



National  
Construction  
Code

# Livable Housing Design Handbook



Australian  
Building  
Codes Board

## The Australian Building Codes Board

The Australian Building Codes Board (ABCB) is a standards writing body responsible for the National Construction Code (NCC), WaterMark and CodeMark Certification Schemes.

The ABCB is a joint initiative of all levels of government in Australia, together with the building and plumbing industry. Its mission is to oversee issues relating to health, safety, amenity, accessibility and sustainability in building.

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## **Preface**

This handbook is one of a series by the ABCB. Handbooks expand on areas of existing regulation or relate to topics that are not regulated by the NCC. They provide advice and guidance.

The Livable Housing Design Handbook assists in understanding Part G7 of NCC Volume One, Part H8 of NCC Volume Two and the ABCB Standard for Livable Housing Design.

It addresses issues in generic terms and is not a document that sets out specific compliance advice for developing solutions to comply with the requirements in the NCC. It's expected that this handbook will guide readers to develop solutions relevant to specific situations in accordance with the generic principles and criteria contained herein.-



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### **Reminder**

This handbook is not mandatory or regulatory in nature. Compliance with it will not necessarily discharge a user’s legal obligations. The handbook should only be read and used subject to, and in conjunction with, the general disclaimer at page i.

The handbook also needs to be read in conjunction with the NCC and the relevant legislation of the appropriate state or territory. It is written in generic terms, and it is not intended that the content of the handbook counteract or conflict with the legislative requirements, any references in legal documents, any handbooks issued by the administration or any directives by the appropriate authority.

# 1 Introduction

## 1.1 Intent of livable housing design

The intent of the livable housing design requirements is described in their Objectives, which you can find at clause G7O1 (in Volume One) and H8O1 (in Volume Two). These Objectives are:

*“...to ensure that housing is designed to meet the needs of the community, including older people and those with a mobility-related disability.”*

The reference to ‘the community’ appears first because the requirements are intended to benefit all home occupants. The reference to ‘mobility-related disability’ reflects how the requirements have also been designed around meeting the needs of people with reduced mobility.

The requirements may not fully cover everyone’s needs. There may be times where further design changes or home modifications are necessary to suit a person’s specific needs or preferences.

The title ‘Livable Housing Design’ comes from the Livable Housing Design Guidelines, which are a voluntary guideline published by Livable Housing Australia. These guidelines were the basis of the requirements now included in the NCC.

## 1.2 ABCB Voluntary Standard for Livable Housing Design

The ABCB has also published the ABCB Voluntary Standard for Livable Housing Design: Beyond Minimum (the Voluntary Standard). The Voluntary Standard is designed so it can be used as a Deemed-to-Satisfy (DTS) Solution, as an alternative to the ABCB Standard for Livable Housing Design (the Standard). This is because the solutions it specifies go beyond the minimum requirements of the ABCB Standard - but do not conflict with them.

Regardless of whether you choose to use the Standard or the Voluntary Standard, compliance still needs to be achieved with any other applicable NCC requirements.

## 1.3 Using this document

Abbreviations used in this handbook are in Appendix A.

General information about complying with the NCC and responsibilities for building and plumbing regulation is in Appendix B.

Examples of bathroom layouts are in Appendix C.

Further resources are listed in Appendix D.

Different styles are used in this document. See the examples below.

**NCC extracts<sup>1</sup>**

**Examples**

**Alerts or Reminders**

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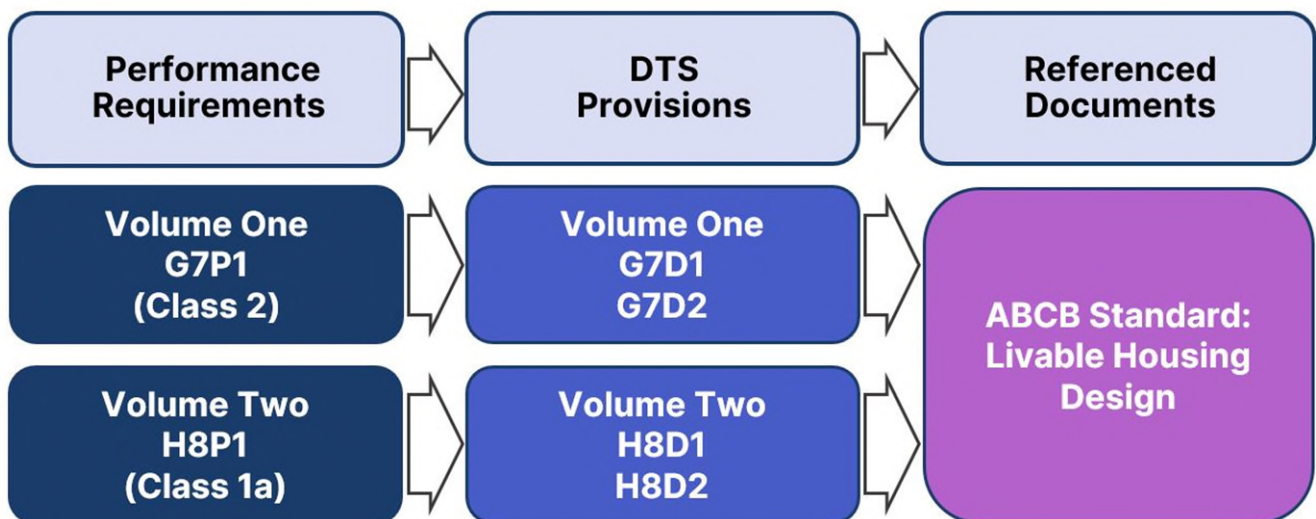
<sup>1</sup> NCC extracts italicise defined terms as per the NCC. See Schedule 1 of the NCC for further information.

## 2 Application of livable housing provisions

The livable housing provisions apply to houses and apartments. Relevant Performance Requirements appear in NCC Volume One and Volume Two. The DTS Provisions provide a compliance pathway to satisfy the Performance Requirements (see Appendix B).

DTS Provisions in Part G7 of NCC Volume One and Part H8 of NCC Volume Two call-up the ABCB Standard for Livable Housing Design (the Standard). The Standard details technical provisions for DTS compliance for Class 1a buildings (dwellings not above another classification, other than a private garage) and Class 2 apartments. This is shown in Figure 2.1. As an NCC referenced document, the Standard must be read in conjunction with the NCC.

Figure 2.1 Livable Housing Design Standard as a referenced document



The livable housing design provisions do not apply to residential buildings other than Class 1a and Class 2 dwellings (i.e., Class 3, 4, and Class 9 residential care buildings). This is because these buildings are subject to existing accessibility requirements (i.e., Class 3 and Class 9), or are generally occupied by people without mobility impairment (e.g., a caretaker in a Class 4 dwelling).

### 2.1 The Standard

The Standard has 6 Parts covering:

- **Dwelling access** – getting to the entrance from the allotment boundary
- **Dwelling entrance** – ease of access through a step-free entrance
- **Internal doors and corridors** – ease of movement within the dwelling



- **Sanitary compartment** – ease of movement to use a toilet pan
- **Shower** – ease of movement by way of a step-free shower
- **Reinforcement of bathroom and sanitary compartment walls** - providing the ability to add supports such as grabrails if needed.

The NCC already has provisions for access to apartments in Class 2 buildings in Part D4 of Volume One. Therefore, the dwelling access provisions of the Standard do not apply to Class 2 apartments; all other parts of the Standard ordinarily apply, as shown in Table 2.1.

**Table 2.1 Overview of application of the Standard**

Part	Apartments (Class 2) Volume One <sup>1</sup>	Dwellings (Class 1a) Volume Two
Dwelling access	X	✓ <sup>2</sup>
Dwelling entrance	✓	✓
Internal doors and corridors	✓	✓
Sanitary compartment	✓	✓
Shower	✓	✓
Reinforcement of bathroom and sanitary compartment walls	✓	✓

- Notes:
1. Applies to apartments located on an accessible floor from common area.
  2. Subject to concessions specified in Volume Two H8D2.

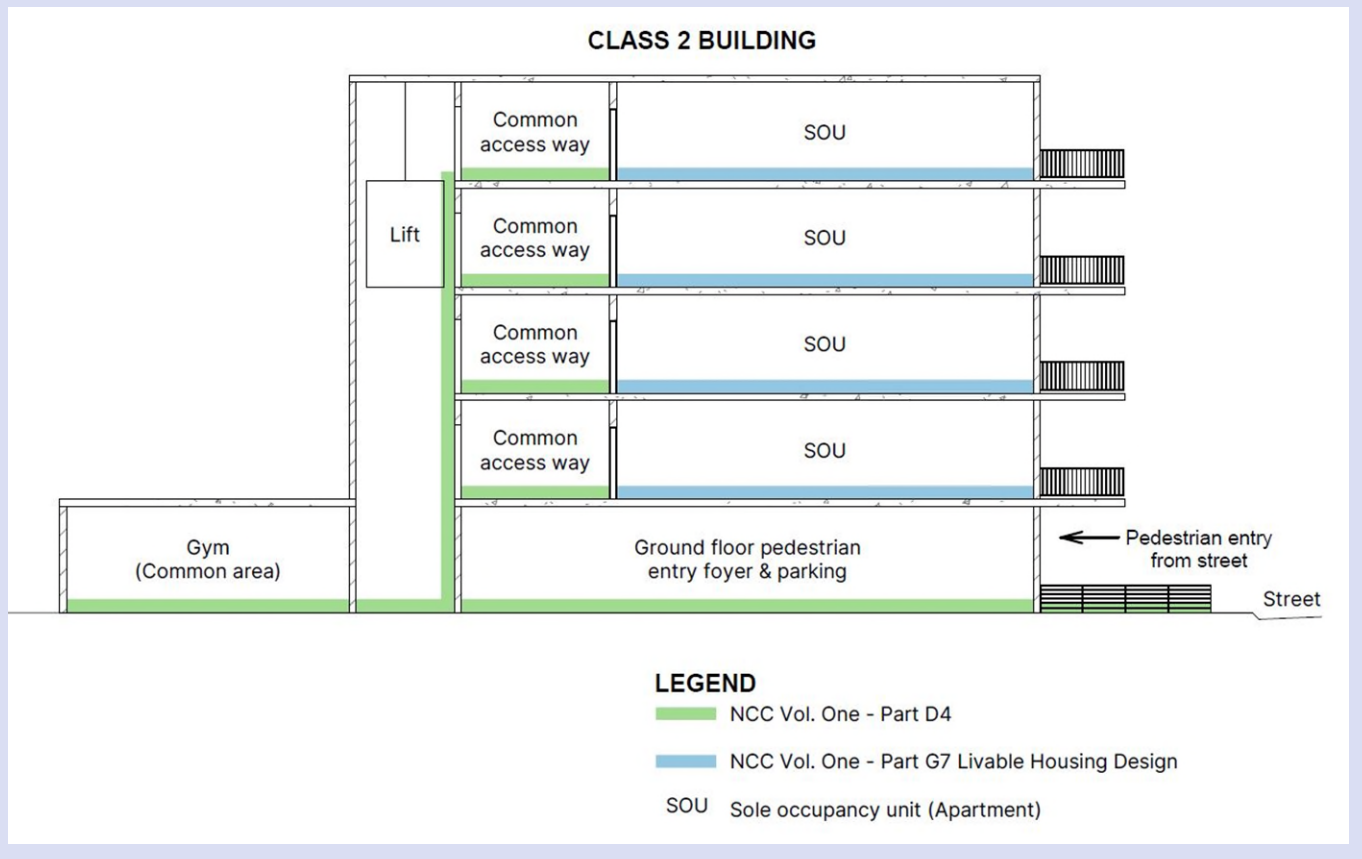
## 2.2 Livable housing and NCC requirements - Apartments (Volume One)

Each apartment (SOU) in a Class 2 building is required to comply with the Standard, except for Part 1. Figure 2.2 illustrates where NCC Volume One Part D4 requires accessibility for common areas, and where Part G7 requires compliance with Parts 2 to 6 of the Standard.

**Example: Application of Part D4 and livable housing requirements to a Class 2 building with lift access to each floor**

Each apartment (SOU) has an accessible floor accessed from a common area and Part D4 and Part G7 apply, as shown in Figure 2.2.

**Figure 2.2 Class 2 building where both Part D4 access provisions and Part G7 livable housing provisions apply**



## 3 Dwelling access

### 3.1 Introduction

The intent of the dwelling access requirements (also referred to as ‘step-free access path’) is to provide safe and easy access to the dwelling entrance from the allotment boundary or a designated car parking space. These features are to improve usability for occupants and visitors, including older people and people with a mobility-related disability. This intent is reflected in the Objective H8O1 and Functional Statement H8F1(a). Objectives and Functional Statements provide guidance on the intent and application of the Performance Requirements.

### 3.2 Application

With regard to livable housing design, dwelling access is covered by the following NCC Volume Two requirements:

- H8P1(a)
- H8D2(1) and (2)
- Part 1 of the Standard.

#### Reminder

Part 1 of the Standard does not apply to Class 2 apartments.

Clause H8D2(1) states that a Class 1a dwelling must comply with the Standard. Part 1 of the Standard has 2 components:

- step-free access path
- car parking space incorporated into step-free access path.

Clause H8D2(2) provides exemptions to the requirement for a step-free access path. These exemptions include:

- steep sites
- insufficient space.

### 3.3 Step-free access path

The continuous step-free access path must be provided from:

- the pedestrian entry at the allotment boundary, or
- an appurtenant Class 10a garage or carport, or
- a car parking space provided for the exclusive use by dwelling occupants.

These options are shown in Figure 3.1, Figure 3.2, and Figure 3.3 for continuous access path.

**Figure 3.1 Continuous path to a dwelling entrance from the allotment boundary (Clause 1.1(1)(a) in the Standard)**

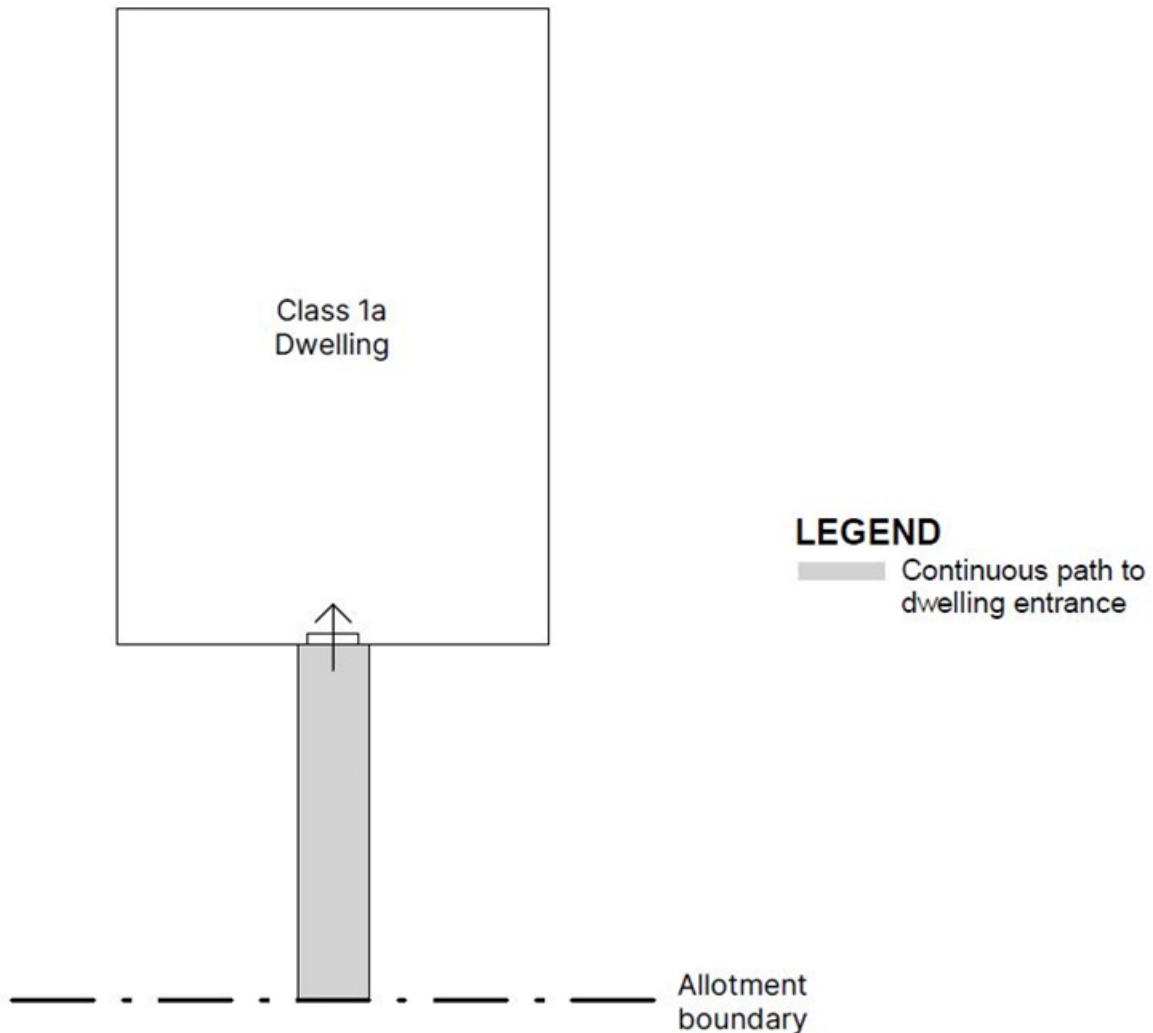


Figure note: Suitable for many applications including narrow lots, small sites, and sites, with minimal setbacks.

**Figure 3.2 Direct entrance to a dwelling from a garage/carport (Clause 1.1(1)(b) in the Standard)**

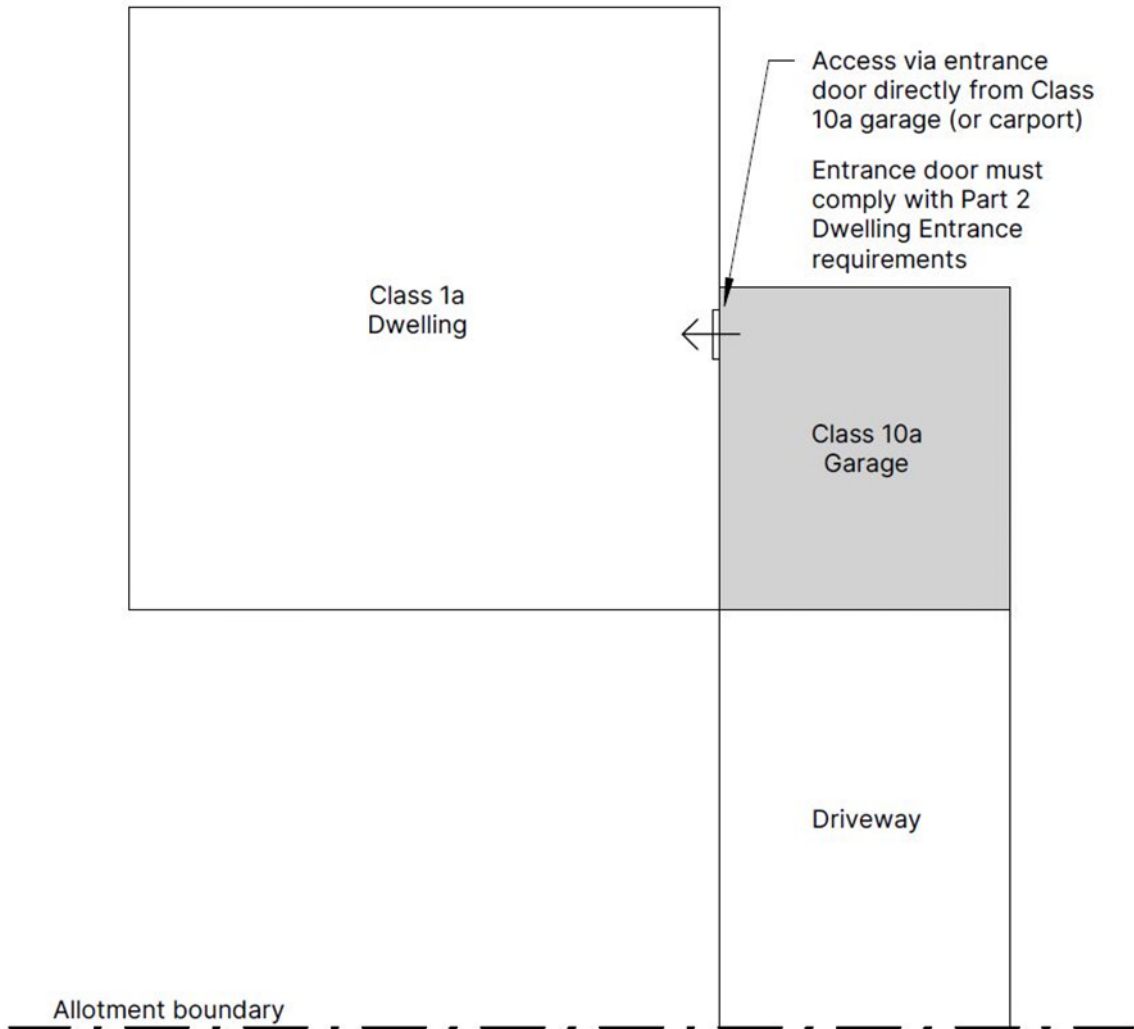


Figure note: Suitable for many applications including steep sites, large allotments, small sites, and minimal setbacks.

**Figure 3.3 Continuous path to a dwelling entrance from an exclusive use car parking space (Clause 1.1(1)(c) in the Standard)**

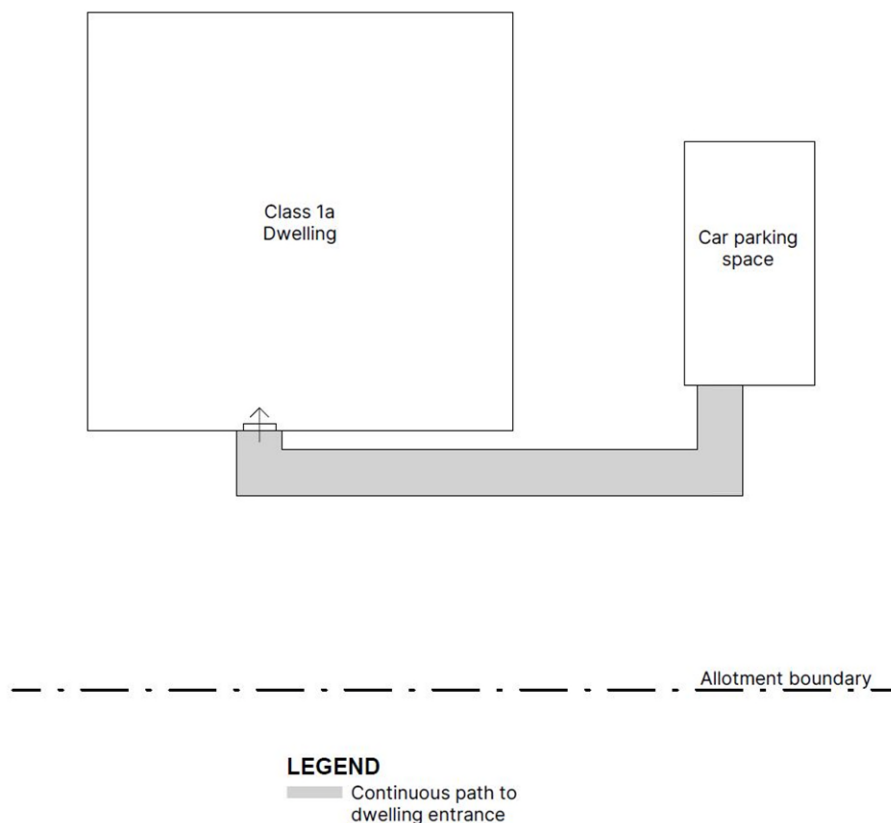


Figure note: Suitable for many applications including steep sites and large allotments.

The requirements for a step-free access path from the allotment boundary, or a car parking space for the exclusive use of the occupants, include the following:

- connection between the dwelling entrance door (that complies with Part 2 dwelling entrance) and the car parking space or allotment boundary
- step-free
- minimum 1000 mm wide
- crossfall of 1:40 or shallower
- gates within the access path (if provided) have a minimum clear opening width of 820 mm
- ramps (other than step ramps), if necessary, must comply with the following:
  - minimum 1000 mm wide
  - gradient between 1:14 and 1:20 (maximum distance between landings dependent on gradient)
  - minimum 1200 mm long landing top and bottom with a crossfall shallower than 1:40.

- a single step ramp, if provided, must comply with the following:
  - minimum 1000 mm wide, or the width of the access path if greater than 1000 mm
  - maximum gradient of 1:10
  - maximum height of 190 mm
  - maximum length 1900 mm.

Where it is nominated to provide step-free access from an attached Class 10a garage or carport, the connecting door is to comply with Part 2 Dwelling entrance. In this instance, it is not necessary to provide an additional entrance door that complies with Part 2.

### 3.3.1 Ramps on step-free access path

Clauses 1.1(4) and (5) include specific requirements for ramps including gradients, maximum length, provision and dimensions of landings, minimum width, and crossfalls.

#### Ramp length and gradient

The maximum length of ramping between landings varies depending on the gradient used as follows:

- 1:14 gradient: maximum 9 m length
- 1:20 gradient: maximum 15 m length
- gradient between 1:14 and 1:20: maximum length as determined by linear interpolation.

The length of the landings is not included in the distance between landings.

#### Difference between a ramp and a path

Table 3.1 provides a comparison of requirements for ramps and paths, including gradient, maximum distance between landings, and requirements for landings and slip resistance. These DTS requirements are minimum standards. To comply, the finished construction needs to provide the stated minimum requirement or higher.

**Table 3.1 Comparison of requirements for ramps and paths**

Component	Gradient	Maximum distance between landings (m)	Landings required (yes/no)	Slip resistance required (yes/no)
Path	Shallower or equal to 1:20	Unlimited	No	No
Ramp	1:14 to 1:20	9 to 15 <sup>1</sup>	Yes	Yes
Step ramp	Shallower or equal to 1:10	1.9	Yes	Yes

Note: Distance varies with gradient (see Clause 1.1(4)(a)).

### Example: Construction tolerances, ramps, and other constructions

A ramp designed with a gradient 1:14 must achieve a gradient of 1:14 or shallower to comply. A gradient of 1:13 is non-compliant.

In construction applications, it is common to see ramp or path gradients designed and specified slightly more than the minimum, to factor in construction tolerances.

For example, to ensure a path does not accidentally become a ramp, it is specified as 1:21. Or, to ensure an acceptable ramp gradient is obtained, 1:15 might be designed.

### Landings

Landings are required at the end of each ramp, providing a safe transition between a sloped and level surface. The landing length must be a minimum of 1200 mm long - in line with the direction of the ramp - and at least as wide as the ramp. Where a cross-fall is provided for drainage, the crossfall must be no steeper than 1:40.

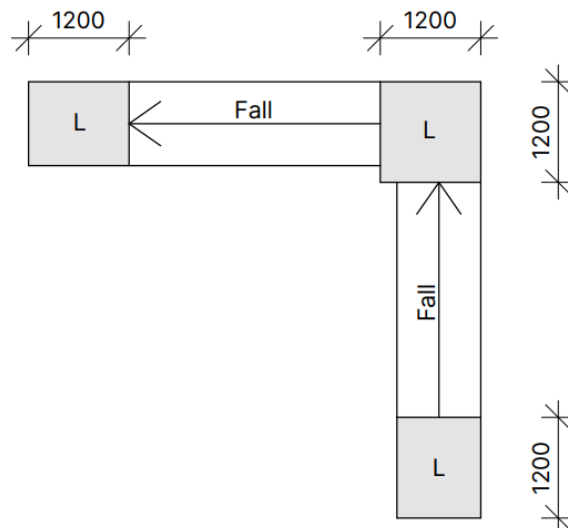
Landings also allow a ramp to change direction. In this case, the landing would require to be a minimum 1200 mm long in each direction, as per Figure 3.4.

A landing provided at one end of a ramp may also be counted as a landing for the purposes of the dwelling entrance requirements in Part 2.3.

### Change in ramp direction

Ramps may have a change in direction. A landing is one means of providing a change in direction. Australian Standard (AS) 1428.1 describes methods of changing direction of ramps; this standard, though not mandatory, may be useful to inform ramp design where a change in direction is necessary.

Figure 3.4 Landing length between ramps that change direction (dimensions in mm)

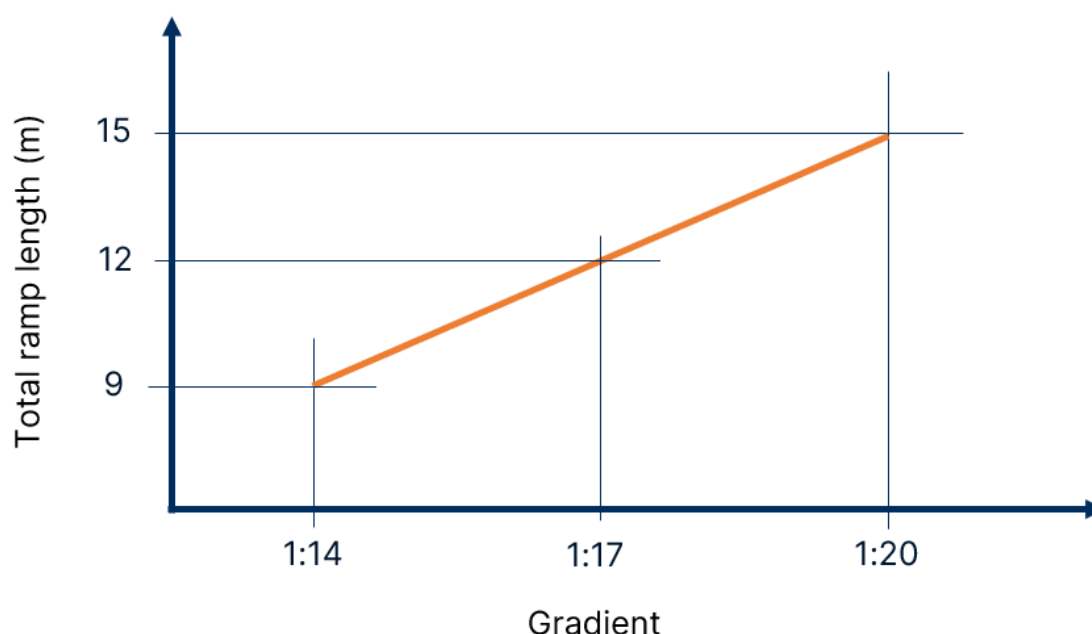




### Linear interpolation

In Figure 3.5, the line of interpolation is shown (in orange) between gradients 1:14 (maximum length 9 m) and 1:20 (maximum length 15 m). The plotted line (in orange) represents the corresponding maximum ramp length (between landings) for a given gradient. For example, in the same figure, for a gradient of 1:17 the maximum ramp length is 12 m. Table 3.2 represents this same information for a selection of ramp gradients.

**Figure 3.5 Interpolation graph illustrating maximum ramp length (between landings) based on the grade of the ramp**



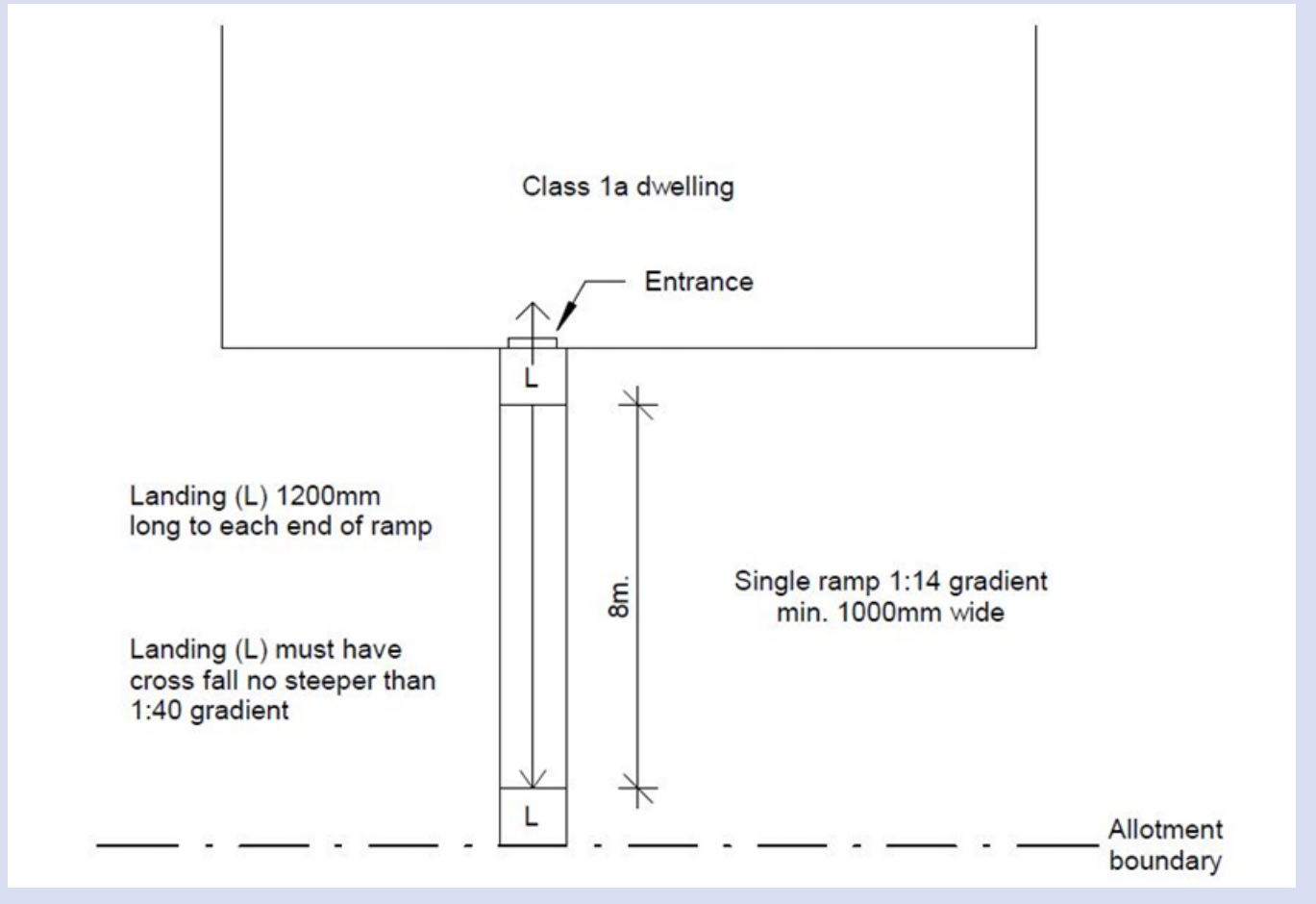
**Table 3.2 Interpolation table illustrating maximum ramp length (between landings) based on the grade of the ramp**

Ramp gradient	Maximum ramp length (m)
1:14	9
1:15	10
1:16	11
1:17	12
1:18	13
1:19	14
1:20	15

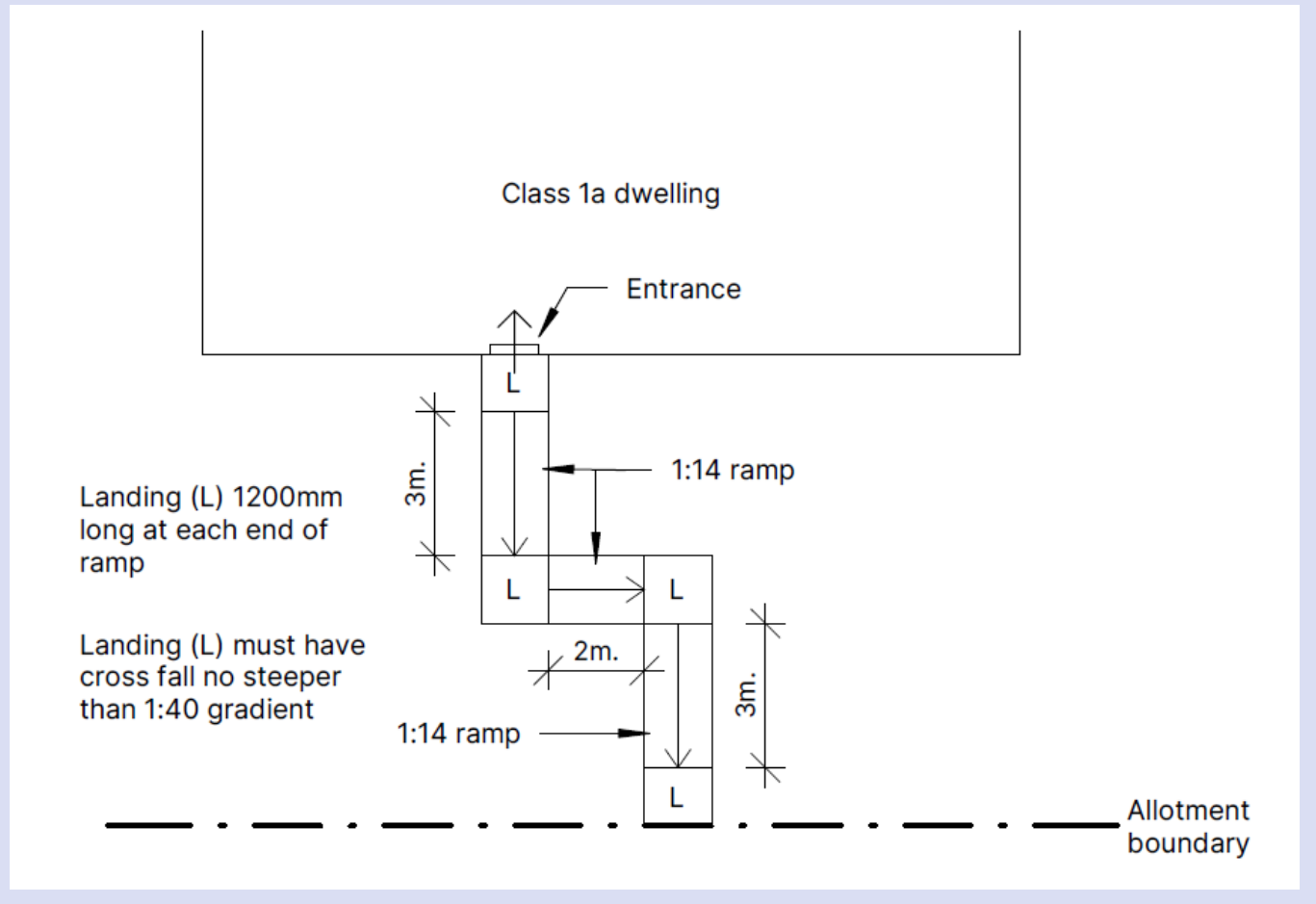
### Example: Ramp designs and lengths

The following diagrams, Figure 3.6 and Figure 3.7, provide examples of single and multiple ramp designs.

**Figure 3.6 A single ramp design with landings**



**Figure 3.7 Multiple ramps with landings**



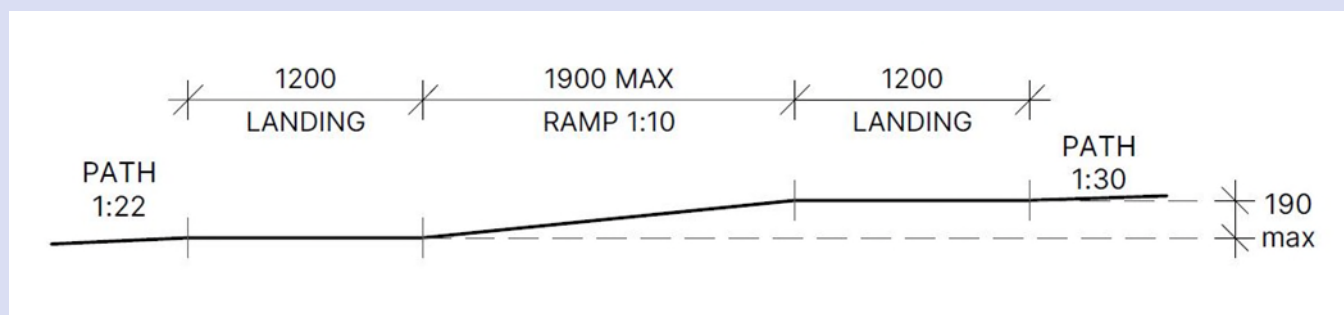
**Step ramp**

Clause 1.1(5) permits the use of one step ramp in an access path. A step ramp assists a person to ascend a single step (no more than 190 mm high), but it can't be longer than 1900 mm or steeper than 1:10 (Figure 3.8). A steeper gradient requires more effort from users, so a shallower gradient should be used where possible.

### Example: Step ramp with landings

Step ramp with landings to safely transition between ramp and paths, as shown in Figure 3.8.

**Figure 3.8 Example of a step ramp with landings (dimensions in mm)**



### Alert: Ramp landing location

The Standard stipulates that the start of the access path is the allotment boundary (see Clause 1.1(1)(a)). Therefore, use of the public footpath for a landing would require a Performance Solution.

### Access path design

The key aim for designers of access paths is to come up with a simple, practical, and safe step-free path design that makes the path accessible for all people regardless of their level of mobility.

The design of the access path will be influenced by various factors. Site topography will have a major influence on what your design options are. The location of the building on the site and car parking requirements also need to be considered. Any gates used along the access path need to have a minimum clear opening width of 820 mm as per Clause 1.1(3)(a).

Deck or boardwalk style paths need to comply with AS 1684 or NASH Standard – Residential and Low-rise Steel Framing.

You have flexibility in choosing the materials used to form the path, so long as the materials and construction methods are fit for purpose – for example a firm surface for the path will meet the Objective and Functional Statement in the NCC. You can use different materials for the same path, for example concrete and timber decking. A continuous access path needs to be clear of impediments to allow safe use of the access path. Examples of impediments include:

- pedestrian bridges using unsuitable materials (for example uneven timber planking with excessive gaps between planks)

- paths with a crossfall steeper than 1:40
- objects that protrude into the required minimum width of the path (such as a bench, post, or letterbox).

Where ramps and non-ramped paths are used, care should be taken to minimise trip and fall hazards from raised edges.

### 3.3.2 Decks, verandahs, and the like forming part of access path

Decks and verandahs (and other similar structures) are a common attachment to Australian homes. These often form part of the access path to an entry to the dwelling. Where they do, the requirements of the Standard for the access path also apply to these structures. This includes the requirement for step-free access to a deck or verandah if these structures (or the like) are part of the identified access path.

### 3.3.3 Driveway may form part of access path

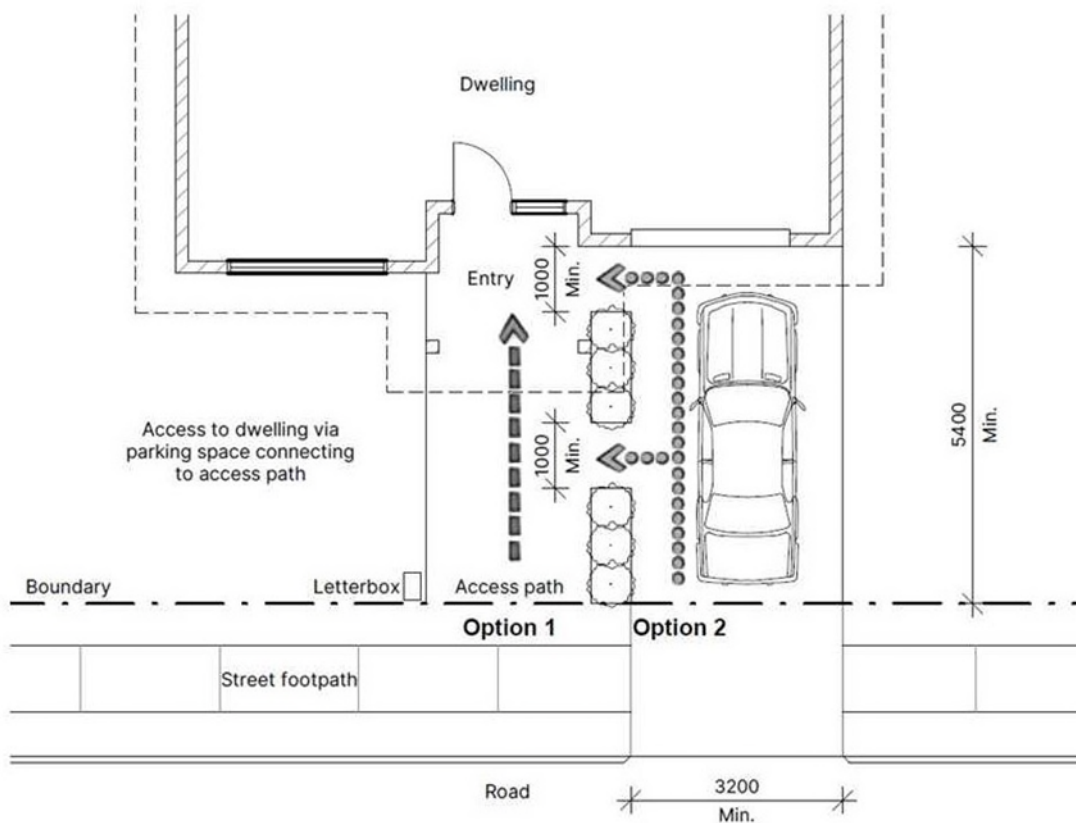
A driveway can be part of an access path if it complies with other Standard requirements for access path gradients and length. If the gradient for part or all of a driveway used as an access path is 1:20 or steeper, it would be subject to Clauses 1.1(4) and (5) in the same way as for a separate access path.

## 3.4 Parking space incorporated into step-free access path.

Clause 1.2 states that one or more car parking spaces can form part of a required access path, provided at least one of the car parking spaces has an unobstructed size of at least 3200 mm wide by 5400 mm long, and has a maximum gradient of 1:33 (bitumen) or 1:40 (any other surface material). This clause only applies when the appurtenant garage, carport, or car parking space is connected to or forms part of a required access path.

Figure 3.9 illustrates how incorporation of a car parking space is an option to providing access from an allotment boundary.

**Figure 3.9 Options for incorporating, or not incorporating, a car parking space in the access path (dimensions in mm)**



Where the step-free access path is provided from an appurtenant garage or carport, access into the dwelling must be via a door complying with Part 2.

### Alert

There is no need to specifically signpost or mark the car parking space (e.g. by line marking) as there is no requirement for car parking spaces associated with a Class 1a dwelling to be identified.

## 3.5 Exemptions to dwelling access requirements

The exemptions that apply for dwelling access for Class 1a buildings are found in the:

- exemptions box for Performance Requirement H8P1
- Clauses H8D2(2)(a) and (b).

### Alert

The exemptions explained here only apply to the access path (excluding landings) to a Class 1a building. This is because the step-free access requirement only applies to Class 1a buildings. The exemption is only applicable for Clause 1.1 of the Standard.

When step-free access from an appurtenant garage, carport or car parking space is not provided, Clause 1.1 of the Standard for step-free access need not be complied with, if one or more of the following apply:

- the area for the access path is too steep
- there is insufficient space.

### 3.5.1 When access via an appurtenant garage, carport or car parking space is not provided

NCC Volume Two Clause H8D2(2)(a) sets a pre-requisite for applying any one or more of the exemption conditions listed in H8D2(2)(b)(i) to (iv). The clause indicates you cannot apply an exemption unless you can establish that step-free access is not provided from an appurtenant garage, carport, or car parking space. Some examples are:

- no garage, carport or car parking space is proposed on the site
- the garage, carport or car parking space is on a different floor level to the rest of the dwelling
- the garage, carport or car parking space is shared with another dwelling or building, and so is not provided for the exclusive use of the occupants.

### Alert

Even if an exemption for Clause 1.1 is applicable, all other relevant requirements of the Standard must still be complied with.

### 3.5.2 The area for the access path is too steep

The exemption only applies to the ground where the access path would be constructed, not to the entire site. If the site has at least one possible location where a compliant access path could be constructed, then the exemption would not apply.

For example, it may not be possible to design an access path from the allotment boundary (or an accessible car space) to the front entrance. However, it might be possible for an access path to be constructed along the side of a house to a rear patio area with an accessible entrance.

### 3.5.3 Insufficient space on the site

The 'insufficient space' exemption is listed in NCC Volume Two at H8D2(2)(b)(iii). Its purpose is to provide for situations where the amount of available space on the site is insufficient to accommodate a step-free access path. This may be due to the physical size of the site, or regulations outside of the NCC which limit the proportion of a site that can be covered by structures and/or impervious ground coverings.

#### **Relationship to property boundary**

The exemption assumes that the step-free access path cannot extend beyond the property boundary. However, for some cases, such as Class 1a dwellings that are part of a strata development with shared access paths, driveways etc., it may be possible for an access path to extend into common property or be shared between dwellings. In this situation, the access path would be extending beyond the strata boundary.

As with all exemptions, such assessments must be made on a case-by-case basis and include considerations such as the permanency of the pathway. A Performance Solution may be used in these circumstances if deemed acceptable by the appropriate authority.

#### **Reminder**

Unless exempt, provision of the step-free access path is an NCC requirement of Volume Two and the Standard. Its satisfactory completion must be signed off by the appropriate authority.

## 3.6 Other relevant NCC Provisions for dwelling access

The NCC has additional provisions for ramps and landings. For example, the Performance Requirement in Volume Two, H5P1 (Movement to and within a building) includes requirements to enable people to move safely to and within a building.



### H5P1 Movement to and within a building

So that people can move safely to and within a building—

- (a) walking surfaces must have safe gradients; and
- (b) any stairway or ramp must—
  - (i) have suitable handrails where necessary to assist and provide stability to people using the stairway or ramp; and
  - (ii) have suitable landings to avoid undue fatigue of users; and
  - (iii) be suitable for safe passage in relation to the nature, volume and frequency of likely usage; and
  - (iv) have slip-resistant walking surfaces on ramps, and on stairway treads or near the edge of the nosing.

Ramps and landings on the step-free access path will need to meet the DTS requirements in Volume Two Clause H5D2. These are detailed in the ABCB Housing Provisions Standard (Housing Provisions) in Clauses 11.2.3, 11.2.4 and 11.2.5.

The Notes to Clause 11.2.3 in the Housing Provisions remind users that the Standard applies to ramps provided for the purposes of Clause 1.1(1). For such ramps, the gradient and landing requirements of the Standard apply, therefore a gradient of 1:8 (permissible under the Housing Provisions) would not be acceptable.

For the purposes of the Standard, if the step-free access path is shared with a driveway that has a gradient between 1:14 and 1:20, it needs to meet the Standard's requirements for a ramp.

## 4 Dwelling entrance

### 4.1 Introduction

The intent of the dwelling entrance requirements is to ensure dwellings are easy to enter and exit, including for older people and those with a mobility-related disability.

The Standard requires that at least one entry door into the dwelling needs to meet the requirements. The entrance door does not need to be the front door, provided that the designated door connects to the step-free path in accordance with Clause 1.1(2). For example, from the garage.

Part 2 of the Standard details the DTS compliance requirements for the designated dwelling entrance.

### 4.2 Application

With regards to livable housing design, dwelling entrance is covered by the following requirements:

- H8P1(b) (Volume Two) and G7P1 (Volume One)
- H8D2 (Volume Two) and G7D2 (Volume One)
- Part 2 of the Standard.

### 4.3 Design and configuration of nominated entrance doors

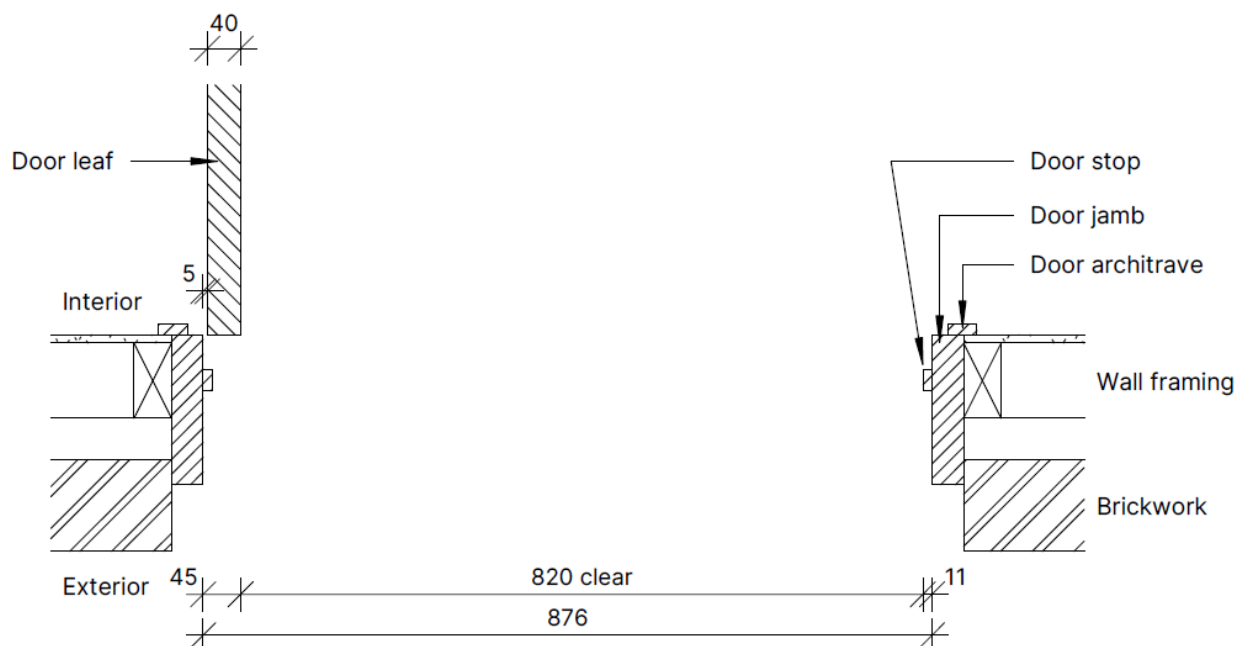
#### 4.3.1 Clear opening width

The Standard requires a clear opening width of 820 mm for the designated entrance door. This means clear of the door leaf and frames. For example, where a swing door opening is used, assuming the entry door leaf depth is 40 mm (a common industry standard for entrance doors) and the depth of the door stops is 11 mm on each side, you could use an 870 mm leaf door to achieve the required minimum opening. This is based on standard door sizes currently available from most door suppliers. Note that different hinge types and their method of installation will also impact calculations for clearances, as would door stops with greater depth than 11 mm.

Figure 4.1 illustrates the example given.

Other types of door assembly may be used, such as double, bi-fold and multiple-slider, provided the overall clear open width is not less than 820 mm, when the door is in a fully open position.

**Figure 4.1 Plan view of a typical door frame with a swing door (dimensions in mm)**



### 4.3.2 Threshold

Clause 2.2 of the Standard provides 4 options for complying with the threshold requirements for an entrance door subject to Clause 2.1.

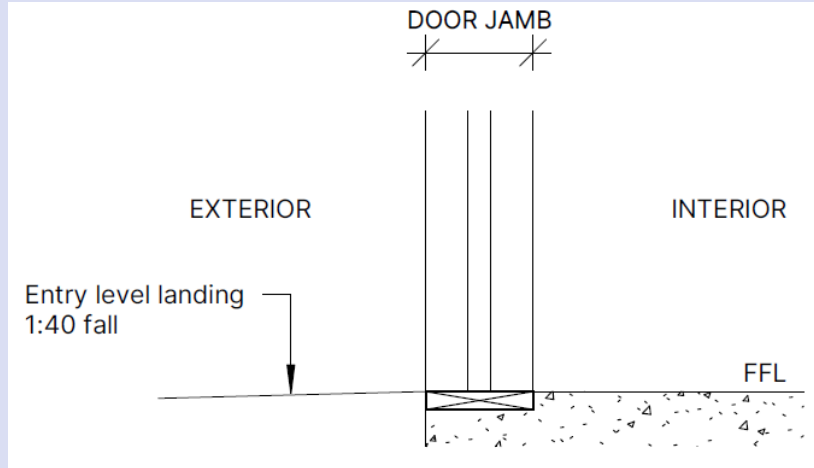
These are:

- (1) provide a level threshold, or
- (2) have a door sill threshold height no more than 5 mm (with rounded or bevelled edge), or
- (3) provide a ramped threshold (maximum 1:8 gradient) within the depth and width of the door jamb, between the entry landing and the inside floor level, or
- (4) where the requirements of the above three points cannot meet the weatherproofing requirements of the NCC—
  - (a) for external entrance doors containing a raised door sill, have no lip or upstand greater than 15mm within the sill profile, and
  - (b) have no more than 5 mm height difference between the edge of the top surface of the sill and the adjoining finished floor surface level.

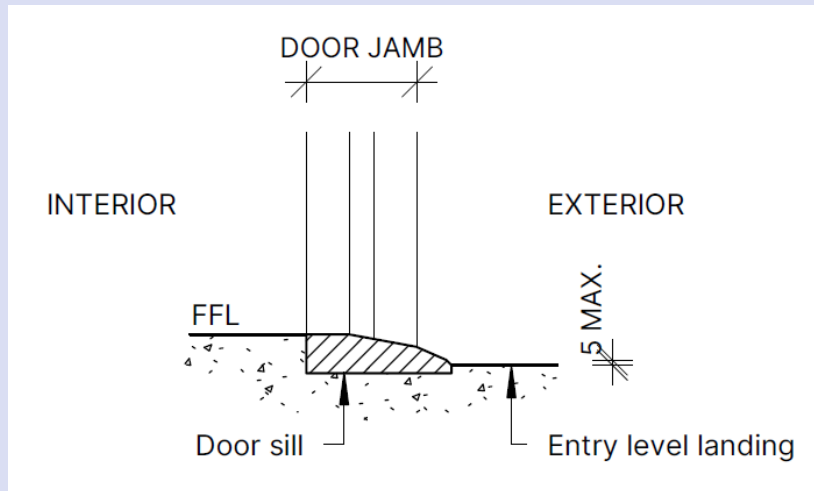
Figure 4.2, Figure 4.3, Figure 4.4, and Figure 4.5 illustrate how each of the 4 options could be applied in practice.

**Example: Threshold options for external step-free entrance**

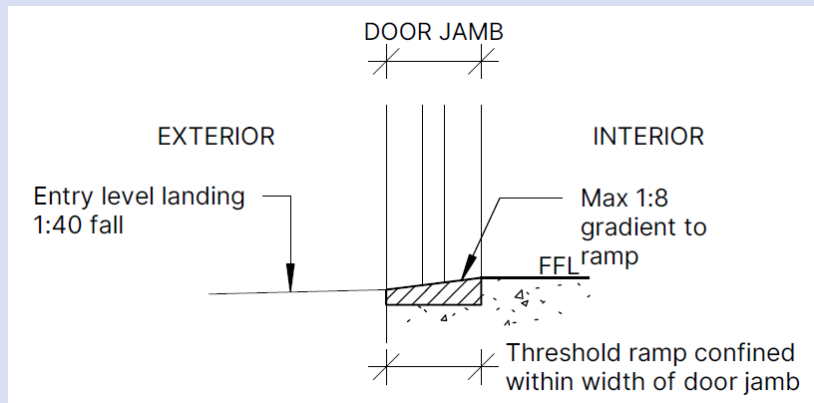
**Figure 4.2 Option 1: Level threshold (example of rebated door threshold)**



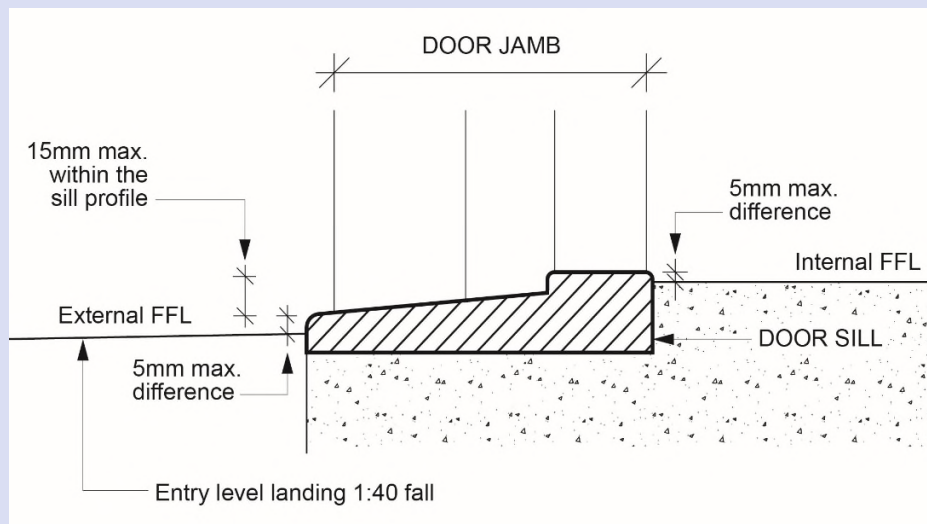
**Figure 4.3 Option 2: Threshold sill 5 mm above entry level and landing (dimensions in mm)**



**Figure 4.4 Option 3: Threshold ramp (confined within depth of door jamb)**



**Figure 4.5 Option 4: Threshold with no lip or upstand greater than 15 mm within the sill profile, with 5 mm maximum height difference with adjoining finished floor surface levels (FFL, dimensions in mm)**



### 4.3.3 Landing area

Clause 2.3 (Landing area) states that an entrance door subject to Clause 2.1 (Clear opening width) must have a space of at least 1200 mm x 1200 mm on the external side of the door with a crossfall gradient no steeper than 1:40. Access to this door must be unobstructed, other than by a gate or screen door.

However, Clause 2.3 does not apply to an entrance door that ‘serves an appurtenant Class 10a garage or carport’ in accordance with Clause 1.1. This means that where the step-free dwelling access is provided from the garage or carport, the 1200 mm x 1200 mm landing area is not required.

An access path to the accessible entrance must comply with Clause 1.2 (Parking space incorporated into step-free access path), as the carport or garage will form part of the access path.

### 4.3.4 Weatherproofing for an external step-free entrance

Clause 2.4 sets out several requirements for weatherproofing external step-free entrances. These include:

- A channel drain to be provided for the width of the entrance, where the external surface of the entrance is impermeable. This channel drain also needs to meet the requirements of H2D2 (Drainage) of Volume Two. The channel drain should be designed and constructed in a way to enable it to be inspected and cleaned. This will assist for the purposes of termite inspection (where applicable, see AS 3660.1) and keeping the drain clear (which is particularly important in bushfire prone areas).

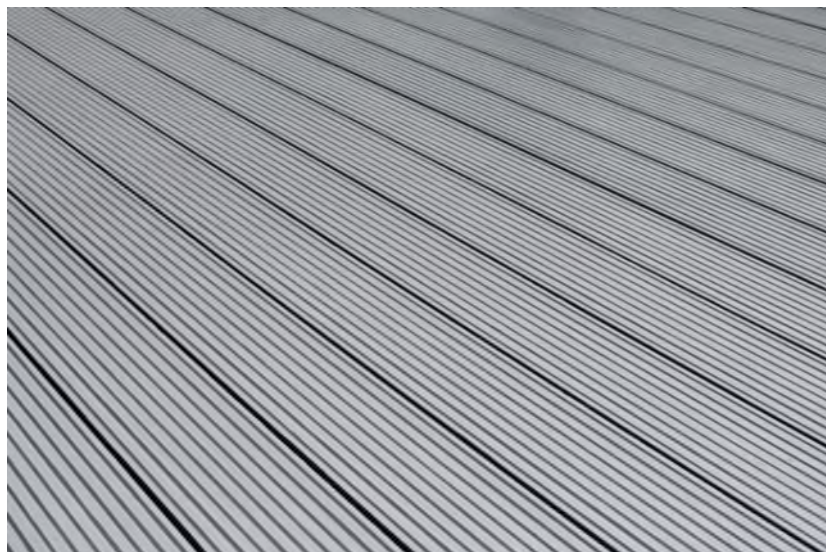
- Where the external entrance area surface is decking or another permeable surface, the drainage surface below also needs to meet the requirements of H2D2 (Drainage) of Volume Two, and AS 3959 (for designated bushfire prone areas).
- A roof covering the landing area (no smaller than 1200 mm x 1200 mm) where the area is also provided with a fall away from the building shallower than 1:40. Note any posts, columns, or other supports for the roof cover must not obstruct the minimum 1200 mm x 1200 mm space required for the landing area in front of the entry door, as per Clause 1.1(4).

Figure 4.6, Figure 4.7 and Figure 4.8 illustrates examples of these requirements.

**Figure 4.6 Channel drain at entrance door**



**Figure 4.7 Permeable decking surface**



**Figure 4.8 Front porch area with roof cover over landing area**



## 4.4 Other relevant NCC provisions for dwelling entrance

There are other NCC Provisions relevant to dwelling entrances, including slip resistance and weatherproofing.

### 4.4.1 Slip resistance and dwelling entrance

If the dwelling entrance landing is served by a ramp, the ramp will need to meet the slip resistance requirements in Volume Two H5D2 as detailed in Clause 11.2.4 of the Housing Provisions.

### 4.4.2 Surface water drainage and landing for dwelling entrance

Volume Two H2P1 Rainwater management includes Performance Requirements relating to surface water, as shown in the extract below.

### H2P1 Rainwater management

- (1) *Surface water*, resulting from a storm having an *annual exceedance probability* of 5% and which is collected or concentrated by a building or *sitework*, must be disposed of in a way that avoids the likelihood of damage or nuisance to any *other property*.
- (2) *Surface water*, resulting from a storm having an *annual exceedance probability* of 1% must not enter the building.
- (3) A drainage system for the disposal of *surface water* resulting from a storm having an *annual exceedance probability* of—
  - (c) 5% must—
    - (i) convey *surface water* to an appropriate outfall; and
    - (ii) avoid *surface water* damaging the building; and
  - (d) 1% must avoid the entry of *surface water* into a building.

The corresponding DTS Provisions are found in Volume Two Clause H2D2(b) Drainage. This includes requirements for drainage of:

- roofs in some areas where a drainage system is required
- sub-soil areas where excessive soil moisture problems may occur
- land adjoining or under buildings.

Clause H2D2 calls up Clause 3.3.3 of the Housing Provisions which contains an important limitation statement that excludes a landing area provided for the purposes of Clause 2.3 of the Standard.

#### 3.3.3 Surface water drainage

##### Limitation

3.3.3 does not apply to a landing area provided for the purposes of Clause 2.3 of the ABCB Standard for Livable Housing Design, except for a channel drain or drainage surface provided under Clause 2.4 of that Standard.

The appropriate authority should be able to provide information on the need for site drainage systems.



## 5 Internal doors and corridors

### 5.1 Introduction

The intent of the requirements in Part 3 of the Standard is to assist unimpeded movement within dwellings to improve their useability. Part 3 specifies the minimum requirements for the design of internal doors and corridors in a dwelling.

### 5.2 Application

With regards to livable housing design, internal doors and corridors are covered by the following requirements:

- H8P1 (Volume Two) and G7P1 (Volume One)
- H8D2 (Volume Two) and G7D2 (Volume One)
- Part 3 of the Standard.

### 5.3 Clear opening width

Clause 3.1 requires internal doorways to have a minimum clear opening of 820 mm, regardless of the type of door used – for example, swing doors, sliding doors, concertina doors and cavity sliding doors. Clear opening width is not the same as door width. This is shown in the following example.

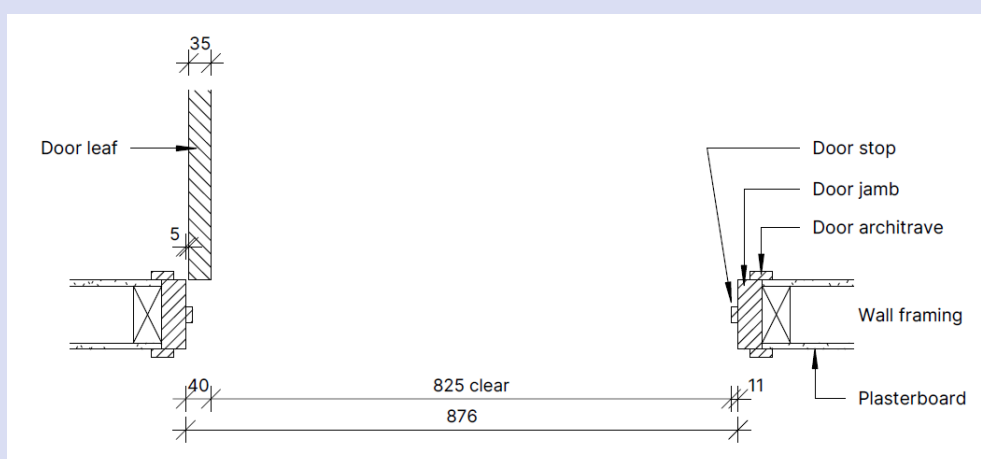
### Example: Clear opening width

Let's consider the following example for an internal swing door. The 820 mm door leaf size is a common size used for internal doors in residential dwellings. If you allow 3 mm tolerance gaps either side of the door leaf and the door framing, the framing spacing would be 826 mm. When you deduct 22 mm (11 mm door stops either side of the door) from 826 mm, we are left with 804 mm, without even considering the depth of the door leaf itself. This does not meet the requirement for a clearance of 820 mm. So we need to use a wider door leaf.

Figure 5.1 illustrates how an 870 mm door leaf size could achieve the required minimum clearance of 820 mm, based on the following assumptions. Note that different hinge types and their method of installation will also impact calculations for clearances.

internal door leaf width (mm):	870
2 x 3 mm gaps each side(mm):	+ 6
overall door frame spacing (mm):	= 876
internal door depth (mm):	- 35
door stop depth (mm):	- 11
door hinge gap from frame when in open position (mm):	- 5
clear opening width (mm):	= 825

**Figure 5.1 Plan view of typical internal door frame with a swing door (dimensions in mm)**



As illustrated, an 870 mm door would give us a total clearance of 825 mm, which exceeds the minimum clearance requirement of 820 mm. The Standard does not require the door handle to be considered for the minimum clearance.

Note that this example is based on several assumptions, which may differ depending on the materials and methods used for door framing and installation. Check door hardware and installation method to ensure minimum clear opening width is achieved.

### 5.3.1 Threshold

The thresholds of internal doorways, subject to Clause 3.1, must:

- be level, or
- have a height no more than 5 mm if the lip is rounded or bevelled, or
- be ramped within the depth of the door frame and have a gradient not more than 1:8 (the ramp also needs to be as wide as the door frame that it sits in).

Figure 5.2 and Figure 5.3 illustrate examples of these points.

**Figure 5.2 Example of a ramped threshold within a door jamb**



Figure 5.3 Example of a level threshold through the doorway



### 5.3.2 Corridor width

A minimum clear width of 1000 mm is required for corridors, hallways, and the like if they are connected to a door that is subject to Clause 3.1. The clear width is measured between finished wall surfaces (e.g. plasterboard or timber cladding). You do not take the measurement between the wall skirting boards or other wall mouldings such as picture rails. Features such as power outlets, wall tiles, door stops and so on are also excluded from this measurement. Door hardware may encroach the minimum required corridor width.

**Alert:**

The requirement for corridor widths does not apply to a stairway that is part of a path of travel to a shower complying with Parts 5 and 6 on a level other than the entry level.

## 6 Sanitary compartment

### 6.1 Introduction

The sanitary compartment requirements in the Standard are intended to improve their accessibility and useability for occupants and visitors, including older people and those with a mobility-related disability. Part 4 specifies the minimum requirements for the design and construction of at least one sanitary compartment in a dwelling. 'Sanitary compartment' is an NCC defined term and means a room or space containing a closet pan or urinal.

In the following figures, Figure 6.1 and Figure 6.2 illustrate that a room **is** a sanitary compartment when it contains a closet pan or urinal. In Figure 6.1, the room containing the bath **is not** a sanitary compartment as it does not contain a closet pan or urinal. The sanitary compartment in Figure 6.1 is the room on the left.

#### Sanitary compartments in the NCC

Figure 6.1 Identification of sanitary compartments

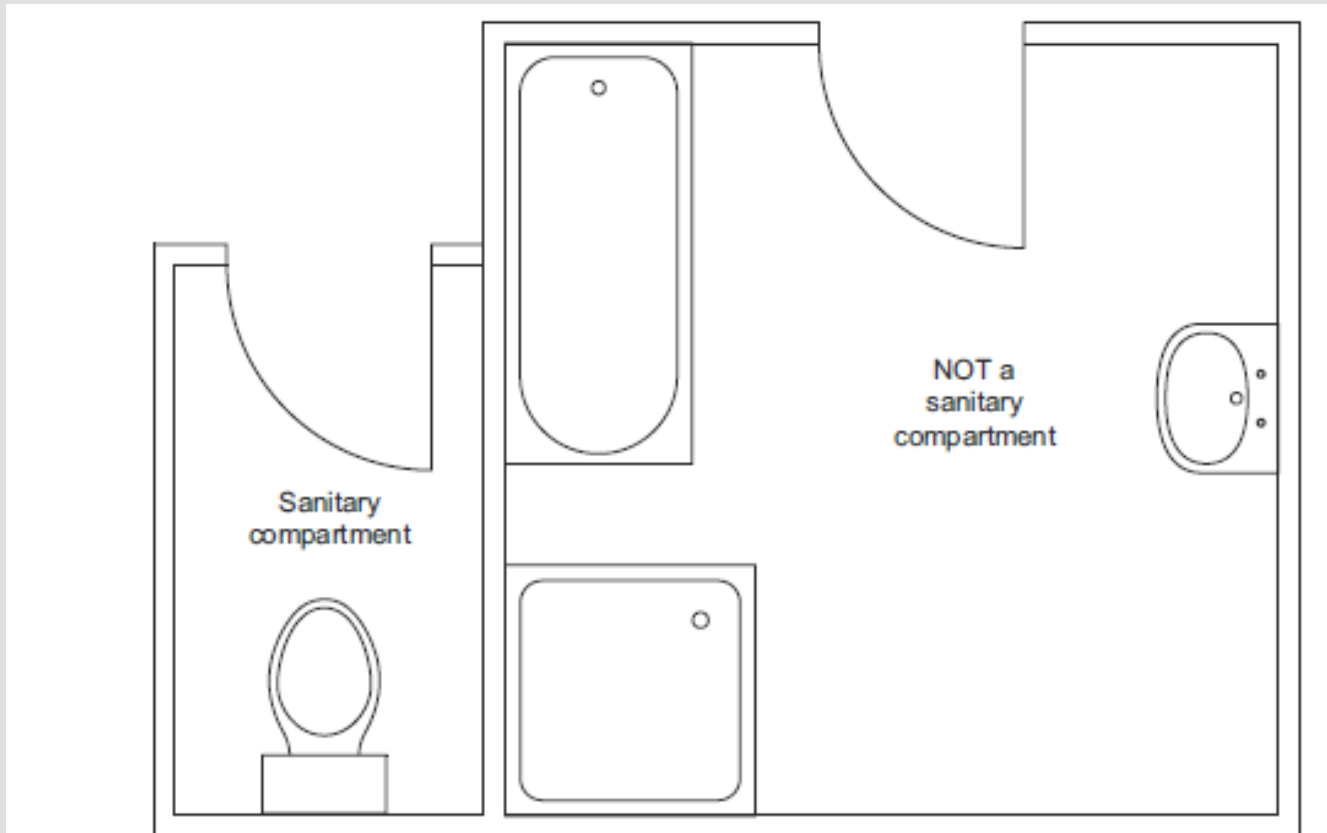
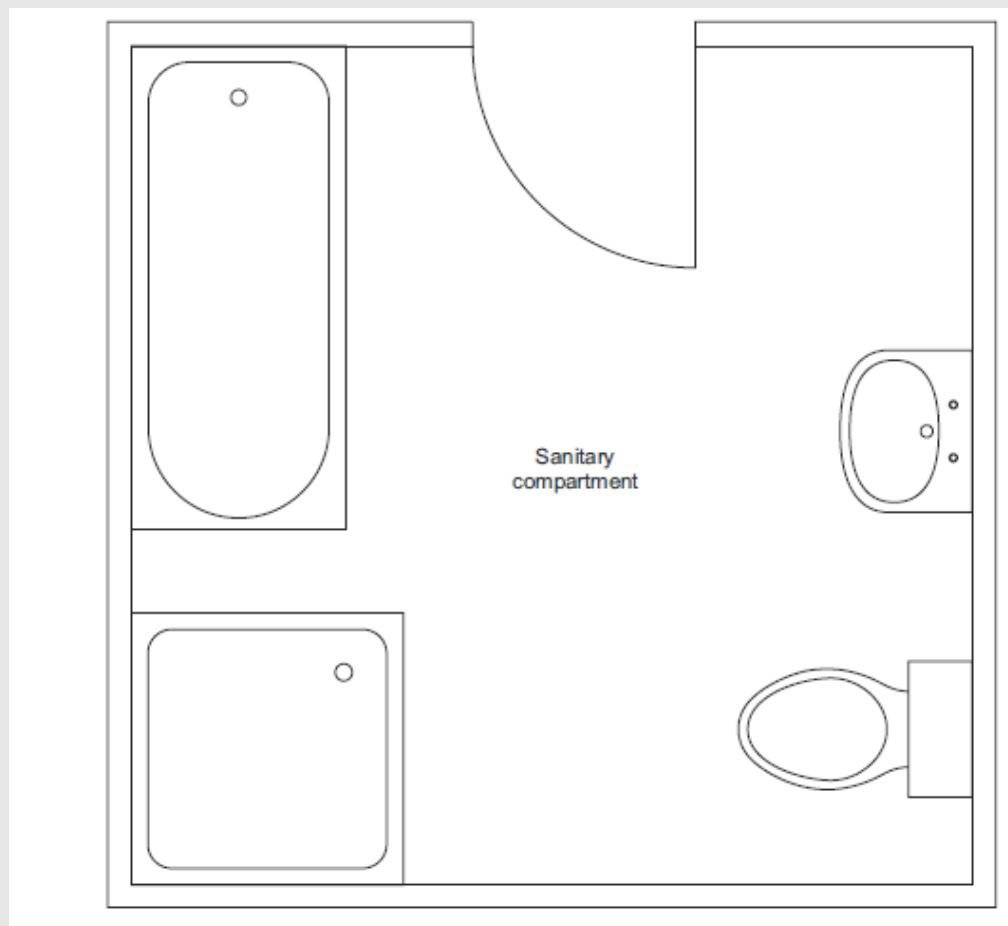


Figure 6.2 Identification of sanitary compartments



## 6.2 Application

With regard to livable housing design, sanitary compartments are covered by the following requirements:

- H8P1(d) (Volume Two) and G7P1 (Volume One)
- H8D2 (Volume Two) and G7D2 (Volume One)
- Part 4 of the Standard
- Part 6 of the Standard.

## 6.3 Location

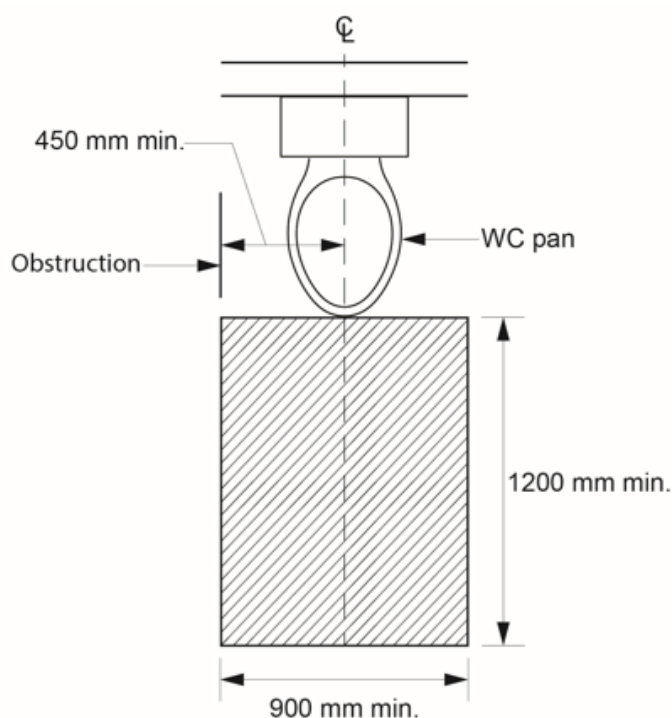
Clause 4.1 Location requires at least one sanitary compartment to be located on the ground floor or entry level of a dwelling. This sanitary compartment must include a toilet.

## 6.4 Circulation space

A sanitary compartment that is subject to Clause 4.1, needs to meet certain circulation requirements in the Standard. The key requirement is a clear zone of 900 mm x 1200 mm immediately in front of the front edge of the toilet pan. Figure 6.3 shows the application of this zone.

Skirting boards, architraves, toilet roll holders, door stops etc. may encroach on the circulation space. However, the circulation space must be clear of the door swing. Clear space in front of and to the side of the toilet pan improves useability for children, older people and people with a mobility disability.

**Figure 6.3 Circulation zone for a toilet**



Where the toilet is located between opposing side walls, such as a typical stand-alone sanitary compartment, there must be a minimum of 900 mm between the finished wall surfaces. Where the toilet pan is within a room with other fixtures, the side of a vanity or other obstruction (e.g. bath) needs to be at least 450 mm from the centreline of the toilet pan. Figure 6.4 and Figure 6.5 illustrates different examples of the application of these requirements.

### Example: Applying the circulation zone

Figure 6.4 Applying the circulation zone – toilet in separate compartment (dimensions in mm)

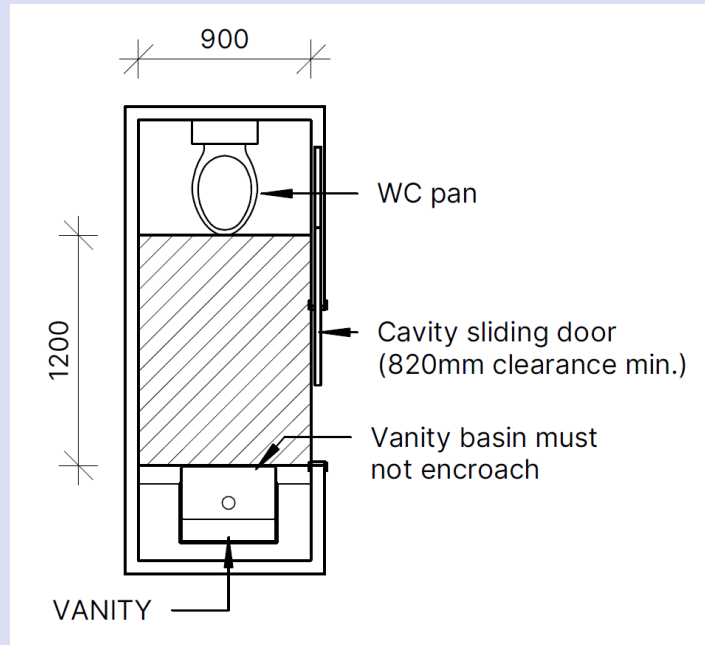
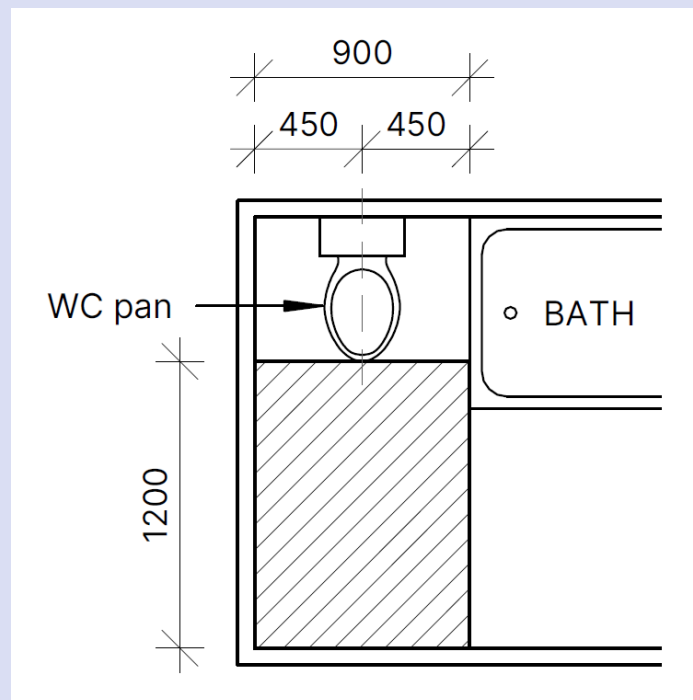


Figure 6.5 Applying the circulation zone and the 450 mm clearance from obstructions with bath adjacent (dimensions in mm)



Note: Examples of room layouts showing positioning of fixtures and reinforcing are shown in Appendix D.



## 7 Shower

### 7.1 Introduction

Part 5 of the Standard seeks to ensure easy and independent access for all home occupants to at least one shower in a dwelling.

### 7.2 Application

With regard to livable housing design, showers are covered by the following requirements:

- H8P1(e) (Volume Two) and G7P1 (Volume One)
- H8D2 (Volume Two) and G7D2 (Volume One)
- Part 5 of the Standard
- Part 6 of the Standard.

#### 7.2.1 Only one shower needs to comply

Regardless of the total number of showers in a dwelling, the Standard only requires that one shower needs to comply with the requirements of Part 5. The compliant shower does not require to be on the ground or entry level.

#### 7.2.2 Hobless and step-free entry

Clause 5.2 of the Standard requires that at least one shower must have a hobless and step-free entry. This means the floor level at the entry to the shower recess must be level with the floor level outside of that recess, while still allowing for necessary falls to enable drainage of water to the recess floor waste. Clause 5.2(2) permits a 5 mm high lip (such as a waterstop angle) commonly placed at the perimeter of the shower recess) for water retention purposes.

Figure 7.1 and Figure 7.2 show examples of hobless and step-free entry. Examples of room layouts showing positioning of fixtures and reinforcing are shown in Appendix D.

### **Example: Hobless and step-free entry showers**

**Figure 7.1 Image of a step-free and hobless shower with glazed screen, no door**



**Figure 7.2 Image of a step-free and hobless shower with no screen**



## **7.3 Other relevant NCC Provisions for shower**

Performance Requirement H4P1 in Volume Two covers what is required for wet areas in Class 1a dwellings. DTS Clause H4D2 states that compliance with AS 3740 or Part 10.2 of the Housing Provisions satisfies Performance Requirement H4P1 for wet areas.

## 8 Reinforcement of bathroom and sanitary compartment walls

### 8.1 Introduction

Part 6 of the Standard specifies the requirements for the reinforcement of bathroom and sanitary compartment walls. The intent of these requirements is to ensure that certain walls adjacent to a shower, a toilet and in some cases a bath, can support the future installation of grabrails.

### 8.2 Application

Reinforcement is covered by the following requirements:

- H8P1(f) (Volume Two) and G7P1 (Volume One)
- H8D2 (Volume Two) and G7D2 (Volume One)
- Part 6 of the Standard.

#### 8.2.1 Location

Wall reinforcement is not required if the walls are constructed of concrete, masonry, or other material capable of supporting grabrails. This includes plaster applied to masonry or concrete. For materials other than concrete or masonry, Part 6 only applies to the sanitary compartment or bathroom subject to the requirements of Part 4 and Part 5.

#### **Alert: Free-standing bath**

A free-standing bath is excluded because it does not have adjoining walls to fix grabrails.

#### 8.2.2 Construction

Reinforcing must be constructed using a minimum 12 mm thick standard grade plywood (or similar), or minimum 25 mm thick timber noggings. The Standard provides figures showing the required locations for sheeting or noggings.

#### **Alert: Grabrails**

There is no requirement to install grabrails.

**Alert: Nogging size**

Nogging sizes are minimum; larger thicknesses are permitted e.g. offcuts from framing timber.

**Alert: Cavity slider doors**

Care is required when locating a cavity slider door in a wall requiring reinforcement adjacent to a fixture. This is to ensure the door operation is not impeded by future fixings. It is also to ensure the ability to support loads from sheeting (if used), linings and potential grabrails under load (i.e. in use).

For showers and baths, reinforcing need only be provided to the available width of the wall. This includes where the available wall is narrower than the specified reinforcing width, or where a window sill terminates lower than the area specified for reinforcing.

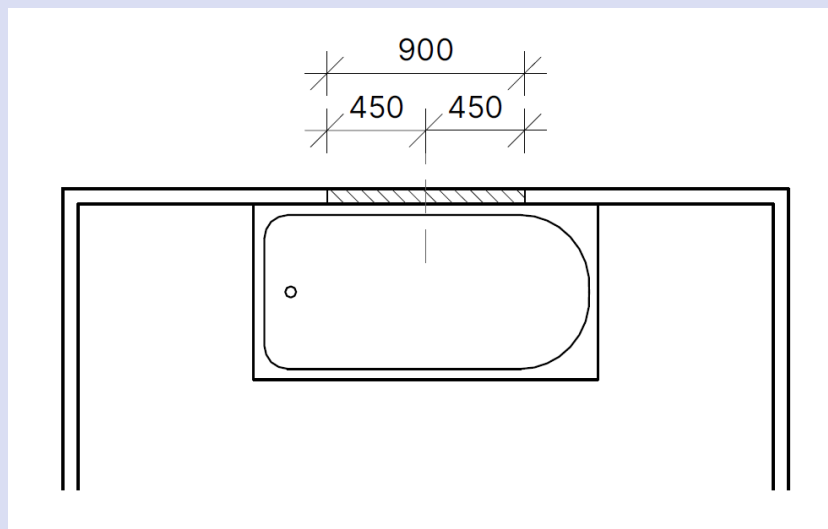
For toilet pans, the full extent of either:

- side wall reinforcing, as stipulated in Figure 6.2e of the Standard, or
- rear wall reinforcing, as stipulated in Figure 6.2f or Figure 6.2g of the Standard, is to be provided.

See examples in Figure 8.1, Figure 8.2, and Figure 8.3.

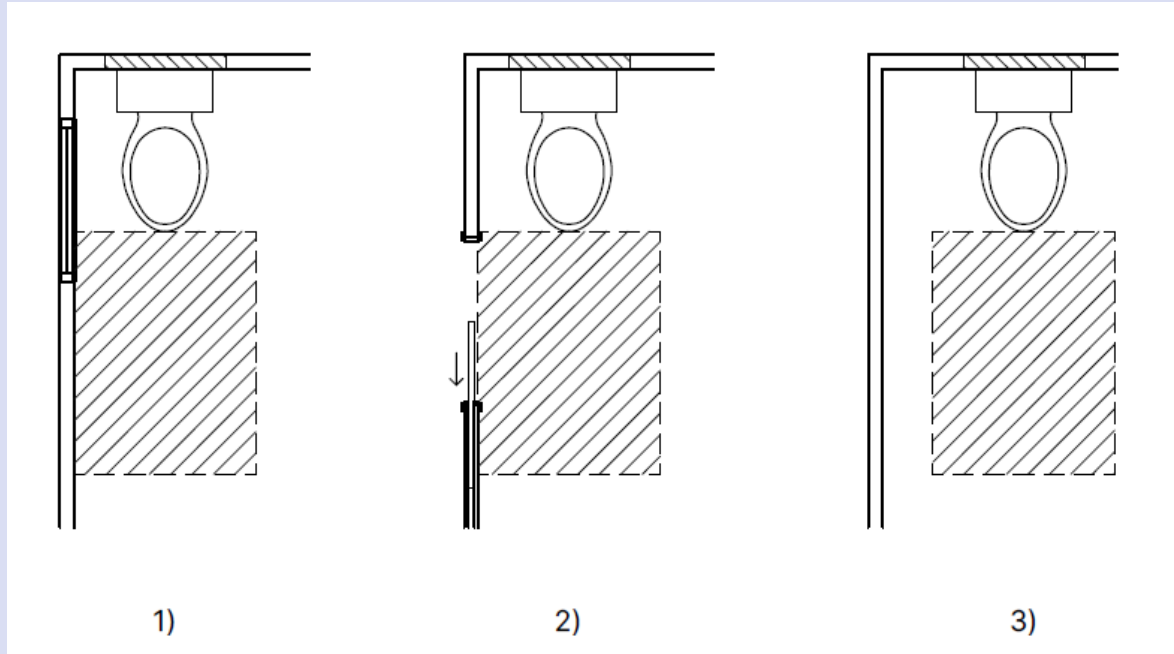
**Example: Reinforcing to a bath wall with only one adjoining wall**

**Figure 8.1 Bath with one adjoining wall, only requires reinforcing to the one adjoining wall (dimensions in mm)**



### Example: Reinforcing the wall behind the toilet pan

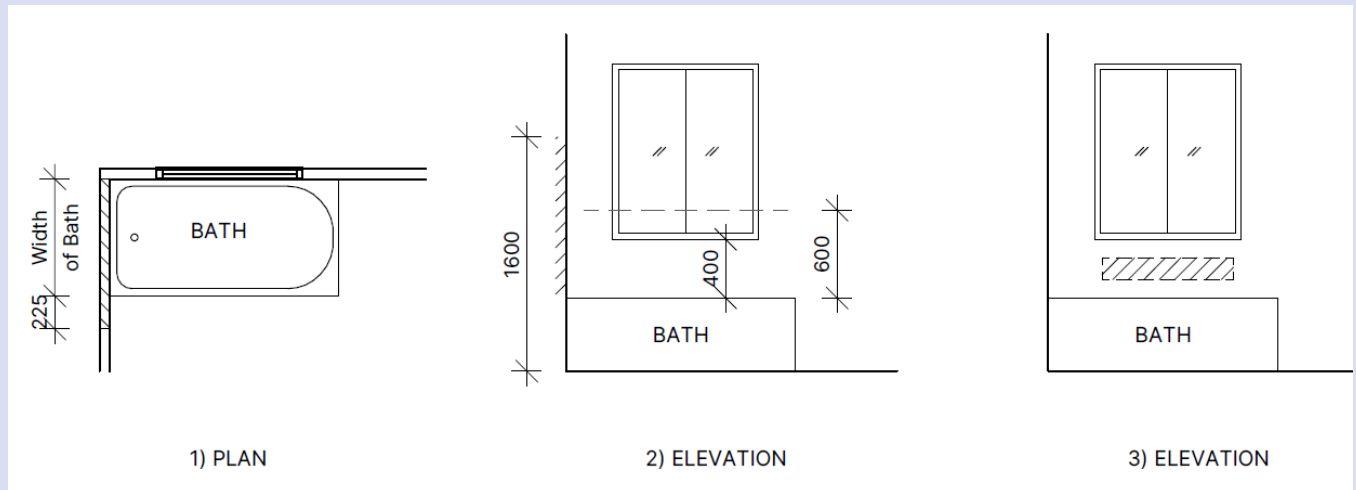
Figure 8.2 Examples of reinforcing behind the toilet pan



- (1) Window sill encroaches on side reinforcement location.
- (2) Door location encroaches on side reinforcement location.
- (3) Toilet pan centreline more than 460 mm away from wall.

**Example: Reinforcing bath (and shower) wall where a wall terminates at a window sill lower than required for reinforcement height**

**Figure 8.3 Window terminates at a window sill lower than the specified reinforcement height (dimensions in mm)**



- (1) Reinforcement sheeting (or noggings) only required to the wall adjacent the end of the bath. Note it extends 225 mm beyond the width of the bath.
- (2) Reinforcement sheeting ordinarily extends 600 mm above bath; sheeting may be provided for the available extent of the area specified in Figure 6.2b of the Standard.
- (3) Provision of noggings in accordance with Figure 6.2a of the Standard, as an alternative to providing sheeting for the available extent of the specified area.

Note: Examples of room layouts showing positioning of fixtures and reinforcing are shown in Appendix D.

# Appendices

## Appendix A Abbreviations

The following table, Table A.1, contains abbreviations used in this document.

**Table A.1 Abbreviations**

<b>Abbreviations</b>	<b>Meaning</b>
ABCB	Australian Building Codes Board
AS	Australian Standard
DTS	Deemed-to-Satisfy
FFL	Finished floor level
NASH	National Association of Steel-framed Housing
NCC	National Construction Code
SOU	Sole-occupancy unit



## Appendix B Compliance with the NCC

### B.1 Responsibilities for regulation of building and plumbing in Australia

State and territory governments are responsible for regulation of building, plumbing, and development/planning in their respective state or territory.

The NCC is a joint initiative of the Commonwealth and State and Territory Governments in Australia and is produced and maintained by the ABCB on behalf of the Australian Government and each state and territory government. The NCC provides a uniform set of technical provisions for the design and construction of buildings and other structures and plumbing and drainage systems throughout Australia. It allows for variations in climate and geological or geographic conditions.

The NCC is given legal effect by building and plumbing regulatory legislation in each state and territory. This legislation consists of an Act of Parliament and subordinate legislation (e.g. Building Regulations) which empowers the regulation of certain aspects of buildings and structures and contains the administrative provisions necessary to give effect to the legislation.

Each state's and territory's legislation adopts the NCC subject to the variation or deletion of some of its provisions, or the addition of extra provisions. These variations, deletions and additions are generally signposted within the relevant section of the NCC and located within appendices to the NCC. Notwithstanding this, any provision of the NCC may be overridden by, or subject to, state or territory legislation. The NCC must therefore be read in conjunction with that legislation.

### B.2 Demonstrating compliance with the NCC

Compliance with the NCC is achieved by complying with the NCC Governing Requirements and relevant Performance Requirements.

The Governing Requirements are a set of governing rules outlining how the NCC must be used and the process that must be followed.

The Performance Requirements prescribe the minimum necessary requirements for buildings, building elements, and plumbing and drainage systems. They must be met to demonstrate compliance with the NCC.

There are 3 options available to demonstrate compliance with the Performance Requirements. These are:

- a Performance Solution
- a Deemed-to-Satisfy Solution, or
- a combination of a Performance Solution and a Deemed-to-Satisfy Solution.

A Performance Solution must be assessed using one or a combination of Assessment Methods, as appropriate. These include:

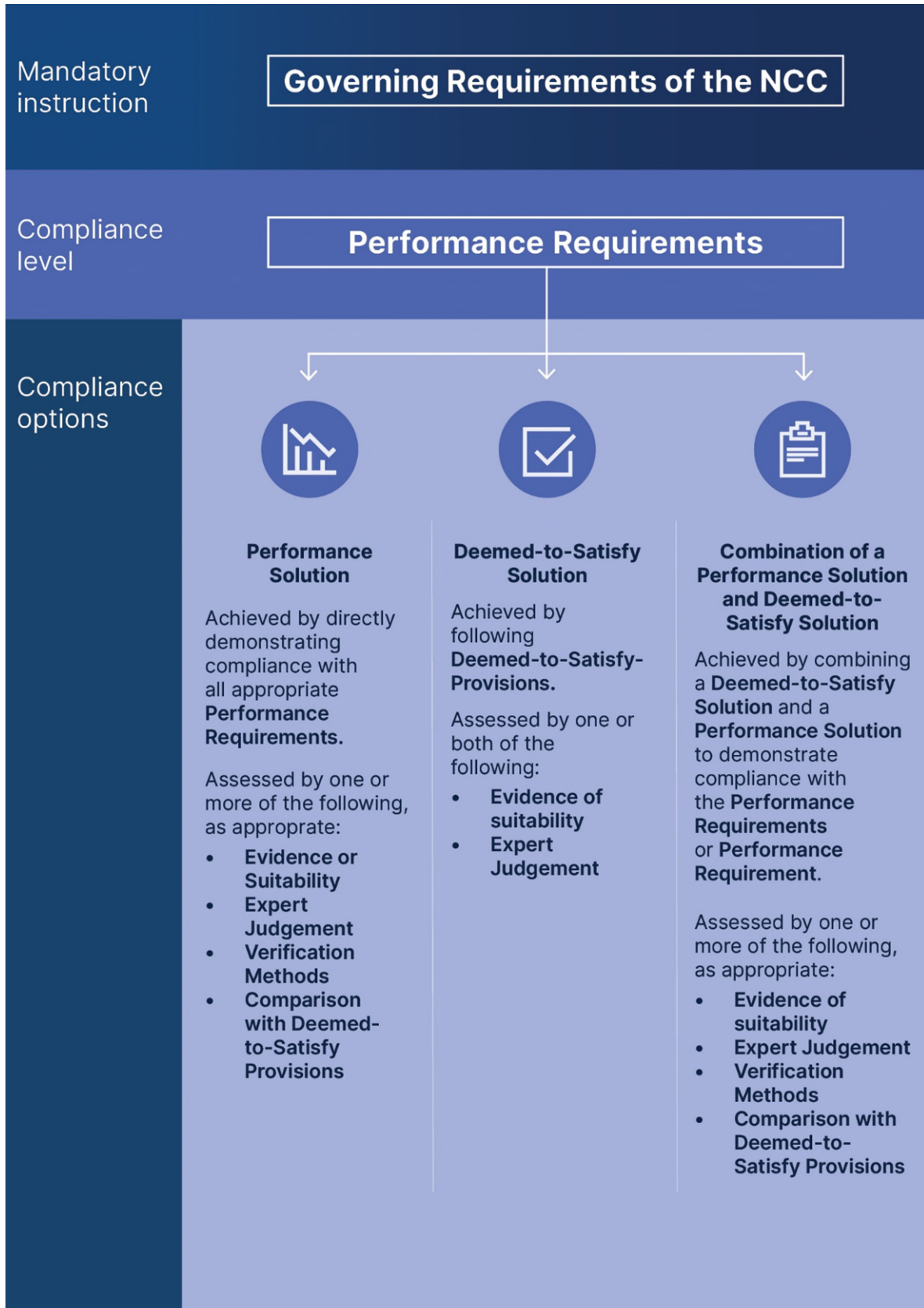
- Evidence of Suitability
- Expert Judgement
- Verification Methods
- Comparison with DTS Provisions.

Evidence of Suitability or Expert Judgement may be used for assessing the compliance of a DTS Solution, as appropriate.

A figure showing hierarchy of the NCC, and its compliance options is provided in Figure B.1. It should be read in conjunction with the NCC.

To access the NCC or for further general information regarding demonstrating compliance with the NCC visit the [ABCB website](http://www.abcb.gov.au).

**Figure B.1 Demonstrating compliance with the NCC**



## Appendix C Examples of bathroom layouts

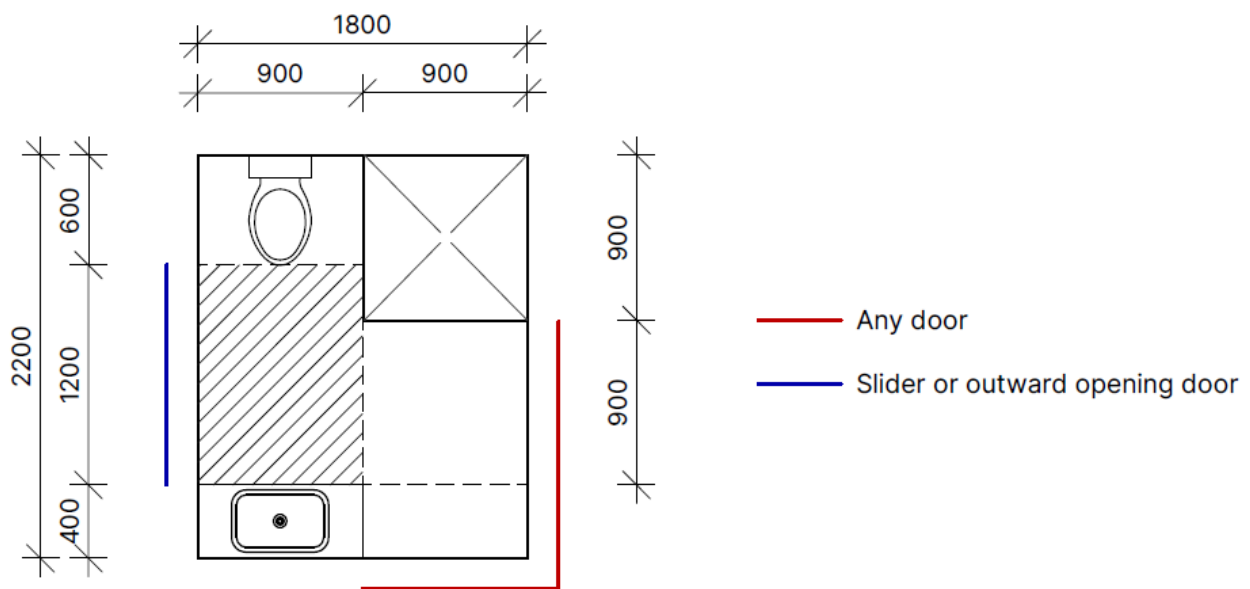
### C.1 Bathroom layout

The following examples illustrate bathroom layouts that meet the requirements of the Standard and the Voluntary Standard.

#### Example: Bathroom layout – 3.96 m<sup>2</sup>

This layout complies with the Standard. There are options for different door configurations.

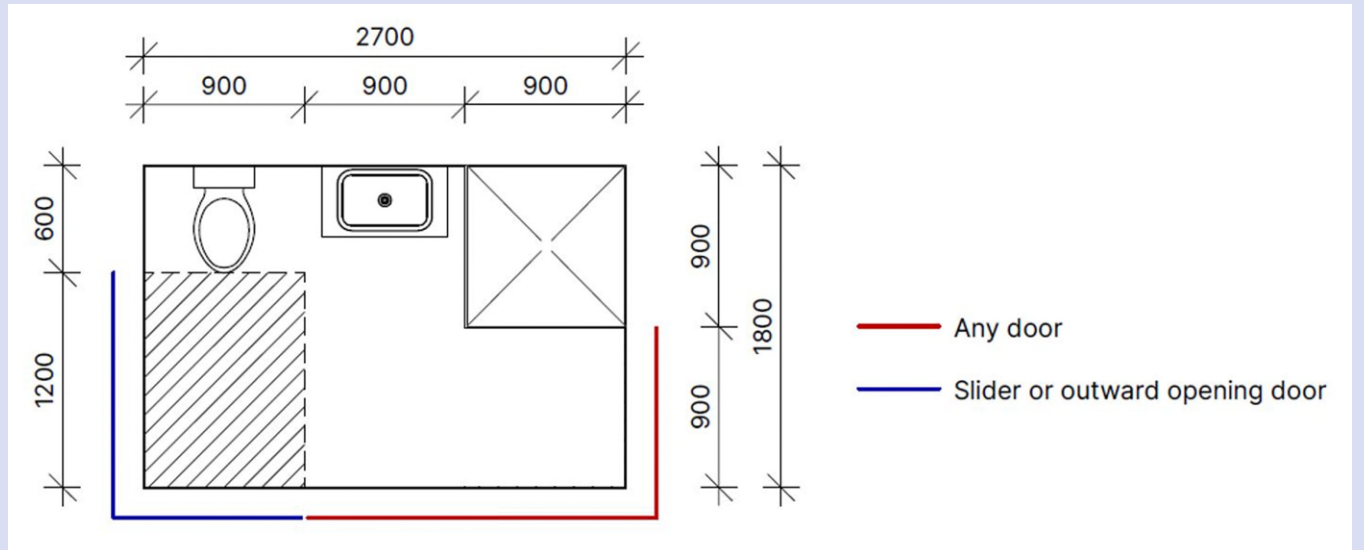
Figure C.1 Bathroom layout – 3.96 m<sup>2</sup> (dimensions in mm)



**Example: Bathroom layout – room area 4.86 m<sup>2</sup>**

This layout complies with the Standard. There are options for different door configurations.

**Figure C.2 Bathroom layout – 4.86 m<sup>2</sup> (dimensions in mm)**



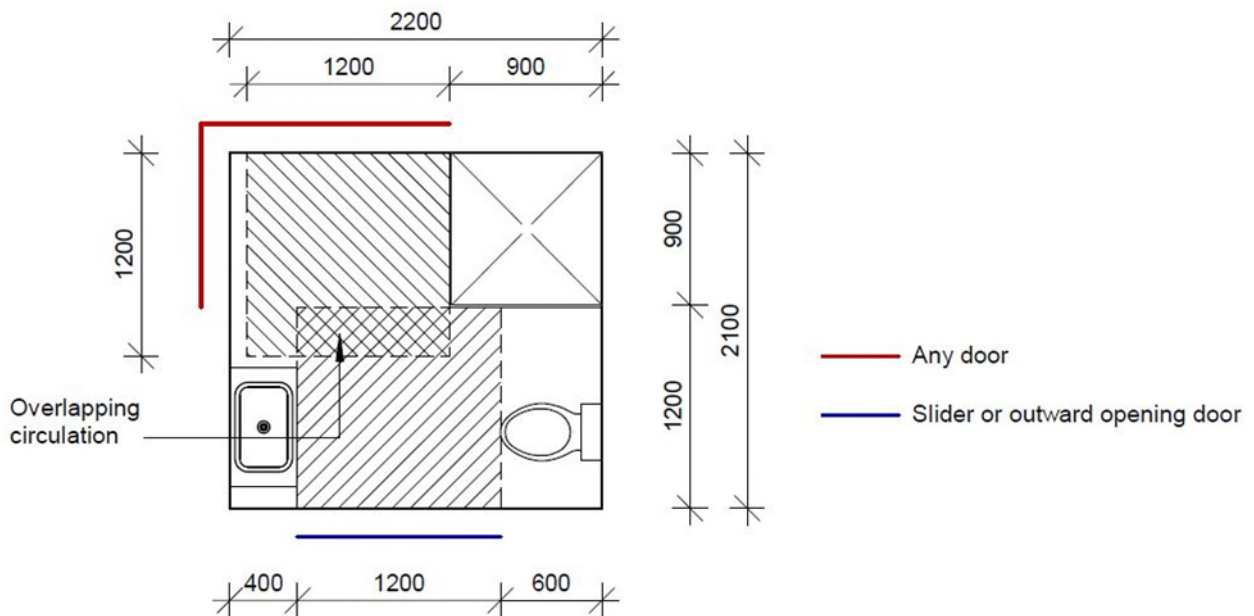
**Example: Bathroom layout – room area 4.62 m<sup>2</sup>**

The layout complies with the Standard and the ABCB Voluntary Standard for minimum circulation and clear opening door width.

There are options for different door configurations.

The minimum circulation space for the toilet pan specified in the Voluntary Standard (1200 mm x 1200 mm) overlaps with the circulation space for a shower specified in the Voluntary Standard (1200 mm x 1200 mm).

**Figure C.3 Bathroom layout – 4.62 m<sup>2</sup> (dimensions in mm)**



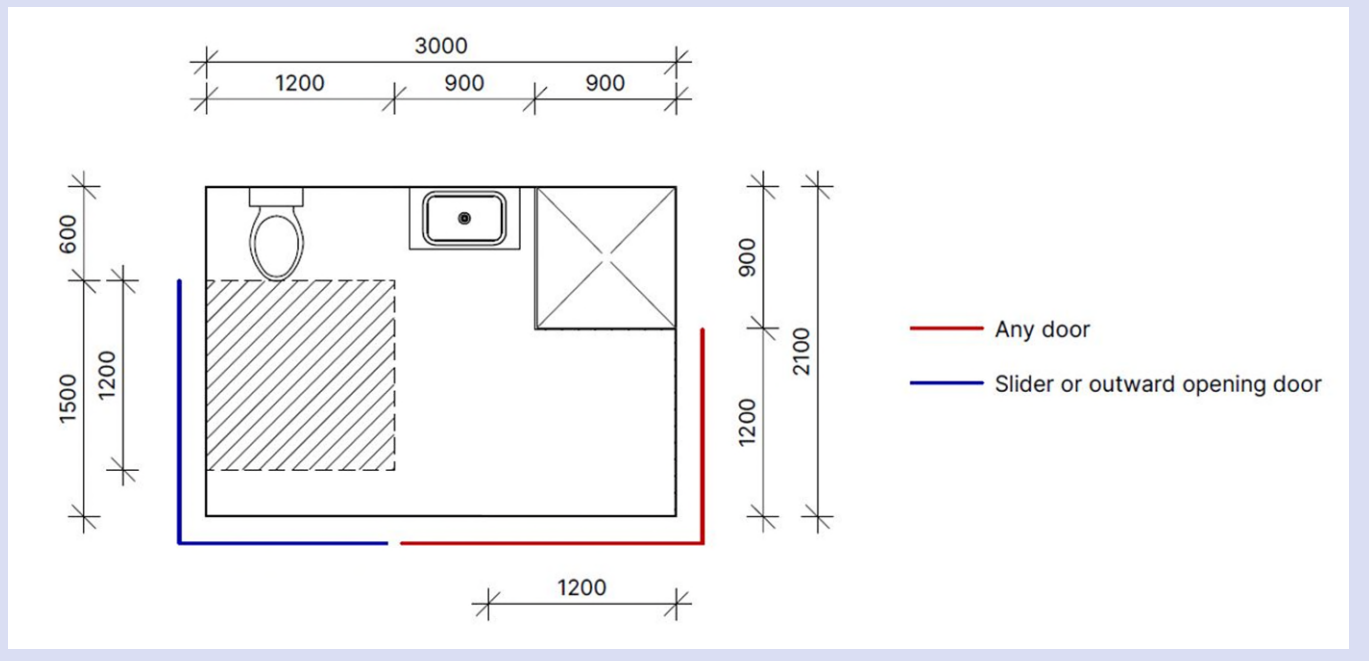
**Example: Bathroom layout – room area 6.3 m<sup>2</sup>**

The layout complies with the Standard and the enhanced Voluntary Standard for minimum circulation and clear opening door width.

There are options for different door configurations.

The minimum circulation space for the toilet pan specified in the Voluntary Standard (1200 mm x 1200 mm) overlaps with the circulation space for a shower specified in the Voluntary Standard (1200 mm x 1200 mm).

**Figure C.4 Bathroom layout – 6.3 m<sup>2</sup> (dimensions in mm)**



**Example: Bathroom layout – room area 5.04 m<sup>2</sup>**

The layout complies with the Standard and (subject to swinging door location) the Voluntary Standard for minimum circulation and clear opening door width.

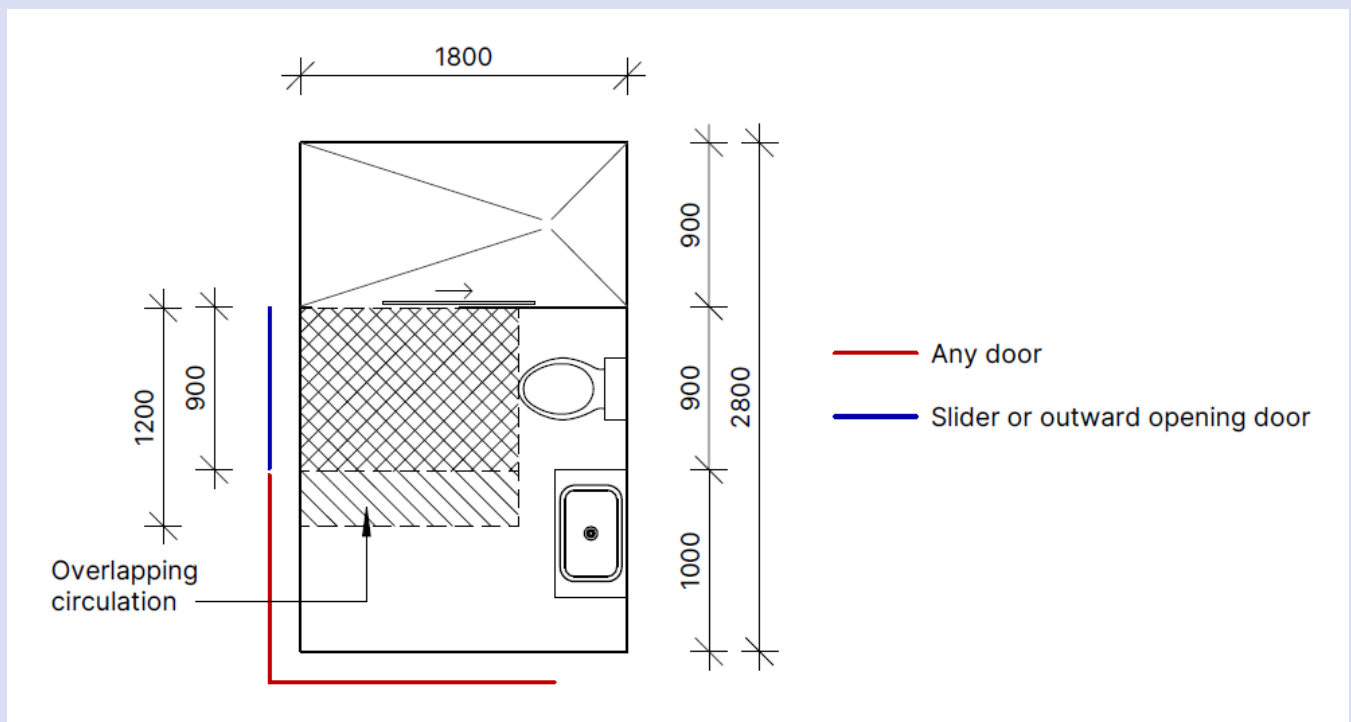
There are options for different door configurations.

The minimum circulation space for the toilet pan specified in the Voluntary Standard (1200 mm x 1200 mm) overlaps with the circulation space for a shower (1200 mm x 1200 mm).

To meet the requirements of the Standard, a 900 mm x 1200 mm circulation space for the toilet pan need only be provided. This is reflected in the diagram; by hatching, and by the permitted location of a door leaf that swings into the sanitary compartment (i.e. ‘Any door’).

To meet the specifications of the Voluntary Standard, a 1200 x 1200 mm circulation space for the toilet pan is necessary. Further, to meet the Voluntary Standard, a swinging door leaf cannot encroach that circulation space.

**Figure C.5 Bathroom layout – 5.04 m<sup>2</sup> (dimensions in mm)**





## Appendix D Resources

### D.1 ABCB publications

Australian Building Codes Board (2022), *ABCB Housing Provisions Standard*.

Australian Building Codes Board (2022), *ABCB Standard for Livable Housing Design*.

Australian Building Codes Board (2023), *ABCB Voluntary Standard for Livable Housing Design – Beyond Minimum*.

Australian Building Codes Board (2022), *National Construction Code*.