statement, all with generally widespread acceptance. They are known as:

- PS 1 – Design
- PS 2 – Design review
- PS 3 – Construction (often used by the installers of proprietary systems or product suppliers)
- PS 4 – Construction review.

Building Consent Authorities generally identify when they expect to receive producer statements during the Building Consent or construction process. Where this is the case during construction, then Construction Monitoring may also form part of the Producer Statement process. Contractors and suppliers will need to be aware of Construction Monitoring and/or PS3 or PS4 documentation requirements and associated stipulated building consent requirements.

3.9 PEER REVIEW

Peer reviews are an independent assessment of another engineer's work conducted by a peer with at least the same level of expertise, who will provide a professional opinion on the suitability of the proposed engineering solution. The assessment can be for a complete project or for only specific aspects. Often peer reviews are requested by BCAs on matters where their in-house expertise or capacity is limited, however the peer review process can also be a useful quality assurance tool for engineers to use even where not required by a BCA. Equally a peer review may be initiated as part of investigations associated with failures (product or design), or at preliminary stage to 'test' concepts before more detailed design is initiated.

Ideally peer reviewers should be independent of the originating engineer though this can be difficult particularly for more innovative and complex timber projects where expertise in NZ is limited. It might be appropriate to engage overseas expertise so long as there is understanding of local conditions, materials, standards or other influence unique to NZ. Alternatively, where full independence cannot be achieved, potential conflicts of interest must be identified and the impact on ethical obligations be considered; peer reviewers must not have any financial or other interest in the outcome of the peer review.

Where a peer review provides assessment of compliance with regulations, codes, standards or guidelines, this is referred to as a Regulatory Peer Review. A regulatory peer review can still be initiated by an engineer or their client for the purpose of quality assurance, but might equally be requested by a BCA. Typically a regulatory peer review is triggered by projects that are:

- Complex
- Unique
- Utilising innovative technology (materials, systems, etc) or processes (design methodology, etc).
- Of high risk
- Designed by an engineer with limited or developing knowledge or skills

While BCAs may use regulatory peer reviews as an opinion on the suitability of the design in establishing compliance with the Building Code requirements, this does not absolve the BCA from the compliance review itself.

If BCAs engage an engineer to provide an assessment of and report on the compliance of a design, then this is referred to as a Compliance Review rather than a Regulatory Review. A compliance review can be a formal part of the building consent process, and the reviewing engineer will need to complete a Producer Statement 2 Design Review (PS2).

This document along with the design review report and log of communication between the reviewer and originating engineer, confirms to the BCA that the reviewer, based on stated reasonable grounds, considers that the proposed building work aspects covered in the scope of engagement will comply with the Building Code.

PRODUCER STATEMENT – PS2 – DESIGN REVIEW

ISSUED BY: .....

TO: .....

TO BE SUPPLIED TO: .....

IN RESPECT OF: .....

AT: .....

Town/City: ..... LOT ..... DP ..... SO .....

We ..... have been engaged by .....

3.10 DESIGN FEATURES REPORTS

BCAs may request Design Features Reports (DFR) to aid in assessing the proposed building works for Building Code compliance. DFRs capture the engineer's design methodology by describing a projects key aspects including design actions, load paths, geotechnical conditions, assumptions and foundation design principles, as well as lateral load resisting systems employed in the project. They hence help 'set the scene' in respect of any detailed design undertaken or validation of applicability of acceptable solutions or verification methods being referenced. This can also highlight key critical aspects unique to a project which may require specific monitoring, review, or inspection that should be included in consent conditions. A well prepared DFR captured in consent documentation can also provide valuable reference to future owners and to engineers engage to provide design input for additions and alterations.

3.11 CONSTRUCTION MONITORING[1]

Construction monitoring is an independent verification provided by a suitably qualified person to a client. This can also be a combination of engineers or technical staff and Building Control Officials. It confirms that construction has been completed according to the building consent. Engineers are required to specify the most appropriate construction monitoring level required for the building work.

There are five levels of construction monitoring service defined, and the level appropriate to a project is dependent on a number of factors including:

- The size of the project
- The importance level of the project
- The complexity of the construction works
- The experience and demonstrated skill in quality management of the constructor

The level of involvement of the engineer during construction depends on the project. Particularly for more complex projects a greater level of engineer engagement during the construction phase can be beneficial to ensuring the design is correctly interpreted and construction techniques are appropriate, resulting in the completed works being in accordance with plans and specifications. A greater level of engagement between engineer and contractor also reduces the risk of non-compliance being established only upon completion of the construction works and therefore can be cost advantageous.

Similarly, alternative design and construction methods can result in different levels of construction monitoring being required. Hence a client may want to consider the effects of design and construction costs versus the associated construction monitoring being required, and then make an informed decision on the best solution for their particular project.

The different construction monitoring service levels are *(next page)*:

[1] *'Construction Monitoring Services' guidance published by Engineering NZ*

CONSTRUCTION MONITORING SERVICE		
LEVEL	**REVIEW**	**COMMENT**
CM1	Monitor the outputs from another party's quality assurance programme against the requirements of the plans and specifications. Visit the works at a frequency agreed with the client to review important materials of construction critical work procedures and/or completed plant or components.Be available to advise the constructor on the technical interpretation of the plans and specifications.	This level is only a secondary service. It may be appropriate where: - For the design consultant when another party is engaged to provide a higher level of construction monitoring or review during the period of construction or - When the project works are the subject of a performance based specification and performance testing is undertaken and monitored by others.
CM2	Review, preferable at the earliest opportunity, a sample of each important work procedure, material of construction and component for compliance with the requirements of the plans and specifications and review a representative sample of each important completed work prior to enclosure or completion is appropriate. Be available to provide the constructor with technical interpretation of the plans and specifications.	This level of service is appropriate for smaller projects of a routine nature being undertaken by an experienced and competent constructor and where a higher than normal risk of non-compliance is acceptable. It provides for the review of a representative sample of work procedures and materials of construction. The assurance of compliance of the finished work is dependent upon the constructor completing the work to at least the same standard as the representative sample reviewed.
CM3	Review, to an extent agreed with the client, random samples of important work procedures for compliance with the requirements of the plans and specifications and review important completed work prior to enclosure or completion as appropriate. Be available to provide the constructor with technical interpretation of the plans and specifications.	This level of service is appropriate for medium sized projects of a routine nature being undertaken by an experienced constructor when a normal risk of non-compliance is acceptable.
CM4	Review, at a frequency agreed with the client, regular samples of work procedures, materials of construction and components for compliance with the requirements of the plans and specifications and review the majority of completed work prior to the enclosure or on completion as appropriate.	This level of service is appropriate for projects where a lower than normal risk of non-compliance is required.
CM5	Maintain personnel on site to constantly review the work procedures, materials of construction and components for compliance with the requirements of the plans and specifications and review completed work prior to enclosure or on completion as appropriate.	This level of service is appropriate for - Major projects where the consequences of failure are critical - Projects involving innovative or complex construction procedures. The level of service provides the client with the greatest assurance that the work complies with the requirements of the plans and specifications.

3.12 RESOURCE CONSENT

The Resource Management Act 1991 (RMA) requires local councils to ensure that effects on the environment are managed sustainably. Councils manage this requirement in a similar manner to the building consent process. Applicants will provide detail of their proposed works and the impacts on the environment which council will review in granting or declining resource consents. Impacts on the environment for which a resource consent is required can include building a new house or garage, subdividing their property, discharging wastewater into a stream, moving earth, or discharging pollution into the air. Again as with building consents, some resource consents will be straightforward and easier to assess while others will be more complicated depending on the impact on the environment. The resource consent process acknowledges the level of complexity by providing different resource consent 'pathways' or requirements. More complex resource consent applications or those of national significance must be decided by a board of inquiry or the Environment Court instead of the local council.

The Ministry for the Environment provides useful guidance intended for resource consent applicants in its 'An Everyday Guide to the RMA', which is available for free download from their website.

4. THE BUILDING CODE

4.1 CODE STRUCTURE AND CLAUSES

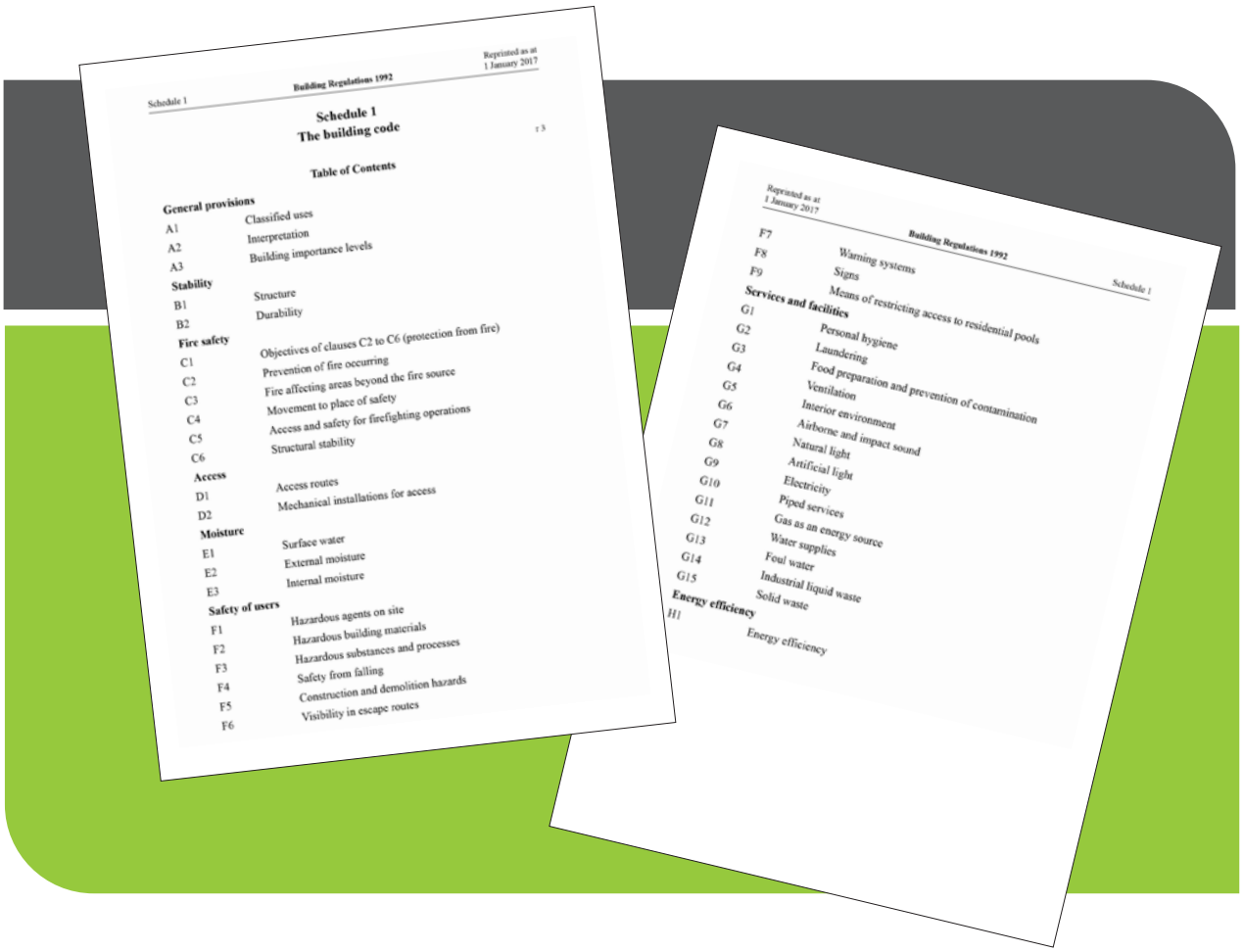
The Building Code is presented in eight sections; Section A General Principles, Section B Stability, Section C Fire Safety, Section D Access, Section E Moisture, Section F Safety of Users, Section G Services and Facilities, and Section H Energy Efficiency. Each broad section is further defined by a number of different clauses within it, referenced by its principle section letter followed by the clause number. Ie. Section A has three general principles clauses documented as A1, A2, A3, and similarly for the remaining seven (B to H) sections that capture a total of 38 technical clauses.
All of these 38 clauses follow a consistent structure in identifying the:

1) Objective of the clause,

2) Functional requirement -> ie the functions to be performed in order to meet the objective,

3) Performance -> ie the performance criteria which if met will satisfy the functional requirements and hence meet the objective of the clause.

Other sections will ultimately need to be considered also, however for the purpose of this Guide Sections A, B, C, and E are likely to require greatest consideration when designing or constructing timber structures and hence these are explored in more detail in this chapter of the guide. Further detail on other sections can be found on the MBIE website.



4.2 SECTION A

Section A contains three general provision clauses that cover:

A1 Classified Uses

A2 Interpretation

A3 Building Importance Levels

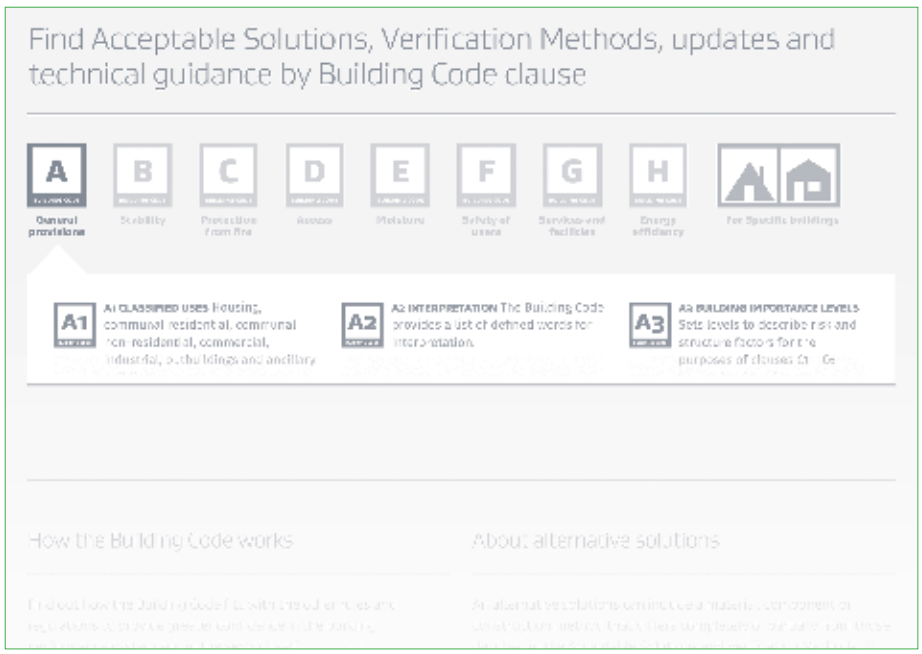
Clauses A1 and A3 in particular 'set the scene' for the proposed design and identifies the Building Code limits of application.

Clause A1 provides classification categories to identify the intended occupancy and function of the building:

- Housing
- Communal residential
- Communal non-residential
- Commercial
- Industrial
- Outbuilding
- Ancillary

As not all parts of the Building Code apply to all classified use categories, determining the appropriate classified use will inform parts of the Building Code needing to be met for the specific project. It is worth noting that as set out in section 7 of the Building Act, a building with a given classified use can have one or more 'intended uses'.

Clause A3 provides a building's importance level based on risk to human life, the environment, economic cost and other risk factors in relation to its use. It is noted that Clause A3 is specifically provided for the purpose of risk in relation to the clauses in section C (Protection from Fire), however the same building importance level classifications have been adopted for other section's acceptable solutions and means of compliance documents.



4.3 SECTION B

Section B contains two clauses that address building stability considerations:

B1 STRUCTURE

Requires buildings, building elements and site work to withstand the combination of loads and physical conditions they are likely to experience during construction, alteration and throughout their lives. Loads and physical conditions include self-weight, live load, temperature, water, earthquakes, snow, wind, fire, or combinations of these.

Depending on the classified use identified in clause A1, and the building importance level selected from clause A3, the requirements of clause B1 can be satisfied by way of "Acceptable Solutions". For timber residential buildings an acceptable solution is NZS3604:2011, beyond which B1 must be satisfied using another means of compliance. Use of the verification methods and alternative solutions are common for multi-storey and/or mass timber buildings, supported by Producer Statements and where requested by a BCA, peer review.

B2 DURABILITY

Must always be considered when demonstrating compliance with each of the clauses of the Building Code. It ensures that a building throughout its life will continue to satisfy the performance of the Building Code. It confirms the use of materials that, allowing for degradation, will remain functional throughout the specified intended life of the building. It requires building elements to satisfy the performance requirements of the Code (with prescribed maintenance) for:

(a) the life of the building (not less than 50 years) where building elements provide structural stability, are difficult to access or inspect, or replacement is difficult.
(b) not less than 15 years where access or replacement are moderately difficult, or failure would go undetected during normal use.
(c) not less than 5 years if the building elements are easy to access and replace and their failure would be easily detected during normal use of the building.

Consideration of timber moisture exposure during construction can also have an impact on the ultimate outcome of meeting requirements of B2. Where timber elements may have longer exposure to the elements during construction, the designer may need to consider additional protection mechanisms to offset any resulting detrimental impacts on satisfying clause B2 long term. This can be achieved through specification of increased preservative treatment, surface treatments capable of sufficient protection for the construction period, or by requiring other physical barriers such as temporary covers or wraps over the building or elements to limit exposure to moisture during construction.

NOTE: Clause B2 has been a topic of discussion between engineers, BCAs, and the regulator for a number of years with a satisfactory permanent resolution still outstanding. While the technical regulatory requirements themselves are clear, the Building Code (or Building Act) does not identify a specific profession or individual to address all relevant Building Code functional and performance requirements. Hence depending on material selection there can be instances where structural design parameters (B1) will also ensure satisfactory conformance with durability (B2) requirements.

An example might be reinforced concrete design where the concrete cover to steel can be relevant to meeting requirements of both B1 and B2, and hence both clauses can readily be covered by the engineer's design solution. As opposed to a timber beam design in a residential building for which the alternative solution may only satisfy requirements of B1, with B2 requirements dependent on and addressed in relation to the means of compliance with requirements of E2 (external moisture). In that instance it may be more appropriate for the architect or designer proving compliance with E2 to also establish and cover compliance with B2. Therefore the notion of requiring engineers to in general address satisfying requirements of B2 has been met with resistance. This issue is further complicated in that an engineer's insurance might not cover design works related to durability.

Where engineers are unable or unwilling to cover B2 as part of their documentation then this will need to be addressed by the designer or another specialist competent to do so and having appropriate insurance cover.

4.4 SECTION C

Section C contains six clauses focused on the Protection from Fire:

These six Building Code clauses related to protecting people in and around buildings, limiting fire spread and the impact on firefighting and rescue. They are supported by two Verification Methods and seven Acceptable Solutions, based on the occupant activity in all or part of the building.

CLAUSE C1 captures the objectives of Section C2 to C6, covering safety objectives for people, other property and firefighting, with clauses following the sequence of stages of a fire:

C2 PREVENTION OF FIRE OCCURRING

Safe design and installation of fixed appliances using controlled combustion and other fixed equipment.

C3 FIRE AFFECTING AREAS BEYOND THE SOURCE

Consideration of: vertical or horizontal fire spread, Material Group Numbers, surface finishes.

C4 MOVEMENT TO A PLACE OF SAFETY

Fire warnings, visibility of escape routes (smoke obscuration), automatic fire sprinkler systems, means of escape.

C5 ACCESS AND SAFETY FOR FIREFIGHTING OPERATIONS

Access and safety for firefighting operations: access, hazards information and unobstructed paths.

C6 STRUCTURAL STABILITY

Structural stability during fire: buildings remain stable during fire (likelihood of failure or collapse).

These sections apply equally to timber as to other construction materials and must form part of the fire design analysis and life safety features of a building. Timber buildings do however present unique challenges the areas of spread of flame and safety under construction. Active and Passive fire protection features need to be considered based on the type of timber material and level of encapsulation used on a particular project. Mass timber projects often have timber elements left exposed whereas light timber frame construction utilizes full encapsulation. Other provisions including the continuity of fire separations, fire stopping penetrations through fire rated assemblies, interior finishes, occupancy based fire separations (e.g., separation of dwelling units), etc must also be detailed with care to ensure compatibility of these systems especially when used in combination with exposed timber elements.

For more detailed information on fire design please refer to the NZWood Design for Fire Safety Guide.

4.5 SECTION E

Section E contains three clauses, the second of which in particular requires careful consideration with timber construction:

E2 EXTERNAL MOISTURE

E2 sets criteria to manage performance of building exteriors in preventing the penetration and accumulation of water. The clause also recognises that in extreme situations where failure of the primary mechanism to exclude water from the building occurs, water may penetrate the building exterior. Further requirements therefore stipulate how a building exterior must be designed to allow water to dissipate without causing damage to components inside the exterior building envelope. Even more so than is the case with E1, careful consideration of moisture management related to E2 should be considered during the construction phase also to limit as quickly as possible the exposure of timber members to moisture.

Clause E2 can also have a potential impact on clause B2, in that where adequate performance with clause E2 cannot be established then components may need to be designed to allow for moisture content while still satisfying requirements of B2.

The objective of E2 is "To safeguard people from illness or injury that could result from external moisture entering the building.". Hence the requirement does not solely relate to the building itself – eg. structurally unsound as a result of water-based rot – but also the impact on the building occupants – eg. unhealthy living environment as a result of harmful mould and fungal decay. It is for this reason that E2 considers not only adequate resistance to penetration by, but also the accumulation of moisture from the outside.

To achieve this E2 incorporates seven specific performance criteria:

- E2.3.1 Roofs must shed precipitated moisture. In locations subject to snowfalls, roofs must also shed melted snow.
- E2.3.2 Roofs and exterior walls must prevent the penetration of water that could cause undue dampness, damage to building elements or both.
- E2.3.3 Walls, floors and structural elements in contact with or in close proximity to the ground must not absorb or transmit moisture in quantities that could cause undue dampness or damage to building elements or both.
- E2.3.4 Building elements susceptible to damage must be protected from the adverse effects of moisture entering the space below suspended floors.
- E2.3.5 Concealed spaces and cavities in buildings must be constructed in a way that prevents external moisture being accumulated or transferred and causing condensation, fungal growth or the degradation of building elements.
- E2.3.6 Excess moisture present at the completion of construction must be capable of being dissipated without permanent damage to building elements.
- E2.3.7 Building elements must be constructed in a way that makes due allowance for the following:
  - the consequences of failure
  - the effects of uncertainties resulting from construction or from the sequence in which different aspects of construction occur
  - variation in the properties of materials and in the characteristics of the site.

These performance clauses recognise that, at some stage, all buildings may leak. They allow for some external moisture to enter exterior assemblies as long as this water does not cause undue dampness or damage to building elements or that it is not being transferred and causing condensation and the degradation of building elements. The performance clauses also allow for moisture that may enter and be absorbed by components during construction, as long as this moisture is capable of being dissipated without permanent damage to building elements.

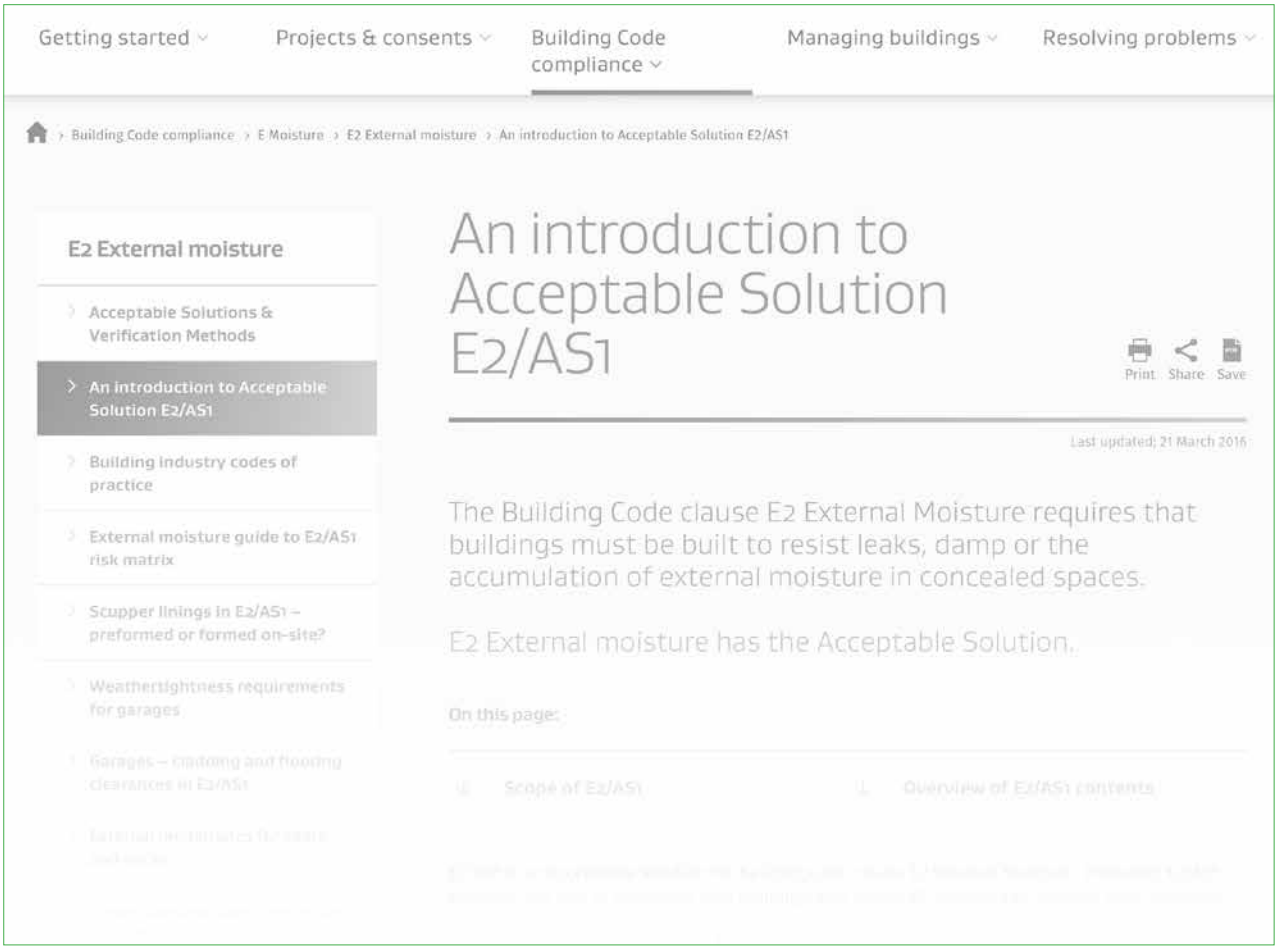
ACCEPTABLE SOLUTION E2/AS1

The Building Code provides an acceptable solution to establish conformance with clause E2, with anyone complying exactly with the methods described in the Acceptable Solution deemed to comply with the Building Code clause requirement itself. As discussed in more detail in the Acceptable and Alternative Solutions chapter, it is not mandatory however to follow an Acceptable Solution.

For clause E2, building designs often establish compliance by way of combination of Acceptable and Alternative Solutions, as E2/AS1

- provides specific guidance
- is well understood and regularly used and must be accepted by BCAs so long as all conditions are satisfied, whereas establishing compliance with E2 based on fully Alternative Solution based designs can be difficult or costly.
- is a MBIE document, so if a building built to E2/AS1 fails, responsibility and liability does not rest solely with the design professional

Most BCAs have E2/AS1 as their benchmark document for weathertight design and E2 compliance. They often use the solutions in it as a comparison when they are assessing Alternative Solution based methods at building consent stage. The limitations of E2/AS1 must also be adhered to, or where used in combination with Alternative Solutions the compatibility or suitability be carefully considered. Limitations include but are not limited to buildings up to Extra High Wind zones, timber-framed buildings up to three storeys high with maximum height from ground to highest roof point of 10 m, and is not applicable to timber-framed windows nor steel framing.



4.6 SAFETY FOR BUILDINGS UNDER CONSTRUCTION

While there are requirements under the Building Code as well as Health and Safety legislation that require consideration of safety and code adequacy during construction rather than just 'in-use', there are also international learnings that are important to consider.

Consider the Remy project for example in the Richmond area of British Columbia, Canada, which was one of the first six-storey mid-rise light timber frame residential buildings to be constructed in 2010. During construction the project was exposed to an unexpected fire that caused substantial destruction of the project. The project was subsequently rebuilt, and fortunately the fire did not have significant impact on uptake of mid-rise light timber frame buildings since then.

The event did however prompt greater consideration of safety during construction, not only for life safety but also the building project itself. Comprehensive construction safety protocols, during building construction rather than for 'in-use', were adopted to reduce the risk of fire establishing and spreading, and to safeguard human life and the building itself during a fire event:

- Firefighting water should be readily available on site during construction – achieved for example by charging standpipes.
- Plasterboard lining should be installed and window/door openings boarded up on levels below current construction to limit the risk of fire spread up the building.
- Hot trades, such as welding and torch-on roofing, should be carefully supervised, or where possible eliminated.
- Multi-stage projects where buildings are in close enough proximity for fire spread to be a risk, eave fitted sprinkler systems are installed to manage fire spread from buildings under construction.

4.7 OTHER CONSIDERATIONS

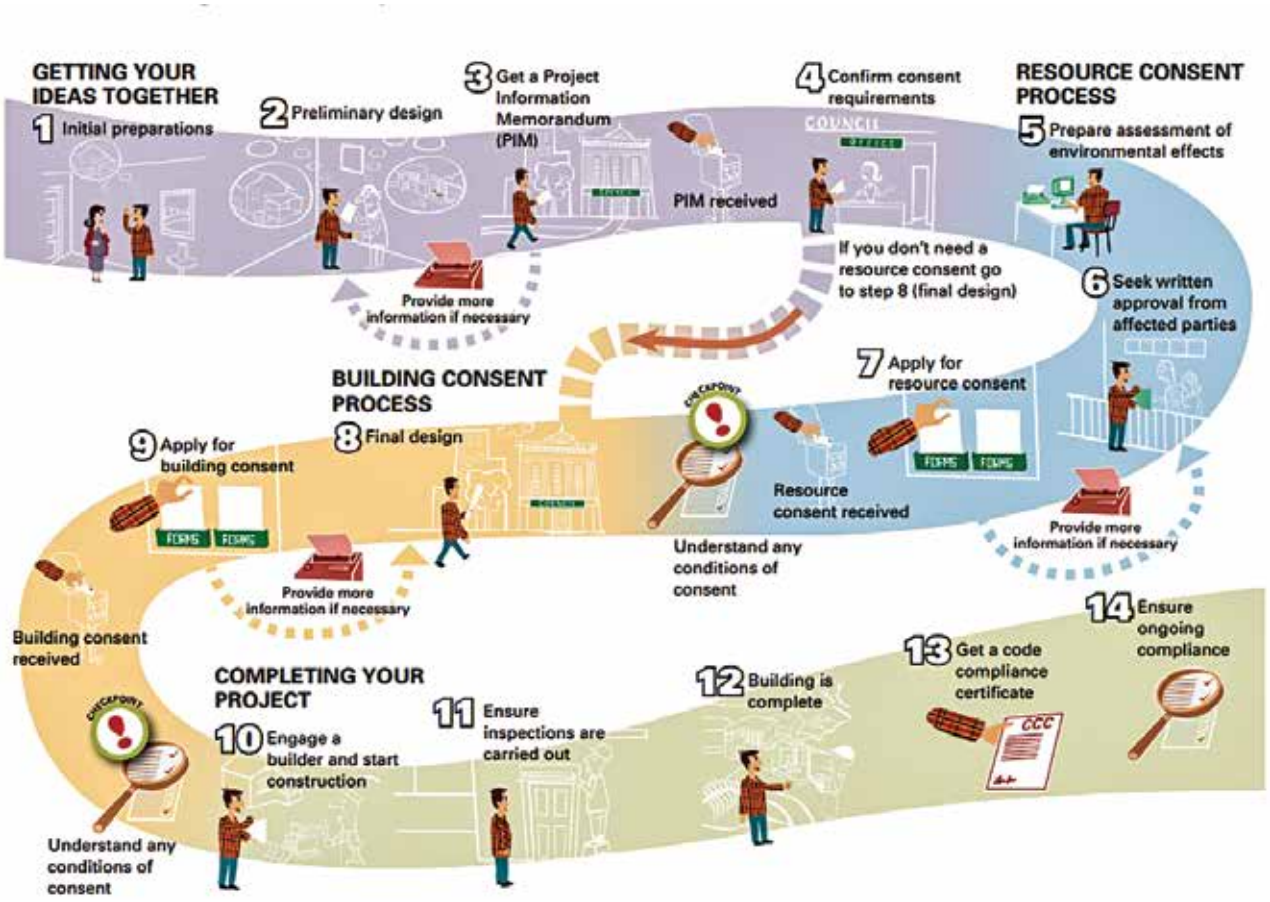
Larger timber commercial, industrial and multi-residential structures inevitably see a combination of construction materials being used. This results in differential vertical and lateral movement between shrinking wood elements and adjacent or connected elements made of other materials. Care must be taken to allow for any such differential and the impact on the structural design, design of building systems and service features (eg. lifts, plumbing, etc), as well as cladding, and fire protection. The impacts range across various different Building Code clauses and are often affected by one another.

Often non-structural elements such as suspended ceilings, partition walls, or other decorative architectural features particularly in commercial buildings are not considered in full detail. Similarly to the differential movement consideration, while there is no dedicated Building Code clause to cover non-structural elements these are affected by various code clauses. Clause B1 for instance requires not just buildings but building elements and sitework to withstand the combination of loads and physical conditions they are likely to experience during construction, alteration and throughout their lives; hence B1 would require non-structural or architectural feature items to remain fixed in place during a seismic event for example.

5. THE BUILDING CONSENT PROCESS

5.1 GENERAL

While build projects are unique, each will still follow a standard compliance pathway. A better understanding of the compliance pathway, and the roles of and interaction with others during that process are important to the success of each project.



While project size and complexity obviously affect the duration and convolution of the compliance process, so can unfamiliarity. We inherently and instinctively apply a level of conservatism in areas of lack of understanding or experience to reduce the risk of unforeseen and undesirable outcomes and hence ensure the success of a project. Building Control Officers and the Building Consent Authorities they are employed by are no different and unfamiliarity can result in a conservative or more detailed approach to the consent process.

Integrating the compliance process into the project from an early stage hence, and providing additional information or engaging others during the design to 'educate' them where appropriate, can significantly aid in utilizing and navigating the compliance process. Equally as important is having an understanding of, and respecting the requirements placed on Building Control Officers and their Building Consent Authorities and hence their need to be satisfied on reasonable grounds that each building project meets the Building Act, Building Code and associated building regulations or other related legislation.

Standard good practice of well prepared consent applications including all of the requested information, detailed drawings and clear evidence of compliance with the Building Code also make it easier for a Building Control Officer to establish compliance. Restricted building work must be identified, appropriate licensed building practitioners listed, and of course resource consents or any other permits must be applied for and/or approved.

Building consents will lapse if building work has not started within 12 months of issue of consent, unless extensions have been granted by the Building Consent Authority, but is otherwise valid for two years. Once building work is completed with all site inspections passed and any supporting certificates and documents (plumbing, electrical, services, producer statements etc) compiled, a Code Compliance Certificate (CCC) can be applied for. The Building Consent Authority will review all of the supplied information, and confirm any final payments have been made and if satisfied issue the Code Compliance Certificate.

Buildings that are affected by building work and have not had a Code Compliance Certificate issued cannot be used as public premises. Where a building partially built or being altered is to be accessed by the public before a CCC is issued then staged consents might be needed with CCC issued for each stage, and/or a Certificate for Public Use must be applied for.

5.2 STAGED CONSENTS

Building consents do not have to cover a building project in its entirety; a series of building consent applications for stages of the proposed building work can be submitted as staged consents, where the scope of each part of the work can be clearly defined. Large project such as multi-storey buildings, multi-unit apartments or development blocks, or commercial and industrial buildings all lend themselves to staged consents.

Staged consents may also be useful where more than one household unit is being built specifically for sale, and the units are not connected. A household unit being built specifically for sale cannot normally be transferred without a Code Compliance Certificate. However, the owner or builder can stage the consents so that a Code Compliance Certificate can be obtained for each unit, or for definitive stages of the construction process (eg. Foundations, Super Structure, Civil Works, etc).

5.3 LAND OR PROJECT INFORMATION MEMORANDA

The Land Information Memorandum (LIM) summarises the information on a particular property that different council departments hold on record. A LIM will include building work related aspects of which the BCA is aware of; that is it reflects the consented building work but cannot capture any unconsented or non-notified work of which the BCA was not made aware. It also includes more broader information including services to or in the vicinity of the property, special features such as erosion or flooding, and planning related information. LIMs do not form part of the building consent process but they do capture the outcomes of completed building works and some of the submitted consent documentation, and are relevant to property owners or prospective purchasers.

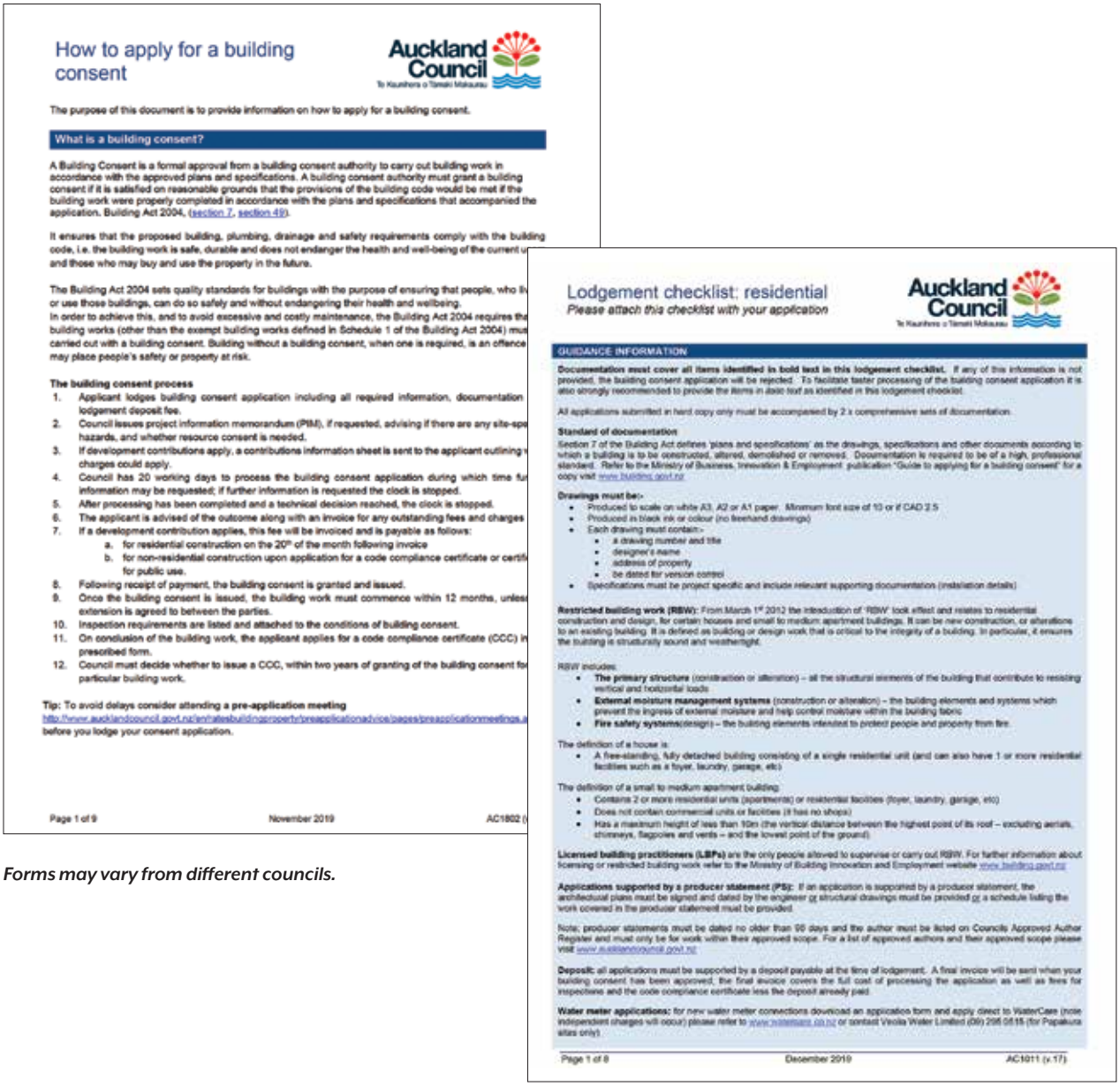
A Project Information Memorandum (PIM) is used before or in combination with a building consent application to provide information council already holds on the particular property. A PIM is relevant at design stage as the information will inform the building design. Information contained in a PIM will include known special features such as erosion, flooding or site contamination, identify heritage status or Fire Service Act evacuation scheme requirements if applicable, and detail available utilities. So while a PIM can be applied for in combination with a building consent, it is recommended and logical to obtain a PIM before detailed design is undertaken to ensure its information can be adequately considered. PIMs are issued by the Territorial Authority for the district not the Building Consent Authority that will assess building consents.

5.4 LODGMENT OF BUILDING CONSENT

The person completing the application needs to understand the application requirements and the Building Code, and also be able to provide or source the information that shows how the project will comply. A well planned and prepared building consent application can provide a solid foundation to make well-informed, efficient and cost-effective decisions, as well as speed up consent processing and approval time. Plans and specifications that clearly identify how a building is intended to be constructed or altered will make it easier for a Building Consent Officer, in their capacity on behalf of a Building Consent Authority, to review how the applicant intends to meet Building Code requirements. Once satisfied that all requirements have been considered and addressed, the Building Consent Authority issues a building consent to confirm the finished building will comply with the Building Code.

Many Building Consent Authorities provide guidance on any documentation they require with a building consent application (such as check sheets), and some offer pre-lodgement meetings valuable to clear up any uncertainty and aid in dealing with unfamiliarity.

Across all building consent applications there are two areas in particular that often fail to show compliance, so particular attention should be given to Building Code requirements related to B1 structure and E2 external moisture.



How to apply for a building consent

Auckland Council

The purpose of this document is to provide information on how to apply for a building consent.

What is a building consent?

A Building Consent is a formal approval from a building consent authority to carry out building work in accordance with the approved plans and specifications. A building consent authority must grant a building consent if it is satisfied on reasonable grounds that the provisions of the building code would be met if the building work were properly completed in accordance with the plans and specifications that accompanied the application. Building Act 2004, (section 7, section 49).

It ensures that the proposed building, plumbing, drainage and safety requirements comply with the building code, i.e. the building work is safe, durable and does not endanger the health and well-being of the current u and those who may buy and use the property in the future.

The Building Act 2004 sets quality standards for buildings with the purpose of ensuring that people, who li or use those buildings, can do so safely and without endangering their health and wellbeing.
In order to achieve this, and to avoid excessive and costly maintenance, the Building Act 2004 requires the building works (other than the exempt building works defined in Schedule 1 of the Building Act 2004) mus carried out with a building consent. Building without a building consent, when one is required, is an offence may place people's safety or property at risk.

The building consent process

1. Applicant lodges building consent application including all required information, documentation lodgement deposit fee.
2. Council issues project information memorandum (PIM), if requested, advising if there are any site-spe hazards, and whether resource consent is needed.
3. If development contributions apply, a contributions information sheet is sent to the applicant outlining charges could apply.
4. Council has 20 working days to process the building consent application during which time fu information may be requested; if further information is requested the clock is stopped.
5. After processing has been completed and a technical decision reached, the clock is stopped.
6. The applicant is advised of the outcome along with an invoice for any outstanding fees and charges
7. If a development contribution applies, this fee will be invoiced and is payable as follows:
   a. for residential construction on the 20th of the month following invoice
   b. for non-residential construction upon application for a code compliance certificate or certi for public use.
8. Following receipt of payment, the building consent is granted and issued.
9. Once the building consent is issued, the building work must commence within 12 months, unles extension is agreed to between the parties.
10. Inspection requirements are listed and attached to the conditions of building consent.
11. On conclusion of the building work, the applicant applies for a code compliance certificate (CCC) i prescribed form.
12. Council must decide whether to issue a CCC, within two years of granting of the building consent fo particular building work.

Tip: To avoid delays consider attending a pre-application meeting
http://www.aucklandcouncil.govt.nz/en/rates/buildingproperty/preapplicationadvice/pages/preapplicationmeetings.a before you lodge your consent application.

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Lodgement checklist: residential

Please attach this checklist with your application

Auckland Council

GUIDANCE INFORMATION

Documentation must cover all items identified in bold text in this lodgement checklist. If any of this information is not provided, the building consent application will be rejected. To facilitate faster processing of the building consent application it is also strongly recommended to provide the items in plain text as identified in this lodgement checklist.

All applications submitted in hard copy only must be accompanied by 2 x comprehensive sets of documentation.

Standard of documentation
Section 7 of the Building Act defines 'plans and specifications' as the drawings, specifications and other documents according to which a building is to be constructed, altered, demolished or removed. Documentation is required to be of a high, professional standard. Refer to the Ministry of Business, Innovation & Employment publication "Guide to applying for a building consent" for a copy visit www.building.govt.nz

Drawings must be:-
- Produced to scale on white A3, A2 or A1 paper. Minimum font size of 10 or if CAD 2.5
- Produced in black ink or colour (no freehand drawings)
- Each drawing must contain:-
  - a drawing number and title
  - designer's name
  - address of property
  - be dated for version control
- Specifications must be project specific and include relevant supporting documentation (installation details)

Restricted building work (RBW): From March 1st 2012 the introduction of 'RBW' took effect and relates to residential construction and design, for certain houses and small to medium apartment buildings. It can be new construction, or alterations to an existing building. It is defined as building or design work that is critical to the integrity of a building. In particular, it ensures the building is structurally sound and weathertight.

RBW includes:
- **The primary structure** (construction or alteration) – all the structural elements of the building that contribute to resisting vertical and horizontal loads
- **External moisture management systems** (construction or alteration) – the building elements and systems which prevent the ingress of external moisture and help control moisture within the building fabric
- **Fire safety systems**(design) – the building elements intended to protect people and property from fire.

The definition of a house is:
- A free-standing, fully detached building consisting of a single residential unit (and can also have 1 or more residential facilities such as a foyer, laundry, garage, etc)

The definition of a small to medium apartment building:
- Contains 2 or more residential units (apartments) or residential facilities (foyer, laundry, garage, etc)
- Does not contain commercial units or facilities (it has no shops)
- Has a maximum height of less than 10m (the vertical distance between the highest point of its roof – excluding aerials, chimneys, flagpoles and vents – and the lowest point of the ground).

Licensed building practitioners (LBPs) are the only people allowed to supervise or carry out RBW. For further information about licensing or restricted building work refer to the Ministry of Building Innovation and Employment website www.building.govt.nz

Applications supported by a producer statement (PS): If an application is supported by a producer statement, the architectural plans must be signed and dated by the engineer or structural drawings must be provided or a schedule listing the work covered in the producer statement must be provided.

Note: producer statements must be dated no older than 90 days and the author must be listed on Councils Approved Author Register and must only be for work within their approved scope. For a list of approved authors and their approved scope please visit www.aucklandcouncil.govt.nz

Deposit: all applications must be supported by a deposit payable at the time of lodgement. A final invoice will be sent when your building consent has been approved, the final invoice covers the full cost of processing the application as well as fees for inspections and the code compliance certificate less the deposit already paid.

Water meter applications: for new water meter connections download an application form and apply direct to WaterCare (note independent charges will occur) please refer to www.watercare.co.nz or contact Veolia Water Limited (09) 295 0515 (for Papakura sites only).

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Forms may vary from different councils.

5.5 CONSENTING CONSISTENCY

Every building project is different, and a consent applicant's as well as Building Control Officer's knowledge and familiarity varies between individuals. The consent process is not an automated autonomous process but one impacted by the human nature of applicant as much as the Building Consent Officer; presentation of information and hence the ability of a Building Consent Officer to assess compliance with the Building Code is unfortunately still a factor in every consent being assessed by a Building Consent Authority. The NZ Building Code is also performance based rather than prescriptive, which does allow for innovative building evolution, but equally arguably may not be as 'black and white' to judge against as other more prescriptive building jurisdiction globally. MBIE, as the regulator, and the various Building Consent Authorities across NZ are attempting to take the human factor into consideration, and with technological advancements there is great interest in improved consistency which stands to benefit not just the consent applicant.

The use of Acceptable Solutions, for example the Residential Timber Construction Standard NZS3604, provide a prescriptive and much more consistent approach to assessing compliance also. While Acceptable Solutions can be very useful, they can also have a negative impact; NZS3604 for example provides a convenient and easy mechanism to show compliance for timber in residential construction, but it has also over the years established a dominant presence which can create difficulty in establishing compliance where NZS3604 is not used – ie. a heavy reliance on an Acceptable Solution can make it more difficult to use an alternative solutions pathway.

Building Consent Authorities are individually accredited and hence they will have their own structure and processes. While this might be seen as counterproductive in relation to consistency, it not doubt provides for an environment that promotes continuous improvement. Where information and learning is then shared among Building Consent Authorities this does provide tangible benefit to consent applicants. Consistency may be further impacted by district plans and other laws (such as heritage) with which the building project must also comply.

Where a consent applicant does not agree with a Building Consent Authority decision on a building consent, a legally-binding determination can be applied for with MBIE, or a complaint laid against the Building Consent Authority. Refer to section 6.2 to learn more about the determinations process.

For larger and more complex projects, greater detail and higher level of specification is required. This is not only the case as the complexity increases risk factors, but also as larger and more complex buildings typically follow the alternative solutions pathway rather than relying on acceptable solutions to establish compliance.

Regardless of project size and complexity, specification and detail must be project and site specific. Generic designs or references that may have been acceptable in the past no longer suffice today; references like 'refer to manufacturer's specification and/or requirements' or 'installed in accordance with best trade practice' are insufficient. Such references do not provide clear communication to the Building Consent Authority of how compliance parameters are met for a specific project and site, and further, manufacturers' specifications or 'best practice' can change over time or between different professionals or practitioners. The consent documentation must be concise and clear on how the requirements at the time of consent application are met, and therefore also end up being captured thoroughly on records; this allows for ready identification of what products and construction methods were employed should these need to be interrogated at a later stage.

Similarly, Standards, Acceptable Solutions or Verification Methods will change over time, and except for transition periods, only current versions can be referred to. It is also important to identify Standards that have been relied upon that may be cited (in whole or in part), versus Standards or industry guidelines that provide guidance or advice. Particularly for larger and more complex projects this is vital as often numerous Standards and guidance documents are relied upon to establish compliance with the various performance requirements. It is important to also consider the relationship or compatibility where multiple Standards or guidance documents are referenced to ensure a cohesive design and building is achieved. A well prepared building consent documents set should include a cover and contents page to make it easier to navigate the presented documents (specifications, Producer Statements, supporting calculations, drawings, supporting reports, etc).

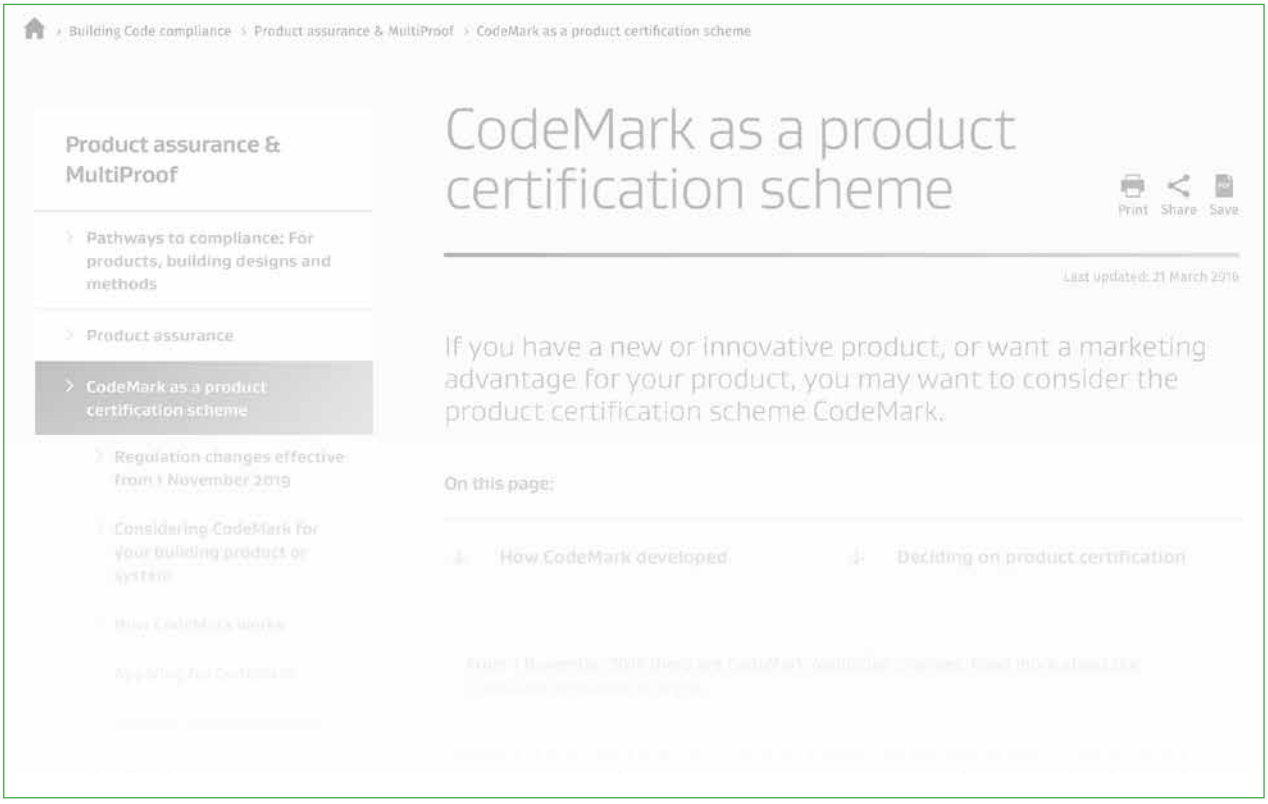
Every designer and engineer in NZ will follow similar design methodology and principles, often directed by design Standards, yet their outputs will not be identical. The regulatory environment is no different, and while technology and guidance from the regulator will aid in improved consistency, until designers and engineers submit identically developed and presented documentation using standard details replicated across building projects it would be remiss to demand absolute consistency from Building Consent Authorities assessing building work.

5.6 PRODUCT ASSURANCE

Product manufacturers and suppliers, under both consumer legislation and the Building Act, are responsible for ensuring their products are fit for purpose in a New Zealand construction context and that these satisfy the performance requirements of the Building Code.

At a minimum, manufacturers and suppliers must supply all relevant product technical information so designers can appropriately specify and BCAs confirm compliance of the product against Building Code performance requirements. This technical information may be independently assessed and verified as an endorsement of the manufacturers' or suppliers' claims. Some products may be benchmarked against industry-based schemes and audited to the scheme's requirements. Where more rigorous verification of a product is undertaken by an independent appraisal organization, including independent testing, a product appraisal will be issued. While appraisals provide a far more robust interrogation of a product's performance than the independent assessment or industry-based schemes noted earlier, they still have no legal standing. Only products assessed and certified under CodeMark product certification, which is administered by MBIE and assessments conducted by accredited bodies, must be accepted by Building Consent Authorities as complying with the Building Code when specified and installed in accordance with CodeMark certificates.

Where product fails to fulfill its intended purpose, and especially if it is causing a building to be dangerous or unsafe, then the consumer or builder should advise the local council as they can issue a dangerous building notice to rectify the issue. It may also be appropriate to advise MBIE if the concern is likely to affect other building work nationwide.



5.7 PRODUCT SUBSTITUTIONS AND MINOR VARIATIONS

Product substitution must be carefully considered for a variety of reasons;

- Does the alternate product provide equivalent or better performance of the originally specified product.
- Is the design intent by the original specifier or client maintained – the original specifier or client should be consulted.
- Have 'flow-on' or 'side' effects been considered and addressed.
- Does the alternate product meet regulatory requirements – is it a code compliant equivalent.
- Does the substitution require a building consent amendment.
- Is the substituted product a component of a building system which if substituted breaks the system.

MBIE's website and many product and material suppliers provide further information on product substitution and the following MBIE flowchart provides a good summary.

BUILDING PERFORMANCE

PRODUCT SUBSTITUTION: THREE-STEP APPROACH

STEP 1:
Consider the law

Before submitting a building product:

- Check your contract with the owner for any potential issues.
- Make sure the implied warranties in the Building Act (section 3621) are not affected.
- If the product will be used in building work, check the manufacturer/ supplier has provided evidence of Building Code compliance and that the proposed use is within scope.

STEP 2:
Consider the building implications

Next, consider the wider implications for the building project, including any:

- Environmental challenges.
- Impact on other design features.
- Restrictions under the Resource Management Act, district plans or similar.
- Interaction with other building products and systems.
- Impact on performance/other features required by the designer or building owner.

STEP 3:
Implement the changes

Next, consider the wider implications for the building project, including any:

- Discuss the proposed substitution with all parties and record any changes in the contract.
- If building work is involved and the building consent has already been issued, contact the BCA for approval before going ahead. The BCA will decide whether this change is a minor variation or whether you need to apply for an amendment to the consent.
- Advise the owner of any maintenance requirements.

Product substitution as well as other changes to approved consented plans require an amendment to the building consent. Some amendments can be processed as minor variations if the BCA deems they meet the definition of a minor variation:

"a minor modification, addition, or variation to a building consent that does not deviate significantly from the plans and specifications".

Minor variations are still documented, and where these are for product substitution the effects beyond regulatory requirements must still be considered and addressed.

5.8 ARTISAN QUALITY ASSURANCE SYSTEM[2]

Artisan is a state-of-the-art mobile phone app and web console developed by BRANZ in consultation with the building and construction industry, which aims to streamline the residential building inspection process.

The concept arose out of a strategic review of BRANZ appraisal systems where it was discovered that build teams did not have or use an effective quality control assurance process. The BCA building inspection process was considered by many builders to be the quality assurance process, which is not what it was designed for.

BRANZ's ambition was to develop a digital solution that could see, assess, verify and record each step in the residential build process, and was accessible to all involved across the build process.

Artisan provides a workflow to capture real-time photographic evidence of the quality of work for critical elements of a build, corresponding to the stage checks undertaken by BCAs.

Artisan solves several issues in the industry and enables many benefits to be experienced:

- It provides a near real-time access to what has been done on site
- It creates an enduring record of the build work and quality
- It reduces the time to build by speeding up inspections
- It allows BCAs to redeploy resources to focus on the "problem areas"
- Provides evidence-based learning
- Improves risk management

The overall outcome is improved quality and speed of the inspection process, resulting in real productivity gains for the industry. More information about the Artisan app can be found on the Industry Transformation website.

[2] *https://industrytransformation.nz/action-areas/artisan-smartphone-app/*

5.9 CONSENTING TIMEFRAMES

The Building Act sets out timeframes for Building Consent Authorities to undertake the necessary assessment of documentation and plans that have been provided for a building consent application. A Building Consent Authority has 20 working days to conduct their assessment process from the time an application is lodged. Well prepared plans and associated documentation will aid in an efficient review to confirm compliance has been established. Ill prepared consent documentation results in the Building Consent Authority having to invest more time to try and determine if compliance has been established.

Where information is missing or a Building Consent Officer has not been able to conclusively establish compliance, a Request For Information (RFI) letter will be provided to the applicant setting out items still needing to be addressed or where further clarification is required to avoid ambiguity. In these instances applications will be suspended to allow the applicant to respond to the RFI, and the time taken to do so is not attributed to the working days; ie. the 'clock is stopped'. Once additional information is lodged with the Building Consent Authority the suspension is lifted; ie. the 'clock starts again'. In addition to RFI interruptions not being counted as part of the 20 working days, there can also be additional fees if documentation needs to be reviewed or assessed again. It is therefore in both the applicant's and Building Consent Authority's interests to ensure consent documents are well prepared and presented to avoid RFIs, possible additional fees, and time delays.

Once consent has been granted, if plans and specifications need to be amended significantly the Building Consent Authority can again take up to 20 days to process the request. Additional fees will also be charged to assess the new plans and documentation.

Physical works must then commence within 12 months of building consent being granted or the consent will lapse. If circumstances prevent work on-site within the 12 month timeframe, an extension might, but does not have to be granted by the Building Consent Authority. If no extension is granted or if works are not initiated within the 12 month timeframe and the building consent lapses a new application must be lodged to be assessed by the Building Consent Authority. This new application will have fees and the 20 working day timeframe to assess applied like any other new building consent application.

Where consent has been granted and works have successfully been initiated within the 12 month timeframe, it remains valid for 2 years. That is, building work relevant to the approved consent must be completed within 2 years from the day consent was granted. As with the previous 12 month timeframe to initiate work on site, Building Consent Authorities can agree to a period beyond 2 years; this could be agreed early on or a Building Consent Authority might grant an extension when the 2 year timeframe is due to expire.

Within the 2 year consent validity, or within an agreed extended construction period that is granted by a Building Consent Authority, the Building Consent Authority must then decide whether all conditions of the consent have been successfully implemented. If so the Building Consent Authority will provide the applicant with a Code Compliance Certificate to close the consent as successfully executed. Where a Code Compliance Certificate cannot be issued the Building Consent Authority might agree to a time extension to allow non-compliances to be remedied, or it may pursue other regulatory pathways to ensure compliance will be established or the works remain unoccupied.

In some instances Building Consent Authorities must also notify and seek advice from Fire and Emergency NZ on submitted consent applications. This is typically the case where alterations, change of use, or subdivision will affect existing fire safety systems, including sprinkler systems, egress routes, or fire walls. This is to ensure not only continued safety of occupants but to provide safe access to emergency services should they ever be required. Fire and Emergency NZ will assess the impacts of the proposed works and confirm building and life safety is maintained, or will advise on additional aspects needing to be addressed – similar to RFIs the Building Consent Authority might issue. Fire and Emergency NZ must complete their assessment within 10 working days and building consent applications are not suspended during this time – ie. the 20 working day timeframe is not affected by the Fire and Emergency NZ 10 working day period.

6. RESOLVING PROBLEMS

6.1 CERTIFICATE OF ACCEPTANCE (COA)

The Building Act recognises that there may be circumstances where building work was undertaken without the required building consent, for which 'retrospective' approval is being sought. An application for such non-consented building work completed after 1 July 1992 can be made to a Building Consenting Authority for a Certificate of Acceptance (CoA). Building work carried out prior to 1 July 1992 cannot be issued a CoA as this work would have been constructed prior to the provisions of the Building Act 1991 coming into effect.

Building work for which a CoA can be applied for includes:

- work undertaken by the owner or a previous owner, for which a building consent was required but not obtained, or
- where building consent was not able to be obtained as the work was carried out under urgency (to save or protect life or health, or prevent serious damage), or
- cases where a private Building Consent Authority is unable or refuses to issue a Code Compliance Certificate, on building works for which they issued a building consent.

Assessment of the building works for which a CoA has been applied for will be made against the Building Code at the time of application, not the time at which a building consent should have been obtained a building consent was issued, nor when the building work was undertaken. CoAs therefore should be applied for as soon as practicable to ensure the building works do not require further remedial works to meet updated requirements.

6.2 DETERMINATIONS

Unfortunately it's almost inevitable that at some stage the performance based nature of our regulatory requirements results in differences in interpretation or differing opinions. Equally building projects by their nature can be recipients of unforeseen events or potential delays, given their vulnerability to nature's influence and the involvement of multiple parties working together. Our regulatory framework provides a mechanism, by way of determinations, to have an independent assessment undertaken and decision conferred.

MBIE can make a determination about:

- whether a building or building work complies with the Building Code
- a council's decision on the following:
  - a building consent (including time extensions to building consents)
  - a notice to fix
  - a code compliance certificate (including time extensions to code compliance certificates)
  - a compliance schedule
  - a certificate of acceptance
  - granting a waiver or modification of the Building Code
  - an exemption from building consent requirements under Schedule 1 (whether or not a building consent is required)
  - building alterations
  - a change of building use
  - subdivision of buildings
  - dangerous, affected, earthquake-prone and insanitary buildings
  - a certificate for public use
  - a certificate under section 224(f) of the Resource Management Act 1991
  - dams.

All those involved in a determination are referred to as 'parties' to the determination. Parties can be individuals, organisations, or businesses and are all treated equally. Determinations are applied for, typically by building owners but can be Building Consent Authorities or other organisations, by presenting evidence to MBIE who will provide a ruling. Determinations can also focus more between two individuals rather than on the actions of a Building Consent Authority; especially so where for example a building owner requests a determination on building work on an adjacent property that might be exempt from consent.

Parties that can ask for, or be drawn into a determination, might be:

- the building owner or the owner's agent
- a licensed building practitioner concerned with relevant building work
- the Building Consent Authority
- a person who has been issued with a notice to fix
- a neighbour or the owner of other property, when the determination relates to a provision in the Building Code that involves protection of other property. For example, the potential spread of fire from one property to another, surface water run-off or land stability.
- a Government department or Crown agency with a statutory duty under the Building Act, such as the New Zealand Fire Service or WorkSafe NZ.
- anyone with a direct interest in the problem or question if it has to do with access and facilities for people with disabilities.

MBIE can also initiate a determination where it believes it is necessary to achieve the aims of the Building Act. The local Building Consent Authority will usually be a party to any determination given their involvement in the consent and inspection process. Where necessary MBIE may ask other people or organisations to become involved if necessary too. Determinations are not for civil disputes or aspects relating to quality of workmanship, but to establish whether a building or building work complies, or will comply, with the Building Code requirements. In addition to Building Code interpretation determinations can also be useful for when a Building Consent Authority, Territorial Authority, or building owner have failed to act or refused to make a decision within acceptable timeframes. A determination is also a legally binding ruling under sections 176-190 in the Building Act 2004. If an opinion or advice on a building or building works has been sought from MBIE previously, this does not preclude a determination application. That is because a determination is not just an opinion or advice, but a formal investigation into a matter that takes a detailed look at the specific parameters and parties involved and then makes a legally binding decision.

Examples of when parties might want a determination:

- a council refuses to issue a building consent for a proposed building
- a building owner has been refused a code compliance certificate for a building that appears to be completed and the owner believes is compliant
- building work on a neighbouring property is affecting the stability of adjacent land
- a building owner disagrees with the contents of a notice to fix.
- The determination can:
  - make a decision on whether building work complies with the Building Code, and/or
  - confirm, reverse or modify an earlier decision made by the council. For example, a determination may say the council was correct in not issuing a building consent.
- A determination can also:
  - make waivers or modifications to the Building Code. For example, a determination may modify the time period for which the building must be durable
  - make conditions that the council may itself grant or impose. For example, a determination may require the council to issue a building consent with certain conditions.

6.3 PREVIOUS DETERMINATIONS / PRECEDENCE

Determinations are specific to buildings, building works, and the actions of inflicted parties, and as such are bound by the unique aspects of those specifics. Determinations therefore are only binding in respect of the specific circumstances of each individual application. While historical determination rulings can be useful for Building Consent Authorities or other parties in establishing regulation compliance interpretation, they cannot be seen as legal precedence given each determination is relevant only to its specific circumstances. Similarly is MBIE not bound by previous determinations in the way that a court is bound by the decisions of a higher court. Where circumstances are substantially similar however, there is expectation that MBIE take account of previous determinations and the rulings carry similar outcome. To aid in avoiding repetitive determinations, MBIE captures and publishes details of each determination including the analysis that led to a decision. This documentation can then be drawn upon as guidance for Building Consent Authorities and other parties faced with substantially similar circumstances to reach a resolution without requiring another determination. Noting that historical determinations do not set precedence however, parties may still choose to apply for a new determination if they feel their circumstances do not entirely reflect those of previous determinations, or a party is not satisfied with the ruling of a historical determination of similar but not identical circumstances.

6.4 FURTHER LEGAL OPTIONS

Where MBIE has provided a determination but a party still remains unsatisfied with the ruling, then further action can be pursued by taking the matter to court. A District Court will then establish whether the decision reached in the determination is correct (an appeal) and that the appropriate determination-making process was followed (a judicial review). The District Court outcome carries greater stature and will be final.

An appeal or judicial review cannot be pursued until MBIE has issued a determination, but must be initiated within 15 working days of the issue date of a determination.

7. OTHER INITIATIVES

7.1 MBIE HIGHER DENSITY 8 (HD8)

The Building Code system is being optimised to support higher density housing solutions. Currently, the majority of Acceptable Solution and Verification Method compliance pathways are generally focused on low density dwellings, and higher density building designs are often outside the scope of these compliance pathways.

The design of higher density housing differs from traditional stand-alone (low density) housing due to the common walls, spaces between household units (lobbies and other common areas), internal rooms and the height of the buildings.

This means that more specialists are required for the design and build of these houses, which can make the consenting processes more complex and create uncertainty for building professionals and building consent authorities.

The Building Code clauses being prioritised for change are collectively known as the 'HD8' and are described below. The aim with all of these is to make changes that facilitate higher density housing by either amending the clause or increasing the scope of the Acceptable Solutions and Verification Methods.

C1–6 PROTECTION FROM FIRE

These clauses are related to protecting people from fire in and around buildings, limiting fire spread and helping firefighting and rescue. Higher density housing typically requires more complex fire solutions. A specialist fire engineer may be required to ensure that escape routes are easy to access, to address fire separation at height and to manage longer escape travel distances. Streamlined compliance pathways for higher density housing need to be considered.

E2 EXTERNAL MOISTURE

Preventing moisture entering the building envelope is critical for building performance. Some parts of current Acceptable Solutions are restricted to three storeys, and beyond this may require a façade engineer to be involved in the design of the building. Extending the scope of Acceptable Solutions needs to be considered.

2.2.1 E3 INTERNAL MOISTURE

This Code clause has specific functional and performance requirements that prevent flooding or overflow between households. It also considers internal moisture control and condensation. The solutions need to be reviewed to provide clarity regarding overflow between units, and account for new construction methods for managing moisture in roof cavities.

2.2.2 G4 VENTILATION

This Code clause sets performance requirements for adequate ventilation and air flow in buildings. For higher density housing, the use of natural ventilation such as openable windows to the exterior of the building may not be suitable. Mechanical ventilation systems for the household units or building need to be considered to address situations of shared ventilation.

2.2.3 G6 AIRBORNE AND IMPACT SOUND

This Code clause ensures minimal noise transfer in higher density situations. A review is needed to clarify the scope of current requirements and also consider whether they should take into consideration environmental factors, for example roads and airports.

2.2.4 G7 NATURAL LIGHT

The Building Code requires habitable spaces like bedrooms to have access to daylight and visual awareness of the outside; this can be an issue for higher density housing where there may only be one or two external walls. Compliance pathways need to reflect more complex situations.

2.2.5 H1 ENERGY EFFICIENCY

The Building Code and cited Standards are currently unclear on the best way to calculate the thermal insulation and efficiency of higher density housing for common building elements (walls and floors) between household units. Reviewing the scope of the Acceptable Solutions and Verification Methods will help to clarify this.

7.2 BIANNUAL BUILDING CODE SYSTEM UPDATE

MBIE consult on a regular six-monthly cycle to ensure Acceptable Solutions and Verification Methods are up to date. In the past, public consultations on changes to Acceptable Solutions and Verification Methods have been on an irregular basis with no defined timeframe year to year. These documents are necessary for the building and construction sector and the old process did not provide the certainty, clarity or consistency the industry requires.

The new bi-annual consultation process will allow the sector, including owners, builders, Building Consent Authorities, architects and designers, to keep up to date more easily because they will know when consultations will be issued.

There are two consultation periods each year, the first being held in February/March and the second in August/September. These consultation periods have been chosen so as not to coincide with holiday periods. Publication dates are then programmed for 30 June and 30 November.

The intent of setting regular consultation times is to assist MBIE to be more responsive to industry and reduce the number and scale for any changes required to maintain the system. This is expected to make the content more manageable for the sector and easier to plan for. It will also provide the flexibility to enable timely incremental changes to be made regularly while also allowing more complex changes to be rolled over into the next update cycle if required.

7.3 BUILDING CODE TECHNICAL RISK ADVISORY GROUP

MBIE has launched a Building Code Technical Risk Advisory Group (BCTRAG) to engage with a wide range of building sector participants. As the building and construction regulator, MBIE wants to obtain expert building sector advice to have awareness of emerging risks or changes to existing risk settings in the New Zealand Building Code system. This advice will help MBIE make decisions on what Building Code regulatory changes may be needed.

BCTRAG will focus on identifying technical risks in the Building Code system, and provide:

- strategic advice to MBIE on risks related to the Building Code technical clauses (the A to H clauses) and the documents that provide a means of complying with the Building Code
- feedback on building sector technical trends and innovations
- advice on the wider impacts of Building Code performance settings.

MBIE has worked with Engineering New Zealand and the New Zealand Institute of Architects to set up BCTRAG. The group has permanent members representing technical organisations in the building and construction sector, and also interact on a co-opted basis with a number of organisations representing more specialist areas in the building sector.

8. APPENDICES

8.1 REFERENCES AND FURTHER INFORMATION

MBIE – www.building.govt.nz

Building Act – www.legislation.govt.nz/act/public/2004/0072/latest/whole.html

MBIE New Zealand Building Code Handbook – www.building.govt.nz/assets/Uploads/building-code-compliance/handbooks/building-code-handbook/building-code-handbook-3rd-edition-amendment-13.pdf

MfE Applying for a Resource Consent Handbook – www.mfe.govt.nz/sites/default/files/media/RMA/RMA%20Booklet%202.1.pdf

simpli – www.simpli.govt.nz

ENZ – www.engineeringnz.org

ENZ – Construction Monitoring Services Handbook https://www.engineeringnz.org/documents/112/Construction_Monitoring_Services.pdf

ENZ – Practice Note 2: Peer Review https://www.engineeringnz.org/documents/278/Peer_Review_Practice_Note_-_Version_2.pdf

Canadian Wood Council and Wood WORKS! – Mid-Rise Best Practice Guide

ABOUT THE AUTHOR

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Daniel is a member of Engineering NZ, holds CPEng status, a ME (Hons) qualification, and has had various roles with manufacturers of Engineered Wood Products and structural connectors and fasteners. He also spent two years as the Building Officials Institute of NZ's Technical and Education Manager gaining insight of the NZ building regulatory framework. This, and his passion for encouraging and supporting uptake of timber in commercial, industrial and multi-storey construction, has allowed him to build extensive timber engineering expertise and a unique skillset across engineering, marketing, sales and building compliance. His involvement with numerous industry bodies and standards committees, the time as President of the Timber Design Society, and roles across Australia and NZ have allowed him to be at the forefront of advances and innovation in timber engineering.

8.2 TEMPLATES

PRODUCER STATEMENT – PS2 – DESIGN REVIEW

PRODUCER STATEMENT – PS1 – DESIGN

PRODUCER STATEMENT – PS4 – CONSTRUCTION REVIEW

REQUIREMENTS

POLICIES

LAW

COMPLIANCE

STANDARDS

REGULATIONS

TRANSPARENCY

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