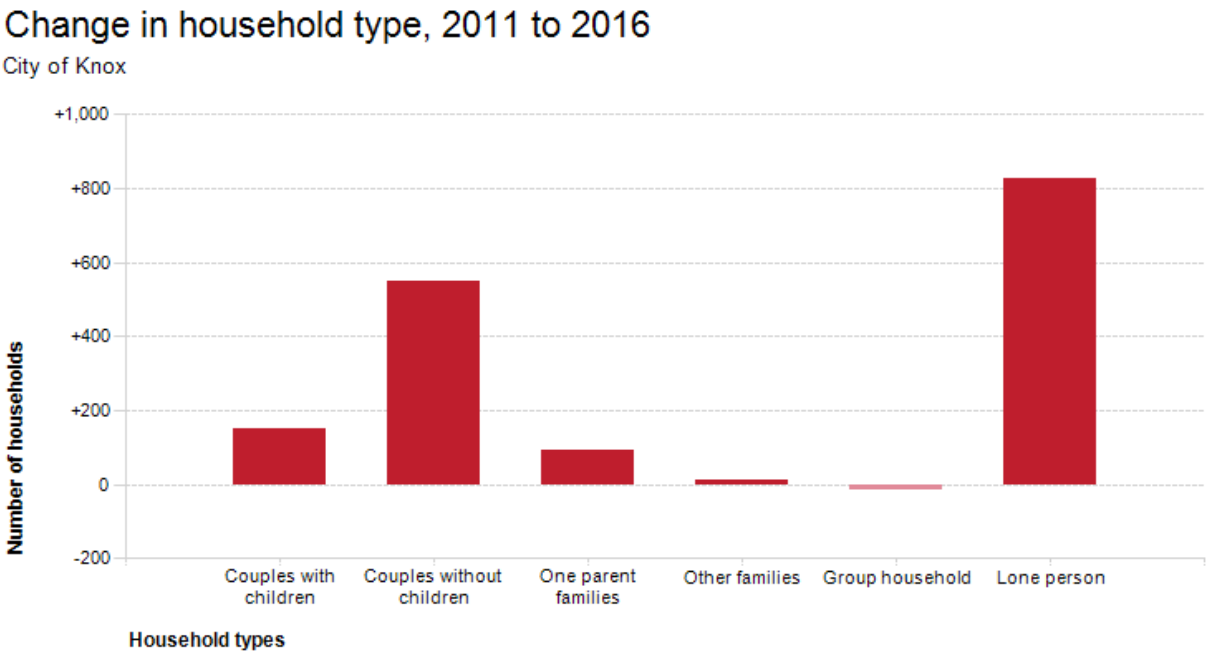
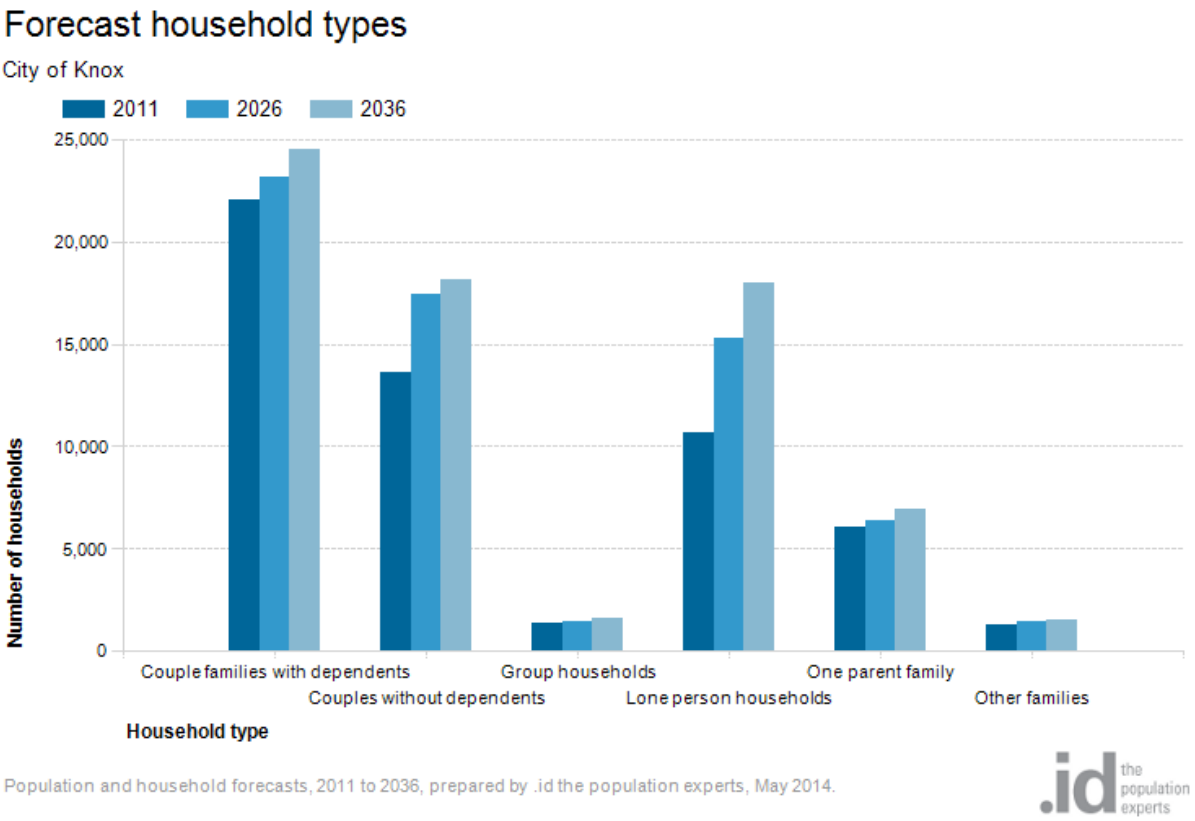
APPENDIX A – Accessible and adaptable housing for older Australians

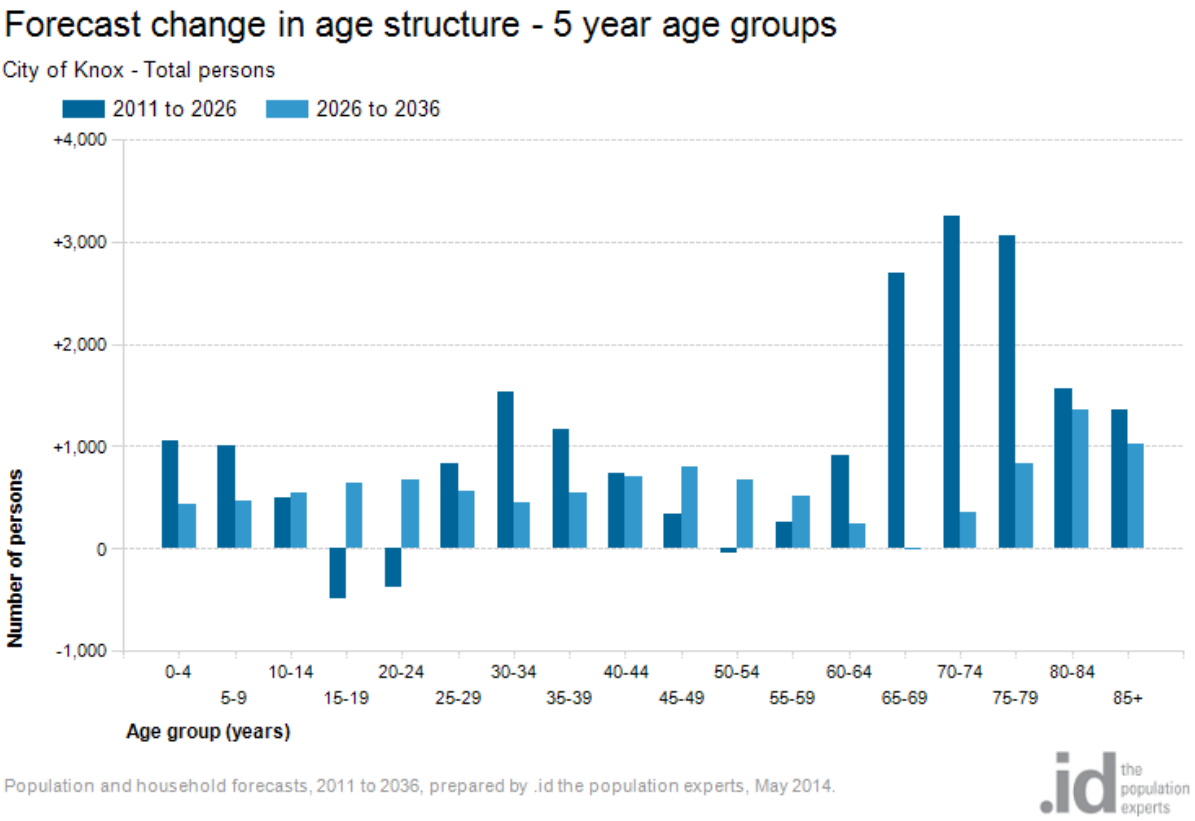


Source: Australian Bureau of Statistics, Census of Population and Housing, 2011 and 2016 (Enumerated data)
Compiled and presented in profile.id by .id, the population experts.

APPENDIX B – Accessible and adaptable housing for older Australians

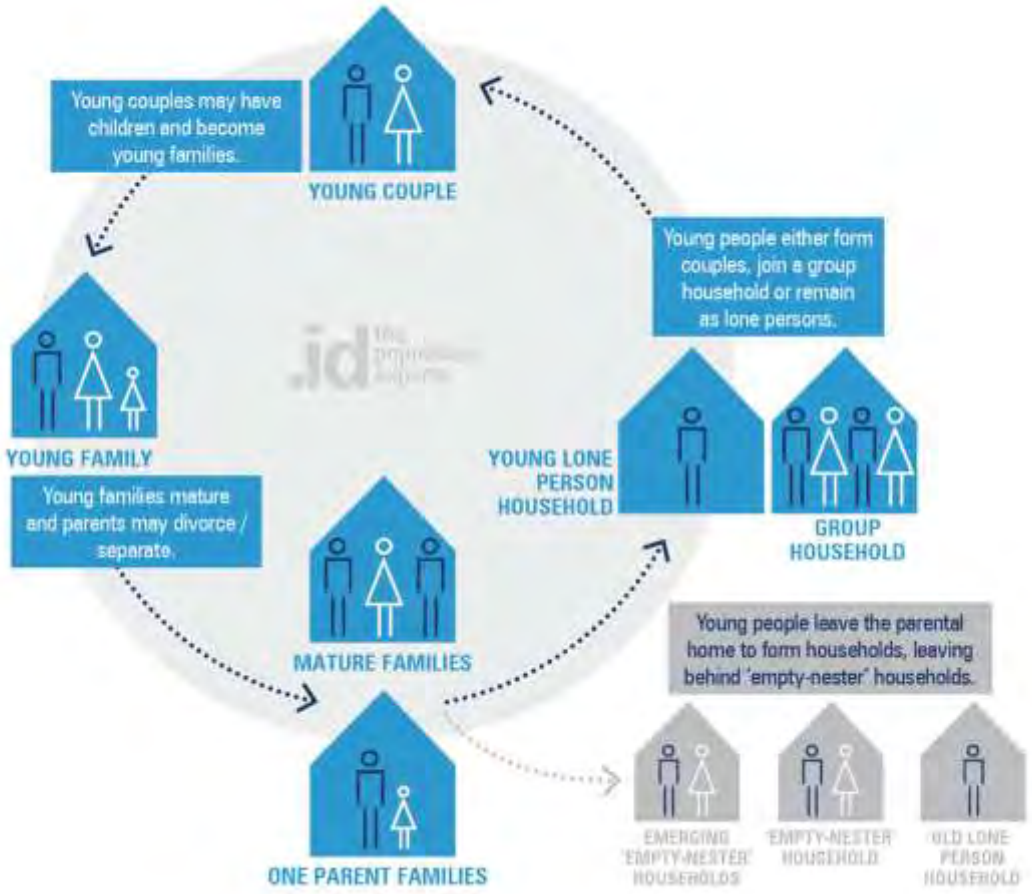


APPENDIX C – Accessible and adaptable housing for older Australians



APPENDIX D – Accessible and adaptable housing for older Australians

The Housing Cycle



Appendix E

Livable Housing Design

Livable Housing Design **Guidelines**

Second Edition

About Livable Housing Australia

Livable Housing Australia (LHA) is a partnership between community and consumer groups, government and industry.

LHA champions the mainstream adoption of livable housing design principles in all new homes built in Australia.

LHA arose from the Kirribilli Dialogue on Universal Housing Design, which established nationally agreed guidelines on designing and building livable homes.

LHA is responsible for the ongoing development, dissemination and revision of Australia's Livable Housing Design Guidelines.

Livable
Housing Australia

Executive Director
Livable Housing Australia
Level 1, 11 Barrack Street, Sydney, NSW 2000
Livable Housing Australia, 2nd Edition, (2012), Livable Housing Design Guidelines.

Table of Contents

Foreword

The design of the Australian family home is set for a makeover.

Our homes have transformed significantly over the years. Today's houses are greener, more efficient and safer.

The next step is to design them to be more versatile, to better meet the changing needs of occupants over their lifetimes.

Livable Housing Australia, which represents a unique partnership between community, business groups and government, is helping make homes easier to access, navigate and live in, as well more cost-effective to adapt when life's circumstances change.

LHA has produced practical, common sense guidelines to livability. The design features embraced by the guidelines are inexpensive to incorporate into home design, and will deliver huge dividends to future generations of Australians.

Our Silver, Gold and Platinum ratings represent a trusted quality mark – a seal of approval that attests to enhanced livability.

LHA's goal is simple: we champion the adoption by 2020 of a Silver rating for all new homes.

It's makes smart sense to commit to livability features when a home is first designed and built rather than wait for an unplanned need to arise. In fact, international research shows that it's 22 times more efficient to design for adaptability up front.

Livability works for pregnant mums, young families with kids and people with sporting or traumatic injuries, as well as seniors, Australians with disability and their families.

Livability is an investment that makes both economic and social sense. It also offers peace of mind.

On behalf of Livable Housing Australia, I encourage you to help transform the Australian dream home by adopting and implementing these Livable Housing Design Guidelines.

Peter Verwer
Chair
Livable Housing Australia

Livable Housing Australia:

Championing safer, more comfortable and easier to access homes for everybody, everyday, at all stages of life.

Introduction

What is Livable Housing Design?

A livable home is designed and built to meet the changing needs of occupants across their lifetime.

Livable homes include key easy living features that make them easier and safer to use for all occupants including: people with disability, ageing Australians, people with temporary injuries, and families with young children.

A livable home is designed to:

- be easy to enter
- be easy to navigate in and around
- be capable of easy and cost-effective adaptation, and
- be responsive to the changing needs of home occupants.

Livable homes enhance the quality of life of all occupants at all stages of their life.

What are the benefits of a livable designed home?

All Australians benefit from homes designed with comfort, safety and ease of access as core design features. These features make the home easier for parents to manoeuvre prams, easier to carry the shopping into the house, easier for people with disability or temporary injury to get around and easier to move furniture.

These same features enable key living spaces to be more easily and cost effectively adapted to meet the changing needs and abilities of home occupants such as ageing baby boomers and people who have or acquire disability.

A livable designed home benefits:

Families with young children by making it easier to manoeuvre prams and strollers and removing trip hazards for toddlers.

People who sustain a temporary injury that limits their mobility (for example as a result of sporting or work-related injury or motor vehicle accident).

Ageing baby boomers who are looking to move or renovate their existing homes to better accommodate future needs.

People with disability and their families enabling them better choice of housing and the opportunity to visit the homes of friends and relatives.

Is there a market?

Mainstream adoption of key livability features into new housing makes sense for several reasons:

Baby Boomers

- The significant ageing baby boomer demographic represents a growing market for age-friendly, livable designed housing.

- The number of Australians with disability will inevitably rise as the population grows and ages.

1 in 5

- One in five (close to 4 million) Australians currently have a disability of some type - about 320,000 are children.

60%

- Research indicates a 60 percent chance that a house will be occupied by a person with a disability at some point over its life[1]. This person is likely to be someone you know – a parent, child, sibling or friend.

62%

- The family home accounts for 62 percent of all falls and slip-based injuries and costs the Australian population $1.8 billion in public health costs[2].

22 x

- The cost to the homeowner of including key livable housing design features (in this case the silver level) is 22 times more efficient than retrofitting when an unplanned need arises[3].

A national survey has shown that the majority of recent home buyers, builders and renovators, and people aged 60 plus believe that livable housing design features make a home safer and more functional for all[4].

[1] Smith, S., Rayer, S., & Smith, E. (2008) Ageing & disability: Implications for the housing industry and housing policy in the United States. Journal of the American Planning Association, 74:3, 289 – 306.
[2] Monash University Accident Research Centre. (2008) The relationship between slips, trips and falls and the design and construction of buildings. (Funded by the Australian Building Codes Board).
[3] New Zealand Ministry of Social Development. (2009) Economic effects of utilising Lifemark at a National level.
[4] Australian Housing and Urban Research Institute. (2010) Dwelling, Land and Neighbourhood Use by Older Home Owners, p.282.

Intended audience for the Livable Housing Design Guidelines

The Livable Housing Design (LHD) Guidelines assist the residential building, property industry and governments better understand how to incorporate easy living features into new housing design and construction.

How to read this document

The LHD Guidelines provide useful information for consumers seeking to introduce livable design features into a new home and could be readily applied within an existing home during renovation or refurbishment.

The Guidelines describe 16 livable design elements. Each element provides guidance on what performance is expected to achieve either silver, gold or platinum level accreditation. Elements 1–7 and 11 cover the core elements of the basic silver level accreditation.

Structure of the LHD Guidelines

Three levels of performance are detailed in the LHD Guidelines. These voluntary performance levels can be applied to all new detached and semi-detached houses, terraces and townhouses (Class 1a) and new apartment dwellings (Class 2). In the majority of circumstances the performance requirements are identical.

It is noted that some common areas for Class 2 buildings are covered by the *Disability (Access to Premises – Buildings) Standards 2010*. The requirements detailed in the Premises Standards and the National Construction Code (NCC), Building Code of Australia (BCA) Volume 1 and 2 take precedence over the LHD Guidelines for this building class.

Performance levels

The levels of performance range from basic requirements through to best practice in livable home design. The levels are as follows:

Silver Level

Seven core livable housing design elements

Focuses on the key structural and spatial elements that are critical to ensure future flexibility and adaptability of the home. Incorporating these features will avoid more costly home modification if required at a later date.

Gold Level

Enhanced requirements for most of the core livable housing design elements plus additional elements.

The gold level provides for more generous dimensions for most of the core livable housing design elements and introduces additional elements in areas such as the kitchen and bedroom.

Platinum Level

Some further enhanced requirements for the core livable housing design elements plus all remaining elements.

All 16 elements are featured in the platinum level. This level describes design elements that would better accommodate ageing in place and people with higher mobility needs. This level requires more generous dimensions for most of the core livable design elements and introduces additional elements for features such as the living room and flooring.

Introducing the seven core design elements:

LHA is committed to championing the adoption of the silver level design elements into all new dwellings.

LHA acknowledges that the core design elements do not necessarily accommodate the needs and abilities of all home occupants. However, they are considered to be of most widespread benefit and use in the majority of circumstances.

Importantly, by including the core livable housing design elements, home occupants are provided with the opportunity to reduce or avoid costs associated with retrofitting a home to improve access in future, should it be required.

The seven core design features elements in the silver level they are:

1. A safe continuous and step free path of travel from the street entrance and / or parking area to a dwelling entrance that is level.
2. At least one, level (step-free) entrance into the dwelling.
3. Internal doors and corridors that facilitate comfortable and unimpeded movement between spaces.
4. A toilet on the ground (or entry) level that provides easy access.
5. A bathroom that contains a hobless (step-free) shower recess.
6. Reinforced walls around the toilet, shower and bath to support the safe installation of grabrails at a later date
7. A continuous handrail on one side of any stairway where there is a rise of more than one metre.

The relationship between the **Livable Housing Design Guidelines** and the **National Construction Code (NCC), Building Code of Australia (BCA) Volume 1 and 2**

The National Construction Code (NCC) sets out the legal construction requirements for all new building work in Australia. It includes performance requirements that must be achieved for each aspect of building construction.

In designing a home that incorporates the design elements of the LHD Guidelines it is important to ensure that all building work also complies with the relevant NCC, inclusive of BCA Volume 1 and 2, requirements where they apply, particularly for:

- fire safety
- water proofing of wet areas (internal)
- weather proofing (external)
- termite protection
- window location and size
- floor surfaces in wet areas and on stairs.
- stairways

Application

The elements described in the LHD Guidelines are applicable to the following classes of buildings as specified in the NCC.

Class 1 – one or more buildings, which in association constitute:

Class 1a – a single dwelling being:

- **i.** a detached house; or
- **ii.** one of a group of two or more attached dwellings, each being a building, separated by a fire-resisting wall, including a row house, terrace house, town house or villa unit; or

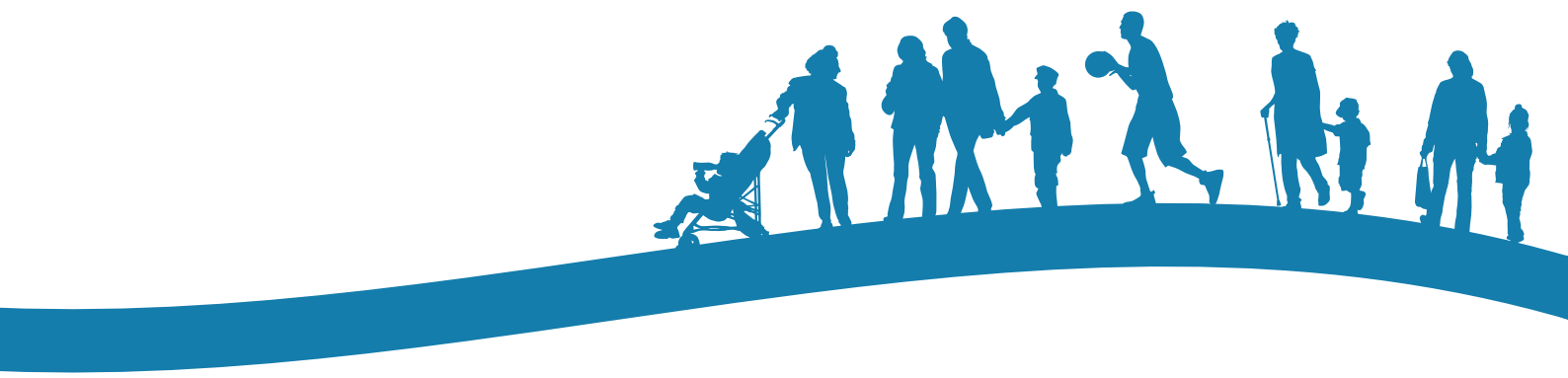
Class 1b:

- **i.** a boarding house, guest house, hostel or the like; with a total area of all floors not exceeding 300 m^2 measured over the enclosing walls of the Class 1b building; and in which not more than 12 persons would ordinarily be resident, which is not located above or below another dwelling or another Class of building other than a private garage;
- **ii.** 4 or more single dwellings located on one allotment and used for short-term holiday accommodation.

Class 2 – a building containing 2 or more sole-occupancy units, each being a separate dwelling.

Class 4 – a dwelling in a building that is a Class 5, 6, 7, 8 or 9 if it is the only dwelling in the building.

Note: The design elements described in these Guidelines should only be applied to the parts of the building classes not covered by the Disability Standards and NCC (BCA Vol 1 and 2).



The 16 Livable Housing Design Elements

1 Dwelling access

Performance Statement

There is a safe, continuous, step-free pathway from the street entrance and/or parking area to a dwelling entrance that is level.

Silver Level

Please Note:
For Class 2 buildings, the Commonwealth Disability (Access to Premises – Buildings) Standards 2010[5] require a safe and continuous pathway from the pedestrian entrance to at least one floor containing sole occupancy units and to the entrance of units located on that level. The requirements detailed below therefore do not apply to Class 2 buildings.

For other Building Classes not covered by the Premises Standards the following applies:

a. Provide a safe and continuous pathway from:

- **i.** the front boundary of the allotment; or
- **ii.** a car parking space, where provided, which may include the driveway on the allotment, to an entrance that is level (step-free) as specified in Element 2.

This provision does not apply where the average slope of the ground where the path would feature is steeper than 1:14.

b. The path of travel as referred to in (a) should have a minimum clear width of 1000mm and –

- **i.** an even, firm, slip resistant surface;
- **ii.** a crossfall of not more than 1:40;
- **iii.** a maximum pathway slope of 1:14, with landings provided at no greater than 9m for a 1:14 ramp and no greater than 15m for ramps steeper than 1:20. Landings should be no less than 1200mm in length; and
- **iv.** be step-free

[5] Commonwealth Disability (Access to Premises – Buildings) Standards 2010. http://www.ag.gov.au

c. A step ramp may be incorporated at an entrance doorway where there is a change in height of 190mm or less. The step ramp should provide:

- **i.** a maximum gradient of 1:10
- **ii.** a minimum clear width of 1000mm (please note: width should reflect the pathway width)
- **iii.** a maximum length of 1900mm

Level landings no less than 1200mm in length, exclusive of the swing of the door or gate than opens onto them, must be provided at the head and foot of the ramp.

Note The width of the landing will be determined by the adjoining pathway. If the landing directly adjoins the doorway please refer to Element 2 for dimensional requirements.

Gold Level

As for silver level except in (b) replace the minimum clear pathway width of 1000mm with 1100mm.

Platinum Level

As for silver level except in (b) replace with a minimum clear pathway width of 1100mm with 1200mm provided from:

- **i.** the front boundary of the allotment, and
- **ii.** any car parking space, where provided, which may include the driveway on the allotment, to an entrance that is level (step-free) as specified in Element 2.

1 Dwelling access

Performance Statement

There is a safe, continuous, step-free pathway from the street entrance and/or parking area to a dwelling entrance that is level.

Photo courtesy of Landcom 1

Photo courtesy of Lend Lease 2

Photo courtesy of Landcom 3

1. Continuous step-free path of travel to a side entrance
2. Easy access from the front pathway and driveway
3. Continuous step-free pathway with varied surface finishes
4. Achieving access on a sloping block

Direct entry from a parking space to a level entry (not necessarily the front entrance) is essential. A level path from the street further improves access.

Photo courtesy of Landcom

4

Performance Statement
There is a safe, continuous, step-free pathway from the street entrance and/or parking area to a dwelling entrance that is level.

2 Dwelling entrance

Performance Statement

There is at least one level (step-free) entrance into the dwelling to enable home occupants to easily enter and exit the dwelling.

Silver Level

a. The dwelling should provide an entrance door with -

- **i.** a minimum clear opening width of 820mm (see Figure 2(a));
- **ii.** a level (step-free) transition and threshold (maximum vertical tolerance of 5mm between abutting surfaces is allowable provided the lip is rounded or beveled); and
- **iii.** reasonable shelter from the weather.

b. A level landing area of 1200mm x 1200mm should be provided at the level (step-free) entrance door.

c. Where the threshold at the entrance exceeds 5mm and is less than 56mm, a ramped threshold may be provided (see Figure 1(b)).

d. The level (step-free) entrance should be connected to the safe and continuous pathway as specified in Element 1.

Note The entrance must incorporate waterproofing and termite management requirements as specified in the NCC.

Gold Level

As for silver level except replace:

- (b) with a level landing area of 1350mm x 1350mm, and
- (a) (i) with minimum clear door opening width of 850mm (see Figure 2(b)).

Platinum Level

As for silver level except replace:

- (b) with a level landing area 1500mm x 1500mm, and
- (a) (i) with a minimum clear door opening width of 900mm (see Figure 2(c)).

A level entrance makes entering and exiting the home safer and easier.

Photo courtesy of Lend Lease

Performance Statement
There is at least one level (step-free) entrance into the dwelling to enable home occupants to easily enter and exit the dwelling.

2 Dwelling entrance

Performance Statement

There is at least one level (step-free) entrance into the dwelling to enable home occupants to easily enter and exit the dwelling.

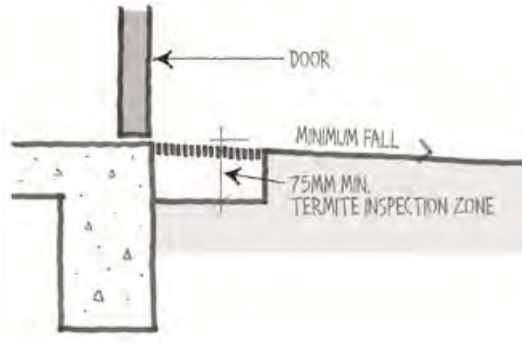


Figure 1(a) Threshold treatment: incorporates grated drain along threshold to achieve minimum termite inspection zone and weather protection.

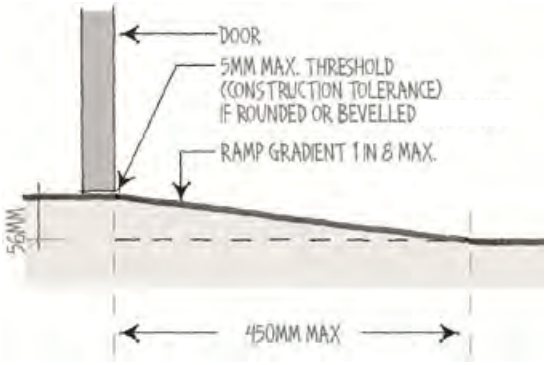


Figure 1(b) Weather protection: 1 in 8 max. ramp at threshold

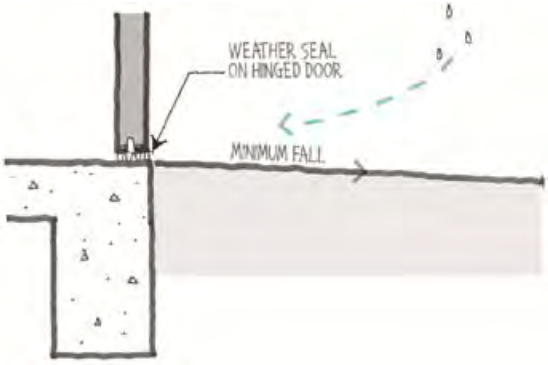


Figure 1(c) Weather protection: weather seal on hinged door.

Design considerations at level entries

1. Termite prevention:

The limiting of thresholds at doorways (to say 50mm) prevents achieving adequate inspection zones (min 75mm) and termite barriers across these thresholds. This commonly demands that porch slabs be integrated with the general floor slab of the house so that termite barriers and inspection zones can be continued around the perimeter of the porch.

This inspection zone might be achieved by other methods such as within the depth of a grated drain along the threshold.

2. Weather protection and thresholds:

Weather protection is traditionally aided by stepped thresholds. Level access requires consideration of alternative solutions to maintain adequate protection from the wet weather. Standard threshold ramps, as detailed in 1(b) above, allow weatherproofing thresholds of up to approx. 50mm. This can be combined with gently sloping porches to limit the possibility of water entering the dwelling.

Appropriately sized grated drains and generous cover at entries should also be provided to limit the quantity of water in the area adjoining the door.

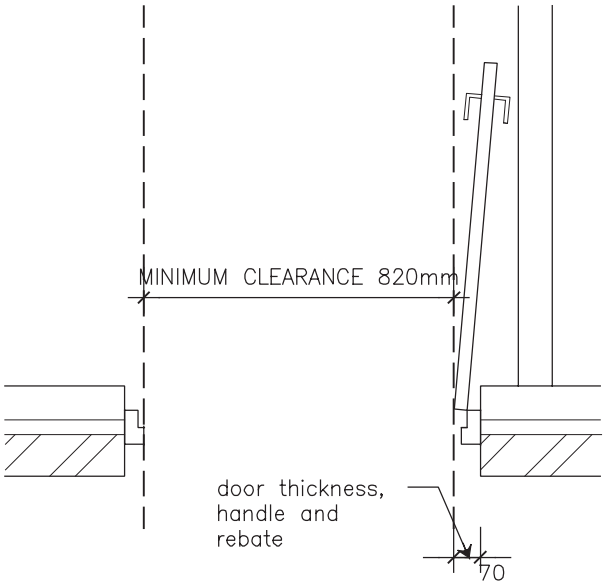


Figure 2(a) Silver level clear door opening

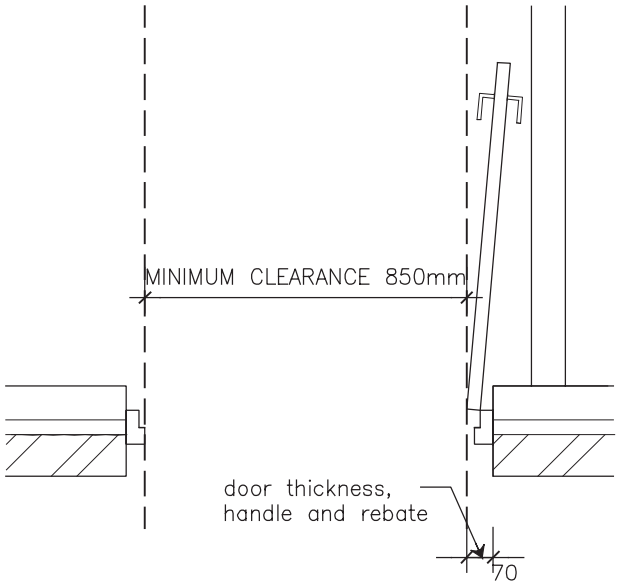


Figure 2(b) Gold level clear door opening

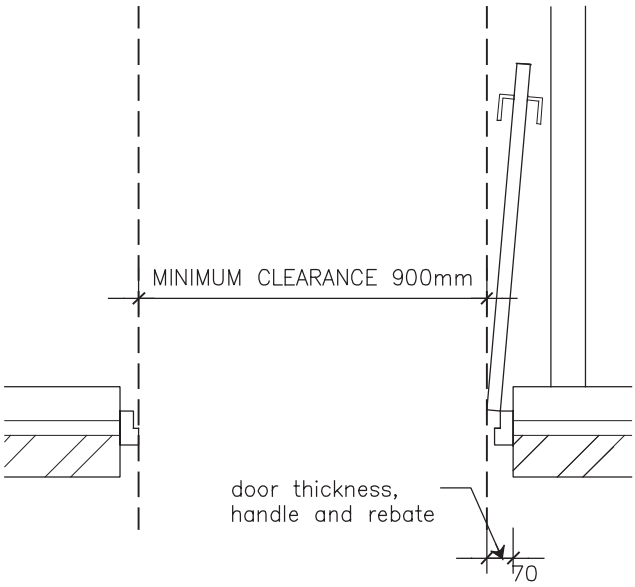


Figure 2(c) Platinum level clear door opening

3 Car parking
(Where part of the dwelling access)

Performance Statement

Where the parking space is part of the dwelling access it should allow a person to open their car doors fully and easily move around the vehicle.

Silver Level

a. Where the parking area forms part of the dwelling access the space should incorporate:

- **i.** minimum dimensions of at least 3200mm (width) x 5400mm (length);
- **ii.** an even, firm and slip resistant surface; and
- **iii.** a level surface (1:40 maximum gradient, 1:33 maximum gradient for bitumen).

Gold Level

As for silver level with the following additional features incorporated for Class 1a dwellings:

- **iv.** a vertical clearance over the parking space of 2500mm; and
- **v.** a covered parking space to ensure protection from the weather.

Platinum Level

As for gold level for Class 1a dwellings except that the parking space in (a)/(i) should be at least 3800mm (width) x 6000mm (length).

b. For Class 2 dwellings, parking spaces compliant with the accessible parking provisions detailed in AS2890.6 (2009), should be provided as follows:

- **i.** where individual parking spaces form part of the individual unit's title, one accessible parking space should be provided for each unit; and
- **ii.** if visitor parking is provided, then 1 space per 100 units (or part thereof) should be an accessible parking space.

A generous car space makes it easier to move around a vehicle when the doors are fully open.

Photo courtesy of Lend Lease

Performance Statement
Where the parking space is part of the dwelling access it should allow a person to open their car doors fully and easily move around the vehicle.

4 Internal doors & corridors

Performance Statement

Internal doors and corridors facilitate comfortable and unimpeded movement between spaces.

Silver Level

a. Doorways to rooms on the entry level used for living, dining, bedroom, bathroom, kitchen, laundry and sanitary compartment purposes should provide:

- **i.** a minimum clear opening width of 820mm (see Figure 2(a)); and
- **ii.** a level transition and threshold (maximum vertical tolerance of 5mm between abutting surfaces is allowable provided the lip is rounded or beveled).

b. Internal corridors/passageways to the doorways referred to in (a) should provide a minimum clear width of 1000mm.

Gold Level

As for the silver level except replace:

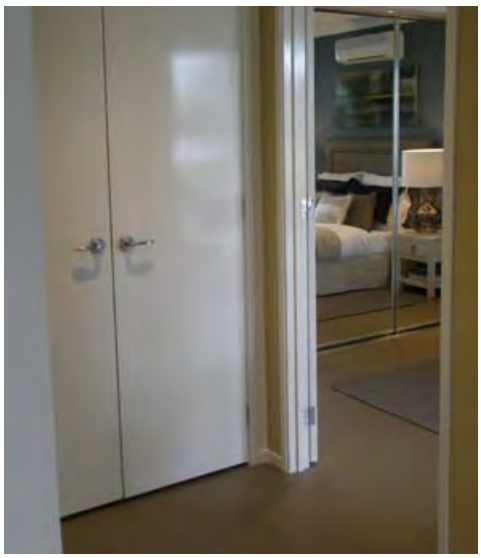
- (a)/(i) with a minimum clear opening width of 850mm (see Figure 2(b)), and
- (b) with a minimum corridor/passageway width of 1200mm.

Platinum Level

As for the silver level except replace:

- (a)/(i) with a minimum clear opening width of 900mm (see Figure 2(c)), and
- (b) with a minimum corridor/passageway width of 1200mm.

Slightly wider doors and corridors make it easier to manoeuvre strollers and prams, move furniture and carry in groceries. It's also easier for people with mobility issues.



Performance Statement
Internal doors and corridors facilitate comfortable and unimpeded movement between spaces.

5 Toilet

Performance Statement

The ground (or entry) level has a toilet to support easy access for home occupants and visitors.

Silver Level

a. Dwellings should have a toilet on the ground (or entry) level that provides:

- **i.** a minimum clear width of 900mm between the walls of the bathroom if located in a separate room; and
- **ii.** a minimum 1200mm clear circulation space forward of the toilet pan exclusive of the swing of the door in accordance with Figure 3(a).

b. If the toilet is located within the ground (or entry) level bathroom, the toilet pan should be located in the corner of the room to enable the installation of grabrails.

Gold Level

As for silver level except replace (a)/(i) with a minimum clear width of 1200mm between the walls of the bathroom if located in a separate room, or between amenities if located in a combined bathroom.

Platinum Level

As for the gold level with the following features added to (a):

- **iii.** a toilet pan positioned between 450mm – 460mm from the nearest wall as measured from the centre line of the toilet;
- **iv.** 600mm minimum clearance forward of the cistern measured from the front of the cistern to the front of the toilet pan. 800mm (+/-10mm) clearance is required if the cistern is recessed; and
- **v.** a height for the pan of between 460mm - 480mm above the finished floor level as detailed in Figure 4.

Clear space in front of the toilet is key as it ensures easier access for children, older people and people with mobility difficulties.

Performance Statement
The ground (or entry) level has a toilet to support easy access for home occupants and visitors.

5 Toilet

Performance Statement

The ground (or entry) level has a toilet to support easy access for home occupants and visitors.

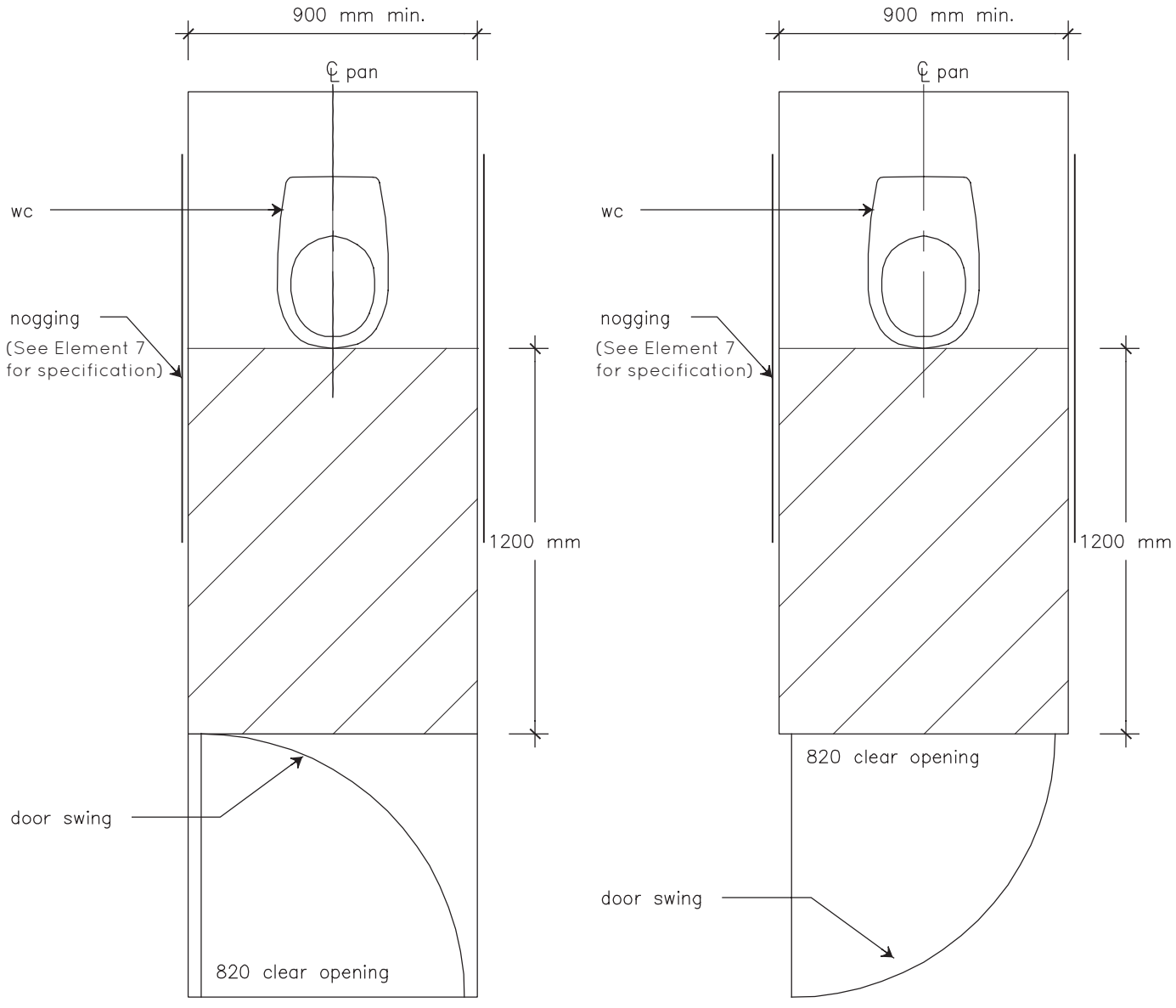


Figure 3(a) Silver level ground (or entry) level toilet layout and space requirements in a separate room.

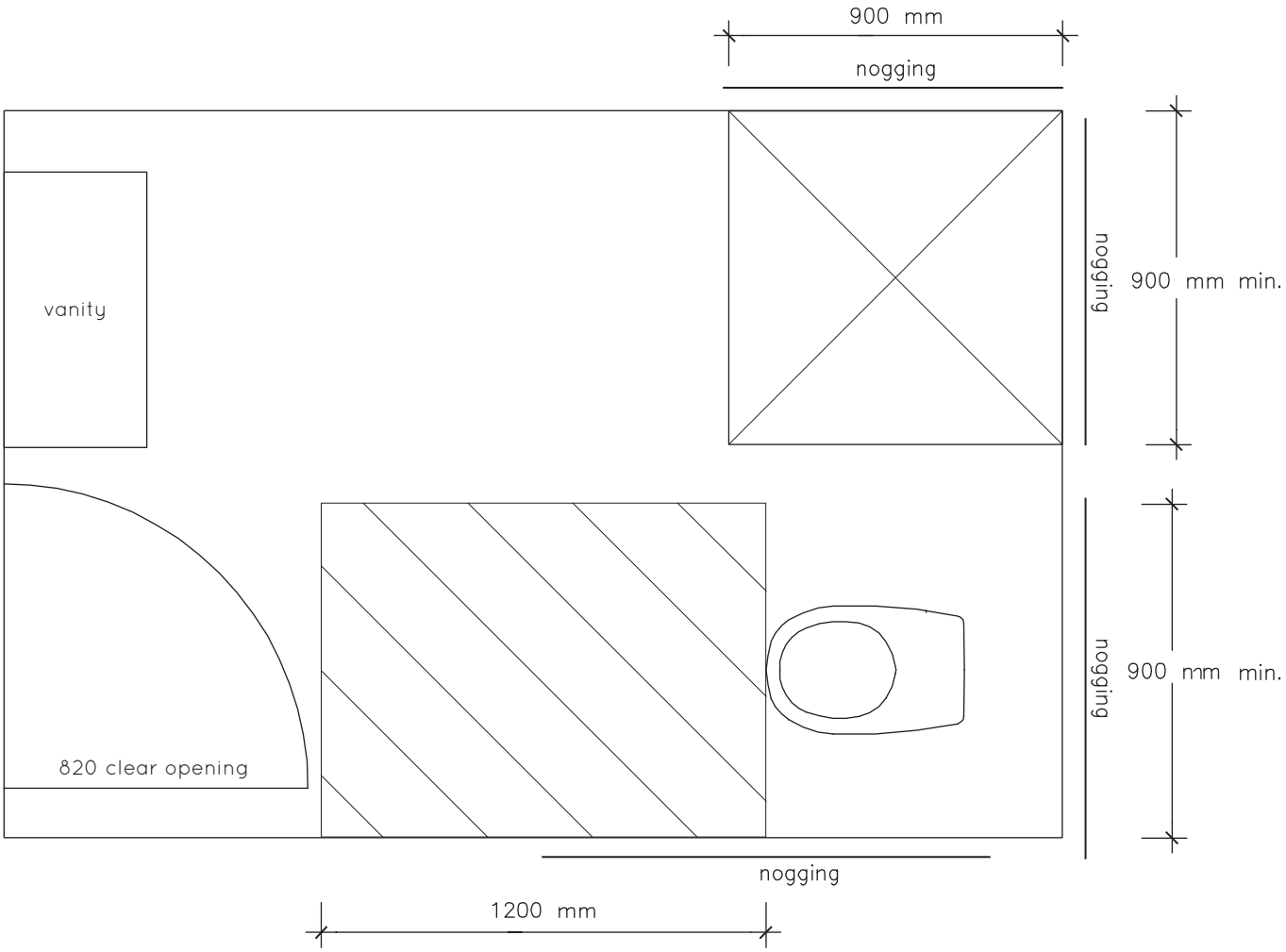
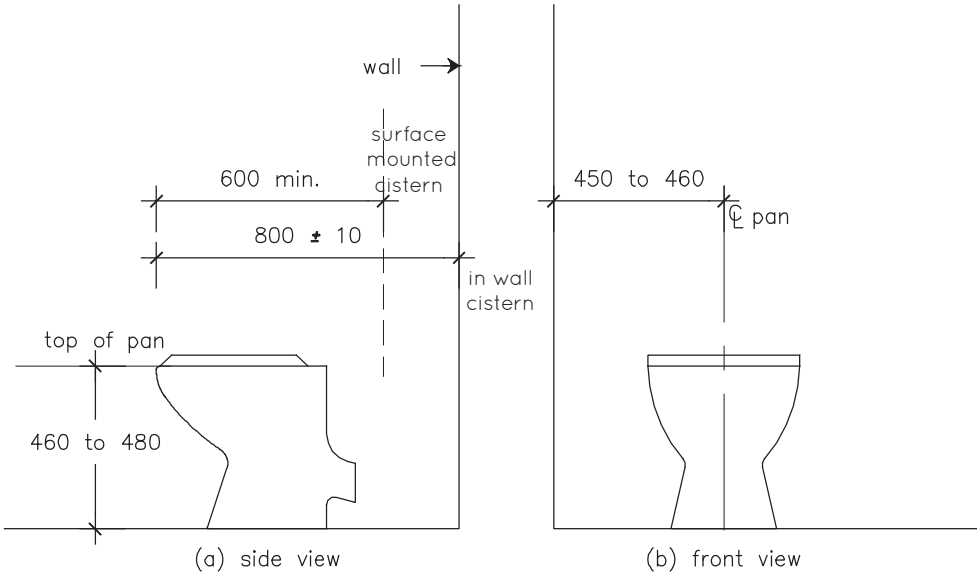


Figure 3(b) Silver level ground (or entry) level toilet layout and space requirements in a combined bathroom.



note: for the purpose of dimensioning, the front of the wc pan has been used as the datum plane

dimensions in millimetres

Figure 4 Platinum level toilet pan clearances

6 Shower

Performance Statement

The bathroom and shower is designed for easy and independent access for all home occupants.

Silver Level

a. One bathroom should feature a slip resistant, hobless (step-free) shower recess. Shower screens are permitted provided they can be easily removed at a later date.

b. The shower recess should be located in the corner of the room to enable the installation of grabrails at a future date.

Gold Level

As for silver level except:

c. The hobless (step-free) shower recess described in (a) should:

- **i.** be located in a bathroom on the ground (or entry) level;
- **ii.** provide dimensions of 900mm (width) x 900mm (length); and
- **iii.** provide a clear space of 1200mm (width) x 1200mm (length) forward of the shower recess entry as detailed in Figure 5(a).

Platinum Level

As for gold level except:

- **i.** replace (c)/(ii) with dimensions of 1160mm (width) x 1100mm (length); and
- **ii.** replace (c)/(iii) with dimensions of 1400mm (width) x 1600mm (length) forward of the shower recess as detailed in Figure 5(b).

Hobless, step free shower recesses reduce the risk of slips and falls and make access easier and safer for home occupants.

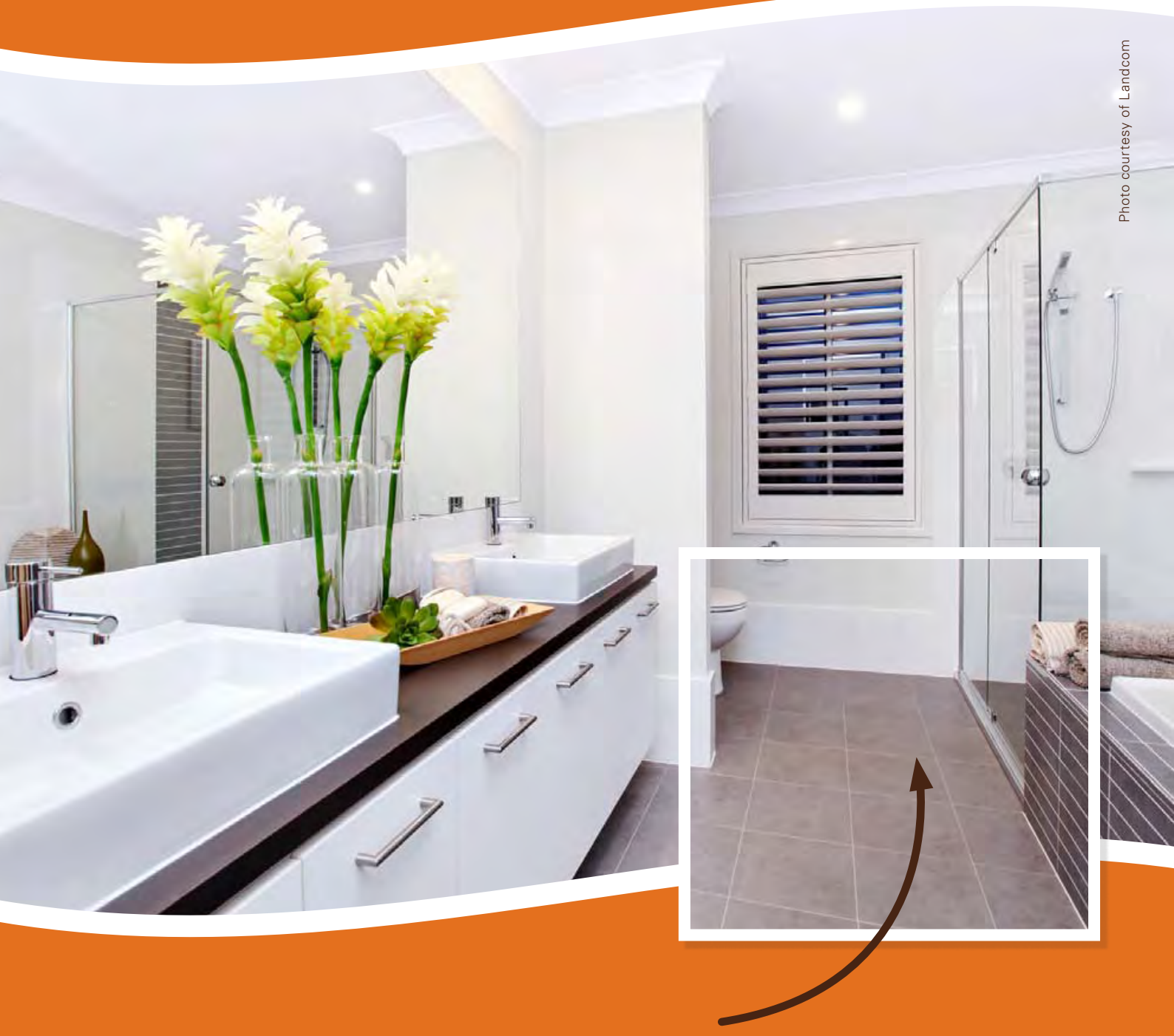


Photo courtesy of Landcom

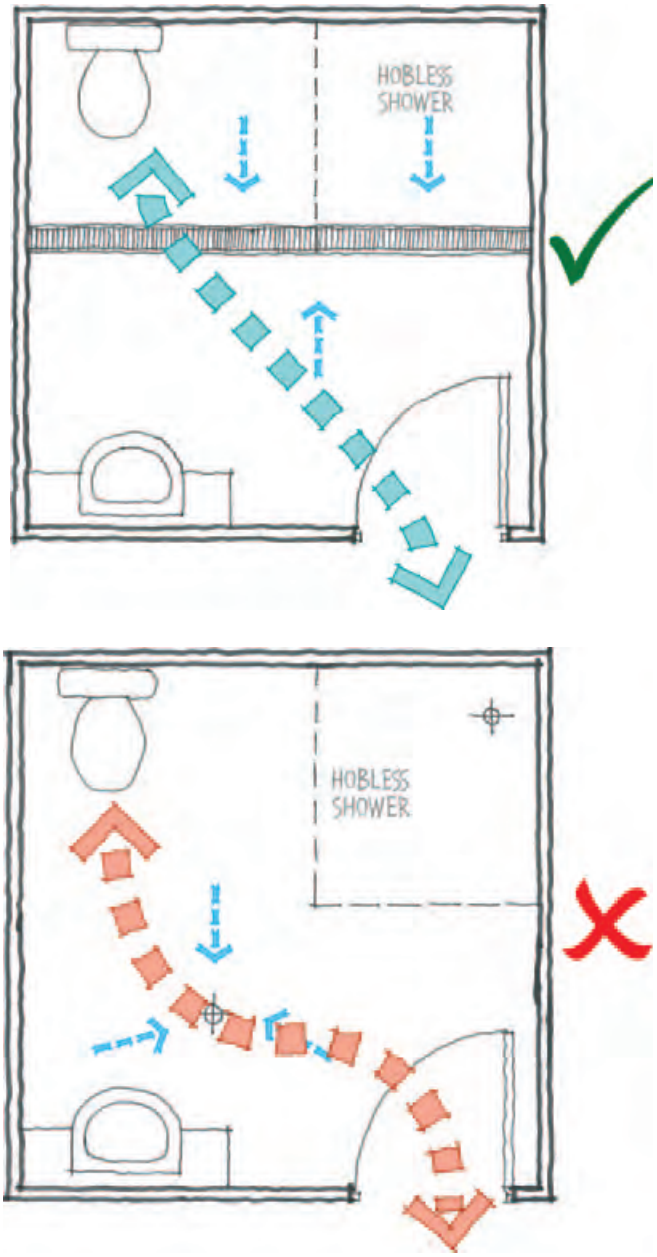
Performance Statement
The bathroom and shower is designed for easy and independent access for all home occupants.

Floors in shower recesses need to be graded properly so that screens can be removed if required and water will still drain effectively.

6 Shower

Performance Statement

The bathroom and shower is designed for easy and independent access for all home occupants.



Informative Diagram: Suggested floor waste design for a hobless shower recess within a bathroom to support adequate drainage.

Diagrams courtesy of Integrated Design Group

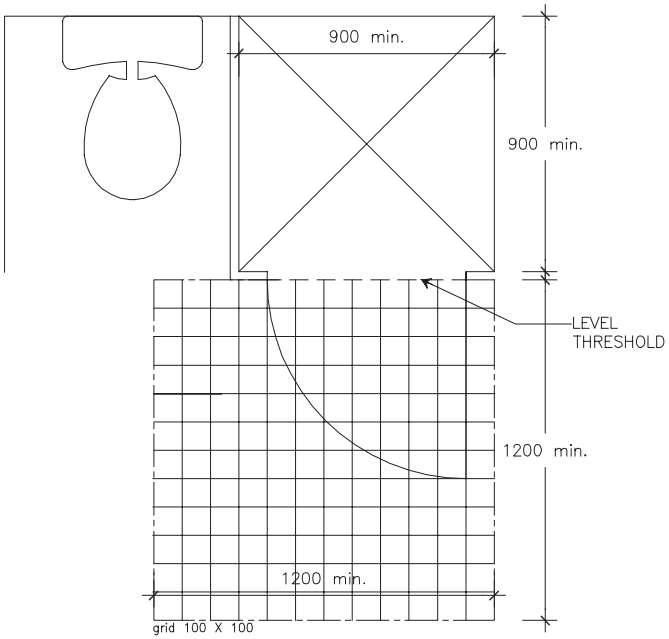


Figure 5(a) Gold level circulation space requirements for shower recess

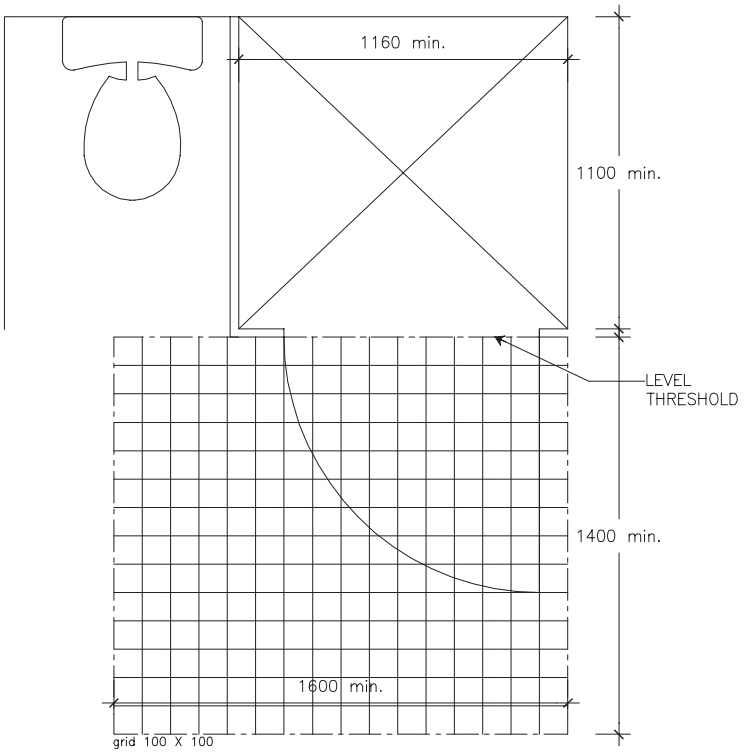


Figure 5(b) Platinum level circulation space requirements for shower recess

7 Reinforcement of bathroom & toilet walls

Performance Statement

The bathroom and toilet walls are built to enable grabrails to be safely and economically installed.

Silver Level

a. Except for walls constructed of solid masonry or concrete, the walls around the shower, bath (if provided) and toilet should be reinforced to provide a fixing surface for the safe installation of grabrails.

b. The fastenings, wall reinforcement and grabrails combined must be able to withstand 1100N of force applied in any position and in any direction.

c. The walls around the toilet are to be reinforced by installing:

- **i.** noggings with a thickness of at least 25mm in accordance with Figure 6(a); or
- **ii.** sheeting with a thickness of at least 12mm in accordance with Figure 6(b).

d. The walls around the bath are to be reinforced by installing:

- **i.** noggings with a thickness of at least 25mm in accordance with Figure 7(a); or
- **ii.** sheeting with a thickness of at least 12mm in accordance with Figure 7(b).

e. The walls around the hobless (step-free) shower recess are to be reinforced by installing:

- **i.** noggings with a thickness of at least 25mm in accordance with Figure 8(a); or
- **ii.** sheeting with a thickness of at least 12mm in accordance with Figure 8(b).

Gold Level

Silver level requirements apply.

Platinum Level

Silver level requirements apply.

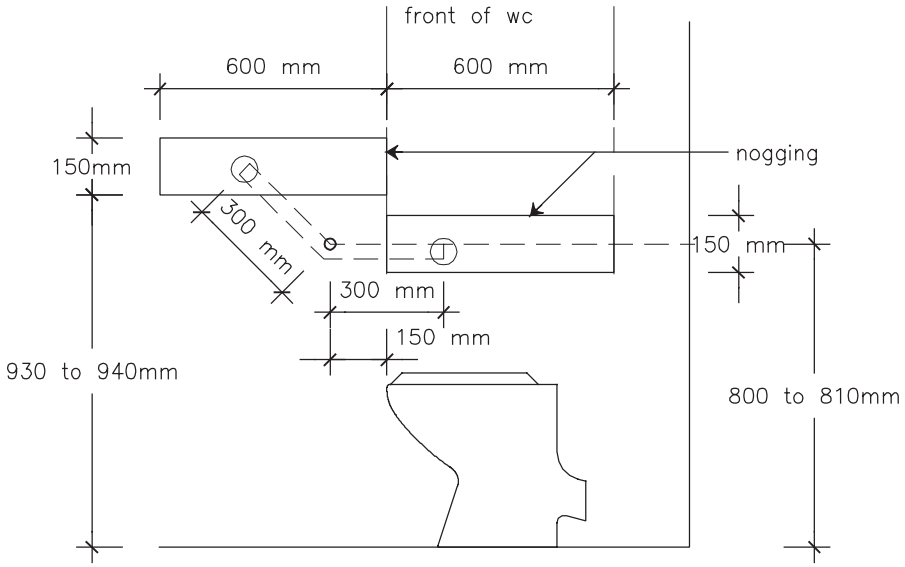


Figure 6(a) Toilet – Location of noggings

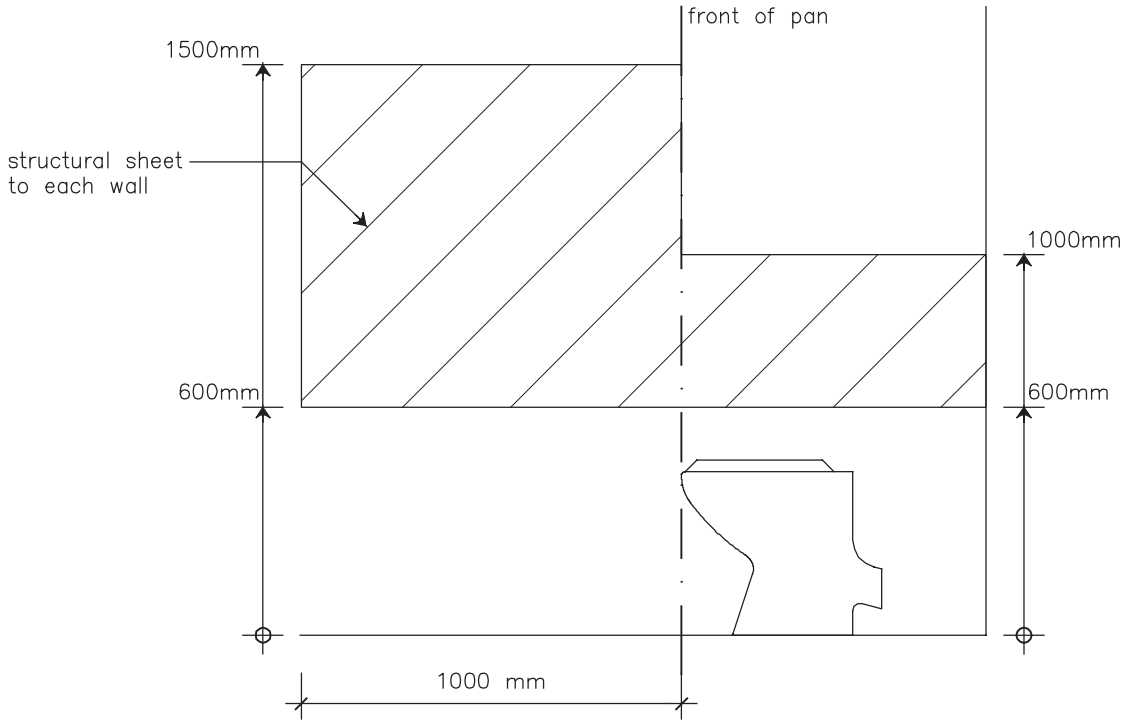


Figure 6(b) Toilet – Location of sheeting

Performance Statement
The bathroom and toilet walls are built to enable grabrails to be safely and economically installed.

7 Reinforcement of bathroom & toilet walls

Performance Statement

The bathroom and toilet walls are built to enable grabrails to be safely and economically installed.

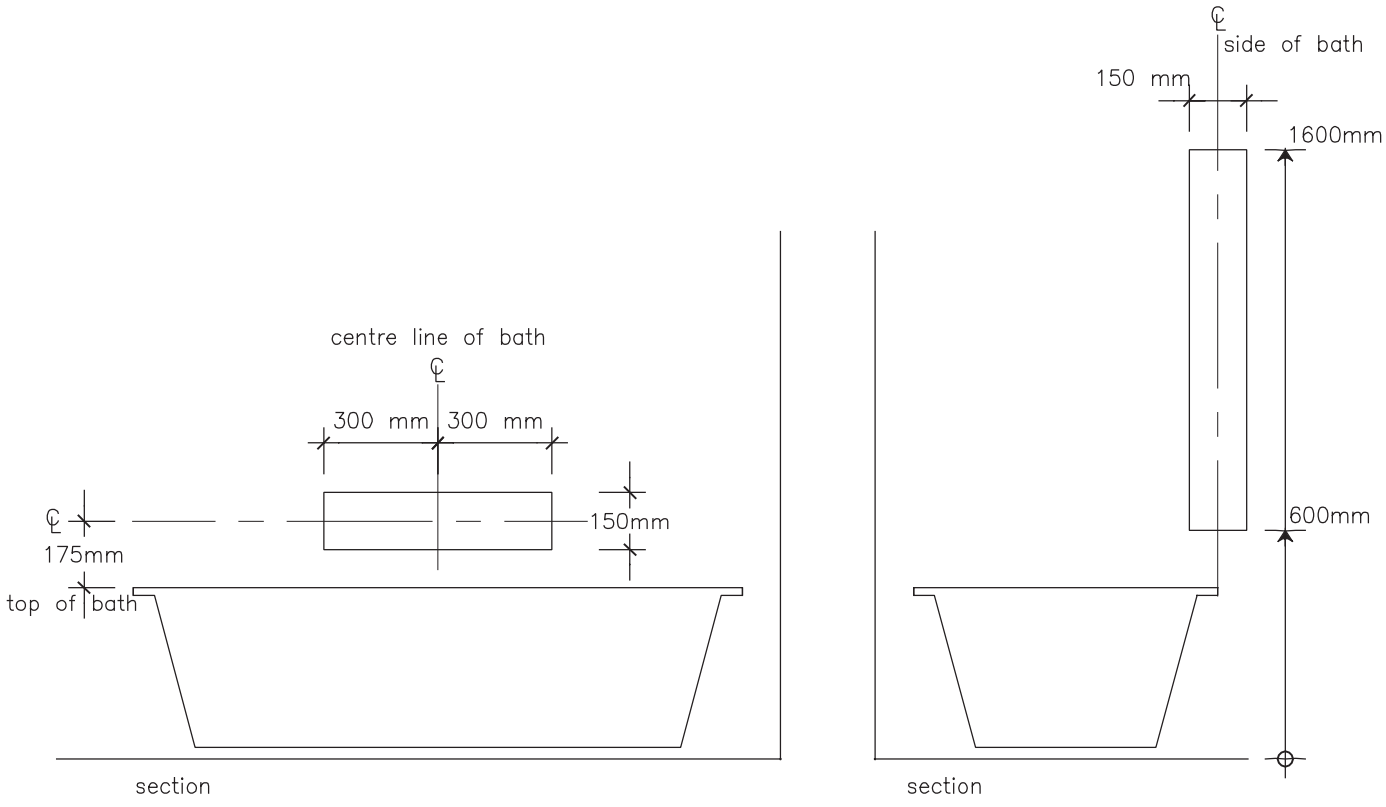


Figure 7(a) Bath – Location of noggings

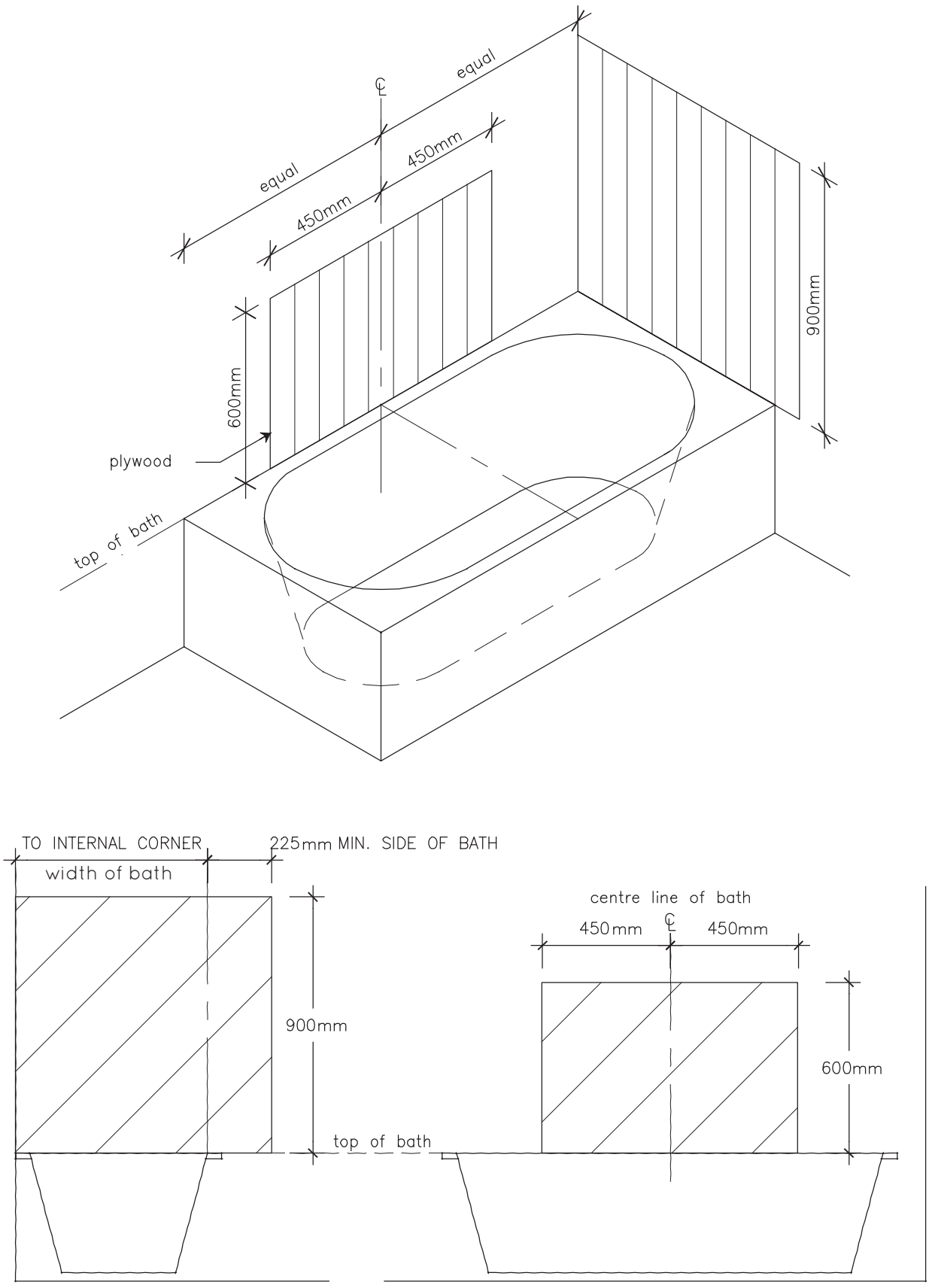


Figure 7(b) Bath – Location of sheeting

7 Reinforcement of bathroom & toilet walls

Performance Statement

The bathroom and toilet walls are built to enable grabrails to be safely and economically installed.

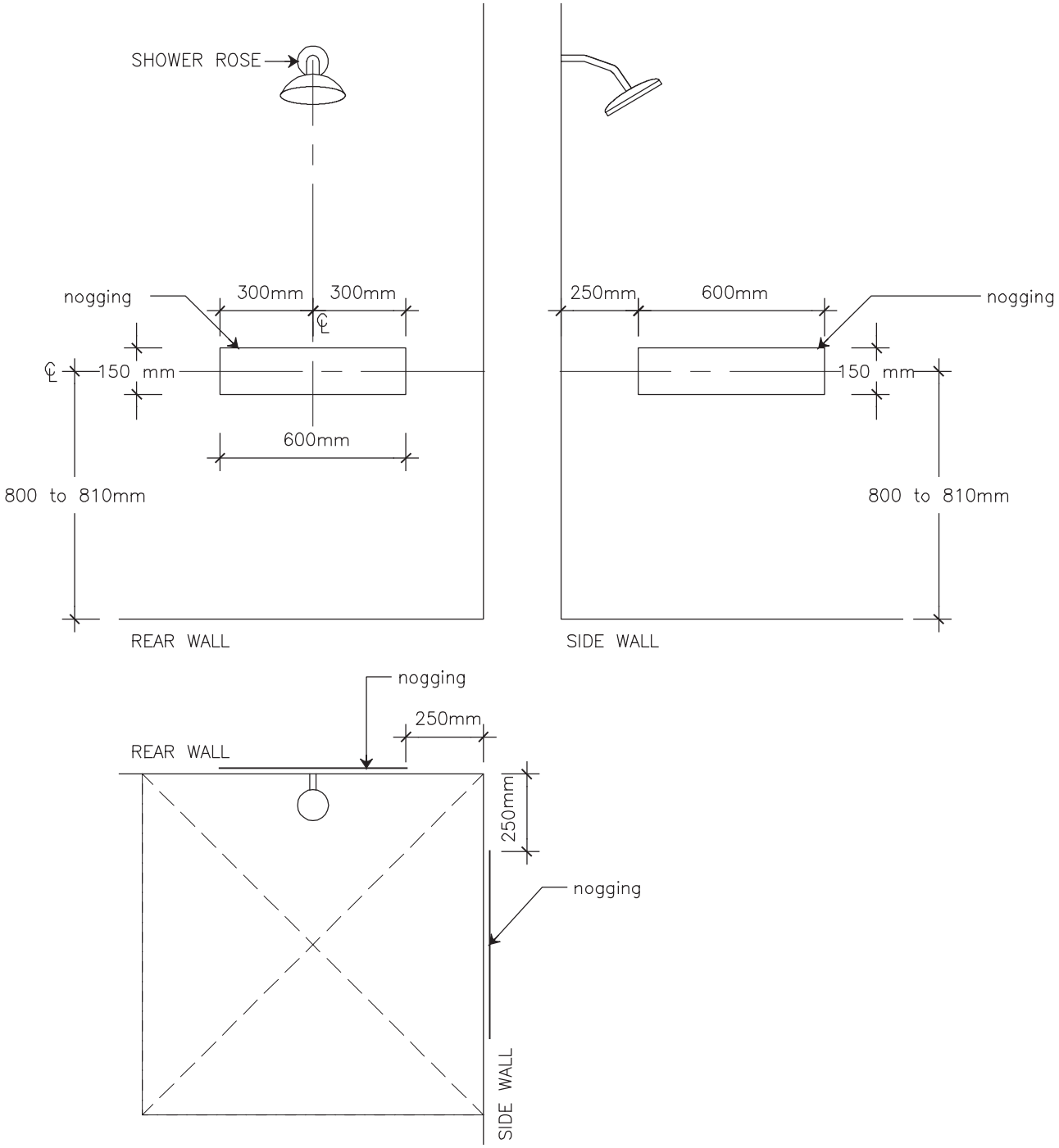


Figure 8(a) Shower recess – Location of noggings

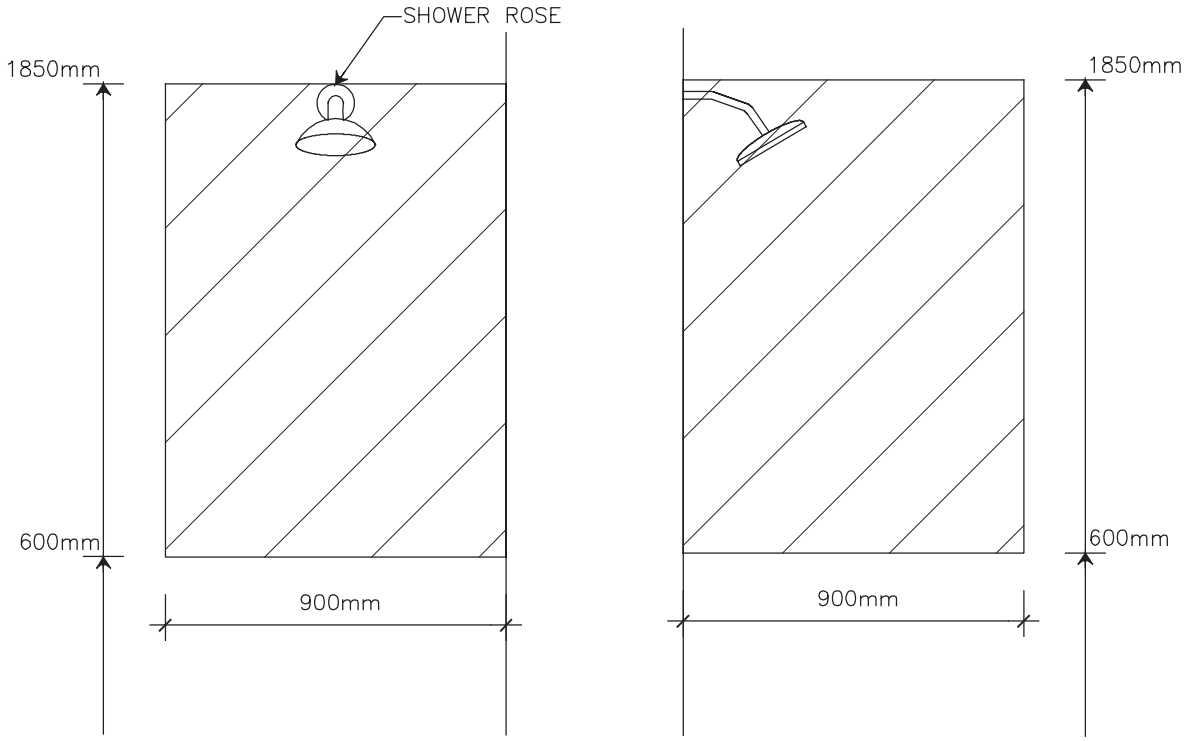


Figure 8(b) Shower recess – Location of sheeting

Construction image illustrating
reinforcement of walls using sheeting

8 Internal stairways

Performance Statement

Where installed, stairways are designed to reduce the likelihood of injury and also enable future adaptation.

Silver Level

a. Stairways in dwellings must feature:

i. a continuous handrail on one side of the stairway where there is a rise of more than 1m.

Gold Level

As for the silver level with the following additional features:

ii. a minimum clear width of 1000mm;

iii. be straight in design; and

iv. be positioned adjoining a load bearing wall.

Note The steps must provide a slip resistant finish and suitable non-slip tread as specified in the NCC. Handrails on both sides of the stairway are preferred.

Platinum Level

As for the gold level with the following additional features:

v. closed risers;

vi. continuous handrails on both sides of the stairway; and

vii. minimum landing areas of 1200mm x 1200mm at the top and base of the stairway.

Note The steps must provide a slip resistant finish and suitable non-slip tread as specified in the NCC.

Straight stairs against a load bearing wall are safer to use and easier to modify if needs change.

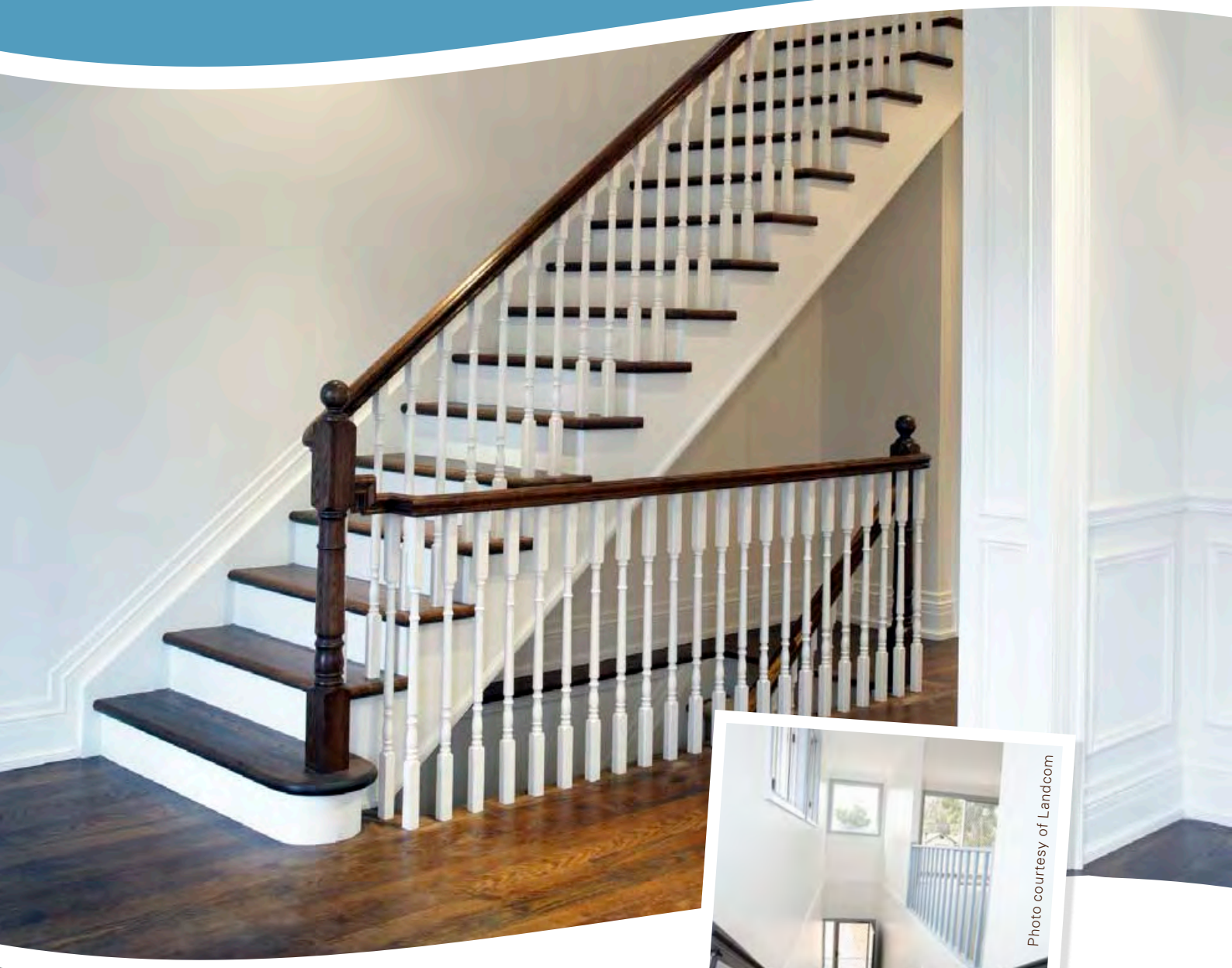


Photo courtesy of Landcom

Performance Statement
Where installed, stairways are designed to reduce the likelihood of injury and also enable future adaptation

9 Kitchen space

Performance Statement

The kitchen space is designed to support ease of movement between fixed benches and to support easy adaptation.

Silver Level

No requirements.

Gold Level

a. The kitchen space should be designed to support ease of movement and adaptation with:

- **i.** at least 1200mm clearance provided in front of fixed benches and appliances; and
- **ii.** slip resistant flooring.[6]

b. Where practicable, floor finishes should extend under kitchen cabinetry to enable cupboards to be removed without affecting the flooring.

Platinum Level

As for the gold level except that the kitchen space described in (a) should be designed to support ease of movement and adaptation with:

- **i.** at least 1550mm clearance should be provided in front of fixed benches and appliances;
- **ii.** slip resistant flooring; and
- **iii.** task lighting installed above workspaces.

[6] As per the NCC

Clear space between benches makes it easier and safer to use the kitchen space and appliances.

Photo courtesy of Landcom

Performance Statement
The kitchen space is designed to support ease of movement between fixed benches and to support easy adaptation.

10 Laundry space

Performance Statement

The laundry space is designed to support ease of movement between fixed benches and to support easy adaptation.

Silver Level

No requirements.

Gold Level

As for silver level except:

a. The laundry space should be designed to support ease of movement and adaptation with:

- **i.** at least 1200mm clearance provided in front of fixed benches and appliances; and
- **ii.** slip resistant flooring.[6]

b. Where practicable, floor finishes should extend under laundry cabinetry to enable cupboards to be moved without affecting the flooring.

Platinum Level

As for the gold level except that in laundry space described in (a) should be designed to support ease of movement and adaptation with:

- **i.** at least 1550mm clearance should be provided in front of fixed benches and appliances;
- **ii.** slip resistant flooring; and
- **iii.** task lighting installed above workspaces.

[6] As per the NCC

Free space in front of the laundry bench makes it easier to unload laundry appliances.

Performance Statement
The laundry space is designed to support ease of movement between fixed benches and to support easy adaptation.

11 Ground (or entry level) bedroom space

Performance Statement

There is a space on the ground (or entry) level that can be used as a bedroom.

Silver Level

No requirements.

Gold Level

a. The dwelling should feature a space (or room) on the ground (or entry) level that:

- **i.** is of at least 10m² with one wall a minimum length of 3m;
- **ii.** provides for a minimum path of travel of at least 1000mm on at least one side of the bed.

Platinum Level

As for the gold level, but it also:

- **i.** provides a space 1540mm (width) x 2070mm (in the direction of travel) on the side on the bed that is closest to the door approach; and
- **ii.** provides for a minimum path of travel of 1000mm on the remaining side of the bed.

Bedroom space should encourage ease of movement and be free of obstructions.

Diagram courtesy of Integrated Design Group

Performance Statement
There is a space on the ground (or entry) level that can be used as a bedroom.

Platinum Level bedroom circulation space requirements.

12 Switches and powerpoints

Performance Statement

Light switches and powerpoints are located at heights that are easy to reach for all home occupants.

Silver Level

No requirements.

Gold Level

a. Light switches should be positioned in a consistent location:

- **i.** between 900mm – 1100mm above the finished floor level; and
- **ii.** horizontally aligned with the door handle at the entrance to a room.

b. Powerpoints should be installed not lower than 300mm above the finished floor level.

Platinum Level

As for gold level with the following feature:

c. Light and powerpoint switches should be rocker action, toggle or push pad in design with a recommended width of 35mm.

Light switches should be positioned in a consistent configuration.

Photos courtesy of Landcom

Performance Statement
Light switches and powerpoints are located at heights that are easy to reach for all home occupants.

13 Door and tap hardware

Performance Statement

Home occupants are able to easily and independently open and close doors and safely use tap hardware.

Silver Level

No requirements.

Gold Level

a. Doorways should feature door hardware installed at between 900mm – 1100mm above the finished floor.

Platinum Level

As for gold level with the following features:

b. Doorways should feature lever or D-pull style door hardware; and

c. Basins, sinks and tubs should feature lever or capstan style tap hardware with a central spout.

Lever door hardware and taps are easier to independently operate for all home occupants especially children.

Photos courtesy of Landcom

Performance Statement
Home occupants are able to easily and independently open and close doors and safely use tap hardware.

14 Family/living room space

Performance Statement

The family/living room features clear space to enable the home occupant to move in and around the room with ease.

Silver Level

No requirements.

Gold Level

No requirements.

Platinum Level

a. The family/living room should accommodate a free space, 2250mm in diameter, to enable ease of movement clear of furniture.

Ensuring there is free space in a living room area encourages ease of access within the home.

Photo courtesy of Landcom

Diagram courtesy of Integrated Design Group

Performance Statement
The family/living room features clear space to enable the home occupant to move in and around the room with ease.

15 Window sills

Performance Statement

Windows sills are installed at a height that enables home occupants to view the outdoor space from either a seated or standing position.

Silver Level

No requirements.

Gold Level

No requirements.

Platinum Level

a. Window sills on the ground (or entry) level in living areas and bedroom spaces should be positioned no higher than 1000mm above the finished floor level to enable enjoyment of the outlook.

b. Window controls should be able to be easy to operate with one hand and located within easy reach from either a seated or standing position.

Note A concession from (a) is reasonable in kitchen, bathroom and utility spaces.

Lower level windows encourage good sight lines to the outdoor space making it easier to monitor children and inviting better interaction with neighbours.

Performance Statement
Windows sills are installed at a height that enables home occupants to view the outdoor space from either a seated or standing position.

16 Flooring

Performance Statement

Floor coverings are slip resistant to reduce the likelihood of slips, trips and falls in the home.

Silver Level

No requirements.

Gold Level

No requirements.

Platinum Level

a. All floor coverings should:

- **i.** be firm and even, and
- **ii.** feature a level transition between abutting surfaces (a maximum vertical tolerance of 5mm between abutting surfaces is allowable provided the lip is rounded or beveled).

Slip resistant floor surfaces significantly reduce the risk of slip, trips and falls in the home.

Photos courtesy of Landcom

Performance Statement
Floor coverings are slip resistant to reduce the likelihood of slips, trips and falls in the home.

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Master Builders and its members have for a long time demonstrated a commitment to delivering diverse housing for individuals and households.

Our members are at the forefront in developing housing that meets the current and future requirements of its households.

A house will have many occupants with a variety of needs over its lifetime. Intelligent design and innovative construction can deliver housing that is adaptable. It provides an accessible and safe home environment for young families, the elderly and people with disability.

As an industry leader, Master Builders is pleased to work with Livable Housing Australia in developing the Livable Housing Design (LHD) Guidelines. The LHD Guidelines will be a valuable resource for households, the building industry and the broader community to better understand the benefits and the design options available to make our homes more accessible and safe for everyone.

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Image courtesy of sydesign.com.au

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- Australian Institute of Architects
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- Building Commission (Victoria)
- Council on the Ageing Australia (COTA)
- Grocon
- Housing Industry Association
- Lend Lease
- Master Builders Australia
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- Office of the Disability Council of NSW
- Property Council of Australia
- Real Estate Institute of Australia
- Stockland

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The livable and adaptable house

Many people, when building a new home, anticipate spending a number of years, if not decades, living in it. Others may conceive of a shorter stay. Whatever the intention, any new home is likely to have to accommodate changing needs over its lifetime. A livable and adaptable house is one that is able to respond effectively to these needs without requiring costly and energy intensive alterations.

Australian demographics are changing rapidly, with average households becoming both smaller and older as an increasing number of people live independently in their later years. The balance between home and work life also places altering demands on our houses as many people choose to work from home. A single space may act at different times as a home office, a teenage retreat, a family study or a bedroom for an elderly relative.

> *An adaptable house accommodates lifestyle changes without the need to demolish or substantially modify the existing structure and services.*

An adaptable house can be designed to easily enable a large family home to be eventually divided into two smaller housing units, so residents continue living in a familiar environment.

Adaptable floor plans.

Household needs vary over time in relation to physical capabilities. Most people can expect temporary or permanent variations in their physical capabilities in their life due to injury, illness or age. The Australian Bureau of Statistics reports that the percentage of individuals with a disability increases significantly with age, rising to more than 50% of people aged over 60. Longer life spans and higher proportions of older people in our society make it more likely that every home will be required to respond to the needs of a person with a physical limitation whether they are the primary resident or a visitor.

For those with limited mobility, reduced vision or other impairment, the ability to perform common tasks such as carrying shopping into the home, cooking a meal, using the bathroom or accessing items from high shelves may be unnecessarily limited by the physical design of a home. As the needs of individuals are specific to their personal circumstances there is no single solution to designing a home to meet changing needs; however, several approaches exist:

- **Livable house** — designed to meet the changing needs of most home occupants throughout their lifetime without the need for specialisation.
- **Accessible house** — designed to meet the needs of people requiring higher level access from the outset, and usually designed and built with a specific person's needs in mind. An accessible house meets Australian Standard AS 1428.1-2001, Design for access and mobility, and is able to accommodate wheelchair users in all areas of the dwelling.
- **Adaptable house** — adopts the idea of a livable house but in addition is able to be easily adapted to become an accessible house if the need should arise.

The livable house

The livable house is based on the principles of 'universal design' — defined as the design of products and environments so that they are usable by all people, to the greatest extent possible, without the need for adaptation or specialised design. The intention is to simplify life for everyone by making more housing usable by more people at minimal extra cost.

A livable house uses building features, fittings and products in combination to increase usability, benefiting people of all ages and abilities. It ensures that rooms and services

within the home are of a size and type usable by as many people as possible. For example, slightly wider doorways or passageways are more easily navigated by users of mobility devices such as walking frames, wheelchairs or a child's pram. People with limited hand function find screw-type sink taps more difficult to use than lever-type taps, which can be used by everyone. The same applies to lever-type door handles and rocker electrical switches. Incorporating these fittings during construction reduces the need for later retrofitting.

When homes are retrofitted with ramps, handrails and other devices, they can take on an institutionalised appearance. Universal design does not propose special features for the aged or disabled but instead promotes the use of standard building products and practices to overcome access and usability problems. For example, designing an entry without steps removes the need for the later addition of a ramp and handrails for wheelchair users, while improving access for children's prams.

Livable Housing Australia's Design guidelines (2nd edition) provide technical advice and guidance on the key living features that make a home easier and safer to live in for people of all ages and abilities. The guidelines were developed and endorsed by industry, community and government, and aim to improve the design and function of new homes in the mainstream and social housing market. The guidelines detail three performance levels for livability — silver, gold and platinum — which range from basic requirements through to best practice.

A livable house does not necessarily accommodate the higher access needs of occupants who require an adaptable or accessible house. The inclusion of livable design features may reduce or eliminate the cost of retrofitting a home to improve access in the future.

The adaptable house

In addition to being designed to be usable by most people, the adaptable house has provision for further modifications should they be required to meet the specific needs of a disabled occupant. This may include modifying kitchen joinery and altering the laundry and bathroom to improve access and usability, increasing lighting levels in response to vision impairment, or introducing support devices such as grab rails and/or additional security measures.

> *Australian Standard AS 4299-1995, Adaptable housing, provides guidance for designing houses to accommodate varying degrees of physical ability over time.*

Starting from the basic premise that every house should be accessible to a visitor using a wheelchair, AS 4299-1995, Adaptable housing, requires the house to also be adaptable for an occupant using a wheelchair. Although such a need is unlikely in every home, the standard specifies wheelchair space requirements, as circulation and access present the greatest difficulties. By allowing enough space for wheelchairs, other equipment such as walking frames, prams and trolleys can be better accommodated.

Adherence to AS 4299 may be specified in the building contract and enables housing to be certified as adaptable to one of three classes based upon the inclusion of essential and desirable features. It recommends that adaptable features incorporated into a dwelling be clearly documented with 'before' and 'after' drawings. This avoids relying upon recollection and enables the information to be readily passed on to contractors or subsequent owners. Compliance with this standard enables a design to be certified as an adaptable house, clearly identifying and recognising its adaptable features. Whether or not a designer is seeking certification, the certification document provides useful information.

Benefits to the owner

By meeting occupant needs over a greater period of time, the livable house and the adaptable house reduce the need to relocate to alternative housing, which can break community ties. They are also attractive housing options for the greatest number of people and therefore provide a sound investment for resale and rental.

Design for adaptability enables rapid response to changing life needs which can be swift and unexpected. It also increases the building's serviceable life span before remodelling, with associated financial, energy and material savings.

Developing a design

In the early stages of designing a new house or renovation, consider what type of use may be desirable and discuss your choices with your architect, designer or builder. Consider the following:

- Is it likely that the house will be extended in the future?
- How might the use of space change over time?
- Is it desirable for the house to be accessible for elderly friends and relatives who have a disability? If so, ask your designer to adopt the Australian Standard for adaptable housing.
- Is it desirable to make provisions for the future accommodation of an ageing or disabled occupant? Again, ask your designer to adopt the Australian Standard for adaptable housing.

Adaptable housing solutions can also be considered in smaller projects.

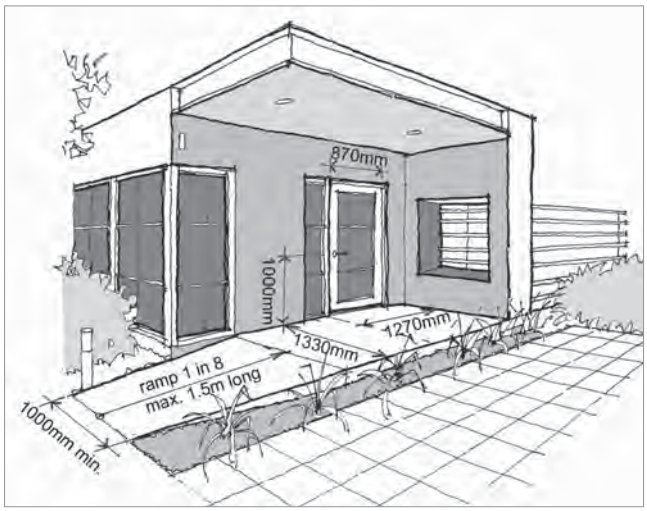
Minor alterations to bathrooms or kitchens can incorporate many adaptable housing features at minimal extra cost, making significant savings when adaptations are required in the future.

The following sections show how spaces in and around a home may begin to accommodate both livable and adaptable housing principles. Features and dimensions prescribed by AS 4299 and AS 1428.1 may vary over time as these documents are periodically revised.

Access and entry

An adaptable house should:

- provide easy access from both the street and car parking spaces in all weather and light conditions
- avoid stairs and use ramps only where essential
- dimension both ramps and stairs in compliance with AS 1428.1
- construct access paths from well drained, solid, non-slip surfaces that provide a high colour contrast to surrounding garden areas
- light pathways with low level lighting directed at the path surface, not the user
- protect paths and entries from weather
- avoid overhanging branches and plants which may cause hazards.



Adaptable house: access.

For security, the house entrance needs to be visible from the entry point to the site or the car parking space. The entry itself should provide a level sheltered landing that is dimensioned for wheelchair manoeuvrability and is adequately lit for visibility from inside the home. Entry door locks and lever handles should be fitted at appropriate heights and be able to be used with one hand. Ensure no obstructions or level changes limit access by a wheelchair user or are a tripping hazard to others.

Interior — general

The interior of the house should allow easy movement between spaces; often, this simply means slightly widening internal doors and passageways. Ideally, access should be easy throughout the entire home but it may be considered necessary only in some parts such as between living spaces, kitchen, bathroom and one bedroom.

Internal doors should have a minimum unobstructed width of 820mm and passageways a minimum of 1000mm, but any additional width is beneficial. Doorway width is measured from the face of the open door to the opposite frame. Circulation space around doors to allow wheelchair access is required, with special attention given to providing enough space to reach and operate the door lever. Refer to AS 1428.1 for dimensions, as door types and room configurations vary.

Electrical outlets are best placed at a minimum of 600mm above the floor; for light switches and other controls the ideal height range is 900–1100mm. The use of two-way switches at each end of corridors and where spaces have more than one entry is desirable. Lighting design needs to respond to the specific use of different spaces by evenly distributing light to avoid shadows, especially over work surfaces. Lighting should also be able to provide stronger illumination when required for those with impaired vision.

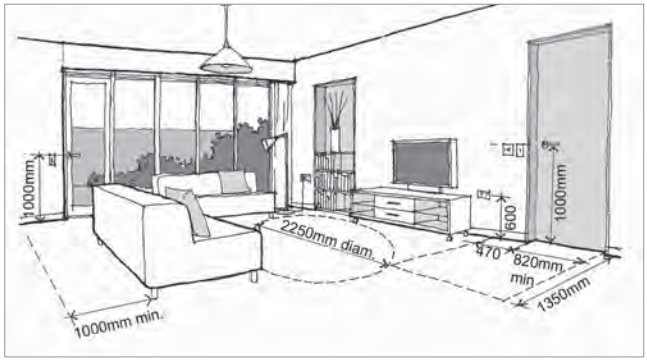
Window sills should be low enough to allow unobstructed views to the exterior from standing, sitting and lying positions where appropriate. Where different floor surfaces meet, they need to be level and fitted with cover strips to prevent tripping.

Living spaces

Living spaces should be comfortable and accessible to all residents and visitors. To accommodate a range of activities and tasks it is advisable to install thermal conditioning and services to suit a variety of furniture layouts. Australian Standards recommend:

- a minimum of four double electrical outlets
- a telephone outlet adjacent to an electrical outlet
- two TV antennae outlets, all located at appropriate heights
- clear circulation space within the room of at least 2250mm diameter for wheelchair manoeuvrability.

Housing
The livable and adaptable house



Adaptable house: living room.

In homes accommodating an elderly or disabled person it is advisable to provide a living space separate to the bedroom and main family areas for additional privacy. It may be located inside or outside the home in an area protected from weather.

Cooking spaces

As a person's physical abilities deteriorate over time, the kitchen is one of the main rooms in the house where the impact of physical limitations is felt. Detailed documentation for designing kitchens and joinery for wheelchair users is widely available; however, as people's maximum reach and strength vary greatly, even among wheelchair users, so kitchens designed specifically for people with disability vary greatly too. The design of a kitchen should not limit a person's independence and ought to be adaptable to accommodate a specific individual's needs.

Adaptable house: cooking spaces.

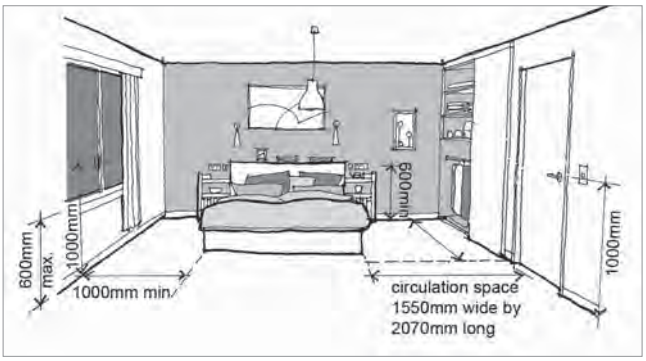
To accommodate a wheelchair user or other seated occupant, portions of the work surfaces should be constructed at a lower level than those for standing users, with leg room provided under work benches. To facilitate such changes kitchen joinery can be installed using modular components that allow for easy removal or modification of individual parts rather than the reconstruction of the entire joinery layout. Install such components after the non-slip floor finish is completed.

Design the kitchen with safety considerations in mind including:

- appropriately sized work spaces to the side of all appliances such as the cooktop, oven, microwave and refrigerator
- proximity of the cooktop to the sink to allow easy transfer of pots between the two for draining
- contrasting colours between bench tops and cupboard fronts to assist the visually impaired.

Sleeping spaces

At least one bedroom in the house should be accessible to a person using a wheelchair and be sized to enable them to manoeuvre within the space. The location of the accessible bedroom should take into account who is likely to use it, be it a family member with a temporary physical limitation, visitors of various abilities or an ageing resident. Additional services such as two-way light switches, telephone outlets, additional electrical outlets and TV outlets are recommended to ensure maximum usability and security.



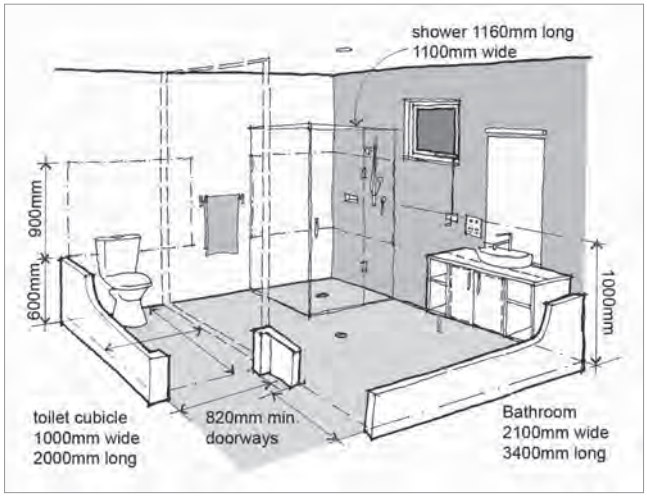
Adaptable house: sleeping spaces.

Wet areas

In the design of all wet areas such as toilets, bathrooms and laundry:

- ensure adequate sizing for access and circulation
- locate storage for easy and safe use
- install non-slip surfaces to minimise accidents.

During construction an accessible toilet should be included for visitors. If possible, make the entire bathroom fully accessible for a wheelchair user, ensuring that all the facilities can be used by residents with limited mobility or who need the assistance of a carer.



Adaptable house: wet areas.

If separate bathroom and toilet facilities are preferred, install a removable wall between the toilet cubicle and the bathroom during construction. To reduce the amount of work required later, install such a wall as a non-loadbearing partition after the floor and wall finishes are completed. Similarly, install items such as vanity cupboards, toilet bowls or shower screens which may require relocation or modification, as removable fixtures after all surrounding surfaces are completed.

One of the most common adaptations employed in residential bathrooms is the installation of grab rails for support and stability. To avoid demolishing sections of wall to insert support points, fix 12mm structural plywood to any stud wall framing behind the finished wall materials. In addition, allow leg space around handbasins and locate items such as mirrors, electrical outlets and controls so they can be used by people both standing and seated.

Depending upon the user, top or front-loading laundry appliances may be preferred. In either case, provide:

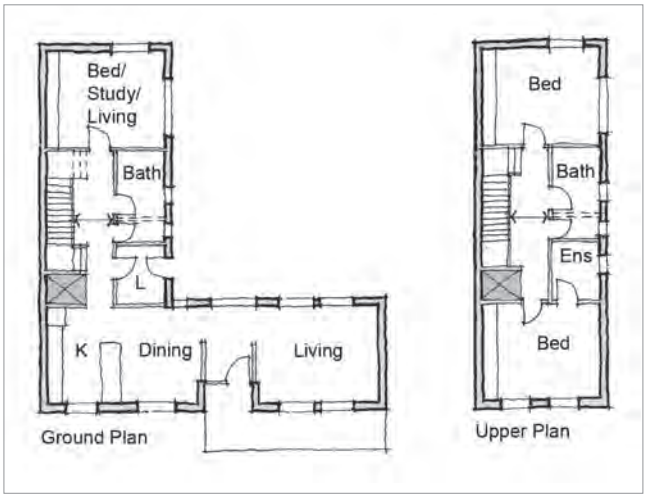
- a minimum circulation space 1550mm deep in front or beside appliances
- taps located to the side, not the back, of any laundry tub
- sufficient storage shelves at a maximum height of 1200mm.

Access to external drying areas should consider mobility issues and the need to use clothes baskets and trolleys.

Multi-level housing

Although single level homes seem an obvious choice for accessible housing, two or more storey houses and apartments can also be suitable for adaptation. The ground floor of a multi-level house can be accessible to visitors with a disability or even accommodate an occupant with a temporary disability. In addition to access between living, kitchen and bathroom spaces, include an accessible bathroom and a space appropriate for use as a bedroom on the ground floor.

To facilitate multi-level access, floor plans should allow for the future installation of vertical lifts or staircase lifts. A vertical lift requires space for a hole through each floor adjacent to circulation space on all levels. Initially the hole in the upper floor can be filled in or the space used for storage until adaptation is required. A stair lift requires ample space on top and bottom stair landings.



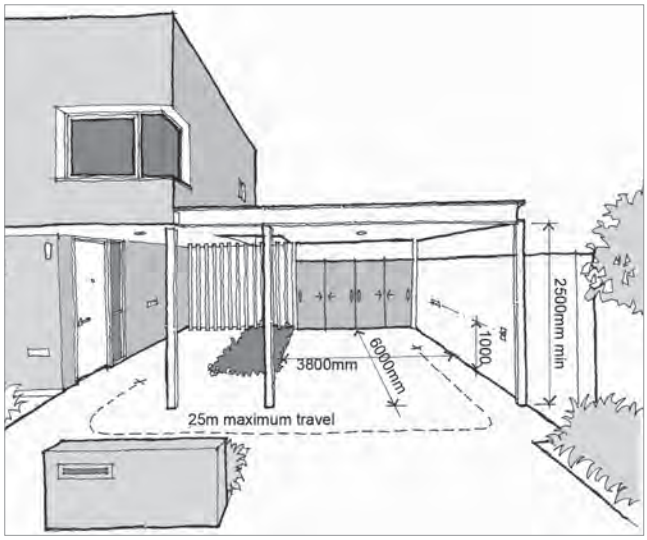
Adaptable house: multi-level.

Site

Activities such as mail collection, rubbish storage, car parking and enjoyment of outdoor spaces must also be considered in designing for full accessibility:

- Make rubbish bins, recycling storage, letterboxes, clotheslines and garden tool storage accessible along paths (*see 'Access and entry' above*).
- Provide access and circulation space to external areas such as patios and terraces (*see 'Living spaces' above*).
- Provide private, sheltered areas with access to northern sun in winter, visible from inside the home.
- Allow for raised garden beds in the initial garden layout.
- Locate car parking close to the entry with at least one covered parking space sized to enable wheelchair access.
- Install electronically operated garage doors.
- Allow secure space for future storage and recharging of a wheelchair or other mobility device such as a scooter.

- Ensure that garden and fence layouts do not compromise security by limiting visibility through the site.
- Ensure that house or unit numbers are clearly visible from the street.
- Use movement activated sensor lights.



Adaptable house: site.

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