The Adaptable House

A HOME FOR CHANGING NEEDS

An Adaptable House is one which is able to respond effectively to changing household needs without requiring costly and energy intensive alterations.

When building a new house many people anticipate spending a number of years, if not decades, living in their home. Others may conceive of a shorter stay. Whatever the intention, any new home is likely to have to accommodate changing needs over its lifetime.

Australian demographics are changing rapidly with average households becoming both smaller and older, with an increasing number of people living 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 offices. 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.

Similarly, an adaptable dwelling might be designed to easily enable a reduction in size over time through the division of a large family home into two smaller housing units, offering residents the opportunity to continue living within a familiar environment.

Household needs vary over time in relation to physical capabilities. Everyone can expect to experience temporary or permanent variations in their physical capabilities in their lifetime 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 half for people aged over 60. Due to longer life spans and higher proportions of older people in our society, it is more likely that every home will be required to respond to the needs of a person with a physical limitation whether they are a primary resident or visitor.

For those with limited mobility, reduced vision or other disability, 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 for an aging or disabled occupant but a number of design approaches exist:

1. The ‘Universal House’ which is usable by as many people as possible without the need for specialisation.
2. The ‘Accessible House’ which meets the Australian Standard AS1428.1-2001 Design for Access and Mobility and is able to accommodate wheelchair users in all areas of the dwelling.
3. The ‘Adaptable House’ which adopts the idea of a ‘Universal House’ and in addition is able to be easily adapted to become an ‘Accessible House’ when required.

THE UNIVERSAL HOUSE

Universal design has been 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 specialized design. The intention being to simplify life for everyone by making more housing usable by more people at minimal extra cost.

A Universal House uses building features, fittings and products in combination to increase usability, benefiting people of all ages and abilities. For example, a doorway or passageway is more easily navigated by users of mobility devices such as walking frames, wheelchairs or even a children’s pram if it is slightly wider than typical.

With regard to fittings, people with limited hand function find screw-type sink taps more difficult to use than lever-type taps which can be used by everyone. A similar benefit is found in using lever-type door handles and rocker electrical switches; incorporating the most usable fittings at the time of construction reduces the need for later retrofitting. A Universal House will ensure rooms and services within the home are of a size and type which is usable by as many people as possible.

When homes are retrofitted with ramps, handrails, and other devices to provide enhanced usability an institutionalised appearance can result. Universal design does not propose special features for the aged or disabled but instead promotes normalised solutions to access and usability for the majority of people through the use of standard building products and practices. For example, designing an entry without the need for steps removes the need for the later addition of a ramp and handrails for wheelchair users, while improving current access for children’s prams.

THE ADAPTABLE HOUSE

In addition to being designed to be usable by most people, the Adaptable House has provision for additional modifications should they be required to meet the specific needs of an occupant. This may include the modification of kitchen joinery to meet changing physical needs, alterations to the laundry and bathroom to increase access and usability, the increase of lighting levels in response to sensory disability or the introduction of support devices such as grab rails and/or additional security measures.

Australian Standards provide guidance for designing houses to accommodate varying degree of physical ability over time.

A typical house plan (above) often requires the expensive relocation of wet areas such as bathrooms and kitchen if the house is to be extended.

Another floor plan (above) provides larger wet areas for improved accessibility, and these wet areas are located to allow for future extensions with only minor changes to the existing dwelling.

Starting with the requirement that all houses are accessible to visitors using wheelchairs these standards then require the house to be able to adapt, becoming accessible to an occupant using a wheelchair. Although the need to accommodate a wheelchair user is unlikely to be experienced in every home, space requirements are set for wheelchair use as they represent the most difficult scenario for circulation and access. By providing enough space for wheelchairs, people with walking frames, children's prams, trolleys and other equipment can be better accommodated.

AS4299 recommends that adaptable features designed into a dwelling be documented with 'before' and 'after' drawings clearly demonstrating the features which have been included. This avoids the reliance 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, this document provides useful information.

BENEFITS TO THE OWNER

The Universal House and the Adaptable House remain appropriate to occupant needs over a greater period of time. This reduces the need to relocate to alternative housing which can lead to dislocation from existing 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 quick and unexpected. It also increases the building's serviceable life span prior to 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:

> Is it likely that the house will be extended in the future?

> How might the use of space change over time?

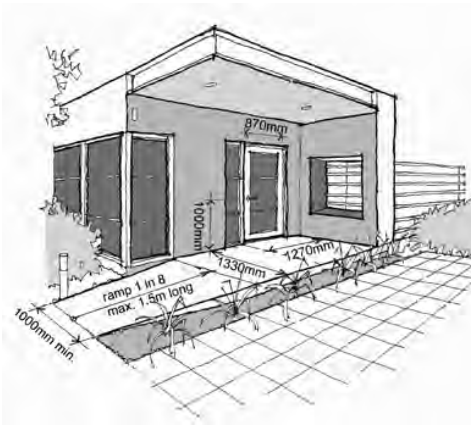
> Is it desirable for the house to be visitable by elderly or disabled friends and relatives? (if yes, then ask your designer to adopt the Australian Standard for Adaptable Housing)

> Is it desirable to make provisions for the future accommodation of an ageing or occupant or one with a disability? (if yes, then ask your designer to adopt the Australian Standard for Adaptable Housing)

Adaptable housing solutions can also be considered in smaller projects.

Minor alterations to bathroom or kitchen plans can integrate many desirable adaptable housing features with minimal additional cost, making significant savings when adaptations are required in the future.

The following section provides initial advice as to how spaces within and around a home may begin to accommodate both universal and adaptable housing principles. Essential features prescribed by the Australian Standard for Adaptable Housing (AS:4299) and required dimensions set by the Australian Standard Design for Access and Mobility (AS:1428) 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.

> 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 drop leaves causing potential hazards.

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 dimensioned for wheelchair manoeuvrability and be 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. Avoid any obstructions or level changes which limit access by a wheelchair user or provide a tripping hazard to others.

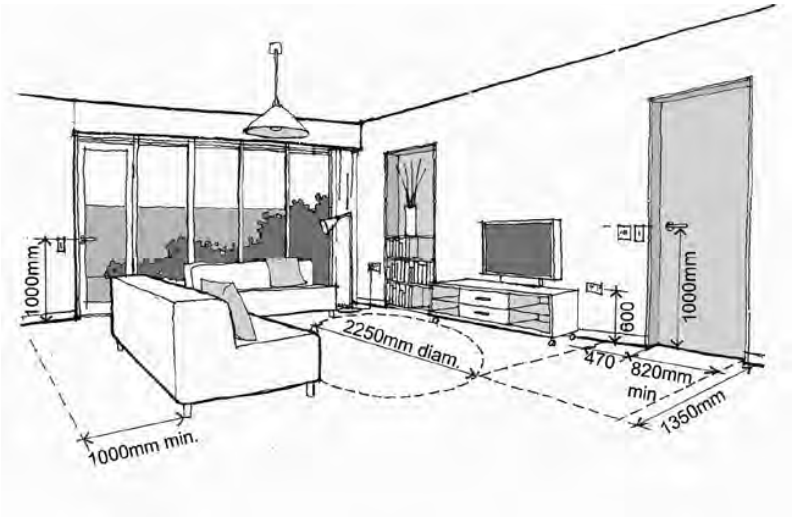
INTERIOR – GENERAL

The interior of a house should allow easy movement between spaces. Often, this simply involves a slight widening of internal doors and passageways. Ideally, easy access should be provided throughout the entire home but it may be considered necessary only in some portions of the home such as between living spaces, kitchen, bathroom and one bedroom.

Internal doors with a minimum unobstructed width of 820mm and passageways with a minimum width of 1000mm are appropriate 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. As door types and room configurations vary, reference should be made to AS:1428 for dimensions.

Electrical outlets are best located 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 light switches at each end of corridors and where spaces have more than one entry is desirable. Lighting design needs to respond to the specific uses of different spaces with an even distribution of light to avoid shadows and light fittings located over work surfaces where specific tasks are undertaken. It is advisable to ensure that lighting can be adapted to provide higher lighting levels when required due to visual limitations.

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 these need to be level and fitted with appropriate cover strips to avoid 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.

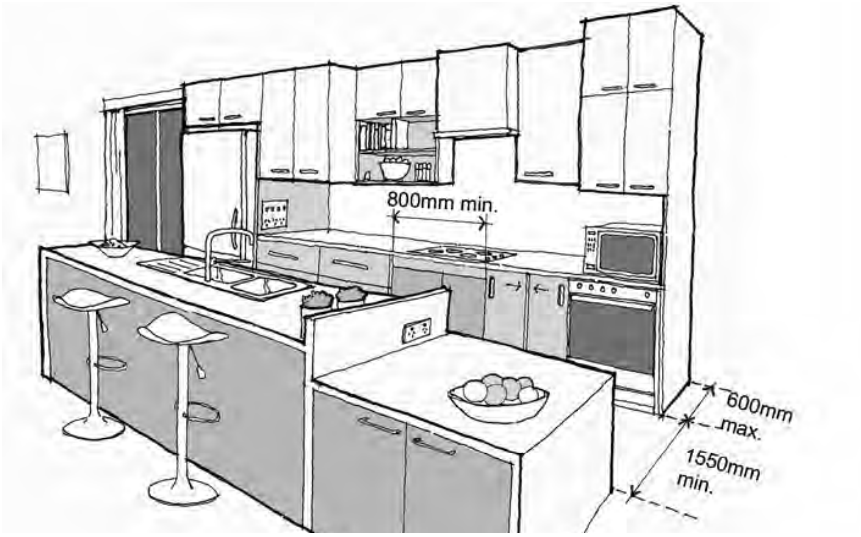
> Clear circulation space within the room of at least 2250mm diameter for wheelchair manoeuvrability.

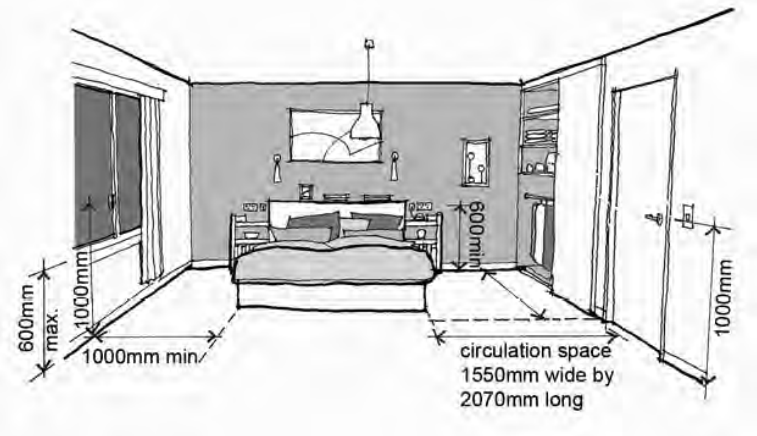
In homes accommodating an elderly or disabled resident it is advisable to provide an additional living area separate to the bedroom and main family areas which provides an opportunity for personal space. This may be located inside or outside the home in an area protected from weather.

COOKING SPACES

As a person's physical abilities change 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 even among wheelchair users people's maximum reach and strength vary greatly, as do kitchens designed specifically for individual disabled users. The design of a kitchen should not limit a person's independence and ought to be adaptable to accommodate specific individual's needs.

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 enable such changes to occur easily kitchen joinery can be installed using modular components which allow for easy removal or modification of individual components rather than the reconstruction of the entire joinery layout. Such components should be installed after the non-slip floor finish is completed to avoid replacement at a later stage.





The kitchen should also be designed with safety considerations in mind including:

> Location of appropriately sized work spaces to the side of all appliances such as the cooktop, oven, microwave and refrigerator.

> The relationship between the cooktop and the sink to allow easy transfer of pots 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 manoeuvring within the space. The location of an 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 outlet, additional electrical outlets and TV outlet are recommended to ensure maximum usability and security.

WET AREAS

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

> Adequate sizing for access and circulation.

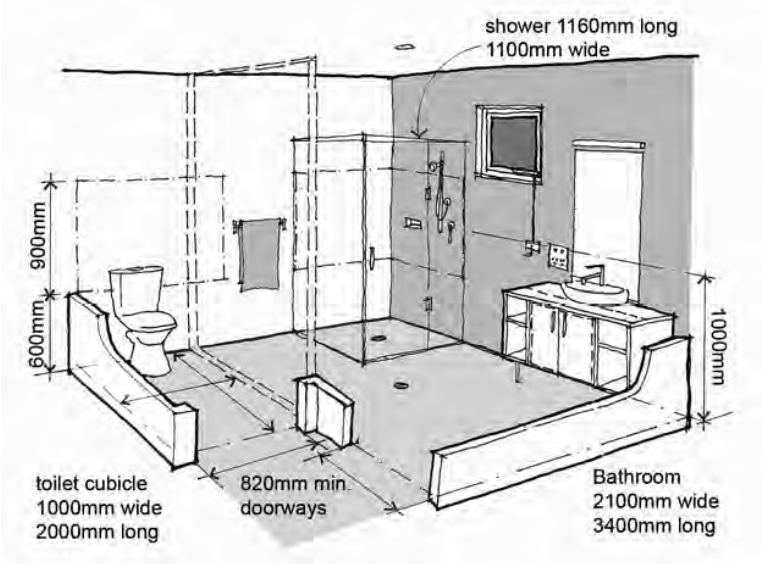
> Location of storage for easy and safe use.

> Installation of non-slip surfaces to minimise accidents.

At the time of construction either an accessible or visitable toilet should be included for use by visitors. If possible, include a bathroom that provides full accessibility for a wheelchair user, ensuring the bathroom and toilet are able to be used by residents with limited mobility or with the assistance of a carer.

If separate bathroom and toilet facilities are preferred at the time of construction an adaptable approach might be taken to achieve the same outcome, such as the use of a removable wall between the toilet cubicle and bathroom. To reduce the amount of work required at adaptation such a wall should be installed as a non-load bearing partition after the floor and wall finishes are completed. Similarly, any items such as vanity cupboards, toilet bowls, or shower screens which may require relocation or modification should not be constructed integral with the initial construction but installed 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 to provide support and stability. So that these can be installed without the need to demolish sections of wall to insert support points it is recommended that 12mm structural plywood be fixed to any stud wall framing behind the finished wall materials. When designing a bathroom remember it may be used by people either standing or seated, as this will inform leg space around hand basins and the location of items such as mirrors, electrical outlets and controls.



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

> A minimum circulation space 1550mm deep in front or beside appliances.

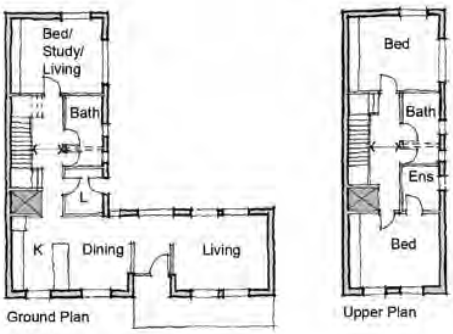
> Taps located to the side, not the back, of any laundry tub.

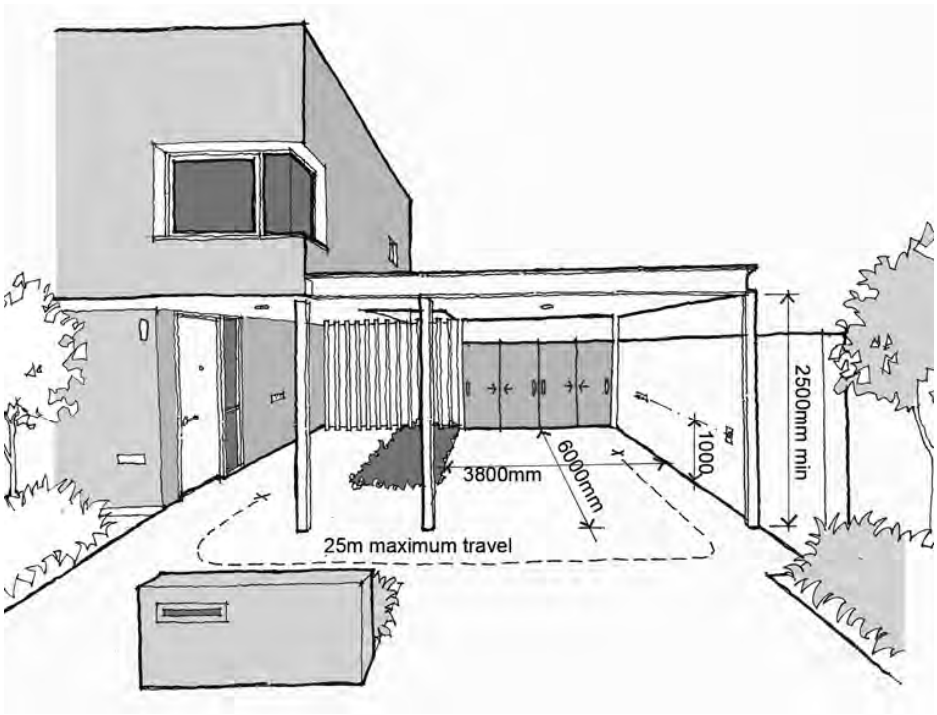
> Sufficient storage shelves at a maximum height of 1200mm.

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 providing access between living, kitchen and bathroom spaces, the inclusion of an accessible bathroom and a space appropriate for use as a bedroom on the ground floor ensures maximum flexibility.





To facilitate multi-level access, floor plans should allow for the future installation of vertical lifts or staircase lifts. A future 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 can be utilised for storage until adaptation is required. A stair lift requires ample space on top and bottom stair landings.

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 and recycling storage, letter boxes, clotheslines and garden tool storage accessible via paths, as described under 'Access and Entry'.

> Provide access and circulation space to external occupied areas such as patios and terraces as described in 'Living Spaces'.

> Provide private, sheltered areas with access to northern sun in winter that is visible from inside the home.

> Allow for raised garden beds for elderly or disabled gardeners in the initial garden layout.

> Locate car parking close to the entry with at least one covered parking space sized to enable wheelchair access.

> Make garage doors electronically operated.

> Allow future secure space for 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.

ADDITIONAL READING

Australian Standards
AS4299-1995 Adaptable House.
AS1428.1-2001 Design for Access and Mobility.

Australian Network for Universal House Design
www.anuhd.org.au

Master Builders Association (2001), *Housing for Life: Designed for Everyone*
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www.design.ncsu/edu/cud

Mace, R (1998), *Universal Design: Housing for the Lifespan of All People*, US Department of Housing and Urban Development.

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www.jrf.org.uk

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