

universal housing design guidelines



For Landcom Projects



why universal housing?

Just over one third of Australia's older people live in NSW. In this state today almost one in eight people is aged 65 and older. By 2051 this is projected to increase to one in four, almost 2.4 million people. And it's the 'older old' group that is growing proportionately faster than any other – people aged 85 and older now represent approximately 1.5% of the population and by 2051 this will increase to 7%.¹

Older people live independent and active lives and are involved in a wide range of social, leisure and community activities. Approximately 20% of older people provide support to relatives and a similar proportion volunteer in welfare and community activities. Grandparents provide care for 18% of all children aged 0 – 11 years.

Most older people continue to live in private households, with around two thirds in family households, usually with their partner. This is their preference. Only 3% of people aged 65 and older live in retirement villages and of these, approximately 80% have moved only out of necessity because their homes were not designed for them to 'age in place'. The vast majority would have preferred not to have moved from their previous homes.²



As people get older they want to stay living in their own homes and as part of the community they know, for as long as possible. To do this they need: independence and security; easy access around the house; a house designed to minimise the risk of trips and falls; and to avoid having to use stairs.

Landcom has prepared these guidelines to encourage the design of homes that meet these principal needs, to create and maintain strong and socially sustainable communities as the profile of our population changes over time.

¹ Australian Bureau of Statistics and the NSW Department of Disability, Ageing and Home Care

² Research by Anglican Retirement Villages 2003

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1.0 introduction

1.1 Purpose of this document

Landcom has prepared this guide to facilitate the development of housing that meets the current and future needs of an ageing population. This document has been written to assist our development staff, developer partners, industry colleagues and other stakeholders involved in housing development and policy.

1.2 What is universal housing?

'Universal housing' refers to homes that are practical and flexible, that meet the needs of people of different ages and abilities over time, and that avoid barriers that may discriminate against people living in or visiting the home. Universal housing is designed to be useable by most people over their lifetime without the need for major adaptation or specialised design.

Landcom's policy and guidelines on universal housing have been driven by a need to provide appropriate housing for older people. But universal design benefits others as well – making it easier for parents to manoeuvre prams, easier to carry the shopping into the house and easier for people with a physical disability or temporary injury to get around, for example.

In this guide we have separated the principles of universal design into two categories: the Key Design Features that we believe are critical to get right up front; and other design features that are basic good practice, which we have provided on the CD-ROM attached.

The Key Design Features are what we believe are the minimum structural and spatial requirements that cannot be changed later without major expense, such as the arrangement and size of rooms in a home. The explanation of these features also includes supplementary design advice.

The good practice features are other design elements that will make the home more flexible and practical to live in, such as the type of door handles and bathroom tiles. It makes sense to include these in the original design but if necessary they may be fitted or modified later to meet specific future needs of the occupants.



Universal housing benefits people of all ages.

1.3 Landcom's policy

Landcom's aim is to influence the design of mainstream housing so that a greater proportion of new homes built will be suitable for older people to live in for a longer period of time.

We aim to include a proportion of universal housing in each of our projects wherever appropriate. We will undertake or require a project by project review to assess opportunities, and implement universal housing wherever appropriate and financially viable.

In some cases it may be appropriate to include a greater proportion of universal housing. For example, in locations with direct and convenient access to services that would particularly benefit older people, such as medical services and transport. In other cases it may be appropriate to have less universal housing, such as in locations with a particularly steep topography.

Landcom will also showcase universal design in our projects by encouraging display homes that meet at least the Key Design requirements as set out in this guide.

1.4 Who these guidelines are for

These guidelines have been written primarily for Landcom's development managers, our developer partners and our project managers, to enable teams to assess opportunities for each project. They have also been written for our industry colleagues to encourage a universal design approach to new housing.

We also trust that these guidelines may assist local governments with their own housing policy work.

This is a 'working document' and we will update and amend it as required. We welcome feedback from all stakeholders to inform our policy and help us to refine the guidelines over time.



An objective of universal design is to make 'mainstream' housing suitable for older people to live in for a longer period of time.

1.5 How the guidelines apply

This document includes guidelines for the design of detached and semi-detached houses, terraces and townhouses. While most of the principles relate equally to apartments, these have not been specifically included at this stage. We propose to expand the guidelines in the future, following industry and stakeholder consultation, to include specific guidelines for universal design of apartments.

Several councils have their own particular requirements for universal, adaptable and/or accessible housing, many referencing the Australian Standards³. Where this is the case these Landcom guidelines should be used in conjunction with the council's policy to ensure the particular local government requirements are addressed.

³ Refer to the definitions under 1.8.

1.6 Relationship to the Australian Standards

Australian Standards for access and adaptable housing already exist, and indeed many of the local government areas we work in have policies that reference the Standards. Why does Landcom not just require compliance with these?

Our aim, over time, is to see a large scale shift in new housing design so that an increasing proportion will be suitable for older people. We believe the best way to achieve this is by focussing on the critical design features first – those things that cannot be changed later without major expense. These are addressed in the Australian Standard for Adaptable Housing, but the Standard also includes other features that could be fitted or modified later.

In preparing these guidelines Landcom did not want to develop a 'different' approach that would

complicate the existing landscape. So, the Key Design Features and best practice principles in this guide are actually derived from the Australian Standard for Adaptable Housing.

We recognise that there is much debate among stakeholders about what minimum spatial requirements are appropriate, particularly as they affect people with disabilities. Because Landcom is looking for a simple approach that will be taken up by the industry, we have adopted the spatial minimums in the Australian Standard as they currently exist. If these are amended in time then we will look to update these guidelines as appropriate. We accept that housing designed in line with these guidelines may not meet the needs of people with special mobility issues, but we trust the guidelines will help to influence the design of mainstream housing over time.



Universal housing can be achieved with simple modifications of existing designs.

1.7 Background to the guidelines

Landcom's policy and these guidelines are the culmination of several years of research and consultation. Our initial work was to understand how Landcom should respond to the changing housing needs of an ageing population. This included studies into the range of housing currently available for older people, the financial position of older people and their housing preferences.

What was clear was that the sheer size of the demographic shift demands a large scale response. Because the vast majority of people want to stay living in their own homes and the neighbourhoods they know, rather than moving to an age-restricted development of some sort, it makes sense to ensure that mainstream housing meets the majority of their needs.

Taking the Australian Standard for Adaptable Housing as the starting point, we identified the key structural and spatial elements we believe are critical to put in place up front, during the house design stage, to ensure the future flexibility and adaptability of the home.

We then did a design review of typical project homes currently developed in greenfield locations – single and double storey, detached, semi-detached and terrace homes. The review included an assessment of the modifications required to meet the Key Design requirements in these guidelines, and the cost implications. The cost study showed that the modifications to existing non-compliant designs could be made at a cost of 1 – 2% of the original construction cost. Building industry representatives have advised that if the Key Design Features are designed in up front, then universal housing could be achieved with almost no additional cost.



Grandparents provide care for 18% of all children aged 0 - 11 years. Universal housing will help them to stay living in their own homes for longer.

1.8 Definitions

Universal

Universal housing refers to homes that are practical and flexible, that meet the needs of people of different ages and abilities over time. A universally designed home generally avoids barriers that may discriminate against people living in or visiting the home. Universal housing is designed to be useable by most people over their lifetime without the need for major adaptation or specialised design. Universal design includes many of the features specified in the Australian Standard for Adaptable Housing (AS 4299).



A universal house meets the needs of most ages and abilities.

Adaptable

An adaptable house is a dwelling with design features that are adaptable to flex with the changing needs of the occupants, as specified by an Australian Standard. AS 4299 Adaptable Housing specifies performance requirements for adaptable housing. It includes three classification levels: a Class A adaptable house includes all essential and desirable features; a Class B house includes all essential and 50% desirable features; a Class C house includes all essential features.



An adaptable house is designed to be changed over time.

Accessible

An accessible house is generally a purpose built dwelling for a person or persons with a disability. AS 1428.1 Design for Access and Mobility specifies design requirements applicable to new building work, but excluding work to private residences, to provide access for people with disabilities. AS 1428.1 is referenced by AS 4299.



An accessible house is generally purpose-built.

2.0

key design features



This section of the guidelines explains the design features that Landcom believes are critical to get right up front. They are the minimum structural and spatial requirements that cannot be changed later without major expense.

No.1

direct access

"Getting to the door safely"

Ensure there is direct and level access from the car parking space to the house.

Why this is important

Direct and level access is the beginning of barrier-free design. A fall is often the first disabling event in a cascade toward immobility and restricted lifestyle. Prevention of trips and falls is the critical first threshold in preventative health care for the ageing.

The objective of this key design feature is to provide easy access to and from the house.

Easy access is required not only by older people and those in wheelchairs. It will also help users of walking frames, parents with strollers, a mum balancing a child on one hip with bags of groceries, and toddlers taking their first steps.

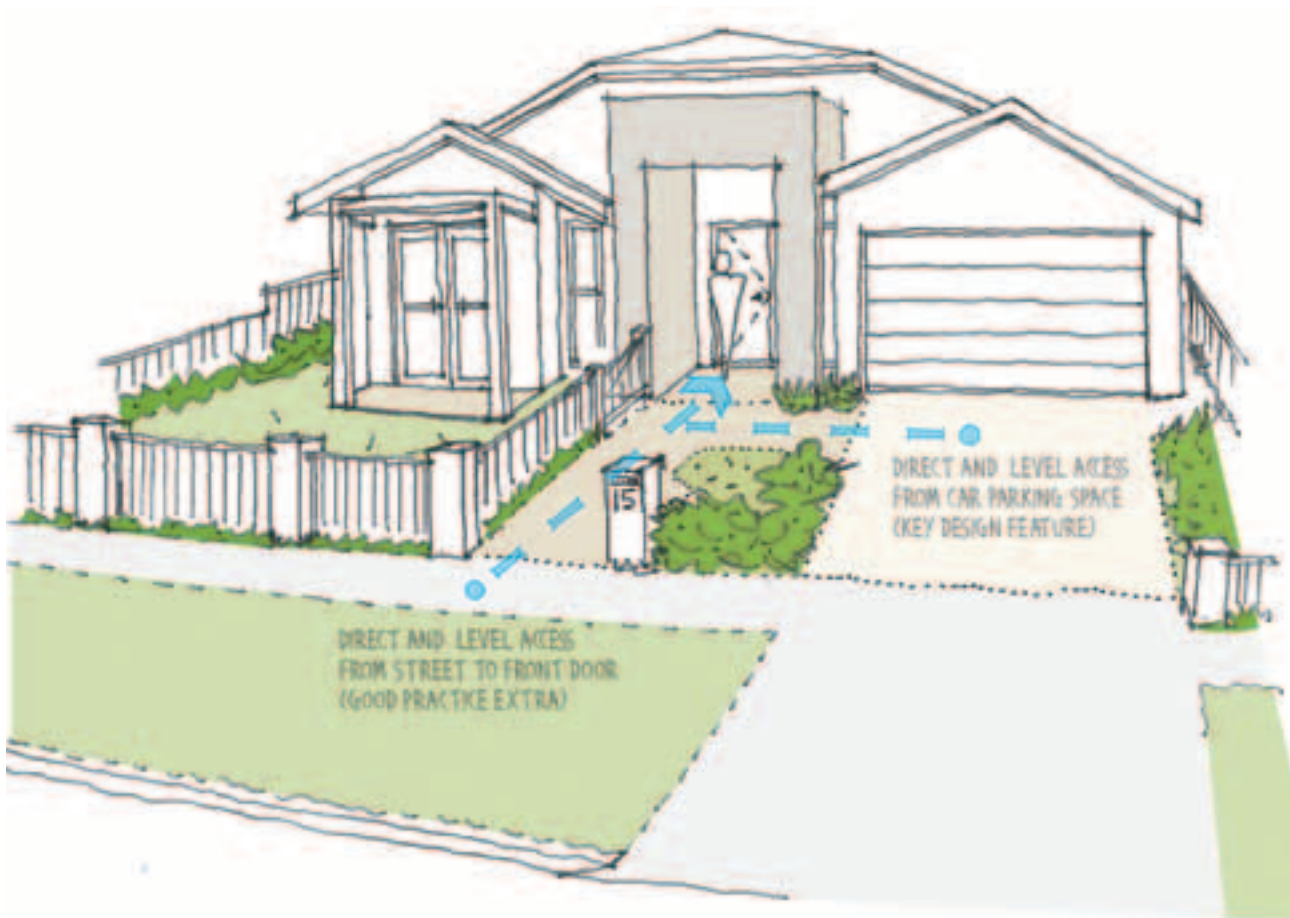
Design principles

Barrier-free design begins outside the home. Universal homes enable easy and comfortable access, whether from the garage or carport, or the front gate. Generally, access from the car parking space to the house is the most critical to get right in the up-front design of a house.

Barrier-free access does not necessarily mean a collection of institutional-type ramps, rails and platforms. It is about easy progress from outside to inside, from the car to the house. It is about providing sufficient clearance and manoeuvring space, level thresholds and paths.



A level path from the footpath to the front door makes access easier.



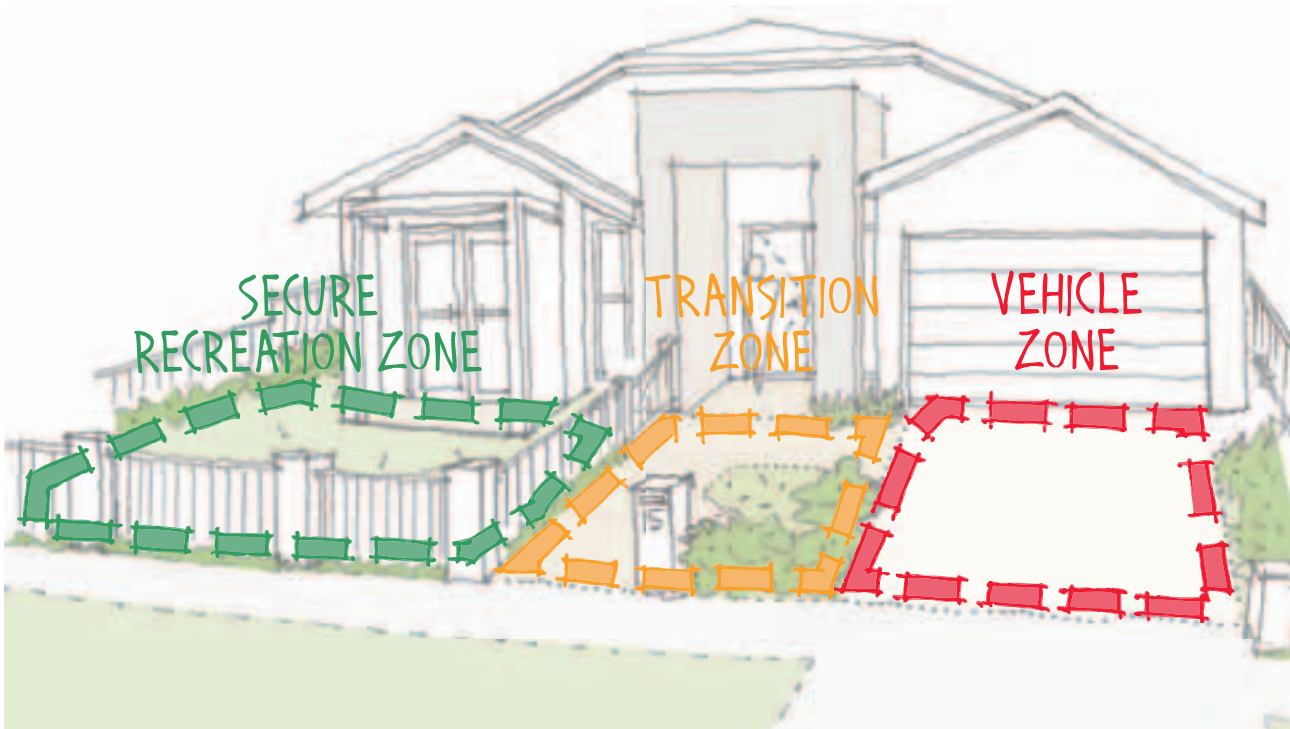
Direct and level access from the car parking space to the front door is key. A level path from the street further improves access.

Design considerations

- **Security:** it is important to consider the visibility of the main entrance. Clear lines of sight from the street will enable neighbours to see that the resident got inside safely. This is important for both actual and perceived security, which is an issue for older people.
- **Level surfaces:** disabled access rules allow a maximum cross fall of 1:40.
- **Width of path:** 1m is generally considered adequate width for universal movement, though wider is better.



Security: the door next to the carport is not the best main entry as it is obscured by the adjacent building.



Child safety and driveways: this front yard is divided into three zones.

Design considerations

- **Child safety and driveways:** there is a potential conflict in providing direct and easy access to driveways while also ensuring toddlers and older children are protected from vehicles. This is particularly relevant for older people's homes as they often have children visiting and many are regular carers of grandchildren. This apparent conflict may be addressed by considering vehicle sight-lines and toddler desire-lines.

One possibility is to consider the delineation of the front yard into three distinct zones:

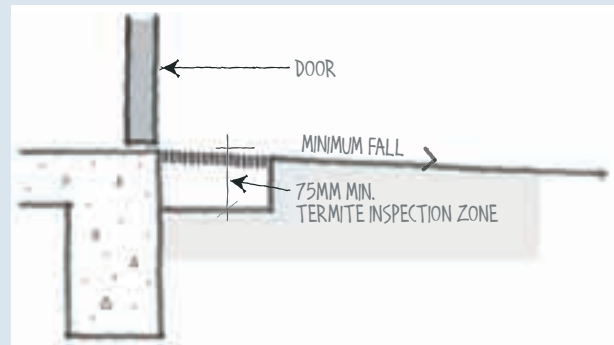
- 1 Vehicle zone
- 2 Transition zone
- 3 Secure recreation zone - securely fenced semi-private space, directly connected to a living zone of the house, can provide a secure space for children to 'escape' to without being at conflict with vehicles in the driveway.



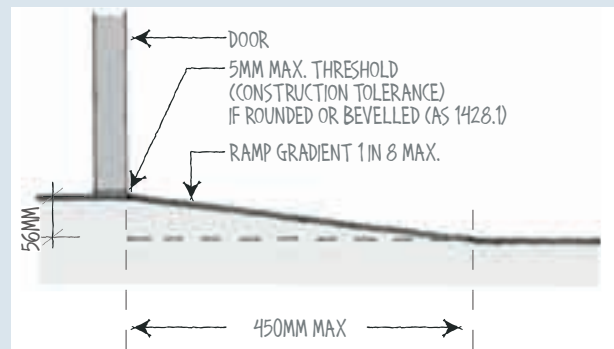
Children are frequent visitors to the homes of older people, so design for their safety is important.

Issues that may arise

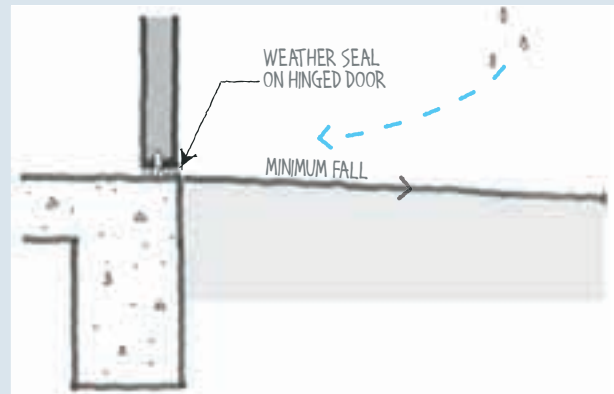
- Termite prevention:** the limiting of thresholds at doorways (to say 50mm) prevents achieving adequate inspection zones (min 75mm) and termite barriers continuous across these thresholds. This commonly demands that porch slabs be integrated with the general floor slab of the house so that termite barriers and inspection zones can be continued around the perimeter of the porch. Alternatively, the inspection zone might be achieved by other methods such as within the depth of a grated drain along the threshold.
- Weather protection and thresholds:** weather protection is traditionally aided by stepped thresholds providing freeboard at entrances. Level access requires alternative solutions to prevent flooding. Standard threshold ramps (refer to AS 1428) allow weathering thresholds/freeboard of up to approx 50mm. This can be combined with gently sloped porches to limit flood ingress. Appropriately sized grated drains and generous cover at entries should also be provided to limit the quantity of water in the area near the door.
- Slab design:** waffle slabs can deploy shallower void formers and depressed reinforcement mesh for an integrated porch, maintaining level excavation while enabling the limited set down of the porch.



Threshold treatment: incorporates grated drain along threshold to achieve minimum termite inspection zone and weather protection.



Weather protection: 1 in 8 max. ramp at threshold.



Weather protection: weather seal on hinged door.



Slab design: front porch incorporated with garage set down integral to house slab.



Slab design: front porch separate to house slab, requires 'alternate' threshold treatment.



Slab design: front porch integral to house slab with minimal set down.

No.2

space for car parking

"Getting in and out of the car simply"

Provide a car parking space that is at least 6.0m in length and with potential for a width of 3.8m (internal dimensions).

Why this is important

Vehicle access is very important to the mobility of older people to enable them to be actively involved in the community, and so easy access to and from the car is critical to universal housing.

Design principles

To enable easy access to and egress from the vehicle it is necessary to provide a level parking space with sufficient clearances to allow people to move comfortably around the vehicle and to open

doors fully. This space will also allow for the transfer to/from wheelchairs or walking frames, if required. It also allows young children to be easily secured in car seats.



Parking spaces should allow for doors to be opened fully.

Design considerations

- **External parking:** external parking that meets the key dimensional requirements may be easier to provide than garage parking. This could still meet universal design requirements provided all other requirements were met, particularly the requirement for direct and level access from the car to the house. External parking may be able to be covered now or in the future.

When designing carports, consider the placement of support posts to ensure car doors can be fully opened.

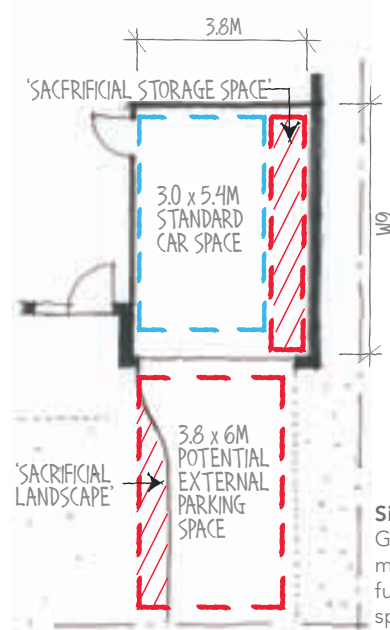
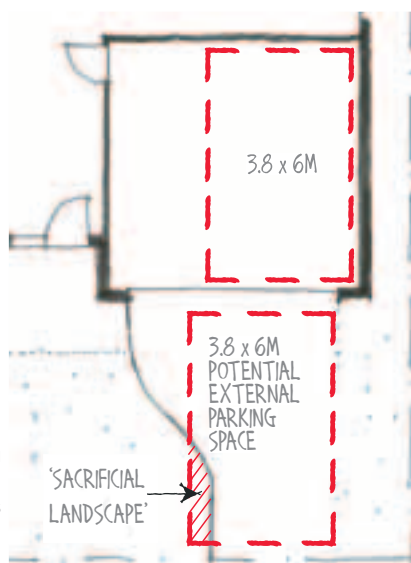
- **'Sacrificial' landscaping:** where the parking space is external, the space requirements may be met with landscape strips that could be

'sacrificed' for paving in the future if required. Where this approach is taken, care should be used in calculating the future total paved/impermeable surfaces, with regard to stormwater run-off/harvesting. It will also be important to consider the future landscape design to avoid an 'institutional' paved character.

- **'Sacrificial' storage space:** garage storage space may be provided that can be 'sacrificed' in the future to provide extra space around the car if required. Where this occurs, alternative storage provisions should be considered in the up-front design.

Double garage:

Where a parking space is external, landscape strips may be 'sacrificed' for paving.



Single garage:

Garage storage space may be 'sacrificed' in the future to provide extra space around the car.

Issues that may arise

- **Garage dominance of double doors:** a double garage would normally provide sufficient space to meet this requirement. Where double garages are provided for universal homes, single wide-opening doors should generally be used in preference to paired doors – to allow a vehicle to be parked towards the centre of the space if required.

This may appear to contradict Landcom's urban design objective of reducing garage dominance in the streetscape. However, careful design will help to minimise the visual impact of a single door, if other features of the street elevation provide the dominant design element. Garage dominance is not simply a factor of the size of the garage door, but its proportion in the overall elevation. A balanced and considered design approach is required.

No.3

wide front door

"Being able to get inside"

Ensure the front entrance has a minimum internal clearance of 850mm.

Why this is important

The front door is the primary access point of the home. When residents and visitors are going in and out of the front door they are often carrying more

things than when they are moving about inside the home. Providing a sufficiently wide front entrance will provide comfortable manoeuvring space.

Design principles

An 850mm clear entrance provides sufficient space for wheelchair access, but a wide entrance is important not only for wheelchair users. It means people can avoid difficult twisting movements – when carrying a wide load of shopping for example

– which can be destabilising for older people in particular. A wide doorway may also help a person with a walking stick or frame, a carer alongside a frail walker, and a parent carrying children or pushing a pram.



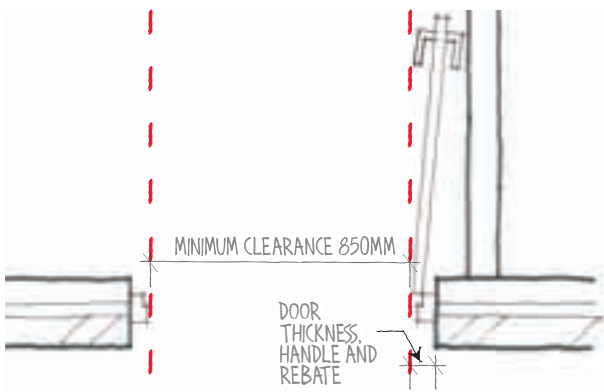
An 850mm clear opening generally requires a 920mm door leaf.



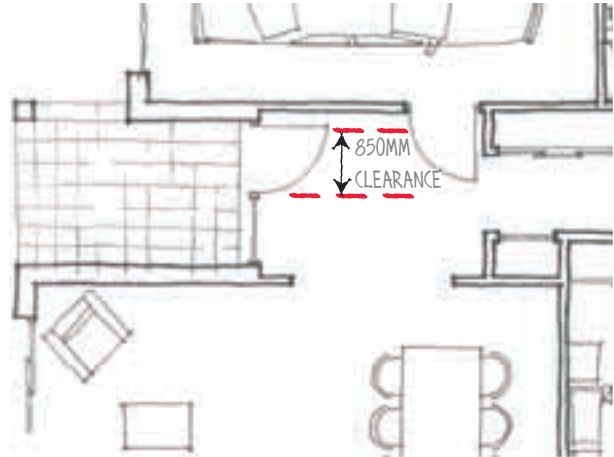
In this example, the window panel next to the front door improves perceived security, as the resident can see who is on the other side.

Design considerations

- **Clear opening:** the 850mm opening should be clear of all protrusions including the door handle and the thickness of the door in the open position. This will generally require a 920mm door leaf.
- **Door weight:** the total weight of the door and the forces required to operate it should be considered.



Plan of typical door opening.



An ideal example: Generous internal (entry foyer) and external (front porch) spaces make getting through the front door easier.

Issues that may arise

- **Wide door leaves:** are generally non-standard items at a slightly higher cost and may require more hinges and more robust door frames. Over time, Landcom is seeking to influence the standardisation of larger front doors through increased demand, so that the cost impact is reduced.
- **Paired leaves:** can provide wider openings but generally the latching mechanisms make them difficult to operate, secure and access. Future hardware design may address these issues.



As well as the width of the doorway, consider the design of the entrance porch. A generous approach makes it easier to get through the door.

No.4

wide internal doors

"Doors I can get through"

Ensure the internal doors on at least the entry level have a minimum internal clearance of 820mm.

Why this is important

As for the front door, slightly wider doors inside the house provide extra space for manoeuvring, which becomes more important as people get older.

Design principles

It is generally appropriate to have slightly narrower doorways inside the house, compared to the front door. Arguably, the 'pressure' and utility of internal access is less demanding than at the front door - the shopping has been put down, and there is a more 'secure' space with support options.

A clear opening of 820mm is suitable for general wheelchair access inside the home, provided sufficient manoeuvring space is available around doorways.



An 820mm clear opening generally requires an 870mm door leaf.

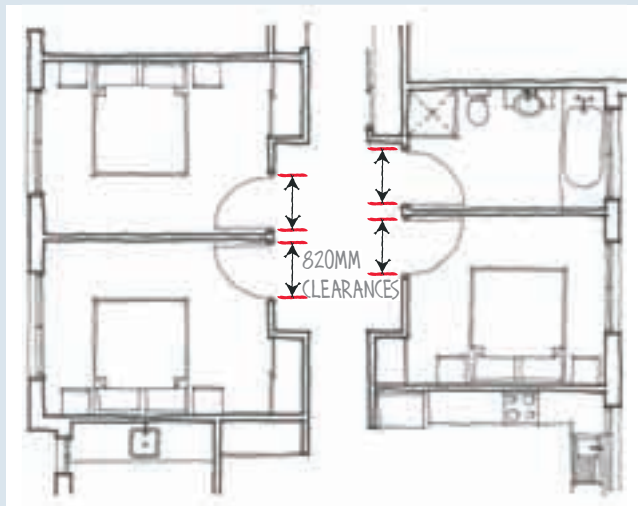
Design considerations

- **Clear opening:** the 820mm opening should be clear of all protrusions including the door handle and the thickness of the door in the open position. This will generally require an 870mm door leaf, able to be opened to at least 90 degrees.
- **Planning:** the protrusion of the door into rooms and circulation space should be considered in the design of the home, to ensure there is sufficient space to accommodate the door swing while still allowing movement space within the room.
- **Upstairs and downstairs:** the Key Design requirements in this guide presume that primary living spaces will be provided on the ground or entry level. That is, a living/family room, a room capable of being used as a bedroom, a bathroom, and the kitchen and laundry. In some houses (e.g. a two storey townhouse) the bedroom and bathroom may be upstairs. When these houses are designed as universal homes they will require provision for a future stair lift. In this case, then the upstairs as well as the downstairs doorways should have clearances of 820mm. Stair lifts are generally less expensive to install on straight stairs, rather than return or curved flights.

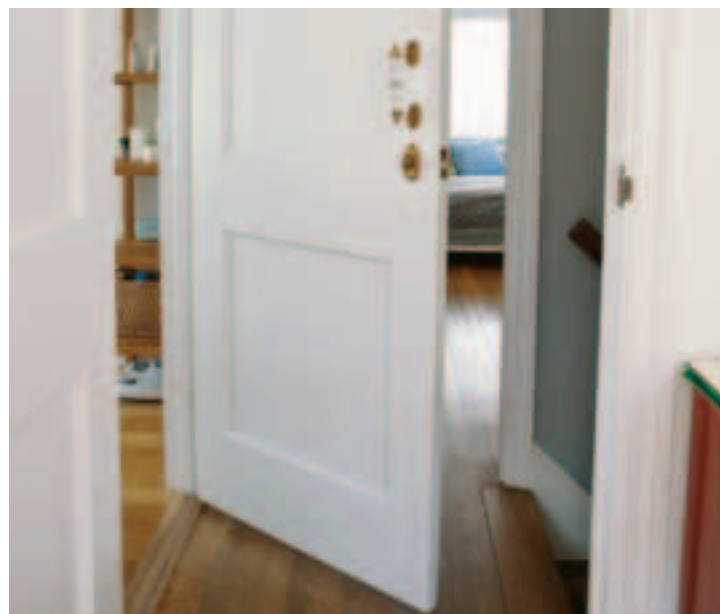
Issues that may arise

- **Availability:** 870mm doors are available as standard from major Australian door suppliers.

An ideal example: door swings are clear of any obstructions and allow space for movement within the room, even when all doors are open.



Wide internal doorways provide manoeuvring space.



Consider the swing of the door into circulation spaces to ensure there is enough space around it.

No.5

wide corridors

"Moving about easily"

Ensure the internal corridors on at least the entry level have a minimum width of 1000mm.

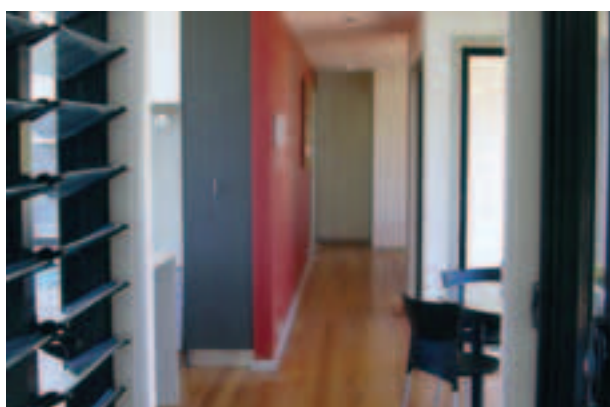
Why this is important

Universal homes need to provide free movement between all the critical facilities. Wide corridors make it easier to move around.

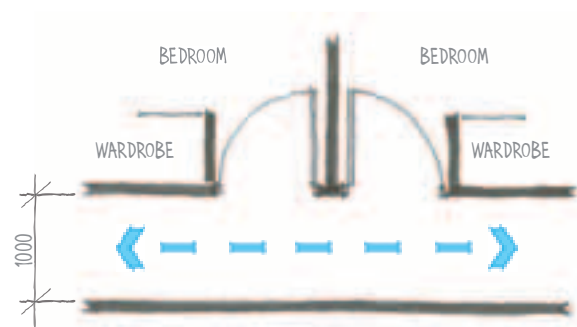
Design principles

Universal homes should have internal corridors at least 1000mm wide on at least the ground or entry level. The Key Design requirements in this guide presume that primary living spaces will be provided on the ground or entry level. Where this cannot be achieved and provision for a future stair lift is proposed instead, the upper levels should also have 1000mm corridors.

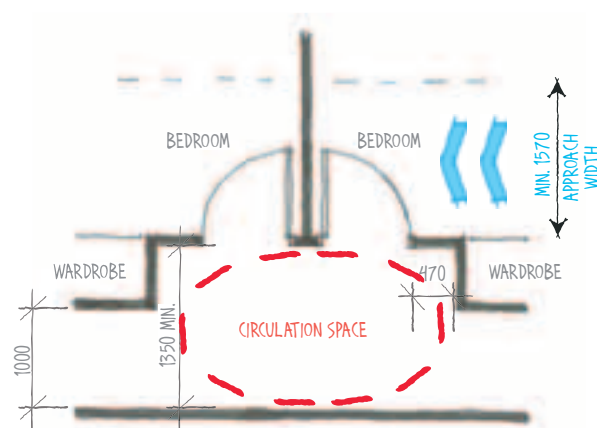
Consideration should also be given to the space required for turning movements at doors and 'intersections', and clearances adjacent to doors. AS 1428 includes standards for door clearances and is a useful reference for 'movement planning'.



Wide corridors make it easier to move around.



Long uninterrupted corridor: Clearance widths at doors do not comply with AS 1428.1.



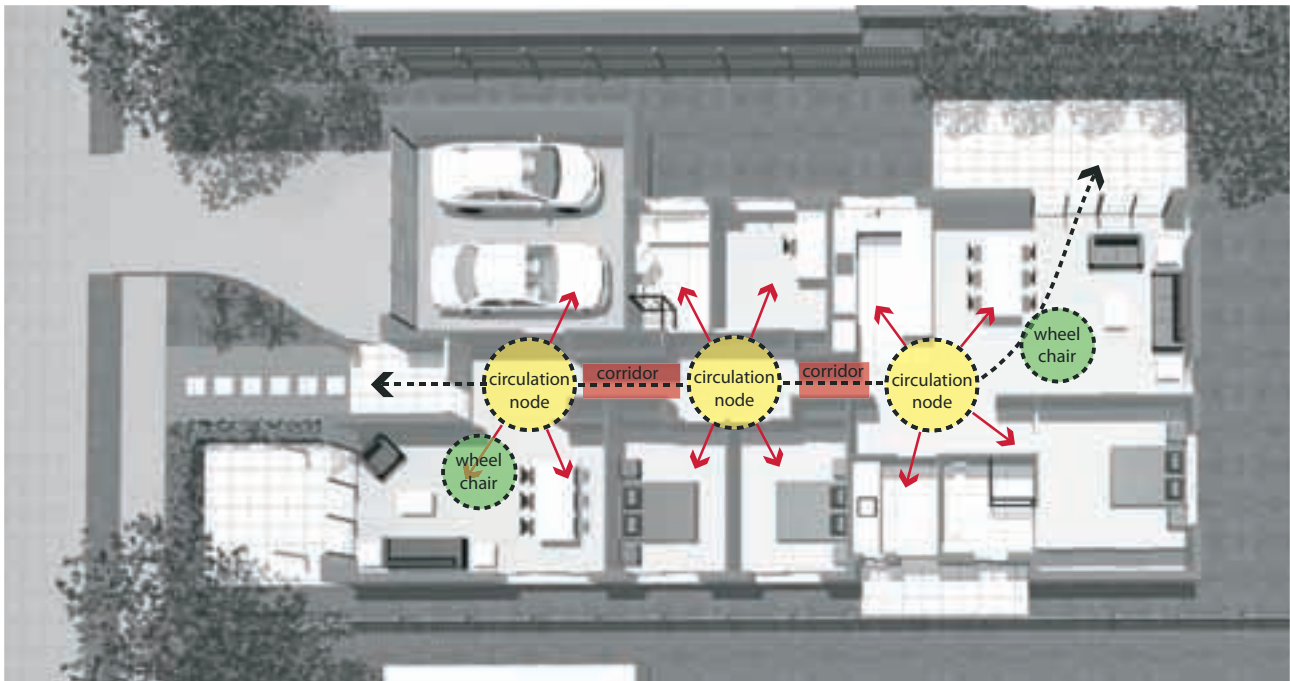
Corridor with extra circulation space: This corridor incorporates circulation space and built in wardrobes in the bedrooms, in accordance with AS 1428.1. Note that universal housing does not require compliance with AS 1428, but it is a useful reference for 'movement planning'.

Design considerations

- **Better design, not just 'more space':** turning spaces at doorways and intersections can be well used to increase the perceived spaciousness of a home and therefore its amenity and appeal. Clever design will see the sharing of spaces with other uses in the home. Living areas can overlap turning areas so as to increase the overall perceived spaciousness. Turning areas can serve several doorways simultaneously to increase efficiency. Perceived spaciousness through good design adds value.
- **Avoid long corridors:** this will improve the efficiency of the layout and contain construction costs, and also provide a more universally accessible home. It should not be presumed that wheelchairs and walking aids simply travel in straight lines. The designer needs a realistic understanding of the difficulties of manoeuvring, especially in the circumstances of compounded disability or frailty of older people.



Tight corridors leave little room for 'living'.



An example of how a long straight corridor may be broken up to improve accessibility.

Circulation nodes: this house is planned around three circulation nodes.

Shorter corridors: corridors are shortened between circulation nodes.

Access to rooms: directly from circulation nodes.

Circulation in living rooms: direct connection between circulation nodes and wheelchair spaces.

No.6 main facilities on the ground level

"Simple transitions as life happens"

Ensure that the ground (or entry) level includes a living/family room, a room or other space capable of being used as a bedroom, and a bathroom.

Why this is important

Single level living is the most accessible for people with any type of mobility constraint. This becomes more important as people get older. Having living, sleeping and bathroom spaces on one accessible level will mean that people who are or become

movement impaired – whether permanently or for a short period – will be able to live more independently. The concept behind universal homes is that design should not compound already difficult life-transition events.



An example of attached single storey living. See MH5 for more details.



For two storey universal houses, there should be a space on the ground level that can be used as a bedroom in the future if required.

Design principles

Universal housing does not necessarily have to be single story, but key rooms and facilities that are essential for day-to-day living should be located on one easily accessible level.

These spaces include a living or family room, a space that can be used for sleeping, and a universal bathroom. The sleeping area does not necessarily

have to be a dedicated bedroom. Universal housing is about flexibility and adaptability – so, for example, it may be a separate dining room or study nook that can be used as a bedroom in the future if required.

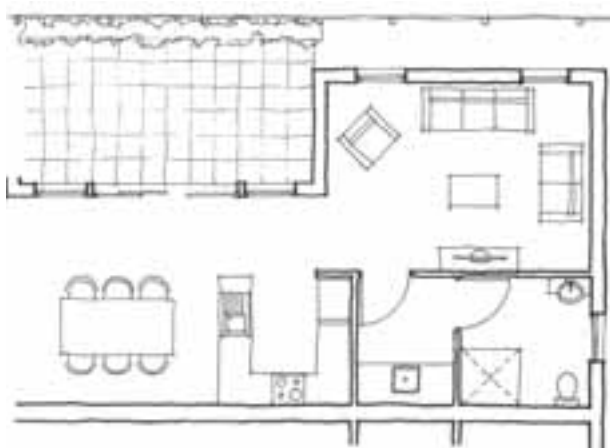


Single level living is the most accessible for people with limited mobility.

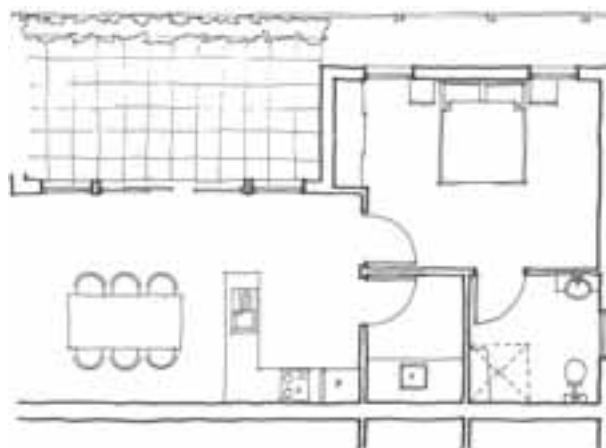
Design considerations

- **Avoid 'compromised' adaptations:** universal homes should be planned so that when ground level sleeping spaces (that were not originally

designed as bedrooms) need to be used, they do not appear to be compromised spaces.



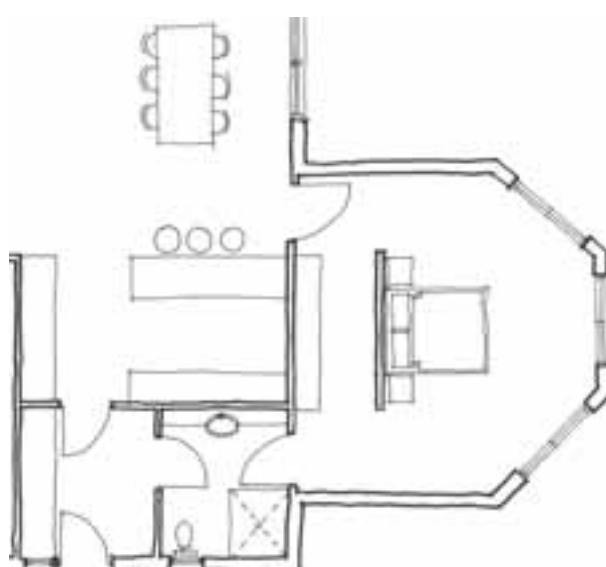
Consider placement of windows and walls prior to adaptation, in anticipation of the post-adapted furniture layout.



The family room is now used as a bedroom with direct access to a bathroom.



A separate family/media room accessed from the dining and kitchen areas at the rear of house.

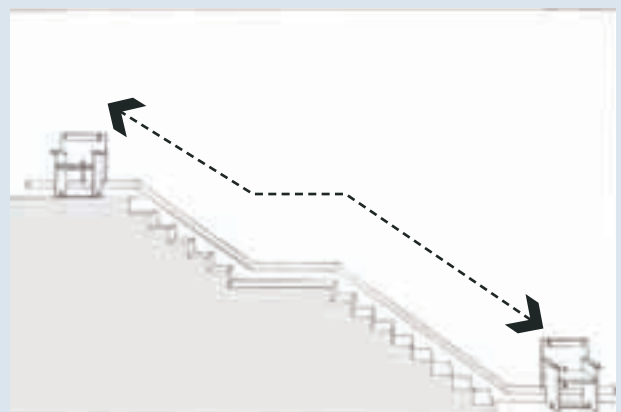
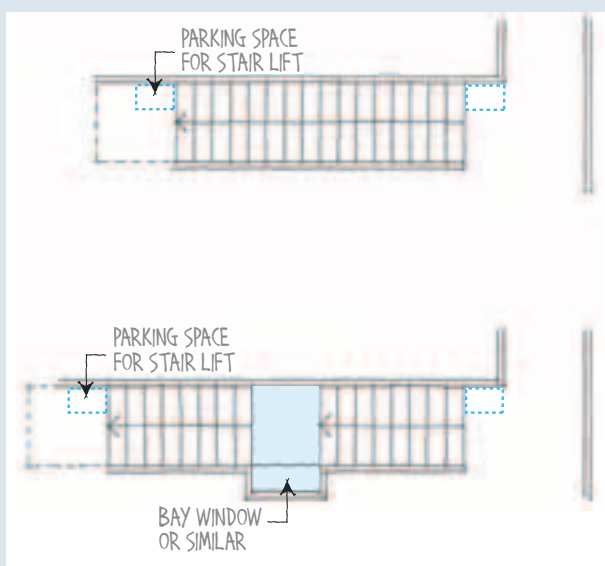


The family/media room may be used as a ground level master bedroom. A new door provides direct access to a bathroom.

Issues that may arise

- **When it won't all 'fit' on the ground level:** as allotment sizes decrease, there is increasing pressure to plan bedrooms and bathrooms on upper floors (e.g. in a smaller two storey townhouse). Because of such constraints on space, some house types will be more suitable for universal design than others. However, houses with bedrooms and bathrooms upstairs

can still be designed for universal access, by making provision for a future stair lift. Stair lifts are generally less expensive to install on straight stairs, rather than return or curved flights. 'Parking space' for the chair or platform of the lift should be considered in the layout of the home.



The inclusion of a landing on a straight flight of stairs allows for a rest stop, making it more approachable, and can break the length of a fall. Ideally the landing ought to have a purpose, a bay window/observation point, a useful nook, for example.



'Parking space': allow adequate space for stair lift parking and manoeuvring at top and bottom landings. (Images from www.prking.com.au)

No.7 circulation space in the living room

"A normal family life"

Ensure that the living or family room has at least 2.25m diameter circulation space, clear of furniture.

Why this is important

The living room is a central focus of the home, where a great deal of recreation and social interaction occurs. Natural and easy access to participate in

these activities is fundamental to leading a normal life.

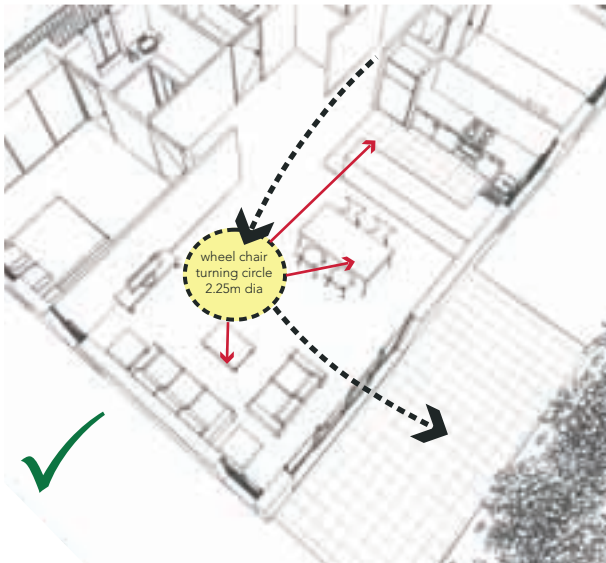
Design principles

The objective of providing this space is to allow people with movement constraints to easily engage in the activity of the living area. It should not be considered by the designer as 'traditional circulation' space, but rather as the space that allows participation. It is the place of 'destination', it is not the space for a u-turn of a wheelchair at the end of

the access route. Ideally, the space is not the area created by removing the coffee table from within the 'conversation' of the lounge chairs, but the area adjacent the lounge chairs that enables 'parking' and manoeuvring to participate in the conversation.



This design feature is about providing space for people with movement constraints to participate normally in the living room activities.



Wheelchair turning space is located centrally allowing for full participation in activities in the kitchen, living and dining areas and is also accessed directly from the general circulation path through the house.



Turning space positioned in the far corner of the living room is illogical.

Design considerations

- **Spaciousness and planning efficiencies:** this circulation area is one of the spaces which can easily be combined with adjunct areas to contribute to the spaciousness of the home

and overall planning efficiency. This area should be logically and directly linked to the general circulation through the home.



Circulation space should be central to the activities in the room.

No.8

space in the bedroom

"I can just have a quick lie down"

Ensure that the bedroom space on the ground (or entry) level is large enough for a queen size bed and a wardrobe, with space to move around them.

Why this is important

The bedroom space on the ground level needs to enable easy movement in and out of the room and around normal bedroom furnishings.

Design principles

Direct and simple movement paths improve accessibility and increase independence. The bedroom should allow for easy manoeuvring and

easy access to the wardrobe. Space should be provided on both sides of the bed.

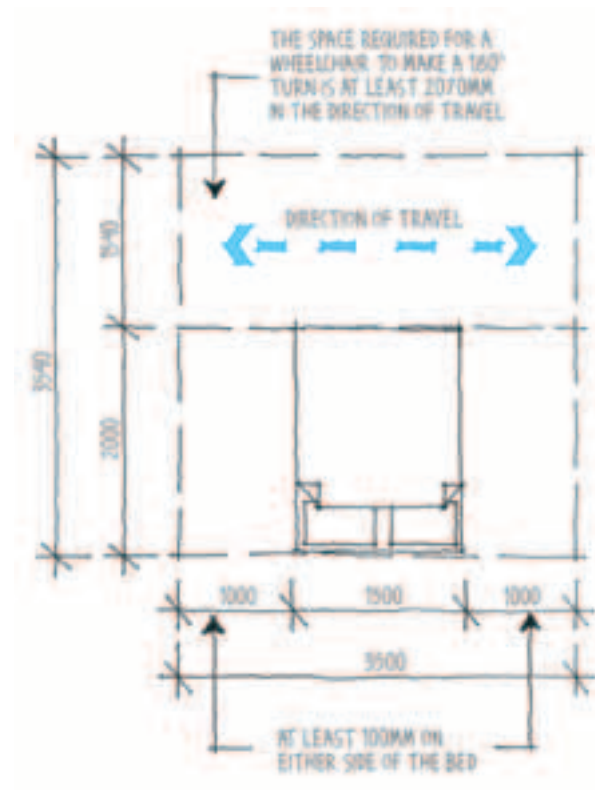
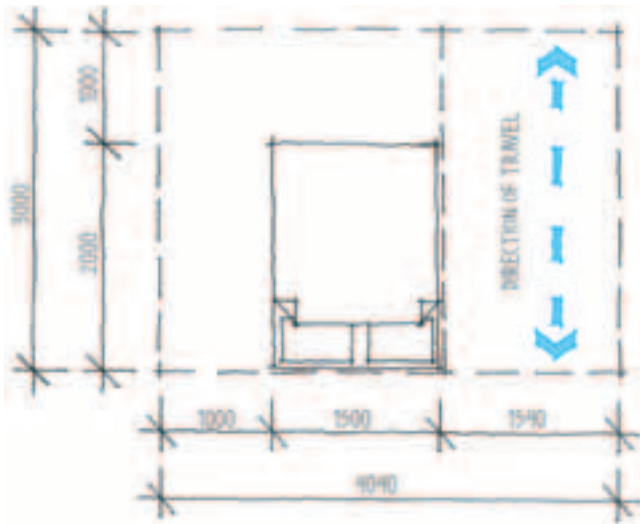
Design considerations

- **Enough space:** the bedroom needs to provide circulation space at least 1m wide on either side of the bed as well as space for manoeuvring a wheelchair. Depending on the layout of the room, this means it needs to be at least 3.5 x 3.54m or 3.0 x 4.04m excluding the wardrobe.

(Refer to AS 1428.2 Clause 6.2 for further guidance).



A universal bedroom needs to provide circulation space on both sides of the bed, and manoeuvring space for a wheelchair.



Issues that may arise

- **If the bedroom has to be upstairs:** if the design of the house does not enable a space that can be used for sleeping on the ground level, universal access to the upper levels may be considered by making provision for

a future stair lift. Stair lifts are generally less expensive to install on straight stairs, rather than return or curved flights. 'Parking space' for the chair or platform of the lift should also be considered in the layout of the home.



Direct access from the bedroom to a bathroom is good practice when designing for people with limited mobility.

No.9 bathroom designed for easy and independent access

"I can take care of myself"

Ensure that the bathroom on the ground (or entry) level:

- Is at least 2.4 x 2.4m *(or provision is made for this)*
- Has a shower with no hob and full-floor waterproofing
- Has wall strengthening around the toilet (700 – 1500mm above the floor)
- Has wall strengthening around the shower (700 – 1850mm above the floor)

Why this is important

Wet areas are among the most expensive parts of a house to construct and to refit. They are also the more difficult to manoeuvre within. They are the places where the requirement to accommodate different levels of mobility become most apparent. It is therefore critical that wet areas are designed with flexibility to meet different needs.



Bathrooms designed for universal access do not look institutional.

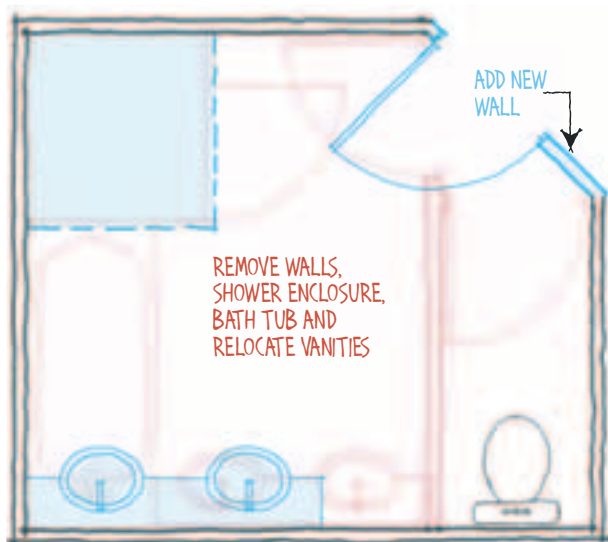
Design principles

Universal bathrooms need to provide sufficient space, remove trip hazards and allow for future fixtures as required.

Typically, modern houses are designed with WCs that are separate from bathrooms. The adaptation of these designs, combining the two into one room, may provide the circulation space required for people who are less mobile. Where universal homes are designed with a separate WC and bathroom, the

designs should allow easy adaptation without having to relocate any major fixtures (i.e. by removing a 'loose fit' dividing wall only).

The bathroom is one of the key areas for potential injury through slips, falls and scalding. The bathroom should be designed to reduce the risk of injury. Hobless showers will reduce the risk of trips and strengthened walls will allow the future fitting of grab-rails if required.



A 'loose fit' wall between the WC and bathroom can be removed to create an accessible bathroom.



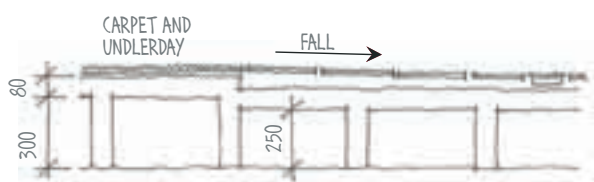
A contemporary bathroom with double vanity requiring little or no adaptation.



Wall strengthening around the shower allows for future fitting of grabrails if required.

Design considerations

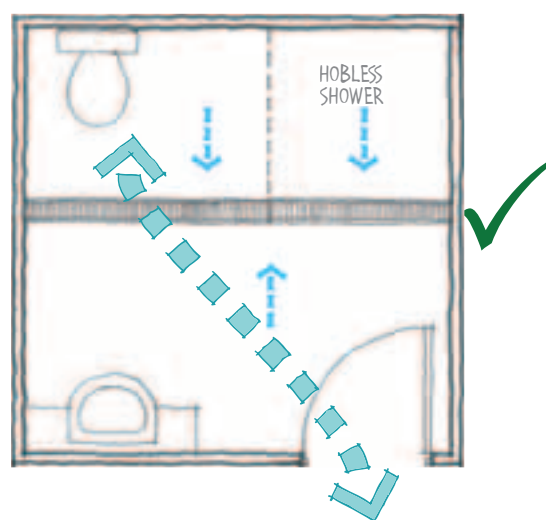
- **If walls are to be removed:** to provide future circulation space, then they need to be non-structural, independent of the integrity of waterproofing systems, and not contain plumbing or electrical fixtures.
- **Thresholds at bathroom doors:** often include a level change between tile and carpet surfaces, resulting from the different thickness of materials over the slab. This is a trip hazard and may limit access for some people. It is marginally more expensive, but a much preferred approach, to set down the slab in the area of the bathroom. This can be achieved by using alternative size void formers in a standard waffle slab construction, together with localised 'depression' of the reinforcing mesh (subject to engineering design).



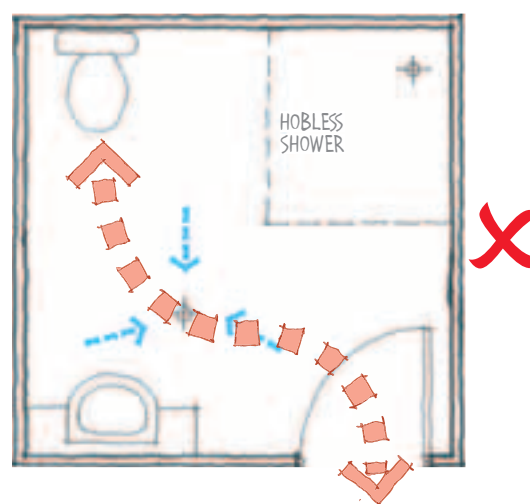
Waffle slab: Threshold at bathroom door

- **The location of shower fittings:** the shower rose and taps in particular should be positioned to minimise the risk of scalding. Typically this is achieved by locating the taps adjacent to the shower opening, rather than on the facing wall, and by directing the shower rose away from the entry to the shower.
- **Tile selection:** while tiles can be changed later if required, it is a good idea to choose slip resistant tiles at the outset, to minimise the risk of slips.

- **The location of floor wastes:** will influence the tracking of water across normal movement paths within the room. Consideration can be given to the layout of fixtures to avoid creating unnecessary hazards. Plumbing regulations should also be considered.



Floor wastes: A grated drain can be used for both the shower and general drainage.



Floor wastes: Falls associated with floor waste positions can inhibit easy movement through the bathroom.

Issues that may arise

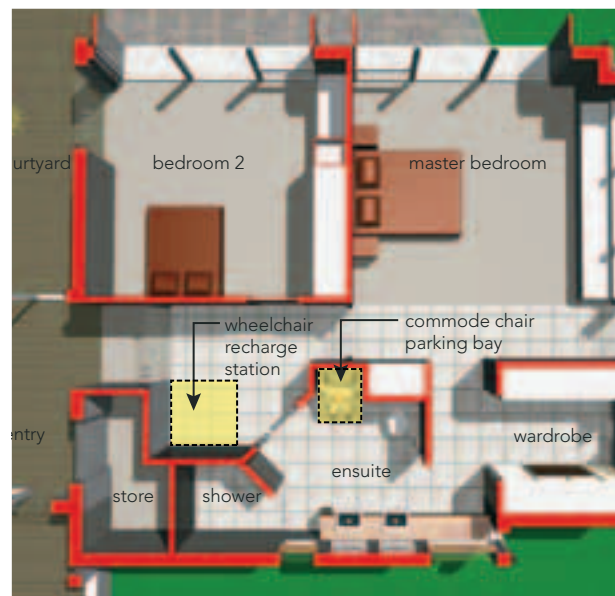
- **Ensure the construction program allows for full floor waterproofing:** where the WC and bathroom are initially divided, waterproofing of the floor should be contiguous, independent of any wall between the bathroom and WC. If a separating wall is used, it needs to be fitted after the waterproofing (i.e. 'loose fitted'). Similarly, waterproofing should continue below the bath hob to enable easy removal of the bath

in the future if required (to gain circulation space). Careful management of the construction process will be required.

- **Door swings and clearances:** the location and dimension of bathroom doors and the impact of door swings on clearances within the bathroom are best considered in the initial planning of the home.

Case study

This is a purpose - designed bathroom for a wheelchair user. It is designed as a luxurious ensuite to the master bedroom. Subtle features provide for ease of movement and storage of equipment in a discreet but accessible location. The size and shape of the hobless shower contains water spray without the need for a shower screen or door, and allows a carer to operate taps without getting wet."



No.10 enough space in the kitchen

"I can refit the kitchen later if I need to"

Ensure the kitchen is designed with a minimum of 2.7m between any facing walls.

Why this is important

Independent living requires access to all utilities of the home. The refit of a kitchen is generally non-structural and often, within the lifespan of the home, it might be expected that the kitchen would ordinarily be refitted. Also, if people have special requirements for the design of the kitchen they will generally build to suit their specific needs.

Therefore, it is generally not necessary to make specific provisions for disability in the original design of the kitchen.

The key requirement for universal housing is to ensure the space is there to provide flexibility for a range of future needs.

Design principles

2.7m between any facing walls generally allows sufficient space for wheelchair manoeuvring between benches tops (i.e. 2 x 600mm deep bench tops and 1500mm between them).

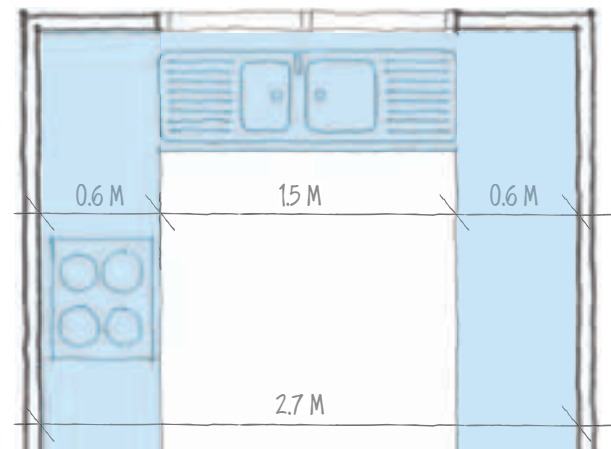
Most modern kitchen designs are open plan so they already meet this requirement.



Most contemporary kitchens are open plan, so they already meet the spatial requirements of universal housing.

Design considerations

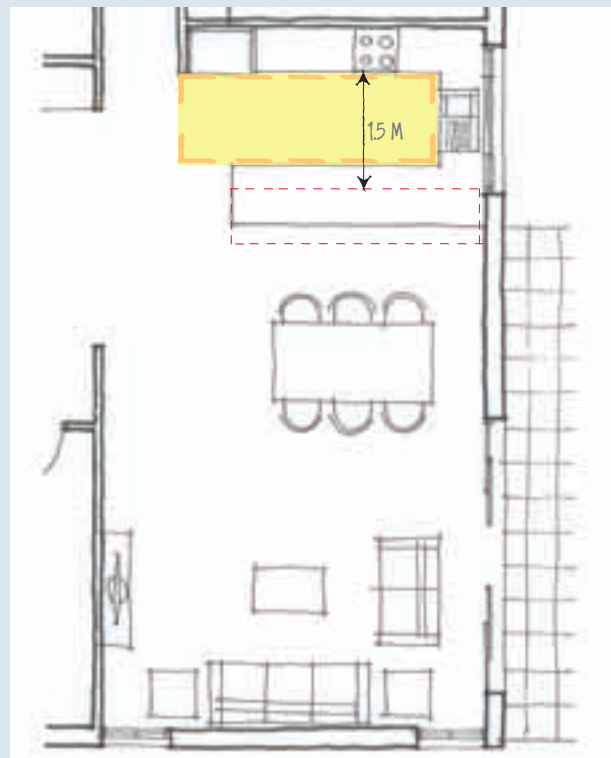
- **Arrangement of kitchen fittings:** (especially the location of the sink) can have some bearing on the cost of adaptation. Where a bench is capable of relocation, it is preferable that it does not contain the sink.
- **Safety:** selection of appropriate appliances in the original kitchen can significantly improve its safety for older people. For example, older people are generally more susceptible to burns due to deteriorating skin sensitivity, and their burns often take longer to heal. Burns are common when they are required to reach across boiling pots to adjust hotplate and oven controls. Selection of a cooktop with hotplate controls along the side (or front) can lessen this risk. (Side controls are preferable as controls along the front are too easily reached by young children.)



Issues that may arise

- **Thinking ahead for cost efficient adaptation:** ideally an efficient galley kitchen has a corridor width of 1000-1350mm between benches, compared with the minimum 1500mm to enable wheelchair manoeuvring. Thoughtful design can reduce the cost of any future adaptations that may be required.

Cost efficiencies are improved by avoiding benches that require 'site measurement'. This is achieved where the benches are not constrained between walls (i.e. an open plan kitchen). This is in fact the most common arrangement of modern homes, where the kitchen and family rooms are combined. Open planning also allows the space between benches to be increased in the future if required, by relocating the return bench. Often it will be possible to ensure that no plumbing or electrical fittings connect to this bench, or if they do, that they do not constrain future relocation of it.



Flexible kitchen space: an open plan kitchen that is not constrained between walls allows the space between benches to be increased in the future if required.

No.11 enough space in the laundry

"I can take care of my own washing"

Ensure the laundry is designed with a minimum clear circulation space of 1.55m diameter.

Why this is important

Independent living requires access to all utilities of the home.

Design principles

Laundries need to provide sufficient space for easy manoeuvring which means a clear circulation space of at least 1.55m diameter. Laundry facilities may be provided in separate rooms or combined with other wet areas. They may also be designed as 'cupboard laundries' provided sufficient adjacent circulation space is provided.

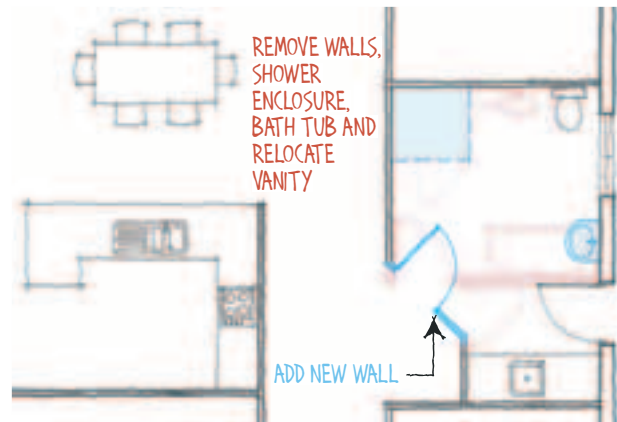


Laundry orientated to allow easy access both inside and outside.

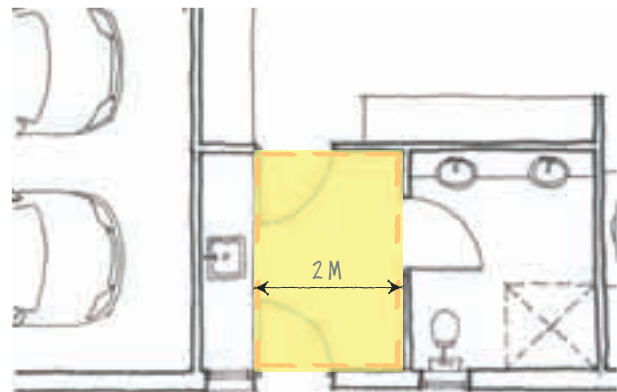
1.55m diameter circulation space enables access to appliances from a wheelchair.

Design considerations

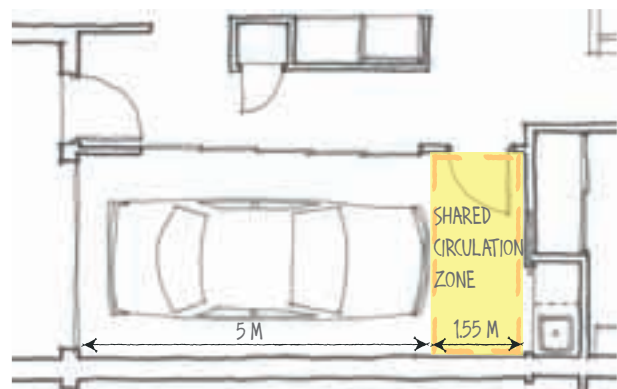
- Laundries combined with other wet areas:** provision of a laundry as an independent utility room can demand a disproportionate amount of space in a modern home when considering the sophistication of modern appliances. It may be warranted to consider combining the laundry with other utility/wet areas (e.g. bathrooms) to enable sharing of circulation space and reduced travel distances (e.g. between undressing and placing clothes in a washing basket or machine).
- Laundries as larger utility rooms:** alternatively, it may be worth expanding the laundry into a larger more broadly useful utility room. This may be used for storage, recycling, wheelchair parking for overnight charging etc.
- Cupboard laundries:** laundry facilities in cupboards off a passageway or other room may borrow circulation space from the adjoining area. When designing cupboard laundries it is worth considering the floor surface of the adjoining area to avoid damage from splashes or flooding accidents.



Laundry combined with bathroom and WC: to provide circulation space.



Laundry as larger utility room: laundry combined with storage space, recycling and wheelchair charging etc.



Cupboard laundry: laundry borrows circulation space from adjoining area.

Issues that may arise

- Thresholds:** as for other wet areas, it is appropriate to ensure a level threshold at doorways and consider the impact of floor

grades to waste. Refer to Key Design Feature 9 for more on this.

No.12

low window sills

"I'm not shut in"

Ensure the window sills on at least the ground (or entry) level are no higher than 730mm above floor level (excluding utility areas).

Why this is important

Older people are often seated more than younger people, and some may be constrained to a wheelchair. Lower window sills enable people to see outside more easily from a seated position, and so feel connected to what is going on in the street.

This is important not only for their own health but it also improves neighbourhood safety by enabling passive surveillance – older people are often around to watch when others are not.

Being 'shut in and left alone' is one of the great fears about ageing and it is also the antithesis of sustainable community making. Housing design ought to encourage and allow controlled interaction between public and private zones. Windows are the primary interface in this.



Low sills enable a view through the window while seated in bed.

Design principles

Window sills on at least the ground (or entry) level should be a maximum height of 730mm above floor level, excluding the bathroom, kitchen and laundry.

Design considerations

- **Interface from public to private:** the objective of this principle is to ensure that a view through a window is available from a seated position. It is also useful to consider the progressive interface from public to private space and the 'defensibility' of the private zone. People are encouraged to

participate in the public life of a street when they can do so on their own terms and within definable and defensible limits. This security is especially important to senior people.

Issues that may arise

- **Local government controls and project-specific design guidelines:** various council controls and project-specific guidelines may conflict with this universal housing requirement. Where this is the case, the specifics of the project and council requirements will need to be considered.
- **Overlooking:** high window sills are occasionally used to control overlooking of neighbouring properties. Alternative methods may be appropriate, such as screening. Ideally though, where such site specific demands exist, the home should be designed for the privacy of residents and neighbours alike, and windows in locations that compromise privacy should be avoided.



Glazed doors and low sills help to connect the inside with the outside.

3.0

model houses

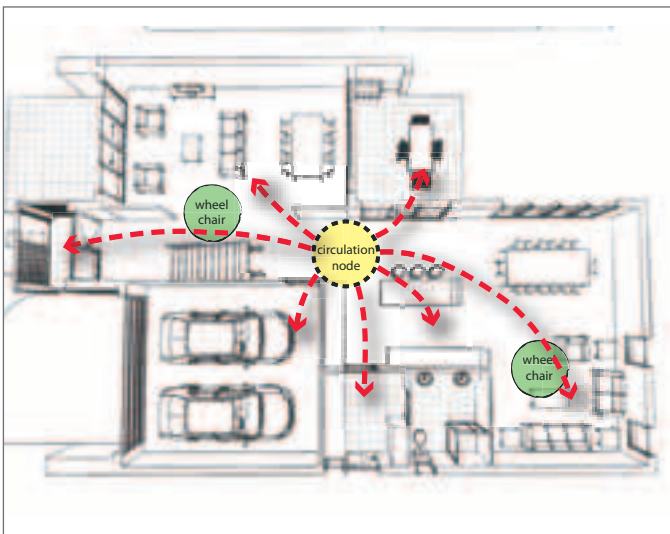


This section of the guidelines presents designs for five homes - single and double storey, attached and detached - that demonstrate the Key Design Features.

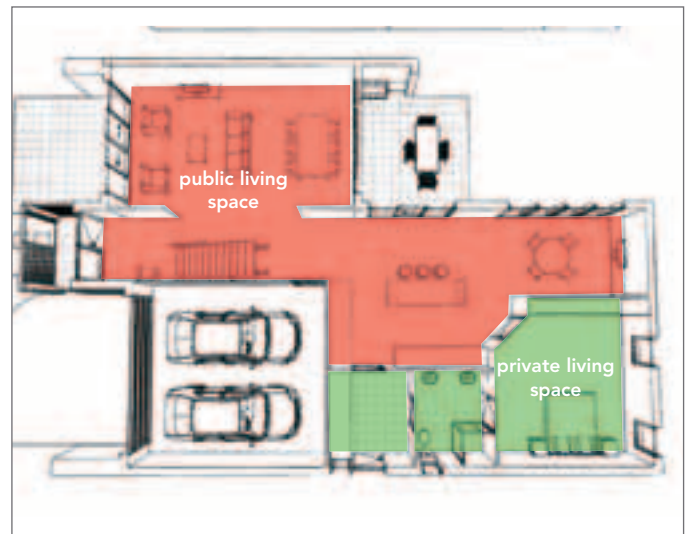
They include some innovative approaches to design for people with limited mobility.

MH1

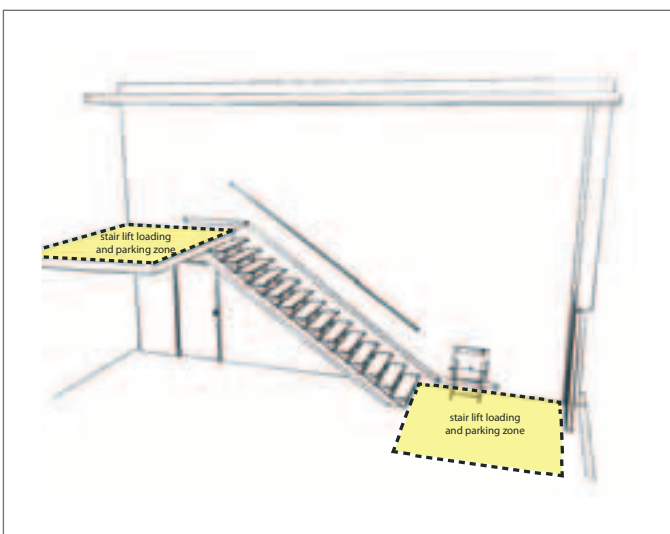
double storey detached



The entry level of this house is designed to minimise travel distances for those less mobile. A circulation node at the centre of the ground level provides direct access to living, kitchen, garage and utility areas.



Conversion of the family room to a bedroom provides for single level living at entry level. The powder room is located to be easily adapted to an ensuite. A clear demarcation between the private and public zones of the house is maintained in the adapted mode.



The straight stair allows for a stair lift to be installed in the future if required, at minimum cost. The design also allows space for a wheelchair turning circle and parking at the top and bottom landings of the stair.

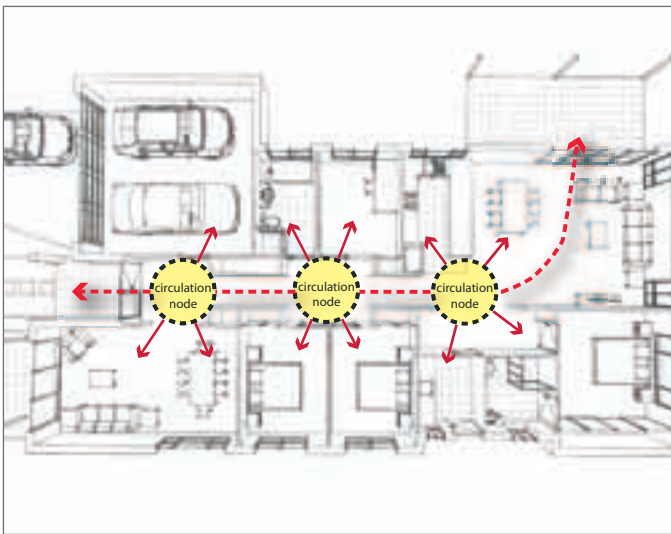


The addition of a stair lift means that the first floor of this design is also accessible for people unable to use stairs. Generous internal dimensions of the master bedroom and ensuite meet current market expectations. The shower may be modified later to achieve a fully accessible bathroom.

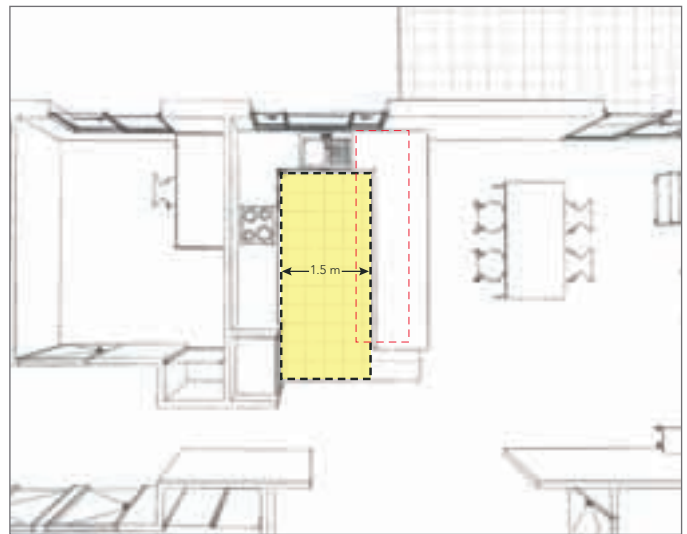


MH2

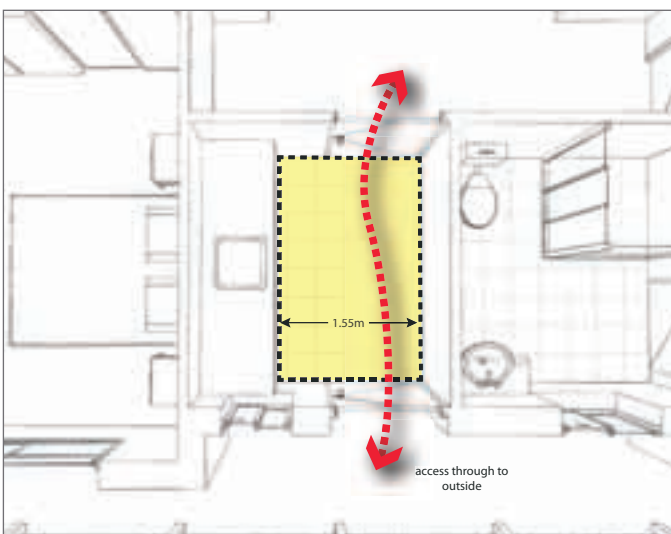
single storey detached



This house is planned around three circulation nodes. All rooms in the house are accessed from these nodes, with minimum travel distances between them. The nodes enhance the sense of spaciousness in the house.



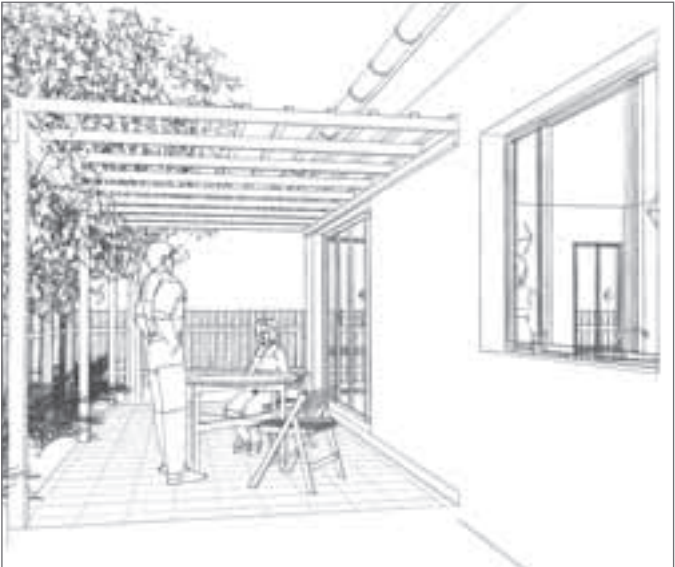
The open plan u-shape kitchen with freestanding bench (no impeding wall) allows for simple conversion. All significant kitchen fittings are located away from the island bench.



The laundry is designed to provide adequate circulation space in front of fittings and provides access to a rear yard utility area. The setback of the external wall ensures manoeuvring space outside the laundry door.

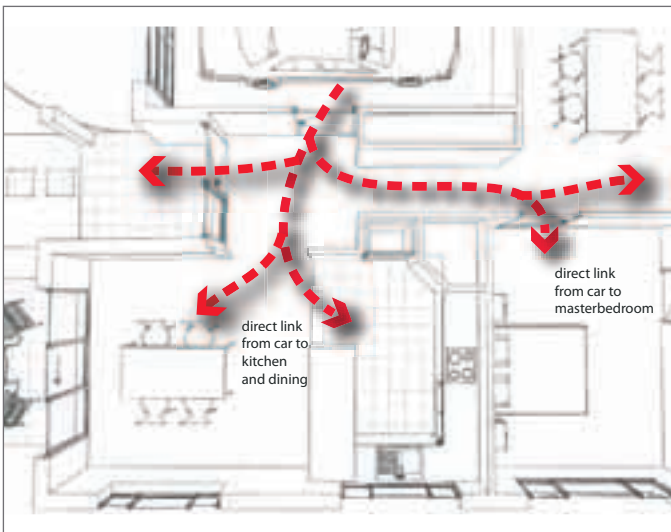


Wheelchair turning space of 2.25m diameter clear of furniture is provided in the family room. It is located centrally so that a person can be a part of the activities in the kitchen/dining area. This space provides for 'natural' participation in the living room.

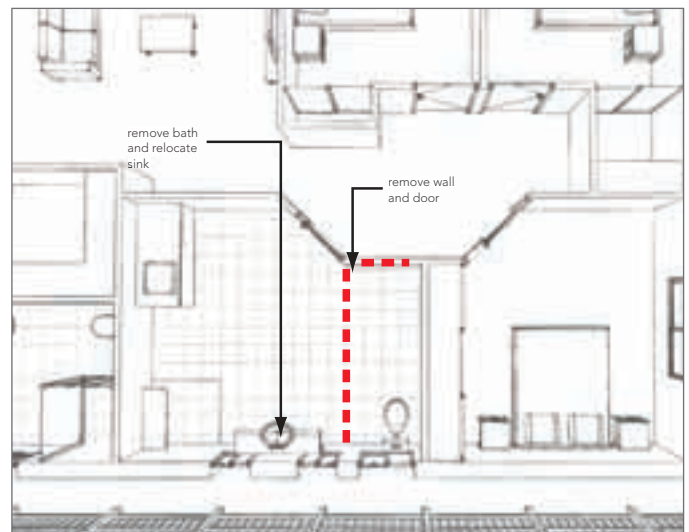


MH3

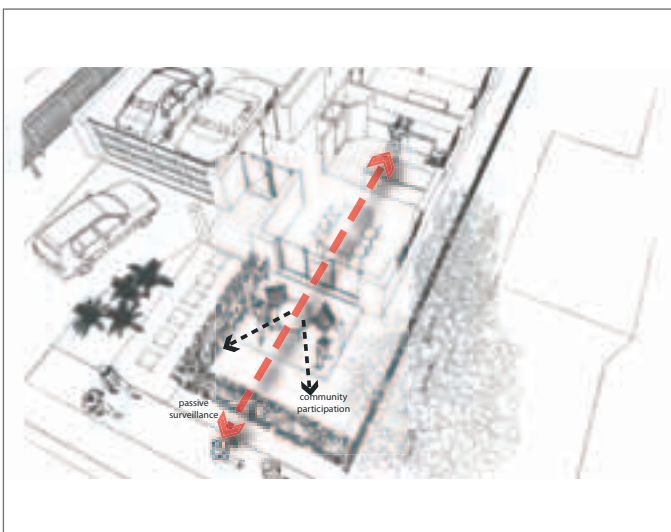
single storey detached



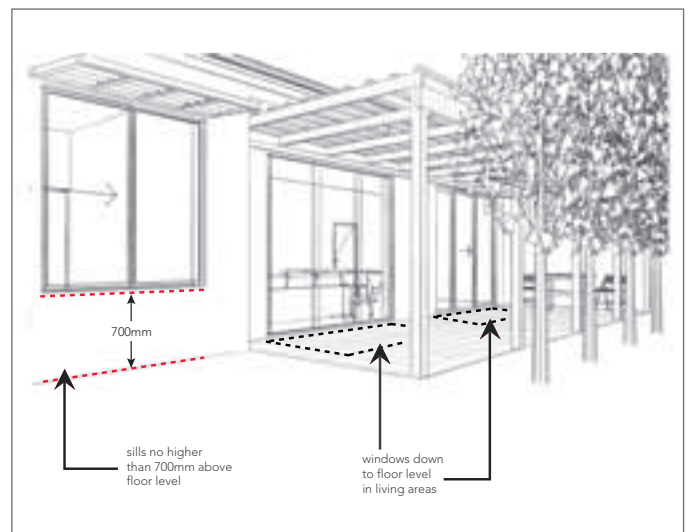
This house demonstrates a plan where all key elements of the house are adjacent to one another, to minimise travel distances and improve livability for people with limited mobility.



The house has also been designed so that the main bathroom (which includes the laundry) can be simply converted to create a fully accessible bathroom.



This house is designed to encourage community engagement enabling passive surveillance of the street from the kitchen and primary casual living area. This design also provides clear demarcation of the front yard into vehicular movement, pedestrian transition, and passive engagement zones for child and pedestrian safety.

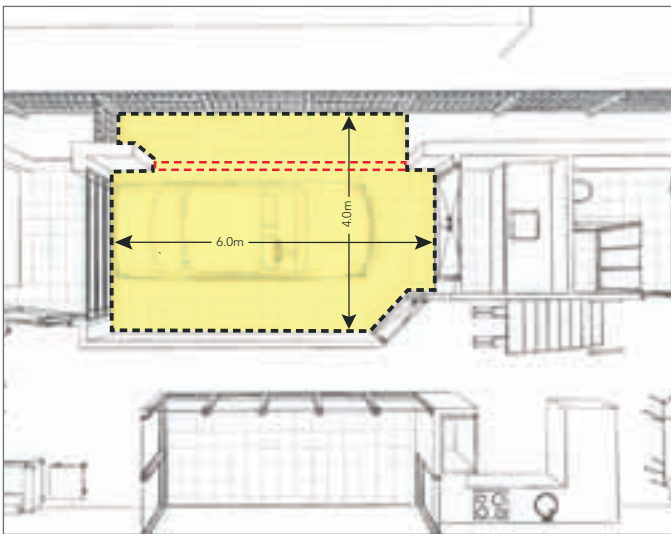


All living areas (primarily focused towards the north) have windows down to floor level. Windows in all other rooms have sills no higher than 700mm above floor level. Generally window proportions respond to orientation.

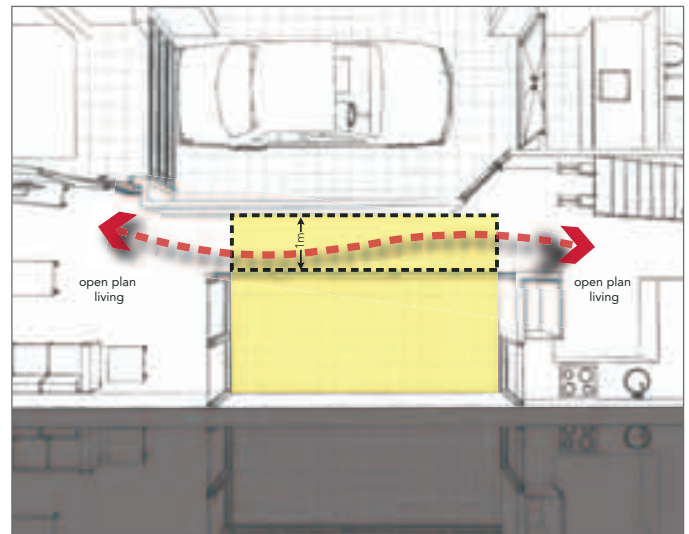


MH4

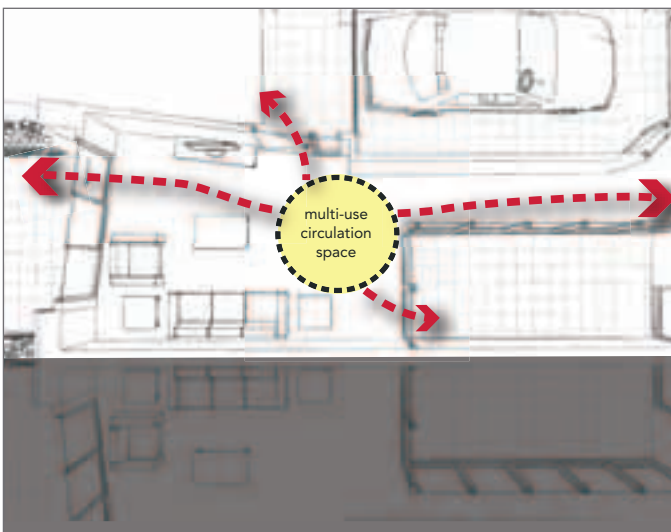
double storey attached



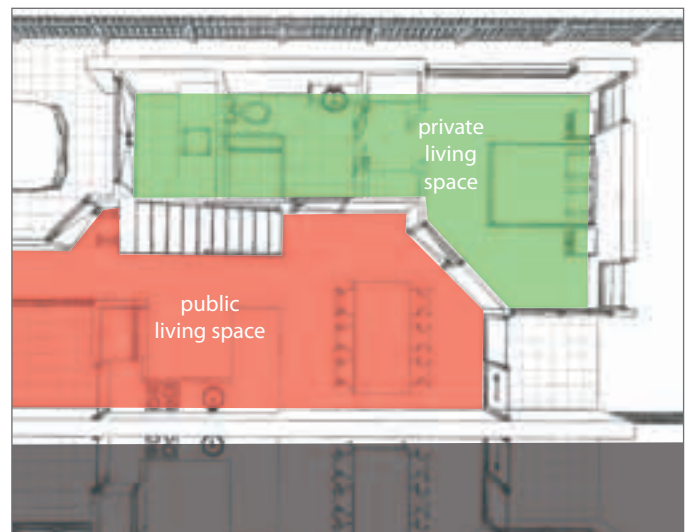
This design aims to optimise use of space on a narrow site. By removing a section of the wall, the parking space is converted from an internal garage to a secure carport and makes use of the area between the wall and the boundary to provide additional clearance around the car.



Narrow designs typically generate long corridors. Here the one long connection between living spaces is made an interesting route of travel alongside a courtyard.



The entry, hallway, living room and internal courtyard are accessed from a single node.



Future conversion of the family room to a bedroom allows for all aspects of living to take place on the entry level. This house has been designed so that, following adaption, the master bedroom and ensuite provide appropriate privacy.

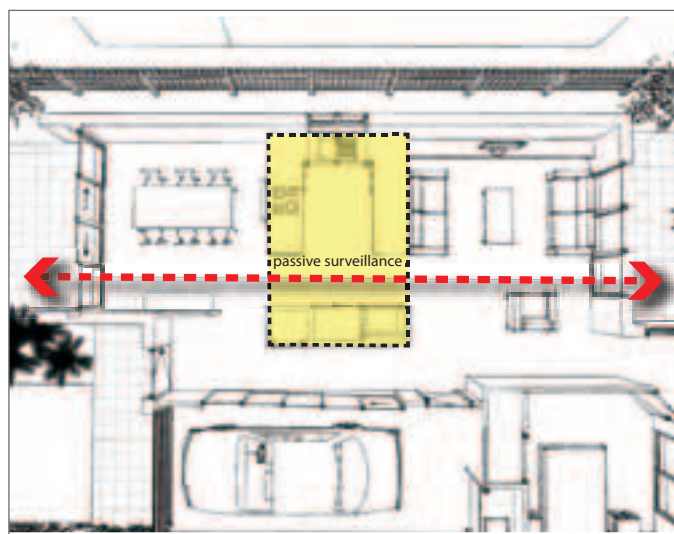


MH5

single storey attached



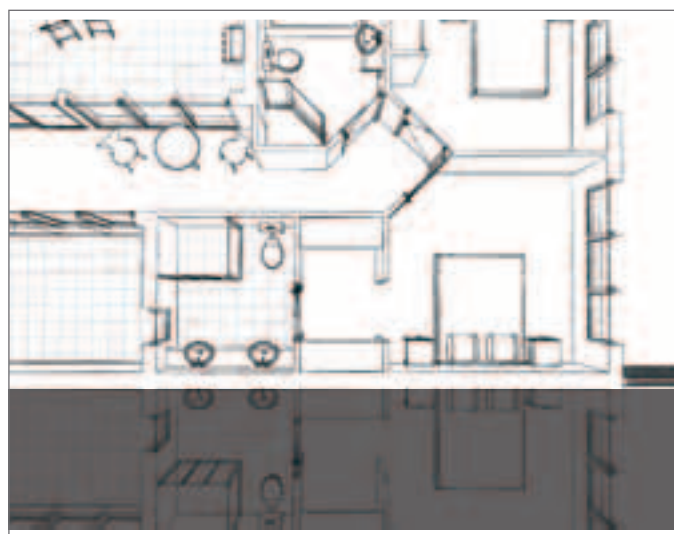
This design presents a creative solution, with circulation space shared between the garage and the laundry. This means the house is more efficient, allowing living and dining areas to be more generous.



The house also presents a modern arrangement that recognises the kitchen as the heart of the home. Being centrally located allows for passive surveillance of the street and interior courtyard.



The design also provides innovative circulation space in the garage by using large stackable sliding doors which fully open to provide extra circulation space around the car. When not required they can be fully closed.



The "destination" at the end of the corridor is a lobby from which you access the private bedrooms of the house. The layout of the master bedroom, robe and ensuite illustrate that facilities designed for accessibility do not need to look or feel institutional.



4.0

good practice extras

When Landcom was preparing its universal housing policy we separated the principles of universal housing into two categories: the Key Design Features that we believe are critical to build in up front, and other design features that are basic good practice.

Our aim is to influence the design of mainstream housing so that a greater proportion of new homes built will be suitable for older people to live in for a longer period of time. Because of this, we have focussed this document on the Key Design Features – the minimum structural and spatial requirements that cannot be changed later without major expense.

What we have defined as other 'good practice extras' are features that will make a home more flexible and practical to live in, but that can reasonably be fitted or modified later, without major expense. We have included a schedule of these features on the CD-ROM attached to this guide.

As we have said, in preparing these guidelines Landcom did not want to complicate the existing landscape by developing a 'new' approach that differed from existing standards. So, the Key Design Features and good practice extras are in fact derived from the Australian Standard for Adaptable Housing (AS 4299). The schedule of good practice extras that is attached follows the structure of AS 4299 (Class C design features) so it is easy to see the relationship between the Landcom guidelines and the Standard.



Doors with lever handles are often easier for older people to open.

references



references

The following resources and contacts may assist those using these guidelines to gain a better understanding of the principles and rationale.

Australian Standards

AS 4299 - 1995	Adaptable Housing
AS 1428.1 - 2001	Design for Access and Mobility (Part 1)
AS 1428.2 -1992	Design for Access and Mobility (Part 2)

Building Code of Australia

Independent Living Centre NSW
www.ilcnsw.asn.au

**Australian Network
for Universal Housing Design**
www.anuhd.org

**Crime Prevention
Through Environmental Design (CPTED)**
www.aic.gov.au



acknowledgements

Thank you to the people that have assisted us with these guidelines and those who have provided advice.

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TNS

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Blacktown	Randwick
Camden	Shellharbour
Campbelltown	Sydney
Gosford	Wingecarribee
Great Lakes	Wollongong
Liverpool	Wyong

Disclaimer

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CD-ROM



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