

## BUILDING PERFORMANCE

### Case study one: 1–2-storey attached houses

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Melissa and her partner Mark have purchased an 850m<sup>2</sup>, rectangular section in an Auckland suburb, and are keen to develop medium-density housing that maximises the space.

Melissa is an architectural designer. Her partner Mark is a builder. They've been in business designing and building homes together for 15 years, and are keen to capitalise on current housing demand by branching out into MDH.

Melissa and Mark have decided to register to be part of KiwiBuild's Buying off the Plans initiative. They have purchased an 850m<sup>2</sup>, rectangular section in an Auckland suburban area through which a rail link was recently extended, and are now exploring a cost-effective design that maximises the available space.

Due to the relatively small scale of this MDH project (1–2-storey attached houses), many of the requirements of the Building Code are covered by Acceptable Solutions. This will reduce the involvement of engineers and simplify the building consent process.



### Demonstrating compliance with the Building Code

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When Melissa and Mark lodge a building consent application with their BCA, they will need to demonstrate how their design complies with each relevant Building Code clause.

#### B1 Structure

Melissa and Mark opt to demonstrate compliance with the B1 Structure clause using an Acceptable Solution that refers to NZS 3604 (Timber-framed buildings).

NZS 3604 shows how to construct timber-framed buildings up to a maximum of three storeys where there is good ground, and is commonly used in the design and construction of residential buildings, garages and decks.

Both Melissa and Mark have experience using NZS 3604, so know their design needs to be under 10 metres (or three storeys) in height to fall within its scope.

#### Specialists needed

A structural engineer is needed to design the ground-floor garage and intertenancy walls (which will be blockwork). On the structural engineer's advice, a geotechnical engineer is also engaged to assess the site conditions before the foundations are designed.

As the project doesn't include structural steel framing, Melissa is able to design the rest of the structure to comply with NZS 3604. This means there is no need to engage a structural engineer to design the rest of the building.

[Read more about using NZS 3604 Timber-framed buildings \(https://www.building.govt.nz/building-code-compliance/how-the-building-code-works/using-nzs-3604-timber-framed-buildings/\).](https://www.building.govt.nz/building-code-compliance/how-the-building-code-works/using-nzs-3604-timber-framed-buildings/)

#### B2 Durability

Melissa and Mark also need to consider how to demonstrate compliance with B2 Durability. They decide to follow Acceptable Solution B2/AS1, which specifies a number of New Zealand Standards that, if followed, will ensure the compliance of all timber and wood-based building elements.

B2/AS1 specifies durable materials and requires the designer to consider how the building's high-level cladding will be accessed and maintained. If they choose this method of compliance, the BCA is likely to request a copy of the maintenance plan before granting building

consent. Any maintenance plan would also need to comply with health and safety legislation.

## C Protection from fire

To demonstrate compliance with Building Code clause C Protection from fire, Melissa knows that a simple design of concrete block for the intertenancy walls and a concrete ground-floor slab will comply with Acceptable Solution C/AS1.

### Specialists needed

The structural engineer knows how to use NZS 4229 (Concrete masonry buildings not requiring specific engineering design) to design these features, so they don't need to engage a fire engineer. However, Melissa decides to use a fire engineer to peer review the fire design. Including a peer review document when applying for building consent will provide the BCA with assurance that the design complies with the requirements of C Protection from fire.

## G6 Airborne and impact sound

Because the tenancies are side by side and not stacked, the blockwork meets the design requirements for G6 Airborne and impact sound.

Acceptable Solution G6/AS1 provides that sound transmission can be minimised through the physical separation of building elements, the use of noise control building elements, avoiding rigid service connections, or making the noise control installation airtight.

## E1 Surface water

Melissa and Mark decide to follow Acceptable Solution E1/AS1 to ensure the drainage systems for disposing of surface water at the property comply with Building Code clause E1 Surface water.

E1/AS1 can apply to sites with a catchment area of up to 0.25 hectares that have no history of flooding, are not adjacent to waterways or located in a secondary flow path, and are not located in low-lying areas.

## E2 External moisture

Melissa and Mark intend to demonstrate compliance with Building Code clause E2 External moisture through the use of Acceptable Solution E2/AS1.

As an experienced builder, Mark is familiar with E2/AS1, as it is widely used to ensure weathertight design. The scope of this Acceptable Solution is restricted to timber-framed buildings up to three storeys (10 metres) high.

### Specialists needed

Melissa and Mark won't need a façade engineer to design the cladding system, as Melissa is a Level 2 Design LBP. However, as they are new to MDH, they decide to get a façade engineer to peer review the design. A peer review by an expert can be helpful when applying for building consent and needing to demonstrate how your design complies with the Building Code.

## H1 Energy efficiency

Building Code clause H1 Energy efficiency provides for the efficient use of energy and sets physical conditions for energy performance. Melissa plans to refer to Acceptable Solution H1/AS1.

To determine the amount of insulation required, she will need to refer to NZS 4218 (Thermal insulation – Housing and small buildings).

## Applying for building consent

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Mark and Melissa can't start physical work on their building project until they have building consent and any other required approvals, such as resource consent. They know it's important to submit a good building consent application, and to have done the right amount of planning and preparation from the start.

As part of their preparation, they had a pre-application meeting with their BCA well before making their application for building consent. By discussing the project in depth with their BCA, they were able to get detailed advice from the consenting officer about the information required to support their building consent application.

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