Building for Everyone: A Universal Design Approach

All booklets from the Building for Everyone series:

Booklet 1 - External environment and approach

Booklet 2 - Entrances and horizontal circulation

Booklet 3 - Vertical circulation

Booklet 4 - Internal environment and services

Booklet 5 - Sanitary facilities

Booklet 6 - Facilities in buildings

Booklet 7 - Building types

Booklet 8 - Building management

Booklet 9 - Planning and policy

Booklet 10 - Index and terminology

Building for Everyone:

A Universal Design Approach

External environment and approach

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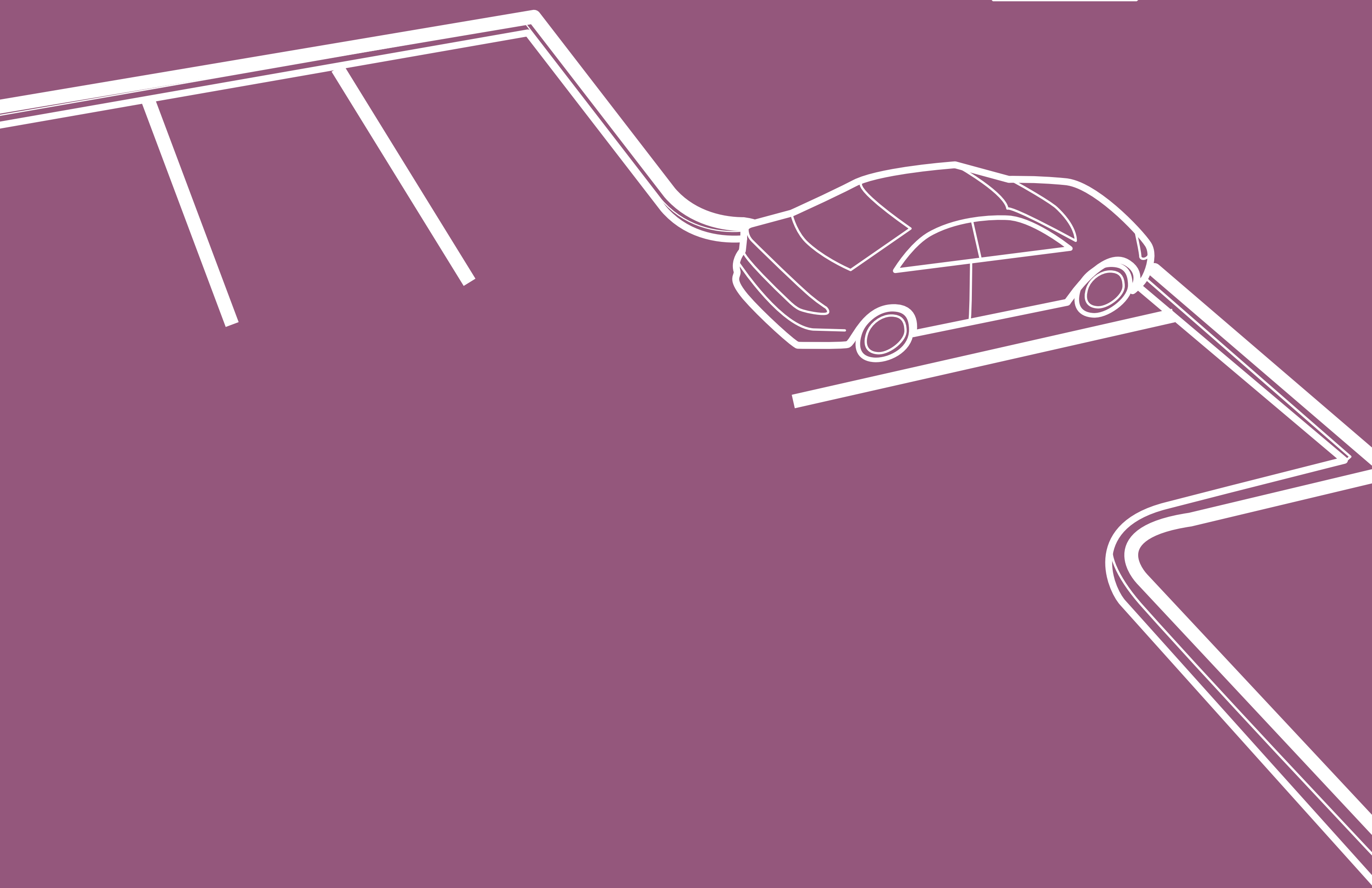

Centre for Excellence in Universal Design

Creating an environment that can be used by all people, regardless of their age, size, disability or ability.

The National Disability Authority's Centre for Excellence in Universal Design has a statutory role to promote the achievement of excellence in universal design in:

- the design of the built and external environment
- product/service design
- information and communications technologies (ICT)
- the development and promotion of standards
- education and professional development
- raising awareness of universal design

More information and updates on the website at: **www.universaldesign.ie**

Building for Everyone

Booklet 1 - External environment and approach

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1.0 Objectives

The guidance in this booklet promotes the concept and philosophy of universal design and encourages developers, designers, builders and building managers to be innovative and think creatively about solutions that meet the needs of all building users.

The objectives of the series of booklets are to:

- identify and promote best practice with regard to universal design of the built and external environment
- provide best practice guidelines while recognising existing regulations in Ireland
- provide guidelines that are usable by and accessible to the target audience
- promote the achievement of universal design in Ireland

This booklet aims to:

- identify and promote best practice for access to and understanding of the external environment and approach to buildings with regard to universal design
- increase awareness of, and encourage designers to identify, the needs of all those who require access to the external environment in order to undertake daily activities
- highlight the wider benefits experienced by all when accessible and universal design features of the external environment and approaches to buildings are provided
- encourage designers to provide universal design solutions for the external environment and approaches to buildings that look beyond the recommended requirements of national building regulations

1.1 Introduction

This booklet is part of the series "Building for Everyone – A Universal Design Approach," which aims to provide practical guidance on the universal design of buildings, places and facilities.

Universal design places human diversity at the heart of the design process so that buildings and environments can be designed to meet the needs of all users. It therefore covers all persons regardless of their age or size and those who have any particular physical, sensory, mental health or intellectual ability or disability. It is about achieving good design so that people can access, use, and understand the environment to the greatest extent and in the most independent and natural manner possible, without the need for adaptations or specialised solutions (see full definition in **Appendix A1**).

Why universal design?

People are diverse - some are left-handed and some right-handed - and vary in their age, size and functional capacities. Illness or disability (whether temporary or permanent) can also affect characteristics such as a person's mobility, dexterity, reach, balance, strength, stamina, sight, hearing, speech, touch, knowledge, understanding, memory, or sense of direction. A reference list with these booklets indicates some of the key differences in human abilities that should guide the design of buildings and of outdoor places. (See full description of Human Abilities in **Appendix A2**).

People of diverse abilities should be able to use buildings and places comfortably and safely, as far as possible without special assistance. People should be able to find their way easily, understand how to use building facilities such as intercoms or lifts, and know what is a pedestrian facility and where they may encounter traffic.

Given the wide diversity of the population, a universal design approach, which caters for the broadest range of users from the outset, can result in buildings and places that can be used and enjoyed by everyone. That approach eliminates or reduces the need for expensive changes or retro fits to meet the needs of particular groups at a later stage.

It is good practice to ascertain the needs of the range of expected users as early as possible, and to check the practicality and usability of emerging designs with a diverse user panel.

Designing for one group can result in solutions that address the needs of many others. For example:

- level entry (Step-free) entrances facilitate not just wheelchair users but also people with buggies; people with suitcases or shopping trolleys; people using walking or mobility aids; and people with visual difficulties
- larger toilet compartments provide easier access to wheelchair users; those with luggage or parcels; parents with pushchairs or accompanying small children; those using walking or mobility aids; and larger-sized people
- clear, well-placed signage that uses recognised symbols or pictograms helps people with reading or cognitive difficulties, and those whose first language is neither English nor Irish

Sometimes one solution will not suit all and a range of options will need to be provided. For example:

- providing both steps and a ramp where there is a change in level
- providing parking ticket machines that offer slots at different heights to facilitate use at standing height, sitting height, and by people of small stature

This series of booklets is for architects, engineers, planners, developers, designers, building contractors, building workers, building managers and others involved in designing, commissioning and managing buildings and their surroundings. It provides guidance on a universal design approach to all new buildings, and the use and adaptation of existing environments.

Those who commission, design, construct or manage any part of the built and made environment also have a duty of care to adhere to relevant legislation and regulations including equality legislation, building regulations and health and safety regulations.

The guidance is based on a best practice approach, drawing on up-to-date international best practice; guidelines and standards; previous guidance by the National Disability Authority; and extends beyond disability access matters to incorporate a universal design approach. The series is fully compatible with Part M (2010) of the Building Regulations and associated Technical Guidance Documents related to Part M.

A disability access certificate is required for new buildings other than dwellings (including apartment buildings) and certain other works (as set out in Article 20 D (1) of SI 351 of 2009) to which the Requirements of Part M of the Building Regulations apply, which commence or take place on or after 1 January 2012. Further details on these and other relevant standards, codes of practice, and professional codes of practice are listed in **Appendix A3** Further Reading.

The detailed guidance provided here does not represent the only possible solution. Designers may come up with other ways to meet a diversity of users. New materials and technologies that emerge may open up further possibilities of accommodating the diversity of the population.

Checklists are provided throughout the series and while they provide a summary of main considerations and technical criteria, they should not be regarded as a substitute for the main text or an exhaustive list.

A comprehensive **index** is also available for the suite of booklets.

The Building for Everyone series is available online at **www.nda.ie** and **www.universaldesign.ie**. Electronic links are provided to relevant sections in the different booklets. As standards and requirements develop, the electronic versions of these booklets will be updated.

The electronic version is produced in accessible PDF format, in accordance with the Web Content Access Guidelines 2.0. If you have any difficulties in this regard or require the document, or particular sections, in alternative formats, please contact the Centre for Excellence in Universal Design at the National Disability Authority, **info@ceud.ie** or (01) 6080400.

1.2 Terminology

Accessible design – Design focussed on principles of extending standard design to people with some type of performance limitation to maximize the number of potential customers who can readily use a product, building or service.

Access route – Any route in an internal or external environment whether it is level, gently sloped, ramped or stepped that is available and understandable for a person to use. In external environments, access routes comprise paths, pavements and other pedestrian routes, such as a right of way through a public space.

Building – A permanent or temporary structure of any size that accommodates facilities to which people have access. A building accommodating sanitary facilities may include a toilet block in a public park or shower facilities at a campsite. A temporary building may include portable toilet facilities such as those provided at outdoor events.

Building user – A person regardless of age, size, ability or disability using facilities in a building or associated external environment.

Designated car parking – Car parking spaces reserved for the use of car users with disabilities, whether as motorists or passengers.

Dropped kerbs – A lowered section of kerb between a pavement and carriageway forming a level or flush crossing point. Also referred to as dished kerbs.

Grille or grill – An opening of several slits side by side in a wall or metal sheet or other barrier, usually to let air or water enter and/or leave but keep larger objects including people and animals in or out.

Laid to falls – Paving and drainage that relies on fall to carry away water. Fall may also be referred to as slope or, more correctly, gradient. By making one part of the pavement higher than another, gravity will cause the water to move in a preferred direction.

Park and ride – The formal provision of car parking linked with either bus or rail services.

Path – A pedestrian route that has no adjacent vehicle carriageway and includes paths in countryside locations as well as paths in urban and residential environments.

Pavement – A pavement is the part of a roadway used by pedestrians and is adjacent to the vehicle carriageway.

Setting-down point – A designated area close to a building entrance or other facility where passengers can alight from a car or taxi.

Soffit – The underside of any construction element, the underside of a flight of stairs.

Step nosing – The leading edge of a step or landing.

Street furniture – Items located in street and other pedestrian environments such as lamp posts, litter bins, signs, benches, and post boxes.

Tactile paving surface – A profiled paving or textured surface that provides guidance or warning to pedestrians with visual difficulties.

Universal Design = Useable = Understandable - Understanding user needs – For example an older person may require many resting places due to discomfort when walking for long distances.

1.3 Design Issues

1.3.1 Topographical constraints

Creating an accessible and understandable external environment is potentially the most challenging task facing designers due to constraints posed by the natural landscape and spatial limitations of the existing built environment.

Designers have limited influence over the natural topography of an area and must seek to optimise accessibility and understanding through the creative placement of routes and features.

This involves strategic thinking during the earliest design stages to ensure, for example, pedestrian access, that routes and building entrances are positioned to provide convenient access with minimal changes in level. Building entrances that are raised to a podium level for the purpose of enhancing visual impact and site presence are likely to be less convenient to access and may present a barrier to some people.

Designers of road and street environments are often constrained by the location and arrangement of existing buildings and road layouts as well as the existing topography, but must ensure that pavements and access routes are safe, convenient and understandable for everybody to use, whether as pedestrians, motorists or passengers. Where there is a sloping site, level access should be provided at various points to ensure barrier-free access for all. Please note that travel distances should be minimised where possible.

1.3.2 Safety and convenience

The design of vehicular environments, such as car parks and setting-down points, must honour the needs of motorists and pedestrians, but above all, provide environments that are safe for all to use.

Car parking facilities should be sufficient for the expected level of use and include spaces for people who require proximate access to the building or facility served by the car park. For example: older persons, parents with young children, or deliveries.

The design of pedestrian environments should be easy to understand, logical and consistent. This will help people who use an environment regularly to memorise a route and to develop a mental map of the area. It will also help people who encounter an area or route for the first time. Well-designed features will help guide and orientate a person and provide a degree of predictability within an environment.

1.3.3 A balance of needs

In some situations, the provision of a particular feature in the built environment may benefit some people while presenting a potential hazard or inconvenience to others. Where this is the case, the needs of all people should be considered and a balance achieved in the final design. Safety for pedestrians and road users should be the priority in all situations.

Raised kerbs are an example of a common feature in the external environment that is particularly useful to people with visual difficulties, because they provide a physical indication of the pavement edge. However, raised kerbs cannot easily be traversed by wheelchair users; parents with strollers; guide dog users; people with visual difficulties; and those with walking aids. At crossing points, it is accepted that kerbs have to be level or flush with the carriageway to meet the needs of all pedestrians. The location of dropped kerbs should match on both sides of the road. In such instances, the use of a tactile paving surface can be used to warn of the absence of a kerb and to guide pedestrians with visual difficulties in the direction of the crossing.

Image 1.1 Example of a man pushing a stroller along a city pavement. The pavement is wide and provides good space for pedestrians of all ages, sizes, abilities or disabilities.

Tactile paving surfaces themselves, however, can present a tripping hazard and may be uncomfortable for some people to stand on or walk across. People who have increased sensitivity in their feet may find it extremely difficult to cross. Wheelchair users; parents with strollers; guide dog users; people with visual difficulties; and those with walking aids may also find it difficult to traverse due to the uneven surface.

If used incorrectly, such as in situations for which it was not designed or in an incorrect configuration, tactile paving can be a risk to people with visual difficulties by conveying the wrong information.

Wherever possible, the pedestrian and roadway environment should be designed in a logical manner so that it is easy for everybody to understand and to limit the need for tactile paving surfaces. Also the location of dropped kerbs should match on both sides of the road.

Good lighting is essential for people with visual difficulties, but also improves safety and usability for everyone. Access routes that have a generous clear width and are free of obstacles enable two wheelchair users or parents with strollers to pass, and provide sufficient space for a person to walk with the support of sticks or a frame. They will also provide space for people to walk alongside each other, such as parents with young children. Designing with consideration for all people will achieve external environments that are universally designed, safe, and easy for everyone to use as independently as possible.

Checklist - Design issues
• Consider access routes, levels, gradients and site layout at earliest design stage.
• Locate car parks and access routes to promote safety and convenience.
• Ensure pedestrian environments are logical and clear to understand.
• Match dished kerbs on opposite sides of the road at crossing points.

1.4 Vehicular Environments

1.4.1 Car park provision

Car parks should be accessible, easy to use, and should provide sufficient parking spaces within a well-designed environment to meet the needs of all people expected to use them. The provision of an adequate number of off-street parking spaces should discourage indiscriminate parking, which can obstruct access and make the roadway environment hazardous for everybody.

Wherever car parking facilities are provided, they should consider the needs of all car users, including parents and carers with young children; people who need to load and unload goods and shopping; people who may not be able to walk very far or carry goods over a long distance; people with visual difficulties; people with hearing difficulties; and people who use larger vehicles such as vans with rear hoists that enable wheelchair users to travel while seated in their wheelchair.

The provision of designated spaces for car users with disabilities is commonplace within all car parks, and the section below includes guidance on the recommended number, location, size, and characteristics of such spaces. The provision of parent and child parking spaces in car parks serving shopping developments is also now accepted good practice. Less common is consideration of the needs of people who require larger bays, proximate parking and easy access, but who are not entitled to use designated spaces or parent and child bays.

In many locations, the criterion for occupying a designated car parking space is that the driver or a passenger in the vehicle is the holder of a parking permit, such as a Disabled Parking Permit. This precludes access by people who are temporarily injured; pregnant women; people who are unwell; and people who are not able to walk long distances due to a medical condition but who are not otherwise holders of a Blue Badge parking permit.

Designers and developers should consider the needs of everybody likely to use a car park and provide facilities that are convenient and safe for all.

Checklist – Vehicular environments

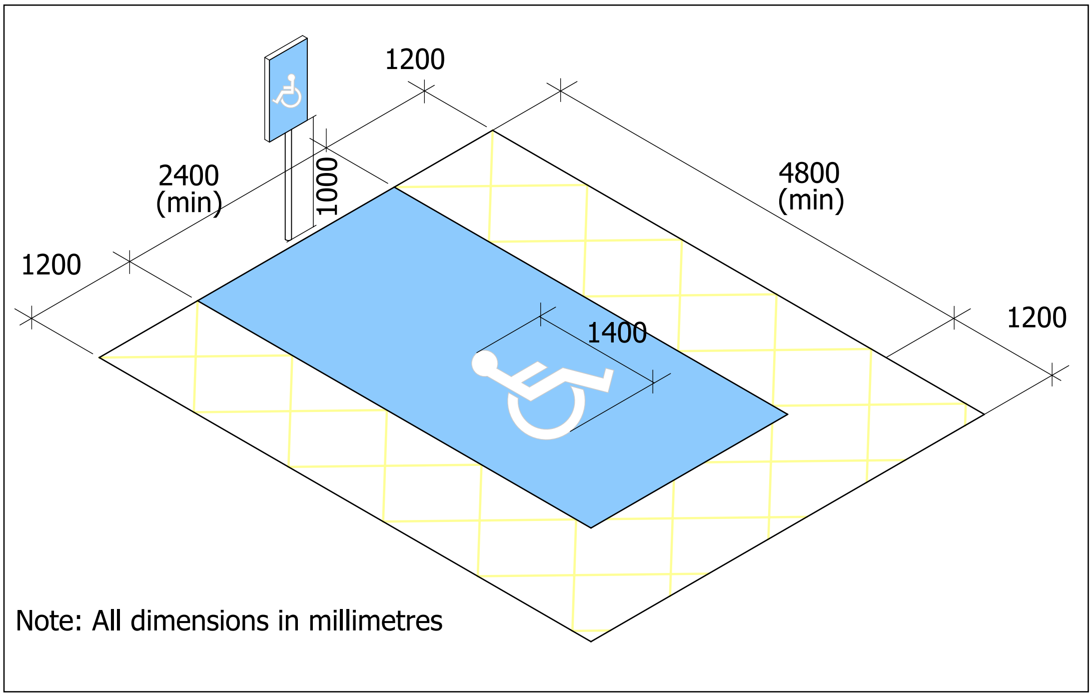
- Ensure adequate parking facilities for the expected number of car users.
- Provide designated parking spaces and parent and child spaces.
- Supply suitable spaces for other people who need large bays and proximate parking.

1.4.2 Car parking spaces

Standard head-on (perpendicular) car parking spaces are typically 2400mm wide x 4800mm long and in-line (parallel) parking spaces 2400mm wide x 6100mm long.

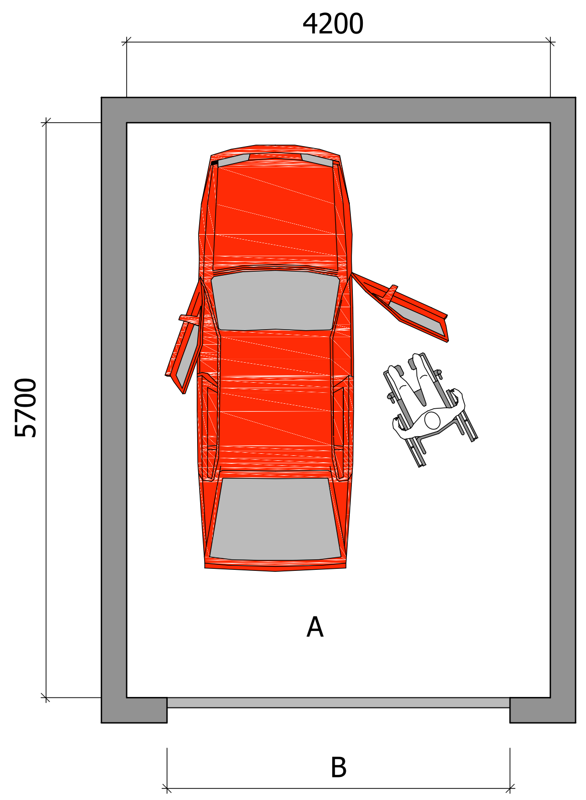
When configured in rows or alongside a boundary or street, these dimensions serve to accommodate as large a number of vehicles as possible, irrespective of vehicle size or the ability and needs of the occupants. While there will always be a need to maximise car park capacity within the constraints of a site, this should be balanced with the provision of spaces that offer opportunities for easier access, ease of understanding, and useability.

Figure 1.1 Example of perpendicular parking.



Wherever possible, a number of car parking spaces that are larger than the standard dimensions should be provided to make it easier for people who drive larger vehicles; for people who need to load or unload via side doors; and for people who need more space to conveniently get in and out of a car. Creative and efficient planning of a car park should enable some larger bays and safe access zones to be provided without unduly compromising the overall capacity.

Figure 1.2 Example of enclosed parking space. Image shows an example of why side space is needed for accessible parking spaces.



Key

A. Space for wheelchair access at the rear of the vehicle

B. Full width door opening provides flexibility in positioning the car within the space and therefore allows wheelchair transfer from either driver or passenger side

Note:

- An increase in width of 750mm is required if both driver and passenger are wheelchair users
- All dimensions in millimetres

All car parks should incorporate designated spaces for car users with disabilities. Car parks should be arranged so that designated spaces are located as close as possible to the building entrance or facility they serve and preferably within 25m. Where this is not possible, a covered path with seating at intervals is beneficial.

Where provided, parent and child parking spaces should also be located close to the entrance or relevant facility, but with priority given to the designated spaces for car users with disabilities. The route between the designated spaces and ‘parent and child’ spaces and the building or facility should be accessible, understandable and safe to use.

Image 1.2 Example of the importance of providing space to the side of an accessible car parking space.

Image 1.3 Example of an accessible parking space.

Image 1.4 Example of insufficient accessible parking spaces. Please note the lack of a post-mounted sign with the international symbol of access fixed to it and the lack of dropped kerbs.

Image 1.5 Example of an accessible/designated car parking space.

In large car parks, such as those serving shopping malls, designated parking spaces and parent and child spaces should be provided close to entrances, lifts and walkways in any adjoining multi-storey car parks.

In transport terminals such as railway stations and airports, short- and long-term designated parking spaces should be provided close to the building entrance. Where there are several terminals such as in large airports, designated parking spaces should be provided close to the entrance of each terminal.

1.4.3 Car parking signage

Image 1.6 Example of the international symbol of access.

Image 1.7 Example of an accessible/designated car parking space sign.

Image 1.8 Example of an alternative accessible/designated car parking space sign.

Image 1.9 Possible accessible parking signage that could be used in conjunction with the pole-mounted version.

1.4.4 Designated car parking spaces

The number of parking spaces to be designated for car users with disabilities depends on the building type. The following guidelines are recommended:

For shops, leisure and recreational facilities and other buildings to which the public has access: 6% of the total capacity plus one space for each employee with a disability who is a motorist. Four percent of the total capacity should be given to enlarged spaces 3000mm x 6000mm. Also, at least one space, 4800mm x 8000mm, for larger vans should be included.
For buildings not normally visited by the public, such as offices and other places of work: 5% of the total car parking capacity. Five percent of spaces should be provided for accessible car parking spaces and 5% should be provided for larger vans (enlarged spaces).

Premises used by a high proportion of people with disabilities need a larger than required number of designated spaces. The parking requirement for such building types should be calculated in relation to the anticipated demand.

Car parking should be laid out in a uniform order, clearly distinguishing between parking and pedestrian areas. Large, featureless car parks may disorientate some people with visual difficulties, therefore it is advantageous to incorporate features to aid orientation such as pathways, planting and tactile surfacing

Car parking spaces designated for car users with disabilities and parent and child spaces may be arranged perpendicular or parallel to a path, pavement or other walkway.

The design criteria set out below is applicable to both types of space. A perpendicular arrangement is characteristic of off-street parking facilities such as large car parks and parallel parking more typical of on-street parking spaces. In both arrangements, there should be sufficient space for a person to alight from a car and to safely move around parked vehicles to an accessible, understandable and useable pedestrian route.

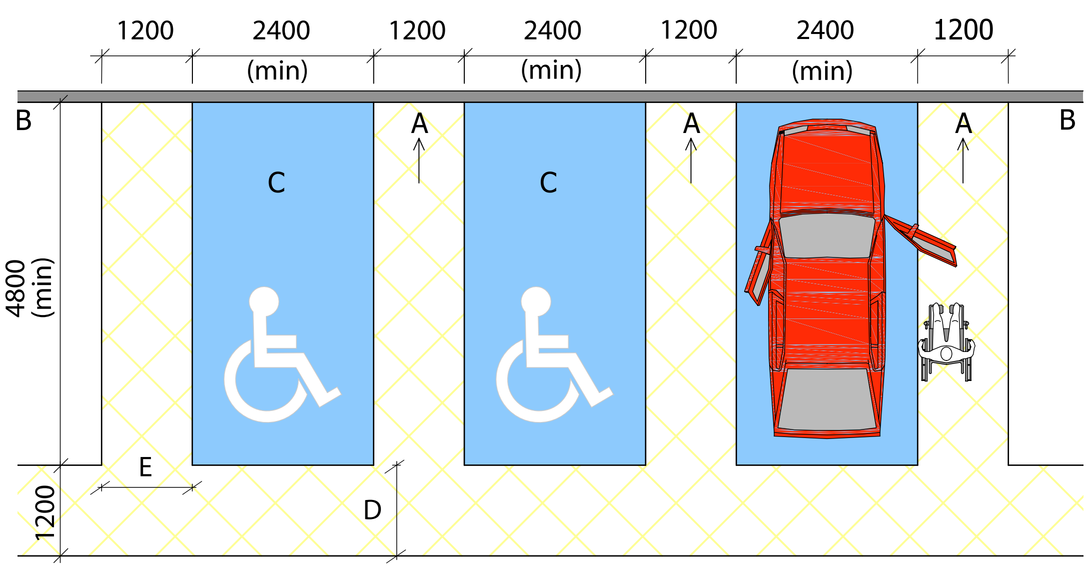
Designated accessible parking spaces and parent and child spaces should be clearly marked both on the roadway surface and with a post- or wall-mounted sign at the end of the bay. Roadway markings are insufficient on their own as they are not easy to see when the bays are in use and can be covered by snow or leaves.

Post- or wall-mounted signs should be at least 300mm wide x 450mm high and positioned 1500 to 2500mm to the centreline from ground level. Painted roadway symbols should be at least 1400mm in plan height.

The location of designated spaces and parent and child spaces should be clearly signed from the car park entrance.

Signage indicating the location of designated spaces should incorporate the International Symbol of Access.

Figure 1.3 Off-street designated parking spaces.



Key

A. Preferred access route with dropped kerb or level access avoiding travel behind parked cars
B. Dropped kerb or level access
C. Standard 2400 (min) x 4800 (min) designated parking space
D. 1200mm wide safety zone for boot access and cars with rear hoists, outside the trafic zone
E. 1200mm wide marked access zone between designated parking spaces

Note: All dimensions in millimetres

(Extract from Department of Transport, UK 'Traffic Signs Manual'). Off-street (perpendicular) designated parking spaces should be 2400mm (min) wide and 4800mm (min) long, with a layout based on **Figure 1.3. ** Each space should have a recommended 1200mm clear access zone to both sides and the end of the space.

Adjacent spaces may share a side-access zone. The access zones to the side of the space enable car doors to be fully opened and drivers and passengers, including infants carried in removable car seats, to transfer in and out of the vehicle without being obstructed by an adjacent car. The access zone to the end of the space provides a safe area for access to the car boot and for cars with rear hoists.

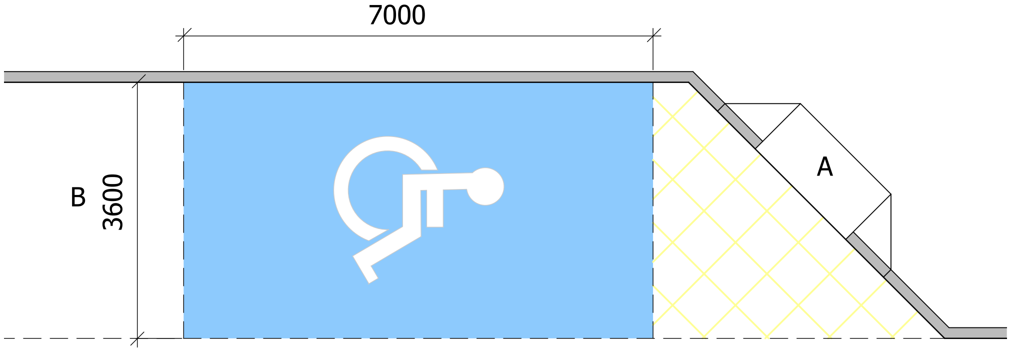
On-street (or parallel) designated parking spaces should be 7000mm in length, with a layout based on **Figure 1.4**.

These dimensions enable a driver or passenger to safely transfer in or out of a car where there is passing traffic and to access the rear of the vehicle using a ramp or tail lift.

On-street bays should be located where the road gradient and camber are no greater than 1 in 50. A steeper camber may present difficulties to people using a side lift in their vehicle to facilitate transfer to a wheelchair.

Image 1.10 Woman using an electric scooter that can be loaded into a modified vehicle. This image indicates the importance of providing adequate space for accessible car parking spaces. This extra space would also be useful for parents loading strollers and buggies into a vehicle.

Figure 1.4 On-street designated accessible parking space and parent and child parking spaces.



Key

A. Dropped kerb (with blister tactile paving)
B. Allows safety zone on kerb or street side

Note: All dimensions in millimetres

Note: Where designated parallel parking bays are provided in series, or in combination with standard parking bays, an additional 2000mm buffer zone should be provided at the rear of the designated space. The length of the designated parking bay may be reduced to 5800mm long in this instance. (Extract from Department of Transport 'Traffic Signs Manual').

When parking in on-street parking spaces, some people, either by preference or necessity, will have to transfer into and out of a car directly onto the pavement. This can be very difficult if the kerb is high, as the person has to raise and lower themselves over a greater height.

Transfer for wheelchair users is also more difficult as it necessitates lifting a wheelchair out of the car up onto the raised pavement level, and then the person raising themselves up onto the wheelchair from the car seat. In some situations, particularly where the pavement width is restricted, it may be appropriate to lower the pavement to road level for the full length of the parking space. There should be no street furniture obstructing egress on the pavement side.

Where designated bays are at a different level to an adjacent path or pavement, a dropped kerb should be provided to facilitate easy access for wheelchair users. A dropped kerb should incorporate the appropriate tactile marking, as **Section 1.5.6**.

All parking spaces should be firm, level and even, with no variation in surface profile exceeding 5mm. A 1-in-50 maximum cross-fall gradient is acceptable where necessary to ensure water run-off. An uneven surface or an inclined bay makes transfer into and out of a car very difficult and may present a hazard to some pedestrians.

Checklist – Car parking
• Provide designated car parking spaces and parent and child spaces as close as possible to building entrance or facility.
• Ensure the route between the car park and the entrance to the building or facility is accessible and easy to understand.
• Provide clear signage to highlight location of designated parking spaces within the car park.
• Include roadway marking and wall- or post-mounted signs for all designated spaces.
• Ensure off-street spaces are 2400mm (min) x 4800mm (min) with 1200mm-wide access zones to both sides and end of space.
• Provide on-street spaces 3600mm wide x 7000mm long.
• Be careful that no street furniture is obstructing the pavement side.
• Supply level or flush access route away from vehicles.
• Provide firm and level surface with cross-fall gradient not exceeding 1 in 50.

1.4.5 Multi-storey and underground car parks

Designated car parking spaces should be provided for drivers and passengers with disabilities as in all car parks. Where the car park serves a shopping development, parent and child spaces should also be provided.

Designated spaces and parent and child spaces should be on the most convenient level and at the most convenient position for entrance and exit to the building or environment they serve. The spaces should be located adjacent to street or lift exits so that exposure to exhaust fumes is minimized.

Multi storey and underground car parks should be designed with adequate passive ventilation. Where this is not possible mechanical ventilation may sometimes be required.

Image 1.11 Example of designated accessible car parking space.

Image 1.12 Example of alternative designated accessible car parking space.

Image 1.13 Example of designated car parking spaces for users with disabilities and their proximity to entrance to shopping centre.

Image 1.14 Entrance to shopping area.

In underground car parks, the route from the car park to the building entrance should be accessible and easy to follow by all car users.

Where a passenger lift serves car parking above or below the main entrance level, direct access should be provided to the building at all levels. This is to avoid having to transfer into an alternative lit at ground floor or other level.

Clear signage should be provided to highlight the location of designated parking spaces; parent and child spaces; ticket machines; lifts; any storey or final exit; and the building entrance, where appropriate.

Image 1.15 Example of car parking signage.

Image 1.16 Example of information provided on electronic displays that can be updated frequently.

Image 1.17 Designated spaces with adequate vertical clearance.

The vertical clearance to a vehicle height barrier, through the car park to the designated parking spaces and to the exit should be at least 2600mm to enable access by high-top conversion vehicles. Projecting elements such as signs and lighting should be taken into account and should not intrude into the 2600mm clear space. In existing car parks, if this clearance cannot be maintained, drivers should be given sufficient warning of height restrictions before they enter the car park and directed to a suitable alternative car parking space.

Image 1.18 Example of car park ticket pay stations with different heights of ticket slot.

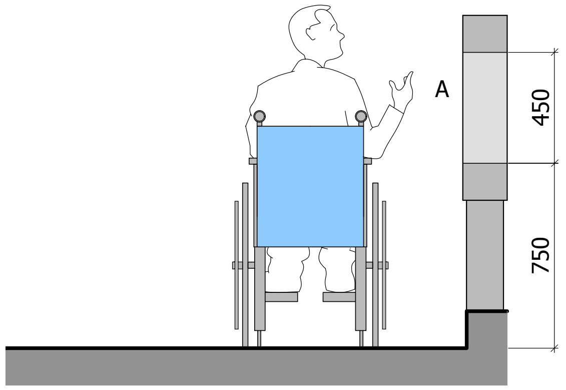
Checklist - Multi-storey and underground car parks
• Locate designated parking spaces in a convenient location in relation to entrance and exits.
• Ensure car park levels are served by lifts providing access to all floors.
• Provide a vertical clearance of 2600mm throughout car park.
• Make sure ticket dispensers are conveniently located, accessible, understandable and useable by all motorists.
• Include intercom and visual display for all ticket machines.
• Make prepay ticket machines (before return to car) available in different heights to accommodate wheelchair users or shorter people.

1.4.6 Paid parking

Ticket dispensers should be accessible as well as easy to use and understand by everyone.

Where ticket machines are provided for pedestrian approach (as opposed to machines reached while in the vehicle), the ground surface should be level and free of obstructions and provide a clear area at the front of the machine of at least 1850mm depth and 2100mm width and the height of the ticket machine should take into account persons of different heights including those using a wheelchair, as illustrated in **Figure 1.5**.

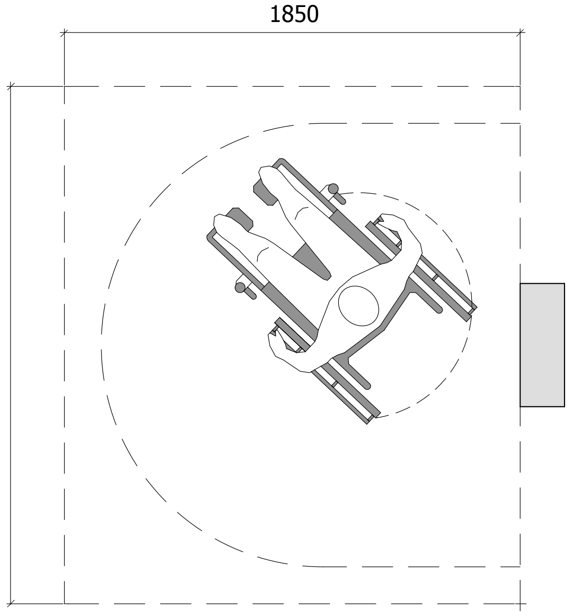
Figure 1.5 Ticket machine.



Key

A. 50mm high zone for control buttons, coin slot and ticket release

Note: All dimensions in millimetres



If ticket machines are mounted on a plinth, the edges of the plinth should not project beyond the face of the machine as this can make approach difficult for wheelchair users.

Coin and card slots, buttons, ticket release slots, and other controls should be positioned within the range 750mm to 1200mm above ground level and should contrast visually with the surrounding surface. Instructions should be clear and logical, incorporating symbols or diagrams in addition to text, where possible.

Ticket machines at car park entrances and exits that are designed to be reached from inside the car can present difficulties to some people and a bell or intercom should always be provided so that a motorist can call for assistance from a member of staff. Tickets should be available for purchase without leaving the car, they should also be made available in advance online and should be able to be changed through the internet. For more guidance on public access terminals please see the National Disability Authority's 'IT Accessibility Guidelines' at www.accessit.nda.ie

Image 1.19 Example of ticket machines at two heights.

If payment is made to a member of staff at a car park exit, a visual display of the transaction amount should always be provided and the counter should be reachable. In car parks where tickets are pre-paid before returning to the car, notices to this effect should be obvious.

Where a car park is provided for a specific venue or facility and car park staff are available, a means of communication such as a direct-line telephone with a text capability for users with hearing difficulties should be provided to enable motorists to gain assistance if required.

Image 1.20 Example of assistance via an intercom system for car park users.

Image 1.21 Example of ticket machines located within easy access of entrance to and from the car park.

1.4.7 Setting-down points

Setting-down points provide a suitable location for passengers to alight from a car close to the principal entrance of a building. People who need to be dropped off as close as possible to a building might arrive via taxi, a dial-a-ride service, or in another person's car. A setting-down point will enable this to happen.

Setting-down points should be provided in addition to designated car parking spaces. Setting-down points are essential where designated parking spaces cannot be provided close to the building.

Wherever possible, setting-down points should be covered to provide protection from the weather. A canopy height of 2600mm to the underside of the canopy facilitates access for most passenger vehicles.

Setting down areas should be easily located. If necessary, signage should be provided.

Setting-down points should be flush with the roadway surface to enable easier transfer to and from cars and taxis. Where the road and footway surfaces are flush, the appropriate tactile markings should be used for the benefit of people with visual difficulties, as **Section 1.5.6**.

Setting-down points should be level with a firm, even surface. Items such as manhole covers, dished gullies, and grilles should be avoided in the area where people will be transferring into and out of vehicles as they can impede access and may present a trip hazard to some people. Where grilles or mesh covers are laid, the mesh size should be maximum 10mm x 20mm. The long side of the mesh should be used in the direction of travel for easier use by guide dogs.

In venues where local bus services provide on-site access close to the building entrance, such as at some supermarkets and shopping malls, an area of raised kerb should be provided adjacent to the setting-down point. The area of raised kerb will make it easier for people who need to use a ramp in order to board a taxi or bus, or who need to step up into a high-floor minibus.

Setting-down points should not obstruct circulation routes. Transfer directly onto a footpath should be avoided unless the footpath is at least 2000mm wide so that other people are not obstructed.

Checklist - Setting down points
• Provide setting-down point close to building entrance.
• Ensure a canopy height clearance of 2600mm.
• Make sure the road surface is flush with the path or pavement, with the appropriate tactile surface.
• Avoid dished gullies, grilles and manhole covers.

1.4.8 Taxi ranks

Taxi ranks should be provided in association with railway, coach and bus stations; adjacent to major visitor attractions and shopping malls; and in appropriate town and city centre locations. Where taxi ranks serve a specific venue, they should be located as close as possible to the entrance and be clearly signposted, both within the venue and outside.

Taxi ranks should be orientated so that passengers can alight and board on the nearside of the taxi. Pavements should be at least 4040mm wide to allow adequate space for a wheelchair user to manoeuvre and for a wheelchair ramp, which can extend 2000mm from the side of the vehicle.

When designing a taxi rank, consideration should also be given to parents with strollers; guide dog users; people with visual difficulties; and those with walking aids when designing a taxi rank.

A pedestrian crossing-point with dropped kerb and the appropriate tactile markings should be provided close to the taxi rank. (See **Section 1.5.6** for tactile surfaces.)

Wherever possible, queuing areas should be undercover and incorporate seating, or provide seating close by.

Image 1.22 Example of a well-lit accessible taxi rank with seating for those waiting.

Checklist - Taxi ranks
• Provide taxi ranks in appropriate locations.
• Orientate taxi ranks to enable passengers to alight and board on the nearside of a taxi.
• Ensure pavement width is 4040mm to allow for wheelchair ramp and manoeuvring space.
• Provide undercover queuing areas with seating.

1.5 Pedestrian environments

1.5.1 Access routes

Access routes in the external environment include paths, pavements and other rights of way, such as pedestrian routes through a public space. An access route may be a path through a rural location; a pavement alongside a city centre street; or a route of travel between a car park and building entrance. All access routes where possible should be designed for use by everyone.

Image 1.23 Wheelchair user on access route with adequate passing and turning space.

The width of an access route should be sufficient to enable people to move in both directions and pass each other with ease.

A clear width of 2000mm is recommended to enable people to walk alongside each other and for two wheelchair users or parents with strollers to pass comfortably. The width should be increased where there is simultaneous use by a large number of people.

Where a clear width of 2000mm is not possible, such as where there are existing obstacles, a width of 1500mm is acceptable. This will enable a wheelchair user or parents with a stroller and another person to pass each other.

Image 1.24 Wheelchair user on path.

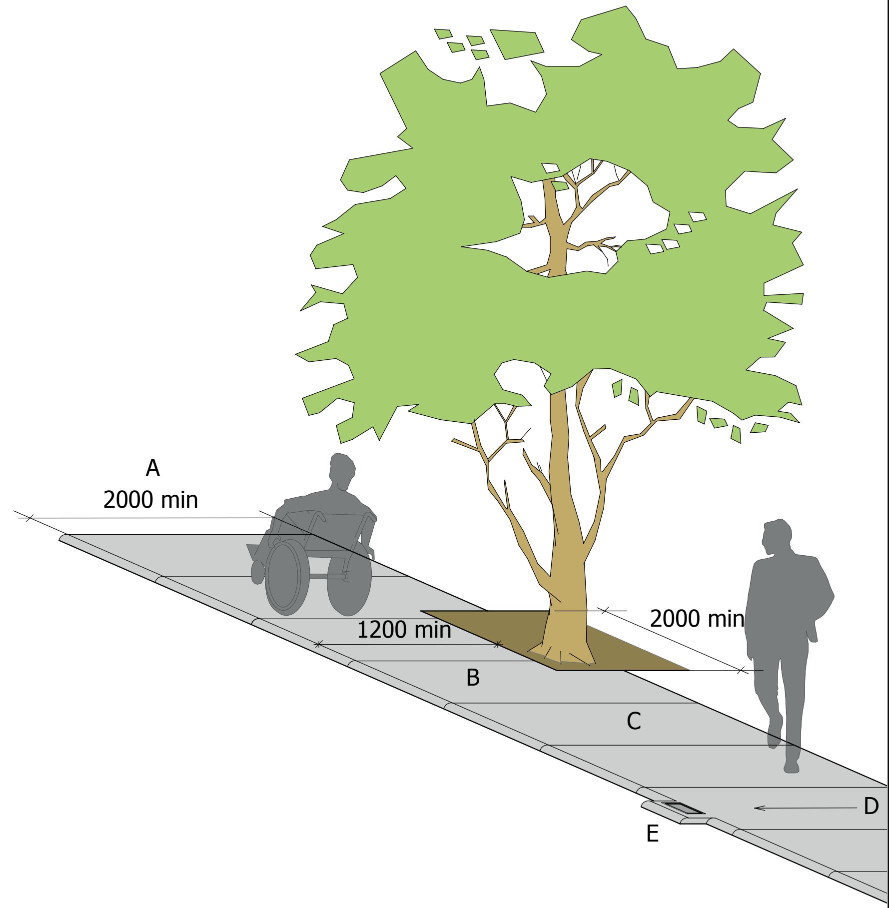
Image 1.25 Wheelchair user on path between buildings.

Where the clear width of an access route is less than 2000mm, passing places should be provided. Passing places should be 2000mm wide x 2500mm long, at a reasonable frequency and located within sight of another passing place, subject to a maximum distance of 25m. This will allow groups of people to pass each other, particularly on busy routes. On long routes, level resting places should be provided off the path of travel at intervals of no more than 30 metres.

Where the clear width of an access route is constricted, such as by existing trees or walls, the width may be reduced to 1200mm for a distance not exceeding

2000mm. A 1200mm wide path is too narrow for people to pass each other, so passing places should be provided either side of the constricted section.

Figure 1.6 Urban environment pavement layout.



Key

A. 2000mm minimum to allow two wheelchairs to pass each other
B. Width reduced to 1200mm minimum for not more than 2m in length around existing obstructions
C. Gradient should either be level along its length or should be gently sloping or incorporate ramp or ramps in accordance with building standards
D. Crossfall gradient not more than 1:50
E. Drainage gratings offset from access route where possible

Note: All dimensions in millimetres

Pavements in urban environments should be as wide as necessary to accommodate the number of people using them, subject to a recommended 2000mm.

At bus stops in front of shops, the pavement should be increased to a recommended width of 3000mm and 3500 to 4500mm, wherever possible. This will help to minimise congestion and the inconvenience that it can cause. The pavement width should be sufficient to enable people to pass in the opposite direction without stepping into the path of a passing vehicle.

Pavements should be separated from the traffic by a kerb, a railing or barrier, or by using tactile paving surfaces. Designated crossing points should be provided, as described in **Section 1.5.5**. Tactile paving surfaces are discussed in **Section 1.5.6**.

Image 1.26 Example of a pavement in an urban setting with adequate width to accommodate a young family.

1.5.1.1 Drainage

Access routes should be laid to even falls to allow proper drainage and prevent the formation of puddles. The cross-fall gradient to any access route should not exceed 1 in 50, except when associated with a dropped-kerb. Steeper gradients tend to misdirect prams, pushchairs and wheelchairs.

Where the cross-fall is insufficient, silt may accumulate after rain and cause the surface to become slippery. Puddles can also cause the surface to become slippery; lead to glare in bright sunshine after other parts of the path or pavement have become dry; and become a hazard in frosty weather.

The gap between paving slabs and any vertical deviation between slabs should not exceed 5mm.

Any break in the surface, for example drainage channels, or gaps between boards on a walkway, should not be greater than 10mm wide and should be perpendicular to the direction of movement. This will prevent walking sticks, heels of shoes and wheels getting caught in the gaps. Where grilles or mesh covers are laid, the mesh size should be maximum 10mm x 20mm. The long side of the mesh should be used in the direction of travel for easier use by guide dogs.

Service covers to manhole and inspection chambers should not be positioned on pavements, particularly at crossing points. They can be dangerous when opened for inspection, forming a trip hazard and reducing the clear width.

If there is a change in level to either side of a path or to the rear of a pavement, edge protection should be provided to prevent people from falling. Edge protection may take the form of an upstand kerb, 150mm high and visually contrasting with the path or pavement, where the change in level is between 200mm and 600mm. A guardrail or barrier can be used where the change in level is greater than 600mm.

1.5.1.2 Guardrails

Guardrails or barriers should be 1200mm high and should visually contrast with the surrounding surfaces so that they are readily identifiable by all pedestrians and road users.

Galvanised railings are not acceptable. Metal handrails should be avoided as they can become very cold in winter weather conditions. People who need to firmly grip handrails in order to safely negotiate a ramp will find a cold handrail extremely uncomfortable and possibly painful to use.

Preferred materials that are not cold to the touch include timber and plastic-coated steel.

Handrails can be used by some people not only for support but also to pull themselves up and to reduce speed of descent when going down when using a ramp or stair.

In extremely cold weather, for someone not wearing gloves their skin could stick to a very cold handrail. Such a shock could also trigger medical complications. It is unsafe to have handrails that are problematic in cold weather.

Handrails whose surface is of a low thermal conductivity, such as timber or nylon-sleeved steel tube, are the most comfortable to touch in extremes of temperature. Handrails fabricated from metals with a relatively low thermal conductivity, such as stainless steel, are more suitable in locations where resistance to vandalism and/or low maintenance are key factors.

Guardrails should be designed so that people with a lower eye level, including children, people of smaller stature, and wheelchair users, can see and be seen through the railings, and to prevent assistance dogs from walking underneath. If the top of the guardrail is intended to provide support to pedestrians, it should comprise a tubular rail, 40 to 50mm in diameter. An oval rail 50mm x 40mm can also be used.

Where the ground level to the side of an access route is flush with the path or pavement surface, a change in the surface treatment at the edge of a path, such as grass or a ground flora verge, will help prevent people from straying off the path.

Checklist - Access routes
• Ensure access route has sufficient width for expected number of people.
• Provide recommended clear width 2000mm wherever possible.
• Provide passing places where clear width is less than 2000mm.
• Include resting places at intervals on long routes.
• Ensure width is not less than 1200mm on short constricted sections of an access route.
• Widen pavements in front of shops and where there are bus stops.
• Use firm, smooth and even surface on access routes, with maximum cross-fall gradient of 1 in 50.
• Avoid gaps and vertical deviations between paving slabs greater than 5mm.
• Keep any break in surface or gap such as a drainage gulley no greater than 10mm and perpendicular to line of travel.
• Prevent accidents at changes in level to side of access route with kerb upstands, barriers or guardrail.

1.5.2 Changes in level

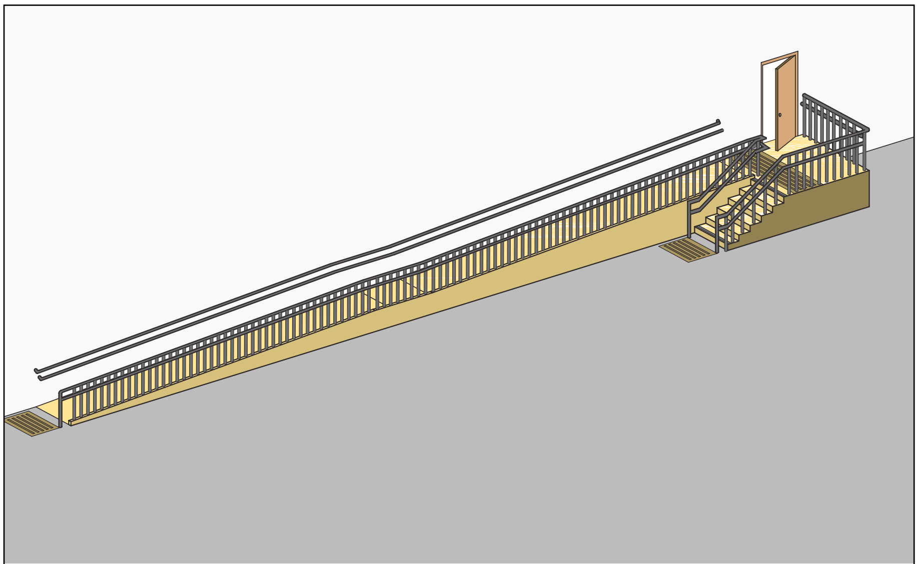
Changes in level frequently pose challenges to designers. In adapting an existing environment, it is appropriate to consider the impact on the general environs, rather than a piecemeal approach. It may be possible to adjust ground levels more broadly to eliminate the need for a ramp or steps altogether.

Arbitrary changes of level should be avoided. For instance, in creating a sense of importance for a building approach, a change in the quality of paving or street furniture can have the desired effect, rather than introducing a level change. When a terrace or steps or podium becomes a necessity for a designer, however, the result need not always be an obstruction for people with functional difficulties if the design is well considered.

On all sites, a suitable, understandable and useable access route should be provided from the site entrance to the building entrance; from an on-site car park to the building entrance; and between buildings where there is more than one building on a site. Suitable access routes should also be provided around a site where there are external facilities or features for people to enjoy, such as paths around a park or garden.

For newly developed sites and new buildings, designers should consider from the outset how best to minimize the level difference along principal access routes, such as between the site entrance and building entrance, and to locate features accordingly. Trying to incorporate a ramp after the initial design has been conceived will lead to undesirable solutions.

Figure 1.7 An example of an external ramp with adjacent steps.



External Ramp

- Ramps at gradient of 1:20, with a clear width of 1200mm and individual flights no longer than 9.0m
- Landings to be as long as the clear width of the ramp or 1300mm which ever is the greater
- Provide continuous handrails on both sides of the ramp, to finish 900 - 1000mm over the ramp surface and 900 - 1100mm over landing. Hand rails to turn into supporting wall as shown, or turn down for min 150mm
- A second handrail is desirable, finishing 600 - 750mm over ramp surface
- 1800 x 1800 turning space at top and bottom of ramp
- Always provide stairs as an alternative
- 75mm raised kerb on open sides
- Slip-resistant surface
- Tactile strips to be located at top and bottom landings

Note: All dimensions in millimetres

Where the topography of the site is such that changes in level are unavoidable, access routes should be designed for ease of access. They should be understandable, useable, and offer choice.

Some routes may have a gradual incline over a long distance and some may have shorter sections with a steeper gradient and level landings or rest areas. The steeper the incline, ramp or steps, and the greater the change in level, the more frequent the need for landings and resting places. Where resting places are located on landings they should be out of the way of the line of travel.

Access routes with a gradient of 1 in 25 should have level landings at maximum 19m intervals and routes with a gradient of 1 in 33 should have landings at no more than 25m intervals. The interval of landings for access routes with gradients between 1 in 25 and 1 in 33 can be established by linear interpolation. Access routes with gradients above 1 in 25 should be designed as external ramps.

Image 1.27 Example of the difficulties and hazards that can be encountered in the built environment. A good design solution would involve an accessible ramp located nearby to the steps.

Where the change in level is such as to require steps or a ramp, both should be provided to meet the needs of all building users.

Some people with mobility difficulties find steps easier to use than ramps, while ramps are beneficial for people using wheelchairs and people with prams, pushchairs, wheeled luggage and trolleys. The route of a ramp should be as direct as possible and easy to use. Wherever possible, the top and bottom of a ramp should be adjacent to the top and bottom of an associated flight of steps.

The location of stepped and ramped routes should be clearly obvious. Where steps and ramps are provided to gain access to a building entrance, they should both be clearly visible from the approach route. If alternative ramps or steps are not readily apparent, clear signage should be provided.

Image 1.28 Examples of signage identifying ramped access and access for less-mobile people.

All ramps, steps and landings should be kept clear of obstacles such as bins and bicycles and should be regularly swept clean of fallen leaves and any litter.

Checklist - Changes in level

- Ensure the routes between site entrance and building entrance, or from the on-site car park and between buildings is accessible.
- Consider the design of routes and levels at early planning stages.
- Design access routes so they are understandable, easy to use, and offer choice.
- Provide inclined routes with a gradient between 1 in 33 and 1 in 25 with level landings at regular intervals.
- Ensure ramped and stepped routes are clearly visible or well signed.

1.5.2.1 External ramps

Where the gradient of an access route exceeds 1 in 25, the route should be designed as an external ramp, the key features of which are illustrated in **Figure 1.8**.

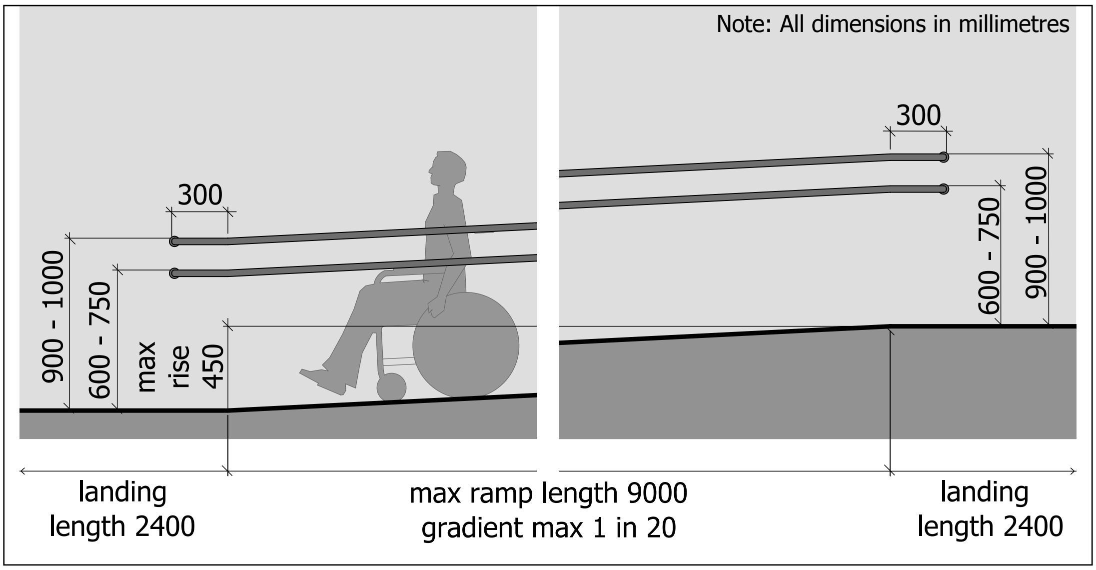
External ramps should have a gradient not exceeding 1 in 20, with a maximum rise of 450mm between landings and a corresponding maximum ramp length of 9000mm.

Where there are two or more consecutive slopes in a ramp, they should be of the same gradient. The gradient of ramps between landings should be constant.

Ramps with steeper gradients should be avoided as they can be difficult for some wheelchair users; parents with strollers; people with walking difficulties; and those using walking aids to ascend due to the strength required to propel them up the slope.

Descent may be hazardous due to the strength required to slow down and stop the wheelchair or stroller. Steeper gradients also present a risk that a person in a wheelchair will fall forwards out of a wheelchair when descending and that a wheelchair or stroller may tip backwards when ascending.

Figure 1.8 Example of an external ramp.



Ramps that are very long and have a substantial overall change in level may be too tiring for some people to use, even with regular landings and rest areas.

Where the overall rise of a ramp is more than 2000mm, an alternative means of access should be provided, such as a lift or platform lift.

The cross-fall gradient of a ramp should not exceed 1 in 50, but should be sufficient to effectively drain surface water.

All ramp slopes and landings exposed to the weather should be detailed and constructed to drain water. If the ramp surface is not adequately drained, it may become unusable in wet weather and extremely hazardous in freezing conditions.

Ramp slopes should be straight. Curved ramps should be avoided as they are more difficult for some wheelchair users; parents with strollers; and those using walking aids to negotiate.

Changes in the direction of travel should occur at an intermediate landing.

The clear width of a ramp should be determined by the expected level of use and whether people are likely to be using the ramp in both directions simultaneously. In any case, the clear width should not be less than 1500mm.

Where a large number of people are expected to use the ramp at any one time and in both directions, a clear width of 1800mm or more may be appropriate.

Landings should be provided at the top and bottom of a ramp and should be 2400mm x 2400mm to provide turning space for wheelchair users and parents with strollers. Intermediate landings should be 2000mm long and equal to the width of the ramp. If the ramp is long, or is likely to be used frequently by wheelchair users or parents with strollers, the intermediate landing should be increased in width to 1800mm to provide a suitable passing place.

Image 1.29 Example of a woman using an electric scooter on a ramp to access a building. Note the lack of handrails to both sides of the ramp.

1.5.2.2 Handrails

Handrails should be provided to both sides of the ramp and should be continuous to the full length of the flight and around intermediate landings.

Handrails should be positioned with the upper surface 900 to 1000mm above the ramp slope and 900 to 1100mm above landings. The provision of a second lower handrail, with the upper surface positioned 600 to 750mm above the ramp and landing surface is desirable and will benefit people of different heights.

It is recommended that handrails should extend 300mm beyond the top and bottom of the ramp to provide support to people as they move from a level surface onto a slope and vice versa.

Handrails should be easy to grip and be either circular in cross-section or non-circular with a broad horizontal face, with a diameter of 40 to 50mm, as **Figure 1.9**.

Where a second lower handrail is provided, the diameter may be 25 to 32mm in recognition that it is likely to be used predominantly by children and that a smaller profile will make it easier to grip.

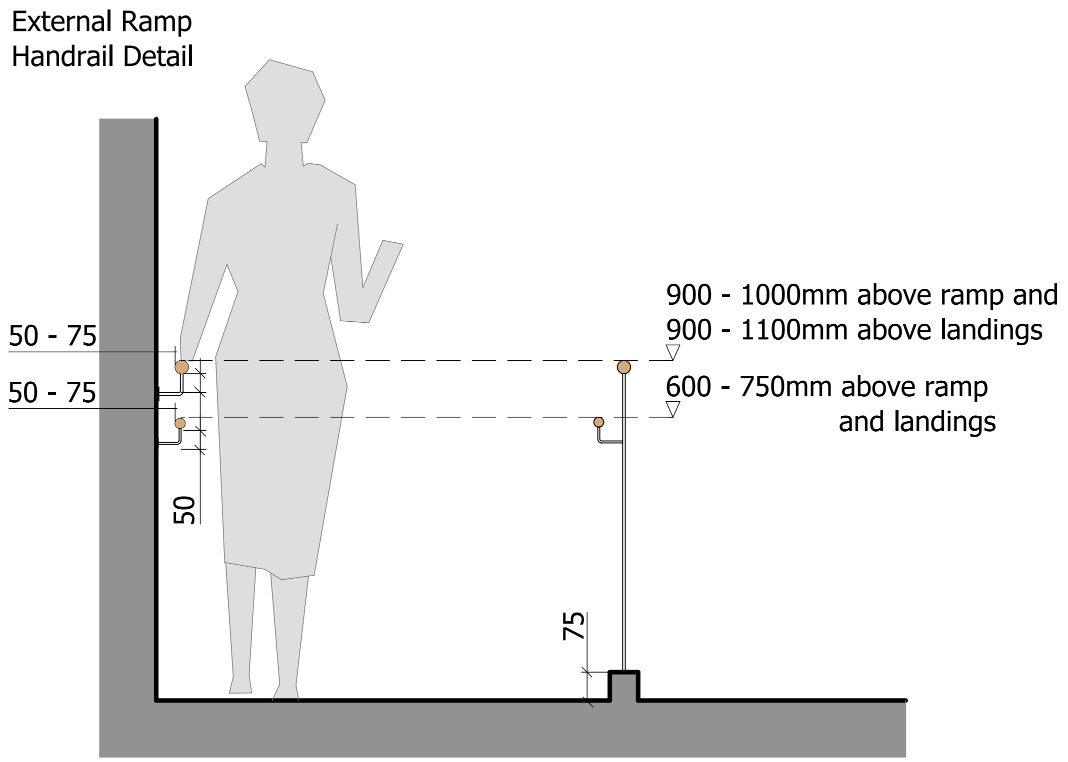
An oval profiled handrail's dimensions should be 50mm wide and 38mm deep with rounded edges with a radius of at least 15mm. For both rails, a clearance of 50 to 75mm between the rail and any support wall or mounting surface should be maintained along the full length of the rail, as **Figure 1.10**.

Support brackets should be fixed to handrails centrally on the underside so that a person can run their hands along the full length of the rail without interruption. If the position of handrail-supports requires a person to release their grip on the handrail, the person may feel insecure and may not be able to support themselves adequately.

The vertical clearance between the underside of the handrail and any angled support brackets should be 50mm.

The ends of handrails should terminate in a way that signifies that the top or bottom of the ramp has been reached.

Figure 1.9 Handrail details.



Note:

- Clearence to the wall may be 50mm where the wall surface is smooth and 75mm where it is rough
- Upper rail 40 - 50 diameter
- Lower rail 25 - 32 diameter

Note: All dimensions in millimetres

This can be achieved by turning the handrail towards the wall or downwards for a recommended 150mm. This arrangement also reduces the likelihood of clothing or bags being caught on the end of the handrails as a person approaches the ramp slope.

Handrails should visually contrast with the surfaces they are viewed against so that they are readily apparent to all users.

The selection of appropriate materials for handrails is not only important in aesthetic terms, but can greatly influence the usability of the ramp for many people.

Metal handrails should be avoided as they can become very cold in winter weather conditions. People who need to firmly grip handrails in order to safely negotiate a ramp will find a cold handrail extremely uncomfortable and possibly painful to use.

Preferred materials that are not cold to the touch include timber and plastic-coated steel.

1.5.2.3 Ramp surface and edge protection

The surface of the ramp should be non-slip in both wet and dry conditions. The ramp slopes should contrast visually with landing surfaces to highlight the change in plane to people with visual difficulties.

Where the ground level to either side of a ramp is different to that of the ramp slope and landings, a kerbed upstand or other form of edge protection should be provided.

A kerbed upstand should be 100mm high (above the ramp and landing surface) and contrast visually with the ramp surface. If a balustrade or guarding is provided to the side of a ramp, this is able to provide appropriate edge protection, as long as the gap between the ramp surface and lower edge of the balustrade or guarding is no more than 50mm.

Where a ramp is bordered by landscaping and the ground level rises up from the ramp, a kerbed upstand or other edge protection is not considered necessary.

Isolated kerbed upstands adjacent to open landscaping are not recommended as they can present a trip hazard.

Ramps should be illuminated so that they can be used safely when it is dark. Lights should be positioned carefully to adequately illuminate the ramp and landing surfaces and to highlight changes in gradient. Lights that present a source of glare and create strong pools of light and dark or harsh shadows should be avoided as these can be visually confusing, particularly to people with visual difficulties. The recommended illuminance at the ramp surface is 150 lux.

Checklist - External ramps and handrails
• Design access routes with a gradient exceeding 1 in 25 as a ramp.
• Ensure the maximum gradient of a ramp is 1 in 20, maximum rise 450mm and maximum length 9000mm.
• Make the gradient of a ramp slope constant and consistent with consecutive ramp slopes.
• Provide an alternative means of access where the overall rise of a ramp exceeds 2000mm.
• Ensure the cross-fall gradient is no greater than 1 in 50.
• Design surfaces to drain water effectively.
• Avoid curved ramps. Ramp slopes to be straight.
• Provide clear width to suit expected level of use, but not less than 1500mm.
• Plan for top and bottom landings to be 2400mm x 2400mm and intermediate landings 2000mm long (multiplied by) ramp width.
• Locate handrails on both sides of the ramp and continuously around intermediate landings, as figures 1.8 and 1.9.
• Provide a kerb upstand or guarding to the side of ramp where adjacent ground is at a lower level.
• Illuminate ramp and landing surfaces to 150 lux.

1.5.2.4 External steps

External steps should always be provided in conjunction with ramps to offer choice and to provide routes that are usable by all. A flight of steps will generally provide a shorter route between two points than a corresponding ramp and this is beneficial to many people, even though it involves a steeper change in level. Some people find it difficult to walk on an inclined surface such as a ramp slope due to the angled position of the foot and prefer the flat surface of steps to negotiate a change in level.

Figure 1.10 External Steps.

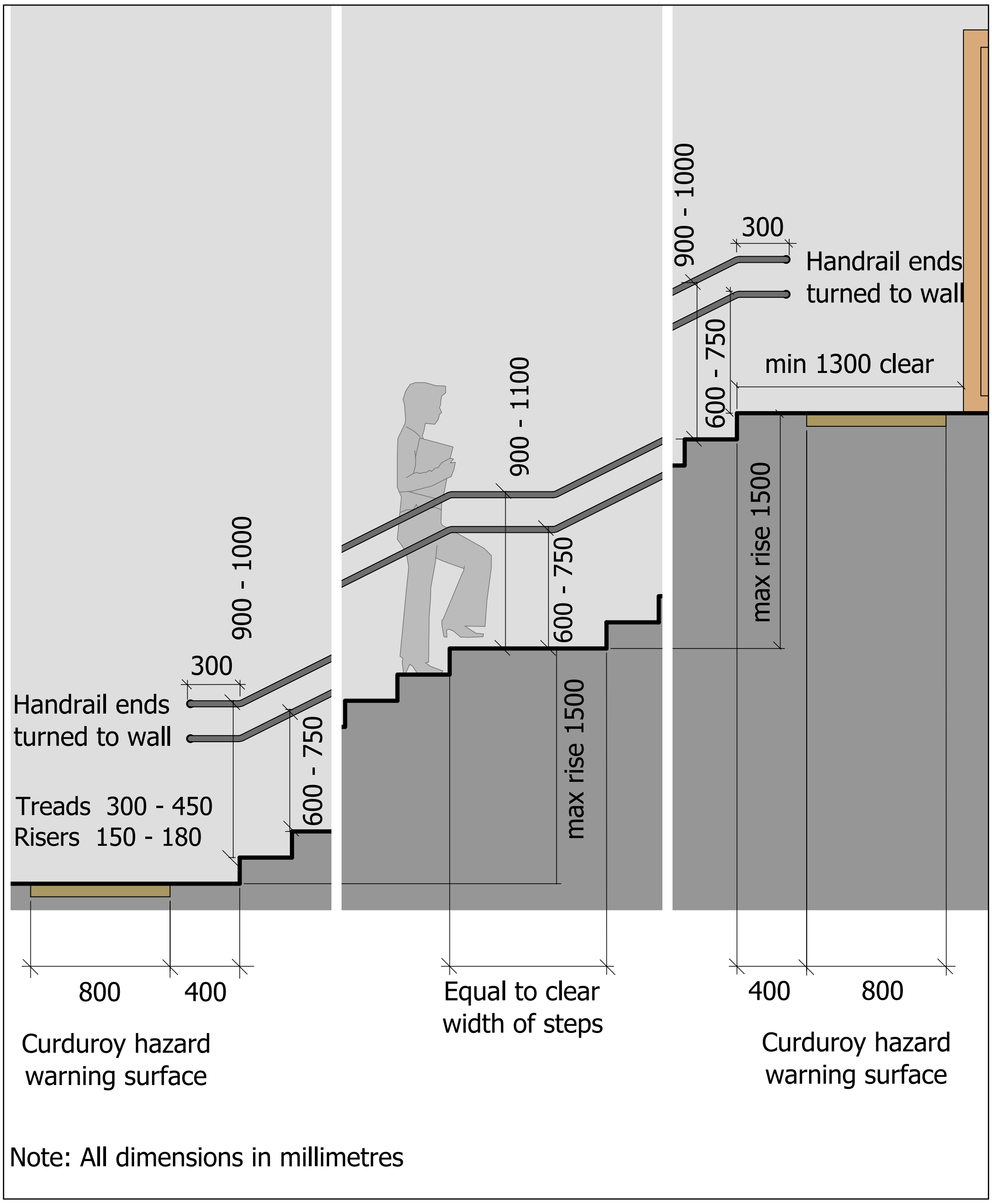
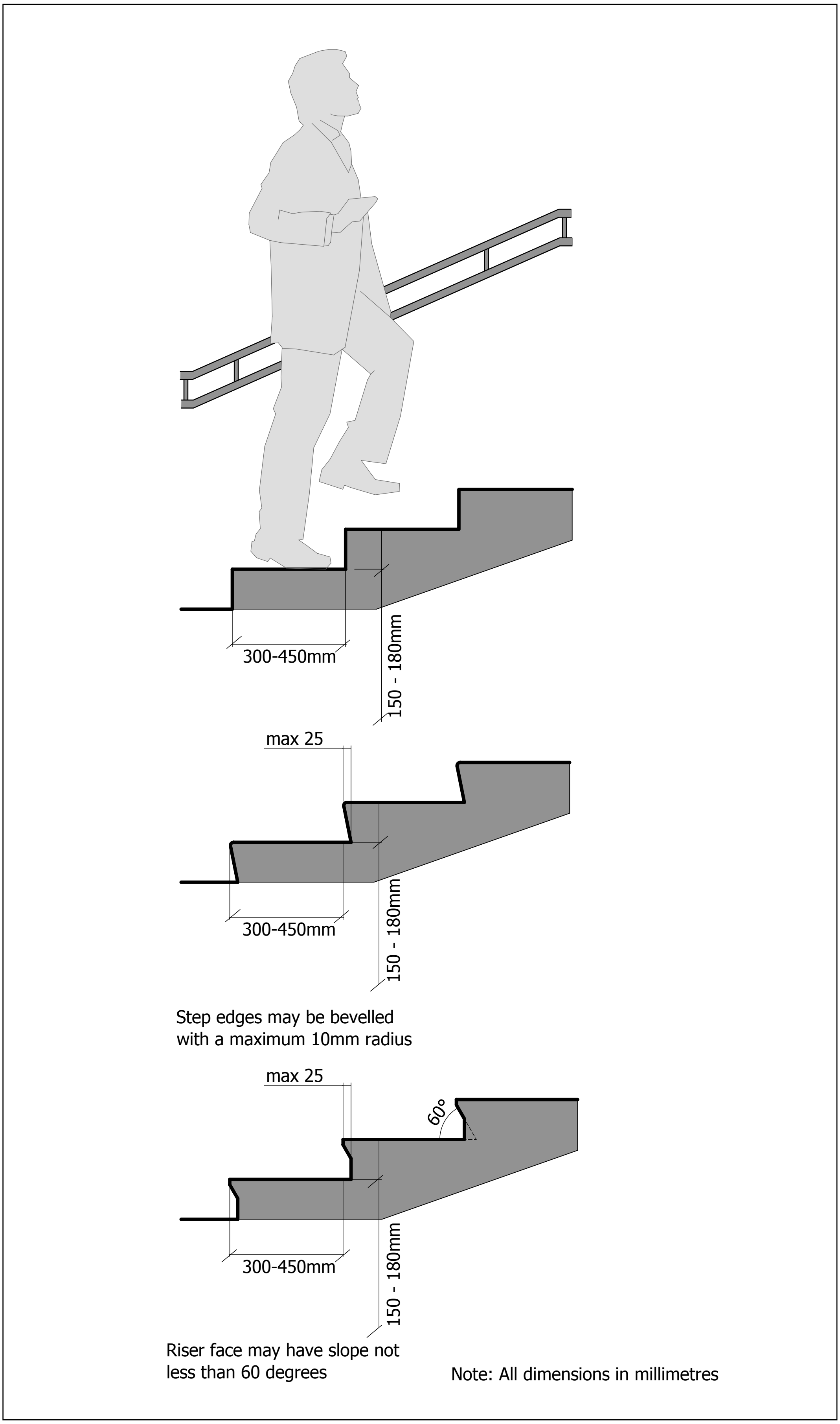


Figure 1.11 Step nosing profiles.



The dimensions of steps should be consistent throughout a flight. The rise of external steps should be in the range 150 to 180mm. The going (depth) should be in the range 300 to 450mm.

The profile of steps should be in accordance with **Figure 1.11**. Steps without projecting nosings are preferred, but if a projection is required, the riser face should be chamfered to an angle of at least 60 degrees and the overlap limited to 25mm. The leading edge of each step may be bevelled with a radius not exceeding 10mm. Projecting nosings that have an underside perpendicular to the riser face should not be used as these present a trip hazard, particularly to people who ascend steps by sliding their feet up the surface of the riser. For the same reason, all step risers should be solid. Open risers can also be a source of visual confusion and are disconcerting for many people to use.

Step treads and landing surfaces should be non-slip and should be well drained to avoid water pooling.

Each step edge should have a non-slip applied nosing or contrasting strip to visually highlight the step edge. The nosing or strip should extend to the full width of the step and be 50 to 70mm deep, measured from the leading edge of the step. Where nosings comprise a metal frame with a coloured plastic insert, the insert should be a single colour. Nosings comprising two parallel strips of different colours should not be used as these can give a false impression of the location of the step edge.

The clear width of external steps should be determined by the expected level of use, but should not be less than 1200mm.

The total rise of a flight of steps between landings should be no more than 1500mm, as **Figure 1.10**. If more than one flight is required, the number of steps in each flight should be the same.

Single steps in an access route should be avoided as they are less readily apparent than a longer flight of steps and may present a trip hazard. If the change in level of a route is equivalent to the rise of a single step, the surface should be gently graded to provide a level approach that is universally designed. Landings should be provided at the top and bottom of each flight. The landing length should be equivalent to the clear width of the steps and should be unobstructed by any door swings or gates.

Figure 1.12 External steps.

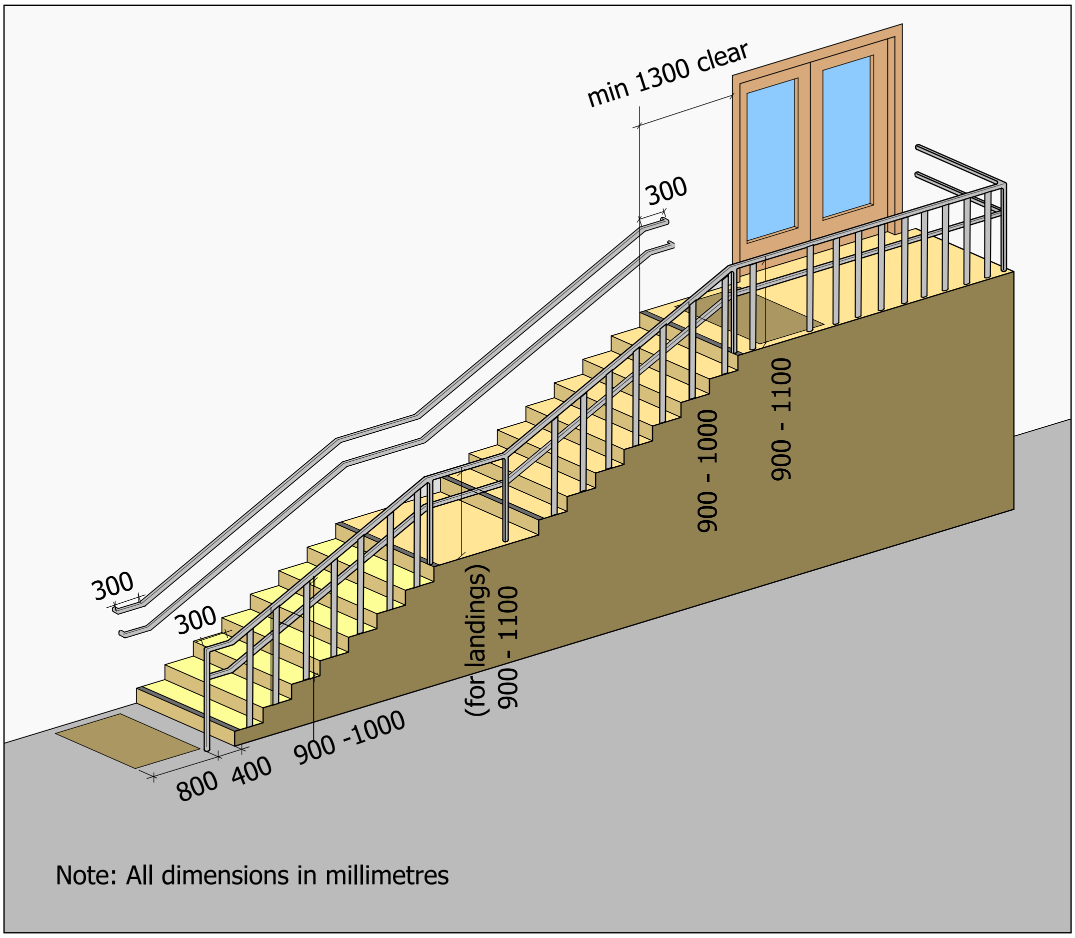


Image 1.30 Example of tactile strip, top step highlighted plus 2 levels of handrails that contrast with surrounds. Note however the lack of highlighting to the nosing of the last step plus the handrails do not extend beyond the last step by 300mm. Also there is no tactile strip at the bottom step however the change of material from timber to stone may work.

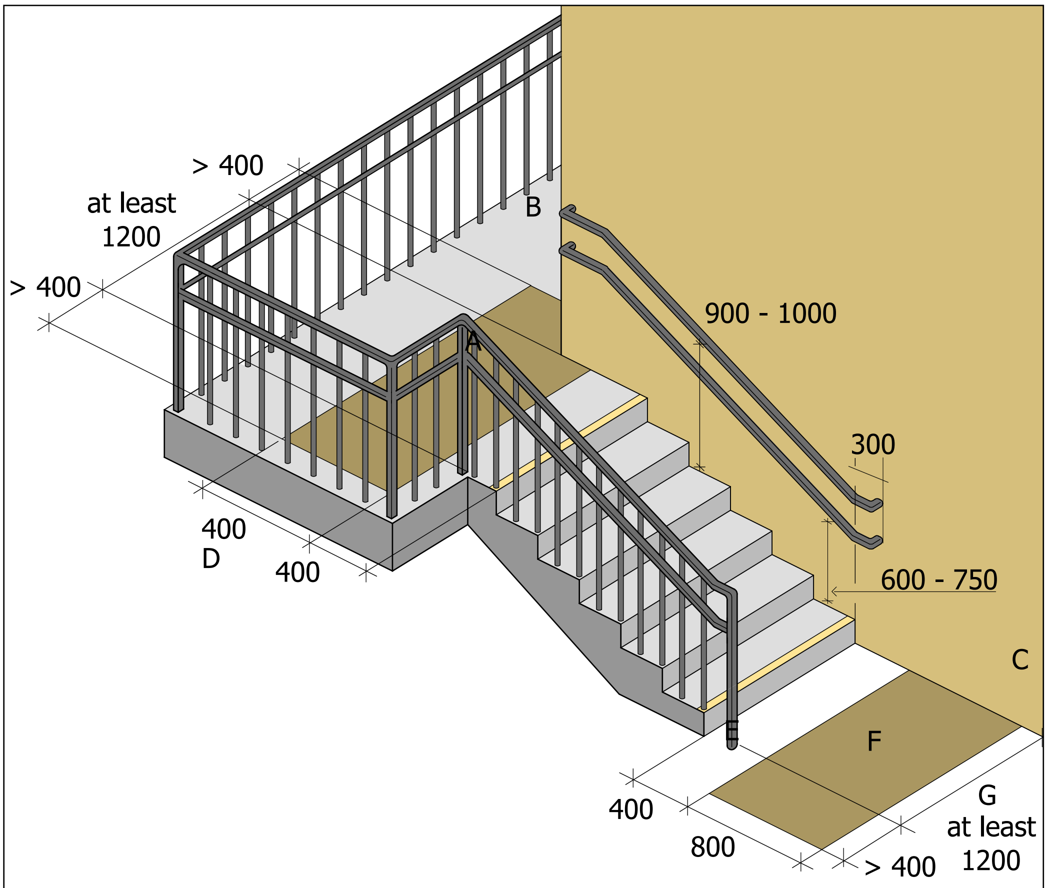
Image 1.31 Example of exterior steps, corduroy hazard warning strips, top and bottom steps with contrasting colour strip, handrails plus landings. Note gap between handrails on each landing. The handrails should continue to help those needing additional support. Note also the lack of a permanent contrasting strip to the nosings of the steps between the top and bottom step plus there should be a tactile warning strip at the bottom of the steps.

Steps can present a hazard to people with visual difficulties, particularly when they are located in the direct line of travel. The use of a tactile hazard warning surface at the top and bottom of a flight of steps provides a means of highlighting the approaching change in level. However, it must be of the appropriate type and be installed correctly in order to convey the right message and to provide adequate warning to pedestrians.

Image 1.32 Example of corduroy hazard warning strip at top and bottom of exterior steps. Note the lack of a permanent contrasting strip to the nosings of the top and bottom steps plus the steps in between. The handrail could also be extended to where the hazard warning strip begins. Steps should include lower handrail as well.

The hazard warning surface should be positioned sufficiently in advance of the steps to give adequate time to stop. It should also extend a sufficient distance in the direction of travel to ensure it is detectable to all pedestrians. If only a narrow strip is provided, a person may step over it with a single stride and be unaware of the approaching hazard. The location and dimensions of hazard warning surfacing for external steps are illustrated in **Figure 1.13**.

Figure 1.13 External steps with corduroy hazard warning surface at top and bottom of stairs.



Key

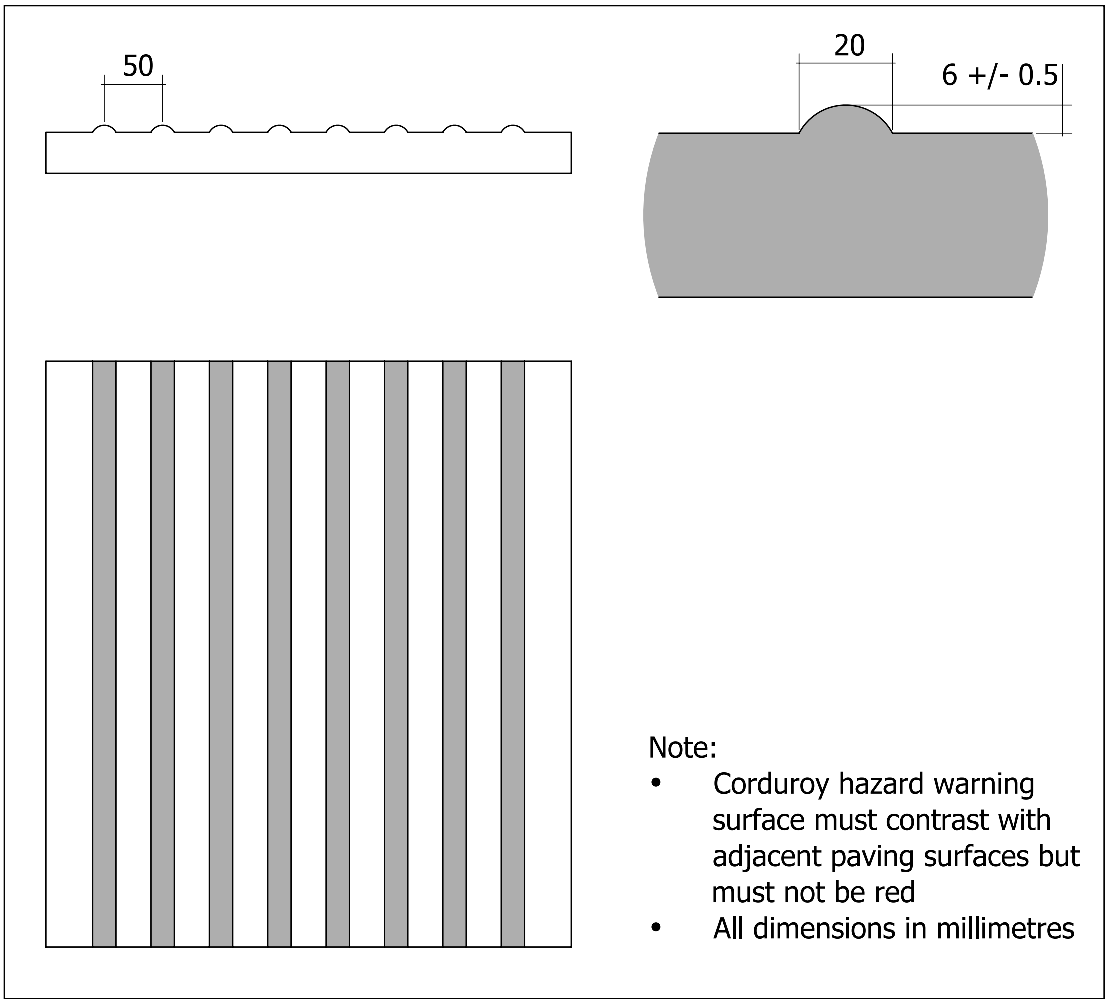
A. Curduroy hazard warning surface at top of stairs to extend at least 400mm at each side of stairs and to stop 400mm from nosing
B. Handrail fixed to side wall and terminated with a closed end at top and bottom
C. Side wall to staircase
D. 800mm when the approach is straight on and 400mm when a conscious turn is required to reach the step
E. Handrail to be treminated in a way that reduces the risk of clothing being caught
F. Corduroy hazard warning surface at bottom of stairs
G. Surface width of stair at least 1200mm wide

Note: All dimensions in millimetres

Hazard warning surfacing should not generally be used on intermediate landings as this can give the false impression that the end of a flight has been reached. The exception to this is if the stepped route can be joined at intermediate landing level from another direction, such as via a doorway or adjoining path. Also, if an intermediate landing is significantly longer than would otherwise be expected and the handrails are not continuous, the use of tactile warning surfacing could be used on the basis that there were two separate flights of steps.

The correct type of hazard warning to use at the top and bottom of external steps has a ribbed profile, as illustrated in **Figure 1.14**, and is commonly termed a 'corduroy' hazard warning surface. See also **Section 1.5.6**.

Figure 1.14 Corduroy hazard warning surface.



Handrails should be provided to both sides of steps and be continuous along intermediate landings. Where the clear width of a flight of steps is greater than 2000mm, an additional handrail (or handrails) should be provided to divide the steps into channels. This will improve safety and be beneficial to many people, particularly when the steps are being used by a large number of people at any one time.

No individual channel in a flight of steps should have a clear width less than 1200mm.

Image 1.33 An example of an external staircase with continuous handrails. Note, however, the lack of corduroy hazard warning strips at the bottom of the steps, the gap in the handrails fixed to the wall of the building and the lack of contrast strips to the nosings of the treads. The handrails should also be painted a different colour to contrast with the stone steps. The lighting set into the risers can lead to confusion if not laid properly.

It is preferred that the area beneath an external flight of steps is enclosed in order to avoid the potential for a person colliding with the soffit or any supporting elements. Where steps are free-standing, any area where the clear height is less than 2100mm should be protected to prevent access. Means of protection could include a permanent raised flower bed or tubs at least 900mm high or a protective guard rail incorporating a low-level tapping rail.

Guidance for the height, length and profile of handrails for stairways is the same as for ramps.

External steps should be illuminated so that they can be used safely when it is dark. Refer to the guidance for ramps above.

Checklist - External steps
• Provide steps in conjunction with a ramp.
• Ensure step dimensions and profile are consistent with **Figure 1.11.**
• Visually highlight each step edge.
• Ensure that the clear width of steps suits expected level of use, but is not less than 1200mm.
• Ensure the total rise of flight between landings is no more than 1500mm.
• Provide consistent number of steps in consecutive flights.
• Avoid single steps in an access route.
• Include clear landings at top and bottom of steps, with the length equivalent to the step width.
• Create tactile hazard warning surface at top and bottom of flight, in accordance with **Figure 1.13.**
• Provide handrails to both sides of the steps and continuous around intermediate landings, as **Figures 1.12** and 1.**13.**
• Provide an additional central handrail where the steps are more than 2000mm wide.
• Protect any area below steps which has headroom less than 2100mm.
• Light step and landing surfaces adequately to 150 lux.

1.5.3 Surface materials

Surface materials for access routes and adjoining areas should be carefully selected, designed and detailed to provide safe and robust environments for everyone to use. The logical and creative selection of materials can make it easier to demarcate different zones, for example, to clearly delineate between pedestrian and vehicular zones in a typical street profile.

The surface of all access routes should be hard and firm with a good grip. Smooth paving surfaces are easier for everyone to navigate and are particularly valued by people pushing prams and pushchairs and by people who use wheelchairs and walking aids. Uneven surfaces such as cobbles and bare earth and surfaces such as loose gravel and sand should be avoided. These are difficult and uncomfortable for many people to cross and may present a tripping hazard. Surfaces should be slip-resistant when wet and dry, with a dry friction coefficient between 35 and 45.

Surface materials should be selected to reduce the potential for glare from bright sunlight or other light sources such as street lights.

The ground surface should not have a strong pattern as this can be a source of visual confusion. The use of contrasting lines or bands should be avoided in locations where they may be perceived by some people as highlighting a step edge.

A significant factor in the selection of surface materials is the ease of making repairs. An expensive stone from a faraway place, or unusual colour of macadam, is less likely to be repaired properly than a local stone or standard colour of macadam that is readily available. This is not to say that special places should not be celebrated by the use of special materials. They will, however, require a high degree of care when repairing any damage.

Regular and effective maintenance should prevent or replace cracked and uneven paving slabs and those with loose joints, as they become tripping hazards and are difficult to walk on, cause puddles to form and become slippery.

1.5.3.1 Natural and tempered landscapes

Gravel, currently a common surfacing material in natural and tempered landscapes, should be used only if it is of a grade which is well compacted, with no loose stones greater than 5mm. This will ease the passage of prams, pushchairs and wheelchairs, and reduces the possibility of tripping for people who are unsteady on their feet. Regular maintenance will be required to repair potholes and erosion.

Alternatively, a bound gravel surface, where a top dressing of gravel is applied to a bitumen layer, gives the feel and appearance of gravel on a firm base. This surface will wear with use, requires regular maintenance and is not suitable for intense vehicular movement.

New surface dressings should not be so deep to make access more difficult. As these surfaces require occasional top dressing, gravel from a local source should be selected, so that it is readily and cheaply available.

Epoxy bound gravel is a more expensive surface that gives the appearance of gravel. Bound in a clear resin, the colour of the gravel comes through but the surface is very firm, non-slip and requires little maintenance. Bitumen macadam has the effect of 'suburbanising' a landscape but may be necessary where paths are used intensively or where maintenance is sporadic.

Different colours are available, made from clear bitumen coloured with a dye and mixed with stone chippings of a similar colour. Buff and red colours are readily available and the source should be local so that repairs are easy to implement. Red is typically used for cycle paths and it may be appropriate to use the same material as a continuation of a wider network of cycle paths in the environs in order to avoid confusion.

Sustainable solutions to hard landscapes should specify permeable surfaces to allow direct percolation of water to the soil substrate.

Where grass tracks are used, a reinforcing system can be used below the surface to give a firm but free-draining layer on which grass can grow. It should be installed so that the edges do not become a tripping hazard. The disadvantages of grass surfaces are that they inhibit the use of wheelchairs, prams and pushchairs and that the grass can conceal trip hazards for people who are frail, unsteady on their feet or who have visual difficulties. Wide expanses present a further disadvantage to people with visual difficulties who will find it difficult to orientate themselves in the space. A mown grass path contrasting in texture and colour with meadow grass, even after the meadow has been mown, may be of some limited assistance with orientation.

1.5.3.2 Urban environments

The unit size of materials used in surfacing is often related to the function or load it is expected to handle. Large slabs can be employed for light pedestrian use, although the larger the surface area of the slab, the thicker it should be to prevent it from cracking. Large slabs can be unwieldy and difficult to lay evenly, even with a hoist.

The smaller the unit size, the more resistant the paving unit will be to vehicular loads. However, the surface itself may become distorted through use, unless a strong enough bed has been laid. Problems can be rectified easily when the units are bedded in sand, but are more difficult when the joints are mortared. Light traffic on small modular paving bedded on sand can encourage grass and moss to grow in the joints which may present a tripping hazard and be a hindrance for wheelchair users; parents with strollers; people with walking difficulties; and those using walking aids. This type of surface requires regular maintenance. Differential settling can result in an uneven surface that becomes a trip hazard.

Polished surfaces cause glare and are not suitable in a damp climate, as they remain slippery in a moist atmosphere, even after rain has passed. Likewise, fine-grained stones with high calcium content can erode quickly with use, forming a polished surface that will be slippery in wet weather. There are numerous mechanical finishes to stone paving, from a simple cleaving or sawing, to pin- and bush-hammering, which produces a non-slip textured finish. Different finishes will also draw out different qualities in the stone.

Checklist - Surface materials
• Ensure logical and creative use of materials to enhance legibility of external environment.
• Ensure all surfaces are firm, hard and slip-resistant.
• Avoid uneven and loose surfaces.
• Be aware that some surfaces are a potential source of glare.
• Avoid surfaces with a strong pattern or contrasting lines that may be visually confusing.
• Consider the ease and cost of future repairs.

1.5.4 Street furniture

Furniture in the external environment consists of a variety of elements such as lighting columns, junction boxes, electrical pillars, mini pillars, seats, picnic tables, litter bins, information panels, traffic signs, parking meters and post boxes, often installed independently over time and without coordination.

The placement of these elements can result in an obstacle course for most people and present particular difficulties for people with visual difficulties, wheelchair users, people using walking aids, those with walking difficulties and people pushing strollers and buggies.

In both rural and urban situations, furniture should be placed at or beyond the boundary of an access route, subject to the widths given in **Section 1.5.1**.

Good placement and coordination of furniture will result in a tidy, easy to follow pathway or street that is easy for everybody to travel along. Elements should be placed in straight lines. For instance, where lighting columns define the main zone of street furniture, other objects such as bollards, traffic signs and post boxes can follow this line.

Bulky objects such as parking meters and post boxes should not be placed where they will become a visual obstruction, for example at crossing points.

1.5.4.1 Lighting and signage

Lighting columns and signs should be mounted on buildings or walls wherever possible to reduce the frequency of interruption at path or pavement level. Where this is not possible, they should be placed as close as possible to the back of the pavement, subject to a maximum distance of 275mm from the outer face of the post or column to the property line. Where they are placed on the road side of a pavement, they should be at least 500mm from the kerb edge, or 600mm if the road has a steep camber or cross-fall. Posts and columns should be at least 1000mm apart.

Overhead signs and any item suspended above a path or pavement such as wall-mounted lights or overhanging trees should provide a vertical clearance of at least 2300mm to the footway surface.

In some instances, such as on pedestrian-only areas within rail or bus stations, signs may be mounted to provide a clearance of 2100mm, but in any areas where cyclists are likely to use a route, a clearance of at least 2300mm must be maintained. Where trees or shrubs overhang a footway, they should be cut back to provide a clearance of 3000mm to allow room for new growth.

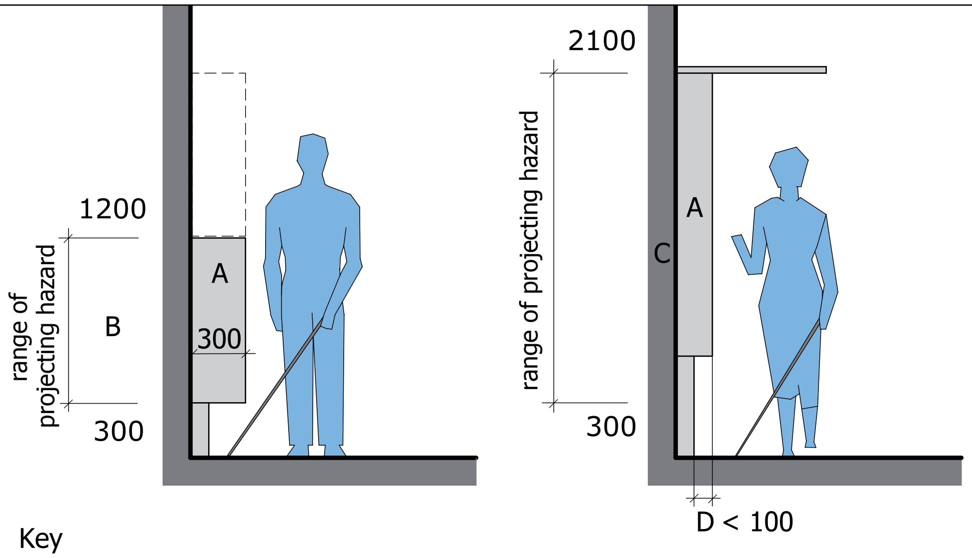
1.5.4.2 Placement of street furniture

All street furniture should visually contrast with the background against which it is seen. Grey posts and columns should be avoided as they tend to blend into the general background. Items such as free-standing posts and columns should be highlighted by means of a 150mm-high feature, such as a crest or band, positioned 1500mm above ground level, which visually contrasts with the furniture itself. Bollards can be effectively highlighted by incorporating a light into the top.

Furniture should be continuous to ground level. Pedestal-mounted objects such as litter bins, telephones and letter boxes should be avoided as the pedestal can obstruct access. Items attached to posts should face in the direction of travel so that they do not interfere with the line of movement.

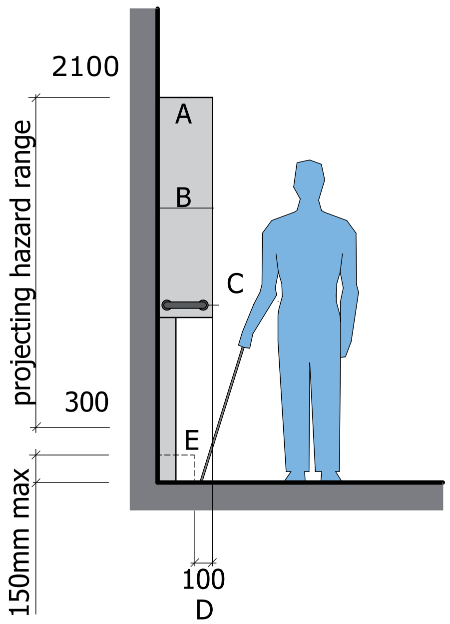
Where eye-level signs, such as maps, are supported on two vertical posts, a tapping rail located between the posts at 250 to 400mm above ground level will help prevent an unsuspecting pedestrian colliding with the sign. The sign should not extend more than 150mm beyond the posts and the rail and posts should contrast visually with the background surfaces.

Figure 1.15 Objects projecting onto access routes.



Key

A. Object projecting into an access route
B. No hazard protection required where the lower front edge of a projecting object is less than 300mm, and the upper front edge of the object is at least 1200mm above the ground
C. No hazard protection required where an object projects into an access route between 300mm and 2100mm above the ground by not more than 100mm, or by not more than 100mm in front of its base where the base projects not more than 100mm into the access route
D. Protection of an object in front of its base



Key

A. Hazard such as:
   - open window;
   - building projection;
   - telephone booth
B. Cane detection required where an object projects into an access route between 300mm and 2100mm above the ground by more than 100mm, or by more than 100mm in front of its base
C. Guarding each side of the obstruction in addition to cane detection
D. Not more than 100mm between the front face of an object and the tapping rail
E. Tapping rail, with its underside no higher than 150mm above floor level, to provide cane detection

Note: All dimensions in millimetres

1.5.4.3 Bins

Litter bins should have an overall height of approximately 1300mm and a bin opening at 1000mm above ground level.

1.5.4.4 Bollards

Bollards are often used to stop vehicles from mounting the footpath and to keep pedestrians away from traffic. Unless positioned carefully they can form a barrier to wheelchair users and parents with strollers and are a particular hazard for people with visual difficulties. Where they are essential, such as to ensure clear escape routes, bollards should be identifiable by using contrasting colours, and be a recommended 1000mm high and 200mm wide. A recommended 1200mm-wide passage should be maintained between the kerb edge and any bollard, in both directions.

Bollards should never be linked with ropes or chains as this can present a hazard to people with visual difficulties.

1.5.4.5 Gates

Gates are sometimes hinged or sprung in such a way as to be self-closing. These should be adjusted so as not to slam shut on an unsuspecting pedestrian or to prevent wheelchair or pushchair access. The opening mechanism should be robust but easy to grip and manoeuvre. The path should extend 500mm to the side of the gate with the latch to make it easier to approach and open the gate. The approach to the gate should be a recommended 2000mm long and free of obstructions.

1.5.4.6 Drinking fountains

Where drinking fountains are provided, they should be clearly identified, understandable, useable and accessible to all users.

Image 1.34 Example of signage identifying a water fountain.

They should provide a clear knee-space for seated users and have a projection from the wall to the front of the fountain of 430 to 500mm and a spout height above the floor within the range 750 to 915mm.

The provision of two drinking fountains, one with a height at each end of the suggested range, is likely to meet the needs of most people.

A clear area of 800mm x 1300mm away from any access route should be provided in front of each drinking fountain to provide convenient and unobstructed approach. One solution is to locate a drinking fountain in an alcove so that it does not present an obstruction or hazard to other pedestrians.

The water spout should be positioned towards the front of the fountain and have a recommended 100mm height of water flow to enable a cup to be filled. Controls should be easy to operate, positioned towards the front of the unit and to both sides to enable operation by a person using either hand. A drain should be located under the drinking fountain to prevent the ground surface from becoming waterlogged or muddy. Consideration should be given to providing a shallow tray or bowl to enable assistance and other dogs to get a drink of water.

1.5.4.7 Seating

Seating should be provided at regular intervals along access routes and, wherever possible, in conjunction with changes in level such as external steps and ramps. In recreational or countryside environments, seating should be located in sheltered places and where people can enjoy a good view.

Table 1.1 Recommended maximum distances without rest	
Users	**Distance (metres)**
People with visual difficulties	150
People using wheelchairs	150
People who are ambulatory without walking aids	100
People using walking sticks or mobility aids	50

Seats should be placed 600mm (to the front of the seat) back from the line of movement so they do not obstruct adjacent access routes. The surface on which seats are placed should be flush with surrounding levels and be firm and stable. A 900mm square of firm paving beside a seat will enable a wheelchair user to sit alongside other people. It will also allow a parent with a stroller to safely park the stroller beside the seat.

Seats should be at least 450mm high and a recommended 500mm wide. Perching seats with a height of 500 to 750mm are easier for some people to use and may be provided as an alternative in some locations. A heel space at least 100mm deep makes it easier for people to stand up off the seat or perch.

Seats with backrests are useful for additional support, and armrests, positioned approximately 200mm above seat level, are also useful to lean against, as well as assisting in getting in and out of the seat. Seats positioned or linked in a row should all be of the same style, such as all with armrests or all without. A mixture of seat styles in a single row can cause confusion for some people with visual difficulties.

Picnic tables should be located in safe, pleasant areas with convenient access to any adjoining car park. They should not be so close to the car park that use of the tables is adversely affected by noise or fumes from cars. Picnic tables should be placed on level sheltered sites and served by accessible paths. The design of the table and seats should be such that they do not topple when unbalanced. A clearance of 700mm to the underside and a tabletop surface 750 to 850mm above ground level should enable universal use.

Seating should be as described in the paragraph above. Where tables and chairs are joined in the same construction, people should not have to climb across beams or other supports in order to access the seats and space should always be available for a person of large stature, those with mobility difficulties & wheelchair users to sit at the table.

A firm, level surface 2000mm wide around the perimeter of the picnic table and seats will provide comfortable, convenient, understandable and useable access for all users regardless of their age, size, ability or disability.

Checklist - Street furniture
• Place items of street furniture at or beyond boundary of access route.
• Ensure overhead signs and fixtures provide clearance of 2300mm to the path or pavement.
• Ensure all street furniture contrasts visually with background.
• Incorporate a visually contrasting band in all free-standing posts and columns.
• Provide tapping rail wherever post-mounted items present a hazard to pedestrians with visual difficulties.
• Never link bollards with chains or ropes.
• Ensure gates are easy to operate and provide clear space adjacent to latch.
• Position drinking fountains to suit seated and standing use.
• Provide seating at regular intervals, away from line of travel.
• Design picnic tables for easy approach with clear path to full perimeter.

1.5.5 Pedestrian crossing points

The provision and location of pedestrian crossing points in any road or street environment should be carefully considered and involve detailed consultation with the relevant road authority.

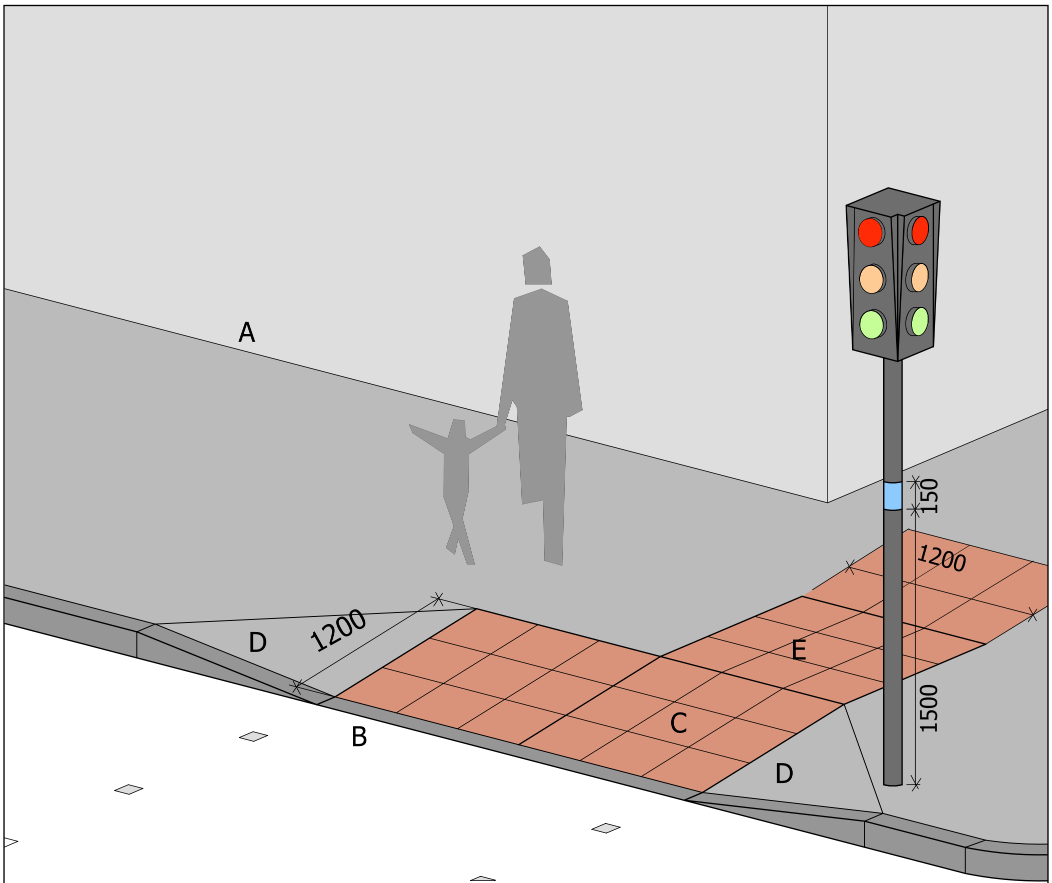
Crossing points should be located where they are clearly visible and safe for all road users, including pedestrians, and where they provide convenient, understandable and useable access.

In busy streets, controlled crossing points with traffic lights should be provided. Audible crossing signals such as pelican crossings help everyone, as well as being essential for people with visual difficulties.

Pedestrian crossing points, including Zebra and controlled crossings, junctions at side roads and other locations such as access points to car parks, should incorporate level or flush access to enable easy passage by all pedestrians. Level or flush access can be achieved with the use of a dropped kerb or a raised road crossing. In residential areas, dropped kerbs should be provided at least every 100 metres.

A dropped kerb should be flush with the carriageway although a 6mm rounded kerb edge is acceptable. The pavement should be ramped perpendicular to the road with a recommended gradient of 1 in 20, where practicable, but not exceeding 1 in 12, as **Figures 1.16** and **1.17**.

Figure 1.16a Crossing point in the direct line of travel. Dropped kerb and red blister paving surface at **controlled crossing points**.



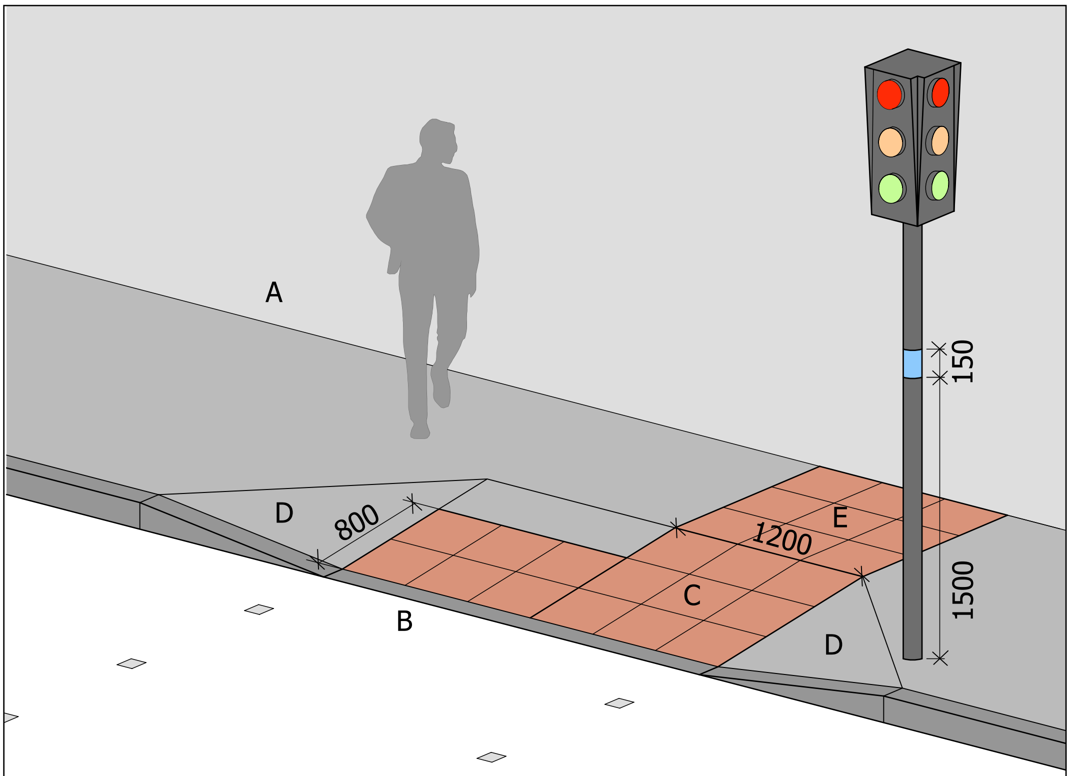
Key

A. Rear of pavement or building line
B. Dropped kerb to be flush with the carriageway, or subject to a max 6mm level difference and a rounded kerb edge. Red blister paving to full width of dropped kerb
C. Ramped section of pavement perpendicular to crossing to be 1 in 20 (max 1 in 12)
D. Flared sides or ramp to be max 1 in 11
E. L-shaped stem of blister paving to guide people to crossing point

Note:

- Red blister paving to full width of dropped kerb
- All dimensions in millimetres

Figure 1.16b Crossing point not in the direct line of travel. Dropped kerb and red blister paving surface at **controlled crossing points**.



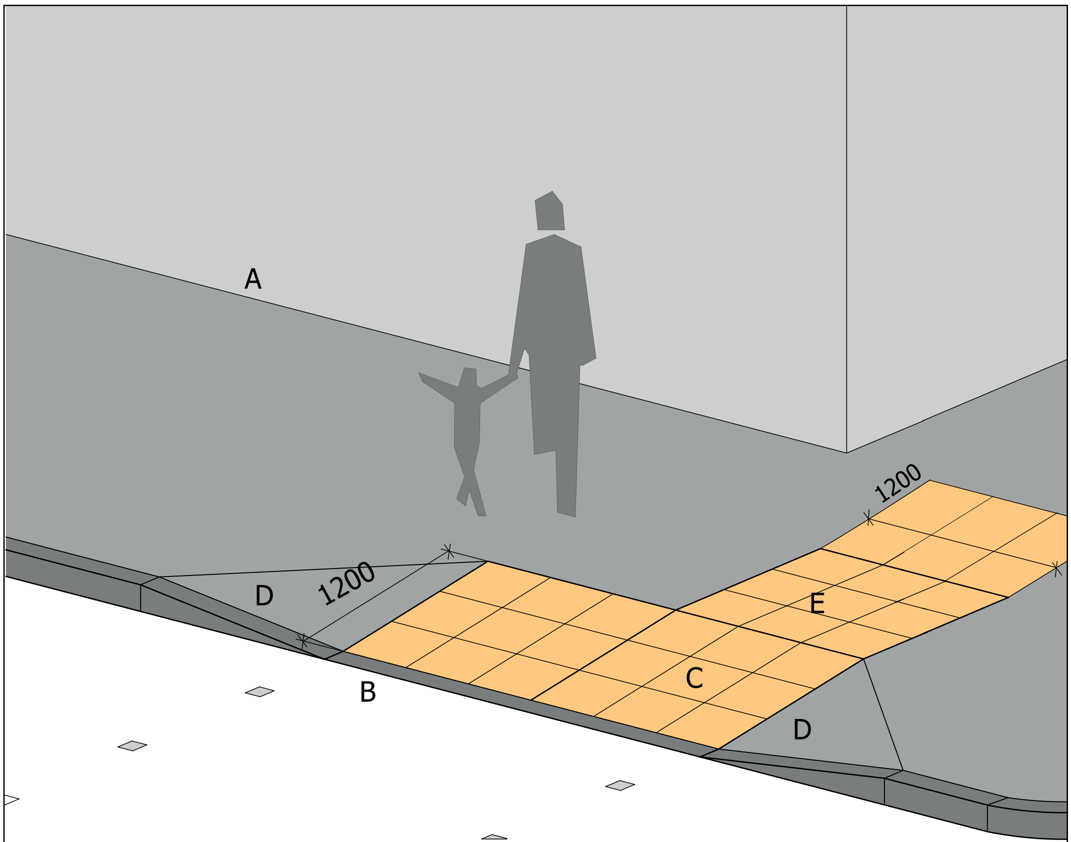
Key

A. Rear of pavement or building line
B. Dropped kerb to be flush with the carriageway, or subject to a max 6mm level difference and a rounded kerb edge. Red blister paving to full width of dropped kerb
C. Ramped section of pavement perpendicular to crossing to be 1 in 20 (max 1 in 12)
D. Flared sides or ramp to be max 1 in 11
E. L-shaped stem of blister paving to guide people to crossing point

Note:
- Red blister paving to full width of dropped kerb
- All dimensions in millimetres

The flared sides of the ramp may have a gradient not exceeding 1 in 11. The ramped section should have a width between 1200mm and 3000mm, dependent on the intensity of use.

Figure 1.17a Crossing point in the direct line of travel. Dropped kerb and buff blister paving surface at **uncontrolled crossing points**.



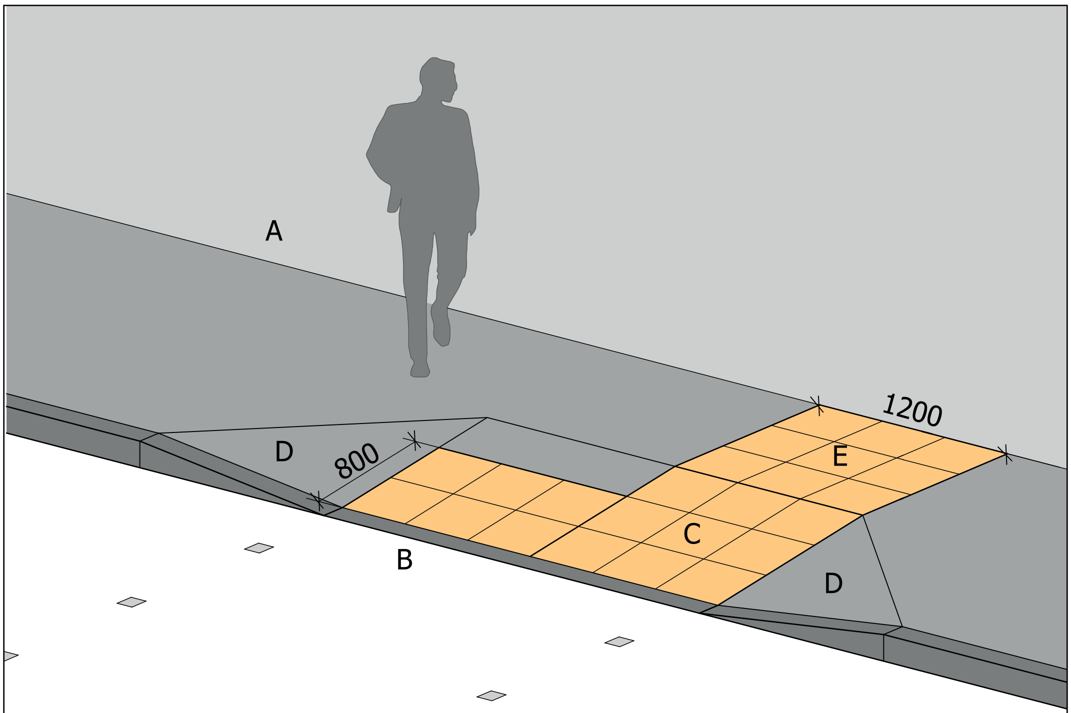
Key

A. Rear of pavement or building line
B. Dropped kerb to be flush with the carriageway, or subject to a max 6mm level difference and a rounded kerb edge. Buff blister paving to full width of dropped kerb
C. Ramped section of pavement perpendicular to crossing to be 1 in 20 (max 1 in 12)
D. Flared sides or ramp to be max 1 in 11
E. L-shaped stem of blister paving to guide people to crossing point

Note:

- Buff blister paving to full width of dropped kerb
- All dimensions in millimetres

Figure 1.17b Crossing point **not** in the direct line of travel. Dropped kerb and buff blister paving surface at **uncontrolled crossing points**.



Key

A. Rear of pavement or building line
B. Dropped kerb to be flush with the carriageway, or subject to a max 6mm level difference and a rounded kerb edge. Buff blister paving to full width of dropped kerb
C. Ramped section of pavement perpendicular to crossing to be 1 in 20 (max 1 in 12)
D. Flared sides or ramp to be max 1 in 11
E. L-shaped stem of blister paving to guide people to crossing point

Note:
- Buff blister paving to full width of dropped kerb
- All dimensions in millimetres

Where a dropped kerb is provided in conjunction with a controlled crossing, the ramped section should be the same width as the crossing, subject to a recommendation of 2400mm. Where the ramped section abuts the carriageway, the road camber should be no more than 1 in 20 for a horizontal distance of 600mm. This is to prevent the front wheels of a wheelchair or footrest becoming caught. The pavement should be sufficiently wide to provide a recommended 1200mm width of level surface to the rear of the ramped section for people to pass without having to traverse the inclined surface.

Where a raised road crossing is provided, the width of the raised area should be at least 2400mm and the surface should be flush with the pavement on both sides.

Where uncontrolled crossing points are provided at road junctions, dropped kerbs should be located away from the curve of the road. Dropped kerbs should be located perpendicular to the line of travel of a person crossing the road and directly opposite a dropped kerb on the other side. People with visual difficulties risk being misdirected by the orientation of the kerb if it is located on the curve of the road.

In street and roadway environments, kerbs are an essential indicator for people with visual difficulties to detect the edge of the pavement.

Where dropped kerbs are provided at crossing points, they should incorporate tactile paving surfaces to highlight the absence of a kerb and to orientate pedestrians to the direction of the crossing (see section below). The provision of double yellow line markings or other form of parking restriction should prevent cars parking either side of a dropped kerb and will help to ensure the area remains unobstructed.

Crossing points should always be well drained. If puddles form at the base of a ramped slope, it can render the crossing impassable. Adequate drainage should be achieved using cross-fall gradients (maximum 1 in 50) and materials that are themselves pervious or are laid to enable water to drain through joints.

Rainwater gullies should never be positioned in the immediate area of the crossing as they may present a trapping hazard for wheels or sticks.

Checklist - Pedestrian crossing points
• Provide crossing points following consultation with relevant roads authority.
• Locate crossings where they are safe and convenient for all road users.
• Provide level or flush crossing points at all controlled crossing points, junctions at side roads and other access points.
• Ensure crossing points incorporating a dropped kerb comply with **figures 1.16 and 1.17**.
• Ensure recommended 1200mm width of level surface to the rear of pavement at a crossing point.
• Make sure crossing points are well drained, with a maximum cross-fall gradient of 1 in 50.

1.5.6 Tactile paving surfaces

Tactile paving should be used on access routes to provide warning and guidance to people with visual difficulties. It should be used sparingly and only after consultation with user groups representing people with visual difficulties.

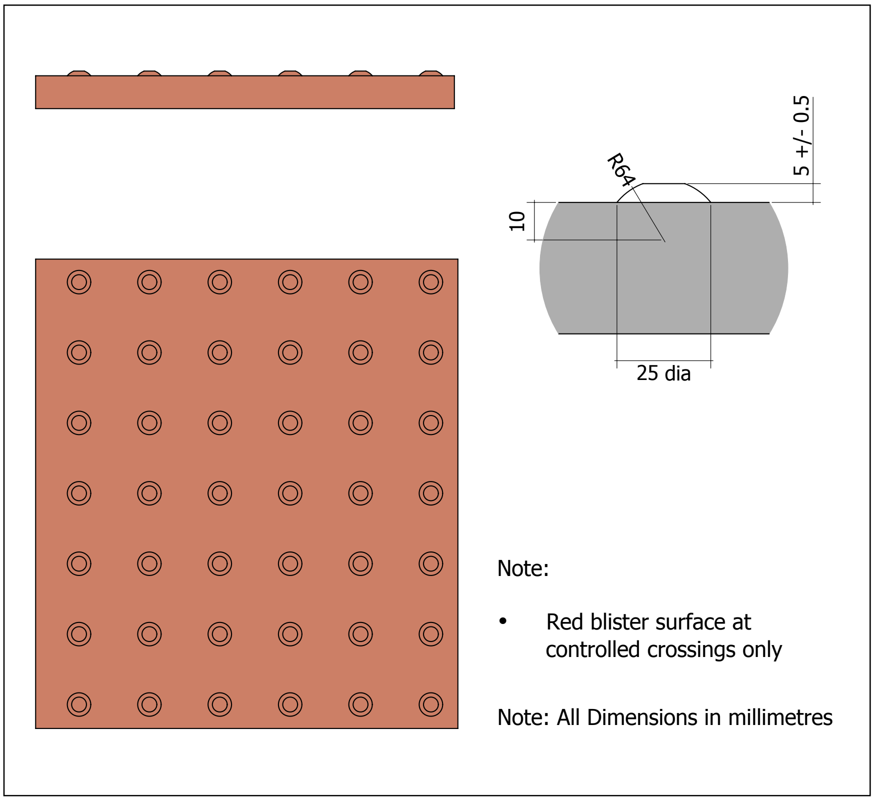
Different tactile paving surfaces have prescribed meanings and all convey important information about the external environment. Some tactile paving surfaces provide guidance and others indicate the presence of a potential hazard such as an approaching change in level or the absence of a kerb at a road crossing. It is essential that the appropriate tactile surface is used in the correct location and in a consistent manner. The incorrect use of a tactile paving surface will convey false and misleading information which could be extremely dangerous.

The most common types of tactile paving surface are described below, together with key principles of design.

1.5.6.1 Blister surface for pedestrian crossing points

Tactile paving with a blister surface is used to warn pedestrians with visual difficulties where a pavement ends and a carriageway begins, in locations where there is no kerb. It may be used at road crossing points with dropped kerbs, raised road crossings and in partially pedestrianised areas where the pavement and carriageway is only differentiated using different colours or materials. At controlled crossing points, the layout of the blister surface also provides guidance by leading people to the crossing point. **Figure 1.18** illustrates the pattern of the blister surface.

Figure 1.18 Blister tactile paving surface.



A red blister surface should be used at controlled crossings only. A buff blister surface should be used at uncontrolled crossings. In all cases, the surrounding paving surface should visually contrast with the blister paving to provide visual indication of the extent of the pavement.

At controlled crossing points, where the dropped kerb is positioned in the direct line of travel, the red blister paving should extend to a depth of 1200mm and to the full width of the dropped kerb, as **Figure 1.16a**. At all other controlled crossings, the paving should extend to a depth of 800mm, as **Figure 1.16b**. At controlled crossings, a stem of blister surface 1200mm wide should extend back from the dropped kerb to the rear of the pavement, or to the building line, to guide people to the crossing point.

At uncontrolled crossing points, the buff blister surface should extend to the full width of the dropped kerb. The depth of the blister surface depends on whether or not the crossing is in the direct line of travel. If it is, the blister surface should be 1200mm deep, as **Figure 1.17a**. Where the crossing point is not in the direct line of travel, the blister surface should be 400mm deep, as **Figure 1.17b**.

Image 1.35 Example of buff blister surface at uncontrolled crossing.

Image 1.36 Example of person with visual difficulties using a guide stick on buff coloured blister surface.

Figure 1.19 Example of red blister surface at controlled crossing and offset blister used to indicate the edge of the platform at rail and tram stations.

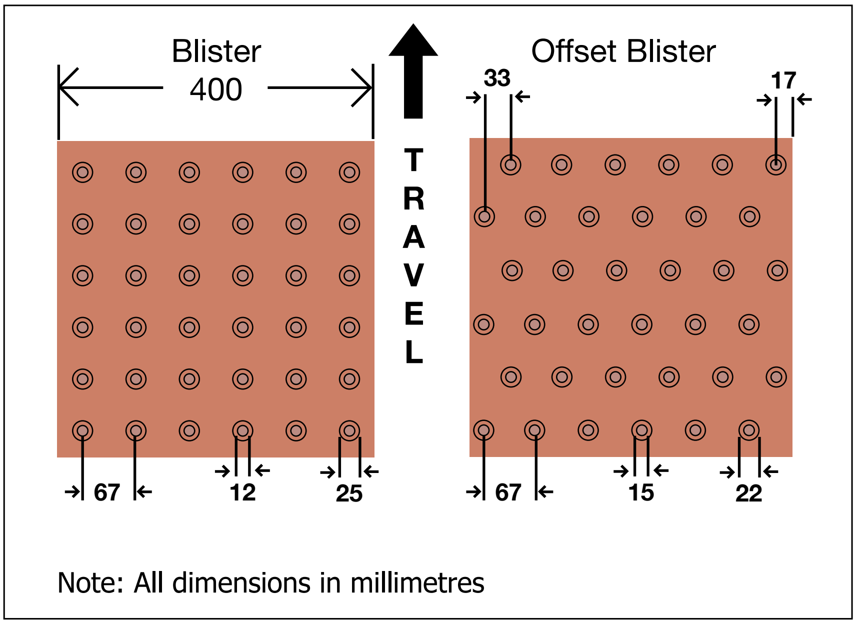


Image 1.37a Example red blister paving.

Image 1.37b and Image 1.37c Example red blister paving.

The Offset Blister units are used to indicate the edge of the platform at Rail and Tram stations, also referred to as off-street applications. Note that the orientation of the offset blister units is critical - the rows of blisters MUST be parallel to the platform edge, and they are generally placed approximately 500mm back from the edge.

Image 1.38 Example of buff coloured offset blister units.

The back edge of all blister surfacing, whether at controlled or uncontrolled crossing points should be perpendicular to the line of travel. This will help people who align themselves with the rear edge of the tactile paving to orientate themselves correctly with the direction of the crossing.

1.5.6.2 Corduroy paving for hazards

Tactile paving with a corduroy surface is used to warn pedestrians that they are approaching a hazard and should proceed with caution. It is used to identify the presence of specific hazards including steps, where a path or pavement joins a shared route, at level crossings and at the bottom of ramped approaches to on-street light rapid transit platforms.

Tactile paving with a corduroy surface should not be used on other ramps, on raised bus stops or to warn of obstacles on an access route. Corduroy hazard warning paving should visually contrast with the adjacent paving surfaces, but it should not be red as this colour is restricted to blister paving at controlled crossing points. The raised bars of the corduroy paving should be laid perpendicular to the direction of travel in all situations.

Image 1.39 and Image 1.40 Example of corduroy surface at top of steps.

Hazard Warning units use continuous half-rods, raised 6mm higher than the surface of the paving, to denote a hazard, such as the top/bottom of a flight of steps. Again, the rods should be parallel to the edge of the hazard.

Cycleway paving uses continuous flat bars to indicate a cycle lane. The bars run parallel to the direction of travel so as not to impede cycles. Where a cycleway and a footpath are adjacent, these pavings may also be used for the pedestrian section, with the bars running transversely, and a demarcation strip between the two.

Figure 1.20 Examples of hazard warning and cycleway paving.

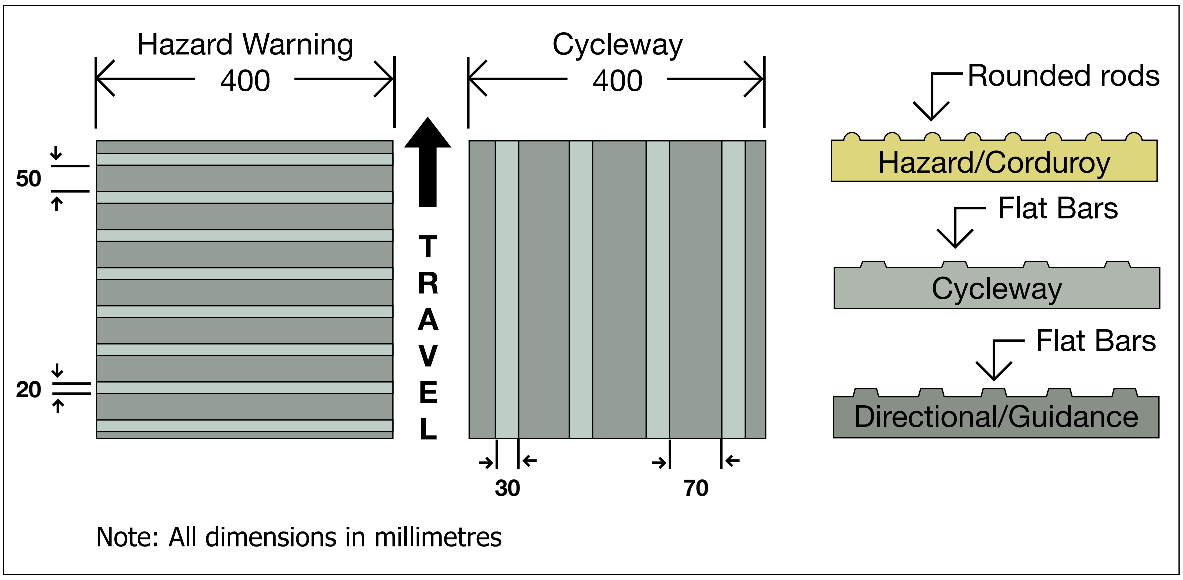


Image 1.41 and Image 1.42 Note that the tactile paving is aligned longitudinally for the cycleway section (right-hand side) and transversely for the pedestrian section (left-hand side).

Where used to warn of an approaching flight of steps, corduroy paving should extend to the full width of the steps, plus at least 400mm to either side wherever possible. However, the corduroy paving must not extend across an adjacent ramp, access route or facility such as a lift.

Corduroy paving should be positioned 400mm from the first step and extend to a depth of 800mm if the steps are in the direct line of travel or 400mm if a deliberate turn through 90 degrees is required. The dimensions and positioning are critical to alert people to the approaching hazard and to give adequate time for people to adjust their walking speed. Refer also to **Section 1.5.2** and **Figure 1.12**.

Checklist - Tactile paving surfaces
• Use tactile paving surfaces sparingly and after consultation with groups representing people with visual difficulties.
• Use tactile paving consistently and strictly in accordance with detailed recommendations.
• Use blister tactile surfacing to highlight the absence of a kerb.
• Use red blister surfaces at controlled crossings.
• Use buff blister surfaces at uncontrolled crossings.
• Use corduroy hazard warning surface at top and bottom of external steps.

1.6 Protection of Outdoor Works

The process of construction work, whether maintenance, repair or new build, can cause significant risk to passers-by unless it is carried out properly. Work to premises on privately-owned land may require the erection of scaffolding or the temporary use of areas of the footpath or roadway for storage purposes. Maintenance and repair work to underground services, such as drains, water mains, gas mains and telephone and electrical cables, often involves the excavation of public rights of way and frequently the storage of spoil and construction materials in the vicinity of the works.

Elderly people, and those with visual or mobility difficulties are particularly at risk from temporary obstructions or openings in the footpath. Using the roadway to avoid a footpath obstruction is also unsafe.

1.6.1 Construction sites

The erection of scaffolding or hoarding on pavements and public rights of way can narrow the walking space and can, unless properly protected, increase the risk of collision with protruding objects.

Where scaffolding is positioned over the pavement, clear headroom of 2200mm should be maintained. An overhead platform should be erected to the full width and length of any pavement to protect people below from falling objects. The use of cross-bracing should be avoided below 2200mm, unless it is located away from the route of pedestrian travel. Where cross-bracing is used, a tapping rail or board should be provided.

It is preferred that scaffolding in public areas is enclosed within a hoarding as this reduces the potential for collision. The hoarding should have no protruding parts, sharp edges or outward opening-doors and be well illuminated during darkness.

Any scaffolding that is not enclosed should be highlighted in a contrasting colour or tone so that it is clearly visible to all pedestrians.

Where a hoarding or scaffolding is erected on the footpath, and passage is restricted, a 1800mm unobstructed width should be maintained in busy areas or a recommended width of 1200mm in less populated areas to enable pedestrians to pass safely. Protruding parts such as pole ends should be minimised, but where they do occur, should be sleeved or boxed in. Hoardings should be highlighted with a contrasting band, at least 150mm deep, and positioned 1400 to 1600mm above ground level.

The provision of a continuous handrail 900 to 1000mm above ground level will assist pedestrians with visual difficulties in finding a safe route through scaffolding and to locate any public entrance.

If it is not practical to provide a safe route through the scaffolding, an alternative route should be provided. If pedestrians are diverted onto the roadway, the pedestrian route should be separated from the traffic and any site vehicles or equipment by a physical barrier on either side.

The name and address of the scaffolding company and of the authority which granted the hoarding licence should be clearly displayed.

1.6.2 Roadway and pavement maintenance

Work on pavements and roads, such as the renewal of surfaces, buried cables and pipes also present an inconvenience and a potential hazard to pedestrians.

All work should be protected to the full extent by a continuous barrier, which should be between 1000mm and 1200mm high and incorporate a tapping rail, 150mm to 200mm deep, with its lower edge on the ground or up to 200mm above the ground surface.

The barrier should be a rigid hoarding that cannot be knocked over and it should visually contrast with the surrounding surfaces.

Path and pavement widths around roadworks and to any temporary footpaths should follow the guidance in **Section 1.5.1**.

Where temporary paths are located on the carriageway, dropped kerbs or raised footways should be provided. If people must use the public roadway it should be clearly marked and signalled to motorists.

A1 Definition of Universal Design

Universal Design

'Universal Design refers to the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or disability.'

Synopsis of the Disability Act, 2005.

A2 Human Abilities and Design

The following piece of text is an extract from European Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons and persons with disabilities'.

It states that: Physical, sensory and mental abilities vary from person to person and for individuals as they get older. Diversity is normal. Designers need to be aware of difference across the range of human abilities, and of associated design considerations.

(a) Physical abilities

This includes walking, balance, handling, pulling, pushing, lifting and reaching. Many activities involve simultaneous use of more than one of these skills. Physical strength and stamina may also affect people's abilities to perform these actions.

Walking

For some people walking on the level or up gradients is difficult. Some people may have a limited walking range, may have difficulty with turning movements or may use mobility devices such as crutches or a walker. They may need to stop frequently, to regain strength or catch breath. Design considerations include provision of handrails, seats at regular intervals, convenient set-down parking and adequate time for slower pedestrians at road crossings. Designers should also consider the needs of people walking and engaging in sign language when designing access to and from buildings plus within the buildings themselves.

Balance

Balance limitations can affect someone's gait or control of hand movements. Design considerations include handrails, regular seating, and providing controls within easy reach. A surface against which a person may stumble against or walk into should be designed to limit abrasion.

Handling

A significant minority of people are left-handed. Some people may have restricted use or no use of one or both hands, or may have limits on strength or precision. Facilities and components should be designed to be suitable for use with either hand or with one hand only. Handling includes gripping, grasping and manipulation. Each of these has a different purpose with specific design considerations. For instance, components should be designed to be easily held. The circumference of the supporting structure and stability are critical. Manipulation involves the moving, turning and twisting of components with a hand or hands. For those who have limited manipulation abilities, size and shape and ease of movement are critical. Another option to consider is to design for manipulation by using a pushing, pulling or pressing action using a clenched fist, or by using the wrist or the elbow.

Strength and endurance

Strength and endurance may be required on sloping paths and floors, stairways and long travel distances, when sustained effort may be needed.

For those with limited endurance, frequent resting-places are essential.

People generally find it easier to push a component, than to pull it. This is particularly so if the individual uses a wheelchair. Self-closing devices on manual doors can be difficult for some people to operate, particularly if the doors are required to resist wind forces. For these reasons, doors that open and close automatically are preferred.

Lifting

Activities such as opening a vertically sliding sash window and an upward opening access gate, should be designed to be easily operated with minimal force.

Reaching

Design has a role to play in ensuring that key components in a building or environment are in easy reach, bearing in mind the range of people's sizes and abilities. Having components within easy reach is particularly important for those with more severe limitations in mobility. The reach range is dependant on the height and arm length of the person, use of the arms, and the balance and mobility of the upper body. A 'comfortable reach range' has been defined as one that is appropriate to an activity that is likely to be frequent and in need of precise execution and that does not involve stretching or bending from the waist. Putting things within comfortable reach can ensure use by a greater number of people. An 'extended reach range' has been defined as one that is appropriate to an activity that is likely, neither to need precision nor to be frequent and that can involve stretching or bending from the waist.

(b) Sensory abilities

Speech

Some conditions affect the capacity for or quality of speech. Two-way communication can be facilitated by environments designed to minimise barriers to hearing low or indistinct speech.

Hearing

People differ in their capacity to hear sound, to determine its direction, its source, to discern pitch, frequency, volume and variation and to separate out different sounds. Hearing quality is important for communication, for information, and for detection of hazards such as traffic. Many people with hearing difficulties

use a hearing aid which amplifies all sounds caught by the microphone, making communications very difficult in noisy environments. Keeping background noise level low is essential. The selection of structural and surface materials can make a substantial difference in audibility. Auditoriums, meeting rooms and reception areas can benefit from additional sound enhancement such as a loop system. The careful design of illumination can assist in communication such as lip reading and sign language. Provision of visual information and visual alarm systems can communicate information to those who have hearing difficulties or who cannot hear. Designers should also consider the colour and size of rooms and even the furnishing arrangement as this is very important for visually based communication. Also the use of vibration as means of sensing others should be considered.

Sight

Vision allows an individual to be aware of the luminance of surfaces, objects, form, size and colour. For people who are blind or who have visual difficulties, the provision of suitable tactile walking surface indicators and tactile or acoustic warnings at hazardous locations, should provide information on using the built environment and should limit the risk of injury. The built environment can be designed for orientation by providing sound cues and tactile cues. An easily discernible system of 'way finding' should also be considered. For people with limited, but low vision, effective visual contrast between surfaces or objects helps to identify critical locations. Warning markings on glass surfaces, and markings on the edges of stair treads, help minimise hazards.

Differences in friction between one floor surface, or one stair tread surface, and the next should be avoided. Therefore, adjacent surfaces that display different standards of slip-resistance, or that depend on raised surfaces, should be carefully considered

Touch

In selecting surfaces in the built environment that people will need to touch (such as handrails, handles, knobs and controls, tactile information), it is important to select materials that avoid distress, injury or allergies. Surfaces should be free of abrasions. Metals that may cause adverse reactions when touched should be avoided.

(c) Mental abilities

Mental abilities include cognition, intellect, interpretation, learning and memory. People differ in their knowledge, their capacity to understand, reason, or interpret information. Designing for differences in these capacities helps provide a usable environment for the population at large, from the very young to the old, and people of diverse abilities. Means of communication in the environment should be designed to be immediately and easily understood, and correctly interpreted. As people age, some experience loss of memory or find it increasingly difficult to absorb new information, so changes in the environment should be carefully considered before implementation.

Design considerations that take account of mental abilities

Aural and visual messages should be simple, clear and have immediate impact. Figures, symbols and simple words are likely to be the most effective. Symbols should be instantly recognisable as representing images seen and activities undertaken in everyday life.

Way finding should be simple, such as tactile, graphic, audible or architectural cues that are easy to follow. Signage should be large and clear. Way-finding maps should be clear, indicate the person's whereabouts in the building or facility, and be free from extraneous information.

(d) Age and size

Accommodating the developing child

It is important to create environments that are safe, accessible and useable for children. Individual components should be safe and useable as age-appropriate. Learning to manage risk is an essential part of a child's development.

Accommodating ageing adults

Life span within the human population is increasing. More and more we expect to maintain an economic and social life within both the public and private domains as we age. However, many human faculties are in decline as we age, such as mobility, dexterity, stamina, strength, hearing, sight, or memory. Familiarity with a particular environment is important.

Diversity of size

The population contains a diversity of sizes and heights, from children, to the diversity in the height of fully-grown adults. The positioning of components and the heights of building elements such as steps should recognise the diversity of height. Increased weight and girth is now also a feature of the population.

Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'.
http://www.cen.eu/cen/Sectors/Sectors/ISSS/About_ISSS/Documents/cclcgd006.pdf

A3 Further Reading

National and International standards and codes of practice

AS 1428.1-2001 Design for access and mobility. General requirements for access – New building work.

AS 1428.2-1992 Design for access and mobility. Enhanced and additional requirements – Buildings and facilities.

AS 1428.3-1992 Design for access and mobility. Requirements for children and adolescents with physical disabilities.

AS 1428.4-2002 Design for access and mobility. Tactile indicators.

BS 4800: 1989 Paint colours for building purposes (whilst the colours in this standard cannot be seen on CD-ROM or online the text can still be used).

BS 5395-1:2000 Stairs, ladders and walkways – Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders.

BS 5588-8:1999 Fire precautions in the design, construction and use of buildings – Part 8: Code of practice for means of escape for disabled people.

BS 5776:1996 (incorporating amendment No.1) Specification for Powered stairlifts

BS 6440:1999 (Incorporating amendment No.1) Powered lifting platforms for use by disabled persons – Code of practice.

BS 6440:1999 Powered lifting platforms for use by disabled persons – Code of practice (partially superseded by BS EN 81-40:2008. The remainder of BS 6440:1999 will eventually be superseded by EN 81-41: 2009 Safety rules for the construction and installation of lifts – Special lifts for the transport of persons and goods – Part 41: Vertical lifting platforms intended for use by persons with impaired mobility).

BS 6465-1:2006+A1:2009 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.

BS 6571-4: 1989 Vehicle parking control equipment – Part 4: Specification for barrier type parking control equipment.

BS 7036-1:1996 Code of practice for Safety at powered doors for pedestrian use – Part 1. General.

BS 7036-4:1996 Code of practice for Safety at powered doors for pedestrian use – Part 4. Low energy swing doors.

BS 7997:2003 Products for tactile paving surface indicators – Specification.

BS 8300:2009 (Incorporating amendment No.1) Design of buildings and their approaches to meet the needs of disabled people – Code of practice.

BS 8493:2008 (+A1:2010): Light reflectance value (LRV) of a surface – Method of test.

BS 8501:2002 Graphic symbols and signs – Public information symbols (AMD 16897).

BS EN 115:1995 Safety rules for the construction and installation of escalators and moving walkways.

BS EN 15838:2009 Customer contact centres, Requirements for service provision.

BS EN81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passengers lifts – Part 70: Accessibility to lifts for persons including persons with disability.

Building Regulations (Part M Amendment) Regulations 2010 (S.I. No. 513 of 2010).

Citizens Information Board – Accessible information for all (2009).

DD 266:2007 (Draft for Development) Design of accessible housing – Lifetime home – Code of practice.

I.S. EN 1991-1-1:2002 – Eurocode 1: Actions on structures Part 1-1: General actions – densities, self weight, imposed loads for buildings (including Irish National Annex: 2005).

I.S. EN 81-1: 1999 Safety rules for the construction and installation of lifts – electric lifts (Amd 1) (+A3:2009).

I.S. EN 81-2:1999 Safety rules for the construction and installation of lifts – hydraulic lifts (Amd 1) (+A3:2009).

I.S. EN 81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passenger lifts. Accessibility to lifts for persons including persons with disability (Amd A1:2005).

I.S. EN 997:2003 (+A1:2006) WC pans and WC suites with integral trap (AMD Corrigendum 14805) (AMD 16965).

IEC 60118-4:2006 Electroacoustics. Hearing aids. Induction loop systems for hearing aid purposes. Magnetic field strength (ISBN 978 0 580 50047 3).

International standard for Induction loops. IEC 60118-4.

Irish Code of Practice on Accessibility of Public Services and Information Provided by Public Bodies www.nda.ie/website/nda/cntmgmtnew.nsf/0/3DB134DF72E1846A8025710F0040BF3D/$File/finaldrcode_nda.htm

Key cards should conform to EN 1332. For further information on key cards please see: http://www.universaldesign.ie/useandapply/ict/itaccessibilityguidelines/smartcards/guidelines/smartcardguidelines/cards

Lifetime Homes Standard: http://www.lifetimehomes.org.uk.

Norwegian Universal design of building standard, 2009.

Passenger Lift Design: The Machinery Directive 2006/42/EC; Lifts should conform to BS 6440.

National and international reference documents

2020 Vision – Sustainable Travel and Transport: Public Consultation Document. Department of Transport.

Bus Based Park and Ride – A Pilot Scheme. A Report to: Dublin Transportation Office. The TAS Partnership Limited, 2002.

City of London 2006 Facility Accessibility Design Standards. London, Canada, 2006 Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Gallaudet DeafSpace Design Guidelines 2010.

Department of Transport & the National Disability Authority Guidelines for Accessible Maritime Passenger Transport http://www.nda.ie/website/nda/cntmgmtnew.nsf/0/45AA46D1F77D7EF2802576DC005C5954?OpenDocument

Department of Transport, UK 'Traffic Signs Manual'.

Dublin City Council (2007) Variation (No. 21) of the Dublin City Development Plan 2005 – 2011. Available from: http://www.dublincity.ie/Planning/DublinCityDevelopmentPlan/VariationstotheDevelopmentPlan/Documents/AdoptedVariationNo21Spec.pdf.

Guidance on the use of tactile paving surfaces. Department for Transport, UK.

Guidelines for an accessible public administration. Towards full participation and equality for people with disability. Office of the Disability Ombudsman, Sweden.

Inclusive Mobility. Department for Transport, UK.

International Best Practices in Universal Design. A Global review. Canadian Human Rights Commission, 2006.

Irish Wheelchair Association: Best Practice Access Guidelines 2010.

Joseph Rowntree Housing Trust.

Parking for disabled people. Department for Transport, UK.

Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Rail Park and Ride Strategy for the Greater Dublin Area. Dublin Transportation Office, 1994.

Regulation of Bus services outside the Greater Dublin Area. Department of Transport.

"Sign Design Guide and Inclusive mobility," Oxley, P. (2003), Inclusive Mobility. Department for Transport, UK. www.mobility-unit.dft.gov.uk

Smarter Travel 'A Sustainable Transport Future' – A New Transport Policy for Ireland 2009 – 2020. Department of Transport.

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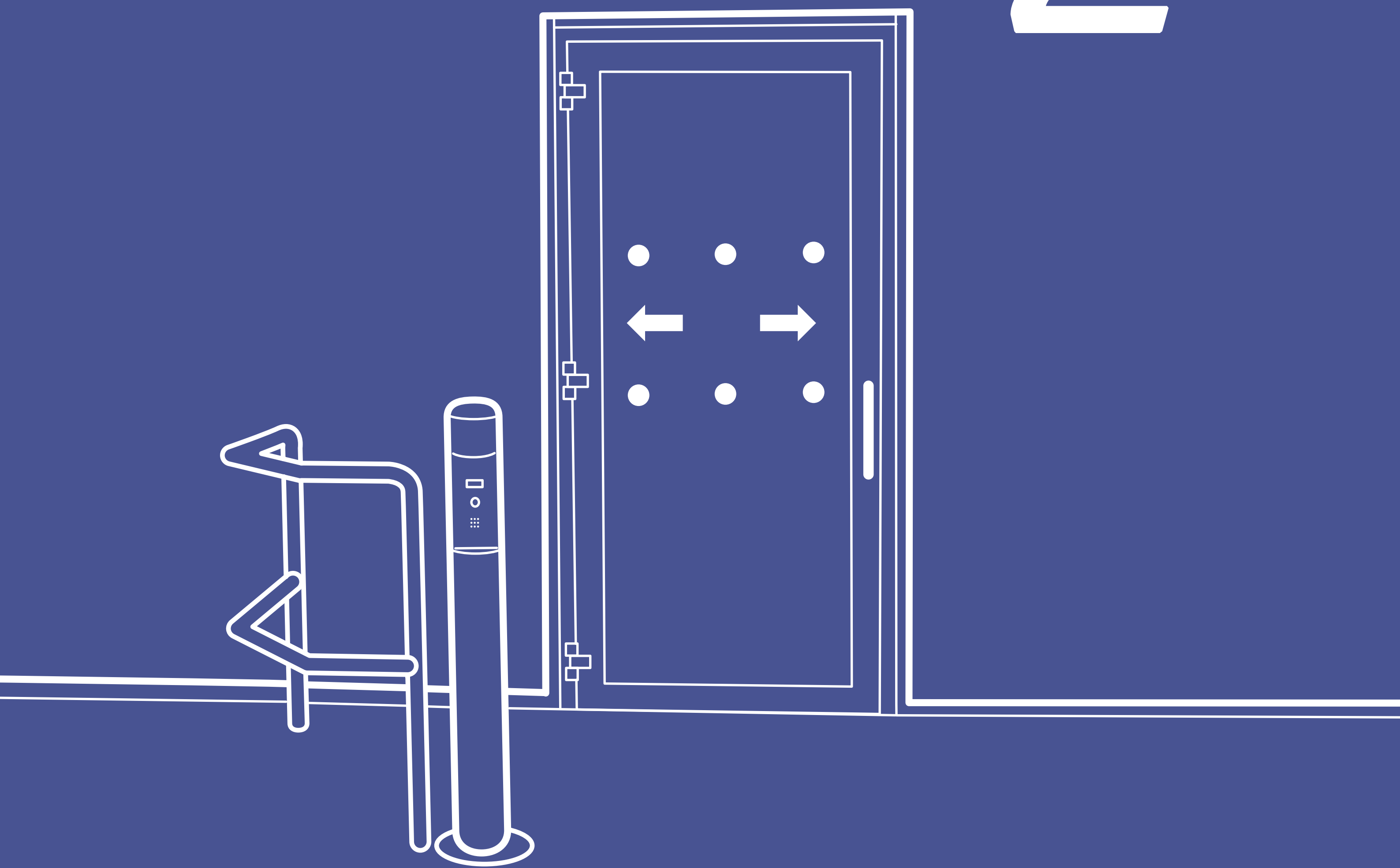
Building for Everyone:

A Universal Design Approach

Entrances and horizontal circulation

2



Centre for Excellence in Universal Design

Creating an environment that can be used by all people, regardless of their age, size, disability or ability.

The National Disability Authority's Centre for Excellence in Universal Design has a statutory role to promote the achievement of excellence in universal design in:

- the design of the built and external environment
- product/service design
- information and communications technologies (ICT)
- the development and promotion of standards
- education and professional development
- raising awareness of universal design

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Building for Everyone

Booklet 2 - Entrances and horizontal circulation

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Booklet 3 - Vertical circulation

Booklet 4 - Internal environment and services

Booklet 5 - Sanitary facilities

Booklet 6 - Facilities in buildings

Booklet 7 - Building types

Booklet 8 - Building management

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2.0 Objectives

The guidance in this booklet promotes the concept and philosophy of universal design and encourages developers, designers, builders and building managers to be innovative and think creatively about solutions that meet the needs of all building users regardless of their age, size, ability or disability.

The objectives of the series of booklets are to:

- identify and promote best practice with regard to universal design of the built and external environment
- provide best practice guidelines while recognising existing regulations in Ireland
- provide guidelines that are usable by and accessible to the target audience
- promote the achievement of universal design in Ireland

The objectives of this booklet are to:

- identify and promote best practice for access to and understanding of entrances to buildings and the horizontal circulation within buildings with regard to universal design
- increase awareness of, and to encourage designers to identify, the needs of all those who require access to buildings and the horizontal circulation within buildings in order to undertake daily activities
- highlight the wider benefits experienced by all when accessible and universally designed features are provided in building entrances and interiors
- encourage designers to provide universally designed solutions for the entrances to buildings and the horizontal circulation within buildings that look beyond the recommended requirements of national building regulations

2.1 Introduction

This booklet is part of the series "Building for Everyone – A Universal Design Approach," which aims to provide practical guidance on the universal design of buildings, places and facilities.

Universal design places human diversity at the heart of the design process so that buildings and environments can be designed to meet the needs of all users. It therefore covers all persons regardless of their age or size and those who have any particular physical, sensory, mental health or intellectual ability or disability. It is about achieving good design so that people can access, use, and understand the environment to the greatest extent and in the most independent and natural manner possible, without the need for adaptations or specialised solutions (see full definition in **Appendix A1**).

Why universal design?

People are diverse - some are left-handed and some right-handed - and vary in their age, size and functional capacities. Illness or disability (whether temporary or permanent) can also affect characteristics such as a person's mobility, dexterity, reach, balance, strength, stamina, sight, hearing, speech, touch, knowledge, understanding, memory, or sense of direction. A reference list with these booklets indicates some of the key differences in human abilities that should guide design of buildings and of outdoor places. (See full description of Human Abilities in **Appendix A2**).

People of diverse abilities should be able to use buildings and places comfortably and safely, as far as possible without special assistance. People should be able to find their way easily, understand how to use building facilities such as intercoms or lifts, know what is a pedestrian facility, and where they may encounter traffic.

Given the wide diversity of the population, a universal design approach, which caters for the broadest range of users from the outset, can result in buildings and places that can be used and enjoyed by everyone. That approach eliminates or reduces the need for expensive changes or retro fits to meet the needs of particular groups at a later stage.

It is good practice to ascertain the needs of the range of expected users as early as possible, and to check the practicality and usability of emerging designs with a diverse user panel.

Designing for one group can result in solutions that address the needs of many others. For example:

- level entry (Step-free) entrances facilitate not just wheelchair users but also people with buggies; people with suitcases or shopping trolleys; people using walking or mobility aids; and people with visual difficulties
- larger toilet compartments provide easier access to wheelchair users; those with luggage or parcels; parents with pushchairs or accompanying small children; those using walking or mobility aids; and larger-sized people
- clear, well-placed signage that uses recognised symbols or pictograms helps people with reading or cognitive difficulties, and those whose first language is neither English nor Irish

Sometimes one solution will not suit all and a range of options will need to be provided, for example:

- providing both steps and a ramp where there is a change in level
- providing parking ticket machines that offer slots at different heights to facilitate use at standing height, at sitting height, and by people of small stature

This series of booklets is for architects, engineers, planners, developers, designers, building contractors, building workers, building managers, and others involved in designing, commissioning and managing buildings and their surroundings. It provides guidance on a universal design approach to all new buildings, and the use and adaptation of existing environments.

Those who commission, design, construct or manage any part of the built and made environment also have a duty of care to adhere to relevant legislation and regulations including equality legislation, building regulations and health and safety regulations.

The guidance is based on a best practice approach, drawing on up-to-date international best practice; guidelines and standards; previous guidance by the National Disability Authority; and extends beyond disability access matters to incorporate a universal design approach. The series is fully compatible with Part M (2010) of the Building Regulations and associated Technical Guidance Documents related to Part M.

A disability access certificate is required for new buildings other than dwellings (including apartment buildings) and certain other works (as set out in Article 20 D (1) of SI 351 of 2009) to which the Requirements of Part M of the Building Regulations apply, which commence or take place on or after 1 January 2012. Further details on these and other relevant standards, codes of practice, and professional codes of practice are listed in **Appendix A3** Further Reading.

The detailed guidance provided here does not represent the only possible solution. Designers may come up with other ways to meet a diversity of users. New materials and technologies that emerge may open up further possibilities of accommodating the diversity of the population.

Checklists are provided throughout the series and while they provide a summary of main considerations and technical criteria, they should not be regarded as a substitute for the main text or an exhaustive list.

A comprehensive **index** is also available with the suite of booklets.

The Building for Everyone series is available online at **www.nda.ie** and **www.universaldesign.ie**. Electronic links are provided to relevant sections in the different booklets. As standards and requirements develop, the electronic versions of these booklets will be updated.

The electronic version is produced in accessible PDF format, in accordance with the Web Content Access Guidelines 2.0. If you have any difficulties in this regard or require the document, or particular sections, in alternative formats, please contact the Centre for Excellence in Universal Design at the National Disability Authority, **info@ceud.ie** or (01) 6080400.

2.2 Terminology

Accessible design – Design focussed on principles of extending standard design to people with some type of performance limitation to maximize the number of potential customers who can readily use a product, building or service.

Building – A permanent or temporary structure of any size that accommodates facilities to which people have access. A building accommodating sanitary facilities may include a toilet block in a public park or shower facilities at a campsite. A temporary building may include portable toilet facilities such as those provided at outdoor events.

Building user – Any person regardless of their age, size, ability or disability using facilities in a building or associated external environment.

Coir matting – A coarse kind of carpet made from coconut fibre usually used as a floor mat in matwells at building entrances.

Matwell – Entrance Door Matting Systems set into a frame in the floor.

Vision panel – A fixed, glazed panel set into a door that enables people to see through from one side of the door to the other. May also be termed 'viewing panel.'

Door ironmongery – A collective term for components including hinges, handles, locks and self-closing devices, which are used to facilitate the correct functioning of a door. May also be termed 'architectural ironmongery' or 'door furniture'.

Transom – A horizontal crosspiece across a window or separating a door from a window over it.

Universal Design = Useable = Understandable – Understanding users needs. For example an older person may require many resting places due to discomfort when walking for long distances.

2.3 Design Issues

2.3.1 Appearance and function

The design of an entrance has a significant influence on both the appearance and functionality of the building. Entrances signify the point of access to a building; provide a focal point for staff, residents and visitors; and serve to welcome people into the building. They may also characterise in a visual and practical way the ethos of the building or organisation and its approach to universal design.

A clearly visible and accessible entrance is likely to create a positive impression for all building users and make them feel welcome. If an entrance is hard to find or if it is difficult to access due to heavy doors or narrow door width, it creates a poor first impression and may make some people feel less welcome or even excluded.

The design of reception and waiting areas, and the ease in which people are able to move independently around a building, have a similar influence on overall accessibility. A well-designed building layout with clear access routes and doors that are sufficiently wide and easy to operate will demonstrate a commitment to universal design throughout.

Image 2.1 Entrance to a county council office.

2.3.2 To let people in or to keep people out?

A building entrance may be required to serve potentially conflicting functions, such as to permit controlled access by staff or residents but to deny access to unannounced callers, as may be the case in some private offices or residential premises.

Other entrances may provide unrestricted access to all to the extent that doors are held fully open during the day, such as in some large retail stores. Some entrance doors will permit unrestricted access but will remain closed in order to conserve energy and to reduce the intrusion of traffic noise.

The design of an entrance must acknowledge these and other requirements whilst ensuring that everybody who is likely and entitled to enter a building is able to do so conveniently and independently.

Similarly, internal doors provide a means of enclosing a room or providing an effective barrier between adjacent areas for reasons of privacy, noise reduction, fire safety or security. However, they must also be designed to permit easy passage for people to allow them to access facilities and to exit a building safely.

Checklist – Building entrances appearance and function
• Entrances should signify the uses of a building or organisation and demonstrate positive approach to universal design.
• Entrances should be accessible whilst also maintaining security, environmental performance, and other requirements.

2.4 Entrances

Every building entrance should be easy to locate and clearly distinguishable from the rest of the building. The position of an entrance may be highlighted with architectural features such as a canopy or a door recess. A change in surface texture of the pavement or forecourt may help to signal the location of an entrance, particularly for people with visual difficulties.

Image 2.2 Example of an entrance canopy.

Audio clues, such as a small fountain or rustling plants, and olfactory features such as fragrant plants can also assist.

Artificial lighting can highlight the entrance to a building and make it more obvious at night for everyone.

In new buildings, all entrances – whether they are the principal entrance or any other entrance such as a staff entrance – must be universally designed.

It is not acceptable that people with different abilities such as people of different ages, size or disability should be required to use a secondary or alternative entrance.

In existing properties, site or building constraints may preclude universally designed access to the main entrance. All options for improvement should be considered in these circumstances, both internally and externally. Alterations to the internal layout of a building may provide the opportunity to create a new entrance in a more accessible and useable location. Externally, the provision of steps and ramps may be appropriate, or the installation of a platform lift if there is insufficient space for a ramp. However, if universally designed access still cannot be achieved, it may be necessary to provide an alternative entrance in a location that is accessible.

Any alternative entrance should be as freely available and clearly sign-posted as the principal entrance and should be available for everyone to use.

It is never acceptable for a service entrance to be the sole point of access for people with disabilities. Discrimination of this nature would be unacceptable in respect of any group.

Adequate space should be provided outside all entrance doors to enable people to manoeuvre, understand, access, and use any intercom or entry system. When leaving a building, people often pause outside an entrance to button a coat or open an umbrella; there should be sufficient space to do this without obstructing other people who are entering or leaving. Where entrances are located at the top or bottom of a ramp or a flight of steps, or at the end of a long passage, it is essential that sufficient space is provided for wheelchair users; parents with strollers; people with visual difficulties; guide dog users; and those with walking aids to manoeuvre and turn safely.

The recommended clear area for a landing or turning space immediately outside an entrance is 2400mm x 2400mm.

Outward-opening entrance doors should either be recessed or protected to avoid the risk of collision. Where outward-opening doors are located close to a flight of steps or a ramp, they should also be positioned to avoid the risk of anyone tripping or falling backwards down the steps or a ramp while opening the door.

The use of multiple doors would allow individuals a choice should they sense the approach of others to the same entrance, whether head-on or along-side. Refer to **Section 2.6.1** for further information on entrance doors.

Every accessible entrance must incorporate a level threshold, despite the challenge this presents in terms of waterproofing. Wherever possible, the threshold should be flush with the external ground surface and internal floor finish.

However, where a raised threshold is unavoidable for structural or other reasons, it should have an overall change in level of no more than 10mm, with any upstand greater than 5mm chamfered, ramped or pencil-rounded.

Features such as a recessed entrance or a canopy will help to reduce rainfall directly onto the area next to the doorway, thereby helping with the issue of waterproofing. The provision of drainage gullies adjacent or close to the entrance door can significantly reduce water penetration while not inhibiting access.

Recessed entrance doors and canopies also provide weather protection for people waiting outside. Protection from the weather is particularly useful if people are required to operate security or entry devices before being able to enter a building. It is recommended that a door recess or canopy should be 1200mm deep and have clear a head height of 2200 to 2500mm. Where single doors are recessed, they should have a 600mm-wide clear space adjacent to the handle-side of the door.

Where underground or multi-storey car parking is provided, both the lift and the principal entry to the building from that storey should be accessible from the car park.

If the entrance to a building is accessed via a pedestrian tunnel or an elevated walkway, the tunnel and walkway must be universally designed.

Where the only entrance to a building or facility is a service entrance, such as to an industrial unit, that entrance should be accessible.

Entrances to large buildings such as railway stations should have doors that are permanently left open so that access is unimpeded for all. If it is not possible to have a door-free entrance for security or environmental reasons, entrance doors should be fully automatic, as **Section 2.6.6**.

Entrances to buildings that are required to be secure, such as courts or police stations, should still be accessible, with the necessary security measures designed for universally designed access.

In multi-tenanted buildings, the entrance to each tenancy should be accessible, in addition to the common, shared or public entrance to the building.

Checklist – Entrances
• Ensure entrances are clearly visible and prominent.
• Make sure all entrances in new buildings are universally designed.
• Design alternative entrances to existing buildings to meet universal requirements.
• Provide adequate space inside and outside entrance doors.
• Establish clear landing space outside entrance of 2440mm x 2440mm.
• Arrange outward-opening doors so that they are recessed or guarded.
• Ensure threshold to entrances are level or no greater than 10mm with chamfered, pencil-rounded or ramped profile.
• Provide canopy or door recess for weather protection.
• Leave a clear space of 600mm adjacent to handle-side of door.

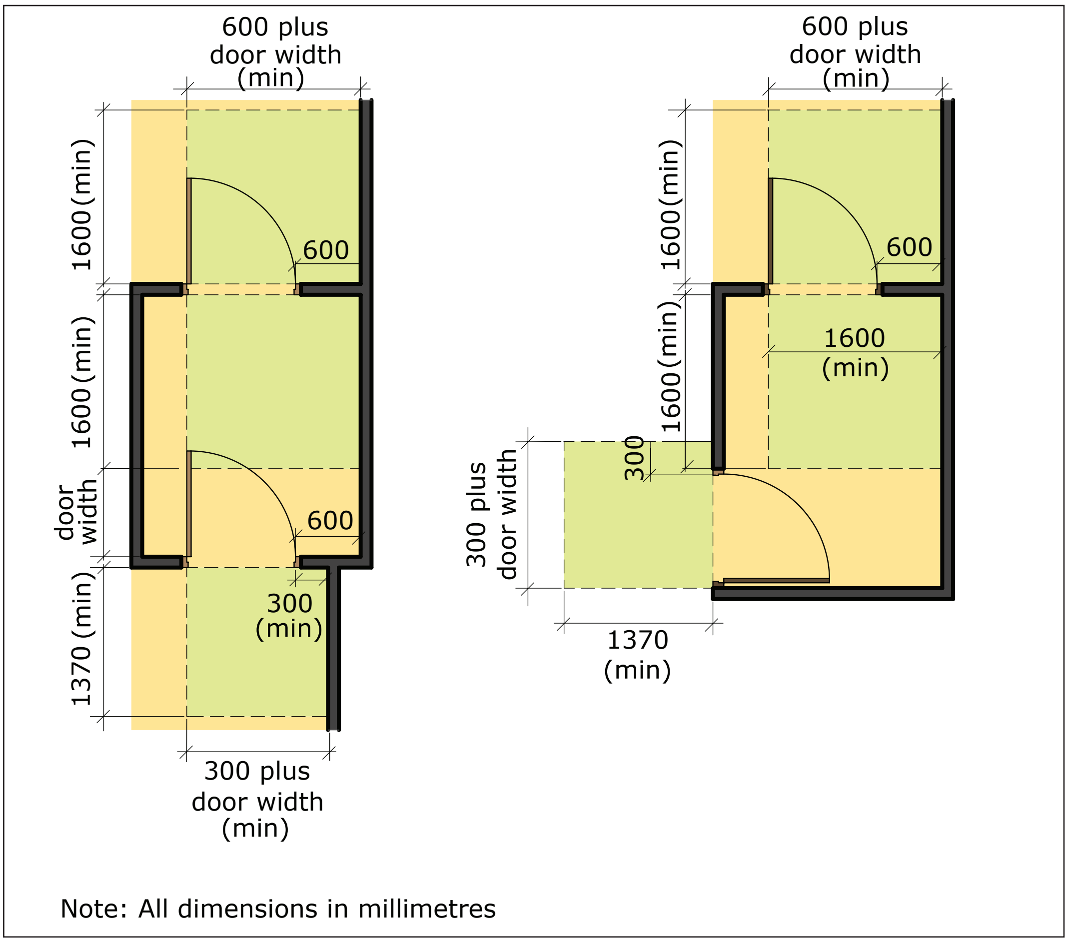
2.4.1 Entrance lobbies

An entrance lobby – that is, a lobby with an outer and inner door arrangement – is common practice in many buildings, and is often required for security or environmental reasons. However, it should not be considered imperative in every situation to create a lobby if the external doors and building layout are able to function without it. Even the most accessible doors create a potential barrier and reduce the available space. Therefore, if a lobby is not absolutely necessary, an entrance without one is likely to be a better solution.

Where they are required, entrance lobbies should be as large as possible, with adequate space for everybody to manoeuvre between both the inner and outer doors. The overall size will depend on a number of factors including the building type; the number of people expected to use the entrance at any one time, whether the entrance is in simultaneous use as an exit and whether any security features are required on either the inner or outer doors.

The entrance lobby to a small, ground floor office building will clearly be smaller than the lobby to a shopping mall, but it should still be accessible, useable, and meet the recommended dimensions shown in **Figure 2.1**. The entrance lobby to a large building such as a shopping mall or department store should be large enough to enable significant numbers of people to pass through in both directions. This is likely to require the provision of a series of doors side-by-side, with adequate lobby depth for people to move clear of one door before opening another. Where the level of traffic and frequency of use warrants, an automatic opening door should be fitted. See **Section 2.6.6** for further information.

Figure 2.1 Clear space requirements for lobbies.



Entrance lobbies to supermarkets and large retail stores should be designed to accommodate people pushing trolleys. For security reasons, these are often designed to permit only a one-way flow of people, but they still require adequate manoeuvring space.

In buildings in which the outer door is left unlocked, but the inner doors are subject to security controls, the size of the lobby should be sufficient for people to access the security controls, whether these are an entry system, intercom or security desk. There must also be ample room to manoeuvre between the inner and outer doors.

The recommended dimensions for entrance lobbies are illustrated in **Figure 2.1**. The key dimension is 1600mm between door swings. As discussed above, there will be many situations in which increased dimensions will be appropriate or necessary, such as in larger buildings; where large numbers of people are expected at any one time; or where security controls are in place.

Entrance lobbies should not be used as storage or display areas as this will reduce manoeuvring space and may present an obstruction or tripping hazard.

Items such as columns, ducts or piers should not project more than 100mm into the access route within an entrance lobby or they may cause an obstruction and be a potential hazard. In situations where this is unavoidable, such as in an existing building where structural items cannot be altered, a visually contrasting guard rail should be provided.

The lighting in entrance lobbies should be carefully selected and designed to provide a transition zone between the external and internal environment. When conditions outside are very bright, such as on a sunny day, a building interior can appear comparatively dull. During the hours of darkness, even a well-lit external approach can be much darker than the building's interior, and it can take time for people's eyes to adjust to the different conditions.

A sudden and substantial change in the lighting levels can create difficulties for many people and be painful to others. The lobby lighting should be designed to ease the transition between external and internal spaces, but also be adequate for safe circulation.

Where entrance lobbies comprise glazed screens or doors, care should be taken to ensure that they do not create distracting reflections, as this can be disorientating and potentially hazardous. Glazed components should be effectively highlighted incorporating permanent markings as set out in **Section 2.6.1**. The use of glass is not necessarily discouraged, but should be used with careful consideration. Glazing within an entrance or lobby area can be advantageous to many people as it enables a clear view into and out of a building. This provides reassurance to people entering a building for the first time and can help people to understand the layout of and the type of space they are entering. The use of glass lends further sensory awareness to people with hearing difficulties who can use reflected images to see people approaching from behind.

Matwells within entrance lobbies should be designed so that the mat is flush with the surrounding floor surface. The mat should remove rainwater from the soles of shoes, and from the wheels of prams, pushchairs, trollies and wheelchairs. Mats should have a firm, level surface. They should not be compressible or have deep pile, as such surfaces can be particularly problematic for people using crutches or wheelchairs or for anyone pushing a wheeled item such as pram, pushchair or trolley.

Image 2.3 Example of swing door into lobby.

Image 2.4 Example of glazed lobby with automatic sliding doors.

Image 2.5 Example of level entrance into lobby with matwell.

Checklist – Entrance lobbies
• Provide an entrance lobby only where absolutely necessary.
• Ensure external and internal doors are accessible, understandable and useable.
• Provide recommended 1600mm between door swings, as **Figure 2.1**.
• Ensure lobbies are clear of obstructions such as displays or stored items.
• Make sure lighting eases the transition between external and internal environment.
• Highlight glazed screens and doors effectively.
• Ensure mats are firm and flush with the adjacent floor surface.

2.4.2 Reception and waiting areas

A well-designed reception area will welcome people into the building and enable them to orientate themselves. It will also allow them to gain information about the building and its services, report to security or reception personnel, seek assistance if required and sit comfortably in a waiting area. It may provide access to other facilities such as telephones or interview rooms, depending on the building type.

A reception area or entrance foyer may comprise an open-plan hub at the centre of a large, busy building, connecting circulation routes on the entrance-level floor and to and from other floors. Conversely, it may comprise a small, enclosed area that provides a security and information function to a back-office. Whether it is a busy focal point, informal meeting place or a quiet security control point, it should be logically arranged, well signposted and accessible to everybody likely to use the building. All circulation routes should be clear and unobstructed and provide an obvious route of both exit and entrance.

The reception desk should be placed conspicuously so that it is obvious to everybody where it is located. The route to it from the entrance should be direct and unobstructed. The desk should be usable from both sides at a height of 950 to 1100mm for people standing and 760mm for people sitting down or using a wheelchair. A powered, height-adjustable desk may be considered in some applications. Detailed recommendations for counters and service desks are given in **Booklet 6: Facilities in buildings**.

Image 2.6 Example of a reception desk with two levels.
Note induction loop sign.

Image 2.7 Alternative view of a reception desk with two levels.

Reception desks should incorporate an induction loop system for the benefit of people who wear hearing aids, and the presence of the equipment should be clearly signed. Induction loops should also be used where ambient noise levels or the presence of a security screen makes communication difficult. The provision of a speech-enhancement system may also be appropriate.

In all spaces with inductive loop systems care should be taken to avoid the use of electrical and mechanical equipment that might cause electromagnetic interference.

Image 2.8 Example of signage for an induction loop at a reception desk.

Image 2.9 Example of signage for an induction loop.

Detailed recommendations for communication systems are given in **Booklet 4: Internal environment and services**.

Light sources, whether natural or artificial, should not be sited behind a receptionist. This causes silhouetting, which can make visual communication and lip reading very difficult. Where glazed screens are necessary for security, environmental or other reasons, they should not inhibit visual communication nor create confusing reflections. This often precludes placing windows or glazed external walls adjacent to or directly opposite the screen, as these will undoubtedly create reflections during daylight hours and in situations where there are external artificial lights.

Image 2.10 Example of reception desk with natural lighting.

Lighting, whether natural or artificial, should be controllable within a reception and waiting area, in order to provide appropriate levels of light at all times. Light fittings and windows should be located so as to avoid glare and to give a uniform spread of light. The provision of blinds, dimmer switches and computer-controlled lighting systems should be considered.

Floor finishes should be firm, even and slip-resistant. Contrasting colour can be used to define circulation routes, such as the route between the entrance door and reception desk. Where there is a potential for water to be carried into the reception area on the soles of shoes and on wheels, the floor finish should be carefully selected so as to maintain slip resistance when wet. Secondary matting may be required beyond any entrance lobby area for this purpose, particularly if the general floor finish is a non-porous surface.

If the type of building is such that people are required to wait for any reason, a comfortable seating area within sight of the reception should be provided, with an adequate number and range of seats. Even when waiting is not generally required, a small number of seats should be provided for people who are not able to stand for long periods. The seats could be labeled 'priority for disabled or older users'. Some people may need to rest after arriving at the building and before leaving, such as while waiting for a taxi. Seats are also useful surfaces on which to place bags while putting on or taking off a coat, as they avoid the need for a person to bend to the floor.

Seats should be of a colour that contrasts with the surrounding area. Seats should be in the range of 450mm to 475mm high and a recommended width of 500mm with firmly padded seats incorporating rounded front edges. Chairs with stiff backrests and armrests are easier for many people to get in and out of the chair. A proportion of the chairs should be without armrests for people who require more space. Seats should be moveable with adequate space in the seating layout to accommodate wheelchair users; parents with strollers; people with visual difficulties; guide dog users; and those with walking aids. For further information on waiting areas and general seating refer to **Booklet 6: Facilities in buildings, Section 6.5**.

Where lightweight and easy to use chairs are used, an issue arises with regard to maintenance of public waiting areas and potential lack of accessibility if chairs are scattered: Care is advised in maintaining a clear public waiting area.

Image 2.11 Example of seating. Please note that chairs fixed together can make it difficult to arrange for signed conversation. Where possible, lightweight and easy to move chairs are more universally desirable.

Toilets accessible to all building users, regardless of their age, ability or disability, should be provided adjacent to the reception area and should be clearly signed. Detailed recommendations for toilets are included in **Booklet 5: Sanitary facilities**.

Signage should be provided within the reception area to highlight key facilities such as lifts, stairs, toilets, telephones, and the main building functions. The provision of clear signage that is easy for everyone to understand benefits all building users and increases independence. Some people who experience communication difficulties may prefer not to have to ask for directions or assistance, so the provision of effective signage is paramount. Detailed recommendations for the design of signage are covered in **Booklet 4: Internal environment and services**.

Image 2.12 Example of signage with braille.

If telephones are provided in a reception area for public use, they should be accessible, easy to understand, and incorporate variable volume controls and an inductive coupler for the benefit of people who have hearing difficulties. The provision of a combined unit that enables people to telephone, send text messages or to email is recommended. Further information on the provision of public telephones is given in **Booklet 6: Facilities in buildings**.

Image 2.13 Example of pay-phones at two different levels.

Checklist – Reception and waiting areas
• Ensure logical arrangement of circulation routes and facilities.
• Make sure reception desk is clearly visible with direct route from entrance doors.
• Provide induction loop system at reception desk.
• Install well-designed lighting to optimise visual communication and lip reading.
• Avoid glare by using controllable light sources.
• Choose floor finishes that are firm and slip-resistant.
• Provide comfortable seating and free space for wheelchair users; parents with strollers; people with visual difficulties; guide dog users; and those with walking aids.
• Locate toilet facilities adjacent to reception area.
• Highlight the location of key facilities with well-designed, clear signage.
• Ensure telephones or combined telephone, text and email units are accessible and useable.

2.4.3 Queuing areas and temporary barriers

In venues in which people are required to queue for tickets, information or services, such as at visitor attractions, the queuing arrangement should enable everybody to move along the queue conveniently, safely and as comfortably as possible.

When designing queuing areas, consideration should be given to the likely numbers of people queuing at peak times and the speed at which they will move through the queue. Many people will be able to cope with being in close confinement with other people for a brief period if the queue is fast-moving. However, if a queue is likely to be static or very slow-moving, the arrangement should ensure less congestion, whether perceived or otherwise.

Seating should also be provided in queuing areas. For more information refer to **Booklet 6: Facilities in buildings, Section 6.5**.

Where barriers are provided to define queuing lines, they should be firmly fixed to the ground or floor and provide a recommended clear width between barriers of 1100mm. They should be arranged in parallel, logical lines. The barriers should incorporate a rigid rail to serve as a handrail while people are waiting or moving along the line. Barriers and handrails should visually contrast with the surrounding surfaces.

In venues where attendance is predictably greater at certain times, temporary barriers may need to be erected. It is preferable if these can still be firmly fixed; the use of floor sockets or fixing plates, designed to receive removable stanchions or barriers, is a useful solution. The sockets or fixing plates should be installed with the surface flush with the surrounding floor finish, and with an integral cover or cap to conceal any holes or brackets that may otherwise present a tripping hazard.

Image 2.14 Example of stanchions with retractable belt to form queuing line.

The use of unfixed barriers or stanchions with retractable belts are often used when a more flexible queuing system is required, or as a form of temporary barrier. These can present a potential hazard, particularly in areas where they are not normally situated, such as on principal access routes. Their use should be limited to situations where other options such as fixed barriers or hoardings are not practical. Where they are used, care should be taken to ensure that adequate manoeuvring space is maintained for all building users. This requires taking in to account the size of the projecting stanchion bases. In all situations, stanchions and belts should visually contrast with the surrounding surfaces so that they are readily identifiable.

Queuing announcement systems, such as those commonly used in healthcare buildings, are discussed in **Booklet 4: Internal environment and services**.

Checklist – Queuing areas and temporary barriers
• Fix queuing barriers firmly to the floor.
• Leave recommended aisle width of 1100mm.
• Ensure barriers incorporate rigid handrail and visually contrast with surrounding surfaces.
• Make sure sockets for temporary barriers are flush with floor surface and incorporate cap or cover.
• Limit the use of unfixed barriers.
• Provide seating at queuing areas.

2.5 Horizontal circulation

Horizontal circulation in a building may comprise access routes through open-plan areas, walkways, corridors and lobbies.

The overall arrangement of access routes should be logical, understandable, useable, and as direct as possible in terms of providing access to key facilities.

Travel distances should be minimised, although this of course will depend on the nature and size of the building. A well-designed building layout, with clear circulation routes that are easy to follow will benefit everybody.

Changes of level within a storey should be avoided if at all possible. Where this is not possible in an existing building, the installation of a ramp, passenger lift or platform lift may need to be considered and designed to be accessible. Elements of vertical circulation are covered in **Booklet 3: Vertical circulation**.

Image 2.15 Example of tactile surface at top and bottom of steps.

All circulation routes should be well maintained, free of obstacles and have adequate headroom. Windows should not open into circulation routes in a manner that would cause obstruction or reduce corridor width.

Open-plan areas in buildings such as offices, entrance foyers, shops and exhibition galleries are beneficial because they reduce the need for internal doors or other divisions, which often impede access. However, circulation routes should still be clearly defined, for example with the use of contrasting colour floor surfaces, a change in texture of floor coverings or the careful placement of furniture.

Potential obstructions or hazards should be adequately guarded and visually highlighted. The width of circulation routes should follow the guidance for corridors below.

Walkways typically provide an internal access route within a building or a link connecting one or more adjacent buildings in a large complex, such as a hospital or airport.

Enclosed walkways may bridge a road and link two buildings at first floor level or above.

Walkways are often lengthy and should incorporate seating at regular intervals to enable people to rest. It is also recommended that handrails be provided the full length of walkways and on both sides to provide support and directional guidance.

The width of walkways should follow the guidance for corridors below. However, it is likely in many circumstances that a greater width will be required in order to accommodate the number of people expected to use them.

Checklist – Horizontal circulation
• Plan overall layout to be as logical and direct as possible.
• Avoid changes of level within a storey.
• Maintain access routes carefully and keep them clear of potential obstructions.
• Ensure access routes through open-plan areas are well defined.
• Incorporate handrails to both sides of walkways and provide seating at regular intervals.

2.5.1 Corridors

Corridors in buildings accessed by members of the public should have a recommended clear width of 2000mm, as illustrated in **Figure 2.2**, to enable people to move in both directions and pass each other with ease.

In buildings that are not accessed by members of the public, a minimum corridor width of 1500mm is recommended.

In public buildings, DeafSpace recommends 2440mm wide corridors, and 2000mm for secondary corridors to allow space for people walking and signing to clearly view sign language.

Where a corridor is predominantly less than 1800mm wide, passing places should be provided. Passing places should be at least 2000mm long and 1800mm wide, and positioned within sight of another, or at intervals not exceeding 20m, whichever is the closer. Passing places also serve as turning areas, which are useful at corridor junctions, at the top of ramps and at the end of passageways. They enable wheelchair users and parents with strollers to turn and return along a corridor and generally improve access for all building users.

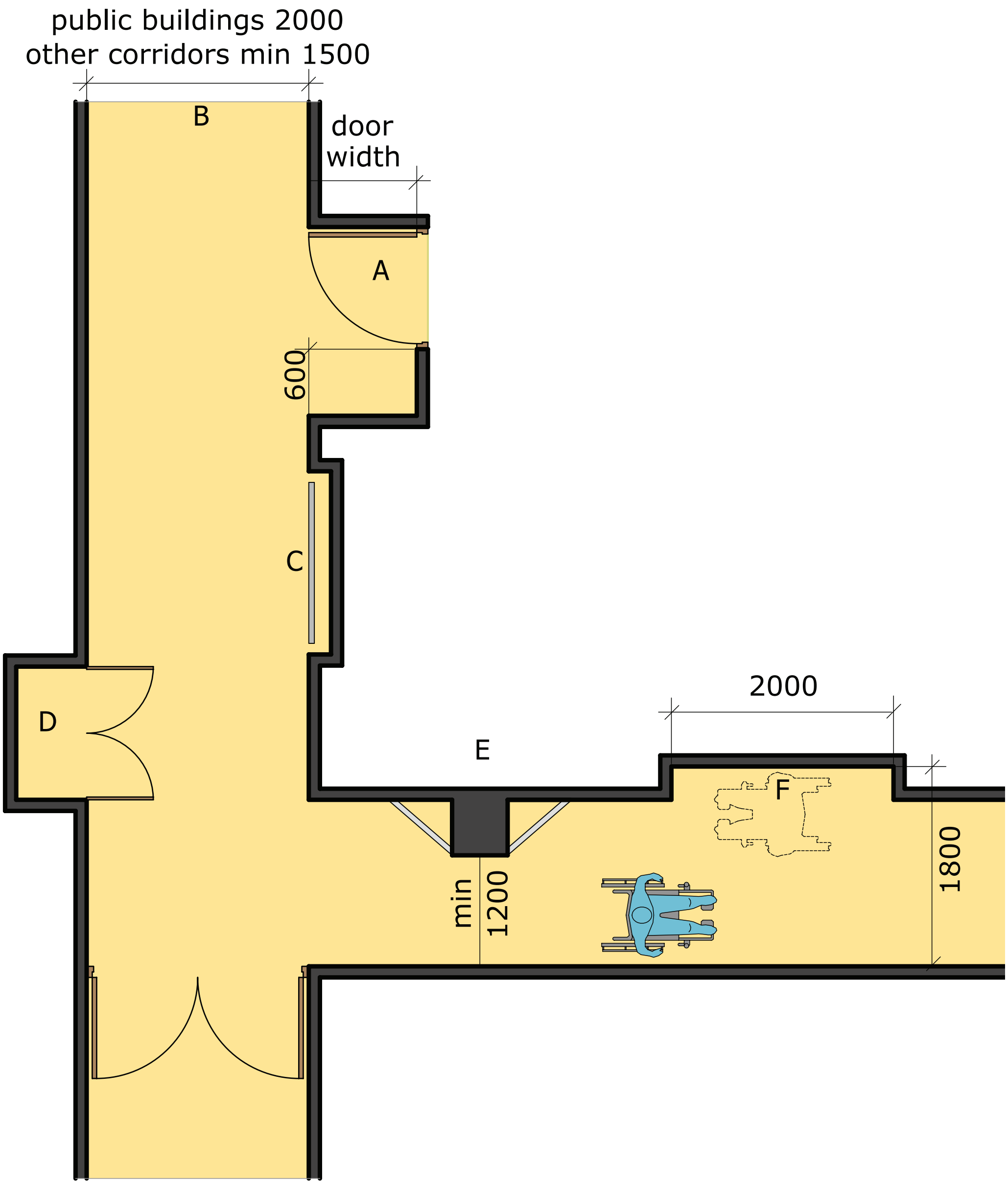
A wheelchair user or parents with strollers should never be forced to reverse along a corridor, as this can be a very difficult manoeuvre, particularly over a long distance.

It should also be noted that eased or translucent corners on corridors allow people with hearing difficulties to see others approaching and avoid collision.

Ensure the handrails are adequately fixed, comfortable to touch, and contrast in colour with the surrounding walls. The handrails should indicate where they are ending. Handrails may also be fitted across doors that are not in regular use.

Passing spaces also allow people with hearing difficulties to form conversation circles on corridors while allowing others to pass comfortably.

Figure 2.2 Clear space requirements for corridors.



Key

A. Outward opening doors such as doors to accessible toiltets to be recessed. The door recess to equal to the width of the door

B. Corridors in public buildings to be 2000mm wide. Other corridors to be minimum 1500mm wide with passing places

C. Radiators and other wall mounted items to be recessed

D. Duct or store; doors that are normally locked may open outwards, but should be clearly signed and protected when in use

E. Projections such as column or pipe ducts should be permanently guarded

F. Passing places to be provided to corridors less than 1800mm wide and to be minimum 2000mm long and 1800mm wide

Note: All dimensions in millimetres

Where there is a reduction in the width of a corridor, due to a projecting column or duct, for example, the resulting clear width should not be less than 1200mm and the projection should be guarded.

Items such as radiators and fire extinguishers should ideally be recessed so that they do not project into the clear width of the corridor.

Items such as plants or seats located in a corridor should be sited only where they do not cause an obstruction and where there is adequate clear width remaining.

The provision of handrails along corridors may be appropriate in some situations to provide support, balance and directional guidance. Handrails should be provided on corridors over 20m long. Where handrails are provided, the clear corridor width should be measured between the handrails and not between the walls. The position of radiators should be carefully considered in relation to handrails to ensure that the handrails do not become too hot.

On long internal corridors, seats should be provided at intervals of no more than 20m to enable people to rest. Seats should be positioned close to the corridor, but not obstructing the clear width. Detailed guidance on the provision of seating is included in **Booklet 6: Facilities in buildings**.

Image 2.16 Example of a corridor in a school.

Checklist – Corridors
• Ensure recommended 2000mm clear width for corridors in public buildings.
• Ensure recommended 1500mm clear width for corridors in other buildings.
• Provide passing places of 2000mm long x 1800mm wide in corridors less than 1800mm wide.
• Make sure short constrictions in width are not be less than 1200mm.
• Recess wall-mounted items wherever possible.
• Ensure any projections into the clear width are guarded.
• Consider using handrails for certain building types and in all cases where corridors are over 20m long.
• Provide seats at no more than 20m intervals on long corridors.

2.5.2 Internal lobbies

Wherever possible, buildings should be designed without the need for internal lobbies. Even the most accessible doors present a barrier to some people and the presence of a lobby impedes general access for all building users. However, it is acknowledged that internal lobbies will be required in certain circumstances, such as to provide fire separation, to act as an acoustic barrier, for security reasons or for privacy.

Where they are required, internal lobbies should be large enough to accommodate the number of people expected to pass through them at any one time, with adequate space for people to move clear of one door before opening the next, and with suitable doors and door controls.

The recommended dimensions for internal lobbies are the same as those for entrance lobbies, as illustrated in **Figure 2.1**.

The lobby arrangement should enable people to pass through in the opposite direction and provide sufficient space for manoeuvre. Again, the key dimension is 1600mm between door swings.

The floor surface within an internal lobby should be firm and level, and flush with the surface in the circulation spaces either side. It may be appropriate for the floor finish in the lobby to differ from that in the adjacent areas.

Any change in floor finish should occur at the line of the door and have edges firmly fixed with edge strips or threshold plates.

For further details on floor finishes, refer to **Booklet 4: Internal environment and services**. For details on internal doors, see **Section 2.6.4**.

Checklist – Internal lobbies
• Avoid creating internal lobbies unless absolutely necessary.
• Design lobbies in accordance with dimensions in **Figure 2.1.**
• Install floor surfaces that are firm and level.
• Ensure junctions between different floor finishes are fixed with threshold plates.

2.6 Doors

The design, specification and maintenance of doors and associated ironmongery can substantially affect the accessibility of a building. The very presence of a door presents a barrier by forming a division between adjacent rooms or spaces. Indeed, doors are designed to enclose and in many cases to seal tight against the weather, fire or sound. The requirement to provide easy and understandable access through doors often presents a significant challenge to designers.

As a starting point, designers should consider whether doors are necessary and, wherever possible, plan the building to minimise the need for doors.

Quiet and noisy areas of a building could be separated by a buffer zone to avoid the need for a lobby or heavy doors. In some buildings, door-free access can be provided to toilet areas, with privacy maintained by the careful positioning of walls and screens and effective ventilation achieved using pressure differentials.

(This requires a higher extract rate in the toilet area compared with the adjacent lobby or foyer so that air moves from the foyer into the toilet, rather than the other way round.)

Where doors are provided, they should be easy to identify, wide enough for people to pass through comfortably and easy to operate. In order to approach and open a door or to operate controls and ironmongery, sufficient space is required on both sides for a person to manoeuvre and for the door to swing or slide.

Checklist – Doors
• Avoid the use of doors where other solutions are possible.
• Consider how the building layout can be used to divide or screen areas as an alternative to using conventional doorways.
• Make sure doors are easy to identify, sufficiently wide and easy to operate.
• Ensure sufficient space is available on both sides of the door.

2.6.1 Entrance doors

Image 2.17 Example of an entrance to a town library.

There should be a clear space on both the inside and outside of an entrance door to enable people to manoeuvre and swing the door open. Greater space is required on the pull-side of swing-doors to enable a person to pull the door open and to manoeuvre clear of the door swing. **Figure 2.4** illustrates the recommended unobstructed space that should be provided for different door configurations and for different directions of approach.

Vision panels should be provided in all entrance and entrance lobby doors. This is to enable people to see whether another person is approaching the door on the other side and also to gauge the size and type of space they are about to enter. Good visibility can help people to orientate themselves as they enter or leave a building and provides reassurance that they are moving into a safe place.

The zone of visibility should extend between 400mm and 1600mm above floor level, be at least 150mm wide and be positioned no more than 200mm from the leading edge of the door, as **Figure 2.5**.

Vision panels do not have to be rectangular, but they should provide a clear view through the door for people at all eye levels.

The clear opening width of entrance doors to new buildings should be 1000mm and at least 850mm for existing buildings (although 1000mm is preferred wherever practical). The effective clear width should be measured from the face of the door in the open position to the door stop on the opposite frame, taking into account any projecting door handles, as **Figure 2.3**.

Where there are double doors, the primary door leaf of each pair of doors should provide the clear widths noted above.

In large buildings and where large numbers of people are expected to use the doors simultaneously, wider doors should be provided.

All hinged entrance doors should be capable of opening to at least 90 degrees.

Figure 2.3 Measuring door clear opening.

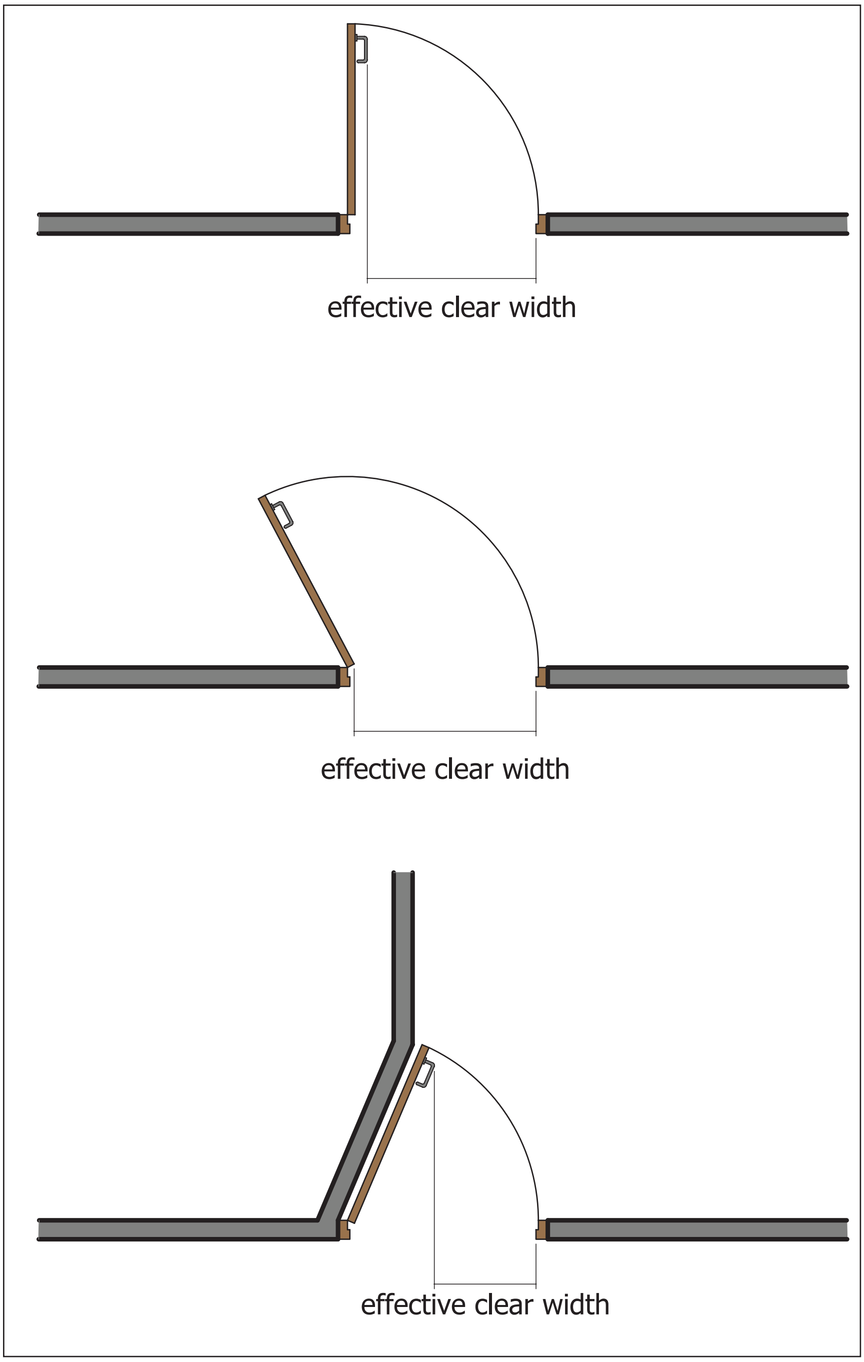
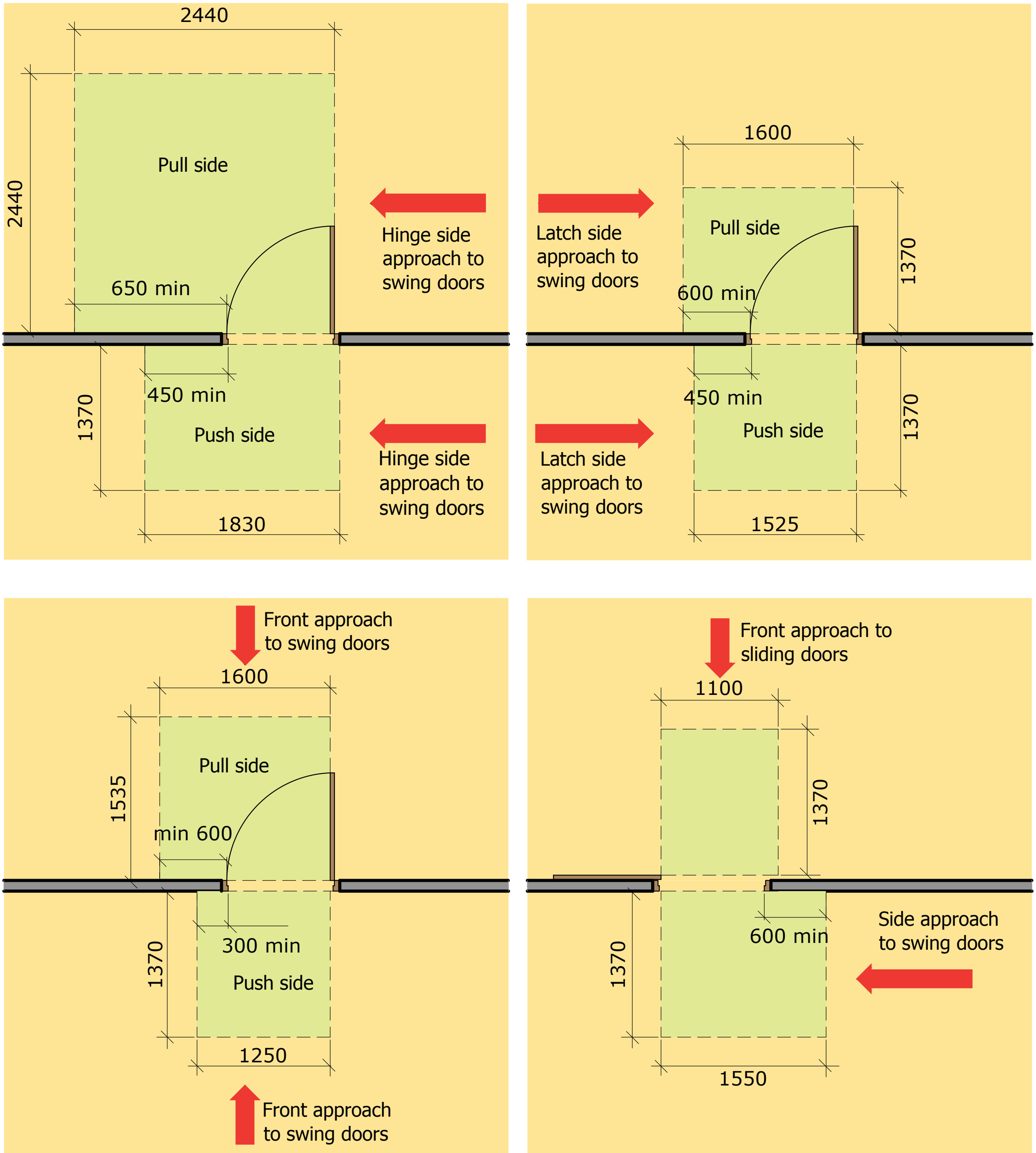


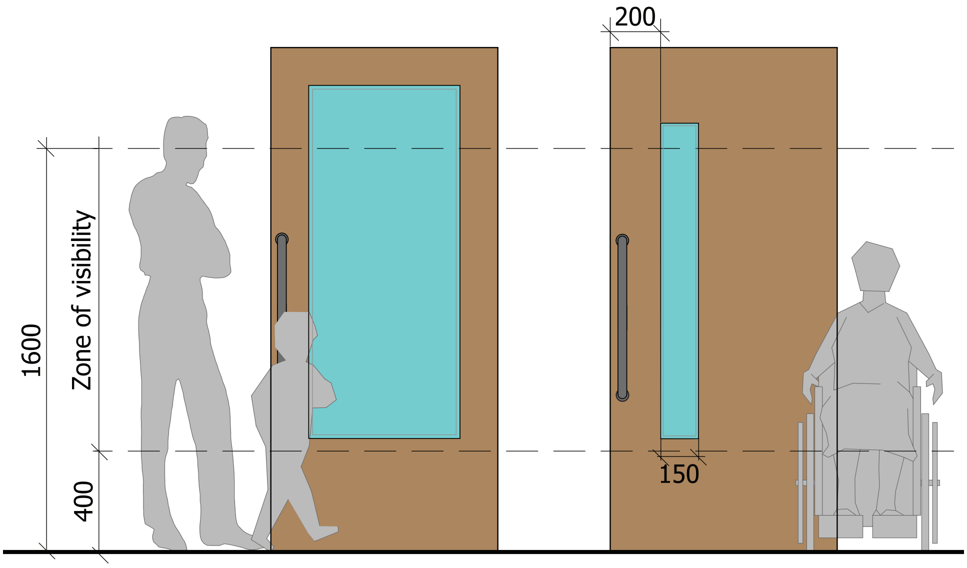
Figure 2.4 Recommended unobstructed space that should be provided for different door configurations and for different directions of approach.



Note: All dimensions in millimetres

Door widths may vary – the important dimensions to refer to are the unobstructed spaces.

Figure 2.5 Door vision panels.

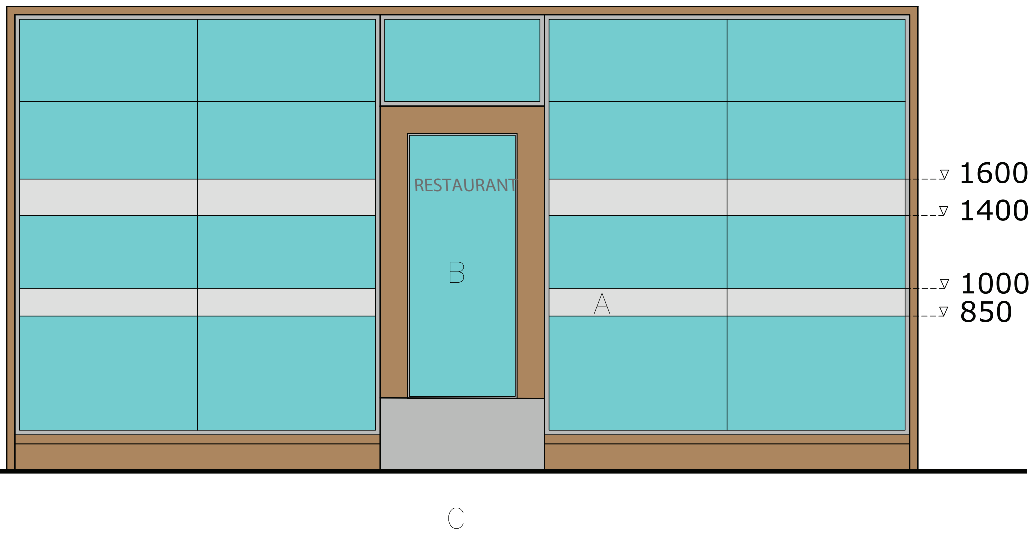


Note: All dimensions in millimetres

Where a door or fixed panel is mostly glazed or comprises a single pane of glass, it should incorporate permanent markings so that its presence is clearly apparent to people at a range of eye levels. The markings should be at two levels, 850mm to 1000mm and 1400mm to 1600mm above floor level, as **Figure 2.6**. The markings should contrast visually with the background surfaces viewed through the door in both directions and in all lighting conditions. This can be difficult to achieve as the background surfaces will undoubtedly differ inside and outside a building, as will the lighting conditions. The use of two-tone markings often improves visibility.

Whatever style or colour is adopted, it is imperative that the presence of glass is clearly highlighted, as otherwise it presents a significant hazard to all building users.

Figure 2.6 Glass markings for safety.



Key

A. Frosted glass manifest as safety and visibility strip
B. Glazed door to be clearly highlighted in relation to adjacent screen. Door to have solid protection to lower level and a contrasting strip to all edges.
C. Kickplate

Note: All dimensions in millimetres

Image 2.18 Example of glass markings.

Entrance doors should visually contrast with adjacent surfaces so that they are easy to identify. Where doors comprise a glazed or other panel that is of a similar material to the adjacent wall, they should be highlighted with a contrasting colour frame, decorative feature or other means so that the presence of the door is clearly apparent within the building façade.

The edges of frameless glass doors should be made apparent so that they are easily identified when open and closed. This can be achieved using a visually contrasting strip at least 25mm wide on all sides of the door. It is recommended that the lower 400mm of such doors or screens should be of a solid material to avoid possible damage from wheelchair footplates.

Where possible entrance doors should be automated.

Door ironmongery should be carefully selected to ensure that the door is universally designed. Door ironmongery is discussed in **Section 2.6.5**.

Door entry controls or intercom systems should be clear of obstructions and positioned away from any projecting columns and return walls. Further details on door security and entry systems are given in **Section 2.6.7**.

2.6.2 Revolving doors

Revolving doors should be avoided wherever possible as they are inaccessible to many people and hazardous to others. Even the largest, slowest moving, power-operated revolving door is unlikely to serve as a universal means of access and, in new buildings, the alternative of automatic sliding doors or powered hinged doors should be chosen.

Where large, slow-moving, power-operated revolving doors are installed, there should be an associated sliding or hinged door for people who are not able to use the revolving door or who prefer not to. The door should be designed and installed in such as way that results in the door reducing speed or stopping if any pressure is exerted while in use.

Image 2.19 Example of revolving door with a hinged automatic door located either side.

Conventional revolving doors that are generally smaller and require a person to push the door manually should never be used and are recommended to be removed from existing buildings.

2.6.3 Turnstiles

Where turnstiles are required, such as to control access to a visitor attraction or as a means of ticketing control, they should be accompanied by an accessible gate. The gate should be immediately adjacent to the turnstile, or to each row of turnstiles, and should be available for use at all times.

The gate should provide a clear width of 950mm and be easy to operate. The gate should contrast visually with the surrounding surface so that it is easy to identify and it should be marked with the International Symbol for Access.

Image 2.20 Example of turnstile and accessible gate.

Checklist – Entrance doors
• Ensure entrance doors to new buildings have clear opening of 1000mm.
• Ensure existing building entrance doors are not less than 850mm.
• Provide adequate clear space on both sides of doors, in accordance with **Figure 2.4**.
• Provide 600mm clear space adjacent to the handle-side of doors.
• Incorporate vision panels into all entrance and entrance lobby doors.
• Incorporate visually contrasting markings at two levels on all glazed doors and screens.
• Make sure entrance doors contrast visually with adjacent walls or screens.
• Include a highly contrasting strip on all edges of frameless glass doors.
• Provide door protection to the lower 400mm of glass doors.
Checklist – Revolving doors
• Avoid the use of revolving doors wherever possible.
• Provide an accessible sliding or hinged door where revolving doors are installed.
• Remove existing conventional, manually-operated revolving doors and replace with a more accessible entrance door.
Checklist – Turnstiles
• Provide an accessible gate wherever turnstiles are located.
• Install accessible gates with recommended 950mm clear width.
• Ensure gates contrast visually with surroundings and are clearly signed.

2.6.4 Internal doors

Internal doors should provide a clear width of 850mm, although a greater width is preferred wherever practical. The clear width should be measured in accordance with **Figure 2.3** Clear space for access and manoeuvre should be provided on both sides of the door in accordance with **Figure 2.4** Refer also to the guidance on entrance doors in **Section 2.6.1**.

Where internal doors are positioned in thick walls, the door should generally be located centrally within the depth of the wall. This will reduce the distance people are required to reach into the opening to access any handles or locks.

Where walls are so thick that they create a passageway leading to a door opening, the provision of automatic door opening devices should be considered, as **Section 2.6.6**, which will make access easier, useable and understandable for all building users.

As a general rule, doors should always open into rooms and away from circulation routes such as corridors and landings.

Doors that open outwards into corridors or circulation routes present a significant hazard to all buildings users, but particularly to people with visual difficulties.

If it is necessary for a door to open outwards for reasons of emergency evacuation, it should be recessed or guarded by a barrier or other device.

Doors opening onto the landings of ramps or stairs should not reduce their effective width or length. Doors must not open directly onto ramps.

Doors that open out onto landings should not encroach into an escape route, into a refuge area or into a circulation route.

Doors opening into a room should be hung so that they open against an adjoining wall. A nib of wall at the door hinge side will allow it to open beyond 90 degrees without hitting against the wall, which will increase the effective clear width.
In this way, people entering are directed towards the centre of the room rather than to the adjacent wall where there may be obstructions such as furniture. This arrangement also makes it easier for people to manoeuvre around the door swing and maximises the clear space available adjacent to the leading edge.

The direction of opening of doors into rooms should, wherever possible, be consistent throughout a building.

Internal doors should visually contrast with adjacent wall surfaces so that they are easy to identify. A door that is not self-closing, and may therefore be left partially or fully open, may present a potential hazard or obstruction. Therefore the surface of the leading edge of this door should visually contrast with the main surface of the door so that its presence is more readily apparent.

Where double doors are used, the primary door leaf should be clearly identified.

Wherever practical, internal doors should incorporate vision panels – See **Image 2.21**. They are essential for any doors on general circulation and escape routes such as doors dividing corridors and doors leading into lobbies and stairways.

Vision panels are also recommended for room doors, as long as security, privacy and light are not an issue. They are beneficial because they enable people to see whether a room is in use before they enter, which is often useful for classrooms, interview rooms and offices. The design of vision panels should follow the guidance on external doors in **Section 2.6.3**. Where, for privacy or security reasons, vision panels are not suitable, it is recommended to put transoms of glass above the door to allow subtle senses of movement from either side of the door. This is of particular use to people with hearing difficulties.

Image 2.21 Door with vision panels. Note lack of kick plate to base of door. A kick plate can protect the base of the door especially when wheelchair users use the door.

Checklist – Internal doors
• Ensure recommended clear width of internal doors of 850mm.
• Provide clear space to both sides of door, in accordance with **Figure 2.4**.
• Protect outward-opening doors with a door recess or guardrail.
• Install inward-opening doors to open against a side wall.
• Ensure the direction of door openings is consistent throughout a building.
• Make sure doors contrast visually with adjacent wall surfaces.
• Incorporate vision panels wherever practical.

2.6.5 Door ironmongery

2.6.5.1 Hinges

The number and type of hinges should be selected to suit the size and weight of the door, bearing in mind any additional weight likely due to a person leaning on the door or handle for support.

Low-friction hinges are recommended as these minimise opening and closing forces and improve door swing.

Rising butt hinges can be useful when doors do not have mechanical self-closing devices, but benefit from returning to the closed position after use so as not to cause an obstruction. Rising butt hinges make the door rise slightly on a spiral pivot when it is opened, and subsequently close due to the force of gravity when released.

Swing-clear hinges incorporate an angled bracket that aligns the door with the frame when opened to 90 degrees. These are useful in maximising the clear opening width of doors where space is otherwise limited.

2.6.5.2 Handles, latches and locks

People generally need to use door handles to go through a door. It is essential that handles are clearly identifiable, within reach and easy to use.

Door knobs should be avoided as they can be very difficult to grip and turn. Lever handles are generally the easiest for most people to use, either by using hands gripped around the lever bar or by using a forearm or elbow.

Door lever handles should be positioned 800 to 1100mm above floor or ground level, although a height of 900mm is preferred, as **Figure 2.7**.

In some cases, such as where child safety is a concern, it may be acceptable to locate the handles higher, out of the reach of children.

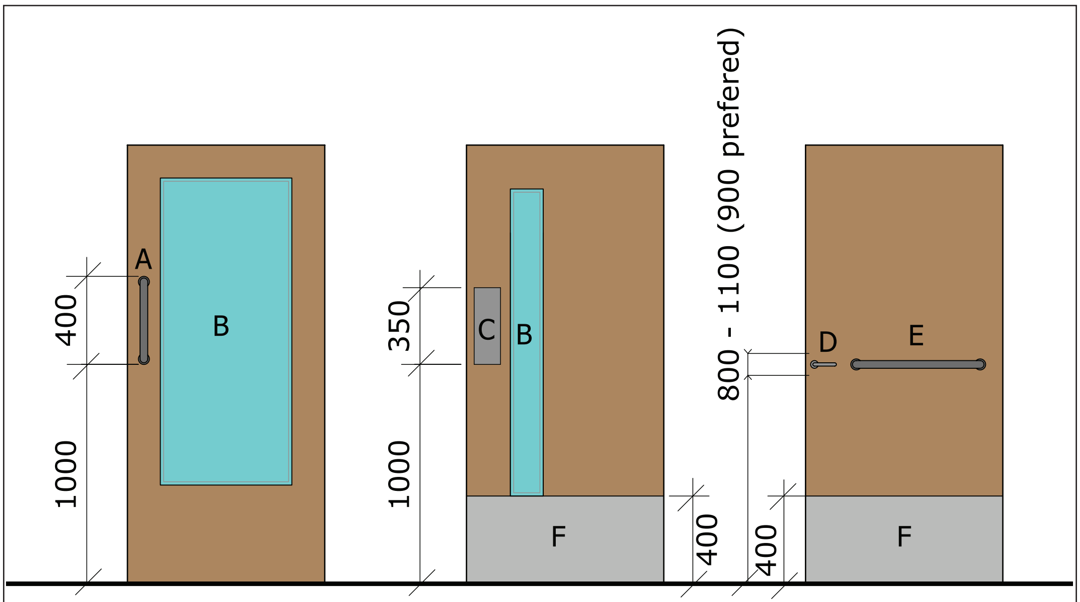
Where doors have a lock, the lock should be positioned above the handle and a recommended 72mm vertical distance from the lever handle to keyhole so that the latter is clearly visible and unobstructed.

Keys should be easy to use, or capable of being fitted with a bow adaptor to make them large and easier to grip. Winged or lever-thumb turns are generally easier to operate and should be used in preference to small, round knob turns.

Lever handles should contrast visually with the door so that they are easy to identify. Where lever handles are provided on the outside face of external doors, they should be of a material that is not cold to touch, such as timber or plastic-coated steel.

Metal handles should be avoided wherever possible as they can become very cold in winter weather conditions, making them extremely uncomfortable and possibly painful for some people to use.

Figure 2.7 Door ironmongery.



Key

A. Verical pull handle
B. Glazing
C. Finger plate
D. Lever handle
E. Horizontal pull handle
F. Kick Plate

Note: All dimensions are in millimetres

On latched doors fitted with self-closing devices, the use of a modified strike plate incorporating a gravity cam should be considered. These are tripped by the projecting latch as the door closes. They significantly reduce the resistance otherwise presented by a conventional latch when the door moves to the fully closed position. By reducing resistance, the forces of any self-closing device can be reduced, which provides easier and useable access for all building users.

Modified strike plates are not suitable for use on external doors.

2.6.5.3 Pull handles and rails

Doors that do not have latches, such as doors dividing corridors and doors into lobbies that are fitted with self-closing devices, are typically operated using pull handles instead of lever handles.

Pull handles should be 400mm long and positioned vertically with the lower end 1000mm above floor level. The clearance from the door face to the handle should be 50mm.

Double-swing doors, that is, doors that are able to swing in both directions, should have a pull handle on both sides of the door. Even though double-swing doors can always be pushed open, there will be circumstances when a person may need or prefer to pull the door, such as when opening the door for another person. Signage should be provided indicating which side is 'Push' and which side is 'Pull'.

Full-height tubular pull handles are beneficial in that they provide the maximum possible range of heights for gripping the handle, but they reduce the clear width of the door opening in doing so. Where provided, the clear width of the door should take into account the projection of the handle when the door is fully open.

Where doors do not have self-closing devices, a horizontal rail should be provided on the closing face to make it easier for people to pull the door closed behind them. The rail should be positioned 1000mm above floor level. This is common practice for doors to accessible toilets, but should also be considered for other situations.

As recommended for lever handles, pull handles and rails should visually contrast with the door so that they are easy to identify. They should also be of a material that is not cold to touch, such as timber or plastic-coated steel, when located on the external face of doors.

2.6.5.4 Finger plates and kick plates

Doors that are required to be pushed open, such as doors on circulation routes that are fitted with self-closing devices, are recommended to be protected against undue wear with the use of finger plates and kick plates.

Finger plates are recommended to be positioned with the lower edge 1000mm above floor level, and should be at least 350mm high. They provide the additional benefit of highlighting which side of the door should be pushed in situations in which there is no handle to identify the leading edge of the door. Finger plates should contrast visually with the door so that they are identifiable.

Highly reflective finger plates should be avoided as they may appear to be a vision panel and thereby cause confusion.

Kick plates are recommended to extend the full width of the door and to 400mm above floor level as this will protect doors from damage by wheelchair footplates or by people pushing or holding the door open with a foot.

Image 2.22 Example of door with finger and kick plates.

2.6.5.5 Door-closing devices

Some doors in nearly all non-domestic buildings will be required to self-close, including all fire-resisting doors, many entrance and lobby doors, and doors required to be shut for security, acoustic or environmental reasons.

However, doors fitted with conventional mechanical self-closing devices can present a significant barrier to many people due to the force required to push or pull the door open. In all cases where self-closing devices are required, designers should consider the options available to reduce or overcome the door forces to facilitate independent an understandable access around the building for everybody.

Image 2.23 Example of a door closer linked to an automatic fire detection and alarm system with a wall-mounted access button.

Self-closing devices should be selected to suit the door type, size, location within the building, and likely frequency of use. Designers should also bear in mind the effect of friction caused by other items of door ironmongery such as hinges, latches, weather seals and fire or smoke control devices as these all influence the forces required to open and close the door.

All self-closing devices should be adjustable and have ‘controlled’ action that enables closing pressure at different positions in the closing cycle to be adjusted. Fixed-strength and spring door-closing devices should not be used as they cannot be adjusted to suit local site conditions and may close the door in an uncontrolled or unpredictable way, which is potentially hazardous.

Delayed-action door closers can be useful in some situations such as on room doors. They work by delaying the closing action of the door, thereby providing a longer period of time for a person to move through a doorway before the closing force is exerted. They also remove the need for a person to maintain continuous pressure on the door in order to keep it open while they pass through, which is beneficial to all users especially older people and those with limited strength, reach or dexterity.

However, delayed action door closers are not recommended for doors on circulation routes.

In buildings fitted with an automatic fire detection and alarm system, door-closing devices can be linked to hold-open and swing-free devices that enable doors to be held open in normal use, or to swing free of any mechanical force. These are the preferred solution in all practicable situations in order to reduce or eliminate the need for people to manually overcome the force of self-closing devices.

For doors fitted with self-closing devices that are not fire-resisting doors, the forces required to open the door should be limited to the following:

- 15 N to initially open the door.
- 6 N to swing the door.
- 7.5 N to hold the door open between 60 degrees and 90 degrees.

- The forces should be measured at the leading edge of the door. Zero degrees represents a door that is fully closed and 90 degrees a door that is fully open.

- Doors that are required to be fire-resisting are unlikely to be able to achieve the limits above due to the force required to fully close the door against any latch, seal and hinge resistance. The forces required to open fire-resisting doors should be limited to the following:
  - 30 N from 0 degrees to 30 degrees.
  - 22.5 N from 30 degrees to 60 degrees.

- Doors and surface-mounted door-closing devices should be positioned where there is sufficient room for the closer arm to fully function, without it clashing with any return wall and for the door to open to 90 degrees.

Electromagnetic hold-open devices enable doors to be held open in a fixed position, allowing unobstructed or at least much easier and useable access for all building users, especially older people and those with limited strength, reach or dexterity. When the power supply to these devices is interrupted by a smoke detection signal, operated by a manual release mechanism or power failure, the doors close under the power of the closing device.

Electromagnetic hold-open devices are suitable for doors on circulation routes such as corridors, and for some lobby doors.

Image 2.24 Example of electromagnetic hold-open device for doors in use.

Image 2.25 Example of electromagnetic hold-open device.

Swing-free door-closing devices enable doors to be opened with minimal effort as they are free of closing pressure under normal operation. When activated by the fire alarm, they revert to spring power and close the door.

Swing-free door closing devices are susceptible to changes in air pressure in buildings and should not therefore be used on circulation routes where they may present a potential hazard or be blown shut. They are suitable for inward-opening room doors and at other similar locations.

2.6.5.6 Emergency exit door ironmongery

Locks and handles on emergency exit doors should be capable of easy operation by all building users.

Generally, mechanisms that require a direct pushing action such as horizontal push bars, push pads or lever handles are easier to use than those that require a simultaneous lifting action.

Emergency exit doors should be capable of being opened in a single action. That is, any lock or latch should be simultaneously released.

2.6.5.7 Other ironmongery

Letter plates and boxes should be positioned 900mm above ground level to facilitate use without bending. They should be positioned where there is a level approach at least 900mm wide.

Checklist – Door ironmongery
Hinges
• Use low friction hinges to minimise door opening and closing forces.
• Consider rising-butt hinges for doors not fitted with self-closing devices.
• Use swing-clear hinges to maximise clear opening width where space is limited.
Handles, latches and locks
• Handles to contrast visually with door leaf and be easy to reach.
• Avoid the use of knob handles.
• Position locks above handles, or with a vertical clearance of at least 72mm.
• Use large winged or lever-thumb turns instead of knob thumb turns.
• Choose handles to external doors that are not cold to touch.
• Consider the use of a modified strike plate for internal self-closing doors.

Checklist continued
Pull handles and rails
• Configure pull handles as per **Figure 2.7**.
• Provide pull handles to double-swing doors.
• Use full-height tubular handles only where clear opening width is increased to compensate for the handle projection.
• Provide horizontal rails on the closing face of outward-opening doors.
Finger plates and kick plates
• Install finger plates on the push side of doors that do not have handles, as **Figure 2.7.**
• Provide kick plates to full width of doors and to height of 400mm.
Door-closing devices
• Use door-closing devices only where necessary.
• Ensure all self-closing devices have controlled action.
• Make sure door opening forces are within the limits set for each stage of the opening cycle.
• Consider delayed-action door closers for room doors.
• Consider improving accessibility with the use of electromagnetic hold-open devices and swing-free door-closing devices.
Emergency exit door ironmongery
• Ensure emergency exit door ironmongery is accessible.
Other ironmongery
• Position letter plates 900mm above ground level.

2.6.6 Automatic door systems

Automatic, or power-operated, door systems make buildings easy to access and useable for everybody. They are particularly useful where a high force would otherwise be required to open the door, such as for external doors and entrance lobby doors that are susceptible to external wind pressures. They are also useful for internal doors that are required to remain closed for security or other reasons but may be difficult for some people to open. Power-assisted doors enable doors to be opened manually, but provide a means of automatic operation for people who require it.

Automatic door systems can be used in conjunction with either sliding, swing or balanced doors and may be fully automatic or comprise a manually-activated control device. The most suitable type of device for any situation will depend on the nature of the building, the frequency of use, the available space and whether any additional security control mechanisms are required.

Image 2.26 Example of automatic swing doors at entrance with pole-mounted access button. DeafSpace recommends floor located warnings in advance of guarding rail in front of approach to door, and warning of swing on mounted button.

Sliding doors may comprise a single sliding door, a double bi-parting door, or a telescopic straight sliding door (where two or more doors slide across one another in the same direction). Sliding doors may be straight, curved or folding.

Whichever arrangement is adopted, the direction of movement and resulting ‘clear opening’ should be obvious. Theobvious. The most logical arrangement is for the clear opening to be located centrally.

Where the clear opening is positioned to one side, such as with telescopic sliding doors, the arrangement is not always immediately obvious. Automatic sliding doors are generally preferred to automatic swing doors as their action is less likely to present an obstruction.

Swing doors may comprise of single or double doors and may be installed as an integral unit in a new building or in the form of a powered operating unit attached to an existing door. Swing doors require more space than sliding doors and additional space is required to enable people to approach and manoeuvre around the door, clear of the door swing.

Image 2.27 Example of swing door entrance. Note use of chrome for intercom and rail – a painted system is recommended as shiny surfaces can cause problems for those with visual difficulties. In addition, the intercom/security system would be better placed adjacent to the door handle to accommodate those with cognitive or mental difficulties.

Balanced doors are typically bi-parting and combine a sliding and swing action. They are useful where space is limited, as the door leaves do not project as far from the pivot position as a swing door of similar width. However, they are not commonly used and this, combined with their unusual method of opening, may be confusing for some people.

Whichever type of door is used, the layout of the door and surrounding area should ensure that sufficient space is provided for people to approach, pass through, and move clear of the opening. It should also take into account the expected number of people in the building. The approach routes should be clear of obstructions and avoid the potential for cross-flow of pedestrians. Doors that are fully automatic should be positioned so that passing pedestrians do not inadvertently activate the door system.

Fully automatic doors open on activation of a sensor, which may be either a motion sensor or a presence sensor. Safety devices prevent the doors closing on a person who remains in the doorway, without the need for any physical pressure to be exerted. The sensors and safety devices should be designed to protect people using the door and should be capable of detecting a person even if they are slow-moving or stationary. Systems that only detect obstructions at specific heights should be avoided.

The activation system should ensure that the door starts to open when a person is no closer than 1400mm from the door in the open position. All automatic doors should be set to provide sufficient time for a person to move slowly through the doorway. For automatic swing doors, the recommended period is a minimum of five seconds.

Manually-activated powered doors may be controlled using a wall- or post-mounted push pad or button, a proximity reader, card swipe device or remote control transmitter.

Wall- or post-mounted controls should contrast visually with the surrounding surfaces and incorporate the International Symbol for Access.

Wall- or post-mounted controls should be positioned 750mm to 1000mm above floor level and no closer than 1000mm to the swing of the door or clear of a sliding door in the open position.

It should not be necessary for a person to have to manoeuvre backwards or clear of the door swing after activation of the door control device.

Power-assisted doors operate by opening automatically after the door is gently touched, pushed or pulled. After a set hold-open period, the door closes in a similar way to doors fitted with mechanical self-closing devices. Power-assisted doors are generally suitable for doors with relatively low levels of use.

When the door is closing, the force required to resist door movement, if a person becomes stuck in the doorway, should not exceed 67 N as this force is considered to present a risk to building users. The provision of supplementary presence-sensing safety devices should be considered.

Image 2.28 Example of powered door with access push plate.

Potential finger traps and body traps should be avoided by careful design and placement of all automatic and power-assisted doors in relation to fixed framing and adjacent walls.

Swing and balanced doors should have a fixed barrier wherever the doors can be approached from the side in order to prevent people being struck by the door as it opens.

Barriers should be at least 900mm high and contrast visually with the surrounding surfaces. All automatic and power-assisted doors should be clearly signed so that their mode of operation is obvious to all building users.

Powered doors (whether sliding, swing or balanced) that are also designated as emergency exits should incorporate either a fail-safe system or manual break-out facility.

A fail-safe system that is set so that the doors are fully opened when the fire alarm is activated is more inherently accessible, useable, and preferred to a manual break-out facility. However, if the door is an internal fire-resisting door, the door should remain closed but be capable of manual operation in accordance with the recommendations in **Section 2.6.5**. Manual break-out, particularly for sliding doors and swing doors that need to be opened in the opposite direction, typically require considerable force to open, which is likely to preclude independent evacuation for many people.

Image 2.29 Example of powered door with push plate.

Image 2.30 Example of powered door with push plate.

Checklist – Automatic door systems
• Ensure adequate clear space on both sides of the door.
• Avoid potential cross-flow of pedestrians adjacent to automatic doors.
• Ensure activation and safety systems protect people who are slow-moving or who have fallen in the doorway.
• Ensure activation system is set to open door when person is no closer than 1400mm.
• Make sure opening time is sufficient for people who are slow-moving.
• Position controls for manually-activated automatic doors within reach and clear of door swing.
• Ensure controls are clearly visible with clear signage.
• Consider the need for additional safety devices for power-assisted doors.
• Guard against all potential finger and body traps.
• Provide barriers to guard all swing doors that can be approached from the side.
• Provide break-out or fail-safe systems on all automatic doors situated on exit routes.

2.6.7 Door security and entry systems

Many entrances to buildings and some internal doors require access to be controlled for security reasons. There are many electronic entry systems, locks and intercoms available on the market that provide an array of solutions to suit the simplest to the most complex of applications.

Whichever solution is selected, designers and specifiers should ensure that it can be readily used by all building users. This means that the system should be clearly visible, within reach, easy to understand and straightforward to operate.

Door entry systems should be located adjacent to the handle side of the door, no further than 200mm from the door frame, and between 750mm and 1000mm above floor or ground level.

Intercoms (entryphones) should be positioned to suit people at a range of heights. Any controls such as buttons should be large and easy to operate and be in the range 1000 to 1200mm above floor or ground level. The microphone should be capable of picking up speech from people of different heights.

As well as enabling people to communicate orally with a receptionist or resident, intercoms should incorporate a visual text display so that people with hearing difficulties can read instructions or advice on entry.

Additionally induction loops should be incorporated into the intercom. For further details on induction loops, please refer to **Booklet 4: Internal environment and services**.

A video intercom that enables the visitor and the receptionist or resident to view each other is beneficial for many people particularly those with hearing or speech difficulties.

Image 2.31 Example of intercom access system.

Card entry systems, which may be either card-swipe or proximity devices, should be positioned with the card reader between 900mm and 1000mm above floor or ground level and within 200mm of the door frame.

The device should contrast visually with the wall surface and, for card-swipe devices, the card slot should either be illuminated or contrast visually with the rest of the unit.

Card-swipe devices should be orientated vertically. The card itself should incorporate some form of tactile surface such as raised lettering, as well as a distinctive colour on one side so that all users are able to easily orientate the card within the reading device.

Proximity card devices are preferred to card-swipe readers as they do not require the same degree of hand control and are therefore inherently more accessible and useable.

The Centre for Excellence in Universal Design's guidelines on public access terminals and smart card systems contain further advice on door entry systems as follows:

- Reach heights for all operable parts
- Positioning of displays
- Size and spacing of controls
- Alternative outputs including audio
- Approach to and location of terminals
- Relevant standards
- Guidelines, techniques, checklists for each user type including older people

Keypad entry systems should incorporate buttons that are raised above the mounting plate so as to be easily located by touch. The buttons should contrast visually with the mounting plate and the mounting plate with the wall surface. Each button should have an embossed (raised) symbol, number, or letter arranged in a logical order.

Doorbells and call buttons should give visual indication of their operation, such as a light that flashes when the button is pressed.

Refer to the Public Access Terminal Guidelines available at the Centre for Excellence in Universal Design website: **www.universaldesign.ie/standards**

Checklist – Door security and entry systems
• Locate door entry systems within reach of all users, on the handle side of the door.
• Intercoms to be supplemented with a text display.
• Consider the use of video intercom to aid identification and communication.
• Orientate card-swipe devices vertically.
• Consider the use of proximity card devices in preference to card-swipe devices.
• Incorporate raised buttons and embossed symbols, numbers or letters in keypads.
• Ensure all devices contrast visually and are easy to identify.
• Install doorbells and call buttons that provide visual indication of operation.

A1 Definition of Universal Design

Universal Design

‘Universal Design refers to the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or disability.’

Synopsis of the Disability Act, 2005.

A2 Human Abilities and Design

The following piece of text is an extract from European Ref: CEN/CENELEC Guide 6 ‘Guidelines for standards developers to address the needs of older persons and persons with disabilities’.

It states that: Physical, sensory and mental abilities vary from person to person and for individuals as they get older. Diversity is normal. Designers need to be aware of difference across the range of human abilities, and of associated design considerations.

(a) Physical abilities

This includes walking, balance, handling, pulling, pushing, lifting and reaching. Many activities involve simultaneous use of more than one of these skills. Physical strength and stamina may also affect people’s abilities to perform these actions.

Walking

For some people walking on the level or up gradients is difficult. Some people may have a limited walking range, may have difficulty with turning movements or may use mobility devices such as crutches or a walker. They may need to stop frequently, to regain strength or catch breath. Design considerations include provision of handrails, seats at regular intervals, convenient set-down parking and adequate time for slower pedestrians at road crossings. Designers should also consider the needs of people walking and engaging in sign language when designing access to and from buildings plus within the buildings themselves.

Balance

Balance limitations can affect someone's gait or control of hand movements. Design considerations include handrails, regular seating, and providing controls within easy reach. A surface against which a person may stumble against or walk into should be designed to limit abrasion.

Handling

A significant minority of people are left-handed. Some people may have restricted use or no use of one or both hands, or may have limits on strength or precision. Facilities and components should be designed to be suitable for use with either hand or with one hand only. Handling includes gripping, grasping and manipulation. Each of these has a different purpose with specific design considerations. For instance, components should be designed to be easily held. The circumference of the supporting structure and stability are critical. Manipulation involves the moving, turning and twisting of components with a hand or hands. For those who have limited manipulation abilities, size and shape and ease of movement are critical. Another option to consider is to design for manipulation by using a pushing, pulling or pressing action using a clenched fist, or by using the wrist or the elbow.

Strength and endurance

Strength and endurance may be required on sloping paths and floors, stairways and long travel distances, when sustained effort may be needed.

For those with limited endurance, frequent resting-places are essential.

People generally find it easier to push a component, than to pull it. This is particularly so if the individual uses a wheelchair. Self-closing devices on manual doors can be difficult for some people to operate, particularly if the doors are required to resist wind forces. For these reasons, doors that open and close automatically are preferred.

Lifting

Activities such as opening a vertically sliding sash window and an upward opening access gate, should be designed to be easily operated with minimal force.

Reaching

Design has a role to play in ensuring that key components in a building or environment are in easy reach, bearing in mind the range of people's sizes and abilities. Having components within easy reach is particularly important for those with more severe limitations in mobility. The reach range is dependant on the height and arm length of the person, use of the arms, and the balance and mobility of the upper body. A 'comfortable reach range' has been defined as one that is appropriate to an activity that is likely to be frequent and in need of precise execution and that does not involve stretching or bending from the waist. Putting things within comfortable reach can ensure use by a greater number of people. An 'extended reach range' has been defined as one that is appropriate to an activity that is likely, neither to need precision nor to be frequent and that can involve stretching or bending from the waist.

(b) Sensory abilities

Speech

Some conditions affect the capacity for or quality of speech. Two-way communication can be facilitated by environments designed to minimise barriers to hearing low or indistinct speech.

Hearing

People differ in their capacity to hear sound, to determine its direction, its source, to discern pitch, frequency, volume and variation and to separate out different sounds. Hearing quality is important for communication, for information, and for detection of hazards such as traffic. Many people with hearing difficulties

use a hearing aid which amplifies all sounds caught by the microphone, making communications very difficult in noisy environments. Keeping background noise level low is essential. The selection of structural and surface materials can make a substantial difference in audibility. Auditoriums, meeting rooms and reception areas can benefit from additional sound enhancement such as a loop system. The careful design of illumination can assist in communication such as lip reading and sign language. Provision of visual information and visual alarm systems can communicate information to those who have hearing difficulties or who cannot hear. Designers should also consider the colour and size of rooms and even the furnishing arrangement as this is very important for visually based communication. Also the use of vibration as means of sensing others should be considered.

Sight

Vision allows an individual to be aware of the luminance of surfaces, objects, form, size and colour. For people who are blind or who have visual difficulties, the provision of suitable tactile walking surface indicators and tactile or acoustic warnings at hazardous locations, should provide information on using the built environment and should limit the risk of injury. The built environment can be designed for orientation by providing sound cues and tactile cues. An easily discernible system of 'way finding' should also be considered. For people with limited, but low vision, effective visual contrast between surfaces or objects helps to identify critical locations. Warning markings on glass surfaces, and markings on the edges of stair treads, help minimise hazards.

Differences in friction between one floor surface, or one stair tread surface, and the next should be avoided. Therefore, adjacent surfaces that display different standards of slip-resistance, or that depend on raised surfaces, should be carefully considered

Touch

In selecting surfaces in the built environment that people will need to touch (such as handrails, handles, knobs and controls, tactile information), it is important to select materials that avoid distress, injury or allergies. Surfaces should be free of abrasions. Metals that may cause adverse reactions when touched should be avoided.

(c) Mental abilities

Mental abilities include cognition, intellect, interpretation, learning and memory. People differ in their knowledge, their capacity to understand, reason, or interpret information. Designing for differences in these capacities helps provide a usable environment for the population at large, from the very young to the old, and people of diverse abilities. Means of communication in the environment should be designed to be immediately and easily understood, and correctly interpreted. As people age, some experience loss of memory or find it increasingly difficult to absorb new information, so changes in the environment should be carefully considered before implementation.

Design considerations that take account of mental abilities

Aural and visual messages should be simple, clear and have immediate impact. Figures, symbols and simple words are likely to be the most effective. Symbols should be instantly recognisable as representing images seen and activities undertaken in everyday life.

Way finding should be simple, such as tactile, graphic, audible or architectural cues that are easy to follow. Signage should be large and clear. Way-finding maps should be clear, indicate the person's whereabouts in the building or facility, and be free from extraneous information.

(d) Age and size

Accommodating the developing child

It is important to create environments that are safe, accessible and useable for children. Individual components should be safe and useable as age-appropriate. Learning to manage risk is an essential part of a child's development.

Accommodating ageing adults

Life span within the human population is increasing. More and more we expect to maintain an economic and social life within both the public and private domains as we age. However, many human faculties are in decline as we age, such as mobility, dexterity, stamina, strength, hearing, sight, or memory. Familiarity with a particular environment is important.

Diversity of size

The population contains a diversity of sizes and heights, from children, to the diversity in the height of fully-grown adults. The positioning of components and the heights of building elements such as steps should recognise the diversity of height. Increased weight and girth is now also a feature of the population.

Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'.
http://www.cen.eu/cen/Sectors/Sectors/ISSS/About_ISSS/Documents/cclcgd006.pdf

A3 Further Reading

National and international standards and codes of practice

AS 1428.1-2001 Design for access and mobility. General requirements for access – New building work.

AS 1428.2-1992 Design for access and mobility. Enhanced and additional requirements – Buildings and facilities.

AS 1428.3-1992 Design for access and mobility. Requirements for children and adolescents with physical disabilities.

AS 1428.4-2002 Design for access and mobility. Tactile indicators.

BS 4800: 1989 Paint colours for building purposes (whilst the colours in this standard cannot be seen on CD-ROM or online the text can still be used).

BS 5395-1:2000 Stairs, ladders and walkways – Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders.

BS 5588-8:1999 Fire precautions in the design, construction and use of buildings – Part 8: Code of practice for means of escape for disabled people.

BS 5776:1996 (incorporating amendment No.1) Specification for Powered stairlifts

BS 6440:1999 (Incorporating amendment No.1) Powered lifting platforms for use by disabled persons – Code of practice.

BS 6440:1999 Powered lifting platforms for use by disabled persons – Code of practice (partially superseded by BS EN 81-40:2008. The remainder of BS 6440:1999 will eventually be superseded by EN 81-41: 2009 Safety rules for the construction and installation of lifts – Special lifts for the transport of persons and goods – Part 41: Vertical lifting platforms intended for use by persons with impaired mobility).

BS 6465-1:2006+A1:2009 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.

BS 6571-4: 1989 Vehicle parking control equipment – Part 4: Specification for barrier type parking control equipment.

BS 7036-1:1996 Code of practice for Safety at powered doors for pedestrian use – Part 1. General.

BS 7036-4:1996 Code of practice for Safety at powered doors for pedestrian use – Part 4. Low energy swing doors.

BS 7997:2003 Products for tactile paving surface indicators – Specification.

BS 8300:2009 (Incorporating amendment No.1) Design of buildings and their approaches to meet the needs of disabled people – Code of practice.

BS 8493:2008 (+A1:2010): Light reflectance value (LRV) of a surface – Method of test.

BS 8501:2002 Graphic symbols and signs – Public information symbols (AMD 16897).

BS EN 115:1995 Safety rules for the construction and installation of escalators and moving walkways.

BS EN 15838:2009 Customer contact centres, Requirements for service provision.

BS EN81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passengers lifts – Part 70: Accessibility to lifts for persons including persons with disability.

Building Regulations (Part M Amendment) Regulations 2010 (S.I. No. 513 of 2010).

Citizens Information Board – Accessible information for all (2009).

DD 266:2007 (Draft for Development) Design of accessible housing – Lifetime home – Code of practice.

I.S. EN 1991-1-1:2002 – Eurocode 1: Actions on structures Part 1-1: General actions – densities, self weight, imposed loads for buildings (including Irish National Annex: 2005).

I.S. EN 81-1: 1999 Safety rules for the construction and installation of lifts – electric lifts (Amd 1) (+A3:2009).

I.S. EN 81-2:1999 Safety rules for the construction and installation of lifts – hydraulic lifts (Amd 1) (+A3:2009).

I.S. EN 81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passenger lifts. Accessibility to lifts for persons including persons with disability (Amd A1:2005).

I.S. EN 997:2003 (+A1:2006) WC pans and WC suites with integral trap (AMD Corrigendum 14805) (AMD 16965).

IEC 60118-4:2006 Electroacoustics. Hearing aids. Induction loop systems for hearing aid purposes. Magnetic field strength (ISBN 978 0 580 50047 3).

International standard for Induction loops. IEC 60118-4.

Irish Code of Practice on Accessibility of Public Services and Information Provided by Public Bodies www.nda.ie/website/nda/cntmgmtnew.nsf/0/3DB134DF72E1846A8025710F0040BF3D/$File/finaldrcode_nda.htm

Key cards should conform to EN 1332. For further information on key cards please see: http://www.universaldesign.ie/useandapply/ict/itaccessibilityguidelines/smartcards/guidelines/smartcardguidelines/cards

Lifetime Homes Standard: http://www.lifetimehomes.org.uk

Norwegian Universal design of building standard, 2009.

Passenger Lift Design: The Machinery Directive 2006/42/EC; Lifts should conform to BS 6440.

National and international reference documents

2020 Vision – Sustainable Travel and Transport: Public Consultation Document. Department of Transport.

Bus Based Park and Ride – A Pilot Scheme. A Report to: Dublin Transportation Office. The TAS Partnership Limited, 2002.

City of London 2006 Facility Accessibility Design Standards. London, Canada, 2006 Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Gallaudet DeafSpace Design Guidelines 2010.

Department of Transport & the National Disability Authority Guidelines for Accessible Maritime Passenger Transport http://www.nda.ie/website/nda/cntmgmtnew.nsf/0/45AA46D1F77D7EF2802576DC005C5954?OpenDocument

Department of Transport, UK 'Traffic Signs Manual'.

Dublin City Council (2007) Variation (No. 21) of the Dublin City Development Plan 2005 – 2011. Available from: http://www.dublincity.ie/Planning/DublinCityDevelopmentPlan/VariationstotheDevelopmentPlan/Documents/AdoptedVariationNo21Spec.pdf.

Guidance on the use of tactile paving surfaces. Department for Transport, UK.

Guidelines for an accessible public administration. Towards full participation and equality for people with disability. Office of the Disability Ombudsman, Sweden.

Inclusive Mobility. Department for Transport, UK.

International Best Practices in Universal Design. A Global review. Canadian Human Rights Commission, 2006.

Irish Wheelchair Association: Best Practice Access Guidelines 2010.

Joseph Rowntree Housing Trust.

Parking for disabled people. Department for Transport, UK.

Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Rail Park and Ride Strategy for the Greater Dublin Area. Dublin Transportation Office, 1994.

Regulation of Bus services outside the Greater Dublin Area. Department of Transport.

"Sign Design Guide and Inclusive mobility," Oxley, P. (2003), Inclusive Mobility. Department for Transport, UK. www.mobility-unit.dft.gov.uk

Smarter Travel 'A Sustainable Transport Future' – A New Transport Policy for Ireland 2009 – 2020. Department of Transport.

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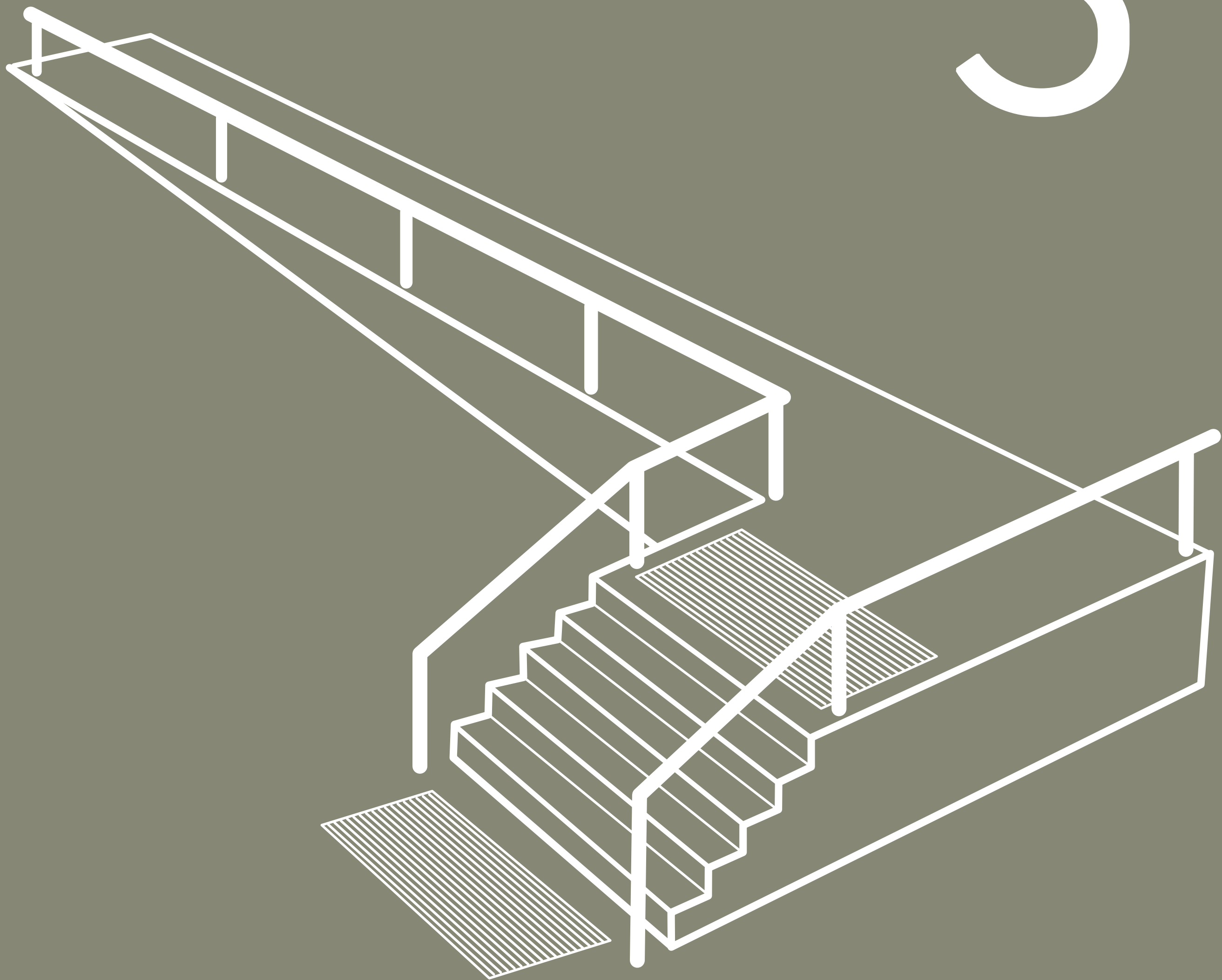
Building for Everyone:

A Universal Design Approach

Vertical circulation

3



Centre for Excellence in Universal Design

Creating an environment that can be used by all people, regardless of their age, size, disability or ability.

The National Disability Authority's Centre for Excellence in Universal Design has a statutory role to promote the achievement of excellence in universal design in:

- the design of the built and external environment
- product/service design
- information and communications technologies (ICT)
- the development and promotion of standards
- education and professional development
- raising awareness of universal design

More information and updates on the website at: **www.universaldesign.ie**

Building for Everyone

Booklet 3 - Vertical circulation

The other booklets from the
Building for Everyone series:

Booklet 1 - External environment and approach

Booklet 2 - Entrances and horizontal circulation

Booklet 4 - Internal environment and services

Booklet 5 - Sanitary facilities

Booklet 6 - Facilities in buildings

Booklet 7 - Building types

Booklet 8 - Building management

Booklet 9 - Planning and policy

Booklet 10 - Index and terminology

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3.0 Objectives

The guidance in this booklet promotes the concept and philosophy of universal design and encourages developers, designers, builders and building managers to be innovative and think creatively about solutions that meet the needs of all building users regardless of their age, size, ability or disability.

The objectives of the series of booklets are to:

- identify and promote best practice with regard to universal design of the built and external environment
- provide best practice guidelines while recognising existing regulations in Ireland
- provide guidelines that are usable by and accessible to the target audience
- promote the achievement of universal design in Ireland

This booklet aims to:

- identify and promote best practice for vertical circulation such as stairs, ramps and lifts within buildings with regard to universal design
- increase awareness of, and encourage designers to identify, the needs of all those who require vertical access, routes and circulation within buildings in order to undertake daily activities
- To highlight the wider benefits experienced by all when accessible and universally designed features of vertical circulation within buildings are provided
- encourage designers to provide universal design solutions for the entrances and the horizontal circulation within buildings that look beyond the recommended requirements of national building regulations

3.1 Introduction

This booklet is part of the series “Building for Everyone – A Universal Design Approach” to provide practical guidance on the universal design of buildings, places and facilities.

Universal design places human diversity at the heart of the design process so that buildings and environments can be designed to meet the needs of all users. It therefore covers all persons regardless of their age or size and those who have any particular physical, sensory, mental health or intellectual ability or disability. It is about achieving good design so that people can access, use, and understand the environment to the greatest extent and in the most independent and natural manner possible, without the need for adaptations or specialised solutions (see full definition in **Appendix A1**).

Why universal design?

People are diverse - some are left-handed and some right-handed - and people vary in their age, size and functional capacities. Illness or disability (whether temporary or permanent) can also affect characteristics such as a person’s mobility, dexterity, reach, balance, strength, stamina, sight, hearing, speech, touch, knowledge, understanding, memory, or sense of direction. A reference list with these booklets indicates some of the key differences in human abilities that should guide design of buildings and of outdoor places. (See full description of Human Abilities in **Appendix A2**).

People of diverse abilities should be able to use buildings and places comfortably and safely, as far as possible without special assistance. People should be able to find their way easily, understand how to use building facilities such as intercoms or lifts, and know what is a pedestrian facility and where they may encounter traffic.

Given the wide diversity of the population, a universal design approach, which caters for the broadest range of users from the outset, can result in buildings and places that can be used and enjoyed by everyone. That approach eliminates or reduces the need for expensive changes or retro fits to meet the needs of particular groups at a later stage.

It is good practice to ascertain the needs of the range of expected users as early as possible, and to check the practicality and usability of emerging designs with a diverse user panel.

Designing for one group can result in solutions that address the needs of many others. For example:

- level entry (Step-free) entrances facilitate not just wheelchair users but also people with buggies; people with suitcases or shopping trolleys; people using walking or mobility aids; and people with visual difficulties
- larger toilet compartments provide easier access to wheelchair users; those with luggage or parcels; parents with pushchairs or accompanying small children; those using walking or mobility aids; and larger-sized people.
- clear, well-placed signage that uses recognised symbols or pictograms helps people with reading or cognitive difficulties, and those whose first language is neither English nor Irish

Sometimes one solution will not suit all and a range of options will need to be provided. For example:

- providing both steps and a ramp where there is a change in level
- providing parking ticket machines that offer slots at different heights to facilitate use at standing height, sitting height, and by people of small stature.

This series of booklets is for architects, engineers, planners, developers, designers, building contractors, building workers, building managers and others involved in designing, commissioning and managing buildings and their surroundings. It provides guidance on a universal design approach to all new buildings, and the use and adaptation of existing environments.

Those who commission, design, construct or manage any part of the built and made environment also have a duty of care to adhere to relevant legislation and regulations including equality legislation, building regulations and health and safety regulations.

The guidance is based on a best practice approach drawing on up-to-date international best practice; guidelines and standards; previous guidance by the National Disability Authority; and extends beyond disability access matters to incorporate a universal design approach. The series is fully compatible with Part M (2010) of the Building Regulations and associated Technical Guidance Documents related to Part M.

A disability access certificate is required for new buildings other than dwellings (including apartment buildings) and certain other works (as set out in Article 20 D (1) of SI 351 of 2009) to which the Requirements of Part M of the Building Regulations apply, which commence or take place on or after 1 January 2012. Further details on these and other relevant standards, codes of practice and professional codes of practice are listed in **Appendix A3** Further Reading.

The detailed guidance provided here does not represent the only possible solution. Designers may come up with other ways to meet a diversity of users. New materials and technologies that emerge may open up further possibilities of accommodating the diversity of the population.

Checklists are provided throughout the series and while they provide a summary of main considerations and technical criteria, they should not be regarded as a substitute for the main text or an exhaustive list.

A comprehensive **index** is also available for the suite of booklets.

The Building for Everyone series is available online at **www.nda.ie** and **www.universaldesign.ie**. Electronic links are provided to relevant sections in the different booklets. As standards and requirements develop, the electronic versions of these booklets will be updated.

The electronic version is produced in accessible PDF format, in accordance with the Web Content Access Guidelines 2.0. If you have any difficulties in this regard or require the document, or particular sections, in alternative formats, please contact the Centre for Excellence in Universal Design at the National Disability Authority, **info@ceud.ie** or (01) 6080400.

3.2 Terminology

Accessible – Facilities that are designed to be accessible and understandable to all users of a building or external environment.

Building – A permanent or temporary structure of any size that accommodates facilities to which people have access.

Building user – A person regardless of age, size, ability or disability using facilities in a building or associated external environment.

Clear width – The width between handrails.

Dog-leg/Switch back stairs – Configuration of stairs between two floors of a building, often a domestic building, in which a flight of stairs ascends to a half-landing before turning 180 degrees and continuing upwards. The flights do not have to be equal, and frequently are not.

Escalator – A moving stairway.

Evacuation lifts – Lifts designed to continue operating in the event of a fire, which have special design features to ensure safety.

Fillet – A decorative filler piece on the floor between balusters.

Inclined platform stairlift – A stairlift incorporating a fold-down platform for wheelchair users and support rails that follows the incline of a stair. Also termed wheelchair stairlift and platform stairlift.

Kerbed upstand – Strip used to form a raised edge (for example 150mm high) at floor level.

Nosing – An edge part of the step tread that protrudes over the riser beneath in a flight of stairs.

Passenger lift – A conventional motorised lift enclosed within a structural shaft and rising one or more storeys within a building. Lift and door movement is automatic.

Refuge area – Areas within a building, separated by fire-resisting construction and provided with a safe route to a storey exit, where people with mobility difficulties can await assistance for their evacuation.

Riser – The vertical portion between each tread on the stair.

Stairlift – A device mounted on a support rail that follows the incline of a stair and incorporates either a seat with footrest (chairlift) or standing platform and perch (perching stairlift). Stairlifts are designed for domestic use only. Also termed chair stairlift and domestic stairlift.

Travelator – A moving walkway designed to transport people quickly over a long distance in large buildings. Travelators are usually level, but may have a slight incline where a vertical change in level is also required.

Tread – The part of the stairway that is stepped on.

Vertical platform lift – A guarded platform that travels vertically and is designed to accommodate one wheelchair user and one companion. Vertical platform lifts do not require a structural shaft, but are required to be enclosed if they rise more than 2000mm. Also termed vertical lifting platform; vertical-rise platform lift; short-rise platform lift (up to 2000mm rise); enclosed platform lift; hydraulic platform lift; and scissor lift.

3.3 Design Issues

Vertical circulation in a building comprises distinct components including stairs, ramps, lifts, platform lifts, and escalators.

Each component provides a viable means of access between different levels within a storey or between floors in a multi-storey building, but a mix is required in order to meet the needs of all building users and to take account of different ages, sizes, abilities or disabilities.

Escalators are not suitable for wheelchair users; people with strollers and buggies; those who use walking or mobility aids; and people with guide or pet dogs.

Stairs are not suitable for wheelchair users; people with buggies or strollers; and those using walking or mobility aids.

Platform lifts are slow-moving and have limited occupancy.

Ramps with a significant rise can be so long that they become impractical and too tiring for many people to use.

Mechanical devices such as passenger lifts and platform lifts may be unsuitable for use in an emergency. In these circumstances, an alternative means of access and suitable management procedures will be required.

A recurring theme throughout this booklet is the need to ensure individuals can use facilities independently. There is no ‘one size fits all’ and there will always be a need to provide alternatives to meet the needs and preferences of all building users, and to safeguard occupants in an emergency.

People should be able to freely and easily move around a building. They should not have to ask permission to use a lift, or have to locate a key in order to operate a platform lift.

Stairs and ramps that offer an alternative route to lifts or escalators should be easily found or clearly signed so that people do not have to ask for directions or be delayed by having to search for a different route.

All methods of vertical circulation in a building should link with horizontal access routes and key facilities. Although covered in separate booklets, horizontal and vertical circulation are integral. Well-designed circulation routes contribute to the creation of a logical building layout that is easy for everyone to understand and access.

3.4 Vertical Circulation

Changes of level within a storey should be avoided in new buildings. In existing buildings, where there is an existing change in level that cannot be eliminated, people should be offered the choice of using steps or a ramp. Where the change in level is high and the installation of a ramp is not practical, the provision of a passenger lift or vertical platform lift should be considered.

Irrespective of the means of vertical circulation, safety is of paramount importance.

Stairs, while the most common means of changing level, can give rise to risk of serious injury following falls. In many buildings that incorporate lifts, the stairwells might never be used at all in the day-to-day operation of the building. It is essential, however, that the stairs be designed, detailed, and maintained in a manner that will ensure they are safe for everyone in the event of an emergency.

The provision of a passenger/evacuation lift (or lifts) to all floors in a building will provide the most convenient and safe means of access and egress for building users. Passenger/evacuation lifts should be sufficiently large, have adequate circulation space on landings and controls that are easy to use, as described in **Section 3.7 and 3.8**.

Suitable passenger lifts will enable everyone to access all parts of a building smoothly and independently. In many cases, the provision of passenger lifts is a requirement under legislation, but it is good practice to provide them even when they are not mandatory.

EN 81-70:2003 (IS EN 81-70:2003) 'Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Accessibility to lifts for persons including persons with disability.' Passenger lifts will make the building usable for more people, more adaptable, and suitable for letting to different tenants during the building's lifetime.

In some existing buildings, it may not be possible to install a lift due to spatial or structural constraints. In such situations, the provision of a vertical platform lift may be beneficial in that it provides an alternative means of access to stairs, see **Section 3.9.1 and Section 3.9.2**.

Some existing buildings may have a lift that is smaller than current best practice and it may not be feasible to install a new one or to increase the size of the existing structural shaft. In these circumstances, the potential to improve the lift controls, signalling system, safety and communication devices, and surface finishes should be considered, as these will improve accessibility for building users.

Checklist – Vertical circulation
• Avoid changes of level within a storey for new buildings.
• Design and maintain stairs to provide safe access at all times even if rarely used.
• Install passenger lifts in preference to other devices, as they provide the most convenient means of vertical circulation.
• Consider improving controls, signalling, safety and communication devices, and surface finishes in existing lifts.

3.5 Internal Stairs

3.5.1 Design and dimensions of internal stairs

Stairs should be safe and easy for everyone to use. They should be clearly visible and easy to identify. Spiral stairs and stairs with tapered treads should not be used, as they are much more likely to cause tripping.

The dimensions of each step should be consistent throughout a stair flight. The rise of internal steps should be in the range 150mm to 180mm. The going (depth) should be in the range 300mm to 450mm.

The profile of steps should be in accordance with **Figure 3.1**. Steps without projecting nosings are preferred, but if a projection is required, the riser face should be chamfered to an angle of at least 60 degrees and the overlap limited to 25mm. The leading edge of each step may be bevelled with a radius not exceeding 10mm.

Projecting nosings that have an underside perpendicular to the riser face should not be used as these present a trip hazard, particularly to people who ascend steps by sliding their feet up the surface of the riser. Where this already exists on stairs, a fillet can be added to the underside of the projecting nosing to reduce the tripping hazard.

All step risers should be solid. Open risers can be a source of visual confusion and are disconcerting for many people to use.

Figure 3.1 Step nose profile.

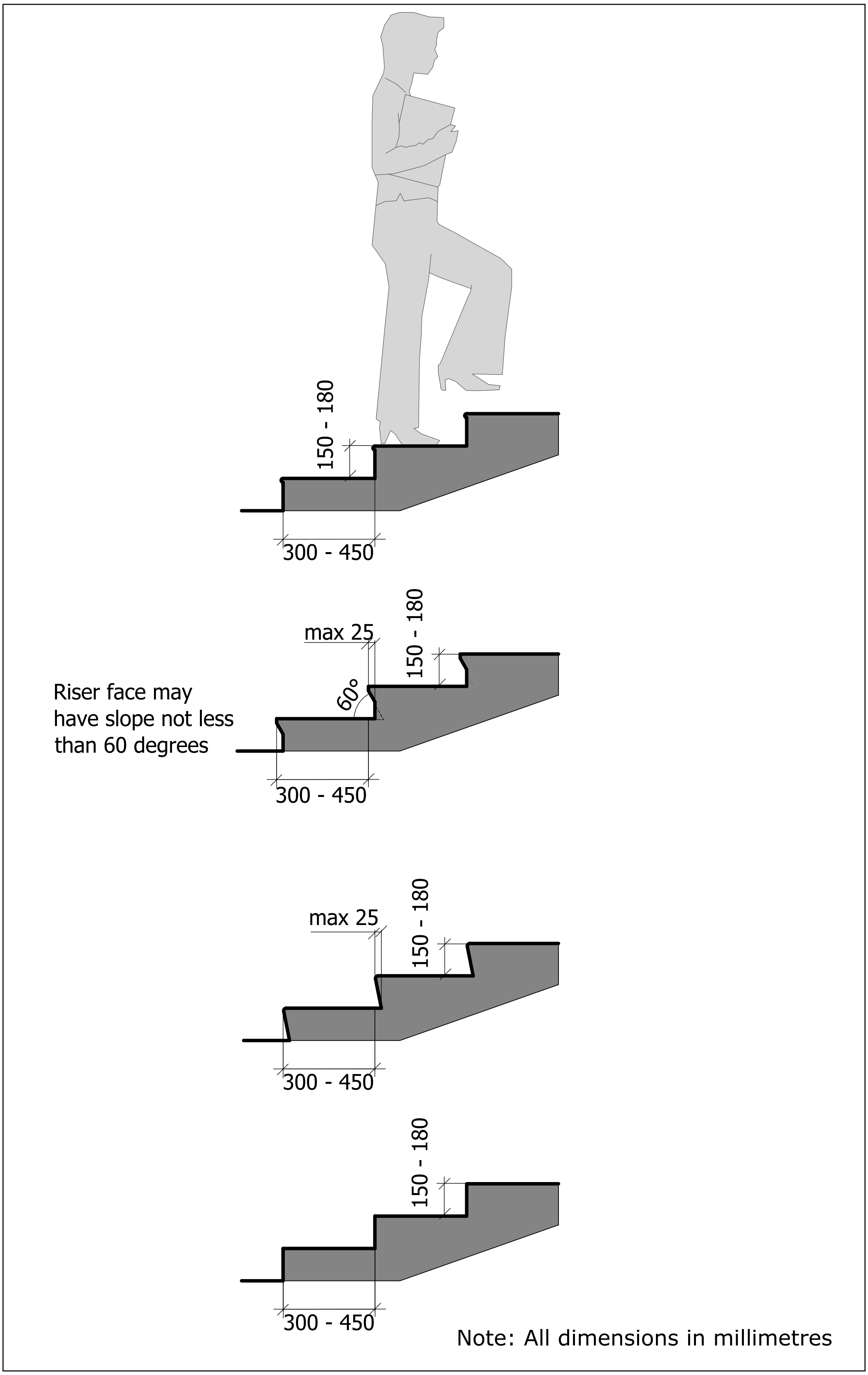


Image 3.1 Example of stairs with non-slip applied nosing.

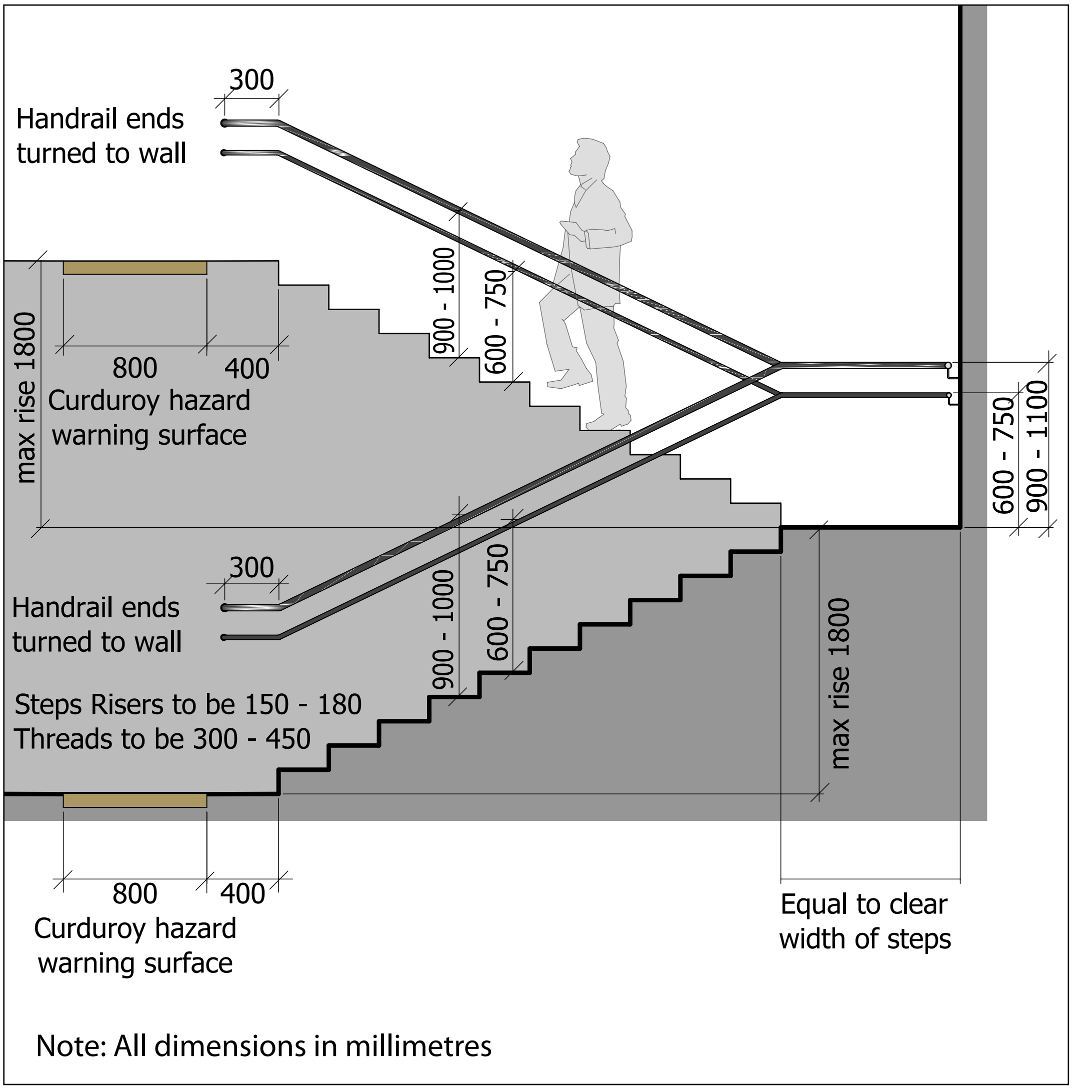
Each step edge should have a non-slip applied nosing or contrasting strip to visually highlight the step edge. The nosing or strip should extend the full width of the step and be 50mm to 70mm deep, measured from the leading edge of the step.

Where nosings comprise a metal frame with a coloured plastic insert, the insert should be a single colour. Nosings comprising two parallel strips of different colours should not be used as these can give a false impression of the location of the step edge.

The clear width of internal stairs should be determined by the expected level of use, but should not be less than 1200mm. The clear width should be measured between handrails.

The total rise of a flight of steps between landings should be no more than 1800mm, and should not contain more than 12 steps, as **Figure 3.2**. Where stairs contain two or more successive flights, the number of steps in each flight should be the same where possible. Single steps should be avoided as they are less readily apparent than a longer flight and may present a trip hazard.

Figure 3.2 Internal stairs.



Landings should be provided at the top and bottom of each flight of stairs. The landing length should be equivalent to the clear width of the stairs, subject to a minimum of 1200mm, and should be unobstructed by any door swings.

Clear headroom of 2200m minimum should be maintained throughout the full length of the stair flight and any landings.

Steps can present a hazard to people with visual difficulties, particularly when located in the direct line of travel. In new buildings and in buildings undergoing internal reorganisation, the location and configuration of stairs should be carefully considered.

Stairs that are not enclosed should not be positioned directly in line with a corridor or principal circulation route; unenclosed stairs should always require a conscious change in direction to use them. This will reduce the likelihood of a person inadvertently stepping onto stairs.

3.5.2 Refuges

Many people are unable to use stairs unassisted, such as young children, older people, or people with mobility difficulties. It is necessary to ensure that they can stay in a safe location until help arrives in case of evacuation.

A common way to facilitate this need is through the provision of safe refuge areas within protected stair enclosures. This is not always possible and may not always be desirable, particularly when dealing with existing buildings where space in the stairs is limited or where large numbers of people who require assistance to escape are anticipated.

The use of refuge areas will often require a person with mobility difficulties to wait alone. Therefore, it is important that designers ensure that appropriate accessible connections for communications devices are installed in the refuge area to prevent individuals becoming fearful or concerned about being left behind in these areas.

It is essential that the use of refuges is discussed fully in advance with those who might need to use them. This should be discussed with employees as part of the drawing up of Personal Emergency Evacuation Plans (PEEPS). Where people are unfamiliar with the use of refuge spaces and their locations in a building, the intervention of staff will be necessary to provide direction and reassurance. It may also be necessary for staff to remain with those waiting in refuge areas to assist with the use of communication systems or provide general support.

Refuges should be provided so that people with mobility difficulties are not placed at a greater risk from fire than other occupants. This will usually require an assessment of the number of people likely to require the use of a refuge space and assistance with vertical evacuation of the building. Inherent in this assessment is the availability and suitability of appointed staff who can provide assistance.

As a minimum requirement, refuges should:

- have a 1400 x 900mm space clear of the escape route, where a single refuge space is considered sufficient
- be enclosed in a not less than 30 minutes fire-resisting structure that has a 30 minute, fire-resisting, self-closing fire door fitted with cold-smoke seals
- be provided with a 30 minutes fire-resisting construction (integrity and insulation) from a fire inside the building, where the refuge is external
- be located either within, or be a space with direct access to, each protected stairway required for means of escape
- have a two-way communication system linked between the refuge and the management control point, which suits a range of mobility difficulties and is compliant with the recommendations of BS5839-9: 2003
- contain no glazing between the general accommodation and the refuge space
- have clear signage indicating that the space is designated for refuge including identification of the floor level
- have a notice providing guidance on procedures in the event of fire

3.5.3 Tactile hazard warning surfaces for stairs

In some circumstances, the use of a tactile hazard warning surface at the top and bottom of a flight of internal stairs may be appropriate. As with external steps, this can provide a means of highlighting the approaching change in level.

Tactile hazard warning surfaces should provide a visual contrast as well as tactile contrast. However, there are additional potential risks involving the use of such surfaces in internal environments, and these should be fully explored in the form of a risk assessment prior to specification.

Where it is not considered appropriate to use a tactile hazard warning surface, floor finishes that contrast both visually and audibly (when walked on, i.e timber to stone) should be used to highlight the top and bottom of the stair flight.

Tactile hazard warning surfaces are typically manufactured from relatively hard, non-slip materials such as durable GRP (glass reinforced polyester). They have different frictional characteristics from floor finishes commonly found in internal environments such as vinyl flooring, linoleum, and carpet.

Where adjacent materials have different frictional characteristics, they can present a slip or trip hazard and may present an even greater danger to all building users especially those with mobility difficulties. There may also be issues with the use of evacuation chairs (See **Section 8.5 Emergency evacuation in Booklet 8: Building management**) and difficulties arising from using tactile warning surfaces.

Where it is not considered appropriate to use a tactile hazard warning surface, floor finishes that contrast visually should be used to highlight the top and bottom of the stair flight.

Image 3.2 Example of a hazard warning surface. Many others are available. Care should always be taken when choosing a warning surface.

Should tactile hazard warning surfaces be used indoors, 3mm-high ridges may be used as 3mm is detectable on smooth floors.

For details of the recommended dimensions, position and profile of external tactile hazard warning surfacing, refer to **Booklet 1: External environment and approach, Section 1.5.2**.

3.5.4 Handrails for internal stairs

Handrails should be provided to both sides of stairs and be continuous throughout the flight. Where the clear width of a flight of stairs is greater than 2000mm, an additional handrail (or handrails) should be provided to divide the stairs into channels. This will improve safety and will be beneficial to many people, particularly when the stairs are being used by a large number of people at any one time.

No individual channel in a flight of steps should have a clear width less than 1200mm. A central handrail can, however, present an obstacle for people with hearing difficulties who are engaged in conversation. Care should be taken, perhaps using floor colour or textures as a warning, to make them obvious both visually and audibly (when walked on).

Switchback or dog-leg stairs often cause people with hearing difficulties to collide with oncoming people, unless the gap is widened between the switchback runs.

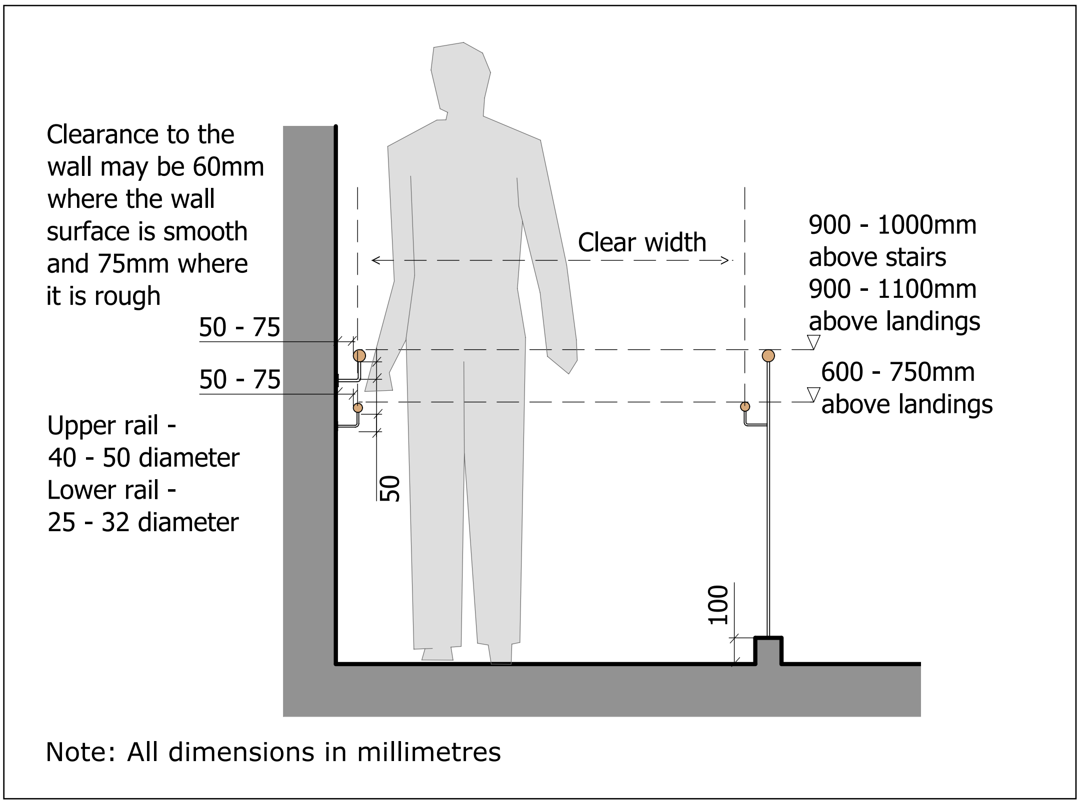
Handrails should be positioned with the upper surface 900mm to 1000mm above the pitch line of the stair flight and 900 to 1100mm above landings.

The provision of a second handrail at a lower height, with the upper surface positioned 600mm to 750mm above the pitch line and landing, is desirable and will benefit people of different heights. Handrails should extend a minimum of 300mm beyond the top and bottom step to provide support to people as they move onto or off the stair flight.

Handrails should be easy to grip and be either circular in cross-section or non-circular with a broad horizontal face, with a diameter of 40mm to 50mm, as **Figure 3.3**. Where a second handrail is provided at a lower height, the diameter may be 25mm to 32mm in recognition that it is likely to be used predominantly by children and that a smaller profile will make it easier to grip. An oval-profiled handrail should be 50mm wide and 38mm deep with rounded edges and a radius of at least 15mm. For both rails, a clearance of 50mm to 75mm between the rail and any support wall or mounting surface should be maintained along the full length of the rail. Where the surface of an adjacent wall is rough, the clearance should be 75mm; where it is smooth, the clearance may be 60mm.

Support brackets should be fixed to handrails centrally on the underside so that a person can run their hands along the full length of the rail without interruption. If the position of the handrail requires a person to release their grip, the person may feel insecure, and may not be able to support themselves adequately. The vertical clearance between the underside of the handrail and any angled support brackets should be 50mm.

Figure 3.3 Handrail details for internal stairs.



The ends of handrails should terminate in a way that signifies that the top or bottom of a flight of stairs has been reached. This can be achieved by turning the handrail towards the wall or downwards for a minimum of 150mm. This arrangement also reduces the likelihood of clothing or bags being caught on the end of the handrails as a person approaches the stair flight.

Handrails should visually contrast with surrounding surfaces so that they are readily apparent to all users.

It is preferred that the area beneath an internal staircase is enclosed in order to avoid the potential for a person to collide with the soffit or any supporting elements.

Where stairs are free-standing, any area where the clear height is less than 2100mm should be protected to prevent access. Means of protection could include a permanent raised flower trough at least 900mm high or a protective guard rail incorporating a low-level tapping rail.

Internal stairs should be illuminated so that they can be used safely at all times. The recommended minimum level of illumination at tread level is 150 lux.

Time-delay or sensor-operated lights used in stairwells should be set to a maximum of 2-3 seconds. However, the time-delay should be set to ensure that the timings accommodate the needs of all users.

Access on existing stairs can often be improved by fitting new or additional handrails; by fitting contrasting, non-slip nosings; and through the provision of additional space on landings by removing cupboards or other redundant features.

Checklist – Internal stairs
• Ensure step dimensions and profile are consistent with **Figures 3.1 and 3.2**.
• Make sure each step edge is visually highlighted.
• Incorporate clear width of steps to suit expected level of use, but not less than 1200mm.
• Check that total rise of flight between landings no more than 1800mm or 12 steps.
• Install consistent number of steps in consecutive flights.
• Avoid single steps on an access route.
• Provide clear landings at top and bottom of steps, with the length equivalent to the step width.
• Use tactile hazard warning surface at top and bottom of flight, only if deemed appropriate following risk assessment.
• Provide handrails on both sides of the steps and continuous around intermediate landings, as **Figure 3.3**.
• Provide an additional central handrail where the stairs are more than 2000mm wide.
• Protect any area below stairs that has headroom less than 2200mm.
• Light step and landing surfaces to 150 lux.
• Ensure that time-delay timings accommodate the needs of all users.

3.6 Internal Ramps

3.6.1 Design and dimensions of internal ramps

Ramps can provide an effective means of overcoming changes in level within a building. Ramps that travel from one storey to another are at present generally only found in large public buildings such as museums, airport terminals, or shopping centres, as the space required is much greater than for stairs or lifts.

Much more common are ramps that accommodate a change in level within a storey of an existing building.

Where any type of ramp is provided, there should always be an alternative flight of stairs. The only exception is with changes in level less than 300mm, where it would otherwise be necessary to have a single step. In many cases there will also be a passenger lift or vertical platform lift, as **Sections 3.7** and **3.9**.

The provision of an internal ramp benefits many people, including anyone pushing a trolley, buggy or stroller; people using a wheelchair; and those conversing in sign language while walking.

Ramps also aid independent and assisted evacuation in many instances, such as when lifts are unavailable. People are generally much less likely to trip on a ramp than on stairs. People also tend to feel more confident assisting another person on a ramp than on stairs.

Internal ramps should have a gradient not exceeding 1 in 20, with a maximum rise of 450mm between landings, and a corresponding maximum ramp length of 9000mm, as **Figure 3.4**.

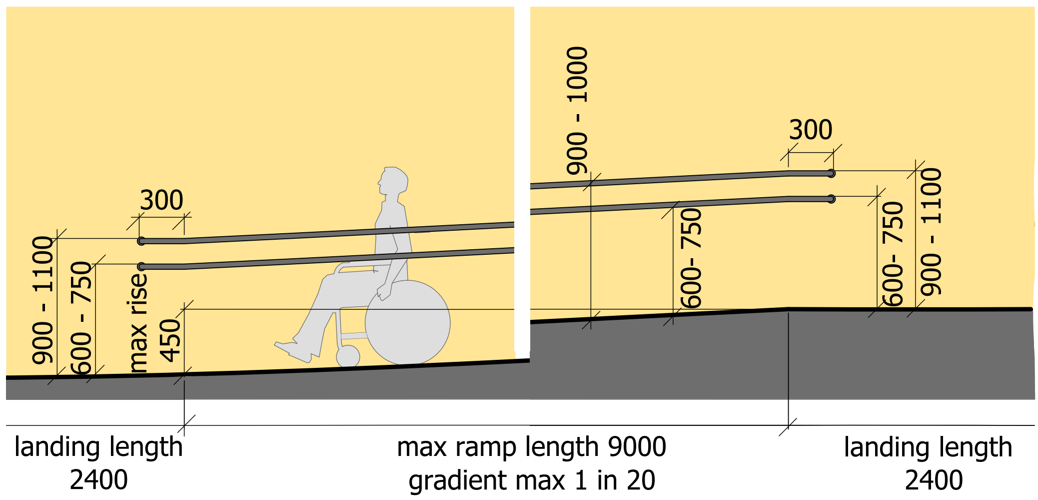
Where there are two or more consecutive slopes in a ramp, they should be of the same gradient. The gradient of ramps between landings should be constant.

Ramps with steeper gradients should be avoided as they can be difficult for some users to ascend, such as older people; parents with strollers or buggies; and in particular, wheelchair users, due to the strength required to propel a manual wheelchair up the slope. Descent may be hazardous due to the strength required to slow down and stop the wheelchair.

Steeper gradients also present a risk, in that a wheelchair user may fall forwards out of their wheelchair when descending, or the wheelchair may tip backwards when ascending. Consideration should also be given to parents with strollers and those using walking or mobility aids.

The clear width of a ramp should be determined by the expected level of use and whether people are likely to be using the ramp in both directions simultaneously. In any case, the clear width should not be less than 1500mm. Where a large number of people are expected to use the ramp at any one time, and in both directions, a clear width of 1800mm or more may be appropriate.

Figure 3.4 Internal ramp.



Note: All dimensions in millimetres

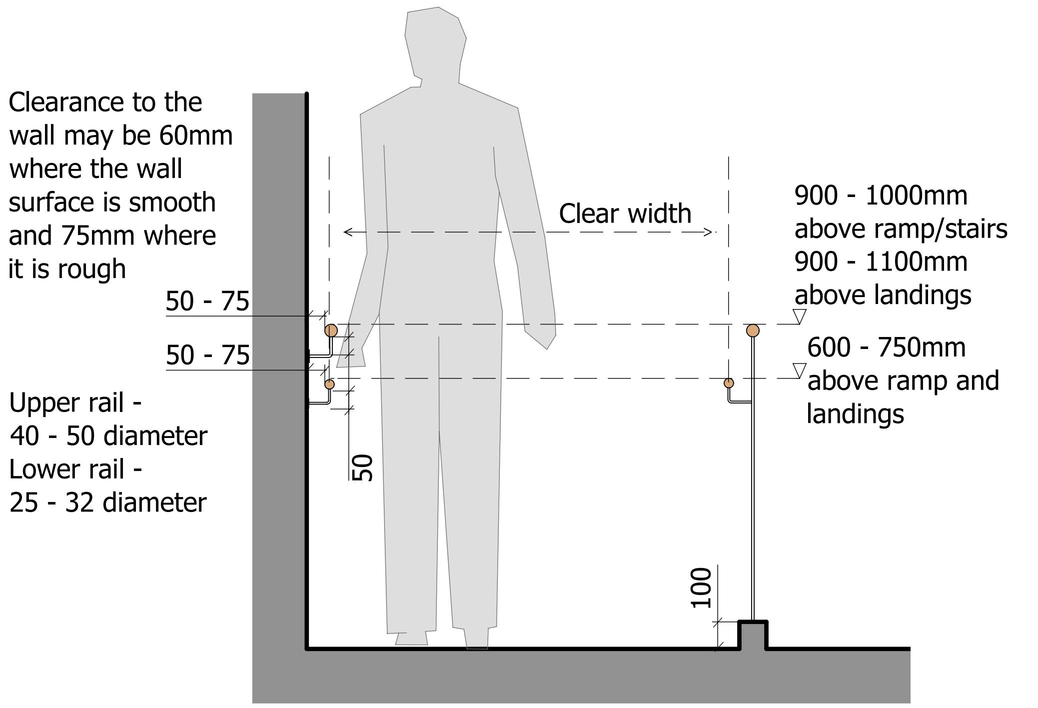
3.6.2 Ramp landings

Landings should be provided at the top and bottom of a ramp and should be 2440mm x 2440mm to provide turning space for wheelchair users; parents with strollers; guide dog users; and people using walking or mobility aids. It is recommended that intermediate landings should be 2000mm long and equal to the width of the ramp. If the ramp is long, or is likely to be used frequently by wheelchair users and people with strollers, the intermediate landing should be increased in width to 1800mm to provide a suitable passing place.

3.6.3 Ramp handrails and kerbed upstands

Handrails should be provided to both sides of the ramp and should be continuous to the full length of the ramp slope, as well as around intermediate landings. Guidance for the height, length and profile of handrails is the same as for internal stairs in **Section 3.5.4** above.

Figure 3.5 Handrail detail for internal ramps.



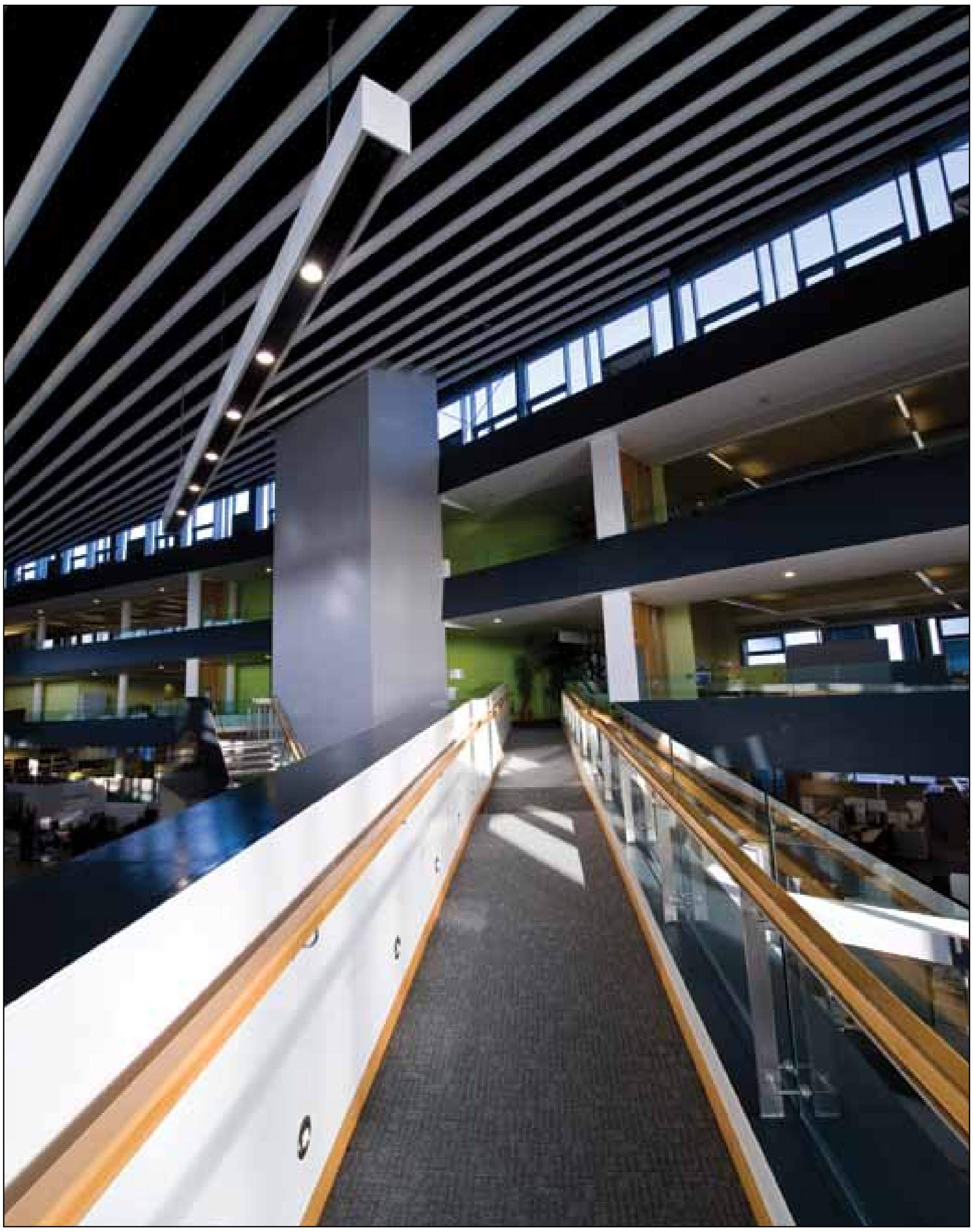
Note: All dimensions in millimetres

Image 3.3 Example of ramp with selected stone floor surface and contrasting wooden handrails.

The surface of the ramp should be non-slip. The ramp slope should contrast visually with landing surfaces to highlight the change in plane to people with visual difficulties. Tactile hazard warning surfacing should not be used on ramps as it is not designed for this purpose. Its use in these situations would be confusing and potentially hazardous for some people.

Ramps should incorporate a kerbed upstand or other form of edge protection. A kerbed upstand should be 100mm high (above the ramp and landing surface) and should contrast visually with the ramp surface. If a balustrade or guarding is provided to the side of a ramp, this will provide appropriate edge protection, as long as the gap between the ramp surface and lower edge of the balustrade or guarding is no more than 50mm.

Image 3.4 Example of a ramp with carpeted floor finish.



Ramps should be illuminated so that they can be used safely at all times. The recommended illuminance at the ramp surface is 150 lux.

Image 3.5 Alternative example of a ramp with carpeted floor finish.

Signage using the universal sign for a ramp should be provided to notify people that a ramp is available in the building. Please also refer to **Booklet 4 – Internal environment and services, Section 4.11**.

Checklist – Internal ramps
• Ensure maximum gradient of a ramp is 1 in 20, maximum rise 450mm, and maximum length 9000mm, as **Figure 3.4.**
• Make sure the gradient of a ramp slope is constant and consistent throughout and between consecutive ramp slopes.
• Install ramp with clear width to suit expected level of use, but not less than 1300mm.
• Incorporate top and bottom landings of 2440mm x 2440mm and intermediate landings 2000mm long x ramp width.
• Provide handrails on both sides of the ramp and continuous around intermediate landings, as **Figure 3.3.**
• Provide a kerb upstand or guarding to the side of ramp.
• Light ramp and landing surfaces to 150 lux.

3.7 Passenger Lifts

3.7.1 Location of passenger lifts

A passenger lift is generally the most convenient method of travelling between storeys in a building for people who cannot, or prefer not to, use the stairs. In multi-storey buildings, particularly high-rise developments, they are an essential means of access between floors for all building users. In new buildings, installing a lift capable of use in an evacuation should be considered

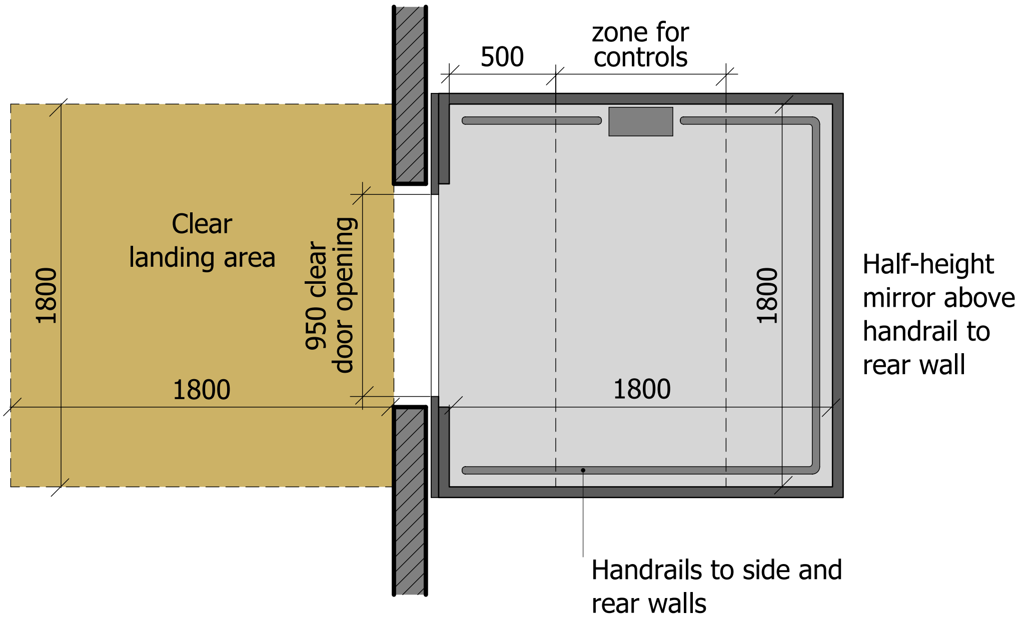
Wherever possible, passenger lifts should be installed in preference to platform lifts, especially in new buildings. Passenger lifts should be universally designed, they should be able to carry more people at any one time, and are much quicker than platform lifts. Passenger lift controls are generally easier to operate and facilitate independent access for all. Passengers lifts can be designed to 'evacuation lift' standard. This means the lift can be used to evacuate the building in case of fire or other emergency.

Where lifts are not designed to evacuation lift standard, designers should ensure that alternative mechanisms are available for the vertical movement of people with disabilities, particularly people with mobility difficulties and wheelchair users, in emergency situations.

Notwithstanding this, there will be circumstances when the installation of a passenger lift is not possible due to structural or other constraints. This may be the case when improvements are being made to some smaller, existing buildings. In these situations, the installation of a platform lift may be appropriate, subject to the recommendations in **Section 3.9** below.

Passenger lifts should always be located adjacent to stairs in order to offer an alternative means of access. This is to meet the needs of people who may be anxious about using a lift and prefer to use stairs in order to access other floors. The stairs should be designed to be accessible, useable and understandable (see **Section 3.5**), as a significant number of people with mobility difficulties, and those with reduced stamina or balance, will still choose to climb a stairs rather than enter a lift.

Figure 3.6 Passenger lift.



3.7.2 Glass-walled lifts

Glass-walled lifts can be a source of extreme anxiety for people with vertigo, who might not use them under any circumstances. On the other hand, glass-walled lifts may be preferred by people with hearing difficulties, as they can sense space beyond the elevator car, particularly in the case of a malfunction.

A conventional enclosed passenger lift should always be provided as an alternative to a glass-walled lift. The location of the enclosed lift should be clearly signed and it should not be located at too great a distance from the glass-walled lift.

Lifts should be clearly signed from the entrance (or entrances) of a building and from other key areas within the building at each floor level. The signs should incorporate the International Symbol for Access. (See **Image 3.6**).

3.7.3 Size and capacity of passenger lifts

The size and capacity of a lift (or lifts) will be determined by a number of factors including the building type and occupancy. Lifts in buildings such as railway stations, airports and hotels should be large enough to accommodate people travelling with luggage. Lifts in hospitals will be required to accommodate beds, trolleys, and other equipment. Lifts in public buildings should be large enough to accommodate a small group of people, including people pushing prams and pushchairs, and people who use mobility aids such as wheelchairs and electrically powered scooters.

Image 3.6 International Symbol of Access.

Where more than one lift is provided in a building, they should all be accessible to, and useable by, all building users.

Wherever possible, a lift should have recommended internal dimensions of 1800mm x 1800mm. This will enable wheelchair users and parents with strollers to turn inside the lift and also provides manoeuvring space for people using mobility scooters.

Lifts with internal car dimensions 2030mm wide x 1525mm deep may be acceptable where space is more limited. In lifts with these dimensions, some people who use wheelchairs or electric scooters and parents with strollers may have to do a three-point turn inside the lift car in order to enter and exit without having to reverse.

An absolute minimum lift car size of 1100mm wide x 1400mm deep may be acceptable in very small premises where the installation of a larger lift is not feasible. However, it is not ideal as the limited size means that wheelchair users and parents with strollers have to reverse out of the lift. Space is also very limited if anyone in the lift is carrying a lot of luggage or pushing a trolley, pram, or pushchair. Lifts of this size may also be too small to accommodate some electrically powered wheelchairs and scooters, which have a length (when occupied) of 1500 to 1600mm.

3.7.4 Safety devices in passenger lifts

When designing passenger lifts, consideration should also be given to EN 81-70:2003 (IS EN 81-70:2003) 'Safety rules for the construction and installation of lifts. Particular applications for passenger and goods passenger lifts. Accessibility to lifts for persons including persons with disability.'

Lifts should incorporate a self-levelling device that brings the lift car to a stop no more than 10mm from the finished floor level of each landing. A levelling accuracy of 20mm should be maintained during loading and unloading.

Lift doors should provide a clear opening width of 950mm. They should remain fully open for at least eight seconds to provide sufficient time for people to enter and exit the lift car. Doors should stay open longer in lifts where a significant proportion of the people using them are older or have disabilities.

A 'rapid-close' button and a 'hold-open' button should be provided inside the lift car. A 'hold-open' button should be provided on landings, allowing the user to hold the door open for 30 seconds. Doors requiring manual operation should never be used for passenger lifts. Lift doors should contrast visually with the adjacent wall surfaces.

Some lifts are designed with doors on opposite sides, requiring one-way travel into and out of the lift car. These can be advantageous in that they remove the need for people to turn through 180 degrees inside the lift. This is particularly beneficial for smaller lifts such as those with a lift car 1400mm long x 1100mm wide. Lifts with doors on opposite sides are recommended where the lift only serves two floor levels. However, if the lift serves several floors and the direction of door opening is not consistent, the arrangement can be disorientating.

The lift and door-opening arrangement should be as clear and logical as possible so that it is readily understood by everyone using it. The use of clear maps and signage inside the lift and on lift landings will help people to orientate themselves at different floor levels.

A safety device that prevents the lift door from closing on a person or object should be provided. The device should not require any physical pressure or contact to be made with the door, as this can be dangerous and frightening for many people. It should incorporate a 'light curtain,' covering the range 25mm to 1800mm above floor level, and should cause the door to stay open or reopen automatically.

On lift landings, there should be a clear space of 1800mm x 1800mm in front of the lift door to enable people to manoeuvre easily, to approach and reach the lift landing controls, and to enter or exit the lift car. The clear space should be highlighted with a visually contrasting floor finish.

3.7.5 Signage for passenger lifts

Signage bearing floor numbers should be positioned on the lift landing so that it is readily apparent. Two sets of signs will be required: one positioned adjacent to the lift landing controls and another positioned directly opposite the lift doors. The latter should be clearly visible from inside the lift car so that people can check which floor level they have reached before leaving the lift car.

The numbers positioned adjacent to the lift landing controls should not only be visual, but should also be tactile so that they can be read by touch. A combination of large embossed characters and Braille text is ideal. If it is not possible to use both, only embossed characters should be provided. All numbers should visually contrast with the adjacent wall surface.

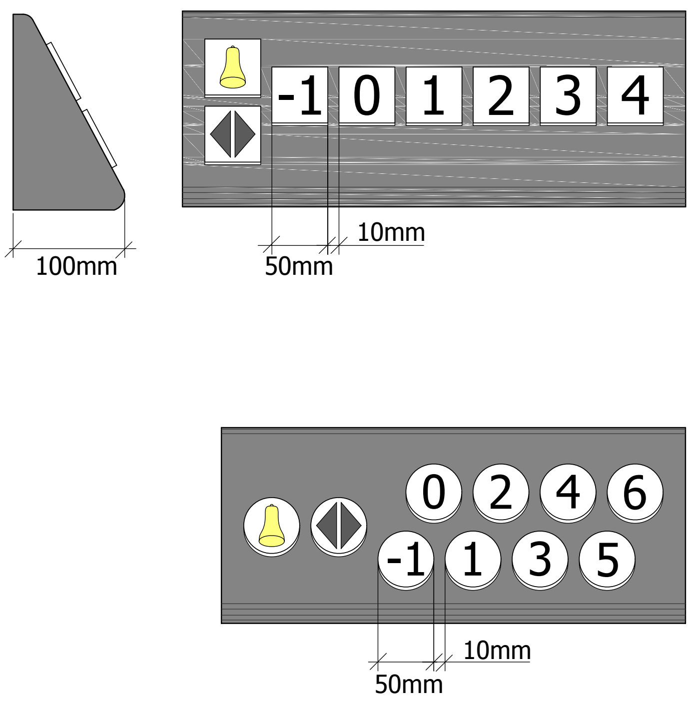
Image 3.7 Example of floor number signage fixed to elevator door frame.

The lift controls should be positioned at a 500mm horizontal distance from any adjacent wall or projecting surface and 900mm to 1100mm from floor level to the centreline of the button. A clear floor space of 1800mm x 1800mm (minimum 1500mm x 1500mm) should be provided in front of any controls. (The only exception to this would be where the lift car itself is less than the recommended dimensions.)

All control buttons should contrast visually with any mounting plate and the mounting plate should contrast visually with the adjacent wall surface so that it is easy to identify. Control buttons should be at least 50mm in diameter or 50mm x 50mm square, with embossed numbers and symbols to enable tactile reading.

Embossed numbers and symbols should be raised a minimum of 1.5mm above the button face or mounting plate and be 30mm to 40mm high. The distance between adjacent buttons should be 10mm. Lift car controls should be mounted on an angled plate that projects 100mm, and positioned in the order illustrated in **Figure 3.7**.

Figure 3.7 Lift car controls.



Note: All dimensions in millimetres

On each landing, the lift signalling system should provide both visual and audible confirmation that the lift is answering a call, that the lift has arrived, that the lift has stopped, and wherever possible, the next direction of travel. The call button should illuminate when pressed and should also emit an audible signal each time the button is pressed, even if the call has already been registered.

The audible signal should be between 35 dB(A) and 65 dB(A) and adjusted to suit the site conditions on each landing.

Visual indicators showing the current position of the lift and direction of travel should be positioned 1800mm to 2500mm above floor level and should incorporate arrows or numbers at least 40mm high.

Audible signals such as a bell chime should indicate the direction of travel: one chime for up and two chimes for down.

Inside the lift, the signalling system should provide visual and audible indication of the requested floors, the direction of travel, and whether the doors are opening or closing. A visual indicator showing the current floor position should be positioned above the control panel at a height between 1600mm and 1800m above floor level. Alternatively, two indicators may be provided, one above the doors and another at a lower level within the control panel. The audible signal should be a voice announcement, adjustable between 35 dB(A) and 65 dB(A) to suit the site conditions.

3.7.6 Emergency systems for passenger lifts

An emergency alarm and two-way communication system, linked to a monitored location, should be provided inside the lift car. The alarm system should incorporate both visible and audible signals and have instructions in both tactile and visual form.

The alarm call button should be yellow with a bell-shaped pictogram. The button should illuminate when pressed and provide an additional audible signal to indicate that the alarm has been raised.

The communication system should incorporate either a telephone handset or permanent speaker panel and microphone set into the wall of the lift car. Whichever system is used, it should be suitable for people with hearing difficulties and incorporate an inductive coupler. Telephone handsets should also incorporate volume control. Consideration should also be given to the provision of a text facility in the lift as part of the emergency communication system, this would benefit people with hearing difficulties.

Telephone handsets should be located within a cabinet and positioned with the handset base 900mm to 1200mm above floor level and a minimum of 500mm from the corner. The handset should have a cord length of at least 900mm, to enable the telephone to be used easily by people at a range of heights. The cabinet should be clearly marked with the internationally recognised telephone symbol, which should be at least 100mm high. The cabinet door should be positioned so that it does not obstruct access to the telephone when open. The door should have a handle such as a lever handle that is easy for everyone to use. Sharp edges should be avoided.

Image 3.8 Example of international telephone symbol.

Once lifted from the cradle, the telephone should indicate automatically which lift, if there is more than one, is the source of the call, and then allow two-way conversation. Telephones that require dialling should be avoided wherever possible. Some emergency telephones will signal an alarm when the door of the cabinet is opened. If this is the case, provide a notice to that effect.

3.7.7 Interior finishes in passenger lifts

The floor surface inside the lift car should have a matt finish, be firm and slip-resistant, and have similar frictional characteristics to the floor surface on each landing. It is recommended that the floor surface inside the lift is not dark in colour or tone. This is to reassure people with visual difficulties that they are not stepping into an open lift shaft.

The walls inside the lift car should contrast visually with the floor and ceiling surfaces. This will help people with visual difficulties to assess the size and shape of the lift interior. The walls should have a matt finish in order to minimise the potential for glare and reflections, which may be confusing and cause discomfort for some people.

Image 3.9 Example of lift with contrasting floor and walls. Also note the mirror and grabrail on the wall opposite the door.

Notwithstanding this, a mirror should be provided to the rear wall of all single-door lifts to allow someone to see what is behind them if they need to reverse out. The mirror should extend from 900mm above floor level to ceiling level and be constructed of safety glass. Full-height mirrors should be avoided as they can make the lift car resemble a corridor which may cause people to walk straight into the rear wall.

Any areas of glass in lifts, such as the doors, lift car walls or shaft walls in glass-walled lifts, should incorporate permanent markings so that the glass is clearly apparent to people from a range of eye levels. The markings should be at two levels, 850mm to 1000mm and 1400mm to 1600mm above floor level. The markings should contrast visually with the background surfaces viewed through the glass in all lighting conditions.

Lights in lifts should be carefully positioned to provide an even distribution of light and to avoid the potential for glare and shadows. Lights positioned behind or to the side of the control panel should be avoided as they are in the direct line of vision and cause the control panel to be silhouetted. This makes it very difficult for anybody using the controls and may even be physically painful for some people's eyes.

The use of indirect lighting such as uplighters or ceiling panels that diffuse light evenly throughout the lift car are preferred. The lights should provide an even level of illumination at the floor surface of 100 lux.

Image 3.10 Example of lighting in a lift.

Handrails should be provided to all internal walls of the lift car, apart from the wall (or walls) incorporating the lift doors. Where handrails meet the lift controls, the handrails may stop either side of the controls. They offer support to people who may be unsteady on their feet and to people who may otherwise be anxious about travelling in a lift.

Handrails should be positioned 900mm above floor level, be 30 to 45mm in cross-section with a 10mm minimum radius and be mounted with a clearance of 35 to 45mm from the lift wall.

The provision of a tip-up seat may be appropriate in certain lifts as they can be of benefit to some people who are unsteady on their feet or have poor stamina. Where provided, tip-up seats should be 500mm above the floor, and have a depth of 300mm to 400mm and width of 400mm to 500mm. Tip-up seats should be capable of supporting a load of up to 100kg.

3.8 Evacuation Lifts

Some lifts are designed to be safe to use for evacuation in case of fire or other emergency. These lifts are particularly useful for ensuring safe, independent, and dignified evacuation of wheelchair users; people with other mobility difficulties; and those who may have stamina or balance difficulties such as children, older people and pregnant women.

Evacuation lifts are required to be enclosed in a fire-resisting shaft and have an independent electrical supply. The fire-resisting enclosure should extend around the landing or a protected lobby at each floor level served by the lift and to the final exit doors at exit level.

Evacuation lifts also require additional controls that enable them to be operated only by an authorised person. This includes the provision of a clearly marked switch at the exit storey level, which, when operated, causes the lift to return to the exit level. The lift can then be operated by the designated person in accordance with the evacuation procedure and is isolated from the landing controls.

It should be noted that it is the Office of Public Works (OPW) policy to incorporate evacuation lifts in all future new buildings. It is also important to state that if an evacuation lift is provided, refuge spaces are still required.

Lifts intended for use in evacuation should be designed to meet Irish Standard EN 81-70:2003 'Accessibility to lifts for persons including persons with disability.'

Where evacuation lifts are not provided, designers should ensure that alternative mechanisms are available for the vertical movement of people with disabilities.

Further guidance on emergency evacuation is included in **Booklet 8: Building management** and in the NDA publication 'Promoting Safe Egress and Evacuation for People with Disabilities.'

Checklist – Passenger lifts and evacuation lifts
• Provide passenger lifts in preference to platform lifts, wherever possible.
• Locate passenger lift adjacent to an accessible flight of stairs.
• Provide conventional enclosed lift as an alternative to glass-walled lifts.
• Ensure lifts are clearly signed from building entrance and other key areas.
• Install lifts with the size and capacity to suit building type and occupancy.
• Ensure that all lifts are accessible , where more than one lift is provided..
• Keep to recommended minimum internal dimensions of 1800mm x 1800mm, as **Figure 3.6**.
• Incorporate clear door opening width of 950mm.
• Ensure lift doors remain open for a minimum of eight seconds.
• Design a lift door arrangement that is consistent and logical.
• Incorporate 'light curtain' safety device, extending 25mm to 1800mm above floor level.
• Include clear landing space of 1800mm x 1800mm.
• Provide visual and tactile floor numbers at each landing.
• Position landing and lift car controls within reach of all users.
• Install control buttons that are easy to use, as **Figure 3.7**.
• Ensure the lift signalling system is both visual and audible.
• Provide an emergency communication system that is suitable for all users.
• Design lift interior to minimise glare and reflection.
• Use even level of illumination of 100 lux.
• Provide half-height mirror to rear wall.
• Install handrails on all walls without doors.
• Consider the provision of a tip-up seat.
• Locate evacuation lifts in fire-resisting enclosure with independent electrical supply and additional controls.

3.9 Vertical Platform Lifts

Vertical platform lifts, which are also termed powered lifting platforms, should not be installed in new buildings, but may be considered as a means of improving access in existing buildings when the installation of a passenger lift is not possible. A vertical platform lift may provide an alternative means of access between split floor levels; to a mezzanine; or between two or more floors in an existing building where structural or other constraints preclude the use of a passenger lift.

Vertical platform lifts should facilitate independent, useable and understandable access; people should not have to seek assistance or permission in order to use it.

The advantages of vertical platform lifts are that they typically take up less space in a building compared to passenger lifts, due to the absence of a structural shaft and motor room, and the requirement for only a shallow lift pit.

3.9.1 Retro-fitted vertical platform lifts

Vertical platform lifts are generally much easier to retro-fit into existing buildings as they can be free-standing and are likely to require substantially less in the way of structural alterations than a conventional passenger lift. In this respect they may be more suited to use in historic environments where their use avoids the need to make significant irreversible alterations to the building structure.

3.9.2 Location and use of vertical platform lifts

As vertical platform lifts are not generally designed to be safe for use in evacuations, designers should ensure that alternative mechanisms are available for vertical movement of people with disabilities in emergency situations.

Image 3.11 Example of a vertical platform lift.

Vertical platform lifts can be installed externally and may be used to access basement areas or the raised ground-floor level of an existing building. They should never be used at entrances to new buildings in place of a ramp.

A number of additional issues should be fully explored when considering the use of an external vertical platform lift, such as, whether access should be monitored to prevent misuse; any additional maintenance requirements due to the lift being exposed to the weather; and the risk of vandalism.

Vertical platform lifts are much slower-moving than conventional passenger lifts, having a maximum speed of travel of 0.15m per second compared with 0.25m per second to 1.0m per second for passenger lifts in low-rise buildings, and 4.0m per second in high-rise buildings. This means that they are much less suited to carrying significant numbers of people within a short timeframe.

Vertical platform lifts are designed to carry a maximum of two people (one wheelchair user and one companion) at any one time, whereas passenger lifts typically have a capacity for eight or more people. When considering the installation of a vertical platform lift for any application, all these factors should be fully considered.

Wherever vertical platform lifts are provided, there should always be an associated flight of stairs or steps in order to offer an alternative means of access. Any landing area should be ancillary to the main circulation route.

3.9.3 Recommended dimensions for vertical platform lifts

Vertical platform lifts should have a platform size of at least 1100mm x 1400mm. However, it should be noted that platforms of this size may be too small to accommodate some electrically-powered wheelchairs and scooters that have a length, when occupied, of 1500mm to 1600mm. A larger platform should be provided wherever possible in order to be accessible to all.

Image 3.12 Example of a vertical platform lift with an associated flight of steps**.**

Vertical platform lifts are designed to have doors, gates or barriers on more than one side. This is an essential feature where it serves floor levels that are less than a storey height apart. Such 'short-rise' lifts typically have gates or barriers on opposite sides enabling through-travel. This is the preferred arrangement as it avoids the need for a person to turn through 90 degrees as they enter or leave the platform. However, where through-travel is not possible, it may be acceptable to position the entry and exit points on adjacent sides of the platform. Vertical platform lifts with doors on three sides are also possible and may suit locations with multiple changes in level.

Image 3.13 Example of vertical platform lift showing interior and controls of lift.

3.9.4 Short-rise vertical platform lifts

Short-rise vertical platform lifts that travel up to 2000mm vertical distance, do not have to be fully enclosed unless their location requires them to be protected from an adjacent area by fire-resisting construction.

3.9.5 Enclosed and non-enclosed vertical platform lifts

Vertical platform lifts that travel more than 2000mm are required to be fully enclosed, whether or not the enclosure is required to be fire-resisting. The enclosures are not required to be load bearing in the same way as they are for conventional passenger lifts.

Non-enclosed vertical platform lifts should have a safety guard and gate or barrier on both the entry and exit side of the platform to safeguard people while travelling on the lift. The safety guard and gate or barrier should remain in place while the platform is in motion. Gates and barriers should be at least 800mm high and incorporate a horizontal rail 300mm above platform level. The clear opening width of any gate or barrier should be 900mm. Any non-access side of the platform should have a permanent, solid barrier at least 1100mm high.

Enclosed vertical platform lifts should incorporate doors at each point of access. Doors should provide a clear opening width of 900mm and be outward-opening. The design and positioning of a door, and the selection of door ironmongery and power-assisted opening devices should be in accordance with the guidelines in **Booklet 2: Entrances and horizontal circulation**.

Manually-activated powered doors incorporating a wall- or post-mounted push pad or button are preferred to manually-operated doors. Wall- or post-mounted controls should be positioned 750mm to 1000mm above floor level and no closer than 1400mm to the swing of the door or clear of a sliding door in the open position.

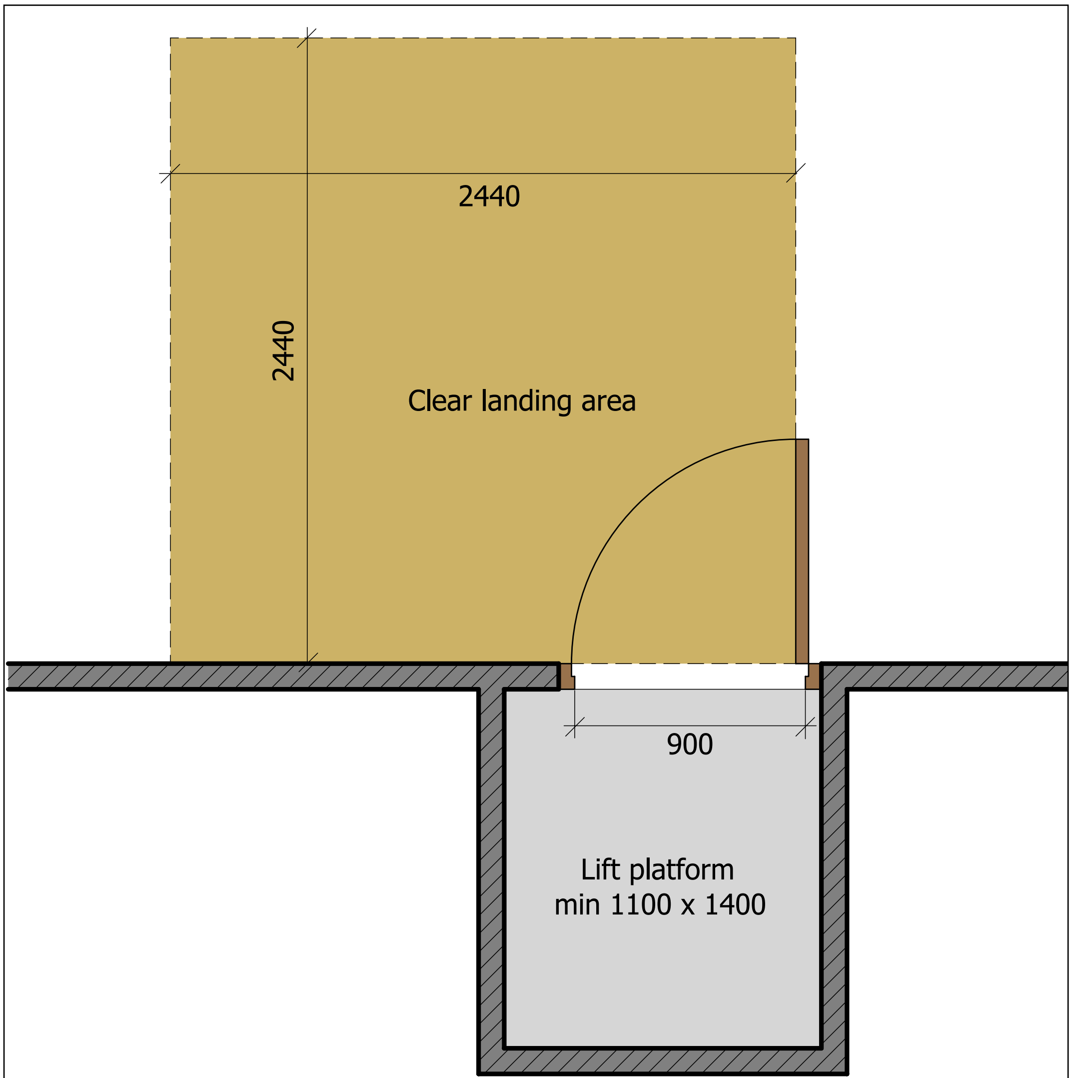
It should not be necessary for a person to have to manoeuvre backwards or clear of the door swing after activation of the door control device. Wall- or post-mounted controls should contrast visually with the surrounding surfaces and incorporate the International Symbol for Access.

The clear space on each landing should be 2440mm x 2440mm to enable people to approach and manoeuvre around the door or gate and to turn through 180 degrees, as **Figure 3.8.**

3.9.6 Controls for vertical platform lifts

Controls for vertical platform lifts should follow the guidelines for passenger lifts, as **Section 3.7.4** above. The controls that cause the platform to move up or down require continuous pressure to be exerted. If the person using the lift releases pressure on the controls, the platform stops, whether or not it has reached its final destination. This is a safety function and is far from ideal, particularly for people who find it difficult to maintain pressure on the controls for any length of time. Assistance should be provided to people using the lift who may find using the controls difficult. The use of a control device mounted on a cord that can be placed on a user's lap, or operated by either hand, is likely to benefit some people. Building users should also be able to quickly and easily identify a source of assistance, should this be required.

Figure 3.8 Platform lift.



Note: All dimensions in millimetres

At each landing, the platform lift signalling system should provide both visual and audible indication that the platform has arrived. Inside the platform lift enclosure, or on the platform control panel, the signalling system should provide visual and audible indication of the floor level reached.

An emergency assistance button should be incorporated into the platform lift control panel and it should be linked to a trained source of assistance.

Guidance on lighting, the selection of floor and wall surfaces, and the provision of handrails and tip-up seats for vertical platform lifts should follow the guidance for passenger lifts in **Section 3.7.7** above.

Checklist – Vertical platform lifts
• Provide vertical platform lifts in existing buildings only, in situations when passenger lifts cannot be installed.
• Consider the vertical platform lift size, capacity, speed and frequency of use fully.
• Install a recommended platform size of 1100mm x 1400mm.
• Incorporate a gate, barrier and door clear opening width of 900mm, and ensure all open outwards.
• Provide permanent solid barrier to non-access sides of platform.
• Design the doors in accordance with guidelines in Booklet 2, Entrances and horizontal circulation.
• Locate manually-activated door controls in a suitable location.
• Include a clear landing space of 2440mm x 2440mm, as **Figure 3.8**.
• Provide visual and tactile floor numbers at each landing.
• Position landing and lift car controls within reach of all users.
• Install control buttons that are easy to use, as **Figure 3.7**.
• Ensure the signalling system is both visual and audible.
• Provide an emergency communication button that is suitable for all users.
• Design the platform lift enclosure interior to minimise glare and reflection.
• Employ even level of illumination of 100 lux.
• Install handrails on non-access sides of platform.
• Consider the provision of a tip-up seat.

3.10 Inclined Platform Stairlifts

Inclined platform stairlifts travel along the slope of a stair. They incorporate a fold-down platform for wheelchair users and may also have a tip-up seat to facilitate use by older people, and those with balance or stamina difficulties. In general they should be avoided in new buildings. They may be acceptable in some non-domestic situations such as in a small existing building where it is not possible to install a passenger lift or vertical platform lift.

Inclined platform stairlifts should not be used where any part of the platform or support rails encroach into the recommended clear width of the stair, or where the safety of other building users will be compromised.

When the unit is folded, all parts should be recessed out of the circulation route and any exposed edges padded to reduce the likelihood of people bumping into the platform or catching their clothing on sharp edges.

As inclined platform stairlifts are not generally designed to be safe for use in evacuations, designers should ensure that alternative mechanisms are available for the vertical movement of people with disabilities in emergency situations.

Inclined platform stairlifts should only be used in buildings where assistance is available, although they should be available for independent use when required.

Image 3.14 Example of an inclined platform stairlift shown from above.

3.10.1 Recommended dimensions for inclined platform stairlifts

The recommended platform dimensions should be 890mm wide x 1525mm long. Clear instructions on using the stairlift should be provided and controls should be easy to use.

The side of the platform nearest the wall or support rails should be solid up to a height of 1100mm above the platform. This part of the stairlift may be used to mount the controls, a handrail, and tip-up seat, which should conform to the guidelines for vertical platform lifts in **Section 3.9.6** above.

Moveable guards and barriers should be provided to the other three sides, with safety mechanisms that allow only the side nearest the landing to be raised or lowered once the stairlift has reached its destination.

Image 3.15 Example of an inclined platform stairlift viewed from below.

Image 3.16 Example of an inclined platform stairlift.

Checklist – Inclined platform lifts
• Provide inclined platform stairlifts in existing buildings only, in situations when passenger lifts and vertical platform lifts cannot be installed.
• Avoid inclined platform stairlifts where the device encroaches into the recommended clear width of the stair or compromises the safety of other building users.
• Install a recommended platform size of 890mm wide x 1525mm long.
• Provide clear instructions for use.
• Include controls that are easy to use.
• Ensure lift has 1100mm-high solid side nearest to wall or support rails.
• Use moveable barriers and guards with integral safety mechanisms.

3.11 Stairlifts

Stairlifts, including chair stairlifts and perching stairlifts, are not suitable for use in public buildings. These types of stairlift are designed for domestic use only, where they can be tailored to meet an individual's needs and where a person can be fully trained in using the equipment. Occasionally, they may be used in situations such as an employment location where they are provided for use by a particular individual. In such locations, they should not obstruct the recommended clear width of the stairs or any emergency exit route.

Image 3.17 Example of a stairlift.

Checklist – Stairlifts
• Restrict chair stairlifts and perching stairlifts to domestic installations and occasional employment situations to meet an individual's needs.
• Never use where the device encroaches into the recommended clear width of the stair or compromises the safety of other building users.

3.12 Escalators

Escalators make vertical travel between storeys quick and easy for many building users and are a common sight in large buildings, such as, shopping centres, airports, railway stations, and some office atria. However, they do not provide a means of access for all and are unsuitable for people pushing strollers and buggies; some people with disabilities; and people with dogs. (Dogs, including assistance dogs, are not permitted on escalators because of the risk of entrapment.)

Some people feel anxious about using escalators and prefer to use alternatives such as stairs, ramps or lifts. An alternative means of access should therefore always be provided in association with escalators. The location of alternative access routes should either be readily apparent or clearly signed.

Image 3.18 Example of escalator with directional signs.

The direction of movement of escalators should be clearly indicated with a sign at the top and bottom. The footway at both ends of escalators should contrast visually with the escalator, and be highlighted with a change in floor finish.

Image 3.19 Example of an escalator with lighting under handrails.

3.12.1 Recommended dimensions for escalators

The moving handrails to each side should be positioned between 900mm and 1100mm above the pitch line of the escalator and extend at least 300mm beyond the top and bottom step. The handrails should contrast visually with the surrounding surfaces and move at the same rate as the steps.

Escalators should have a minimum width of 580mm and a maximum width of 1100mm. The steps should have a maximum height of 240mm, or 210mm if the escalator will be used as an emergency exit route when stationary.

Escalator step treads should have a matt, non-reflective, and non-slip finish. The leading edge of each step should have a visually-contrasting band, 55mm wide and extending the full width of the step. Clear headroom of 2300mm should be maintained throughout the full length of the escalator.

Where escalators are expected to be heavily used, there should be a clear approach area extending at least 10m. The level moving section at the top of an escalator should be at least 2000mm long, and at the bottom should be at least 1600mm long. An audible warning should be provided at the top and bottom of the escalator to warn people that they are approaching or leaving a moving surface.

3.12.2 Escalator speeds

Escalator speed should not exceed 0.75m per second. This may be lower (0.5m per second) where fewer passengers are expected. The recommended angle of the escalator is 30 to 35 degrees.

Emergency stop controls should be clearly identified and should be within reach of all users.

Image 3.20 Example of escalator showing both up and down directions, pole-mounted emergency stop buttons, plus a standard staircase in between.

Image 3.21 and 3.22 Examples of escalator emergency stop buttons.

Image 3.23 Example of external escalator showing tactile hazard warning strips on both up and down directions.

Checklist – Escalators
• Provide a clearly-signed or readily apparent alternative means of access.
• Ensure the direction of travel is clearly signed.
• Make sure the footway at each end contrasts visually and install a change in floor finish.
• Ensure moving handrails extend 300mm minimum beyond the start and end of escalator.
• Ensure escalator steps are a minimum of 580mm wide and a maximum of 1100mm wide.
• Provide maximum step height of 240mm, or 210mm if escalator used for emergency escape when stationary.
• Incorporate 55mm-wide contrasting band to full width of each step edge.
• Employ vertical clearance of 2300mm.
• Ensure clear approach at least 10m long.
• Include level moving section of escalator of minimum 2000mm at top and 1600mm at bottom.
• Install visually-contrasting handrails.
• Employ escalator speed not exceeding 0.75m per second.
• Ensure emergency stop controls are visible and accessible to all users.

3.13 Travelators

Travelators (or moving walkways) are used where long internal horizontal distances are to be travelled and are common in buildings such as large airports and some railway stations. Where distances are very long, alternative ways (e.g. electric buggy / golf cart) should be considered to transport people with limited or no walking capacity. The design of the spaces involved should leave sufficient room for such vehicles to safely negotiate their way amongst crowds of passengers. However, they can be hazardous for people who are unsteady on their feet or who cannot move quickly onto and off the moving walkway.

The speed and motion of travelators may cause anxiety for some people, who will prefer to use an alternative route. An alternative, useable and understandable access route should therefore always be available alongside a travelator. In most cases, this is likely to comprise a linear path or corridor. However, where the travelator is inclined, the provision of a ramp, steps, and lift may also be necessary.

The direction of movement of travelators should be clearly indicated with a sign at both ends of the walkway. The footway at both ends of travelators should contrast visually with the travelator and be highlighted with a change in floor finish.

The moving handrails to each side should be rounded in profile and extend at least 700mm beyond the start and end of the moving walkway. Handrails should contrast visually with surrounding surfaces. Travelators should be at least 1500mm wide and have a vertical clearance of 2300mm to their full length. A minimum 6000mm-long level static run-off should be provided at the end of each travelator.

The vertical panels to each side should be non-reflective and the walkway surface should be non-slip.

Image 3.24 Example of inclined travelator.

The speed of travelators should be kept to a minimum. The recommended speed is 0.5m per second (maximum 0.75m per second).

Emergency stop controls should be clearly identified and be within reach of all users.

Inclined travelators should have a gradient not exceeding 1 in 20.

Image 3.25 Example of travelator with signage.

Image 3.26 Example of travelator with emergency stop button and guard rails alongside pedestrian corridor.

Fixed guarding should be provided at both ends of a travelator and alongside adjacent access routes, wherever there is a potential for people to inadvertently walk towards the moving surfaces. Guardrails should contrast visually with adjacent surfaces.

Checklist – Travelators
• Provide clearly-signed or readily apparent alternative means of access to travelators.
• Ensure direction of travel is clearly signed.
• Install footway at each end that contrasts visually and a change in floor finish.
• Moving handrails to extend 700mm minimum beyond the start and end of walkway.
• Install visually-contrasting handrails.
• Ensure recommended walkway width of 1500mm wide and vertical clearance of 2300mm.
• Include static level run-off at least 6000mm long at each end.
• Employ recommended speed of 0.5m per second.
• Ensure emergency stop controls are clear, visible, and accessible to all users.
• Restrict inclined travelators to maximum gradient of 1 in 20.
• Use fixed guarding at entry and exit points and alongside adjacent access routes.
• Ensure guarding contrasts visually.

A1 Definition of Universal Design

Universal Design

'Universal Design refers to the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or disability.'

Synopsis of the Disability Act, 2005.

A2 Human Abilities and Design

The following piece of text is an extract from European Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'.

It states that: Physical, sensory and mental abilities vary from person to person and for individuals as they get older. Diversity is normal. Designers need to be aware of difference across the range of human abilities, and of associated design considerations.

(a) Physical abilities

This includes walking, balance, handling, pulling, pushing, lifting and reaching. Many activities involve simultaneous use of more than one of these skills. Physical strength and stamina may also affect people's abilities to perform these actions.

Walking

For some people walking on the level or up gradients is difficult. Some people may have a limited walking range, may have difficulty with turning movements or may use mobility devices such as crutches or a walker. They may need to stop frequently, to regain strength or catch breath. Design considerations include provision of handrails, seats at regular intervals, convenient set-down parking and adequate time for slower pedestrians at road crossings. Designers should also consider the needs of people walking and engaging in sign language when designing access to and from buildings plus within the buildings themselves.

Balance

Balance limitations can affect someone's gait or control of hand movements. Design considerations include handrails, regular seating, and providing controls within easy reach. A surface against which a person may stumble against or walk into should be designed to limit abrasion.

Handling

A significant minority of people are left-handed. Some people may have restricted use or no use of one or both hands, or may have limits on strength or precision. Facilities and components should be designed to be suitable for use with either hand or with one hand only. Handling includes gripping, grasping and manipulation. Each of these has a different purpose with specific design considerations. For instance, components should be designed to be easily held. The circumference of the supporting structure and stability are critical. Manipulation involves the moving, turning and twisting of components with a hand or hands. For those who have limited manipulation abilities, size and shape and ease of movement are critical. Another option to consider is to design for manipulation by using a pushing, pulling or pressing action using a clenched fist, or by using the wrist or the elbow.

Strength and endurance

Strength and endurance may be required on sloping paths and floors, stairways and long travel distances, when sustained effort may be needed.

For those with limited endurance, frequent resting-places are essential.

People generally find it easier to push a component, than to pull it. This is particularly so if the individual uses a wheelchair. Self-closing devices on manual doors can be difficult for some people to operate, particularly if the doors are required to resist wind forces. For these reasons, doors that open and close automatically are preferred.

Lifting

Activities such as opening a vertically sliding sash window and an upward opening access gate, should be designed to be easily operated with minimal force.

Reaching

Design has a role to play in ensuring that key components in a building or environment are in easy reach, bearing in mind the range of people's sizes and abilities. Having components within easy reach is particularly important for those with more severe limitations in mobility. The reach range is dependant on the height and arm length of the person, use of the arms, and the balance and mobility of the upper body. A 'comfortable reach range' has been defined as one that is appropriate to an activity that is likely to be frequent and in need of precise execution and that does not involve stretching or bending from the waist. Putting things within comfortable reach can ensure use by a greater number of people. An 'extended reach range' has been defined as one that is appropriate to an activity that is likely, neither to need precision nor to be frequent and that can involve stretching or bending from the waist.

(b) Sensory abilities

Speech

Some conditions affect the capacity for or quality of speech. Two-way communication can be facilitated by environments designed to minimise barriers to hearing low or indistinct speech.

Hearing

People differ in their capacity to hear sound, to determine its direction, its source, to discern pitch, frequency, volume and variation and to separate out different sounds. Hearing quality is important for communication, for information, and for detection of hazards such as traffic. Many people with hearing difficulties

use a hearing aid which amplifies all sounds caught by the microphone, making communications very difficult in noisy environments. Keeping background noise level low is essential. The selection of structural and surface materials can make a substantial difference in audibility. Auditoriums, meeting rooms and reception areas can benefit from additional sound enhancement such as a loop system. The careful design of illumination can assist in communication such as lip reading and sign language. Provision of visual information and visual alarm systems can communicate information to those who have hearing difficulties or who cannot hear. Foregrounding of sign language required. Designers should also consider the colour and size of rooms and even the furnishing arrangement as this is very important for visually based communication. Also the use of vibration as means of sensing others should be considered.

Sight

Vision allows an individual to be aware of the luminance of surfaces, objects, form, size and colour. For people who are blind or who have visual difficulties, the provision of suitable tactile walking surface indicators and tactile or acoustic warnings at hazardous locations, should provide information on using the built environment and should limit the risk of injury. The built environment can be designed for orientation by providing sound cues and tactile cues. An easily discernible system of 'way finding' should also be considered. For people with limited, but low vision, effective visual contrast between surfaces or objects helps to identify critical locations. Warning markings on glass surfaces, and markings on the edges of stair treads, help minimise hazards.

Differences in friction between one floor surface, or one stair tread surface, and the next should be avoided. Therefore, adjacent surfaces that display different standards of slip-resistance, or that depend on raised surfaces, should be carefully considered

Touch

In selecting surfaces in the built environment that people will need to touch (such as handrails, handles, knobs and controls, tactile information), it is important to select materials that avoid distress, injury or allergies. Surfaces should be free of abrasions. Metals that may cause adverse reactions when touched should be avoided.

(c) Mental abilities

Mental abilities include cognition, intellect, interpretation, learning and memory. People differ in their knowledge, their capacity to understand, reason, or interpret information. Designing for differences in these capacities helps provide a usable environment for the population at large, from the very young to the old, and people of diverse abilities. Means of communication in the environment should be designed to be immediately and easily understood, and correctly interpreted. As people age, some experience loss of memory or find it increasingly difficult to absorb new information, so changes in the environment should be carefully considered before implementation.

Design considerations that take account of mental abilities

Aural and visual messages should be simple, clear and have immediate impact. Figures, symbols and simple words are likely to be the most effective. Symbols should be instantly recognisable as representing images seen and activities undertaken in everyday life.

Way finding should be simple, such as tactile, graphic, audible or architectural cues that are easy to follow. Signage should be large and clear. Way-finding maps should be clear, indicate the person's whereabouts in the building or facility, and be free from extraneous information.

(d) Age and size

Accommodating the developing child

It is important to create environments that are safe, accessible and useable for children. Individual components should be safe and useable as age-appropriate. Learning to manage risk is an essential part of a child's development.

Accommodating ageing adults

Life span within the human population is increasing. More and more we expect to maintain an economic and social life within both the public and private domains as we age. However, many human faculties are in decline as we age, such as mobility, dexterity, stamina, strength, hearing, sight, or memory. Familiarity with a particular environment is important.

Diversity of size

The population contains a diversity of sizes and heights, from children, to the diversity in the height of fully-grown adults. The positioning of components and the heights of building elements such as steps should recognise the diversity of height. Increased weight and girth is now also a feature of the population.

Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'.
http://www.cen.eu/cen/Sectors/Sectors/ISSS/About_ISSS/Documents/cclcgd006.pdf

A3 Further Reading

National and international standards and codes of practice

AS 1428.1-2001 Design for access and mobility. General requirements for access – New building work.

AS 1428.2-1992 Design for access and mobility. Enhanced and additional requirements – Buildings and facilities.

AS 1428.3-1992 Design for access and mobility. Requirements for children and adolescents with physical disabilities.

AS 1428.4-2002 Design for access and mobility. Tactile indicators.

BS 4800: 1989 Paint colours for building purposes (whilst the colours in this standard cannot be seen on CD-ROM or online the text can still be used).

BS 5395-1:2000 Stairs, ladders and walkways – Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders.

BS 5588-8:1999 Fire precautions in the design, construction and use of buildings – Part 8: Code of practice for means of escape for disabled people.

BS 5776:1996 (incorporating amendment No.1) Specification for Powered stairlifts

BS 6440:1999 (Incorporating amendment No.1) Powered lifting platforms for use by disabled persons – Code of practice.

BS 6440:1999 Powered lifting platforms for use by disabled persons – Code of practice (partially superseded by BS EN 81-40:2008. The remainder of BS 6440:1999 will eventually be superseded by EN 81-41: 2009 Safety rules for the construction and installation of lifts – Special lifts for the transport of persons and goods – Part 41: Vertical lifting platforms intended for use by persons with impaired mobility).

BS 6465-1:2006+A1:2009 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.

BS 6571-4: 1989 Vehicle parking control equipment – Part 4: Specification for barrier type parking control equipment.

BS 7036-1:1996 Code of practice for Safety at powered doors for pedestrian use – Part 1. General.

BS 7036-4:1996 Code of practice for Safety at powered doors for pedestrian use – Part 4. Low energy swing doors.

BS 7997:2003 Products for tactile paving surface indicators – Specification.

BS 8300:2009 (Incorporating amendment No.1) Design of buildings and their approaches to meet the needs of disabled people – Code of practice.

BS 8493:2008 (+A1:2010): Light reflectance value (LRV) of a surface – Method of test.

BS 8501:2002 Graphic symbols and signs – Public information symbols (AMD 16897).

BS EN 115:1995 Safety rules for the construction and installation of escalators and moving walkways.

BS EN 15838:2009 Customer contact centres, Requirements for service provision.

BS EN81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passengers lifts – Part 70: Accessibility to lifts for persons including persons with disability.

Building Regulations (Part M Amendment) Regulations 2010 (S.I. No. 513 of 2010).

Citizens Information Board – Accessible information for all (2009).

DD 266:2007 (Draft for Development) Design of accessible housing – Lifetime home – Code of practice.

I.S. EN 1991-1-1:2002 – Eurocode 1: Actions on structures Part 1-1: General actions – densities, self weight, imposed loads for buildings (including Irish National Annex: 2005).

I.S. EN 81-1: 1999 Safety rules for the construction and installation of lifts – electric lifts (Amd 1) (+A3:2009).

I.S. EN 81-2:1999 Safety rules for the construction and installation of lifts – hydraulic lifts (Amd 1) (+A3:2009).

I.S. EN 81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passenger lifts. Accessibility to lifts for persons including persons with disability (Amd A1:2005).

I.S. EN 997:2003 (+A1:2006) WC pans and WC suites with integral trap (AMD Corrigendum 14805) (AMD 16965).

IEC 60118-4:2006 Electroacoustics. Hearing aids. Induction loop systems for hearing aid purposes. Magnetic field strength (ISBN 978 0 580 50047 3).

International standard for Induction loops. IEC 60118-4.

Irish Code of Practice on Accessibility of Public Services and Information Provided by Public Bodies www.nda.ie/website/nda/cntmgmtnew.nsf/0/3DB134DF72E1846A8025710F0040BF3D/$File/finaldrcode_nda.htm

Key cards should conform to EN 1332. For further information on key cards please see: http://www.universaldesign.ie/useandapply/ict/itaccessibilityguidelines/smartcards/guidelines/smartcardguidelines/cards

Lifetime Homes Standard: http://www.lifetimehomes.org.uk

Norwegian Universal design of building standard, 2009.

Passenger Lift Design: The Machinery Directive 2006/42/EC; Lifts should conform

to BS 6440.

National and international reference documents

2020 Vision – Sustainable Travel and Transport: Public Consultation Document. Department of Transport.

Bus Based Park and Ride – A Pilot Scheme. A Report to: Dublin Transportation Office. The TAS Partnership Limited, 2002.

City of London 2006 Facility Accessibility Design Standards. London, Canada, 2006 Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Gallaudet DeafSpace Design Guidelines 2010.

Department of Transport & the National Disability Authority Guidelines for Accessible Maritime Passenger Transport http://www.nda.ie/website/nda/cntmgmtnew.nsf/0/45AA46D1F77D7EF2802576DC005C5954?OpenDocument

Department of Transport, UK 'Traffic Signs Manual'.

Dublin City Council (2007) Variation (No. 21) of the Dublin City Development Plan 2005 – 2011. Available from: http://www.dublincity.ie/Planning/DublinCityDevelopmentPlan/VariationstotheDevelopmentPlan/Documents/AdoptedVariationNo21Spec.pdf.

Guidance on the use of tactile paving surfaces. Department for Transport, UK.

Guidelines for an accessible public administration. Towards full participation and equality for people with disability. Office of the Disability Ombudsman, Sweden.

Inclusive Mobility. Department for Transport, UK.

International Best Practices in Universal Design. A Global review. Canadian Human Rights Commission, 2006.

Irish Wheelchair Association: Best Practice Access Guidelines 2010.

Joseph Rowntree Housing Trust.

Parking for disabled people. Department for Transport, UK.

Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Rail Park and Ride Strategy for the Greater Dublin Area. Dublin Transportation Office, 1994.

Regulation of Bus services outside the Greater Dublin Area. Department of Transport.

"Sign Design Guide and Inclusive mobility," Oxley, P. (2003), Inclusive Mobility. Department for Transport, UK. www.mobility-unit.dft.gov.uk

Smarter Travel 'A Sustainable Transport Future' – A New Transport Policy for Ireland 2009 – 2020. Department of Transport.

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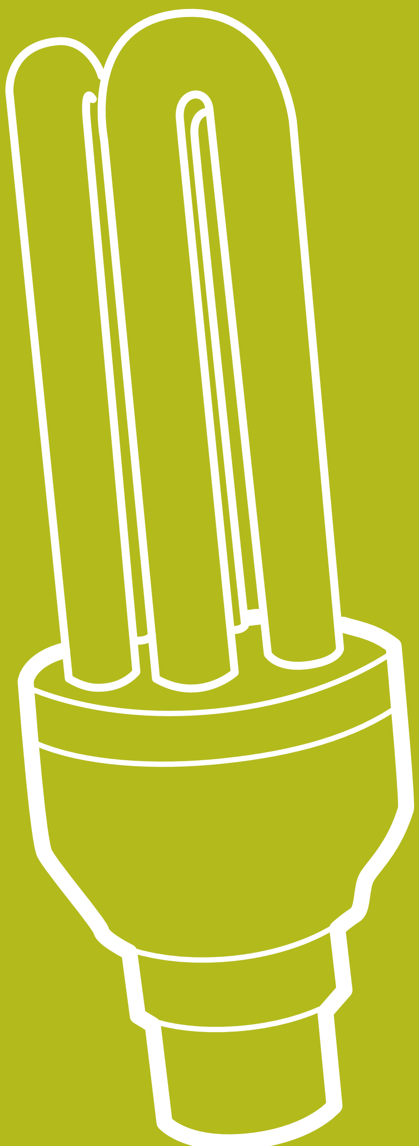
Building for Everyone:

A Universal Design Approach

Internal environment and services



4

Centre for Excellence in Universal Design

Creating an environment that can be used by all people, regardless of their age, size, disability or ability.

The National Disability Authority's Centre for Excellence in Universal Design has a statutory role to promote the achievement of excellence in universal design in:

- the design of the built and external environment
- product/service design
- information and communications technologies (ICT)
- the development and promotion of standards
- education and professional development
- raising awareness of universal design

More information and updates on the website at: **www.universaldesign.ie**

Building for Everyone

Booklet 4 – Internal environment and services

The other booklets from the
Building for Everyone series:

Booklet 1 - External environment and approach

Booklet 2 - Entrances and horizontal circulation

Booklet 3 - Vertical circulation

Booklet 5 - Sanitary facilities

Booklet 6 - Facilities in buildings

Booklet 7 - Building types

Booklet 8 - Building management

Booklet 9 - Planning and policy

Booklet 10 - Index and terminology

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4.0 Objectives

The guidance in this booklet promotes the concept and philosophy of universal design and encourages developers, designers, builders and building managers to be innovative and think creatively about solutions that meet the needs of all building users regardless of their age, size, ability or disability.

The objectives of the series of booklets are to:

- identify and promote best practice with regard to universal design of the built and external environment
- provide best practice guidelines that in no way conflict with the requirements of existing regulations in Ireland
- provide guidelines that are usable by and accessible to the target audience
- promote the achievement of universal design in Ireland

This booklet aims to:

- identify and promote best practice for the design of a building's interior and the provision of services within the building with regard to universal design
- increase awareness of, and to encourage designers to identify, the needs of all those who require good internal environments and layouts within buildings in order to undertake daily activities
- highlight the wider benefits experienced by all when accessible and universally designed features, services, and layouts are provided within buildings
- encourage designers to provide universal design solutions for internal environments that look beyond the recommended requirements of national building regulations

4.1 Introduction

This booklet is part of the series "Building for Everyone – A Universal Design Approach," which aims to provide practical guidance on the universal design of buildings, places and facilities.

Universal design places human diversity at the heart of the design process so that buildings and environments can be designed to meet the needs of all users. It therefore covers all persons regardless of their age or size and those who have any particular physical, sensory, mental health or intellectual ability or disability. It is about achieving good design so that people can access, use and understand the environment to the greatest extent and in the most independent and natural manner possible, without the need for adaptations or specialised solutions (see full definition in **Appendix A1**).

Why universal design?

People are diverse - some are left-handed and some right-handed - and vary in their age, size and functional capacities. Illness or disability (whether temporary or permanent) can also affect characteristics such as a person's mobility, dexterity, reach, balance, strength, stamina, sight, hearing, speech, touch, knowledge, understanding, memory, or sense of direction. A reference list with these booklets indicates some of the key differences in human abilities that should guide design of buildings and of outdoor places. (See full description of Human Abilities in **Appendix A2**).

People of diverse abilities should be able to use buildings and places comfortably and safely, as far as possible without special assistance. People should be able to find their way easily, understand how to use building facilities such as intercoms or lifts, know what is a pedestrian facility, and know where they may encounter traffic.

Given the wide diversity of the population, a universal design approach, which caters for the broadest range of users from the outset, can result in buildings and places that can be used and enjoyed by everyone. That approach eliminates or reduces the need for expensive changes or retro fits to meet the needs of particular groups at a later stage.

It is good practice to ascertain the needs of the range of expected users as early as possible, and to check the practicality and usability of emerging designs with a diverse user panel.

Designing for one group can result in solutions that address the needs of many others. For example:

- level entry (Step-free) entrances facilitate not just wheelchair users but also people with buggies; people with suitcases or shopping trolleys; people using walking or mobility aids; and people with visual difficulties
- larger toilet compartments provide easier access to wheelchair users; those with luggage or parcels; parents with pushchairs or accompanying small children; those using walking or mobility aids; and larger-sized people
- clear, well-placed signage that uses recognised symbols or pictograms helps people with reading or cognitive difficulties, and those whose first language is neither English nor Irish

Sometimes one solution will not suit all and a range of options will need to be provided, for example:

- providing both steps and a ramp where there is a change in level
- providing parking ticket machines that offer slots at different heights to facilitate use at standing height, at sitting height, and by people of small stature.

This series of booklets is for architects, engineers, planners, developers, designers, building contractors, building workers, building managers, and others involved in designing, commissioning and managing buildings and their surroundings. It provides guidance on a universal design approach to all new buildings, and the use and adaptation of existing environments.

Those who commission, design, construct or manage any part of the built and made environment also have a duty of care to adhere to relevant legislation and regulations including equality legislation, building regulations and health and safety regulations.

The guidance is based on a best practice approach, drawing on up-to-date international best practice, guidelines and standards; previous guidance by the National Disability Authority; and extends beyond disability access matters to incorporate a universal design approach. The series is fully compatible with Part M (2010) of the Building Regulations and associated Technical Guidance Documents related to Part M.

A disability access certificate is required for new buildings other than dwellings (including apartment buildings) and certain other works (as set out in Article 20 D (1) of SI 351 of 2009) to which the Requirements of Part M of the Building Regulations apply, which commence or take place on or after 1 January 2012. Further details on these and other relevant standards, codes of practice, and professional codes of practice are listed in **Appendix A3** Further Reading.

The detailed guidance provided here does not represent the only possible solution. Designers may come up with other ways to meet a diversity of users. New materials and technologies that emerge may open up further possibilities of accommodating the diversity of the population.

Checklists are provided throughout the series and while they provide a summary of main considerations and technical criteria, they should not be regarded as a substitute for the main text or an exhaustive list.

A comprehensive **index** is also available with the suite of booklets.

The Building for Everyone series is available online at **www.nda.ie** and **www.universaldesign.ie**. Electronic links are provided to relevant sections in the different booklets. As standards and requirements develop, the electronic versions of these booklets will be updated.

The electronic version is produced in accessible PDF format in accordance with the Web Content Access Guidelines 2.0. If you have any difficulties in this regard or require the document, or particular sections, in alternative formats, please contact the Centre for Excellence in Universal Design at the National Disability Authority, **info@ceud.ie** or (01) 6080400.

4.2 Terminology

Accessible Facilities – Facilities that are designed for all users of a building or external environment, including the young and old, and those of all sizes, abilities, and disabilities.

Acoustics – Characteristics relating to sound.

Building – A permanent or temporary structure of any size that accommodates facilities to which people have access.

Building user – A person regardless of age, size, ability, or disability using facilities in a building or associated external environment.

Coir matting – A coarse kind of carpet made from coconut fibre usually used as a floor mat in matwells at building entrances.

Matwell – Entrance door matting systems set into a frame in the floor.

Reverberation – The reflection of sound within a room or space.

Wayfinding – A collective term describing features in a building or environment that facilitate orientation and navigation.

4.3 Design Issues

Although all sections of this booklet cover specific aspects of the internal environment in detail, all are interrelated and require consideration alongside broader design issues, such as the overall building layout and elements of structure.

The acoustic environment of a building is not only influenced by the geometry of a room or space and its surface finishes, but by the relationship of the building to external noise sources and the impact of noise generated in adjoining areas. Construction elements, such as the floor, wall, and roof structure typically provide the backing or mounting surface for finishes, but can vary considerably in form and have a direct bearing on the acoustic characteristics of a space. The desired acoustic qualities for each area of a building should be considered from the earliest planning stage to mitigate problems caused by noise pollution. Acoustic qualities should also be considered throughout all of the detailed design stages, in order to create an acoustically balanced environment through the use of appropriate materials and construction.

The appropriate selection of surface finishes, particularly floor finishes, has a direct impact on usability and functional performance, and is essential for the safe movement of everybody around a building. By successfully optimising the visual and textural characteristics of surface finishes, designers can also facilitate identification of spaces, routes, features or services, as well as potential hazards. Suitable, uncluttered surface finishes, combined with good lighting, also aid visual communication, an essential tool for many people particularly people with cognitive and mental health difficulties.

Effective wayfinding and orientation within a building often require the use of a well-designed system of signage. However, other factors have a significant impact on the legibility of a building layout; many other features of an environment can be used to navigate and direct people to particular features. A logical internal arrangement of rooms and spaces within a building can greatly enhance the ability of people to navigate independently and predict the location of particular areas without reliance on signage. Other characteristics of an environment, such as the sound of voices, the presence of lighting at a bar, or the fragrance from plants around an entrance, should be considered beneficial features and an aid to wayfinding, particularly for people with cognitive, mental, or visual difficulties.

Many features that are often principally considered as defining the aesthetics of a building interior, such as the wall and floor finishes, the colour scheme, and the position of lights, can have a wide-ranging effect on the usability of an environment. Considered together, these features can be used to optimise the visual and acoustic characteristics of a building and contribute to the creation of an environment that is safe, comfortable, and enjoyable for everyone to use regardless of age, size, ability, or disability.

This booklet should be read in conjunction with others in the series, but in particular **Booklet 2: Entrances and horizontal circulation** and **Booklet 3: Vertical circulation**. The development of a logical and effective system of wayfinding involves the provision of suitable routes for horizontal and vertical circulation, and a central focal point for information, such as a building entrance and associated reception area.

Checklist – Broad planning and interrelated detail
• Consider the detailed aspects of the internal environment alongside broader design issues.
• Think about how detailed design issues may affect other aspects of the internal environment and the relationship between them.

4.4 Surface Finishes

Surface finishes have a significant and wide-ranging impact on the safety, usability, legibility, and comfort of spaces within the built environment, in addition to the obvious issue of defining the building's aesthetic characteristics.

The selection of surfaces finishes should be considered as an integral part of the overall building design and should be undertaken in conjunction with the design of lighting, general acoustics, signage, and information.

Suitable surface finishes will assist building users in orientating themselves, navigating and moving comfortably around a building, identifying features and obstacles, and communicating effectively in an acoustically-balanced environment.

Acoustically-balanced environments are particularly beneficial for people with hearing difficulties and for those who have cognitive, mental health or visual difficulties.

4.4.1 Floor finishes

Floor finishes in buildings should be selected with regard to a number of criteria including safety, functional performance, durability, visual characteristics, acoustic performance, and environmental issues.

Safety is paramount for all building users. The key safety issue in buildings is the slip resistance of the floor finish. Effective slip resistance reduces the likelihood of a person slipping and provides a firm foothold and wheel grip. Slip resistance characteristics should be maintained when the surface is both wet and dry and when spillages occur.

The degree of slip resistance of a floor finish is directly related to the surface roughness, or coefficient of friction, and is represented by the Slip Resistance Value (SRV).

A smoother surface provides less slip resistance and a rougher surface provides greater slip resistance.

Where there is a change in floor finish and the slip resistance characteristics of adjacent materials are significantly different, there is an increased risk of tripping or slipping. The risk can be reduced by ensuring that changes in surface finish occur out of the direct line of travel, for example, to the side of an access route or in a location, such as a doorway, where people are alerted to a potential change by other features.

The risk of tripping or slipping is a consideration in the use of tactile warning surfaces at the top and bottom of internal steps. Tactile hazard warning surfaces are typically manufactured from relatively hard, non-slip materials that have different frictional, or slip resistance, characteristics from floor finishes commonly found in internal environments, such as carpet and linoleum.

The potential risks involved in the use of such surfaces should be fully explored in the form of a risk assessment prior to specification. Where it is not considered appropriate to use a tactile hazard warning surface, floor finishes that contrast visually should be used as an alternative to highlight the change in level. Refer also to **Booklet 3: Vertical circulation, Section 3.5.3**.

Ease of movement is important for all building users and the provision of suitable floor finishes that are firm, even, securely fixed, and non-directional are considered universally designed. Anyone using a mobility aid, such as a stick or a walking frame, or who has difficulty lifting their feet, will be much more likely to trip on a deep pile carpet than a more solid floor covering. Where carpets are used, consideration should be given to the type of underlay, pile height, and density to ensure the surface is sufficiently firm.

Directional floor coverings, such as deep-pile carpets and coir matting, should be avoided. Such floor coverings tend to direct wheels in the direction of the weave or pile, requiring much greater effort to propel a wheelchair, pushchair, trolley, or other wheeled device.

Loose-laid mats should be avoided as they present a potential trip hazard to all building users. They are also prone to ‘creeping’ across the floor surface, which increases the likelihood of a person slipping. Where supplementary mats are required, they should be firmly fixed to the floor along each edge.

Image 4.1 Example of correct floor mat at building entrance.

All floor finishes should be durable and selected with regard to the likely volume of use. The slip resistance of floors may reduce as the surface becomes worn. Fraying edges, loose tiles, sheets or boards and poor quality mats will cause tripping and slipping. Floors need to be maintained so that they remain in a safe condition and should be easy and quick to clean in the event of a spillage.

Visual contrast between surfaces and features in a building is important to enable people with visual difficulties to navigate safely around an environment and to identify features and potential obstacles.

Visual contrast between the floor, wall and ceiling surfaces in a room or space enables people to assess the shape and extent of the area. Visual contrast is also beneficial for people who have cognitive, mental health or visual difficulties.

The use of a contrasting floor finish can also be used to identify potential hazards, such as change in level, or an obstacle, such as a column or barrier.

Image 4.2 Example of junction between carpet and linoleum-type flooring, which differentiates the circulation route from the seating area.

The use of visually contrasting floor finishes and changes in texture can be used creatively to assist with wayfinding and navigation, and to define different areas within a building. Floors can be colour coded to identify different floor levels or a particular department or area of a building. Floor finishes can incorporate a coloured line to lead people, for example, from a hospital reception desk to a particular outpatient clinic. Changes in the type of floor finish, texture, colour, and tone can be used to delineate between different areas, such as an access route and adjacent seating area. Carpet borders and highlighted areas can define particular areas or room entrances.

Expansive floor finishes that are shiny or reflective should be avoided as they can be visually confusing and are a potential source of glare. Reflections from windows or from the sky through an atrium roof can be particularly disorientating if the floor finish is not specified appropriately. Glare caused by reflections of direct sunlight or other bright light sources is likely to be a source of discomfort for some people.

Shiny floor finishes may also be perceived as being wet, which can cause anxiety for many people who will not want to cross the floor surface for fear of slipping.

Floor finishes with a matt or satin finish are preferred in the majority of circumstances. Shiny or reflective materials may be acceptable when used carefully for small details within a floor surface, but not for large areas .

The design and placement of natural and artificial light sources should be considered alongside the selection of floor finishes to reduce the likelihood of glare and reflection and to ensure the floor surface is adequately and evenly illuminated. Refer also to **Section 4.5**.

The use of large or bold patterns on floors should be avoided as they can be visually confusing and may make it difficult for people to identify potential obstacles and changes in level. The use of stripes, or strong contrasting lines in particular, should be avoided as these can be perceived as the edge of a step and cause a person to trip. Plain surfaces or a small pattern using complementary colours are preferred.

The acoustic characteristics of floor finishes and the surfaces on which they are installed can affect the level of background noise in a space and the overall quality of sound within an environment. A good acoustic environment will enable people to hear speech and other desired sounds clearly, and is particularly beneficial for people with hearing difficulties.

For people with visual difficulties, audible clues within an environment can aid navigation and wayfinding, but they need to be clear and not masked by excessive reverberation or echo.

A good acoustic environment is one in which the level of background noise is low and the reverberation time is suitable for the size and purpose of the space, as **Section 4.9**.

In general, a balance between hard and soft surfaces within a room or space will contribute to a good acoustic environment. Hard floor finishes include timber, ceramic tiles, stone, metal, and glass. These will reflect sound and increase reverberation within a room. Softer surfaces, such as carpet, vinyl, rubber, and cork, will absorb some sound and reduce reverberation time.

The use of materials with contrasting acoustic characteristics can be used to advantage to define areas within a building or space. For example, a hard surface, such as a timber floor set within an area of carpet, could be used to delineate a circulation route through a hotel reception area. The timber and carpet will make a different sound when walked upon and provide audible clues as to the different areas of the building. However, care should be taken to ensure that adjacent materials that have different slip resistance characteristics do not present a hazard, as discussed above. Wherever there is a change in material, the finished floor surface of both materials should be level.

Some floor finishes may directly or indirectly aggravate allergic reactions or sensitivities in some people by harbouring dust, hair, and other particles, or by affecting indoor air quality. Carpets, for example, will harbour dust and hair more readily than smoother surfaces that can be more effectively cleaned and washed. Synthetic floor finishes that generate static electricity also have a tendency to attract dust and other particles that are harder to remove. Where this may be an issue, the use of natural floor coverings should be considered.

Table 4.1 Key desirable characteristics of floor finishes for different areas of a building and situations to avoid:

Building element	Characteristics of floor finishes	Things to avoid
Entrances	• Hard wearing. • Firm, dense and non-directional. • Effective in removing and retaining water and dirt from feet and wheels, to avoid transfer to other internal surfaces. • Easy to clean. • Surface flush with adjacent floor finishes. • All edges firmly fixed. • Visually contrasts with wall surfaces. • Slip resistant when both wet and dry.	• Any form of compressible or directional matting, including coir. • Loose-laid mats. • Changes in level between entrance mats and adjacent floor finishes. •
Corridors and access routes	• Firm, level and securely fixed. • Flush with adjacent surface finishes. • Slip resistant when both wet and dry. • Matt or satin finish. • Plain, mottled, or small pattern with complementary colours. • Even level of illumination. • Visually contrasts with wall finishes. • Possible use of colour coding to aid orientation and wayfinding.	• Soft, compressible floor finishes, such as deep pile carpet. • Changes in level between adjacent floor finishes. • Bold patterns and stripes. • Large areas of shiny or polished surfaces that create glare and reflection. • Lighting design that causes dark shadows.

Stairs and ramps	• Firm, level and securely fixed. • Slip resistant when both wet and dry. • Greater slip resistance for ramps and inclined floors than for horizontal surfaces. • Ramp slope to visually contrast with landings. • The top and bottom of a flight of steps to visually contrast with the tread and riser surfaces. • Where different materials are used to highlight a change in level, at the top and bottom of the flight, the slip resistance characteristics of each to be similar. • Floor finish for treads, risers, and step nosings to be consistent throughout a flight. • Floor finishes to extend the full width of each step. • Step nosings to be firmly fixed and extend to the full width of each step. • Matt finish with plain, mottled, or small patterns using complementary colours. • Adequately and evenly illuminated.	• Warning surfaces that have different slip resistance characteristics. • Floor finishes that do not extend the full width of a flight of steps, such as carpet runners. • Lighting design that casts a shadow obscuring the step edges. • Large areas of shiny or reflective surfaces. • Bold patterns and stripes. • Shiny or polished surfaces that create glare and reflection. •
Lifts	• Firm, level, and securely fixed. Slip resistant when both wet and dry. • Similar slip resistance characteristics to landing floor finishes. • Light colour or tone.	• Soft, compressible floor finishes, such as deep pile carpet. • Bold patterns and stripes. • Dark floor finishes. • Surfaces with different slip resistance characteristics to landing floor finishes.

General rooms (Including waiting rooms, meeting rooms, classrooms, offices)	• Firm, level and securely fixed. • Adjacent surface finishes to be flush. • Slip resistant when both wet and dry. • Matt or satin finish. • Plain, mottled or small patterning with complementary colours. • Even level of illumination. Visually contrasting with wall surfaces and other fixtures.	• Soft, compressible floor finishes, such as deep pile carpet. • Changes in level between adjacent floor finishes. • Large areas of shiny or reflective surfaces. • Bold patterns and stripes. • Shiny or polished surfaces that create glare and reflection.
Wet rooms (Including bathrooms, showers and changing rooms)	• Slip resistant when both wet and dry. • Non-abrasive. • Comfortable underfoot. • Easy to clean. • Laid to recommended falls (1 in 50) away from circulation routes. • Incorporating flush drain covers.	• Surfaces that become slippery when wet. • Profiled surfaces that can be uncomfortable to walk on • Channel drains and recessed drains that may present a trip hazard.
Kitchens (Non-domestic)	• Slip resistant when both wet and dry or when contaminated with spillages of grease and dry goods. • Easy to clean.	• Surfaces that become slippery when wet or after spillages. • Surfaces that are difficult to clean and pose a risk to hygiene.

Refer also to **Booklet 2: Entrances and horizontal circulation**, **Section 2.4** for door thresholds and **Section 2.4.1** for matwells.

Checklist – Floor finishes
• Ensure slip resistance is maintained when the floor is wet and dry and when spillages occur.
• Ensure changes in floor finish occur away from the direct line of travel or in a doorway.
• Use tactile warning surfaces with 3mm ridges as they are detectable indoors due to surrounding smooth floor finishes.
• Use tactile warning surfaces only for internal stairs after all risks have been considered in the form of a risk assessment.
• Highlight the change in level using floor finishes that visually contrast where tactile warning surfaces are not suitable.
• Install floor finishes that are firm, even, securely fixed, and non-directional.
• Avoid the use of deep pile carpets and coir matting.
• Avoid the use of loose-laid mats.
• Make sure floor finishes are durable and well maintained.
• Optimise visual contrast between floor and wall finishes and other features, such as obstructions.
• Use changes in the colour, texture and acoustic characteristics of floor finishes to delineate areas and contribute to a system of wayfinding.
• Avoid shiny and reflective floor finishes.
• Avoid large and bold patterns.
• Consider the placement of natural and artificial light sources to provide an even level of illumination.
• Consider the use of natural floor coverings to avoid the potential for aggravating allergic reactions.

4.4.2 Wall and ceiling finishes

The selection of wall and ceiling finishes should be fully considered alongside floor finishes to optimise the visual, acoustic, and aesthetic qualities of an environment. This is of particular concern for people with hearing difficulties and for those who have cognitive, mental health, or visual difficulties.

As with floor finishes, bold patterns should be avoided as they may cause visual confusion and mask features, such as a change in direction or a useful wall-mounted fixture. Patterned wall surfaces can also be distracting for people who lip read or who use sign language and for those who have cognitive, mental, and visual difficulties. It is particularly important that walls forming a background to staff at reception counters and information desks, or to speakers in a lecture room, provide a plain, even, and non-distracting surface.

Wall finishes of different colours can be used to differentiate between, for example, floor levels or departments in a large building to help people to orientate themselves, in the same way as for floor finishes. A brightly coloured or contrasting band can be used along walls to assist with navigation, as an integral part of a signage and wayfinding system, with the contrasting band linking subsequent signs.

Wall finishes of different textures can also be used to define areas by touch, although wall finishes up to a height of 2000mm above floor level should be non-abrasive.

Image 4.3 Example of skirting painted as a wayfinding guide for people with visual difficulties.

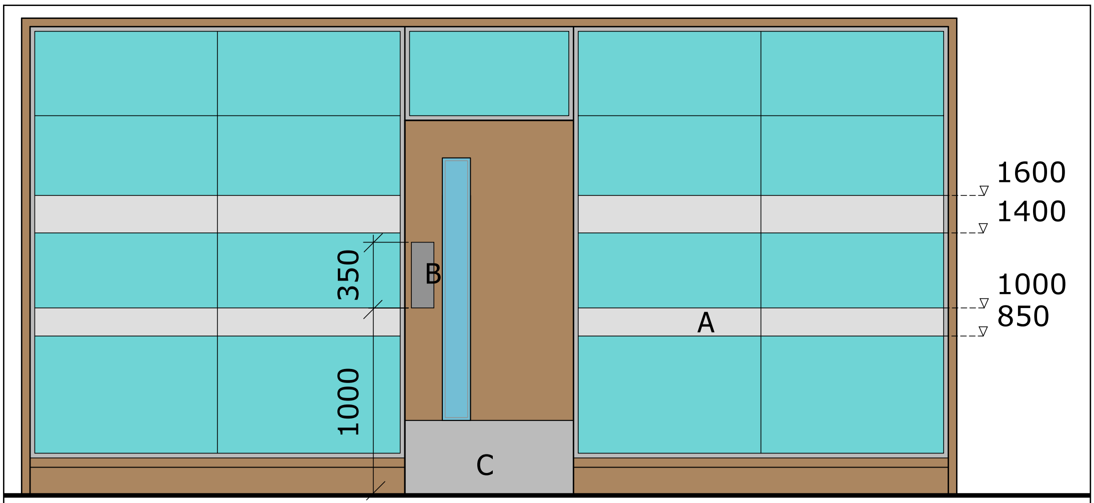
Image 4.4 Example of wall painted as a wayfinding guide for people with visual difficulties.

Polished and shiny wall finishes that are likely to cause glare and reflection should be avoided as these can be visually confusing and a source of discomfort. Walls with windows should be pale in colour so as to minimise the glare of the bright window when viewed against the surrounding wall. Generally speaking, ceilings should be bright so that both artificial and natural light sources are reflected and distributed evenly.

Where walls consist of a glazed screen, the glass should incorporate permanent markings so that its presence is clearly apparent to people at a range of eye levels. The markings should be at two levels, 850mm to 1000mm and 1400mm to 1600mm above floor level, as **Figure 4.1**. The markings should contrast visually with the background surfaces viewed through the door in both directions and in all lighting conditions. The use of two-tone markings often improves visibility.

Whatever style or colour is adopted, it is imperative that the presence of glass is clearly highlighted, as otherwise it presents a significant hazard to all building users.

Figure 4.1 Glazed screens - markings for safety and visibility.



Key

A. Frosted glass manifest or two tone manifest as safety and visibility strip
B. Push plate
C. Kickplate

Note: All dimensions in millimetres

Image 4.5 Example of glazed screen/partition with markings for visibility and safety.

Image 4.6 Example of floor pattern as visual guide.

Image 4.7 Alternative example of floor pattern as visual guide.

Checklist – Wall and ceiling finishes
• Consider wall and ceiling finishes alongside floor finishes.
• Avoid shiny and reflective surfaces.
• Avoid large and bold patterns.
• Consider the use of colour coding for large or complex buildings as an aid to wayfinding.
• Consider the use of changes in texture to differentiate between internal features or areas.
• Ensure the placement of windows and artificial lighting minimises glare and reflection.
• Incorporate permanent markings in glazed walls and screens, as **Figure 4.1**.

4.4.3 Visual contrast

Visual contrast between surfaces is a common theme in the selection of surface finishes and benefits all building users.

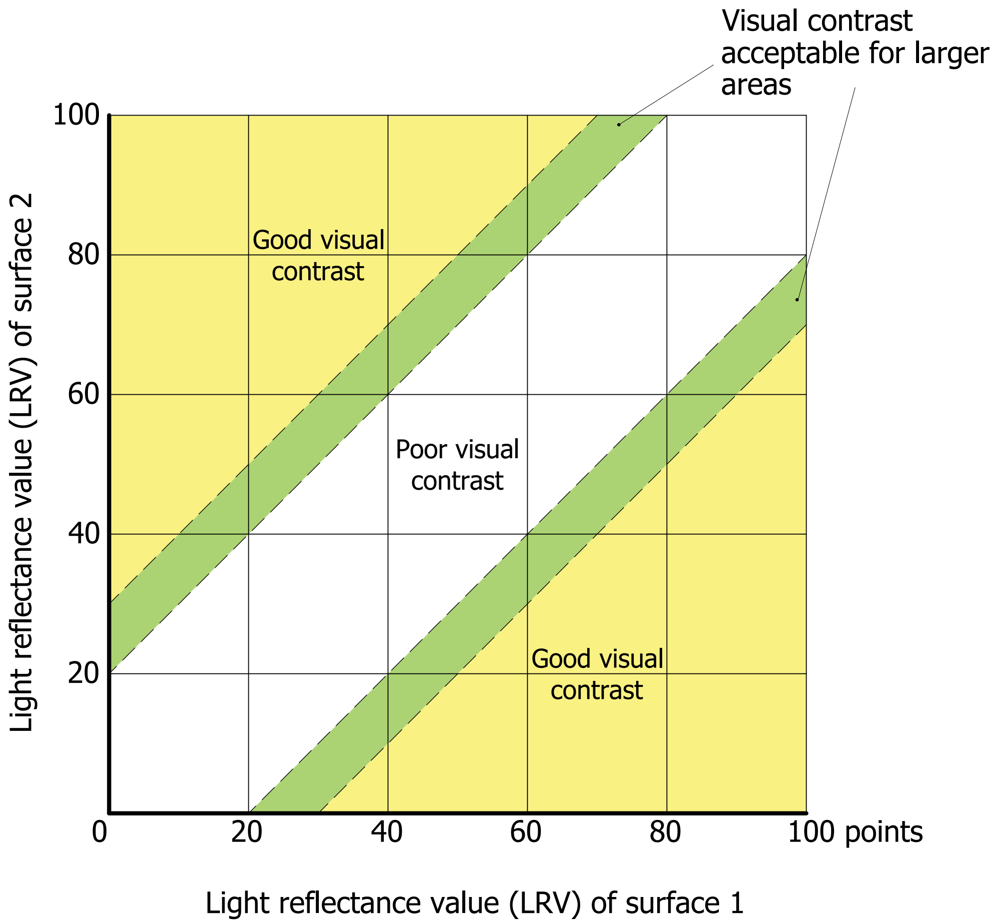
Effective visual contrast promotes visual clarity; orientation; the perception of space; and the identification of surfaces, features, and potential obstacles.

Visual contrast can be assessed by comparing the light reflectance value (LRV) of different surfaces, such as walls, floors, ceilings, and doors. The LRV is a measure of the amount of light that a surface reflects and is represented by a scale from 0 to 100, where 0 represents a fully absorbing surface (black) and 100 a fully reflecting surface (white).

Research has been undertaken to establish the degree of difference required by people with visual difficulties between the LRV of two adjacent surfaces to provide adequate visual contrast. The results drawn from the research are illustrated in the graph in **Figure 4.2** and can be used as a guide for the initial selection of colours and surface finishes in an interior environment.

Note: Part M states that lux levels should be measured at floor level on corridors.

Figure 4.2 Graph illustrating the perceived degree of visual contrast based on the light reflectance value (LRV) of two adjacent surfaces.



Graph illustrating the perceived degree of visual contrast based on the LRV of two adjacent surfaces

The graph indicates that where the LRV of two adjacent surfaces is 30 points or more, effective (good) visual contrast will be achieved. Where the LRV of two adjacent areas is less than 20 points, visual contrast is likely to be insufficient (poor). Where the difference between the LRV of two adjacent surfaces is between 20 and 30 points, visual contrast may be adequate in some circumstances.

The general view, is that smaller items or surfaces require a greater difference in LRV in order to achieve an adequate level of visual contrast and that larger items or surfaces require less. For example, the difference in LRV between a light switch and the surrounding wall should be greater than the difference in LRV between the floor and wall surfaces in a room.

During the design stages, the LRV of different colours and surfaces can be established by reference to manufacturers' product data, where provided, or by comparison with colour swatches that include LRV measurements.

Checklist – Visual contrast
• Optimise visual contrast between surfaces and features.
• Ensure visual contrast between smaller surfaces and objects is greater than for larger surfaces.

4.5 Lighting

Good lighting is essential for everyone. It enables people to move safely and independently around a building or external environment. Good lighting aids the perception of space, colour, and texture. It facilitates identification and reading of signs and instructions. It also makes lip-reading and visual communication easier.

Poor or unsuitable lighting may render a building or environment inaccessible to some people. If lighting levels are too low, some people may not be able to differentiate between features in a building or along an external route, and therefore may be unable to navigate independently. If lighting is positioned so that it creates sources of glare and reflection or strong shadows, it may cause physical discomfort for some people and may also be visually confusing. The provision of good lighting is of particular concern for people with visual difficulties.

Visual contrast between surfaces can be enhanced or minimised by light; the design and selection of surface finishes and lighting should always be considered together.

If light sources are positioned in the wrong place, they may cause glare on a surface, which can make it appear as having a much lighter tone than it actually does. Poorly positioned lights can also appear to wash the colour from surfaces, again, reducing or eliminating any intended contrast with adjacent surfaces or features. Inadequate levels of light may make it difficult to differentiate between surfaces altogether.

4.5.1 Internal lighting

Internal lighting in buildings includes all sources of natural and artificial light, including windows, roof lights, glazed doors, glazed walls, and light fittings. These should all be considered as contributing to the overall lighting design. However, the artificial lighting installation should be designed to provide an adequate and even level of light on its own so that the building can function as intended during the hours of darkness.

Sources of natural or artificial light within a building should be carefully considered at the earliest design stages. Windows and lights should not be positioned at the ends of corridors or behind people at reception areas or counters. Such light sources place people in silhouette, which creates difficulties for people who lip-read and for people with visual difficulties who cannot identify the proximity of oncoming people or objects. Wherever communication is important, such as at reception counters, lighting should be positioned to illuminate a person's face.

Lighting design that creates strong shadows on walls and floors should be avoided, particularly if there is a change in level or direction. Strong shadows can mask step edges or give the impression that there is a step when in fact there is not. Both situations are potentially dangerous and may cause a person to trip and fall.

The use of natural light to illuminate building interiors is encouraged for several reasons. Natural light provides a beneficial connection with the external environment and has an inherent quality that is difficult to replicate with artificial light. Windows and other glazed components enable people inside a building to monitor the weather conditions, and may also help them orientate themselves or gain a sense of the time of day. However, some aspects of natural light need to be controlled; this requires detailed consideration at the design stage. Issues, such as orientation, should be considered at an early stage.

Image 4.8 Example of natural light used to light a corridor.

Features, such as sun-shading devices, solar-control glass, and blinds, may need to be incorporated to reduce the potential for glare; the creation of strong shadows; and any overheating that may be caused by direct sunlight entering a building.

White window frames and window reveals assist in throwing light deeper into a room, which is likely to be beneficial in most circumstances. Dark frames and dark window reveals tend to reduce the amount of light being reflected into a room. Dark frames and reveals around a bright light source, such as a window or glazed door, are also more likely to cause glare and should be avoided wherever possible. Surfaces around rooflights and other sources of natural light should preferably be pale in colour.

Light should be distributed evenly throughout rooms and in all circulation areas.

In corridors, a suitable distribution of light that is comfortable to the eye can be achieved by fixing light fittings in a line down the centre of the corridor. Fluorescent fittings fitted transversely across a corridor are not satisfactory. Careful consideration should be given to the direction of natural and artificial light in workspaces to avoid glare, reflection, and silhouetting. This is particularly important where people use computers as a screen can be rendered unusable by reflections of if viewed against a strong light source.

Many tasks have optimum light levels. Too much light can cause discomfort, while too little will be inadequate for clear viewing. A lighting design that allows flexibility and control is ideal and will suit the widest range of building users.

The design of a lighting system will depend very much on the nature and use of a particular space. In deep-plan environments where background lighting is provided by artificial means, local lighting and task lighting should be provided. This will enable people to supplement and control the lighting levels and direction of light in their immediate environment to suit their own requirements. This approach will be more energy efficient than simply providing a high degree of illumination over large areas.

The use of dimmer switches may be appropriate in some locations, although the location of the switches should be carefully considered so as not to interfere with any hearing enhancement system (refer to **Section 4.10** below). Passive infrared sensors can also be used to increase light levels automatically.

The 'colour temperature,' or colour rendering characteristics, of artificial lighting should be as close as possible to that of daylight wherever possible. This facilitates the true reproduction of colour and will optimise the perception of colour and visual contrast. Good lighting provision is of particular concern for people with hearing difficulties and for those who have cognitive, mental health, or visual difficulties. Lights that give poor colour rendering will reduce the effectiveness of LRV differentials. Strobe lighting should not be used as this may induce seizures in some people with epilepsy.

Light fittings should be selected to suit their particular function and location. Downlighters should always have diffusers to avoid the potential for glare and reflection. Uplighters positioned at floor level should not be used as they can cause glare and obscure, rather than enhance, visibility.

All lighting installations should be designed to be compatible with other electronic installations and radio-frequency equipment. Some types of fluorescent lighting (but not high-frequency lamps) can cause interference with hearing enhancement systems and should be avoided.

The recommended levels of illumination for internal areas of buildings are given in **Table 4.2**.

Table 4.2 Recommended levels of illumination in internal environments

Location	**Recommended level of illumination (lux)**
Entrances	150^{B}
Corridors, passages, and walkways	150^{B}
Steps, ramps, and landings	200^{B}
Lift landings and lift cars	200^{A}
Lift control panels	100^{B}
Toilets, shower rooms, and bathrooms	200^{A} to 300^{A} (the 300 is as per Part M)
Offices	300^{A}
Service counters	250^{B}
Telephones	200$^{A \text{ and } B}$
Switches and controls	100
Directional signs, maps, and information displays	200$^{A \text{ and } B}$

All figures are based on recommendations in the Canadian (City of London) guidelines except the figure for steps, ramps, and landings, which is based on guidance in BS 8300:2009. (The Canadian guidelines recommend 30 lux for steps and ramps.) Note: Part M states lighting levels should be measured at ramp, tread, and landing levels on stairs and ramps.

The figures are based on recommendations in either the Canadian (City of London) guidelines (figures marked A), or Department for Transport UK - Inclusive Mobility (figures marked B).

Checklist – Internal lighting
• Consider all sources of natural and artificial light.
• Avoid positioning windows or lights at the end of corridors and behind a person at a reception desk.
• Ensure a person’s face is well lit wherever communication is important.
• Avoid the creation of strong shadows on floors and walls.
• Ensure all rooms and spaces benefit from some natural light, wherever possible.
• Consider the use of sun-shading devices and blinds to reduce glare from direct sunlight.
• Make sure all rooms and surfaces are evenly illuminated.
• Consider flexibility within lighting design to enable people control individual lighting levels.
• Use lighting that enhances colour rendering of surfaces.
• Avoid the use of strobe lighting.
• Use downlighters that incorporate diffusers.
• Avoid the use of uplighters positioned at floor level.
• Consider the potential for some fluorescent lights to interfere with hearing enhancement equipment.

4.5.2 External lighting

External lighting is important for personal security, safety, and to enable people to read signs and directions. Lighting enhances visual clarity and should be provided at all entrances and building exits; along pedestrian access routes that are in regular use; at bus and tram stops; in car parks; at all outdoor facilities that are in regular use; and to illuminate external signage. The recommended levels of illumination for particular features, as measured at ground level, are given in **Table 4.3**.

Table 4.3 Recommended levels of illumination in external environments

Location	**Recommended level of illumination (lux)**
Entrances	100
Pedestrian access routes and walkways	30
Steps, ramps, and landings	100
Designated car parking spaces	30
Passenger setting-down points	30

External lighting at the approach to a building should clearly highlight and define the entrance area. Good lighting design will help people identify the entrance from a distance during the hours of darkness and will also provide a safe, well-illuminated route for people to approach the building.

The level of external lighting around an entrance should be considered in conjunction with the internal lighting to provide a gradual transition for people entering or exiting a building. Sharp changes in the level of illumination can cause discomfort for some people. Good lighting provision is of particular concern for people with hearing difficulties, and for those who have cognitive, mental health, or visual difficulties.

Lighting to external steps and ramps should be positioned to clearly highlight the tread and riser surfaces and ramp slopes. Lights should not cast shadows on steps or across ramps as this may mask changes in level and present a hazard. Low-level recessed lights should be positioned so that only the light, and not the light source, is visible, otherwise they are likely to create glare. The use of floodlights should also be avoided.

Checklist – External lighting
• Use lighting to highlight the location of a building entrance.
• Provide a gradual transition between internal and external lighting levels around an entrance.
• Ensure external lighting illuminates steps and ramps, without causing shadows.
• Position low-level recessed lights to avoid creating glare.
• Avoid the use of floodlights. When using floodlights to light a building care should be taken to avoid glare reaching the street or road level.

4.6 Power Supply

Electrical cables, such as incoming electrical mains and parts of equipment emanating electromagnetic fields, can interfere with the use of hearing aids and some hearing enhancement equipment. They should be sited away from areas where audible communication is important, such as telephone and reception areas, and meeting and consulting rooms.

Refer to **Section 4.7** below for details of power outlets.

Checklist – Power supply
• Locate electrical mains cables where they will not cause interference with hearing enhancement systems.

4.7 Outlets, Switches and Controls

Outlets, switches and controls should be immediately apparent, easy to reach, simple to operate, and consistent in design. They should visually contrast with their background or surrounding surfaces so that they are easy to identify. When used for similar operations in the same location, control panels and switches should function in the same way or sequence.

All outlets, switches and controls should be positioned in a logical and consistent arrangement throughout a building so that they are easy to locate.

Light switches should be positioned a consistent distance away from door frames, and preferably at the same height as the door handle. Where building occupants are likely to follow a particular route through the building, such as from an entrance to a lobby, then via a circulation area and into individual rooms, the position of light switches should enable people to activate lights in sequence as they move through the building. Similarly, when leaving a building, occupants should be able to switch off lights as they leave an area.

People should never have to move through an unlit area in order to locate a light switch. In many cases, this will require the use of two- or three-way switching. The use of two-way switching is also recommended in locations, such as hotel bedrooms, so that people can control the lights from the bed as well as when first entering the room.

Automatic lights provided in buildings, such as in stairwells and corridors, should be set to ensure that the timings suit the needs of all users.

All outlets, switches, and controls should be positioned a recommended distance of 500mm from any obstructions and the internal corners of a room. The recommended height ranges for different types are given in **Table 4.4**. A clear floor area, at least 900mm wide x 1370mm long, should be provided in front of control panels and the operating mechanism of machines, such as vending or dispensing machines.

Consideration should be made for future options for cabling with power supply to internal doors, above and beside window heads, and at skirting level to provide for future automatic devices, such as ceiling hoists, automatic curtain / blind openers, and door-opening devices.

Table 4.4 Location of outlets, switches and controls

Type	Recommended height range above floor level (mm)	Other considerations
Light switches	750-1200	Wall-mounted light switches should align horizontally with door handles and be a consistent distance from the door edge so that they are easy to locate
Electrical sockets, television and telephone outlets	400-1000	Where plugs are likely to be frequently inserted and removed, sockets should be positioned towards the top of the range to avoid the necessity for people to bend and stoop
Switches and controls (including intercom buttons, switches for extract fans, and heating controls)	750-1000	Controls that require precise hand control should be positioned within easy reach of people in a seated and standing position
Permanently wired switches (including fused spurs and alarm reset switches)	750-1200	
Electricity and gas meters (where the visual indicator is required to be read, but not touched or manually operated)	1200-1400	Meters should be positioned where they can be read by a person at a range of eye levels, but as they do not generally need to be touched or operated, the height range is higher than that for other controls

All height ranges are based on guidance in BS 8300:2009. The majority of height ranges concur with guidance in the Canadian (City of London) guidelines, but where they differ, the lower range or height has been selected.

There should be adequate visual contrast between all switch and socket housings, the adjacent wall, and rocker switch so that each can be clearly differentiated from the others. Where a switch is not available in a colour that contrasts with its surroundings, coloured margins, which are capable of providing the necessary contrast, are available for some of the more common switch types, such as lights or sockets.

All controls and switches should be capable of being operated using one hand and without the need for gripping or twisting. The force required to operate any switch or control should not exceed 22 Newtons.

To operate lights, large rocker-type switches are preferred as they are considered the easiest to operate. Multi-gang switches should be avoided wherever possible as the plethora of switches can be confusing.

Passive infrared light switching, which activates automatically, may be beneficial in some circumstances and obviates the need for people to manually operate individual switches.

Where switched-twin socket outlets are installed, the switches should be on the outside of the unit, rather than between the two plug positions, to avoid confusion.

In dwellings, it is recommended that wall-mounted lighting switches incorporate 20mm-deep switch housings in lieu of the usual 10mm, to facilitate possible future installation of remote control switches.

Switches on inclined surfaces are generally easier to operate than those on vertical surfaces. Inclined surfaces should be tilted up by 15 degrees.

Wherever colour is used to indicate that a switch or appliance is ‘on’ or ‘off,’ the status should also be indicated using text or a pictogram. The use of red and green can be particularly confusing as many people find it difficult to differentiate between these colours.

Any visual information associated with a switch or control, such as instructions or a reference, should be provided in the form of a pictogram and should be embossed to enable tactile reading.

Switching by sensors is increasingly common, with sensors being activated through movement, temperature change, the sound of a voice, or a break in electronic circuitry or infrared beams. Such arrangements can be used for a range of facilities including automatic water taps, light switching, and door opening, which all promote universal design and are important for people with mobility difficulties or restricted hand functions.

For advice on telephones, ATMs, and ticket and vending machines, refer to **Booklet 6: Facilities**.

Checklist – Outlets, switches and controls
• Ensure all outlets, switches, and controls are clearly visible, and easy to reach and operate.
• Use consistency in arrangement, position, style and sequence.
• Locate light switches logically along a route.
• Use two- or three-way switching for lights where flexibility is required.
• Avoid placement of any outlet, switch, or control within 500mm of the corner of any room.
• Ensure clear, unobstructed floor area for approach.
• Make sure switches, background, and mounting surface contrast visually.
• Avoid switches that have to be turned or gripped.
• Keep in mind that large rocker switches are preferred.
• Ensure all switches require a force no greater than 22 Newtons to operate.
• Consider the use of automatic passive infrared operation.
• Provide supplementary text and a pictogram wherever communication is important.
• Use embossed symbols and text to allow for tactile reading.

4.8 Ventilation

Adequate ventilation is required in all habitable areas of a building and may comprise natural ventilation, mechanical ventilation, air conditioning, or a combination of different types, depending on the room or building type and size.

Generally, the most acceptable way of achieving ventilation is through the provision of suitably sized and easily accessible window openings that are positioned so as to avoid draughts. This method gives the user complete control and has inherent environmental benefits.

The design and position of windows for ventilation purposes should be considered in parallel with the provision of windows for natural light, as **Section 4.5.1** above. Windows must not open into circulation spaces where they will cause obstruction and reduce the effective width. Clear access to window controls should be provided at all times.

Mechanical ventilation and air-conditioning systems should be maintained so as to achieve acceptable standards of filtration and dust extraction. Effective maintenance also helps to reduce the tendency of mechanical ventilation systems to vibrate and generate unwanted noise. This may cause annoyance to many building users, but may also make it difficult for some people to hear speech, announcements, or a performance. All systems should be well maintained and cleaned regularly so that they are able to operate as quietly as possible and to maximum effectiveness. The choice of ventilation system should be made with effective acoustics in mind.

Checklist – Ventilation
• Provide adequate ventilation to all rooms and spaces.
• Ensure windows that open are accessible and controllable by building users.
• Make sure mechanical ventilation and air-conditioning systems are well maintained.

4.9 Acoustics

The acoustic design of spaces within a building should suit their intended function and enable people to hear speech, music, or other intended sounds clearly. Good acoustic design will enable sound to be heard without interference or distraction from background noise or excessive reverberation.

The location of a building in relation to external noise sources; the internal layout; the size and shape of individual rooms; and the acoustic performance of the building fabric and its furnishings can all influence the acoustic environment and should be considered fully at each design stage.

Rooms in a building that benefit from a quiet location, such as individual offices, meeting rooms, counselling rooms, and prayer rooms should be located away from external noise sources. Within a building, quieter areas can be buffered from potentially noisier areas with the use of lobbies, screens, or other rooms.

Within each room, good acoustic design can be achieved by ensuring a low level of background noise coupled with an optimum reverberation time for sound generated within the room.

Optimum reverberation times vary according to the room's intended use, such as by a single speaker, for audiovisual presentations or music performances. Generally, rooms designed for speech only require a relatively low reverberation time. Rooms designed for music require a longer reverberation time, with choral music requiring a longer reverberation time compared to contemporary music. Understanding speech is more difficult in areas with longer reverberation times.

Reverberation time is affected by the size of the space and the amount of reflective or absorptive surfaces within the space. A space with highly absorptive surfaces will absorb the sound and stop it from reflecting back into the space. This would create a space with a short reverberation time in which sound may appear to be 'deadened'. Harder reflective surfaces will reflect sound and will increase the reverberation time within a space, resulting in a 'live' acoustic environment. In general, larger spaces have longer reverberation times than smaller spaces. Therefore, a large space will require more absorption to achieve the same reverberation time as a smaller space.

Hard surfaces, such as concrete, brick, plaster, and timber, all reflect sound and will contribute to the creation of a reverberant, potentially noisy, and echoing internal environment.

Softer surfaces, such as carpets, curtains, mineral fibre suspended ceiling tiles, and upholstery, will tend to absorb sound and therefore contribute to a quieter internal environment.

Checklist – Acoustics
• Consider the acoustic requirement of rooms at the earliest planning stage.
• Locate quiet rooms away from external noise sources.
• Use a buffer zone, such as a lobby or foyer, to separate quiet and noisy rooms.
• Establish the desired acoustic characteristics of a room with reference to its intended function.
• Select finishes and methods of installation to achieve a balance of hard and soft surfaces.
• Select ventilation system with minimal noise impact.

4.10 Hearing Enhancement Systems

Hearing enhancement systems enable people with hearing loss to receive amplified sound via their hearing aid or other device, without interference from background noise. They are an essential provision in areas of buildings where audible communication is an inherent aspect of the space, such as in theatres, cinemas and other auditoria; spectator areas in sports venues; meeting rooms, lecture rooms and classrooms; places of worship and confessionals; interview rooms; and at reception, service and information counters. They are particularly beneficial in busy areas where there is background or conflicting noise nearby.

Venues, such as concert halls, theatres, cinemas, other auditoria, and large classrooms or meeting rooms, should have a permanently installed hearing enhancement system. This type of system should also be present in rooms or areas that accommodate more than 50 people; or have audio amplification systems; or have a floor area of more than 100m sq m; and have fixed seating.

In smaller classrooms and meeting rooms, and at the site of other facilities, such as reception desks, payment counters, and interview rooms, either a permanently installed hearing enhancement system or a portable device should be provided.

Wherever hearing enhancement systems are provided, whether permanently installed or portable, the number of receivers available should be equivalent to at least 4% of the total number of seats with a minimum of two receivers.

Lip-reading and sign language are only feasible within a 15m range of the speaker and require particularly good lighting. To facilitate people who use a combination of lip-reading or sign language and a hearing enhancement system, it is important that the hearing enhancement system can be used within a range of 15m of any speaker.

Once installed, hearing enhancement systems should be commissioned and thereafter tested at regular intervals by a number of people with a hearing difficulty to ensure optimum performance. Where the hearing enhancement systems provided are not linked to any other public address or loudspeaker system, they should incorporate or be linked to a sound monitor or sound-enhancing loudspeaker. This is to enable the speaker or any person managing a performance to detect microphone faults.

Specialist advice should be sought prior to the specification and installation of any hearing enhancement system.

Checklist – Hearing enhancement systems
• Provide hearing enhancement systems where audible communication is an inherent aspect of the space.
• Install permanent systems in larger spaces.
• Consider portable systems for some smaller areas and where flexibility is required.
• Ensure regular testing of systems by a selection of people with hearing difficulties.
• Incorporate a fault-detection system in all hearing enhancement systems.
• Obtain specialist advice for all systems.

4.10.1 Induction loop systems

Induction loop systems consist of a sound pick-up device, an amplifier, and a loop. The loop is an insulated wire within which a signal can be received by a personal hearing aid. The loop can be positioned around a room or area, or hung around a person's neck, and may be permanently installed or portable.

Image 4.9 Example of international symbol for induction loop systems.

Image 4.10 Alternative international symbol for induction loop systems.

The amplifier can be connected directly to a sound source, such as a television; DVD or video player; radio; or a microphone. The sound received is amplified and transmitted through the loop. When the hearing aid user is within or close to the loop area, the hearing aid picks up the transmitted signal and converts this into sound.

Image 4.11 Example of signage indicating that there is an induction loop facility in a reception area.

To benefit from an induction loop, a hearing aid wearer must select the induction pick-up facility on their hearing aid. This is commonly achieved by switching the hearing aid to the 'T' (telecoil) position, or by programming the hearing aid to receive the signal.

A hearing aid microphone amplifies all the sound sources around the hearing aid wearer, which can make it difficult to hear speech, particularly if there is simultaneous background noise. An induction loop system is able to amplify a single sound source through a person's hearing aid to facilitate comfortable listening and to effectively eliminate background or incidental noise.

Image 4.12 Example of induction loop sign at a reception desk.

Induction loop systems have the potential for overspill into adjacent areas, and this may be problematic in some circumstances.

Overspill is caused by signals being picked up outside the loop wire. In some situations, this may present confidentiality issues, or may simply render the system unusable. Where an induction loop system is installed in an interview or consulting room, for example, hearing aid wearers seated in an adjacent waiting area may be able to hear confidential discussions by picking up signals close to, but outside, the loop.

It has also been known for hearing aid wearers in one meeting room to receive signals via the induction loop system in an adjacent meeting room, where induction loop systems have been installed in both areas. To avoid such potential problems, the type of system and position of the loop wire should be carefully considered.

In some cases, the provision of a portable system with a smaller, adjustable loop wire or an alternative type of hearing enhancement system altogether may be appropriate.

4.10.2 Permanent induction loop systems

The loop wire in permanently installed systems can be installed within the building structure, for example, within the floor structure or on top of the floor surface. To avoid being damaged, wires should be protected by a non-metallic enclosure, such as a PVC conduit.

The loop should be sited very carefully to avoid metal objects and anything that emits a magnetic field. The loop wire should not be positioned close to reinforcing bars, metal-framed seating, digital cordless telephone systems, fluorescent lighting, dimmer switches or any control that incorporates a transformer coil, all of which may adversely affect the quality of the signal.

Visual display units are a common source of electromagnetic interference and may affect induction loops, particularly portable desk systems and those fitted at counters. The use of flat screen TFT monitors instead of traditional VDUs may alleviate this problem.

4.10.3 Portable induction loop systems

Induction loop technology is relatively small scale and lightweight and lends itself well to portable applications. Portable induction loop systems can provide flexibility in the use of rooms or spaces, particularly in larger buildings. Instead of having to have meetings in one particular room fitted with a permanent induction loop, the availability of a portable system enables many different rooms or areas to be set up for use.

Portable loop systems typically comprise a loop amplifier, one or two microphones, and a loop cable. The loop cable is usually supplied in varying lengths and can be clipped together to suit rooms or areas of different sizes. Loop cables should always be fixed into position so that they do not present a tripping hazard. Portable loops are usually supplied in a carry case or with a purpose-designed storage shelf.

Portable desk loop systems are suitable for one-to-one communication and are often used at information counters or desks where there is no permanent loop system installed. The systems comprise a single integral unit that has no wires and requires no setting up other than switching on. The units are powered by mains-rechargeable batteries, which should be kept fully charged so that the unit is ready for use when required. Portable desk loop systems are positioned at counter or desk level, with the front of the unit facing the hearing aid wearer. With a hearing aid switched to the 'T' position, the loop system feeds amplified speech from the person behind the unit directly into the hearing aid.

Portable clipboard loop systems are available and are suitable for use by people who need to move freely around an internal environment and be able to easily carry the system with them for use when required. Clipboard loops are particularly beneficial for people, such as hospital consultants; people undertaking market research; by conductors or guards on trains; and in many other circumstances.

Portable guide loop systems are also available, which can be carried or worn by tour guides in historic buildings or visitor attractions. They enable hearing aid wearers to receive amplified speech from the guide directly through their hearing aid, within a range of around 5m.

There are also loop systems available that can operate in mobile situations, such as in taxis and buses.

Checklist – Induction loop systems
• Consider the likelihood of overspill into adjacent areas.
• Consider a smaller or adjustable loop wire or alternative type of system, particularly where confidentiality is paramount.
• Protect permanently installed loop wires in a non-metallic enclosure.
• Avoid placement adjacent to any metallic components or electromagnetic equipment.
• Ensure room loop cables for portable systems are fixed in position to avoid creating a trip hazard.
• Consider the most appropriate type of portable system, such as desktop, clipboard, guide loop, or vehicle-based Induction loops that are designed, installed, and commissioned to comply with IEC 60118-4.

4.10.4 Infrared systems

Infrared hearing enhancement systems are based on light and use a transmitter that relays signals capable of being received by headphones. The systems can be portable or fixed. Portable receivers resemble a small radio, with communication via headphones. The headphones can be worn to provide amplified sound directly to the wearer. Alternatively, an infrared receiver can be linked to a portable induction loop worn around a person's neck, which will transmit amplified sound via their hearing aid.

Infrared systems are particularly beneficial where multilingual communication is required, for example, where a voiceover audio description can be provided on one channel and a translation service on another. They are suitable in venues where headsets can be issued from and returned to a central point, such as a ticket office, reception desk, or cloakroom in a theatre, cinema, conference hall, or meeting room. Where this is the case, staff should be trained in using the equipment and should be able to explain instructions effectively to customers. There should also be procedures in place for regular testing and maintenance, for cleaning the headsets between each use, and for safeguarding against loss.

Image 4.13 Examples of infrared hearing enhancement systems.

Infrared systems have the advantage of high-quality sound reception that is comparable to hi-fi quality if they are correctly installed and operated. Infrared systems cannot overspill into adjacent areas and are therefore useful in areas where confidentiality is an issue.

Checklist – Infrared systems
• Consider for use where multi-channel communication is required and where headsets can be borrowed from a central location.
• Ensure procedures are in place for cleaning and maintaining the system.

4.10.5 Radio systems

Radio hearing enhancement systems comprise an FM microphone/transmitter that is worn around the speaker's neck and a receiver worn around the user's neck. Amplified sound is transmitted to the receiver, which sends the signal to the person's hearing aid. The system effectively reduces background and peripheral noise and increases the sound level of the speaker's voice. People who have hearing loss but who do not wear hearing aids can benefit from the system by wearing headphones connected directly to the receiver.

As with infrared systems, radio systems are particularly beneficial where multi-channel communication is required, for example, to provide voice-over audio description and translation services. The availability of different channels also enables radio systems to be used in adjacent rooms without the potential for overspill. However, where confidentiality is an issue, this type of system should not be used as receivers could inadvertently be tuned into transmitters in an adjacent area.

Radio systems are portable and suit use in environments, such as schools and colleges, where students move between different rooms. They are also suitable in venues where headsets can either be issued from and returned to a central point, such as a reception desk, or retained by regular users, such as students in a college. Whatever the circumstances, staff and building managers should be trained in using the equipment and should be able to explain instructions effectively to first-time visitors or customers. There should also be procedures in place for regular testing and maintenance, for cleaning the headsets between each use, and for safeguarding against loss.

Checklist – Radio systems

- Consider radio systems where they may benefit people with a hearing difficulty who do not wear a hearing aid.
- Consider radio systems where multi-channel communication is beneficial and where headsets can be borrowed from a central source.
- Ensure procedures are in place for cleaning and maintaining the system.

4.10.6 Soundfield systems

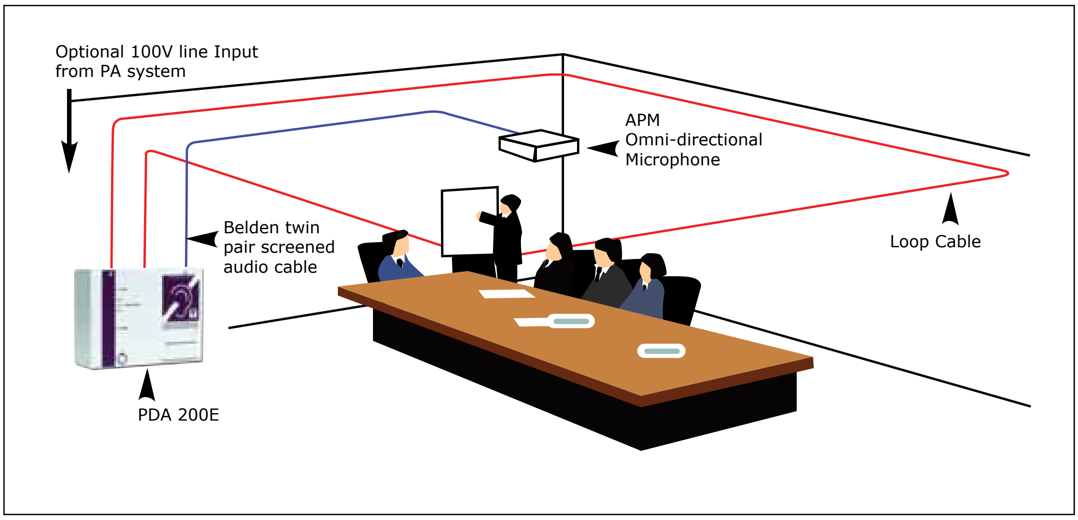
Soundfield hearing enhancement systems are amplification systems designed to give an even level of sound around a room. They comprise a microphone linked to a transmitter (either FM radio or infrared), a receiver/amplifier, and a number of speakers positioned around a room. The speakers can either be wall- or ceiling-mounted. Hearing aid wearers can listen via their own personal FM receiver. The systems can also be used to transmit multimedia output including television, CD, and DVD using auxiliary connections.

Soundfield systems are increasingly being installed in classrooms and environments, such as lecture theatres where they improve audibility for all pupils and students. The systems improve the quality and distribution of sound throughout the room, regardless of the volume of the teacher's or lecturer's voice, or the direction they are facing. The positioning of speakers around the room ensures an even distribution of sound at an appropriate volume, without the teacher having to strain their voice.

People with hearing loss who do not wear hearing aids may also benefit from the improved sound quality provided by a soundfield system.

People who do wear hearing aids are able to wear their own FM receiver and hear amplified sound directly through their hearing aid.

Image 4.14 Example of a soundfield system.



Soundfield systems can use either infrared or FM radio transmission systems. However, there are certain limitations concerning the environment in which infrared soundfield systems can be installed. As transmission is based on infrared beams, the physical environment in which the system is installed requires suitable surface finishes. Rooms with glazed partitions, large or numerous windows, or windows shared with an adjacent classroom are not suitable and neither are rooms with surfaces that either do not reflect light or that are dark in colour, such as drama rooms. Such areas are better suited to FM radio systems.

Checklist – Soundfield systems

- Consider where they may benefit people with hearing difficulties who do not wear a hearing aid.
- Avoid the use of glazed partitions, large windows and dark surfaces where infrared transmission is required.

4.10.7 Signage for hearing enhancement systems

Wherever hearing enhancement systems are permanently installed or available as portable equipment, appropriate signage should be displayed to indicate that the equipment is available. The presence of the equipment should be signed on the approach to and within the room or space so that building users are aware of its presence. If a meeting room is equipped with an induction loop system, for example, the appropriate sign should be clearly displayed adjacent to a meeting room door and also within the meeting room.

Image 4.15 Example of induction loop and staff assistance sign.

If induction loop facilities are available at a payment counter in a shop, a sign should be clearly displayed at the counter, as well as in the shop window or on the entrance door. Any signs or instructions relating to the hearing enhancement system should incorporate the appropriate symbol, as **Image 4.15**.

The four main types of signage are information signs, directional signs, identification signs, and mandatory safety signs. Refer to **Table 4.5** for more information.

Checklist – Signage for hearing enhancement systems

- Ensure signage is clearly displayed to indicate the presence of a hearing enhancement system.

4.11 Signage and Information

In all non-domestic buildings and, where appropriate, in external environments, signage and information should be provided to enable people to clearly understand the layout and function of a space or environment and to find their way around independently. Signage and information should be usable and informative to everyone and include information in visual, tactile, and audible formats. It should be simple and easy for everybody to understand.

Image 4.16. Example of wall signage with Braille.

All signs and information should be clear, consistent and unambiguous. Messages and directions should be concise and use familiar words, symbols and language. Information that is too complicated or that uses unfamiliar language or terminology is likely to be difficult for some people to understand. The over-provision of signage and the use of very complex signs should be avoided as they are likely to cause confusion and will be of minimal benefit.

Clear signage is particularly valuable for people who may have difficulty communicating and for people who prefer not to have to ask for directions. Signs incorporating pictorial symbols are beneficial for people who have learning disabilities, people who have difficulties reading text, and for people who are not familiar with the English language.

Image 4.17 Example of information signage in a large building.

The four main types of signage are information signs, directional signs, identification signs, and mandatory safety signs. Refer to Table 4.5 for more information.

Audible information, such as public address systems and personal messaging devices, should be provided in addition to visual signs and information. At tourist attractions, heritage centres, and in other similar venues, the use of pre-recorded information is also useful for describing displays and presentations.

Table 4.5 Types of sign

Type of sign	Function and characteristics
Information signs	• An aid to overall orientation within a site or building. • Cover information relating to a site, including internal and external areas. • Examples include maps, diagrams and directory signs.
Directional signs	• Provide directional guidance within a site or building. • Signs include arrows. • Examples include sign boards with several named destinations and a series of arrows and signs with a single name and accompanying arrow.
Identification signs	• Identify particular destinations, such as a an individual building, a single room, facility or service. • Do not incorporate arrows. • Examples include building name signs, room name or number signs.
Mandatory signs	• Required by regulation for the safety of all building users. • Type, style and colour of signs prescribed by European standards. • Examples include fire safety signs and notices, emergency exit signs and health and safety notices. • Public bodies have legal obligations to provide signage in Irish. It is important that obligations on bilingual signage are met in a way that respects universal design and are not achieved at the expense of adequate type size.

In large buildings, such as museums, shopping centres, art galleries, hospitals, and hotels, where visitors may not be familiar with the layout, a floor plan or map should be displayed to enable people to orientate themselves. This is also important in external environments, such as parks, gardens and outdoor visitor attractions. Maps and plans should indicate key facilities including information areas; sanitary facilities; refreshment areas; paths and other circulation routes; car parking facilities; and any other relevant spaces particular to the building or external environment.

The use of tactile maps and models provides valuable orientation and wayfinding information for people with a visual difficulty.

Image 4.18 Example of a building plan. Note the use of Braille on the sign.

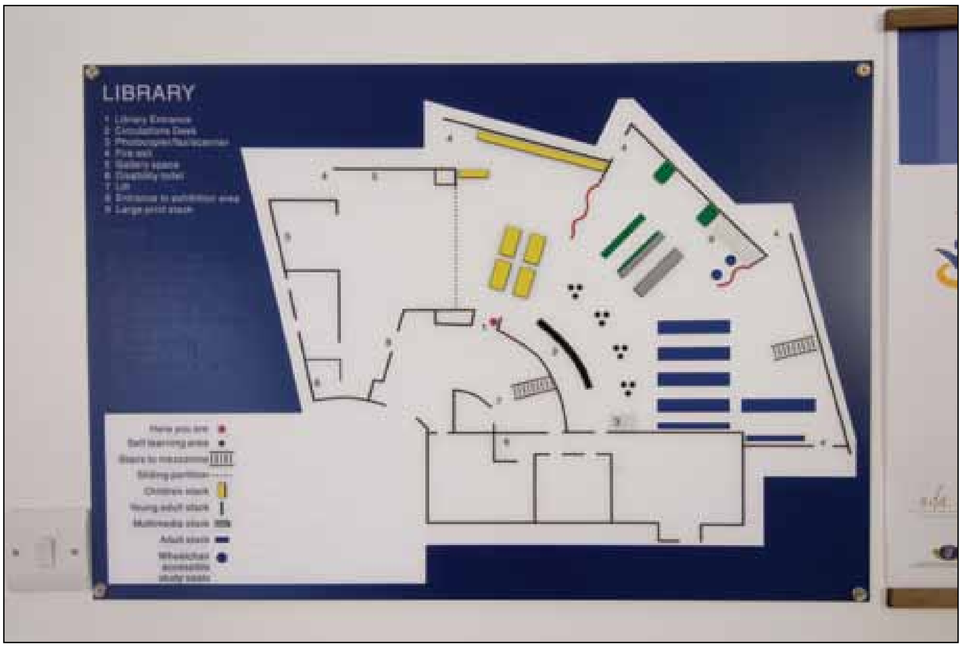
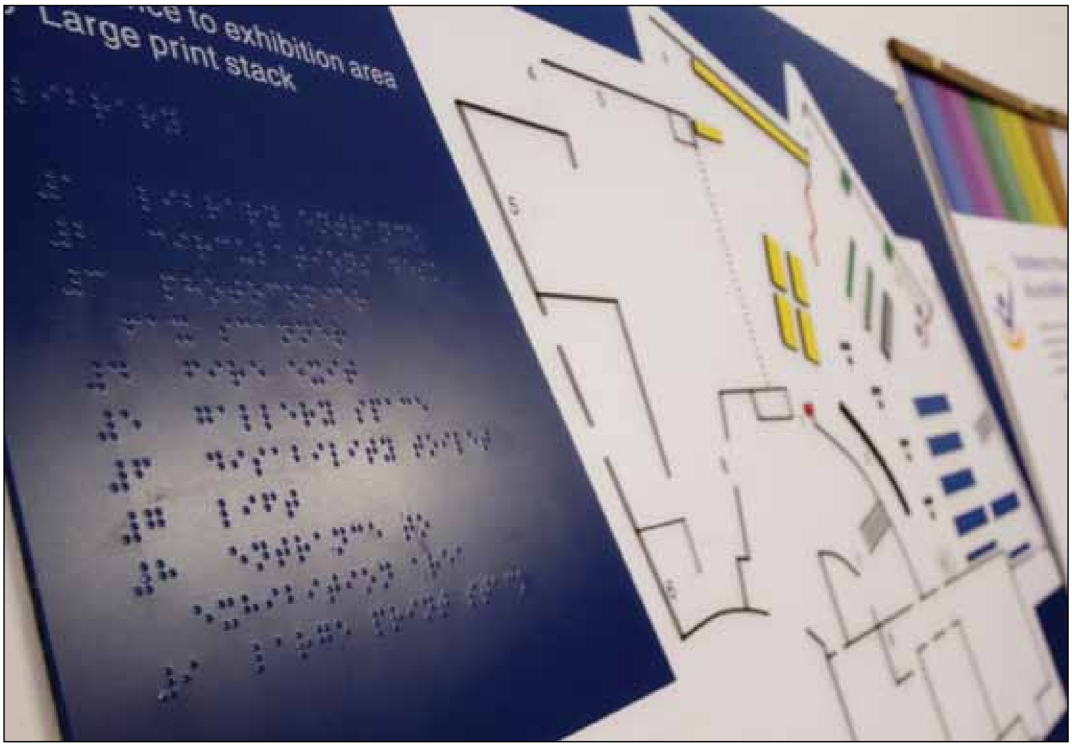


Image 4.19 Alternative example of a building plan.

Image 4.20 Alternative example of a building plan with Braille.



Checklist – Signage and information
• Incorporate visual, tactile and audible information in signage.
• Ensure all signage is clear, consistent, and easy to understand.
• Keep messages concise and use familiar language and symbols.
• Provide maps, plans and models for larger buildings, including tactile information.

4.11.1 Typeface and lettering

The clarity and legibility of signage is significantly enhanced by the use of suitable sans serif display typefaces, including Johnston Underground, Gotham, Helvetica, Avant Garde, Arial, and Futura. These typefaces are clear and uncomplicated, and incorporate good letter spacing.

Typefaces that are highly decorative, complicated, very bold, condensed or italicised should be avoided as they can be difficult to understand and detract from the readability of the sign.

The use of a particular typeface should be consistent for all signage within a building or environment, and on each sign.

Single words and short sentences should begin with a capital letter and continue with lower case letters.

Where signs give a person's name or the title of a particular department, each word should commence with a capital letter and continue in lower case. Where initials are included in a person's name, full stops should be omitted. In this arrangement of capital and lowercase letters, word shape is easier to recognise and the word becomes more memorable, making text easier for many people to read.

The use of wholly capitalised words should be avoided.

Wording on signs should be as simple as possible. Single words or a short sentence should be used to identify a facility or give direction. Where two or more words are used in a name or sentence, they should be clearly separated from one another. Text should be ranged from the left (left aligned).

The use of abbreviations should be avoided as they may not be widely understood. Long sentences, very long words and words placed close together on a sign should also be avoided as they can be difficult to read.

Information on signs should either be listed alphabetically or grouped logically, for example, by department or floor level. To avoid having too much information on any one sign, the adoption of a hierarchy may be appropriate, with more detailed information being provided in subsequent areas of a building or environment.

Where numbers are used on signs, they should be in Arabic format (1, 2, 3, and so on). Roman numerals should be avoided as they are not universally recognised.

Checklist – Typeface and lettering
• Use a clear, sans serif typeface.
• Avoid typefaces that are complex, italicised, too bold, or condensed.
• Ensure the selected typeface is consistent throughout a site or building.
• Capitalise the first letter of names and messages with all other letters lowercase.
• Keep wording brief.
• Avoid the use of abbreviations.
• Align wording to the left.
• List names and messages alphabetically or group them logically, for example, by floor level.
• Consider using a hierarchical system to avoid over-complex signs.
• Use Arabic numbers (1, 2, 3), not Roman numerals.

4.11.2 Symbols and arrows

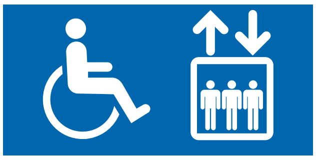
The use of symbols is beneficial to many people including children, people whose first language is not English, and people who have learning difficulties. Symbols that are universally recognised, such as the standard public information symbols illustrated in **Image 4.21**, may be used in place of text. Where other symbols are used, they should be accompanied by text.

Image 4.21 Examples of standard public information symbols.

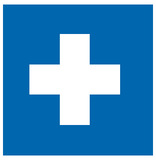
Accessible slope

Accessible parking

Accessible WC



Accessible lift



Medical service / First aid

Sign-language service (*)

Park

Accommodation

Pool

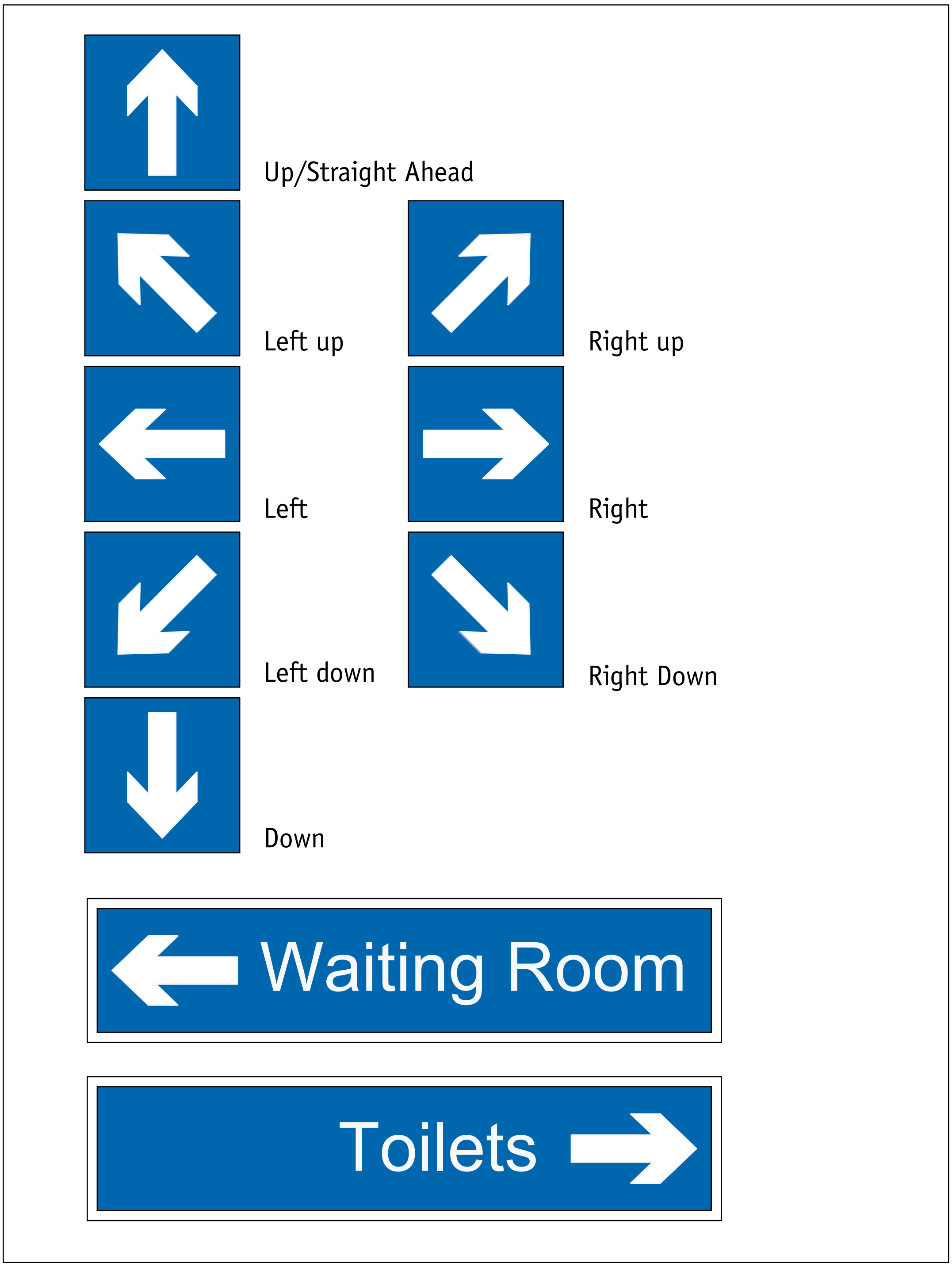
Restaurant

Symbols are particularly beneficial on dual-language signs as they enable quick recognition of information .

Symbols or icons designed for specific buildings can be used to identify particular facilities or departments, such as in a hospital, museum, or visitor attraction. These can be used in conjunction with a system of colour coding to create a recognisable and memorable identity that is universally accessible.

Pictorial devices, such as arrows, are essential for directional signs. Arrows should be used consistently throughout a system of signage and are recommended to be shaped as illustrated in **Figure 4.3**. Where signs include a list of destinations, such as on a directory sign in an entrance area, arrows should be arranged in the following order:

Figure 4.3 Arrow placement on directional signs.



Where a number of destinations are located in the same direction, they should be grouped together on a sign and share a single arrow. Repeated arrows are likely to clutter a sign and make it more difficult to read.

The position of arrows on a sign in relation to the location name should correspond with the direction in which it is pointing. Where an arrow points to the left, it should be positioned to the left of the name and where an arrow points to the right, it should be positioned on the right of the name. This placement reinforces the directional information.

Checklist – Symbols and arrows
• Use symbols in place of text or to supplement text wherever possible.
• Consider the use of symbols or icons in conjunction with colour coding to identify areas of a building.
• Use arrows to indicate direction, as **Figure 4.3.**

4.11.3 Letter and symbol size

The size of letters on signs should relate to the type of sign and the viewing distance. **Table 4.6** provides guidance on the recommended letter height for a range of viewing distances.

Table 4.6 Recommended letter heights in signs

Viewing distance (mm)	Recommended letter height (mm)
6000	200
4600	150
2500	100
2300	75
1500	50
750	25

The size of symbols should suit the size and space available, subject to a recommended border height of 150mm.

Checklist – Letter and symbol size
• Select a letter size to suit the viewing distance.
• Ensure symbols have a recommended border height of 150mm.

4.11.4 Tactile signs and Braille

Signs that provide directional information and those that identify particular functions and activities in a building should be embossed so that they can be read by touch.

Embossed letters should be raised above the surface of a sign by between 1mm and 1.5mm and have a stroke width between 1.5mm and 2mm. The edges of embossed letters should be sufficiently well defined to enable both sides of the stroke to be felt with a finger, but should be slightly rounded to avoid sharp edges.

Engraved and indented letters and symbols are difficult to read by touch and should be avoided.

The letter height of embossed signs should be between 16mm and 50mm. The typeface should be sans serif. The letter spacing should be increased by between 20% and 30% above the standard arrangement so that each individual letter can be clearly identified. Word spacing should be increased by 25%, again so that each word can be read distinctly.

Where Braille is used on signs, single words should use grade one Braille and signs with several words should use grade two contracted Braille. Grade 1 Braille consists of the 26 standard letters of the alphabet and punctuation. It is only used by people who are first starting to read Braille.

Grade 2 consists of the 26 standard letters of the alphabet, punctuation, and contractions. The contractions are employed to save space because a Braille page cannot fit as much text as a standard printed page. Books, signs in public places, menus, and most other Braille materials are written in Grade 2 Braille.

Braille should be located directly below the text to which it relates and ranged to the left. Where arrows are included in the sign, a small embossed arrow can be used to indicate direction and placed either to the left (to indicate left) or right (to indicate right) of the Braille.

The presence of Braille on a signboard should always be indicated by a marker or notch on the left hand edge.

It can be difficult to read embossed signs and Braille when they are mounted on a vertical surface. Most people will find it easier to read signs by touch if they are mounted on an inclined surface that is between 45 and 60 degrees above the horizontal in the direction of the user.

Image 4.22 Example of signage with Braille.

Image 4.23 Alternative example of signage with Braille.

Checklist – Tactile signs and Braille

- Use embossed signs to enable reading by touch.
- Ensure embossed letters are between 16mm and 50mm in height.
- Increase letter and word spacing to ensure they are easily identified.
- Use sans serif typeface for embossed letters.
- Position Braille below related text.
- Use Grade 1 Braille for single words.
- Use Grade 2 contracted Braille for signs with several words.
- Provide a Braille locator or notch to the side of the sign board.
- Consider locating Braille signs on an inclined surface to aid reading.

4.11.5 Tactile maps and models

The provision of tactile maps and models should be considered for public buildings as an aid to orientation. It can be difficult to read embossed signs and Braille when they are mounted on a vertical surface. Most people will find it easier to read signs by touch if they are mounted on an inclined surface that is between 45 and 60 degrees above the horizontal in the direction of the user. They are particularly beneficial in buildings, such as railway stations, visitor attractions and shopping centres, as they facilitate independent navigation for many people with visual difficulties.

Tactile maps are a particularly useful way of representing the internal layout of a building and can be produced in a form that can be easily carried by a person as they move around. Tactile models are less portable, but are well suited to representing three-dimensional landscapes and larger sites.

The basic principle of tactile maps and models is to present a simple version of a visual image that can be read by touch.

Maps and models should be uncluttered and designed to enable clear differentiation between lines, symbols and other features. The provision of explanatory and contextual information, such as a symbol key, bar scale, north arrow or other reference point should be provided. Audible instructions explaining how to use the map or model may be appropriate in some circumstances.

Checklist – Tactile maps and models
• Provide tactile maps or models to aid orientation and wayfinding for people with visual difficulties.
• Ensure maps and models provide clear, uncluttered information.
• Ensure effective differentiation between lines, symbols and other textured surfaces.
• Provide explanatory and reference information in tactile form.
• Consider the provision of audible instructions or supplementary information.

4.11.6 Surface finishes and visual contrast for signage

The surface finish of signs should be matt or satin to enable easy viewing. Finishes that are shiny or reflective are likely to be a potential source of glare and may be difficult to read due to the presence of reflections.

All signs should be evenly illuminated, with a lighting level of 200 lux.

Letters and symbols on signs should contrast visually with the signboard to maximise readability. The signboard should also contrast visually with any adjacent surface, such as a wall or door, so that is it easy to identify. The use of a contrasting border to the perimeter of a sign may help to highlight the location of the sign if the background surfaces are similar to the board.

Where colours are used as part of a system to differentiate between floor levels or departments in a building, the colours used should be very different. Colours that are similar, such as orange and red or blue and purple, may be difficult for some people to differentiate. This is of particular concern for those who have colour differentiation difficulties, as well as people who have cognitive, mental health, or visual difficulties.

Checklist – Surface finishes and visual contrast
• Ensure signs have a matt or satin finish.
• Avoid shiny and reflective surfaces.
• Evenly illuminate all signs to 200 lux.
• Make sure letters and symbols contrast visually with the sign board.
• Ensure sign boards contrast visually with any mounting or background surface.
• Use colours that are easy to differentiate where colour coding is used.

4.11.7 Safety signs

Safety information and warning signs should use the universally established colour code of green for safety, yellow for risk alert, red for prohibition or danger, and blue for mandatory action, as follows:

Image 4.24 Examples of safety information and warning signs. The following image gives further examples of using the proper combinations of colours for safety and warning signs.

- Yellow triangles indicate the presence of a potential hazard. The triangle outlines a black symbol or text.
- Green rectangular signs indicate a safe condition, for example, 'Exit' or 'Push bar to open'. Text should be white on green background, or green on white background.
- Red circles indicate prohibition. A red diagonal line through the symbol indicates the prohibition, for example, 'No smoking.'
- Blue circles indicate mandatory action to be taken, for example, 'Keep door shut'. The text of the symbol should be coloured white on the blue background.

Image 4.25 Examples of safety colours and contrasting colours.

Safety colours and contrasting colours

The meaning of Safety Colours, with some examples, is as follows:

Red — **Prohibition**

- stop signs
- emergency shutdown devices
- prohibition signs
- this colour is also used to identify fire-fighting equipment

Yellow — **Caution**

- identification of dangers (fire, explosion, possible danger, radiation, chemical hazard etc.)
- identification of steps, dangerous passages, obstacles

Green — **No danger** — **First aid**

- identification of emergency routes
- emergency exits
- safety showers
- first aid stations and rescue points

Blue — **Mandatory signs**

- obligation to wear individual safety equipment
- information
- location of telephone

Blue counts as a safety colour only when used in conjunction with a symbol or words on a mandatory sign or information sign bearing instructions relating to technical prevention.

Text and symbols should be in colours which contrast with the background safety colour.

Text Colour	*Symbol Colour*
White	■ ■ ■
Black	■ ■ ■
White	□ □ □
White	□ □ □

Checklist – Safety signs

- Ensure safety information and warning signs follow the universally established colour code.

4.11.8 Location and positioning

The suitable placement of signage is essential in ensuring it is visible at all times; within a comfortable viewing distance; and, for embossed and Braille signage, within easy reach.

Signs should be located at strategic points along a route and wherever routes intersect or diverge. Where routes are long, signs indicating the direction to a room or facility should be repeated to provide confirmation along the way.

Signs that may require a significant period of time to read should be located where users will not obstruct the passage of others.

On circulation routes, signs should be in accessible locations, taking into consideration the angle of vision of people standing or using a wheelchair.

Any system of signage should enable people to move easily around a whole site or building, without the need to retrace their steps to the main entrance in order to locate comprehensive directory and directional information.

Table 4.7 Guidelines on the location and positioning of different types of signage.

Table 4.7 Location and positioning of signs	
Signs requiring close viewing	**Recommended location and positioning**
Directory signs Room identification signs	• Height 1400-1700mm above floor level. • Wall-mounted signs should not project more than 100mm from the wall surface. • Signs to be mounted on the wall adjacent to the leading edge of room doors rather than on the door face so that they are visible at all times and to ensure that the door is not opened while someone is reading the sign. • Embossed signs to be positioned where a person can approach and touch the sign without being obstructed or causing an obstruction to other people.
Detailed signs and instructions Fire safety notices Health and Safety Act notices	• Duplicate signs to be provided at 1000mm to 1100mm and 1600mm to 1700mm to suit close viewing by people at a range of eye levels.
Detailed maps, diagrams and timetables	• Centred 1400mm above floor level, with the lower edge no lower than 900mm and the upper edge no higher than 1800mm above floor level.
Signs accompanying a control panel or an item of equipment	• Signs and instructions to be provided adjacent to an associated control panel or items of equipment. • Height range 900mm to 1200mm to suit people at a range of eye levels.

Signs for medium-range viewing	
Suspended directional or identification signs Wall-mounted projecting signs Post-mounted signs	• 2300mm clear headroom to the underside of the sign. • Wall-mounted signs should not project more than 100mm from the wall surface. • Where a sign may be temporarily obscured by other people, it should be positioned at least 2000mm above floor level.
Signs for long-distance viewing	
Directional signs Identification signs	• In large spaces ,and where visibility of signs may be obscured by crowds, the height should be greater than 2300mm.

Positioning heights and other guidance is common to BS 8300:2009, Sign Design Guide (RNIB, UK) and Department for Transport (UK) – Inclusive Mobility.

Checklist – Location and positioning
• Position visual signs for ease of reading.
• Position tactile and Braille signs within reach.
• Position signs where people reading them will not cause an obstruction.
• Ensure directional signs enable people to retrace their steps and identify alternative locations within a building, without having to return to the main entrance.

4.11.9 Audible information

The provision of audible information should be considered for public buildings to supplement visual and tactile signs or maps.

There are certain audible wayfinding and information systems available that provide individual messages to building users wearing either infrared or radio frequency receivers linked to a headset or earphone. Messages and information about a building or external environment are programmed into the receivers, which are activated by signals at pre-programmed locations.

Public address systems can be used for pre-recorded or live announcements that need to be clearly audible in all relevant areas of a building or environment.

Public address systems that are used for performances or to make announcements should incorporate a hearing enhancement system suitable for people with a hearing difficulty, as **Section 4.10**.

Checklist – Audible information
• Provide audible information to supplement visual and tactile signs and maps.
• Consider the use of individual receivers to provide wayfinding and visitor information.
• Ensure public address systems are clearly audible in all relevant areas of a building.
• Incorporate a hearing enhancement system in public address systems.

4.12 Fire Detection and Alarm Systems

Fire detection and alarm systems in buildings range considerably in scale and complexity. Small buildings may have only one or two manual call points and alarms. Larger buildings, however, may require intricately networked systems that incorporate a large number of automatic fire detectors, manual call points, and alarms, connected to numerous inter-communicating control and indicating panels.

Whichever system is used in a building, it should be effective at alerting all building occupants in an emergency. Where fire detection and alarm systems incorporate manual activation devices, such as break-glass call points, these should be easy to operate and should be positioned within reach of all building users.

The sound level of an audible alarm should be maintained throughout a building. Alarm signals louder than 120dB should not be used, as they can be painful and induce disorientation and anxiety. Very loud alarms can also cause severe discomfort and mask other sounds used by people with visual difficulties to aid orientation, such as the tapping of canes.

It is preferable to have a larger number of quieter alarms rather than a few very loud ones, in order to achieve a more even distribution of the signal. This will also make verbal communication easier for everyone during an emergency.

The provision of supplementary devices that provide visual and tactile indication of alarm activation is essential in ensuring that all building occupants are alerted simultaneously, including those with hearing difficulties.

The use of visual alarms (also termed strobe lights, xenon beacons, flashing beacons, or high-intensity beacons) should be provided in buildings to which members of the public have access.

The location of visual alarms should be carefully considered so that perception of the flashing light is not masked or screened by partitions or furniture. In some areas, multiple visual alarms may be necessary.

There is a significant drawback in the use of visual alarms: some people are susceptible to certain frequencies of flashing light systems and, as a result, may experience disorientation, confusion and, in some cases, epileptic seizures. To reduce the likelihood of this occurring, the frequency of the flashing light should be between two and four hertz, with units synchronized wherever the light from two or more units may be viewed from a single area.

Pager devices, which provide tactile indication that the alarm has been activated, are useful in buildings, such as offices and colleges where staff and students can be issued with a pager programmed to receive alerts. Such radio-based alarm systems comprise a central transmitter that is permanently connected to the fire alarm control panel. When activated, the transmitter sends a warning to individual pager devices worn by people in the building. The pagers can also be used for public address messaging, personal on-site text messages, equipment alarm warning, and security staff messaging.

Personal paging devices can be linked to a cradle or docking device for use at night and may be suitable in buildings, such as hotels, halls of residence, and other residential accommodation. When activated, a high-intensity strobe light and vibrating pillow pad or mattress pad are activated, providing supplementary visual and tactile means of alerting people who have hearing difficulties.

Building Designers should consider the size and layout of the building to see how many break glass units are required. However, in general, a number of break glass units at regular intervals is preferred to the provision of a single unit.

Break-glass units should be positioned between 900mm and 1200mm above finished floor level, and 500mm from any internal corner. They should be positioned where the adjacent floor is unlikely to be obstructed and with a recommended 900mm wide clear space to enable a person to approach and activate the unit .

Image 4.26 Examples of break glass units.

Break-glass units should be capable of being operated by simple hand, arm or general limb movement. Systems that require the use of keys or dexterous hand movements should be avoided. Break-glass units should be green, easily identifiable, contrast with their background, and generally should be located near exit points. Consideration should be given to how far people with mobility difficulties must travel to reach one. No specific advice can be given in this regard, save to say that more, and not fewer, should be provided in any given building whenever possible.

For details of assistance alarms in toilets and bathroom accommodation, refer to **Booklet 5: Sanitary facilities, Section 5.10**.

Checklist – Fire detection and alarm systems

- Ensure alarm systems are effective at alerting all building occupants.
- Incorporate audible, visual, and tactile alarms or alerting devices.
- Limit the sound level of audible alarms to 120dB.
- Ensure alarms sounders achieve an even distribution of the signal.
- Locate visual alarms so that they can be seen from all areas in a building.
- Employ a frequency between two and four hertz for visual alarms, with units synchronized.
- Consider the use of pager devices to provide tactile alerts.
- Provide vibrating mattress or pillow pads in bedroom accommodation.
- Position manual call points within reach of all building users and ensure they are operable with a simple hand or arm movement.

A1 Definition of Universal Design

Universal Design

‘Universal Design refers to the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or disability.’

Synopsis of the Disability Act, 2005.

A2 Human Abilities and Design

The following piece of text is an extract from European Ref: CEN/CENELEC Guide 6 ‘Guidelines for standards developers to address the needs of older persons & persons with disabilities’.

It states that: Physical, sensory and mental abilities vary from person to person and for individuals as they get older. Diversity is normal. Designers need to be aware of difference across the range of human abilities, and of associated design considerations.

(a) Physical abilities

This includes walking, balance, handling, pulling, pushing, lifting and reaching. Many activities involve simultaneous use of more than one of these skills. Physical strength and stamina may also affect people’s abilities to perform these actions.

Walking

For some people walking on the level or up gradients is difficult. Some people may have a limited walking range, may have difficulty with turning movements or may use mobility devices, such as crutches or a walker. They may need to stop frequently, to regain strength or catch breath. Design considerations include provision of handrails, seats at regular intervals, convenient set-down parking and adequate time for slower pedestrians at road crossings. Designers should also consider the needs of people walking and engaging in sign language when designing access to and from buildings plus within the buildings themselves.

Balance

Balance limitations can affect someone's gait or control of hand movements. Design considerations include handrails, regular seating, and providing controls within easy reach. A surface against which a person may stumble against or walk into should be designed to limit abrasion.

Handling

A significant minority of people are left-handed. Some people may have restricted use or no use of one or both hands, or may have limits on strength or precision. Facilities and components should be designed to be suitable for use with either hand or with one hand only. Handling includes gripping, grasping and manipulation. Each of these has a different purpose with specific design considerations. For instance, components should be designed to be easily held. The circumference of the supporting structure and stability are critical. Manipulation involves the moving, turning and twisting of components with a hand or hands. For those who have limited manipulation abilities, size and shape and ease of movement are critical. Another option to consider is to design for manipulation by using a pushing, pulling or pressing action using a clenched fist, or by using the wrist or the elbow.

Strength and endurance

Strength and endurance may be required on sloping paths and floors, stairways and long travel distances, when sustained effort may be needed.

For those with limited endurance, frequent resting-places are essential.

People generally find it easier to push a component, than to pull it. This is particularly so if the individual uses a wheelchair. Self-closing devices on manual doors can be difficult for some people to operate, particularly if the doors are required to resist wind forces. For these reasons, doors that open and close automatically are preferred.

Lifting

Activities, such as opening a vertically sliding sash window and an upward opening access gate, should be designed to be easily operated with minimal force.

Reaching

Design has a role to play in ensuring that key components in a building or environment are in easy reach, bearing in mind the range of people's sizes and abilities. Having components within easy reach is particularly important for those with more severe limitations in mobility. The reach range is dependant on the height and arm length of the person, use of the arms, and the balance and mobility of the upper body. A 'comfortable reach range' has been defined as one that is appropriate to an activity that is likely to be frequent and in need of precise execution and that does not involve stretching or bending from the waist. Putting things within comfortable reach can ensure use by a greater number of people. An 'extended reach range' has been defined as one that is appropriate to an activity that is likely, neither to need precision nor to be frequent and that can involve stretching or bending from the waist.

(b) Sensory abilities

Speech

Some conditions affect the capacity for or quality of speech. Two-way communication can be facilitated by environments designed to minimise barriers to hearing low or indistinct speech.

Hearing

People differ in their capacity to hear sound, to determine its direction, its source, to discern pitch, frequency, volume and variation and to separate out different sounds. Hearing quality is important for communication, for information, and for detection of hazards, such as traffic. Many people with hearing difficulties use a hearing aid which amplifies all sounds caught by the microphone, making communications very difficult in noisy environments. Keeping background noise level low is essential. The selection of structural and surface materials can make a substantial difference in audibility. Auditoriums, meeting rooms and reception areas can benefit from additional sound enhancement, such as a loop system. The careful design of illumination can assist in communication, such as lip reading and sign language. Provision of visual information and visual alarm systems can communicate information to those who have hearing difficulties or who cannot hear. Designers should also consider the colour and size of rooms and even the furnishing arrangement as this is very important for visually based communication. Also the use of vibration as means of sensing others should be considered.

Sight

Vision allows an individual to be aware of the luminance of surfaces, objects, form, size and colour. For people who are blind or who have visual difficulties the provision of suitable tactile walking surface indicators and tactile or acoustic warnings at hazardous locations, should provide information on using the built environment and should limit the risk of injury. The built environment can be designed for orientation by providing sound cues and tactile cues. An easily discernible system of 'way finding' should also be considered. For people with limited, but low vision, effective visual contrast between surfaces or objects helps to identify critical locations. Warning markings on glass surfaces, and markings on the edges of stair treads, help minimise hazards.

Differences in friction between one floor surface, or one stair tread surface, and the next should be avoided. Therefore, adjacent surfaces that display different standards of slip-resistance, or that depend on raised surfaces, should be carefully considered

Touch

In selecting surfaces in the built environment that people will need to touch (such as handrails, handles, knobs and controls, tactile information), it is important to select materials that avoid distress, injury or allergies. Surfaces should be free of abrasions. Metals that may cause adverse reactions when touched should be avoided.

(c) Mental abilities

Mental abilities include cognition, intellect, interpretation, learning and memory. People differ in their knowledge, their capacity to understand, reason, or interpret information. Designing for differences in these capacities helps provide a usable environment for the population at large, from the very young to the old, and people of diverse abilities. Means of communication in the environment should be designed to be immediately and easily understood, and correctly interpreted. As people age, some experience loss of memory or find it increasingly difficult to absorb new information, so changes in the environment should be carefully considered before implementation.

Design considerations that take account of mental abilities

Aural and visual messages should be simple, clear and have immediate impact. Figures, symbols and simple words are likely to be the most effective. Symbols should be instantly recognisable as representing images seen and activities undertaken in everyday life.

Way finding should be simple, such as tactile, graphic, audible or architectural cues that are easy to follow. Signage should be large and clear. Way-finding maps should be clear, indicate the person’s whereabouts in the building or facility, and be free from extraneous information.

(d) Age and size

Accommodating the developing child

It is important to create environments that are safe, accessible and useable for children. Individual components should be safe and useable as age-appropriate. Learning to manage risk is an essential part of a child’s development.

Accommodating ageing adults

Life span within the human population is increasing. More and more we expect to maintain an economic and social life within both the public and private domains as we age. However, many human faculties are in decline as we age, such as mobility, dexterity, stamina, strength, hearing, sight, or memory. Familiarity with a particular environment is important.

Diversity of size

The population contains a diversity of sizes and heights, from children, to the diversity in the height of fully-grown adults. The positioning of components and the heights of building elements, such as steps should recognise the diversity of height. Increased weight and girth is now also a feature of the population.

Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'.
http://www.cen.eu/cen/Sectors/Sectors/ISSS/About_ISSS/Documents/cclcgd006.pdf

A3 Further Reading

National and international standards and codes of practice

AS 1428.1-2001 Design for access and mobility. General requirements for access – New building work.

AS 1428.2-1992 Design for access and mobility. Enhanced and additional requirements – Buildings and facilities.

AS 1428.3-1992 Design for access and mobility. Requirements for children and adolescents with physical disabilities.

AS 1428.4-2002 Design for access and mobility. Tactile indicators.

BS 4800: 1989 Paint colours for building purposes (whilst the colours in this standard cannot be seen on CD-ROM or online the text can still be used).

BS 5395-1:2000 Stairs, ladders and walkways – Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders.

BS 5588-8:1999 Fire precautions in the design, construction and use of buildings – Part 8: Code of practice for means of escape for disabled people.

BS 5776:1996 (incorporating amendment No.1) Specification for Powered stairlifts

BS 6440:1999 (Incorporating amendment No.1) Powered lifting platforms for use by disabled persons – Code of practice.

BS 6440:1999 Powered lifting platforms for use by disabled persons – Code of practice (partially superseded by BS EN 81-40:2008. The remainder of BS 6440:1999 will eventually be superseded by EN 81-41: 2009 Safety rules for the construction and installation of lifts – Special lifts for the transport of persons and goods – Part 41: Vertical lifting platforms intended for use by persons with impaired mobility).

BS 6465-1:2006+A1:2009 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.

BS 6571-4: 1989 Vehicle parking control equipment – Part 4: Specification for barrier type parking control equipment.

BS 7036-1:1996 Code of practice for Safety at powered doors for pedestrian use – Part 1. General.

BS 7036-4:1996 Code of practice for Safety at powered doors for pedestrian use – Part 4. Low energy swing doors.

BS 7997:2003 Products for tactile paving surface indicators – Specification.

BS 8300:2009 (Incorporating amendment No.1) Design of buildings and their approaches to meet the needs of disabled people – Code of practice.

BS 8493:2008 (+A1:2010): Light reflectance value (LRV) of a surface – Method of test.

BS 8501:2002 Graphic symbols and signs – Public information symbols (AMD 16897).

BS EN 115:1995 Safety rules for the construction and installation of escalators and moving walkways.

BS EN 15838:2009 Customer contact centres, Requirements for service provision.

BS EN81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passengers lifts – Part 70: Accessibility to lifts for persons including persons with disability.

Building Regulations (Part M Amendment) Regulations 2010 (S.I. No. 513 of 2010).

Citizens Information Board – Accessible information for all (2009).

DD 266:2007 (Draft for Development) Design of accessible housing – Lifetime home – Code of practice.

I.S. EN 1991-1-1:2002 – Eurocode 1: Actions on structures Part 1-1: General actions – densities, self weight, imposed loads for buildings (including Irish National Annex: 2005).

I.S. EN 81-1: 1999 Safety rules for the construction and installation of lifts – electric lifts (Amd 1) (+A3:2009).

I.S. EN 81-2:1999 Safety rules for the construction and installation of lifts – hydraulic lifts (Amd 1) (+A3:2009).

I.S. EN 81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passenger lifts. Accessibility to lifts for persons including persons with disability (Amd A1:2005).

I.S. EN 997:2003 (+A1:2006) WC pans and WC suites with integral trap (AMD Corrigendum 14805) (AMD 16965).

IEC 60118-4:2006 Electroacoustics. Hearing aids. Induction loop systems for hearing aid purposes. Magnetic field strength (ISBN 978 0 580 50047 3).

International standard for Induction loops. IEC 60118-4.

Irish Code of Practice on Accessibility of Public Services and Information Provided by Public Bodies www.nda.ie/website/nda/cntmgmtnew.nsf/0/3DB134DF72E1846A8025710F0040BF3D/$File/finaldrcode_nda.htm

Key cards should conform to EN 1332. For further information on key cards please see: http://www.universaldesign.ie/useandapply/ict/itaccessibilityguidelines/smartcards/guidelines/smartcardguidelines/cards

Lifetime Homes Standard: http://www.lifetimehomes.org.uk

Norwegian Universal design of building standard, 2009.

Passenger Lift Design: The Machinery Directive 2006/42/EC; Lifts should conform to BS 6440.

National and international reference documents

2020 Vision – Sustainable Travel and Transport: Public Consultation Document. Department of Transport.

Bus Based Park and Ride – A Pilot Scheme. A Report to: Dublin Transportation Office. The TAS Partnership Limited, 2002.

City of London 2006 Facility Accessibility Design Standards. London, Canada, 2006 Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Gallaudet DeafSpace Design Guidelines 2010.

Department of Transport & the National Disability Authority Guidelines for Accessible Maritime Passenger Transport http://www.nda.ie/website/nda/cntmgmtnew.nsf/0/45AA46D1F77D7EF2802576DC005C5954?OpenDocument

Department of Transport, UK 'Traffic Signs Manual'.

Dublin City Council (2007) Variation (No. 21) of the Dublin City Development Plan 2005 – 2011. Available from: http://www.dublincity.ie/Planning/DublinCityDevelopmentPlan/VariationstotheDevelopmentPlan/Documents/AdoptedVariationNo21Spec.pdf.

Guidance on the use of tactile paving surfaces. Department for Transport, UK.

Guidelines for an accessible public administration. Towards full participation and equality for people with disability. Office of the Disability Ombudsman, Sweden.

Inclusive Mobility. Department for Transport, UK.

International Best Practices in Universal Design. A Global review. Canadian Human Rights Commission, 2006.

Irish Wheelchair Association: Best Practice Access Guidelines 2010.

Joseph Rowntree Housing Trust.

Parking for disabled people. Department for Transport, UK.

Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Rail Park and Ride Strategy for the Greater Dublin Area. Dublin Transportation Office, 1994.

Regulation of Bus services outside the Greater Dublin Area. Department of Transport.

"Sign Design Guide and Inclusive mobility," Oxley, P. (2003), Inclusive Mobility. Department for Transport, UK. www.mobility-unit.dft.gov.uk

Smarter Travel 'A Sustainable Transport Future' – A New Transport Policy for Ireland 2009 – 2020. Department of Transport.

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Image acknowledgements:

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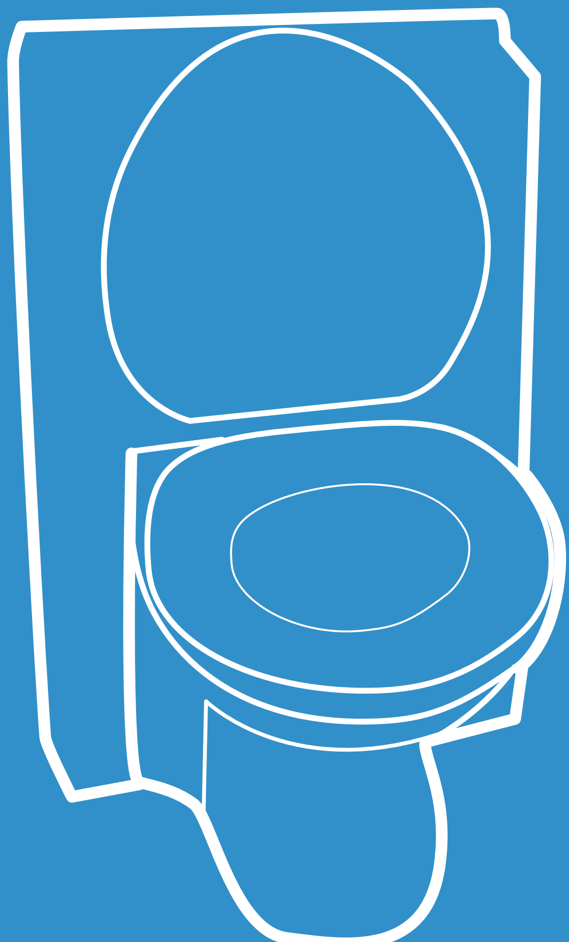
Building for Everyone:
A Universal Design Approach

Sanitary facilities

5



Centre for Excellence in Universal Design

Creating an environment that can be used by all people, regardless of their age, size, disability or ability.

The National Disability Authority's Centre for Excellence in Universal Design has a statutory role to promote the achievement of excellence in universal design in:

- the design of the built and external environment
- product/service design
- information and communications technologies (ICT)
- the development and promotion of standards
- education and professional development
- raising awareness of universal design

More information and updates on the website at: **www.universaldesign.ie**

Building for Everyone

Booklet 5 - Sanitary facilities

The other booklets from the
Building for Everyone series:

Booklet 1 - External environment and approach

Booklet 2 - Entrances and horizontal circulation

Booklet 3 - Vertical circulation

Booklet 4 - Internal environment and services

Booklet 6 - Facilities in buildings

Booklet 7 - Building types

Booklet 8 - Building management

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5.0 Objectives

The guidance in this booklet promotes the concept and philosophy of universal design and encourages developers, designers, builders and building managers to be innovative and think creatively about solutions that meet the needs of all building users.

The objectives of the series of booklets are to:

- identify and promote best practice with regard to universal design of the built and external environment
- provide best practice guidelines while recognising existing regulations in Ireland
- provide guidelines that are usable by and accessible to the target audience
- promote the achievement of universal design in Ireland

This booklet aims to:

- identify and promote best practice with regard to universal design of sanitary facilities
- increase awareness of, and to encourage designers to identify, the needs of all those who will be using the sanitary facilities
- highlight the wider benefits experienced by all when accessible and usable sanitary facilities are provided
- encourage designers to provide universal design solutions for sanitary facilities that look beyond the minimum requirements of national building regulations

5.0.1 How to use this guidance

The guidance (**Sections 5.3 – 5.10**) in this booklet is provided at three levels:

Section 5.3

- Highlights design issues that should be considered for the building as a whole, ensuring that the overall provision is suitable for all building occupants.

Section 5.4 - 5.9

- Provides detailed design guidance for individual rooms within a building, and includes a wide range of toilet, bathroom, shower room, and changing facilities.

Section 5.10

- Focuses on the design and provision of specific accessories and services that are common to all of the sanitary facilities described in **Section 5.4 - Section 5.9**.

5.1 Introduction

This booklet is part of the series "Building for Everyone – A Universal Design Approach," which aims to provide practical guidance on the universal design of buildings, places and facilities.

Universal design places human diversity at the heart of the design process so that buildings and environments can be designed to meet the needs of all users. It therefore covers all persons regardless of their age or size and those who have any particular physical, sensory, mental health or intellectual ability or disability. It is about achieving good design so that people can access, use and understand the environment to the greatest extent and in the most independent and natural manner possible, without the need for adaptations or specialised solutions (see full definition in **Appendix A1**).

Why universal design?

People are diverse - some are left-handed and some right-handed - and people vary in their age, size and functional capacities. Illness or disability (whether temporary or permanent) can also affect characteristics, such as a person's mobility, dexterity, reach, balance, strength, stamina, sight, hearing, speech, touch, knowledge, understanding, memory, or sense of direction. A reference list with these booklets indicates some of the key differences in human abilities that should guide design of buildings and of outdoor places. (See full description of Human Abilities in **Appendix A2**).

People of diverse abilities should be able to use buildings and places comfortably and safely, as far as possible without special assistance. People should be able to find their way easily, understand how to use building facilities, such as intercoms or lifts, know what is a pedestrian facility, and know where they may encounter traffic.

Given the wide diversity of the population, a universal design approach, which caters for the broadest range of users from the outset, can result in buildings and places that can be used and enjoyed by everyone. That approach eliminates or reduces the need for expensive changes or retro fits to meet the needs of particular groups at a later stage.

It is good practice to ascertain the needs of the range of expected users as early as possible, and to check the practicality and usability of emerging designs with a diverse user panel.

Designing for one group can result in solutions that address the needs of many others. For example:

- level entry (Step-free) entrances facilitate not just wheelchair users but also people with buggies; people with suitcases or shopping trolleys; people using walking or mobility aids; and people with visual difficulties
- larger toilet compartments provide easier access to wheelchair users; those with luggage or parcels; parents with pushchairs or accompanying small children; those using walking or mobility aids; and larger-sized people
- clear, well-placed signage that uses recognised symbols or pictograms helps people with reading or cognitive difficulties, and those whose first language is neither English nor Irish

Sometimes one solution will not suit all and a range of options will need to be provided, for example:

- providing both steps and a ramp where there is a change in level
- providing parking ticket machines that offer slots at different heights to facilitate use at standing height, at sitting height, and by people of small stature

This series of booklets is for architects, engineers, planners, developers, designers, building contractors, building workers, building managers, and others involved in designing, commissioning and managing buildings and their surroundings. It provides guidance on a universal design approach to all new buildings, and the use and adaptation of existing environments.

Those who commission, design, construct or manage any part of the built and made environment also have a duty of care to adhere to relevant legislation and regulations including equality legislation, building regulations and health and safety regulations.

The guidance is based on a best practice approach drawing on up-to-date international best practice, guidelines and standards; previous guidance by the National Disability Authority; and extends beyond disability access matters to incorporate a universal design approach. The series is fully compatible with Part M (2010) of the Building Regulations and associated Technical Guidance Documents related to Part M.

A disability access certificate is required for new buildings other than dwellings (including apartment buildings) and certain other works (as set out in Article 20 D (1) of SI 351 of 2009) to which the Requirements of Part M of the Building Regulations apply, which commence or take place on or after 1 January 2012. Further details on these and other relevant standards, codes of practice, and professional codes of practice are listed in **Appendix A3** Further Reading.

The detailed guidance provided here does not represent the only possible solution. Designers may come up with other ways to meet a diversity of users. New materials and technologies that emerge may open up further possibilities of accommodating the diversity of the population.

Checklists are provided throughout the series and while they provide a summary of main considerations and technical criteria, they should not be regarded as a substitute for the main text or an exhaustive list.

A comprehensive **index** is also available with the suite of booklets.

The Building for Everyone series is available online at **www.nda.ie** and **www.universaldesign.ie**. Electronic links are provided to relevant sections in the different booklets. As standards and requirements develop, the electronic versions of these booklets will be updated.

The electronic version is produced in accessible PDF format in accordance with the Web Content Access Guidelines 2.0. If you have any difficulties in this regard or require the document, or particular sections, in alternative formats, please contact the Centre for Excellence in Universal Design at the National Disability Authority, **info@ceud.ie** or (01) 6080400.

5.2 Terminology

Accessible – With respect to buildings, or parts of buildings, means that people, regardless of age, size, ability or disability, are able to both access and use the building and its facilities.

Bathroom – A room comprising a bath, WC, washbasin, and associated accessories.

Building - A permanent or temporary structure of any size that accommodates facilities to which people have access. A building accommodating sanitary facilities may include a toilet block in a public park or shower facilities at a campsite. A temporary building may include portable toilet facilities, such as those provided at outdoor events.

Building user – A person regardless of age, size, ability, or disability using facilities in a building or associated external environment.

Communal – An area that a group of individual people will share for a common purpose. A communal changing area will be a room for people to change and will typically comprise an open area with minimal privacy.

Family toilets – A toilet compartment or washroom designed to meet the needs of a family group or adults supervising young children, which provides a range of facilities including baby-changing area, children's and adult WCs, in a single room.

Handed – Referring to the layout of a room, this term means the provision of both left- and right-handed arrangements in a building.

Person with mobility difficulties – A person who is able, either with or without personal assistance, and who may depend on prostheses (artificial limbs), orthoses (callipers), sticks, crutches or walking aids, to walk, provided that particular design features are installed or available.

Sanitary facilities – A collective term for toilet, shower, bathing and changing facilities in buildings.

Self-contained – A single facility, such as a shower or changing area that is enclosed by walls or cubicle partitions. A self-contained facility will provide greater privacy than communal facilities.

Shower room – A room comprising a shower, WC, washbasin, and associated accessories, such as en-suite facilities in residential accommodation.

Transfer arrangement – The technique adopted by wheelchair users to transfer from a wheelchair to a WC or shower seat and back. The technique will depend on individual preference and the layout and size of the toilet or shower compartment. Common terms for describing transfer arrangements include lateral (side) transfer, angled (oblique) transfer, frontal, or rear transfer. Transfer may be assisted or unassisted. A left-hand transfer means that a person transfers to their left when seated in a wheelchair. See **Figure 5.1**.

Unisex – Facilities that are usable by males and females. Unisex toilets or changing areas may be located adjacent to single-sex washrooms or changing areas but have an independent access. Unisex accessible toilets may be accessed by a person with an assistant, carer, or companion of the opposite sex.

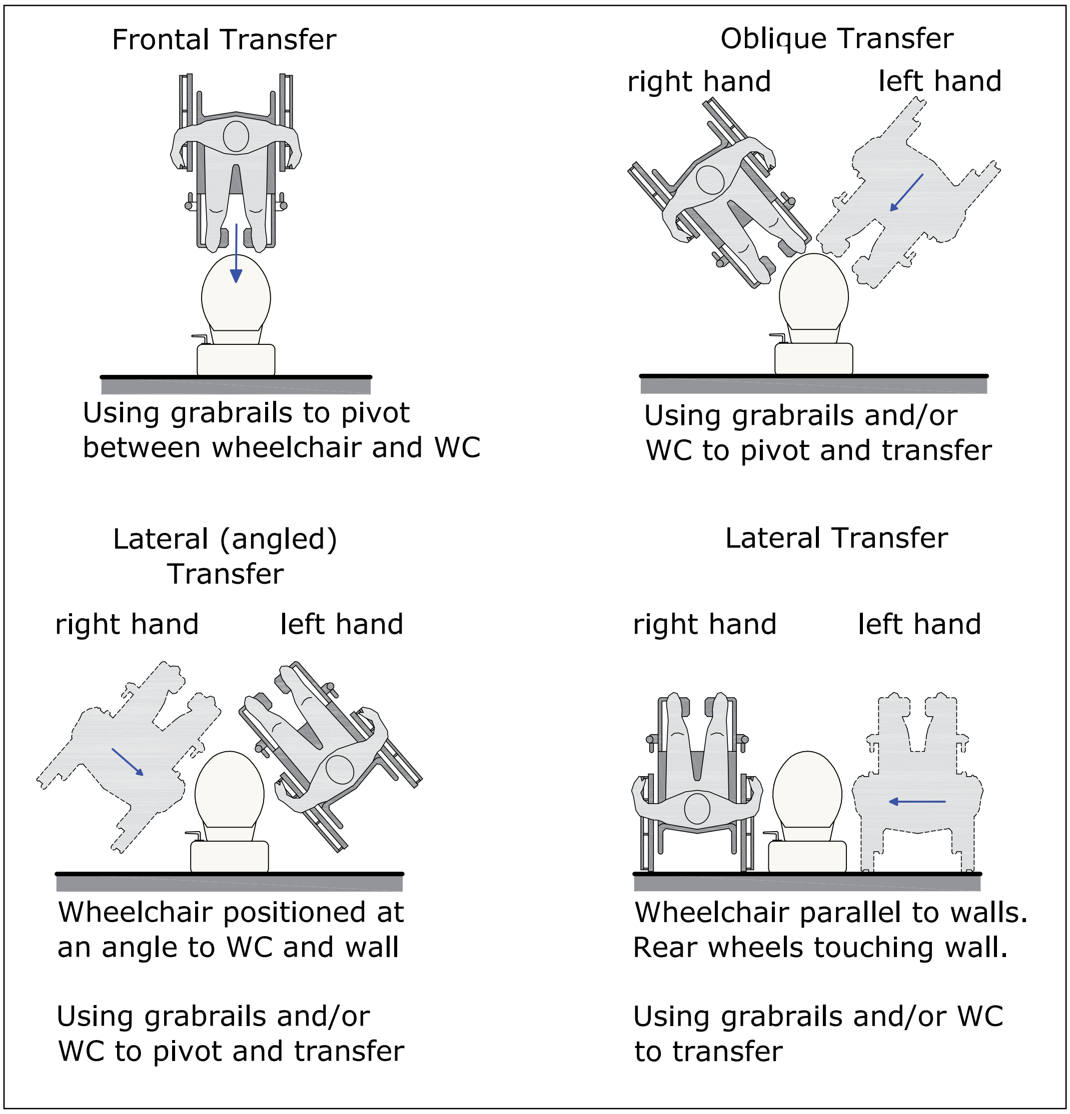
Visual contrast – Colour and/or tonal contrast between surfaces and fixtures, designed to improve visual clarity.

Washroom – The term for a room or area accommodating toilet cubicles and associated facilities, such as washbasins, hand dryers, and urinals (in facilities for males).

Waterless WC – A WC that does not use water to flush and is not connected to traditional water supply pipes or a waste drainage system. Waterless WCs may be used in remote areas, such as forestry sites, fairgrounds, car parks, and construction sites.

Wet room – A shower room in which the floor and walls are all waterproof. The shower area can be accessed without crossing a threshold or stepping into a shower tray.

Figure 5.1 Transfer techniques for people moving between a wheelchair and a WC.



5.3 Design Issues

5.3.1 Building user needs

Sanitary facilities should be designed to meet the needs of all building users regardless of age, size, ability or disability – whether they are staff, residents, frequent or first-time visitors. Sanitary facilities should be designed to accommodate children and adults of all ages, all sizes and all abilities who may be independent, accompanied, or assisted. When designing a facility, consideration should be given to the diverse ways in which people interact with their surrounding environment.

Designers should also consider making their sanitary facility designs look more appealing rather than just ticking the Part M pack box, this can be easily achieved with standard off-the-shelf sanitaryware and imagination.

> Adopting a universal design approach will ensure that the facilities can be accessed and used by a diverse population with an equitable level of convenience, understanding, choice, safety, and comfort.

5.3.2 Scale of provision

The scale of provision of sanitary facilities in a building will be dictated by the nature and size of the building, the overall building occupancy, gender ratio, and particular patterns of use. These factors should be considered alongside the diversity of building user needs to establish the range, location, and type of facilities that will provide access for all.

The number and range of sanitary appliances should be established at an early stage in the design process and should involve consultation with users as well as with the local planning, building control and environmental health, and relevant licensing authorities, where applicable.

The gender ratio should take account of the likely proportion of males and females, but also acknowledge the fact that, for physiological and social reasons, females take longer to use toilet facilities than males. The expected gender ratio will vary depending on the building type. This ratio may also change over time, so the sanitary facilities should always cater for the widest range of scenarios. Where no reliable alternative data is available, the predictions set out in **Table 5.1** can be followed. Some building types are likely to experience considerable variation in gender ratio over time. For example, an event venue may host one event that attracts a considerable majority of one gender, while a second event could attract a ratio of 50% male and 50% females. Such scenarios should be considered at the design stage and reflected in the provision of additional permanent facilities, the flexible use of opposite-gender facilities, or the provision of an area where supplementary temporary toilet facilities can be easily located and connected to water supply and drainage connections.

Table 5.1 Predicted male and female ratios for particular building types.

Building Type	**Predicted Ratio***
Assembly buildings	50% Male, 50% Female
Swimming pools	50% Male, 50% Female
Cafes, restaurants, public houses, nightclubs	50% Male, 50% Female
Theatres and concert halls	50% Male, 50% Female
Shopping centres	35% Male, 65% Female

* BS 6465-1:2006+A1:2009 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances

The British Toilet Association recommends the following ratio of provision: Number of male cubicles plus number of male urinals x 2 = required number of female cubicles.

The pattern of use of a building will affect the demand on sanitary facilities and may influence the number, type, and location of facilities provided. In an office, for example, the toilets are likely to be accessed intermittently throughout the day. By contrast, the toilets in an assembly building, such as a theatre, cinema or entertainment arena will be accessed by a large number of people in a very short time frame, such as immediately before or after the performance, or during the interval. In this case, the number of toilets should be based on the maximum number of people likely to require the facilities at any particular time.

5.3.3 Convenient access

Sanitary facilities should be located in an accessible part of the building and conveniently located in relation to the main entrance, any waiting areas, and other key facilities.

A unisex accessible toilet (see **Section 5.5.1**) should be provided at each floor level in a building and should be clearly identified. If this cannot be achieved, such a toilet should be no more than one floor away, with access to that floor via an accessible lift. In existing buildings that have no lift to their upper floors, accessible toilet facilities should be located at entrance level.

Where a building only requires one or two toilets, they should have at least one fully accessible unisex toilet incorporating an additional standing-height washbasin to suit a broad range of people (see **Section 5.5.3**). Where the building occupancy exceeds 100 people, a second unisex accessible toilet (see **Section 5.5.1** or **5.5.3**) should be provided. Additional provision may also be required depending on the location or the nature of the building.

All buildings or parts of buildings open to the public must have at least one unisex accessible toilet (see **Section 5.5.1**) that can be approached separately from other sanitary accommodation.

Routes to sanitary facilities should be free of obstructions and the travel distances as short as possible. In large public buildings, the location of toilets at each floor level and at regular intervals is critical. The horizontal travel distance to the nearest toilet facilities within a public building should not exceed 40m. In schools the maximum distance should not exceed 25m. Detailed guidance on horizontal circulation can be found in **Booklet 2: Entrances and horizontal circulation.**

All toilets should, wherever possible, be freely accessed in order to preserve the dignity and privacy of building users. Some people need to use toilets more frequently than others, and some with a greater sense of urgency. Having to locate a key or a member of staff will delay access to the WC, which is inconvenient and may cause unnecessary discomfort. Further guidance on management of buildings can be found in **Booklet 8: Building management**.

Door-free entrances to washrooms and communal changing areas are inherently more accessible and easy to use than single entry doors or enclosed lobbies. Lobbies should only be used where specifically required by building regulations. Where door-free arrangements are used, privacy can be safeguarded by the appropriate placement of screens or walls.

Where doors and lobbies are required at the entrance to washroom or other facilities, they should be accessible and easy to use by all building users, and follow the detailed guidance in **Booklet 2: Entrances and horizontal circulation**.

5.3.4 Easy identification

Sanitary facilities should be easily identified with well-placed, clear signage that clearly indicates which are male, female, unisex, or accessible facilities. This is particularly important in buildings accessible to members of the public where people may be unfamiliar with their surroundings or visiting for the first time. Many people need or choose to access toilet facilities as soon as they arrive in a building, and they should be able to do so discreetly and with the minimum of delay. Everybody should be able to rely on effective signage to locate suitable facilities, or to locate alternative facilities where there is a choice of provision within a building.

Refer to **Section 5.10.13** for recommendations on the design of signage. More detailed guidance on signage can be found in **Booklet 4: Internal environment and services**.

5.3.5 Particular building types

The type of sanitary facilities provided should be appropriate to the purpose of the building and designed to enable access for all potential building users.

Table 5.2 Particular building types

Building Type	Guidance
Coach, bus, train stations; ferry terminals; and airports	Toilet facilities should be accessed from the main concourse level, without the need to negotiate steps. Cubicles should be designed to cater for luggage or shopping bags, or the fact that parents and carers need to keep children under close supervision by sharing a cubicle. Accessible toilets should be provided as close as possible to the point of departure and arrival so that they can be accessed immediately before boarding and on arrival. This is particularly important where on-board facilities may not be accessible to some people, such as on coaches, aircraft, ferries, and some trains.
Hotels, motels, and residential accommodation, such as student halls, hostels, and visitor's accommodation in healthcare buildings	• The provision and design of toilets, shower rooms and bathrooms should meet the needs of all potential guests and residents. • En-suite bathroom facilities and en-suite facilities should be provided for accessible bedrooms, even if they are not provided for all residents in the building. • If an en-suite arrangement is not possible, accessible bathroom or shower room facilities should be provided as close as possible to any accessible bedroom accommodation and be unisex. • A WC should always be provided in accessible bathrooms. • If only one accessible en-suite bedroom is provided in an establishment, the en-suite should contain an accessible shower and WC on the basis that accessible (wet room) showers are usable by a greater number of people than baths.

Nursing homes and residential homes for older people	• En-suite bathrooms should be provided, with either bath or shower facilities, as required. • At least one shower room or bathroom design for assisted use should be provided for every eight residents and a unisex accessible toilet provided within easy reach of any lounge, dining room and visitors' facilities. • Toilet and bathroom facilities should be designed and constructed in such as way as to facilitate easy adaptation to suit the particular needs of individual residents. • Separate sanitary facilities should be provided for staff.
Restaurants, cafes, and bars	• Toilet facilities should be provided wherever seating is available for people to eat and drink. • Toilet facilities should be clearly identified from the seating area, and accessible to all customers. • Where a lobby is required to separate the toilet facilities from food preparation and eating areas, it should be accessible and follow the detailed guidance in **Booklet 2: Entrances and horizontal circulation**. • Toilets for staff should provide convenient access from the kitchen and serving areas and, in all but the smallest of premises, should be separate to customer toilet facilities.

Schools	• Sanitary facilities should be provided to meet the needs of pupils, staff, and visitors. • Toilet, changing room and shower facilities for staff should be separate to those provided for pupils. • Where facilities in a school are to be used by the general population, such as classrooms for adult education or the main hall for community events, the provision of sanitary facilities should meet the needs of adults and children in the expected numbers. • Urinals are not expected to be provided in nursery schools, but should be provided in primary and secondary schools. • Where urinals are provided, the ratio of WC cubicles to urinals should be 1 to 2 or greater. (That is, there may be more WC cubicles in proportion to the number of urinals.) • Sanitary disposal units should be provided in all toilets used by girls aged eight and above, and ample space should be provided to comfortably use the WC where there is an adjacent sanitary disposal unit.
Schools for nursery and primary age children	• The provision of infant and children's WC pans should be considered. Infant WC pans are considerably smaller than conventional WCs and mounted at a lower height. Children's WC pans are similar in overall size to conventional WC pans, but mounted at a lower height and can be fitted with smaller seats. • The provision of infant and children's WCs may also be appropriate in other buildings designed specifically for children, such as children's museums or play centres.
Service stations (petrol stations)	• At least one toilet should be provided for customer use. • The toilet should be a unisex accessible toilet (see **Section 5.5.1**). • The toilet may be shared with staff.

Swimming pools, sport and leisure buildings	• Toilet, shower and changing areas should include facilities that offer choice, flexibility, and dignity to all people, whether as participants in a sport or activity, as a coach, trainer, official, or a member of a management team. • There should be a choice of unisex, private, and communal facilities suitable for independent use plus facilities for people who need assistance. • In larger venues such as indoor sports facilities, a changing room large enough for a team of wheelchair users should be provided. • Spectators at sports events should have access to accessible toilet facilities and every part of a sports facility, including pool, hall or field, should be no more than 40m from a unisex accessible toilet (see **Section 5.5.1**). • Sufficient toilets should be provided to enable a number of people to use the facilities during an interval.
Theatres, cinemas, and other entertainment venues	• Toilet facilities should be conveniently accessible to all seating areas. • Each seating area designed for wheelchair users should have convenient access to accessible toilet facilities. • Sufficient toilets should be provided to enable a number of people to use the facilities during an interval. • Dressing rooms and toilets in backstage areas of theatres and other entertainment venues should be accessible to everybody who may be involved in a performance, whether as a performer, director, backstage staff, or other capacity.
Workplaces, such as offices, factories, and shops	• Toilet facilities should be provided to meet the needs of all staff and should be separate from toilet facilities for customers or members of the public if the number of other users is large. • Where shower and changing facilities are provided for staff, they should be accessible and easy to use by all employees.

5.3.6 Temporary facilities

Temporary portable sanitary facilities may be required to supplement permanent facilities on occasions where the existing building occupancy is expected to be greater than normal and at outdoor events, such as festivals and concerts. Temporary facilities may also be required in situations where the permanent sanitary provision is being refurbished in an existing building.

Portable sanitary facilities should be as accessible as permanent facilities, regardless of their location (for example, a music festival located in the countryside). Accessible toilets should be provided at regular intervals within the site along with an appropriate means of access, such as a pathway and ramp suitable for wheelchair and stroller use or by those with walking aids with clear identification and with a regular programme for cleaning and maintenance.

The location of portable sanitary facilities should take into account the need for vehicle access for delivery and emptying. At sites where the frequent use of temporary sanitary facilities is expected, an area can be designated and provided with the appropriate water supply and drainage. This will enable direct connection to mains services and avoid the need for chemical-based toilets, which many people find less desirable to use.

5.3.7 Future proofing

It is acknowledged that the purpose and pattern of use of a building may change over time and that this is likely to affect the number and type of building occupants, and potentially the gender ratio. Wherever it is possible to foresee such changes, it will be advantageous for developers and designers to consider layouts and construction methods that provide a degree of flexibility and enable physical modifications to be made in a cost-effective way.

Image 5.1 Example of a bathroom designed with future proofing in mind. Future proofing elements shown in the photo are as follows: Integral drain creates wet room facility; traditional bath for hoisting/caring; bath panel with toe recess along length of bath for carer; wheelchair accessible adjustable height WC with easy flush panel; accessible basin; thermostatic controls on shower within easy reach both sitting and standing; alternative showering positions both inside and outside the bath; and slip-resistant flooring.

Design guidelines and regulations are also being continually updated as further research is undertaken and as best practice develops. Designers and developers should consider how improvements and modifications could be made over the lifetime of a building so that the facilities provided are able to continually achieve or exceed evolving best practice.

The accurate recording and updating of as-built information relating to the building, pipe routes, materials, and fixings will also make it easier to undertake cost-effective changes with minimal disruption to the building structure and its occupants.

Checklist – Future proofing
• Ensure overall provision is suitable for all building occupants.
• Accommodate particular patterns of use and gender ratio in the design and position of facilities.
• Use clear signage and identification of all facilities.
• Make sure toilets are easily accessed.
• Locate sanitary facilities on accessible routes.
• Provide toilets at regular intervals.
• Safeguard user privacy in all sanitary facilities.
• Install sanitary facilities suitable for particular building types.
• Ensure temporary sanitary facilities are as accessible as permanent facilities.
• Consider future changes and developments in the design and construction of buildings.

The sections that follow provide detailed design guidance for a wide range of toilet, bathroom, shower room and changing facilities. The best practice guidance encourages the provision of facilities that suit the broadest range of needs and that also provide choice. The guidance covers the conventional male and female (single-sex) toilet arrangement, unisex accessible toilet, bathroom and shower rooms for independent and assisted use and facilities for families and baby-changing. There is no one-size-fits-all and no single design of toilet, shower or changing compartment that will meet the needs and preferences of every building user. Designers and developers should consider providing a range of different but well-equipped and well maintained facilities, based on the guidance below. For example, toilets in all but the smallest of buildings are likely to comprise accessible single-sex and unisex compartments and to include facilities suitable for independent use, and facilities for people who need assistance.

5.4 Single-Sex Toilets

Single-sex toilets (also termed male or female toilets or washrooms) should offer choice and flexibility; be comfortable and safe to use; be easy to maintain; and should protect the privacy and dignity of every person. Adopting the principles of universal design will ensure that they are accessible, easy to use, and designed to meet the needs of all building users regardless of age, size, ability, or disability.

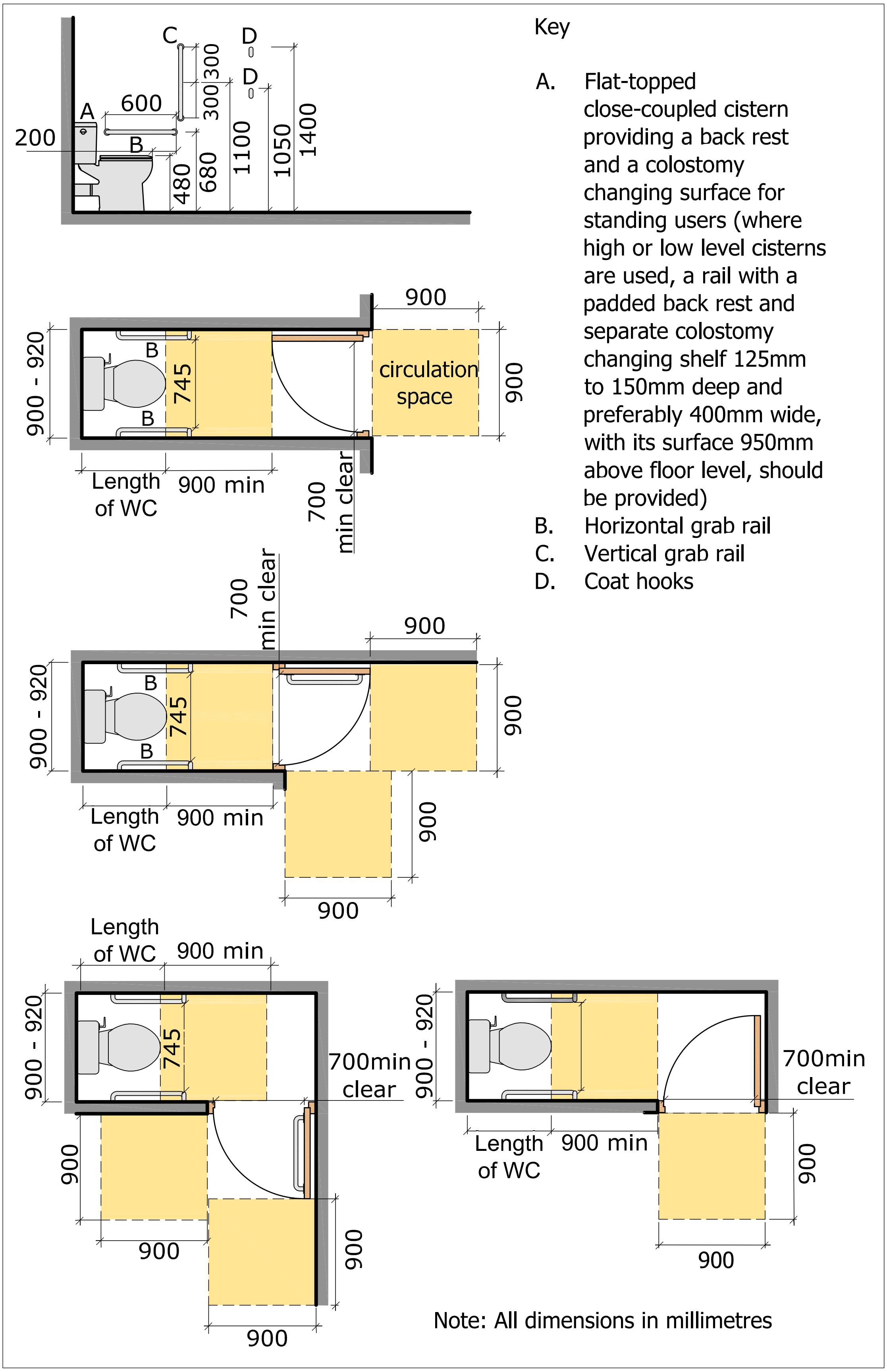
Washrooms should accommodate cubicles that are accessible to all, although not every cubicle will meet every individual need. A combination of the following facilities will offer choice and flexibility to building users:

Image 5.2 Example of single-sex toilet - Male/female washroom.

5.4.1 Accessible toilet cubicles

The provision of an accessible toilet cubicle within a single-sex toilet enables an independent wheelchair user; a wheelchair user with a carer of the same sex; people who require integral hand-washing facilities; and other people who require additional space or support to use the main washroom and provides a greater choice of facilities. Detailed guidance relating to unisex accessible toilets is included in **Section 5.5.1**

Figure 5.2 Layout of cubicles suitable for people with mobility difficulties.



Consideration should be taken of the size of the sanitary disposal unit in the cubicle to accommodate people of larger size using the WC. Cubicles suitable for persons with mobility difficulties should be 900 to 920mm wide and provide a 900mm x 900mm circulation space clear of the WC pan and the door swing. The overall length of the cubicle depends on the projection of the WC pan from the rear wall, the door position and whether the door swings inwards or outwards. **Figure 5.2** illustrates possible cubicle arrangements and door positions. Wherever possible, all cubicles in a single-sex toilet should be equipped to this standard. If this is not possible, at least one in six cubicles should be suitable for persons with mobility difficulties .

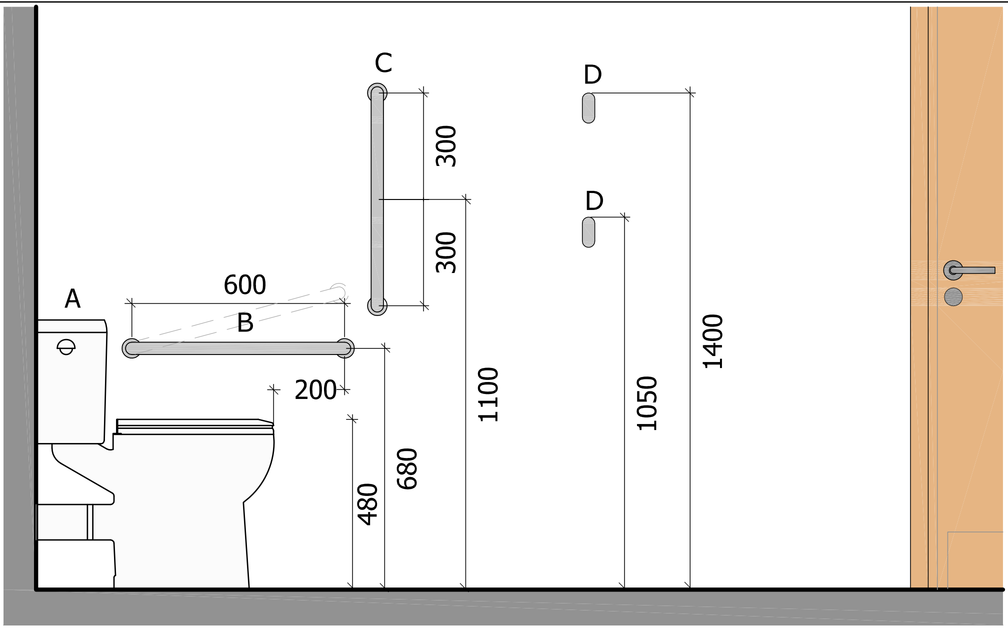
For people with limited mobility, doors opening outward from a cubicle are preferred, however for safety reasons in public buildings cubicle doors are generally recommended to open inwards.

Where inward opening doors have to be installed, they should be fitted with lift-off hinges so that the door can be removed if a person has fallen against the door inside the cubicle.

Where cubicle doors are outward opening, particular care should be taken in planning the layout of the toilet to minimise the risk of a person colliding with the door. Wherever possible, outward-opening doors should open against an adjacent wall. Outward-opening doors should be fitted with a horizontal grabrail in the inside face to assist door closing.

Grabrails should be provided to both sides of the cubicle. The position and size of grabrails is shown in **Figure 5.3**. More guidance on grabrails is provided in **Section 5.10.5**.

Figure 5.3 Position of grabrails in a cubicle suitable for people with mobility difficulties.



Key

A. Flat-topped close-coupled cistern providing a back rest and a colostomy changing surface for standing users (where high or low level cisterns are used, a rail with a padded back rest and separate colostomy changing shelf 125mm to 150mm deep and preferably 400mm wide, with its surface 950mm above floor level, should be provided)

B. Horizontal (or 15 degree angle) grab rail 600mm

C. Vertical grab rail 600mm

D. Coat hooks

Note: All dimensions in millimetres

The WC seat should be 480mm above floor level and should accommodate a variable-height toilet seat riser.

Image 5.3 Example of door-mounted grabrail.

5.4.2 Enlarged cubicles

Enlarged cubicles benefit many people, including people with young children or pushchairs, people with luggage or shopping and people with assistance dogs.

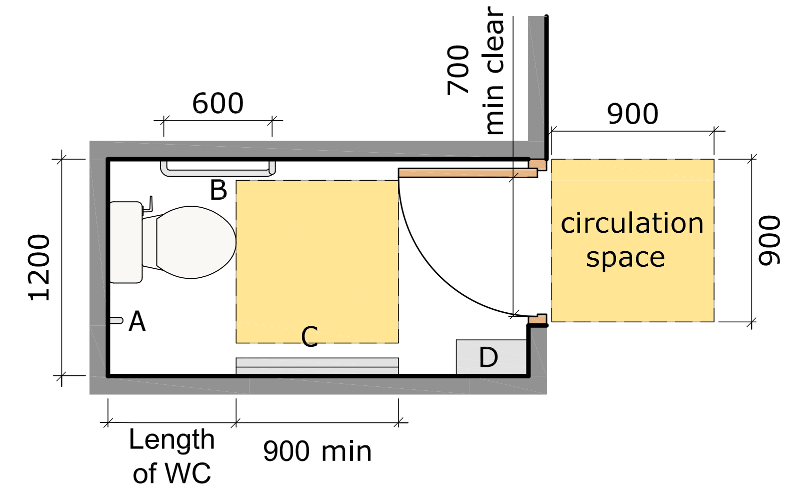
At least one enlarged cubicle should be provided where there are four or more cubicles within a single-sex toilet.

Image 5.4 Example of enlarged WC with guide dog user.

Enlarged cubicles should be 1200mm wide and provide a 900mm x 900mm circulation space clear of the WC pan and the door swing (see **Figure 5.4**). They should include a horizontal grabrail adjacent to the WC; vertical grabrail to the rear wall; a shelf; and fold-down baby-changing table. Where more than one enlarged cubicle is provided, the arrangement should be handed.

Enlarged cubicles are not a substitute for cubicles suitable for people with mobility difficulties, but a further alternative arrangement designed to meet the needs of a broad range of people, such as a parent with a child.

Figure 5.4 Enlarged cubicles for people who need additional space.



A. Vertical grabrail
B. Horizontal grabrail
C. Folddown baby changing table
D. Shelf for personal items, 200 x 400

Note: All dimensions in millimetres

In single-sex toilets, washbasins should provide a choice of heights within the range 680 to 900mm to suit children and people of different heights. Either automatically operated or lever taps should be provided for ease of use. Where separate hot and cold taps are installed, washbasins should always be fitted with plugs so that water can be mixed to the desired temperature.

5.4.3 Urinals

Urinals should be stall-type or wall-hung bowls, with a level floor surface for approach. Urinal troughs should never be used as people with visual difficulties often run their hands along the walls to orientate themselves and so may encounter the unprotected surface. In a row of urinals, at least one in six should be positioned at a lower height, with the rim 380mm above floor level instead of the standard 500mm.

Grabrails should be provided between pairs of urinals to allow both left and right hand support, as illustrated in **Figure 5.5**. A clear space 900mm wide x 1400mm deep should be provided in front of the lower height urinal to suit approach by a person using a wheelchair.

Screens or partitions may be provided between each urinal and between the urinals and adjacent washbasin or cubicle area to improve privacy (see **Figure 5.6**).

Figure 5.5 Accessible urinal arrangement.

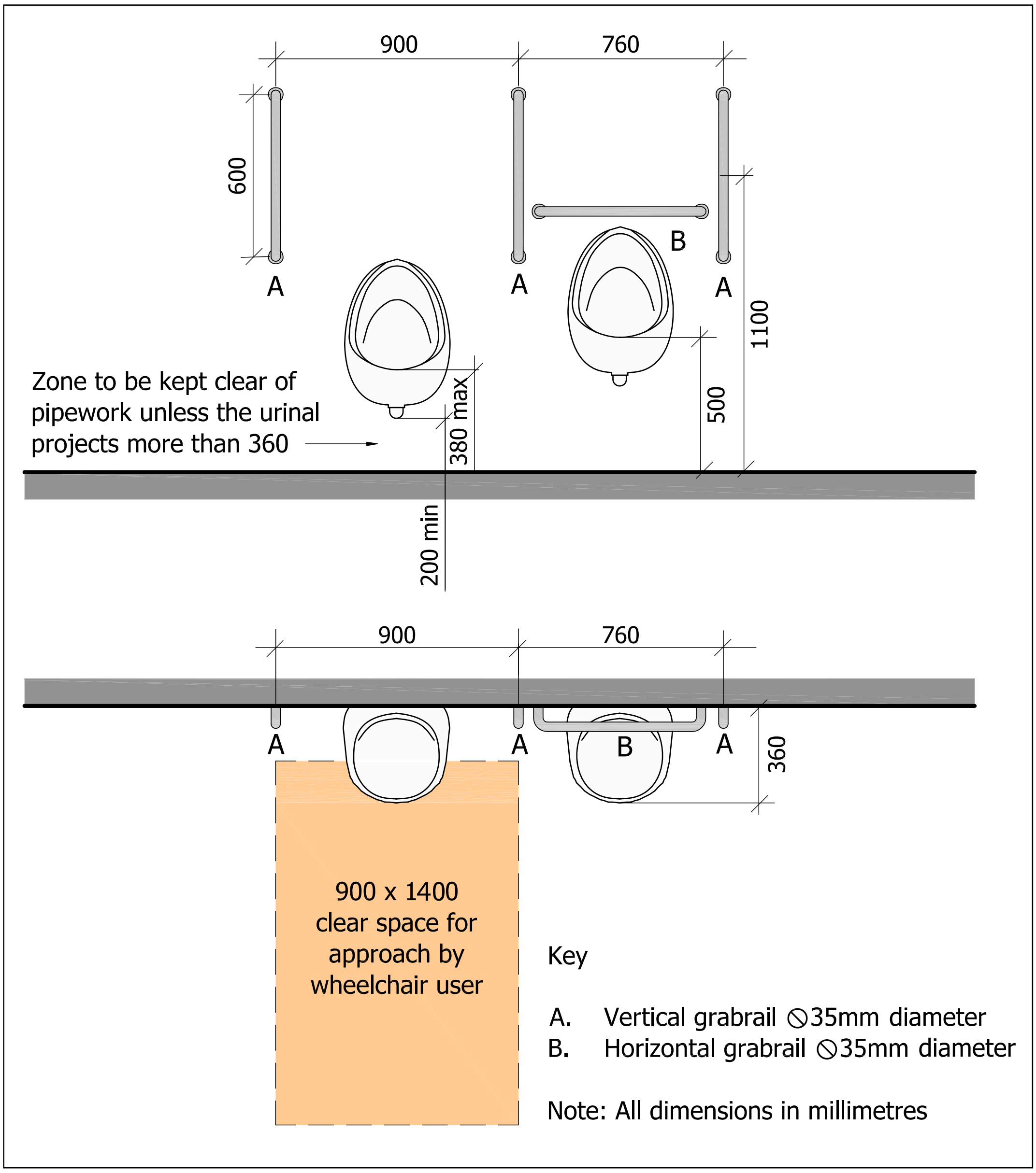
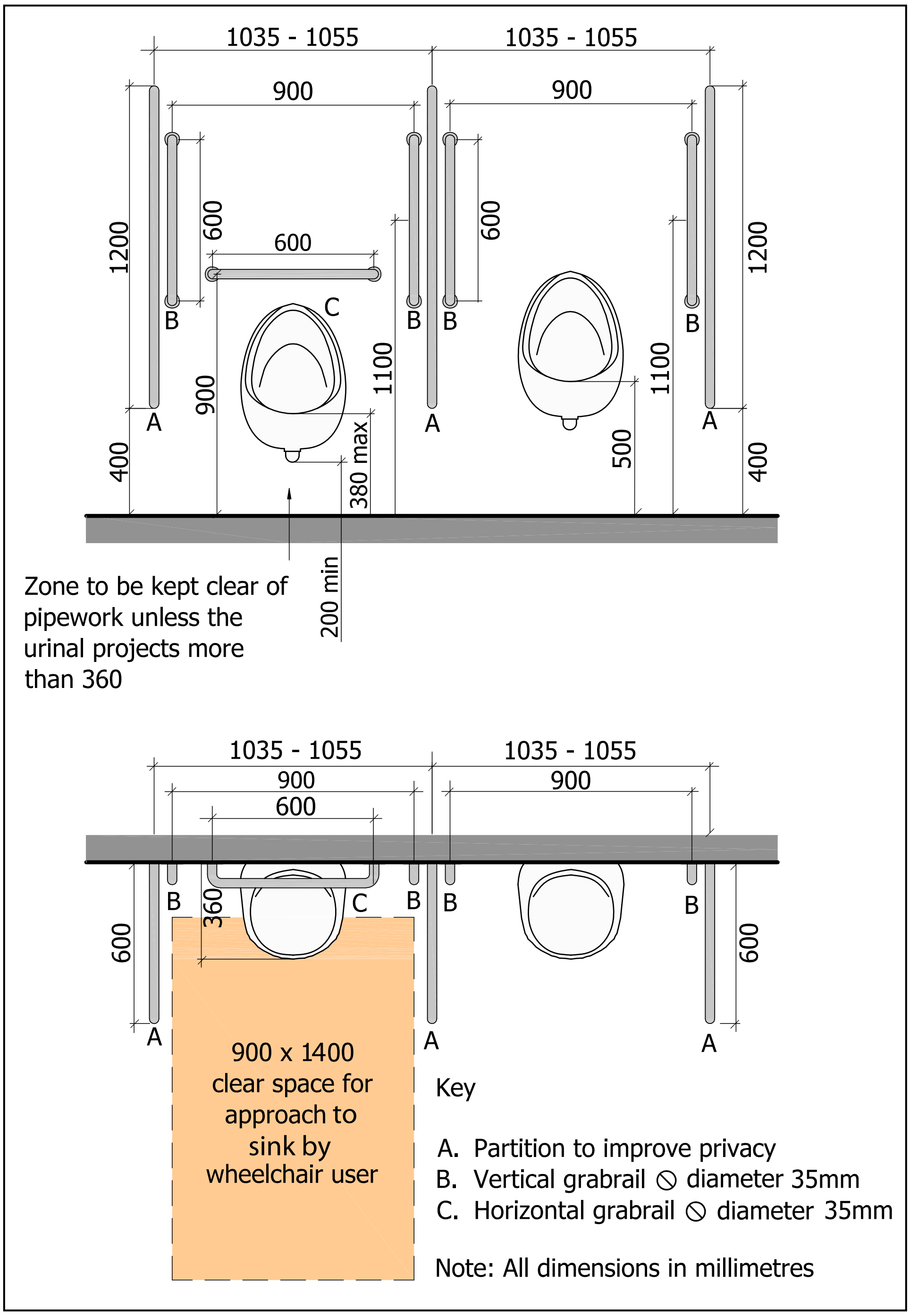


Figure 5.6 Accessible urinal arrangement with partitions.



Guidance on the design and placement of washroom accessories is included in Section 5.10.

Image 5.5 Example of urinals with partitions.

Image 5.6 Example of accessible urinal with grabrails.

Checklist – Single-sex toilets

- Arrange cubicles, urinals and hand-washing facilities logically.
- Provide accessible toilet cubicle.
- Provide cubicle designed for people with mobility difficulties.
- Include enlarged cubicle for people who need extra space.
- Fit doors with lift-off hinges.
- Install washbasins at different heights.
- Incorporate lever or automatic taps and plugs in washbasins.
- Make sure one in six urinals are at lower height and provide space for approach by wheelchair users.
- Consider fitting grabrails between urinals.
- Establish adequate screening to urinals.
- Employ suitable washroom accessories (see **Section 5.10**).

5.5 Unisex Toilets

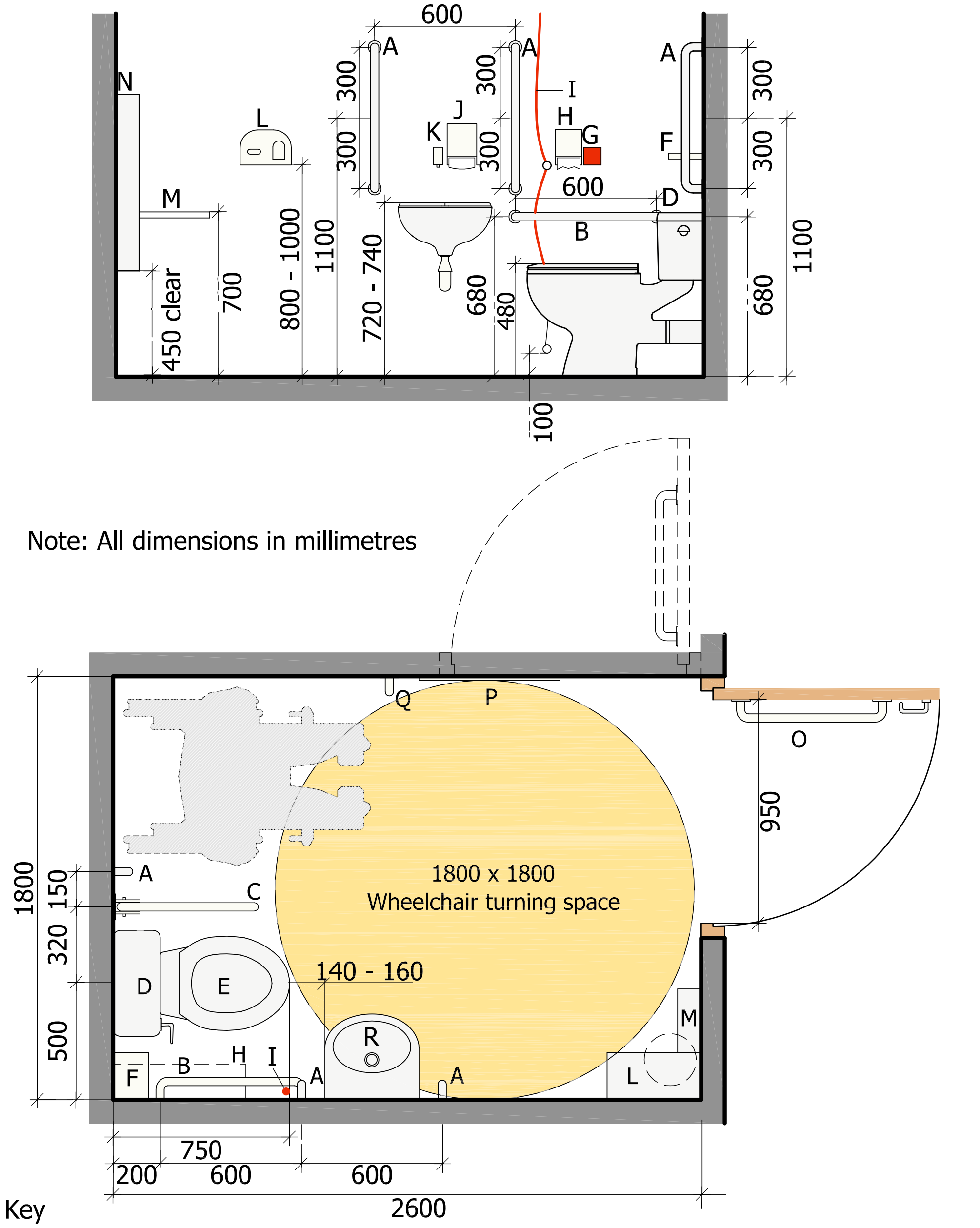
5.5.1 Unisex accessible toilet

A unisex accessible toilet (also termed a wheelchair accessible toilet) is designed to meet the needs of independent wheelchair users but is also equipped to suit persons with mobility difficulties and may be used by other people who require, for example, additional space, the support of grabrails, or integral hand-washing facilities.

Image 5.7 Example of door to unisex accessible toilet – including signage stating it offers right-handed transfer.

Image 5.8 Example of unisex accessible toilet – left-handed transfer.

Figure 5.7 Unisex accessible toilet – right-handed transfer.

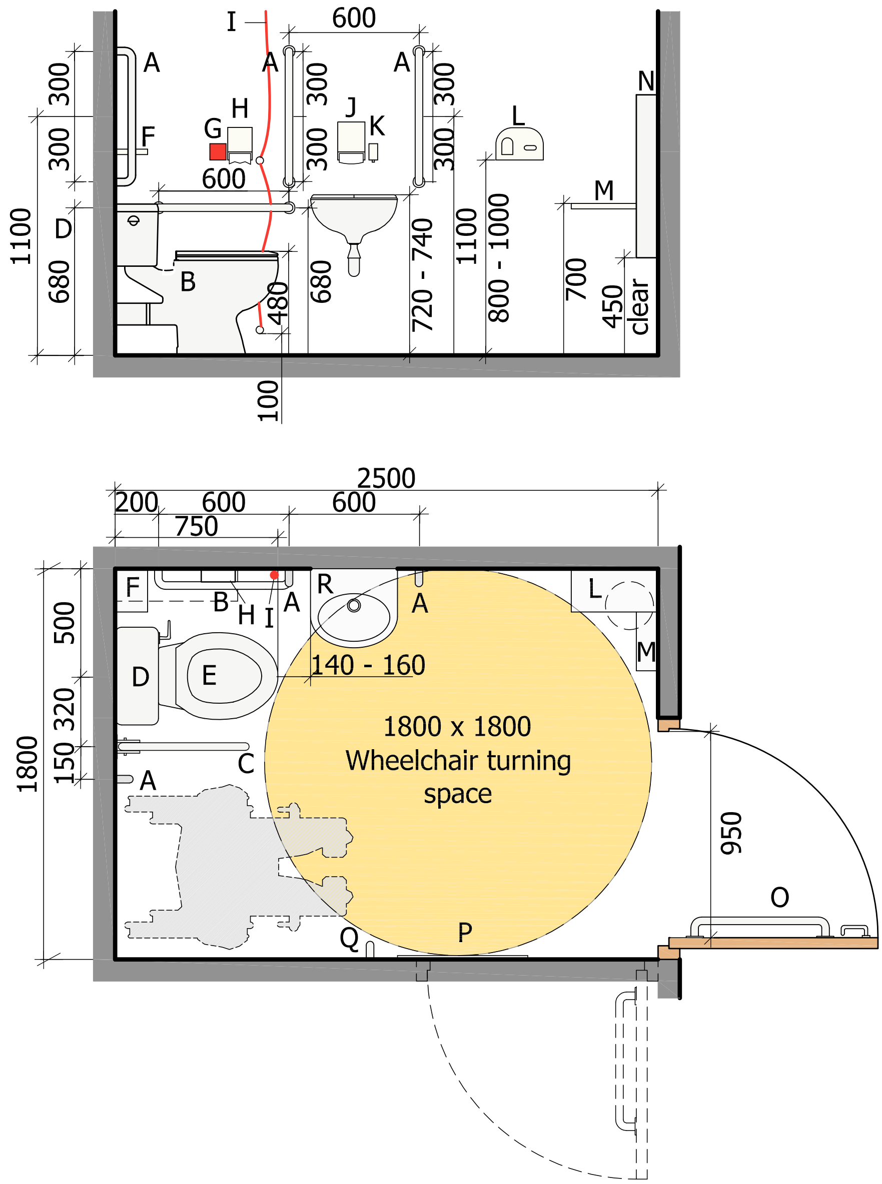


Key

A. Vertical grabrail ⦸ diameter 35mm
B. Horizontal grabrail ⦸ diameter 35mm
C. Drop down rail ⦸ diameter 35mm
D. Flat-topped close-coupled cistern proding a back rest
E. Special WC pan
F. 950 high shelf for colostomy bags
G. Alarm reset button ■
H. Toilet paper dispenser
I. Alarm pull-cord ●
J. Paper towel dispenser
K. Soap dispenser
L. Hot-air hand dryer
M. Shelf for personal use
N. Sanitary dispenser with conrols P. between 750 and 1200
O. Horizontal rail to assist door closing
P. Mirror from 600 - 1600
Q. Two clothes hooks within range 1050 - 1700
R. Wash basin

The room should be at least 1800mm wide x 2500m long, with a layout as illustrated in Figure 5.7. Where more than one unisex accessible toilet is provided, the layout should be handed (see **Figure 5.8** for left-handed transfer layout).

Figure 5.8 Unisex accessible toilet – Left-handed transfer.



Key

A. Vertical grabrail ⦸ diameter 35mm
B. Horizontal grabrail ⦸ diameter 35mm
C. Drop down rail ⦸ diameter 35mm
D. Flat-topped close-coupled cistern providing a back rest
E. Special WC pan
F. 950 high shelf for colostomy bags
G. Alarm reset button ■
H. Toilet paper dispenser
I. Alarm pull-cord ●
J. Paper towel dispenser
K. Soap dispenser
L. Hot-air hand dryer
M. Shelf for personal use
N. Sanitary dispenser with controls between 750 - 1200
O. Horizontal rail to assist door closing
P. Mirror from 600 - 1600
Q. Two clothes hooks within range 1050 - 1700
R. Wash Basin

Note: All dimensions in millimetres

In an accessible toilet, the washbasin should be within reach of a person seated on the WC. The basin is typically small (approximately 450mm x 300mm) so that it does not take up too much manoeuvring space or obstruct access to the WC. If room is available a larger sink should be provided. The location of the washbasin is crucial to enable a person to wash and dry their hands before adjusting their clothes. So too is the location of the soap and paper towel dispenser, which should also be within reach of the WC. The height of the washbasin should suit people using it in both a seated and standing position, with the rim 720 to 740mm above floor level and a clear knee space beneath to enable seated approach. Water supply and waste pipes should be neatly returned to the wall to maximise clear space below the washbasin.

Image 5.9 Example of sink with single mixer tap, soap dispenser, paper towel dispenser, and grabrails. Note the position of the tap plus the lack of a lever handle. A larger sink should also be considered.

A single mixer tap should be provided and positioned on the side of the washbasin nearest the WC. The tap should have a lever handle with vertical or sideways action or be automatic, for example with a proximity sensor. Central mixer taps should be avoided as they make it difficult to wash out urine bottles.

The 750mm dimension from the front of the WC pan to the rear wall of the compartment is critical. This measurement enables a wheelchair user to position themselves in the transfer space to the side of the WC, parallel to the side walls and with the front of the wheelchair level with the front of the WC pan. Wheelchair users are then able to move sideways onto the WC, without also having to move either backwards or forwards as they transfer. See **Figure 5.1** for a visual description of transfer methods.

Image 5.10 Example of unisex accessible toilet – Right-handed transfer.

5.5.2 WC pans and cisterns

Where WCs with concealed cisterns are used, for example for ease of maintenance or appearance, they should be adapted so as not to reduce the 750mm dimension from the front of the WC pan to the rear wall, or the clear transfer space to the side of the WC pan. Similarly, there should be no pipes or pipe boxing projecting into this area. Any reduction in the clear transfer space will make it difficult for wheelchair users to transfer laterally and will also affect the relationship of fixed and drop-down grabrails with the WC.

The WC pan should accommodate a variable-height toilet seat riser and should be wide enough to allow a user to wipe him or herself while sitting on the bowl. It should be a robust floor-mounted pan rather than one fixed to the wall. The seat should be strong, fitted with effective stabilisers and rigidly fixed to the pan to cater for the variety of transfer techniques. The shape of the pan should allow toe space under the bowl to facilitate people adopting a frontal transfer and to suit male users.

The cistern lid of low-level or close-coupled WCs should be securely fixed, as they may be used to provide back support while a person is seated on the WC. Some lids are easily displaced or broken during use of the toilet and the potential for this should be avoided. Where mid-level or high-level cisterns are used, or where the cisterns are concealed, a padded backrest should always be provided.

A common error in the specification and installation of corner arrangement WCs is for the cistern flush-handle to be positioned on the wrong side, that is, adjacent to the side wall of the toilet compartment. If the flush-handle is on the wrong side, many people will be unable to reach or use the handle and the WC will remain unflushed, which is unhygienic and causes embarrassment to users. It is imperative that the cistern flush-handle is positioned on the transfer side of the WC so that it can be reached by a person who has transferred back into their wheelchair. The handle should be spatula-shaped so that it is easier for people with reduced manual dexterity to use.

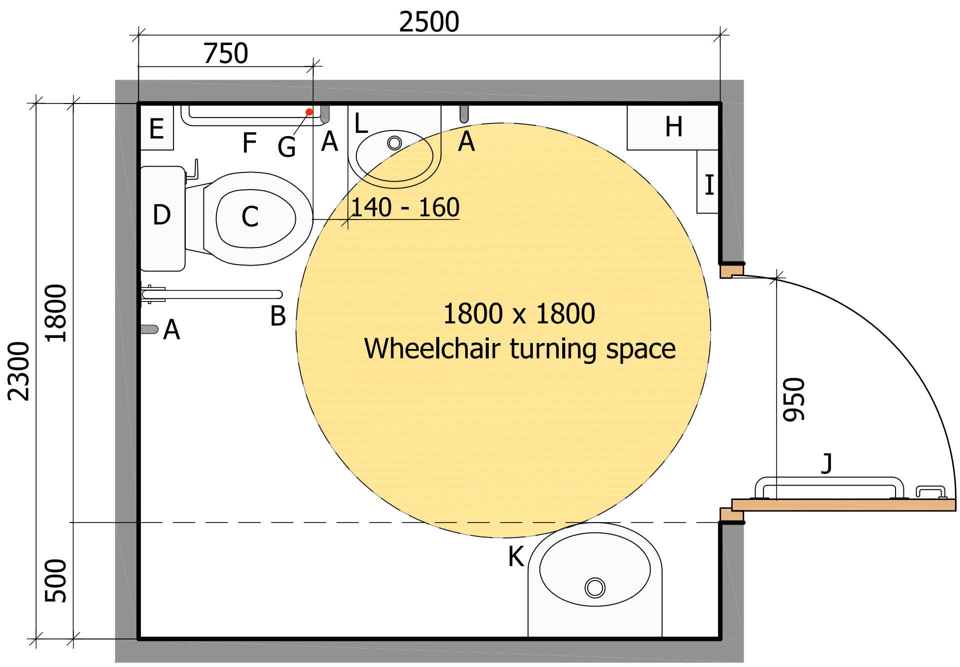
Image 5.11 Example of wall-mounted, dual-flush system.

Some manufacturers now produce a cistern flush mechanism for use in accessible WCs that has a dual-flush capability. Dual-flush mechanisms that require operation with a single finger, or fine hand movement, should not be installed. The preferred mechanism is a cistern flush that comprises a wall-mounted plate with two push buttons (one larger than the other). The push buttons are large enough to operate with a fist or elbow and only require a small depression of the button. Where these are used, the buttons should be positioned where they can be easily reached by a person who has transferred back onto their wheelchair. Also consider 'rocker' type flush controls.

5.5.3 Enlarged unisex accessible toilet with standing height washbasin

Where space allows, the provision of facilities designed for both seated and standing use will address the needs of a higher number of building users. An enlarged unisex accessible toilet with standing height washbasin should be 2300mm wide x 2500mm long, with a layout as illustrated in **Figure 5.9**. The room layout incorporates a corner arrangement accessible WC and provides an additional standing-height washbasin. Where more than one compartment is provided, the layout should be handed. This design is a preferable alternative to the unisex accessible toilet (**Section 5.5.1**) in smaller buildings where space is limited and only one or two toilet compartments are provided for the entire building.

Figure 5.9 Enlarged unisex accessible toilet with standing height washbasin.



Key

A. Vertical grabrail ⦸ diameter 35mm
B. Drop down rail ⦸ diameter 35mm
C. Special WC pan
D. Flat-topped close-coupled cistern providing a back rest
E. 950 high shelf for colostomy bags
F. Horizontal grabrail ⦸ diameter 35mm
G. Alarm pull-cord ●
H. Shelf for personal use
I. Sanitary dispenser with controls between 750 - 1200
J. Horizontal rail to assist door closing
K. Additional standing height washbasin with rim 680 - 700 high and clear knee space
L. Washbasin

Note: All dimensions in millimetres

The additional standing height washbasin should be larger than the finger-rinse basin associated with the corner arrangement WC to facilitate easier hand or body washing, and rinsing of personal care equipment. It should be fitted with a plug and either a single lever mixer tap or separate hot and cold taps with lever arms. The washbasin should be positioned with a rim height of 780 to 800mm to suit standing use and be located so that it does not encroach into the wheelchair turning or transfer area. A soap dispenser and hand drying facilities should be provided adjacent to the standing height washbasin.

Checklist – Unisex toilets
• Ensure the unisex toilet is suitable for all building users, if only one is provided.
• Make sure room dimensions are at least 2300mm wide x 2500mm long.
• Include an additional standing-height washbasin, rim height 780 to 800mm, with soap and hand-drying facilities.

5.5.4 Family toilets

The needs of children and family groups should be considered when planning all sanitary facilities. In large buildings, such as visitor attractions, large retail or leisure complexes, and transport terminals, the provision of a family toilet is recommended. This will enable adults to maintain close supervision of children.

Image 5.12. Example of a family toilet.

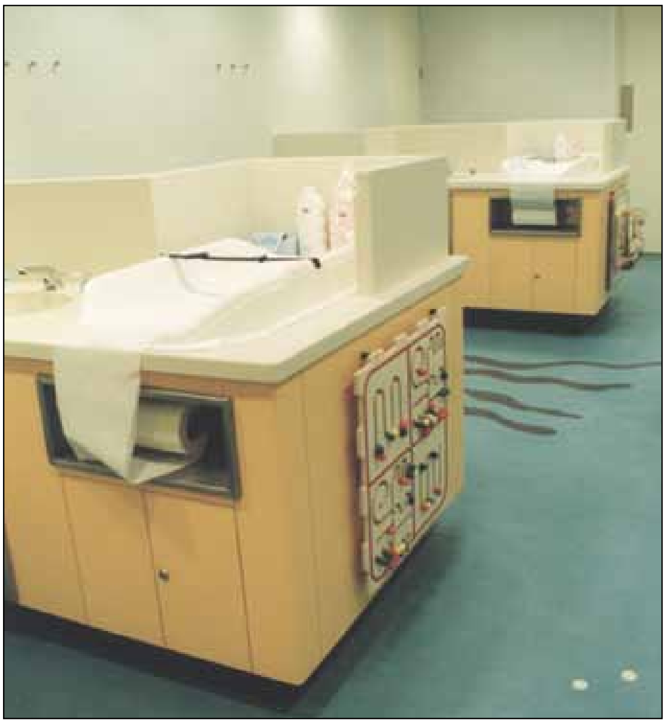
A family toilet should be accessible and easy to use. Family toilets should comprise a large room with one or more WCs (with or without a privacy screen); hand-washing facilities at a height suitable for children and adults; a baby-changing area; and sufficient space for one or more pushchairs.

Checklist – Family toilets
• Establish a large room suitable for small group access.
• Include one or more WCs.
• Install hand-washing and drying facilities.
• Incorporate baby-changing facilities.
• Ensure the room is accessible to wheelchair users; parents with strollers / buggies; people with visual difficulties; and people using walking or mobility aids.

5.5.5 Baby-changing facilities

Facilities for baby changing should be provided in buildings used by members of the public. The facilities should be unisex and accessible so that they are available to all parents and carers of either sex. Where baby-changing facilities are provided in single-sex toilets, these should be in addition to a unisex facility. It is not acceptable for the only baby-changing table in a building to be located in a unisex accessible toilet as this will reduce the availability of the toilet facility.

Image 5.13 Two examples of baby-changing facilities.



A baby-changing room should comprise two changing benches or tables at different heights: 800mm and 1200mm, to cater for people of different heights and people in either a seated or standing position. Hand-washing and drying facilities should be provided adjacent to the changing tables, together with nappy disposal bins, and a shelf or table for personal belongings.

Wherever space permits, a room for breast-feeding should be provided. For hygiene reasons, this should be separate to the general toilet facilities. A room for breast-feeding should be accessible and equipped with a comfortable chair, space for a large pushchair or pram, and baby-changing facilities.

Checklist – Baby-changing facilities
• Provide unisex accessible facilities for baby-changing.
• Consider supplementary baby-changing facilities in male and female toilets.
• Install changing tables at two heights.
• Include hand-washing and drying facilities.
• Provide nappy disposal bin.
• Establish separate facility for breast-feeding.

5.6 Toilets for People Who Need Assistance

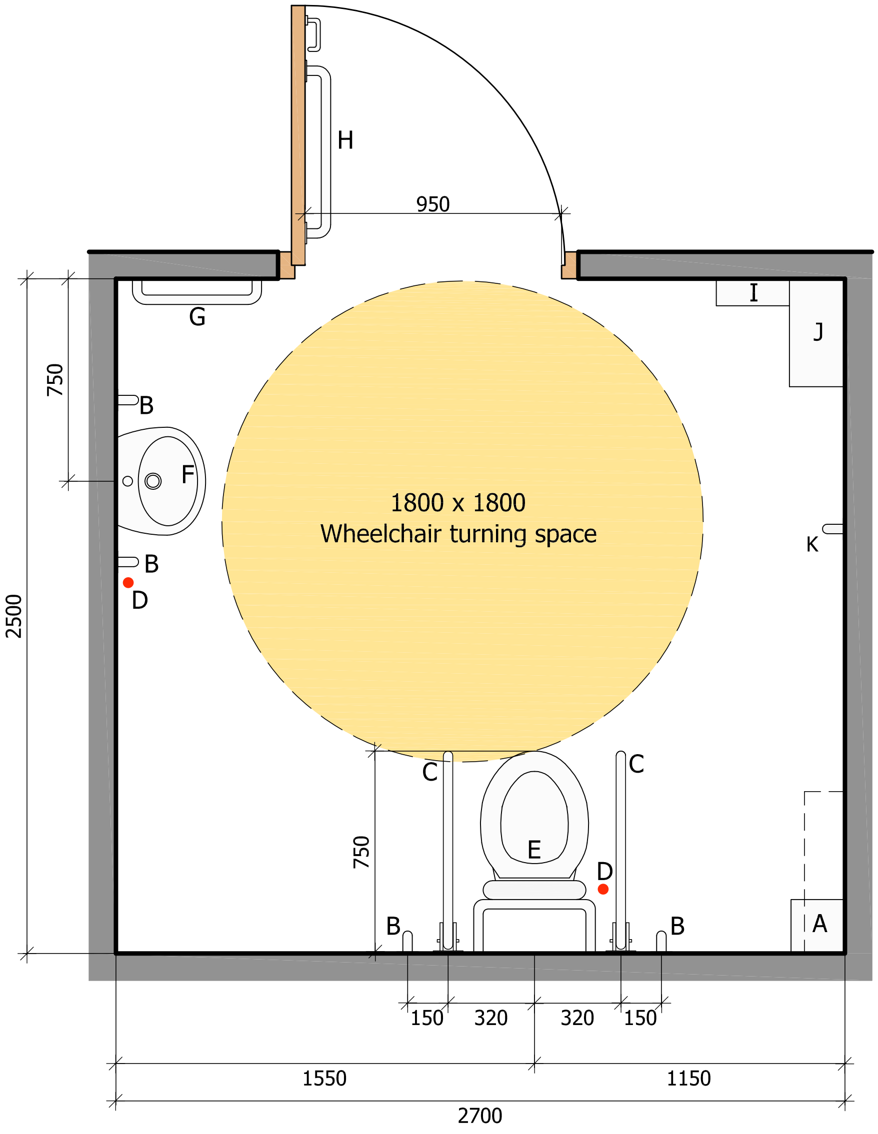
5.6.1 Unisex peninsular-arrangement toilet for assisted use

Toilets for people who need assistance are often termed peninsular-arrangement toilets, due to the central position of the WC pan and clear space on both sides. This arrangement enables a wheelchair user to transfer from either side and provides space for assistants on both sides of the WC.

The peninsular arrangement offers greater flexibility in terms of transfer technique than a corner arrangement accessible toilet, but is only suitable where trained assistance is available, such as hospitals, residential or day care accommodation, and sports or leisure centres, where users may be accompanied by an assistant. People who can use a corner arrangement accessible toilet independently may not be able to use a peninsular arrangement toilet without assistance. The absence of fixed grabrails or a solid wall immediately adjacent to the WC often means there is insufficient support for independent use.

The overall room size should be 2700mm wide x 2500mm long with a layout as illustrated in **Figure 5.10**.

Figure 5.10 Unisex peninsular-arrangement toilet for assisted use.



Key

A. 950 high shelf for colostomy bags
B. Vertical grabrail ⃠ diameter 35mm
C. Drop-down rail
D. Alarm pull-cord ●
E. Special WC pan
F. Washbasin with rim 720 - 740mm high and clear knee space
G. Towel rail
H. Horizontal rail to assist door closing
I. Sanitary dispenser with controls between 750 - 1200
J. Shelf for personal items size 200 - 400
K. Clothes hook between 1050 - 1700

Note: All dimensions in millimetres

A washbasin in a peninsular-arrangement toilet should be provided and positioned away from the WC, as illustrated. In a peninsular-arrangement toilet, a person is not expected to wash their hands while seated on the WC and the washbasin is positioned remotely to ensure there is sufficient space for assistants on both sides of the WC. The washbasin rim should be positioned 720 to 740mm above floor level to suit seated approach and should provide clear knee-space beneath the bowl.

The provision of a curtain that can be drawn around the WC area improves privacy both for the user and an assistant.

Image 5.14 Example of unisex peninsular-arrangement toilet for assisted use.

Checklist – Toilets for people who need assistance
• Ensure room dimensions are 2700mm wide x 2500mm long.
• Establish detailed layout as **Figure 5.10**.
• Install washbasin with clear knee space.
• Provide curtain to screen WC.
• Incorporate suitable washroom accessories (see **Section 5.10**).

5.6.2 Unisex peninsular-arrangement toilet with adjustable changing bench and hoist facilities

Some adults and children with significant mobility and coordination difficulties may need to be laid flat in order to be changed by carers. It is inappropriate for people to be laid on the floor to be changed as this is unhygienic and undignified, and carries the risk of injury to carers due to the manual lifting involved.

Toilet facilities for assisted changing should comprise an adjustable-height changing bench (a typical changing bench is minimum length 1800mm – the bench should be height adjustable, and free standing or wall mounted); a ceiling track hoist for a person to transfer between a wheelchair and either the WC or changing bench; a peninsular-arrangement WC, washbasin, and accessories including a wide tear-off paper roll to cover the bench; and large waste bin for pads and continence aids. If a ceiling track hoist cannot be installed, a mobile hoist should be provided. The WC should have a screen or curtain for privacy.

The room should be 3500mm wide x 2500mm long, with an outward-opening door. The facilities should be arranged to provide sufficient space for wheelchair manoeuvre and space around the changing bench and WC for two carers.

Image 5.15 Example of unisex peninsular-arrangement toilet with hoist.

Image 5.16 Example of unisex peninsular-arrangement toilet with assisted changing.

Image 5.17 Example of assisted changing facility.

Toilets incorporating facilities for assisted changing should be provided in large buildings that are accessed by members of the public in large numbers, such as shopping centres, leisure centres, entertainment venues, and motorway services.

Checklist – Unisex peninsular-arrangement toilet with adjustable changing bench and hoist facilities
• Ensure room dimensions are at least 3500mm wide x 2500mm long.
• Install an adjustable-height changing bench.
• Include wide, tear-off paper roll.
• Provide ceiling track hoist (or mobile hoist).
• Follow 'Toilets for people who need assistance' checklist above.
• Provide curtain or screen for privacy around WC.
• Install hand-washing and drying facilities.
• Incorporate suitable waste disposal.
• Use suitable washroom accessories (see **Section 5.10**).

5.7 Shower Rooms and Bathrooms

Bathing facilities are provided for public use in a range of building types, including residential and guest accommodation; sport and leisure buildings; healthcare premises; and some places of work. The overall provision and design of shower rooms and bathrooms should adopt the principles of universal design, and be accessible and easy to use by all people.

In general, if correctly detailed, showers are more accessible, safer to use, and may require less assistance than baths, but it is always preferable to provide a range of facilities that offer a choice. Designers should also consider making bathroom designs look more appealing, rather than just meeting recommended regulations. Where more than one facility is provided, there should be an option of left- and right-hand transfer, and the transfer arrangement should be consistent within each room. (That is, the direction of transfer to both WC and shower, or WC and bath, should be the same.) In bathrooms allocated for general use, fittings should be provided that suit the broadest range of people.

Image 5.18 Example of a well-designed accessible shower. The shower balances function with aesthetics with wall-mounted products; a folding shower seat; a level floor with an integral floor drain and coved skirting; matt-finish tiles and good tonal balance between floor and walls for visual acuity; thermostatic controls; alternative showering positions, both sitting and standing; controls within easy reach from seated position; a longer riser rail and contemporary grab rails.

All bathrooms and shower rooms should be located on accessible routes. Where facilities are en-suite, the bathroom or shower room door should be positioned to enable easy access from the bedroom or a hallway. Where shower rooms are provided in buildings, such as sports centres, they should be clearly identified and located as close as possible to the facilities they serve.

The guidance in this section may also be applied to private dwellings.

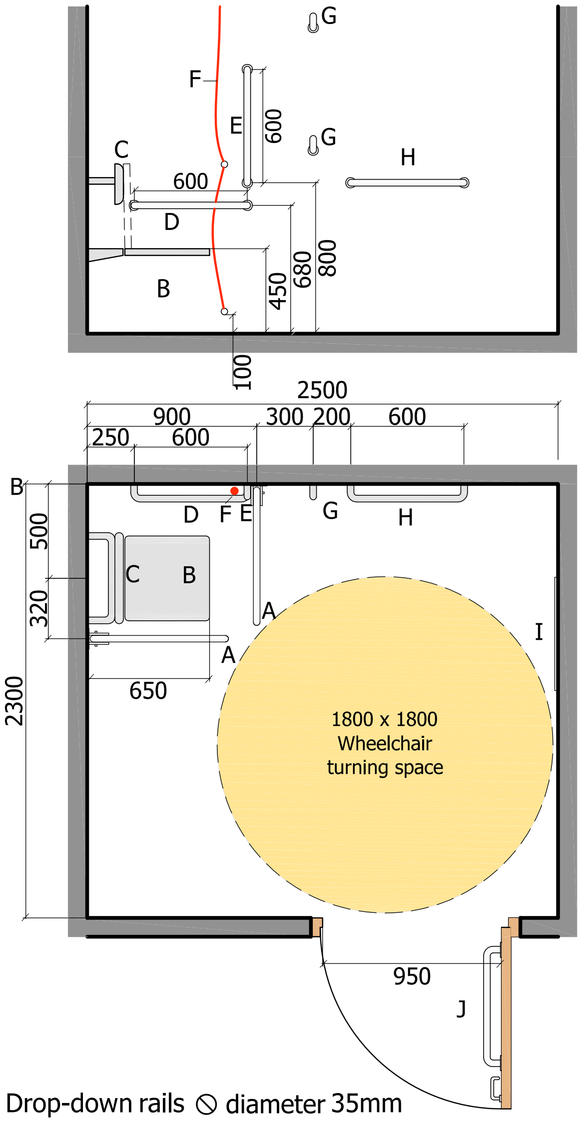
5.7.1 Self-contained accessible shower

A self-contained accessible shower, designed for independent use, should have the dimensions 2300mm x 2500mm and a layout as illustrated in **Figure 5.11**. Where more than one accessible shower is provided, the layout should be handed.

An accessible shower should incorporate a shower tray that is flush with the surrounding floor. This can be achieved by creating a wet room, in which either the whole floor or just the shower area slopes to a drainage point. Any slope in the floor should not exceed a 1:50 gradient.

It should be clear and unambiguous how to operate the shower; what controls the volume of water; and what controls the temperature. Controls should be designed so that users, whose vision may be restricted because of steam or not wearing their glasses, are unlikely to inadvertently change the temperature instead of changing the volume of water.

Figure 5.11 Self-contained accessible shower arrangement.



Key

A. Drop-down rails ⃠ diameter 35mm
B. Fold-down seat (upright position shown dotted)
C. Seat backrest
D. Horizontal grabrail ⃠ diameter 35mm
E. Vertical grabrail ⃠ diameter 35mm
F. Alarm pull-cord ●
G. Clothes hook between 1050 - 1700
H. Towel Rail
I. Mirror from 600 - 1600
J. Horizontal rail to assist door closing

Note: All dimensions in millimetres

The floor slope can be created within a floor screed; by using a proprietary level deck; or by using a recessed shower tray set into either a concrete or timber floor. Trays are also available that sit on top of an existing floor and incorporate a small sloping ridge to the perimeter of the tray. This type of tray is more suited to retrofit showers, where it is not practical to create a depression within the existing floor structure.

In all shower rooms, floor tiling or a sheet-flooring material should be detailed to contain water and to avoid sharp edges or trims. The floor finish should be selected to maximise slip resistance when both wet and dry.

The shower tray area should be 1200mm x 1000mm and open on two adjoining sides. A clear transfer area should be provided to the front and side of the shower, along with a 1800mm diameter turning area clear of the seat in the folded-down position.

Image 5.19 Example of an accessible shower room. Note the WC in the extreme left side of the photo.

An adjustable-height and detachable shower head and lever-operated shower control with a thermostatic mixer valve should be provided on the wall perpendicular to the shower seat. The shower head should be adjustable within the range 1200 to 2200mm above floor level and the controls positioned between 750 and 1200mm above floor level. The water temperature should not exceed 40 degrees centigrade (C). The temperature control indicator should be clear and as easy as possible for everybody to use.

A fold-down plastic seat with integral or separate backrest should be provided for showering and be securely fixed to the wall. The front of the seat should be 650mm from the rear wall to facilitate lateral transfer from a wheelchair. The seat height should be 450 to 480mm, depth 450mm, and width 500mm.

A second fold-down seat may be provided away from the shower for people to sit whilst drying and changing. All seats should be checked and tested regularly to ensure the fixings are secure and that the seat is weight-bearing.

Image 5.20 Example of a fold-down shower seat.

Fixed and drop-down horizontal and vertical grabrails should be provided in the locations shown in **Figure 5.11** and as described above for accessible self-contained changing areas.

A shower curtain (or two, if necessary) should be provided to fully enclose the shower area and fold-down grabrails, but should not obstruct the shower controls. The shower curtain provides privacy to a person using the shower if a carer or companion is also in the room and also helps to keep belongings dry.

Accessories, including a towel rail, clothes hooks, and mirror, should be provided, as illustrated. The seat, grabrails and other accessories should all provide effective visual contrast with the background surfaces.

Checklist – Shower rooms and bathrooms
• Ensure recommended room dimensions of 2300mm x 2500mm.
• Follow detailed layout, as **Figure 5.11**.
• Install level-access shower tray.
• Use adjustable-height, detachable shower head.
• Make sure temperature controls are easy to identify.
• Incorporate fold-down plastic seat in shower area.
• Consider additional fold-down seat for drying.
• Position grabrails and drop-down rails correctly.
• Provide shower curtain for privacy.
• Use suitable accessories including towel rail, clothes hooks, and mirror.
• Provide well-drained, level, and slip-resistant floor surface.
• Consider the provision of a warm air body dryer.

5.7.2 Accessible shower with WC

The recommended dimensions for a combined accessible shower and WC, designed for independent use, are 2700mm x 2800mm. The layout should be as **Figure 5.12a** and **5.12b**. This arrangement is suitable as an en-suite shower room in hotel and residential accommodation and also for changing facilities in sports, leisure, and other environments.

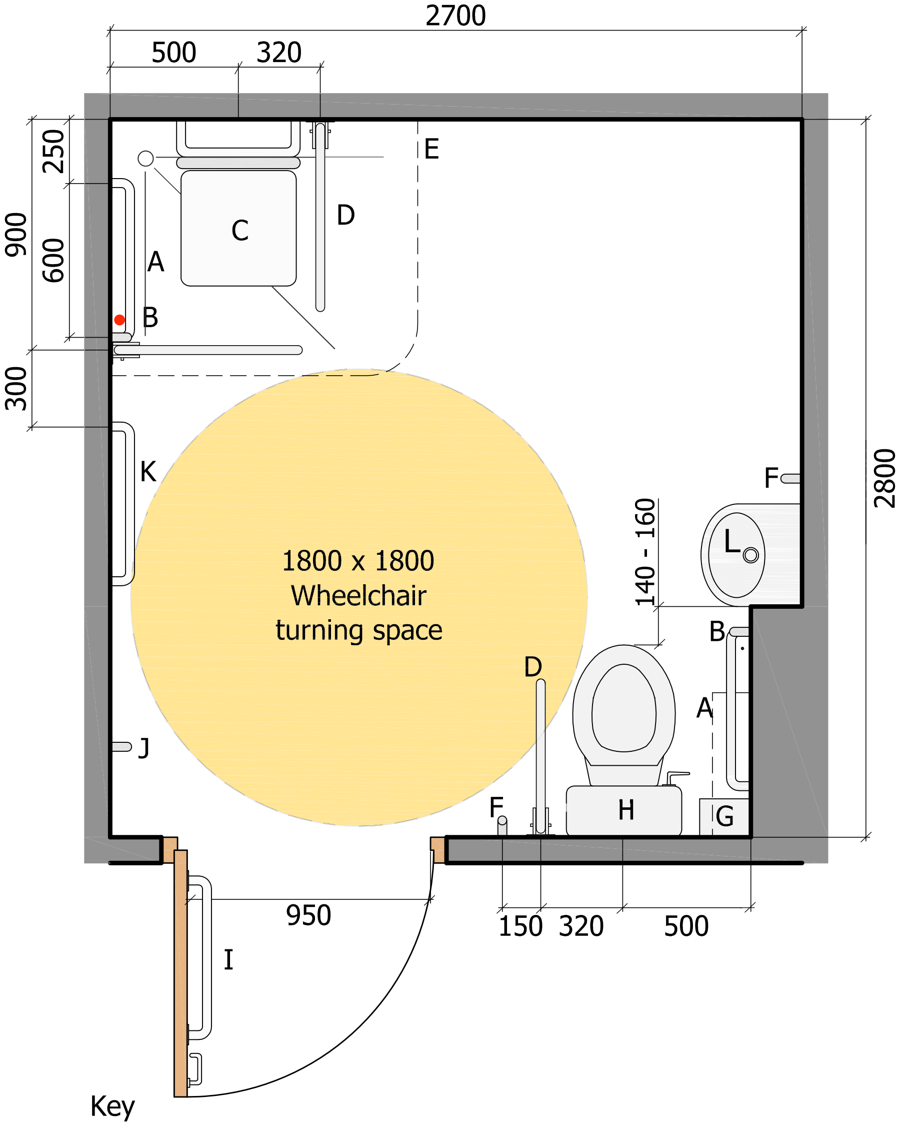
A larger washbasin is provided in this arrangement to enable people to have a full body-wash, to wash their hair and any items of personal care equipment. An overall basin size of approximately 500mm wide x 550mm deep is recommended. The provision of an adjustable-height washbasin is ideal as it can be varied in height from 750 to 900mm above floor level to suit different people.

The knee space under the washbasin should be free of obstructions and should not be boxed in. Pedestals should be avoided at they inhibit manoeuvrability. Water supply pipes should be protected if they are exposed to foot or leg contact.

The taps on the larger washbasin are likely to be beyond the reach of a person seated on the WC. In this arrangement, users are likely to fill the washbasin before transferring to the WC and it is therefore essential that the washbasin has a plug.

Image 5.21 Example of accessible shower with WC. Note lack of grabrails and the exposed pipes.

Figure 5.12a Plan of an accessible shower with WC.



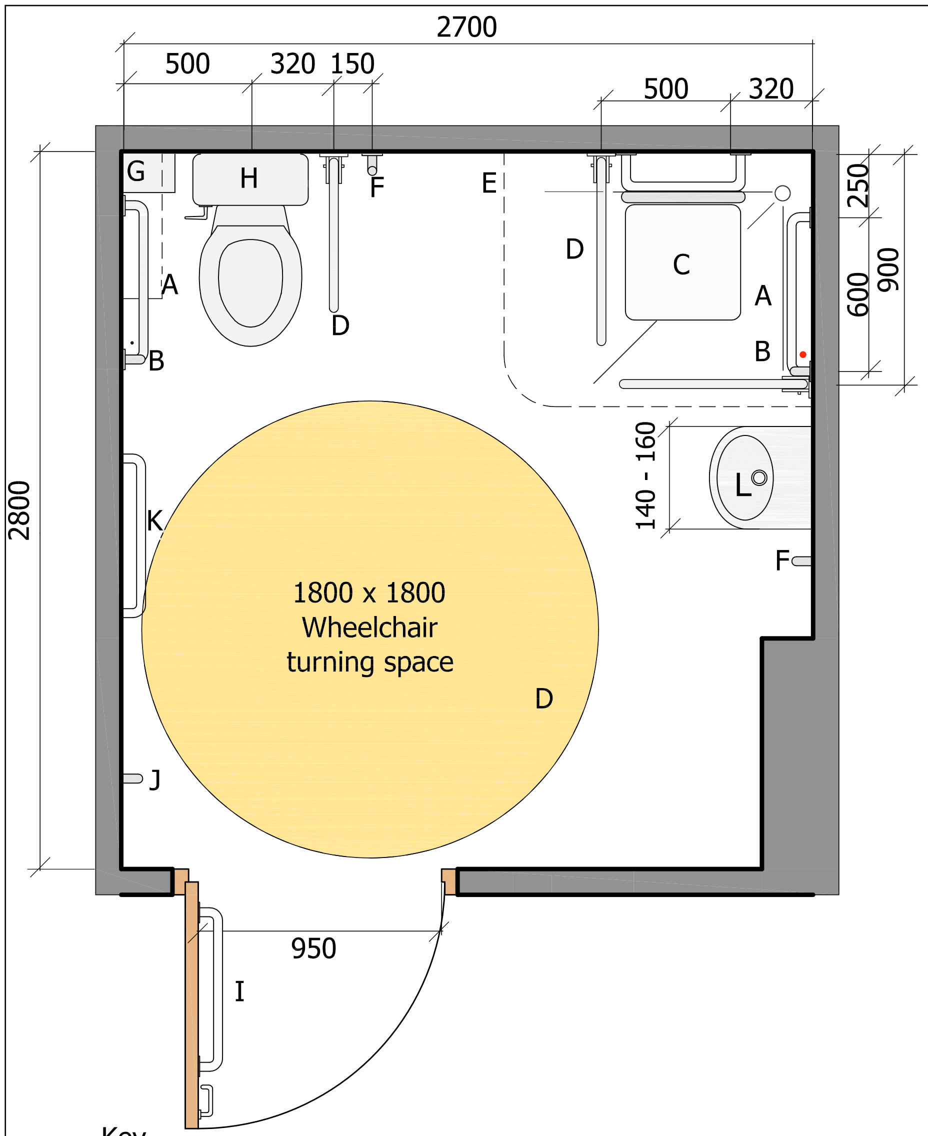
Key

A. Horizontal grabrail ⦸ diameter 35mm
B. Alarm pull-cord ●
C. Fold-down seat
D. Drop-down rails
E. Shower curtain
F. Vertical grabrail ⦸ diameter 35mm
G. 950 high shelf for colostomy bags
H. Flat-topped close-coupled cistern with back rest
I. Horizontal rail to assist door closing
J. Clothes hook between 1050 - 1700
K. Towel rail
L. Wash Basin

For detailed annotations and additional dimensions of corner WC arrangement refer to Figures 5.7 and 5.8

Note: All dimensions in millimetres

Figure 5.12b Alternative plan of self-contained shower with WC



Key

A. Horizontal grabrail ⦸ diameter 35mm
B. Alarm pull-cord ●
C. Fold-down seat
D. Drop-down rails
E. Shower curtain
F. Vertical grabrail ⦸ diameter 35mm
G. 950 high shelf for colostomy bags
H. Flat-topped close-coupled cistern with a back rest
I. Horizontal rail to assist door closing
J. Clothes hook between 1050 - 1700
K. Towel rail
L. Wash Basin

For detailed annotations and additional dimensions of corner WC arrangement refer to Figures 5.7 and 5.8

Note: All dimensions in millimetres

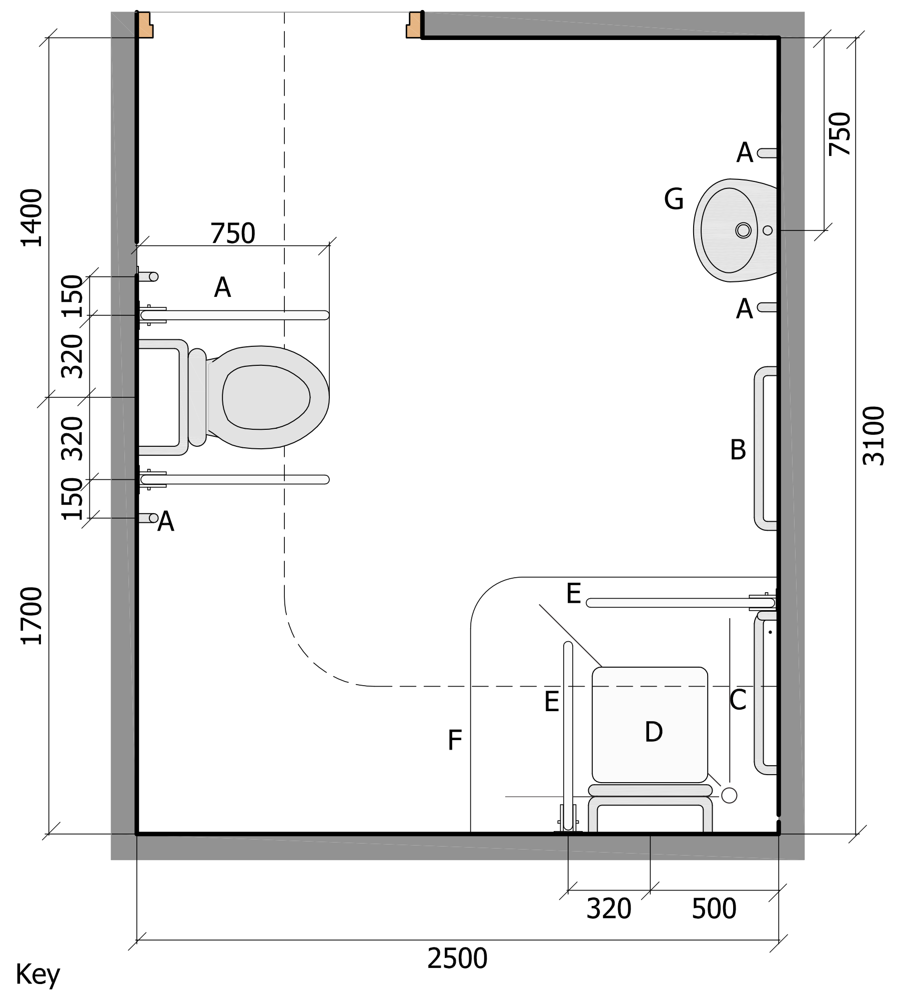
Checklist – Accessible shower with WC
• Follow recommended room dimensions of 2700mm x 2800mm.
• Consider detailed layout in **Figure 5.12a** and **5.12b**.
• Include large washbasin with lever taps and a plug.

5.7.3 Shower and peninsular arrangement WC for assisted use

This facility should be provided, where appropriate, in addition to a combined accessible shower and WC for independent use.

Checklist – Shower and peninsular arrangement WC for assisted use
• Ensure recommended room dimensions of 2500mm x 3100mm.
• Consider detailed layout as **Figure 5.13**.

Figure 5.13 Shower and peninsular arrangement WC for assisted use.



Key

A. Vertical grabrail ⦸ diameter 35mm
B. Towel rail
C. Horizontal grabrail ⦸ diameter 35mm
D. Fold-down seat
E. Drop-down rails
F. Shower curtain
G. Wash Basin

For detailed annotations and additional dimensions of corner WC arrangement refer to Figures 5.7 and 5.8

Note: All dimensions in millimetres

5.7.4 Bathroom for independent use

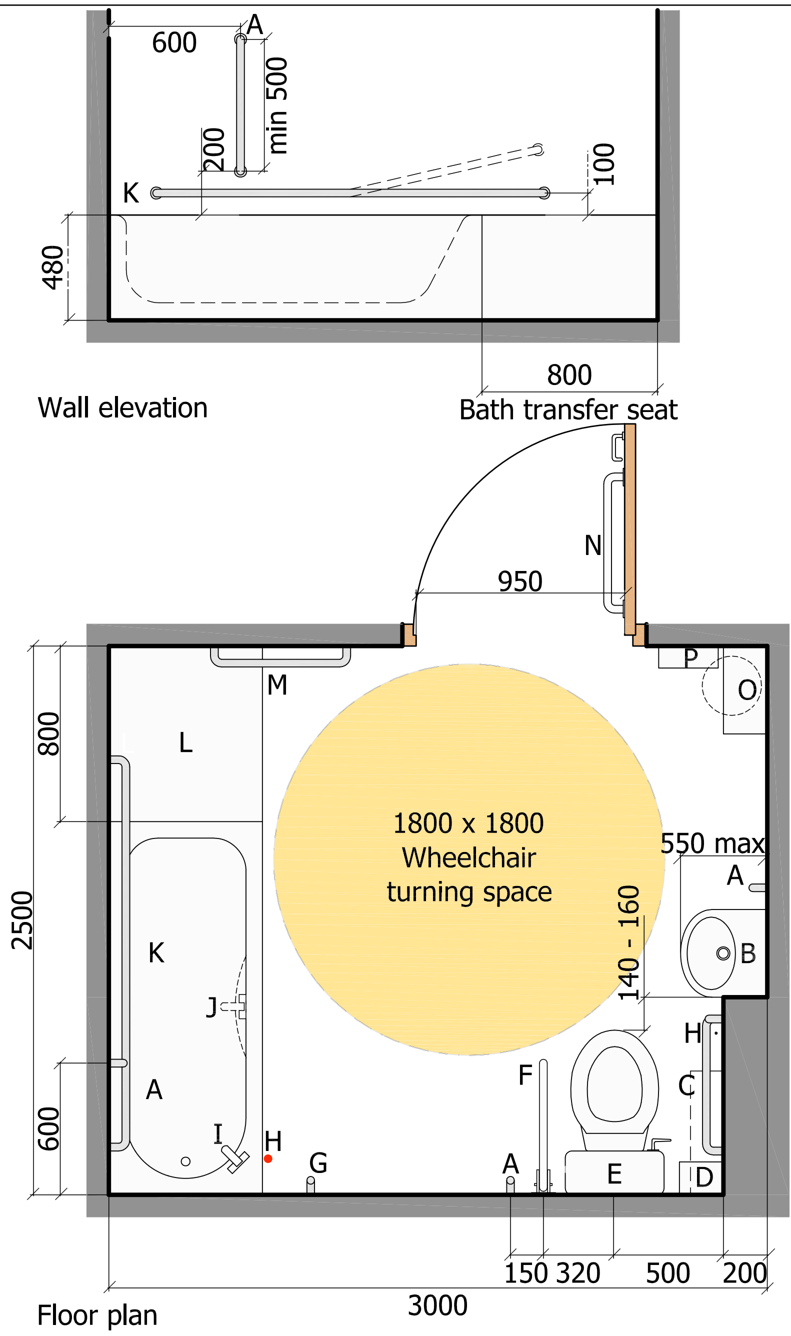
A bathroom incorporating a corner arrangement WC, washbasin, and bath, designed for independent use, should have recommended dimensions of 3000mm wide x 2500mm long. The recommended layout is illustrated in **Figures 5.14**. This arrangement is suitable as an en-suite bathroom in hotel and residential accommodation and in buildings, such as sport and leisure centres where bathing facilities are provided as an alternative or in addition to shower rooms.

The bath should have a pop-up plug operated by a lever integral to the mixer tap, or a self-locating plug on a chain. Either type should be usable by people with limited manual dexterity.

The bathroom incorporates a corner arrangement WC with a large washbasin set back from the side wall. Details of this arrangement are described above for accessible shower rooms with a corner arrangement WC – See **Figure 5.12a**.

Grabrails and accessories, including towel rails, mirrors, clothes hooks, soap and paper dispensers should be provided as illustrated – See **Section 5.10**.

Figure 5.14 Bathroom for independent use – part elevation and plan.



A. Vertical grabrail ⃠ diameter 35mm
B. Washbasin with rim 720 - 740 high and clear knee space
C. Horizontal grabrail ⃠ diameter 35mm
D. 950 high shelf for colostomy bag
E. Flat-topped close-coupled cistern with back rest
F. Drop-down rail ⃠ diameter 35mm
G. Two clothes hooks within range 1050 - 1700
H. Alarm pull-cord ●

Note: All dimensions in millimetres

I. Mixer tap with vertical lever arm
J. Alternative tap location
K. Bath horizontal grab rail ⃠ diameter 35mm, may be partially cranked at no more than 13 degrees to horizontal
L. Bath seat transfer
M. Towel rail
N. Horizontal rail to assist door closing
O. Sanitary dispenser with controls between 750-1200
P. Shelf for personal items, size 200-400

Checklist – Bathroom for independent use
• Ensure recommended room dimensions of 3000mm x 2500mm.
• Consider detailed room layout as **Figures 5.14**.
• Install suitable bath with transfer seat.
• Ensure bath taps are within reach.
• Install plug that is easy to operate.
• Consider corner arrangement WC, as checklist above.
• Include larger washbasin with lever taps and a plug.
• Use suitable accessories, including towel rail, clothes hooks, and mirror.

5.8 Changing Areas

In buildings such as swimming pools, sports centres and pavilions, entertainment arenas, and some back-stage areas in larger theatres, shower and changing facilities should be provided. These facilities should be designed to be accessible and easy to use by all people. The overall provision and design should adopt the principles of universal design and offer choice by including both private and communal areas, and facilities suitable for family groups and children.

All facilities should be clearly identified and located on accessible routes.

Accessible shower and changing facilities should be provided in single-sex accommodation. Unisex accessible changing and shower facilities should be provided to enable a person to be accompanied or assisted by a person of the opposite sex. Unisex accessible facilities should preferably be located adjacent to single-sex changing and shower areas, subject to being easily accessed from the central reception or circulation area, and with convenient access to the sport and leisure areas they serve.

Checklist – Changing areas
• Ensure changing facilities are clearly identified.
• Locate changing areas on accessible routes.
• Provide an appropriate range of facilities to suit all building users.

5.8.1 Self-contained accessible changing area

A self-contained accessible changing area should have the recommended dimensions of 2300mm x 2500mm and a layout as illustrated in **Figure 5.15**. Where more than one accessible changing area is provided, the layout should be reversed to provide a choice of left- or right-hand transfer.

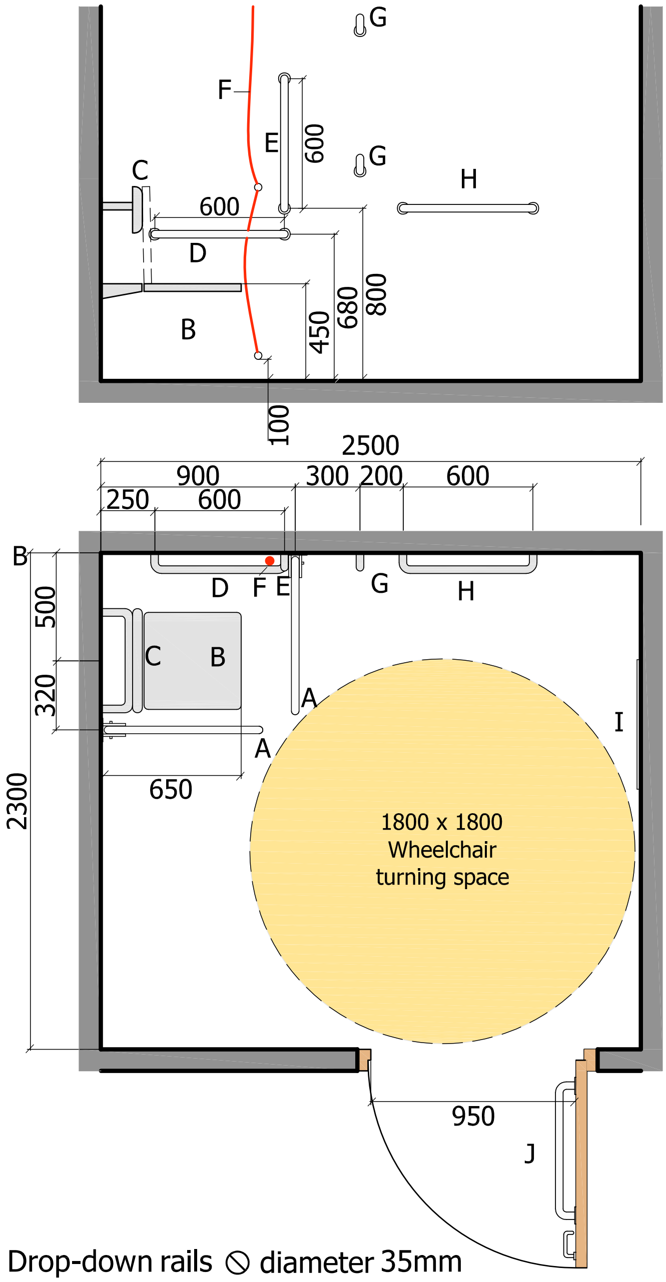
The changing area should provide sufficient space for a person to manoeuvre and transfer to and from a fold-down seat and, when required, into a waterproof wheelchair, which may be required to access shower facilities, poolside or other wet areas in a leisure complex.

Water troughs along a route (to wash the feet of swimming pool users, for hygiene reasons) are not accessible. An alternative entrance from the changing area to the poolside for wheelchair users and those with mobility difficulties should be arranged.

The fold-down seat should be padded, have an integral or separate backrest, and be securely fixed to the wall. Seats with hinged front legs should be avoided as the legs may prevent a wheelchair user from manoeuvring easily within the room. Seats should be checked and tested regularly to ensure the fixings are secure and that the seat is weight-bearing.

Fixed and drop-down horizontal and vertical grabrails should be provided to offer support, in the locations shown in **Figure 5.15**. Drop-down rails should be designed to be held in the upright position when not in use, but be easy to release when required. Drop-down rails without vertical support struts are preferred so that the struts do not impede movement around the room. If struts are required to provide the necessary strength, they should be set back at least half the length of the grabrail when in the horizontal position.

Figure 5.15 Self-contained accessible changing area part elevation and plan.



Key

A. Drop-down rails ⃠ diameter 35mm
B. Fold-down seat (upright position shown dotted)
C. Seat backrest
D. Horizontal grabrail ⃠ diameter 35mm
E. Vertical grabrail ⃠ diameter 35mm
F. Alarm pull-cord ●
G. Clothes hook between 1050 - 1700
H. Towel Rail
I. Mirror from 600 - 1600
J. Horizontal rail to assist door closing

Note: All dimensions in millimetres

Checklist – Self-contained accessible changing area
• Ensure recommended room or cubicle dimensions of 2500mm x 2300mm.
• Consider detailed layout as **Figures 5.15**.
• Employ handed layouts where more than one changing area is provided.
• Provide suitable fold-down seat.
• Ensure grabrails and drop-down rails are correctly positioned.
• Use suitable accessories, including towel rail, clothes hooks and mirror.

5.8.2 Communal changing and shower areas

Communal changing and shower areas are acceptable to many people, but not to all, and optional private facilities should always be available.

Open poolside shower stalls provided for showering before and after entering the pool should be accessible to all swimmers. (These showers are provided to promote good pool hygiene rather than full body-washing, hence the open arrangement.) Access to the showers should be level, with a gradient of 1:50 to ensure effective water drainage within the shower area. A 1800mm diameter turning area for wheelchair users should be accommodated, away from the main poolside circulation area. A fold-down seat and grabrails should be provided adjacent to one of the shower heads to provide support. Shower controls should be positioned between 750mm and 1200mm.

Accessible facilities should be provided within single-sex changing and shower areas to provide choice and flexibility in use. The guidelines detailed previously for self-contained accessible changing and shower facilities should be followed. For example, where individual changing or shower cubicles are provided within the male and female changing areas, these should include accessible changing and shower cubicles.

Benches, seats and clothes hooks should be provided in changing rooms for people to sit whilst changing, and to store and hang clothes. Some waterproof chairs with backs and armrests should be provided in addition to bench seats, and there should be sufficient floor space available for people to be able to use and position chairs to meet their needs. Seats should be available for use adjacent to mirrors and hair dryers.

Checklist – Communal changing and shower areas
• Provide private areas for showering and changing in addition to communal facilities.
• Ensure poolside showers are accessible to all swimmers.
• Position shower controls within reach of all users.
• Install a well-drained, non-slip, level floor surface.
• Locate accessible shower and changing areas within single-sex facilities in addition to unisex facilities.

5.9 Dwellings

The guidance in this section applies to all new housing and to housing refurbishment wherever practicable. Housing constructed or adapted to meet the guidance in this section will provide sanitary facilities that are convenient for all householders and visitors to access and use; provide flexibility in relation to future adaptations; and offer more choice in terms of living accommodation.

The guidance does not cover housing adaptations to accommodate specific individuals with particular requirements and it may not meet the needs of people who require greater space for specialist equipment or for carers to assist with personal care needs.

5.9.1 Toilets

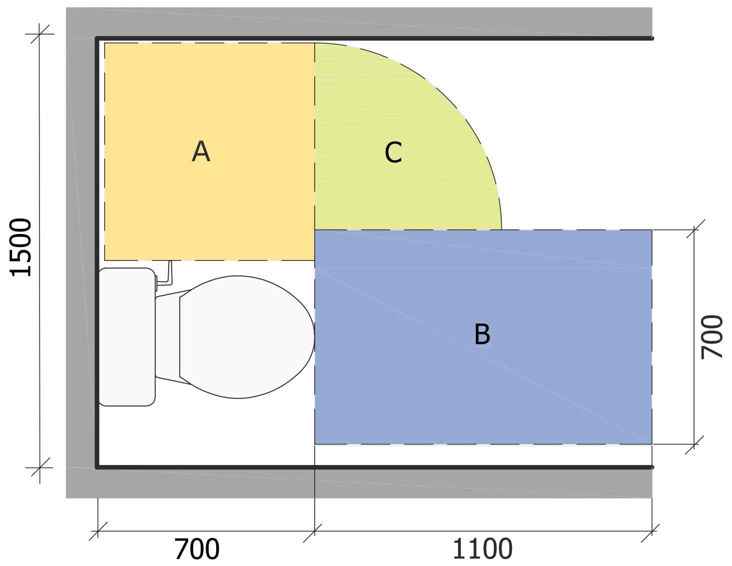
In dwellings, a toilet accessible to all occupants and visitors, including wheelchair users; parents with strollers; people with visual difficulties; and people using walking or mobility aids should be provided at the entrance level, or on a floor served by a platform lift or through-floor lift.

The toilet should incorporate an 1100mm long x 700mm wide clear space in front of the WC pan and be positioned so that the centreline of the WC is 500mm from one side wall and 1000mm from the other to facilitate a choice of transfer technique. This equates to an overall room size of 1800mm long x 1500mm wide, for WCs up to 700mm total projection from the rear wall. A washbasin should be positioned so that there is a clear zone for approach of 1100mm x 700mm. The room should have an outward-opening door so that the transfer and access zones are not obstructed by the door swing. The space allowances for toilets and possible room arrangements are illustrated in **Figures 5.16, 5.17** and **5.18**.

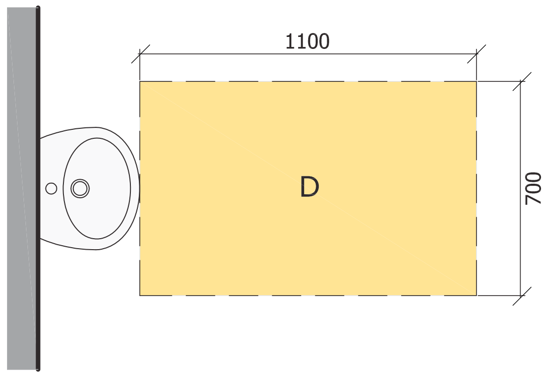
Wherever possible, outward-opening doors should open against an adjacent wall to minimise the risk of a person colliding with or being obstructed by the door.

Figure 5.18 illustrates a toilet designed and equipped to facilitate the future installation of a level-access shower. This provides flexibility to occupants who may in the future be unable to use the stairs to access the principal bathroom or require level-access shower facilities in addition to a bath. The space for the shower should be at least 1000mm x 1000mm and the overall room size 1800mm wide x 2000mm long. Refer also to **section 5.9.2** below.

Figure 5.16 Domestic toilet space allowances.

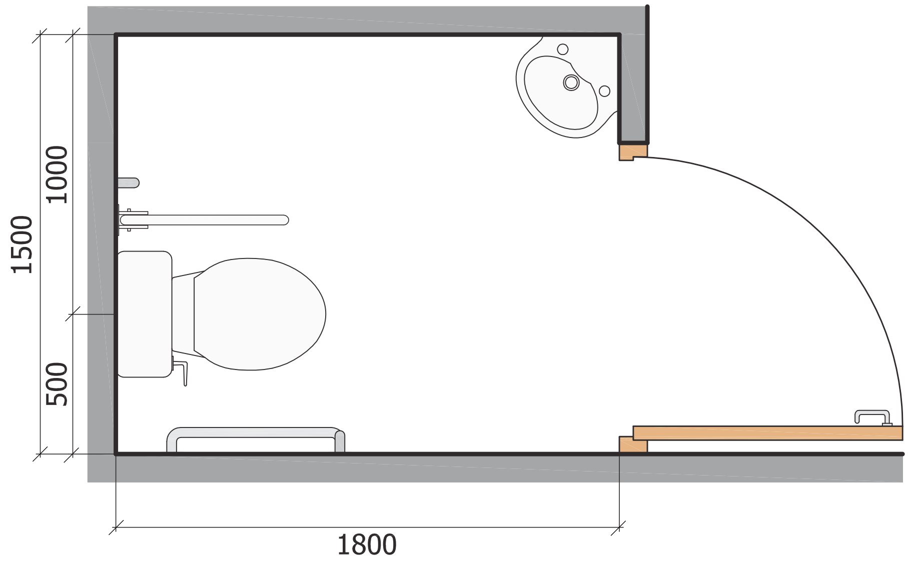


A. Transfer zone to side of WC to full depth of cistern and WC pan.
B. 1100 x 700mm transfer zone to front of WC.
C. Area to be kept clear of obstruction to allow easy access to side transfer area.
D. 1100 x 700mm access zone to washbasin



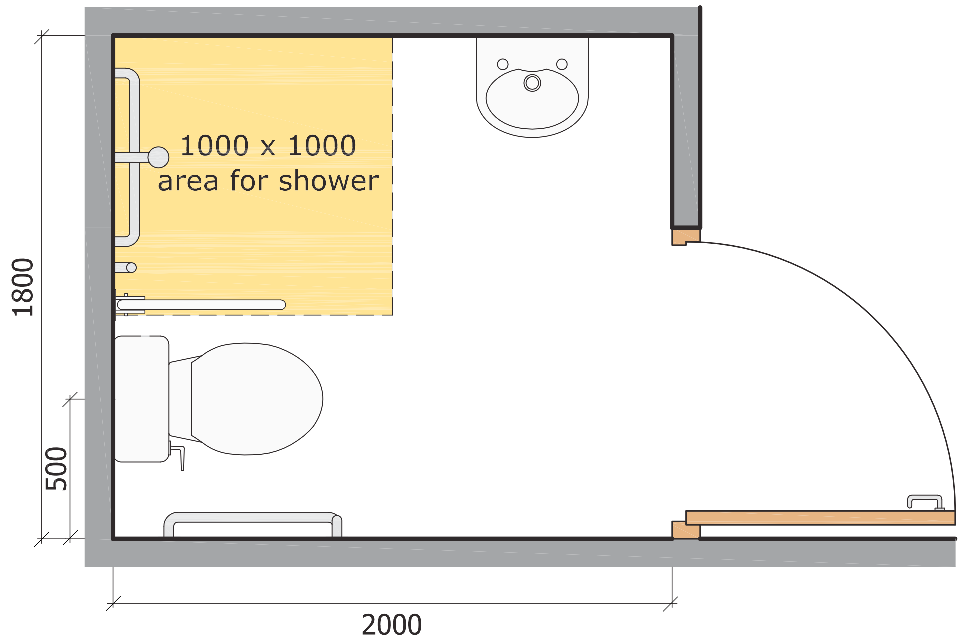
Note: All dimensions in millimetres

Figure 5.17 Domestic toilet plan.



Note: All dimensions in millimetres

Figure 5.18 Domestic toilet and shower plan.



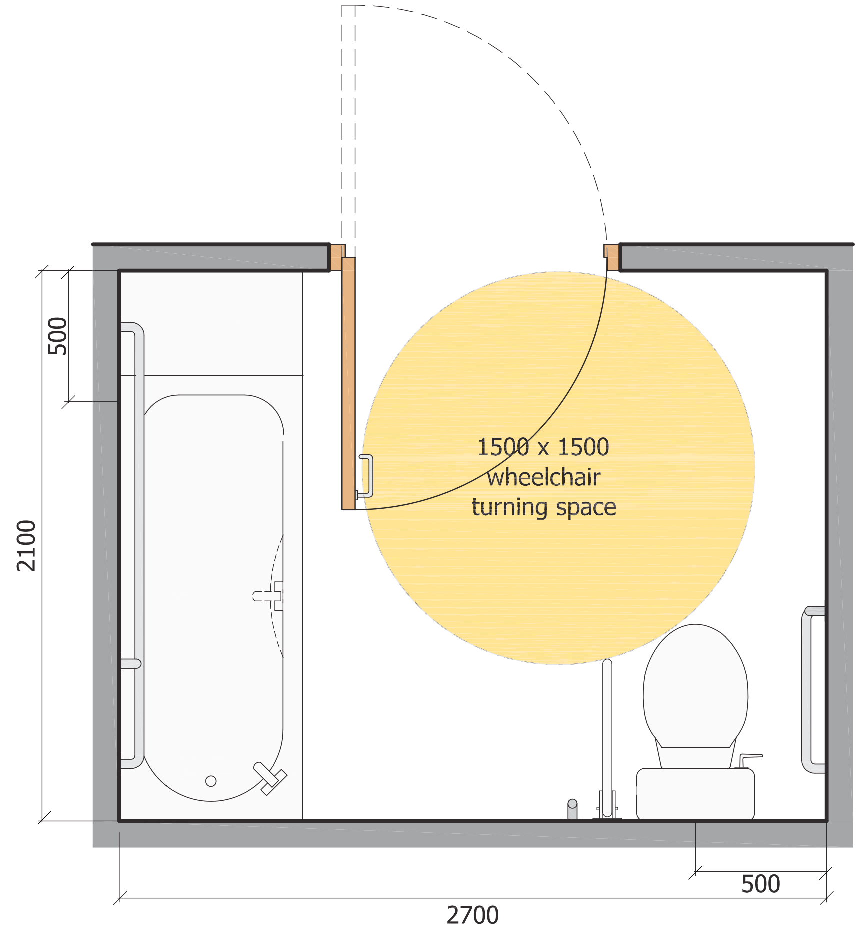
Note: All dimensions in millimetres

5.9.2 Bathrooms

An accessible bathroom should be provided in all new dwellings and dwellings that are being refurbished. It should not be assumed that because a bathroom is on a floor that is accessed by stairs, that access for wheelchair users can be disregarded. Some people with mobility difficulties may be able to use the stairs independently, with assistance, or following the installation of a stair lift, through-floor lift or platform lift, and then use a wheelchair or a mobility aid to move between rooms within any particular floor level. Providing a bathroom that is large enough for wheelchair users will make access easier for all occupants and visitors. The increased space afforded by an accessible bathroom will benefit many households, including families with young children.

Bathrooms should be 2100mm x 2700mm, with a layout as illustrated in **Figure 5.19**. Where space allows, installation of both a bath and a separate shower should be considered.

Figure 5.19 Domestic bathroom.



Note: All dimensions in millimetres

An outward-opening door will maximise space within the bathroom. However, an inward-opening door and frame designed to facilitate easy future reversal is acceptable. The room or landing arrangement outside a bathroom should be carefully considered where outward-opening doors are proposed to reduce the risk of collision or obstruction. Sliding doors may be a suitable alternative to swing-doors. Please note further information on sliding doors in **Section 5.10.3**.

Within the bathroom, a clear space 1100mm long x 700mm wide should be provided in front of the washbasin, to the front and side of the WC, and to the side of the bath to enable easy access and approach for a person using a wheelchair and to allow for a choice of transfer technique.

In new dwellings, provision should be made in the form of a designated area and below-floor drainage for the future installation of a level-access shower. The shower could be installed within a toilet compartment, a bathroom, or in an adjacent storage or circulation space that can be easily converted. The space for a shower could be combined with the transfer space adjacent to the WC in a toilet compartment, as illustrated in **Figure 5.18**, or in place of a bath in the principal bathroom. Level-access showers can be achieved by creating a wet room or by using a proprietary level-deck or recessed shower tray, as discussed in more detail in **Section 5.7.1** – See also **Figure 5.12a** and **5.12b**.

All showers, including shower units positioned over baths, should have adjustable-height, detachable showerheads.

Controls to showers and baths may need to be offset to minimise the need for a person to stoop, bend or reach; and to ensure they are reachable by people of different heights. It should be possible to operate shower and bath controls before entering to set and test the water temperature. Controls should be easy to understand and should clearly distinguish between control of water volume and control of water temperature.

Washbasins in bathrooms should be large enough to facilitate full hand or body washing. They should provide a clear knee space underneath and be either wall-mounted or set into a vanity unit designed for seated approach. Washbasins with pedestals (including semi-pedestals) restrict access for people using wheelchairs and people who sit on a chair while using the washbasin. All pipes below washbasins should be concealed or protected where there is a potential for foot or leg contact.

All washbasins should be fitted with lever taps, with hot taps positioned on the left and cold taps on the right. The method of operation for all taps throughout a dwelling should be consistent.

Checklist – Domestic bathrooms
• Provide an accessible bathroom.
• Ensure recommended room dimensions and layout are followed, as **Figure 5.19**.
• Install inward opening doors designed for easy reversal.
• Ensure bathroom incorporates clear space requirements, as illustrated.
• Consider reinforced wall construction for installation of grabrails.
• Make provision for future installation of level access shower.
• Use detachable shower heads in all showers.
• Offset bath and shower controls.
• Install large washbasins with clear knee space.
• Use lever taps.
• Ensure consistent tap style throughout a dwelling.
• Conceal or protect all pipes.

5.10 Detailed Design

Guidelines for the design and provision of accessories and services common to all sanitary facilities are set out below. This section should be read in conjunction with guidance on the general provision and layout of sanitary facilities included in the booklet.

5.10.1 Assistance alarms

Assistance alarms provide a means of summoning assistance from outside the room and should be provided in accessible toilet, bathroom, shower room, and changing facilities designed for independent use. In unisex accessible toilets, a pull-cord should be located where it can be reached from the WC and by a person who has fallen to the floor.

In accessible bathrooms and shower rooms, two alarm pull-cords should be provided; one positioned within reach of a person using the bath or shower and the other within reach of the WC. The cord within reach of the WC should also be reachable by a person who has fallen to the floor.

All alarm pull-cords should be coloured red and extend to within 100mm of the floor. They should have two red bangles, 50mm diameter, one at the end of the cord and one at a height of 800 to 1000mm.

Image 5.22 Example of alarm pull chord with two red bangles in a unisex accessible toilet – Left-handed transfer.

Once the alarm cord has been pulled, there should be visible and audible indication within the room that the alarm has been activated. Visible indication may be in the form of an indicator light adjacent to the reset button and audible indication in the form of a buzzer or alarm sounder. Any sounder within the room should be set at a level that will not cause discomfort.

Developments in alarm technology may introduce other methods of activating the alarm, such as continuous skirting-level bars or sensors.

Image 5.23 Example of a dado level panic strip. This may also be installed at skirting level.

Image 5.24 Example of the dado level panic strip in use.

A reset button should be provided within the room and be reachable from both a wheelchair and the WC. An additional reset button may be provided outside the room for use by the person responding to the call for assistance.

Image 5.25 Alternative view of the dado level panic strip in use.

A visual and audible indicator should be provided outside the room where it can be seen and heard by people able to respond. A remote indicator, for example, to a reception desk or warden's office, may be appropriate for some building types. The alarm indicator should be noticeably different to fire or other alarms.

Wherever assistance alarms are installed, procedures should be established to ensure that someone will respond and that the person or persons are trained in giving assistance.

5.10.2 Clothes hooks

Clothes hooks should be provided in all WC cubicles and in accessible toilets, bathrooms, shower rooms, and changing rooms. In WC cubicles, coat hooks should be positioned on the rear of the door or on the side wall behind the door when in the open position (for cubicles with inward-opening doors) where it is less likely to cause a head-height obstruction. The recommended positions for coat hooks in accessible toilets, bathrooms, shower rooms, and changing rooms are shown on the diagrams in the relevant sections.

Image 5.26 Example of door-mounted clothes hooks.

Two coat hooks should be provided in each location within the range 1050mm to 1700mm above floor level. The clothes hooks should contrast visually with the wall or door surface on which they are mounted.

5.10.3 Doors and locks

The doors to accessible toilets, shower rooms, and bathrooms should provide a clear opening of at least 950mm. Doors should generally open outwards so that the door swing does not encroach into the turning area inside the compartment, and so that the door can be opened easily in an emergency if a person has fallen against the door inside the room.

Outward-opening doors should be fitted with a horizontal grabrail on the inside to enable a person to pull the door shut behind them when entering the room. For safety reasons, it is imperative that outward-opening doors do not project into a route, in particular an emergency escape route.

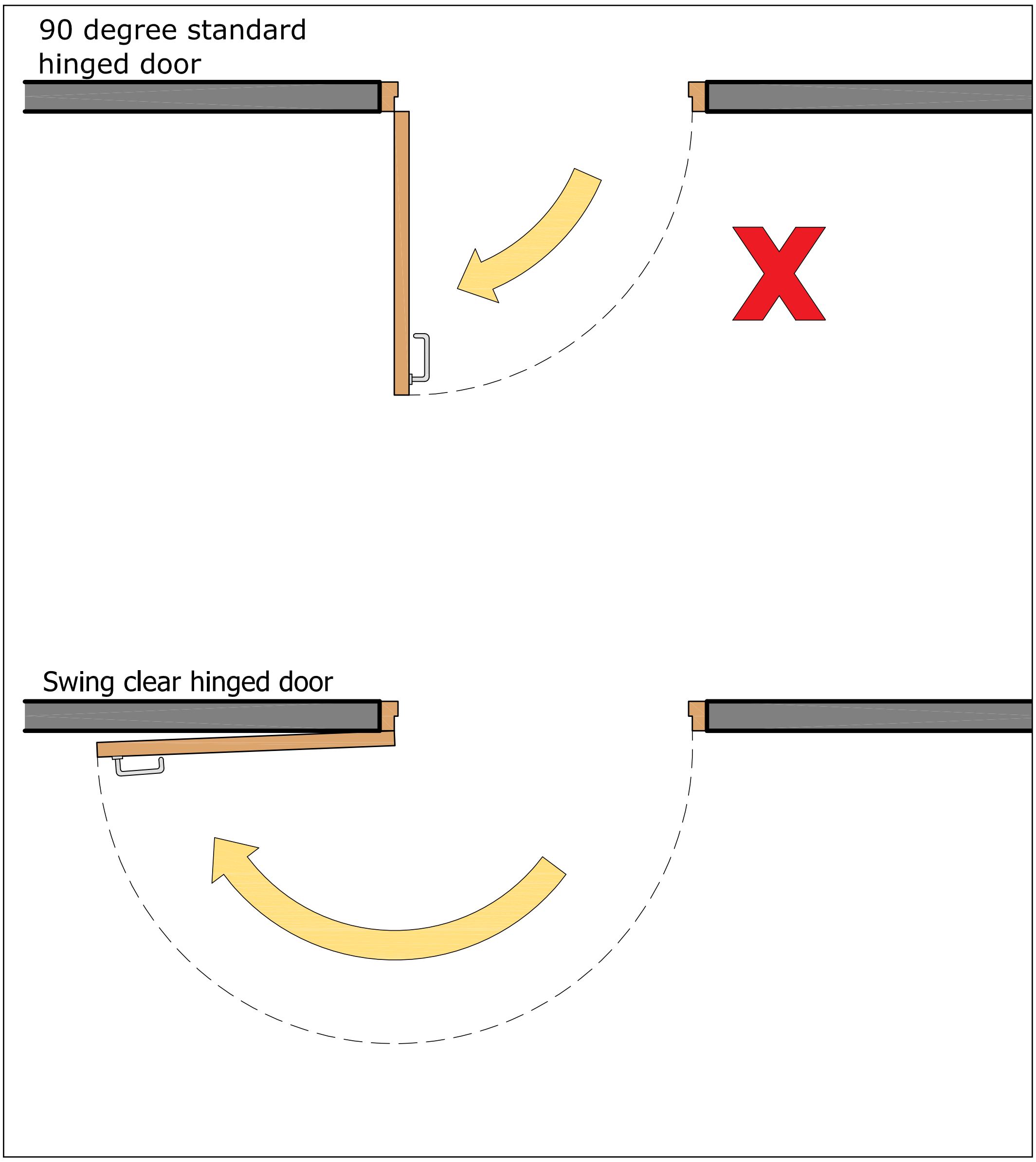
If an accessible toilet, shower room or bathroom is sufficiently large, it may be acceptable to provide an inward-opening door. In this case, the door-swing should not encroach into the wheelchair turning or transfer area. An inward-opening door should be fitted with an emergency-release mechanism to enable the door to be opened outward in an emergency, for example, if a person falls against the closed door.

In exceptional circumstances where space is limited in existing buildings, a sliding door may be used to maintain the recommended dimensions of the accessible toilet compartment. A single-leaf, straight sliding door should be used with a recommended clear opening of 950mm. Projecting vertical pull handles should be provided to both sides of the door and the tracks should be recessed into the floor. It should be noted that sliding doors offer significantly less acoustic privacy that hinged solid core swing doors and this should be considered when considering the location of the toilet and adjacent facilities. Sliding doors are also harder to operate than swing doors due to the sideways push/pull action required.

Swing-clear hinges (also termed projection hinges; see **Figure 5.20**) could be considered as a means of maximising the door clear opening width. These hinges align the door leaf with the door stop when open to 90 degrees, thereby increasing the opening width by the door thickness. This type of hinge positions the door leaf, and consequently the horizontal grabrail and other handles, further away from the opening and the person operating the door, which may be a disadvantage. In such circumstances, the horizontal grabrail may have to be positioned close to the hinge-side of the door leaf.

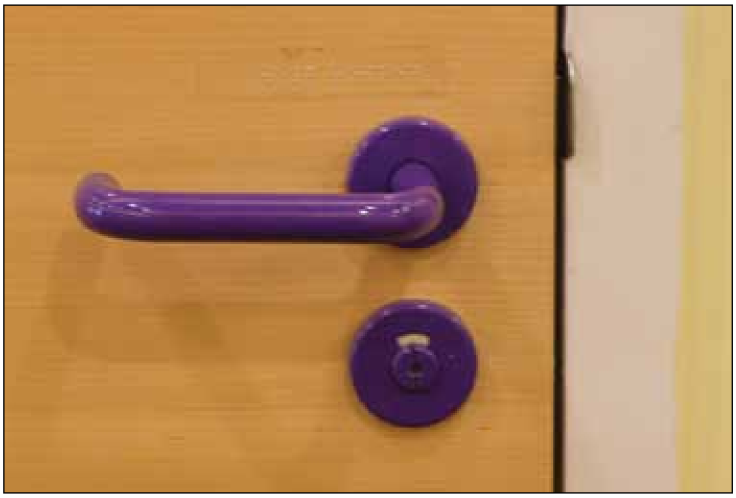
Swing-free hinges, due to their size and shape, project away from the door leaf and frame on the opening side of the door. They should only be considered where there is no chance of a person hitting the projecting part of the hinge, such as where the door is approached in a sideways direction.

Figure 5.20 Swing-clear hinges.



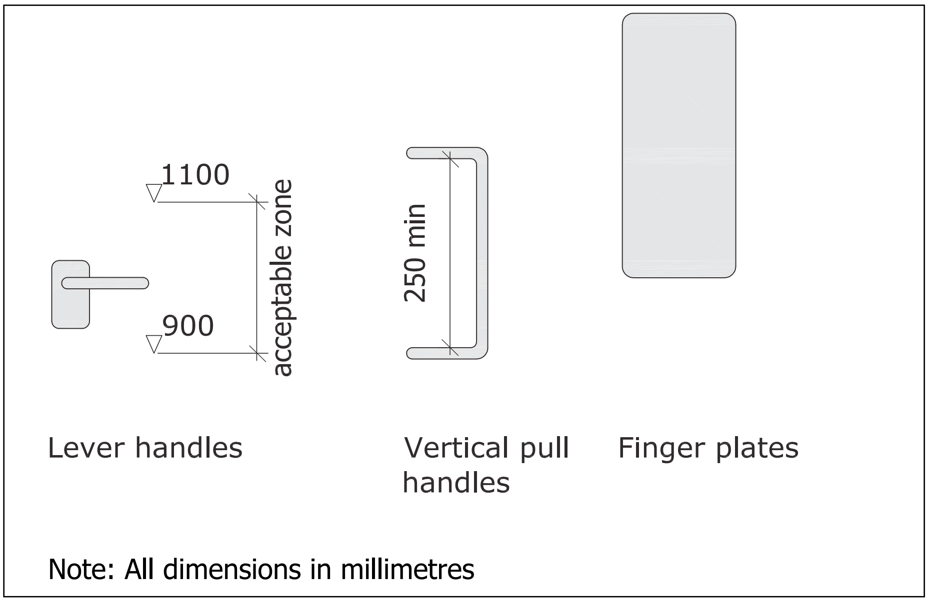
Door handles should be a lever type, as these are easier for people with reduced manual dexterity to operate. Twist type and knob handles should never be used as these are very difficult for many people to grip and operate. Pull handles should be avoided unless they are supplementary to lever handles as they are difficult for some people to grip and pull whilst operating the locking mechanism.

Image 5.27 Example of a lever door handle.



Locks should be easy to operate with one hand and without the use of fine hand movement, and should be positioned 800 to 1000mm above floor level. Locks should be easy to operate by a person with reduced manual dexterity. Swing-lever or winged-turns are preferred. Locks should incorporate an emergency override to enable the lock to be released from outside. Figure 5.21 shows the dimensions of door furniture.

Figure 5.21 Door furniture.



Locks should incorporate a mechanism to indicate whether the cubicle or compartment is occupied or not. This should comprise the words 'vacant' and 'occupied' and be supplemented by a change in colour. Indicators offering only a colour change should be avoided as these are difficult for some people to interpret. It is a common but simple mistake for locks to be fitted with the indicators in the opposite position, showing 'occupied' when in fact the cubicle is vacant and vice versa. This can cause confusion and unnecessary delays in busy toilets.

Image 5.28 Example of a door lock.

Further detailed guidance on doors and door ironmongery is given in **Booklet 2: Entrances and horizontal circulation.**

5.10.4 Fire alarm

In buildings fitted with fire alarms, a visible and audible indicator should be provided in all single-sex toilets, accessible toilets and self-contained bathroom, shower rooms and changing areas. Visible alarm indicators are particularly important in these areas as a means of alerting people with hearing difficulties in the event of a fire or other emergency.

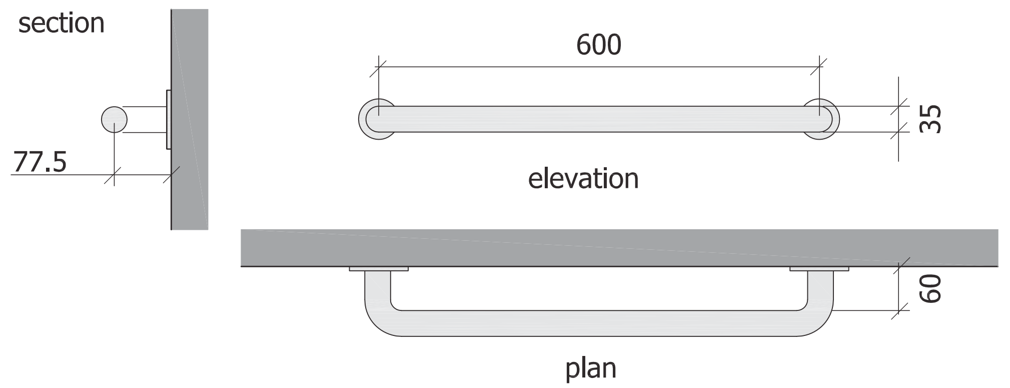
Further detail on alarms is included i**n Booklet 4: Internal environment and services** and in the NDA publication 'Safe evacuation for all'.

5.10.5 Grabrails

Grabrails offer support and stability to a person using sanitary facilities, for example, while sitting down and standing up, transferring to and from a wheelchair, and whilst adjusting clothes.

Grabrails should be tubular, with a diameter of 32 to 35mm, and a clearance of 50 to 60mm to the wall (see **Figure 5.22**). They should have a surface that provides a good grip when wet and contrast visually with the surfaces against which they are viewed. Grabrails are weight-bearing and should be firmly fixed to the wall. The wall construction should be selected or modified to adequately support the grabrails and to allow for possible future relocation in situations where the sanitary facilities are provided to meet individual needs.

Figure 5.22 Grabrails.



Note: All dimensions in millimetres

Image 5.29 Example of door-mounted grabrail.

5.10.6 Hair dryers

Hair dryers should be positioned where they can be used by people in either a seated or standing position, or, if a number of hair dryers are provided in a changing area, they should be provided at a range of heights. Any switches or controls should be easy to operate and within reach of all users. Where hair dryers are coin-operated, the coin slot and any other control should be positioned between 750mm and 1200mm above floor level. Seats should be available for use in conjunction with a hair dryer and there should also be space for approach for a wheelchair user. A suitably positioned mirror should always be provided in conjunction with each hair dryer.

5.10.7 Hand-drying facilities

Hand-drying facilities should be provided in close association with washbasins. Wherever automatic hot-air dryers are provided, it is preferable for an alternative to be available, such as paper towel dispensers.

In larger single-sex washrooms where there are multiple automatic hot-air dryers in use simultaneously, the resultant noise level can be excessive. This may cause anxiety for some people and in general terms makes the washroom less pleasant to use. Where automatic dryers are used, the number, style, and position of units should be carefully considered, together with any practical measures to minimise noise levels.

Image 5.30 Example of automatic hot-air dryers at various height levels.

In accessible toilets, and in bathroom and shower rooms with corner arrangement WCs, a paper towel dispenser should always be provided within reach of the WC. The dispenser should be easy to use with a single hand and by people with limited manual dexterity and reduced hand and arm movement. If automatic hot-air dryers are provided in these rooms, they should be supplementary to paper towels and be located on the opposite side of the washbasin to the WC.

The underside of paper towel dispensers and automatic hand dryers should be within the range 800 to 1200mm above floor level so that they are suitable for people of different heights.

5.10.8 Heating

The need for a heating device within any individual toilet, bathroom, shower or changing room will depend on the overall layout of the building and centralised heat source. If required, wall-mounted room heaters, such as radiators should be positioned where they will not obstruct the transfer or manoeuvring space.

Heaters should not be positioned on the same wall as the WC, under the washbasin or hand dryer, or on the wall opposite the washbasin. Wherever possible, radiators should be recessed into the wall or the room size increased to accommodate the depth of the radiator.

Any exposed surface of a heating device should not exceed 40 degrees (C) or should be screened to prevent the device being touched. Low-surface-temperature radiators are recommended.

5.10.9 Lighting

A general lighting level of at least 200 lux should be provided in toilet facilities. Changing and shower areas should have a lighting level of 200 to 300 lux. (The general lighting level may also be termed ‘maintained illuminance.’)

For safety reasons, wall-mounted rocker switches should not be located inside toilet compartments. If individual room control is required, this should be operated by a pull cord, which should extend to between 900 and 1200mm above floor level and be positioned 150mm from the leading edge of the door when in the closed position.

Automatically operated lights are recommended as they avoid the need for a person to identify and operate a switch and carry additional environmental benefits by ensuring lights are not left on unnecessarily. If provided, automatically operated lights should always be linked to a back-up lighting source so that people inside a toilet compartment are not left in the dark if the primary system fails. Timing devices should be set to take account of the length of time people are likely to take to use the facilities.

It should not be possible for a person to switch off a light from outside whilst the room is in use, for example, by locating a rocker switch on the wall outside the door. Again, this is to prevent people inside a toilet, shower room, or changing room from being left in the dark.

Ultraviolet lighting, which is sometimes used in toilet facilities to deter drug use, should not be used in accessible toilets. This type of lighting can present difficulties to people including those who are diabetic and those who need to change colostomy bags.

5.10.10 Lockers

Lockers should be provided in changing areas and be accessible, understandable, and useable to all sport and leisure participants. They should provide adequate security and suitable storage for clothes, bags, shoes, valuables, and other personal items, and include space to hang clothes on coat hangers. Lockers should be conveniently located in relation to changing and shower facilities and be positioned with sufficient clear space in front to enable people to approach and open the locker doors without obstructing circulation routes or being obstructed themselves.

Accessible lockers should have dimensions of 300mm wide (recommended) x 600mm deep (maximum) x 1200mm high, with the base between 400 to 800mm above floor level. Some larger lockers should be available to store items, such as sticks, walking frames, crutches, or artificial limbs.

Locker doors should be designed to swing shut after use so that they do not present an obstruction or hazard. However, any spring mechanism designed to close the door should not make it awkward for lockers to be filled.

Locks and key fobs should visually contrast with the locker door and be easy to operate. Any numbering or coding system should be easy to follow and include large tactile letters or digits.

5.10.11 Mirrors

In single-sex toilets, mirrors should be provided to suit people of different heights.

Mirrors should be positioned where they will not cause confusion by seeming to distort the size or configuration of a room. Full-height mirrors should be avoided as they may be perceived as a wall opening.

Image 5.31 Example of mirror located on opposite wall to washbasin in accessible WC.

In an accessible toilet, a mirror is recommended to be positioned on the wall opposite the washbasin and extend from 600 to 1600mm above floor level.

If the soap and paper towel dispensers are positioned correctly directly above the washbasin, it may not be possible to also provide a mirror in this location.

If a mirror is provided above the hand-wash accessories, it should extend 1600 to 1800mm above floor level and be tilted forwards so that it can be viewed by people of different heights, including children and people using wheelchairs.

5.10.12 Shelves

Two shelves should be provided in accessible toilets: one 950mm above floor level adjacent to the WC for people standing who need to change colostomy bags; and the other 700mm above floor level, size 200mm x 400mm, on the opposite side of the washbasin for personal effects. See **Figure 5.7, 5.8** and **5.9** for room layout illustrations for position details. In accessible shower areas – See **Figure 5.11, 5.12a** and **5.12b,** a 'wet' shelf should be provided for toiletries and personal items and be positioned within reach of the fold-down shower seat and a wheelchair.

5.10.13 Signage

Sanitary facilities should be clearly identified. People who have difficulty communicating may prefer not to have to ask directions and should be able to rely on signage to identify the location of suitable toilet facilities. The location of alternative or additional facilities should be clearly identified. This is particularly relevant, for example, where alternate handed accessible toilets are available in another part of the building.

Image 5.32 Example of signage for sanitary facilities.

Image 5.33 Example of signage – Single-sex accessible toilet.

Toilets should be clearly identified using symbol signs as these are universally recognisable. Symbols should contrast visually with the background and mounting surface. Tactile signs will assist people with visual difficulties. Where more than one accessible WC is provided, the choice of handing arrangement should be indicated with a pictogram that can be read visually and by touch (touch-legible pictogram).

Unisex accessible facilities should be identified using the international symbol for access and symbols indicating use by males and females.

Toilet facilities suitable for persons with mobility difficulties should not be identified with the international symbol for access.

5.10.14 Soap dispensers

Wall-mounted soap dispensers should be positioned directly above the washbasin, a shelf, or counter so that it does not drip on the floor where the soap may present a slip hazard. Dispensers should be operated by a large pull lever as these are easier to use by people with limited manual dexterity and reduced hand or arm movement.

In accessible toilets, the soap dispenser should be positioned so that a person can wash their hands whilst seated on the WC - See **Figure 5.7, 5.8** and **5.9**.

5.10.15 Surfaces

Floor surfaces in all sanitary accommodation should be firm, level and slip-resistant when wet and dry. Shiny surfaces should be avoided as they are a potential source of glare and reflection which can cause discomfort and confusion to people with visual difficulties. Some people may perceive shiny floor surfaces to be wet even when they are dry and this can cause anxiety and difficulty in accessing facilities.

Floor, wall and door surfaces, sanitary appliances, grabrails and other accessories should be easily cleaned and should all contrast visually to aid identification by people with visual difficulties and people who do not have their glasses or contact lenses, which may often be the case in changing, shower room and bathroom facilities.

Further detail on surface finishes is included in **Booklet 4: Internal environment and services**.

5.10.16 Toilet paper dispensers

Toilet paper dispensers should be positioned within easy reach of the WC and usable by a person in either a seated or standing position. They should be easy to use with a single hand, and by people with limited manual dexterity and reduced hand and arm movement. If roll-type dispensers are used, they should incorporate a lock/pull mechanism to cut the roll at the required length. Alternatively, single-sheet dispensers may be used.

Large industrial dispensers should be avoided as the roll often gets trapped inside the dispenser making them difficult to use and they are difficult to position without causing an obstruction.

In WC cubicles in single-sex toilets, the toilet paper dispenser should be positioned so as not to obstruct door opening or the activity space between the WC and door-swing.

Building management may require dispensers to be lockable to avoid theft. When dispensers are refilled and locked, care should be taken to ensure the paper is not trapped or overfilled as this can make them difficult to use.

5.10.17 Vending machines

All vending machines should be easy to use and clearly visible. Controls should be usable by people with visual difficulties and incorporate effective visual contrast, along with clear and well displayed instructions including information in Braille. Machines should be mounted so that any buttons or coin slots are positioned between 750mm and 1200mm above floor level. There should be a recommended 450mm clearance from the floor to the underside of the unit.

Where facilities such as female sanitary products, condom, and other vending machines are provided in single-sex toilets, they should also be provided in unisex accessible toilets. However, care should be taken to ensure that they do not encroach into the turning and transfer area of the WC or obstruct access to other facilities.

5.10.18 Waste disposal

General waste bins should be provided in single-sex toilets, accessible toilets, bathrooms, shower rooms, and changing areas. They should be positioned where they will not obstruct wheelchair turning and transfer areas. Bins with lids should be easy to operate, and bins should contrast visually with the surrounding surfaces.

A bin for the disposal of sanitary waste items should be provided in all toilets, including unisex accessible facilities. In female toilets, a sanitary disposal bin should be provided in each WC cubicle and should be positioned so as not to obstruct door opening or the activity space between the WC and door-swing. In accessible toilets, the sanitary disposal bin should be positioned between the WC and nearest side wall where it will not obstruct the wheelchair transfer area and not encroach on the seating area so someone can sit comfortably on the WC seat without touching the bin. The bin should be easy to operate and with an opening large enough for incontinence pads as these are larger than sanitary towels.

5.10.19 Water supply

The water supplied to washbasins should not exceed 40 degrees (C) for safety reasons. The water pressure supplied via the tap should be adjusted so that the water does not spray or splash the person or adjacent surfaces. A plug should be provided to enable the washbasin to be filled with water of the desired temperature.

Checklist – Bathroom and toilet detailed design

Assistance alarms

- Provide assistance alarms in all accessible toilets, bathrooms, shower rooms, and changing rooms designed for independent use.
- Position pull-cord in accordance with the detailed diagrams.
- Ensure use of correct cord length with two red bangles.
- Include visible and audible indication within the room that alarm has been raised.
- Include visible and audible alarm outside the room.
- Locate reset button in appropriate location.
- Ensure personnel are trained in providing assistance.

Clothes hooks

- Provide in locations and at height as indicated on detailed diagrams.
- Ensure they visually contrast with the mounting surface.

Doors and locks

- Ensure clear door opening of 950mm.
- Provide outward-opening doors to accessible facilities.
- Ensure outward-opening doors do not obstruct emergency escape routes.
- Fit horizontal rails to outward-opening doors.
- Fit inward-opening doors with emergency-release catches.
- Use lever-style door handles.
- Ensure locks are easy to operate.
- Ensure lock indicators are correctly fitted.

Fire alarm

- Provide visible and audible indicator in all sanitary facilities.

Grabrails

- Ensure grabrails are correctly positioned in accordance with detailed diagrams.
- Use tubular rails, 32 to 35mm diameter.
- Use suitable surface to provide a good grip when wet.
- Ensure all grabrails are firmly fixed to wall.

Hair dryers

- Position hair dryers for use in sitting and standing position.
- Ensure controls are within reach of all users.
- Provide seating.
- Provide space for approach by wheelchair user.
- Install mirror adjacent to each hair dryer.

Hand-drying facilities

- Position hand-drying facilities convenient to washbasins.
- In accessible WCs, shower rooms and bathrooms, position hand-drying facilities within reach of the WC.
- Install alternative paper or towel facilities to supplement hot-air dryers.
- Limit excessive noise levels generated by multiple hot-air dryers.

Heating

- Ensure room heaters are positioned away from transfer and manoeuvring space.
- Ensure surface temperature of heaters does not to exceed 40 degrees C.

Lighting

- Provide adequate lighting levels.
- Install back-up lighting source to supplement automatic lights.
- Ensure adequate timing on automatic lights.
- Make sure pull-cords are suitably positioned.
- Avoid the use of ultraviolet light in accessible toilets.

Lockers

- Position lockers in an accessible location.
- Install a range of sizes and heights.
- Ensure locker doors are easy to use.
- Ensure locks and key fobs are easy to operate.
- Use a clearly identifiable numbering system.

Mirrors

- Position mirrors in all WCs and changing areas at a suitable height.
- Avoid full-height mirrors and mirrors that may appear to cause confusion.

Shelves

- Provide shelves in accessible WCs, shower rooms, and bathrooms in accordance with the detailed diagrams.

Signage

- Ensure sanitary facilities are clearly identified.
- Use symbol and tactile signs.
- Ensure handed layouts can be identified by touch-legible pictograms.

Soap dispensers

- In single-sex toilets, position soap dispensers within reach of the user.
- In accessible WCs, position dispensers within reach of a person seated on the WC.
- Position dispensers so as not to drip on floor.
- Ensure dispensers are easily operated by a pull lever.

Surfaces

- Install firm, level, and slip-resistant floors.
- Avoid shiny surfaces.
- Employ effective visual contrast throughout.
- Ensure attractive interior design.

Vending machines

- Provide vending machines equitably in unisex facilities and single-sex toilets.
- Install at a suitable mounting height
- Follow clear operating instructions.

Waste disposal

- Provide sanitary waste disposal units in all toilets.
- In accessible toilets, position sanitary waste bins between WC and near-side wall.
- Ensure disposal units are easy to operate and large enough for incontinence pads.
- Ensure bins for general waste are suitably positioned and easy to identify.

Water supply

- Incorporate temperature control so as not to exceed 40 degrees (C).
- Ensure water supply pressure is adjusted appropriately.
- Ensure washbasins are fitted with plugs.

A1 Definition of Universal Design

Universal Design

‘Universal Design refers to the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or disability.’

Synopsis of the Disability Act, 2005.

A2 Human Abilities and Design

The following piece of text is an extract from European Ref: CEN/CENELEC Guide 6 ‘Guidelines for standards developers to address the needs of older persons & persons with disabilities’.

It states that: Physical, sensory and mental abilities vary from person to person and for individuals as they get older. Diversity is normal. Designers need to be aware of difference across the range of human abilities, and of associated design considerations.

(a) Physical abilities

This includes walking, balance, handling, pulling, pushing, lifting and reaching. Many activities involve simultaneous use of more than one of these skills. Physical strength and stamina may also affect people’s abilities to perform these actions.

Walking

For some people walking on the level or up gradients is difficult. Some people may have a limited walking range, may have difficulty with turning movements or may use mobility devices, such as crutches or a walker. They may need to stop frequently, to regain strength or catch breath. Design considerations include provision of handrails, seats at regular intervals, convenient set-down parking and adequate time for slower pedestrians at road crossings. Designers should also consider the needs of people walking and engaging in sign language when designing access to and from buildings plus within the buildings themselves.

Balance

Balance limitations can affect someone's gait or control of hand movements. Design considerations include handrails, regular seating, and providing controls within easy reach. A surface against which a person may stumble against or walk into should be designed to limit abrasion.

Handling

A significant minority of people are left-handed. Some people may have restricted use or no use of one or both hands, or may have limits on strength or precision. Facilities and components should be designed to be suitable for use with either hand or with one hand only. Handling includes gripping, grasping and manipulation. Each of these has a different purpose with specific design considerations. For instance, components should be designed to be easily held. The circumference of the supporting structure and stability are critical. Manipulation involves the moving, turning and twisting of components with a hand or hands. For those who have limited manipulation abilities, size and shape and ease of movement are critical. Another option to consider is to design for manipulation by using a pushing, pulling or pressing action using a clenched fist, or by using the wrist or the elbow.

Strength and endurance

Strength and endurance may be required on sloping paths and floors, stairways and long travel distances, when sustained effort may be needed.

For those with limited endurance, frequent resting-places are essential.

People generally find it easier to push a component, than to pull it. This is particularly so if the individual uses a wheelchair. Self-closing devices on manual doors can be difficult for some people to operate, particularly if the doors are required to resist wind forces. For these reasons, doors that open and close automatically are preferred.

Lifting

Activities such as opening vertically sliding sash window and an upward opening access gate, should be designed to be easily operated with minimal force.

Reaching

Design has a role to play in ensuring that key components in a building or environment are in easy reach, bearing in mind the range of people's sizes and abilities. Having components within easy reach is particularly important for those with more severe limitations in mobility. The reach range is dependant on the height and arm length of the person, use of the arms, and the balance and mobility of the upper body. A 'comfortable reach range' has been defined as one that is appropriate to an activity that is likely to be frequent and in need of precise execution and that does not involve stretching or bending from the waist. Putting things within comfortable reach can ensure use by a greater number of people. An 'extended reach range' has been defined as one that is appropriate to an activity that is likely, neither to need precision nor to be frequent and that can involve stretching or bending from the waist.

(b) Sensory abilities

Speech

Some conditions affect the capacity for or quality of speech. Two-way communication can be facilitated by environments designed to minimise barriers to hearing low or indistinct speech.

Hearing

People differ in their capacity to hear sound, to determine its direction, its source, to discern pitch, frequency, volume and variation and to separate out different sounds. Hearing quality is important for communication, for information, and for detection of hazards, such as traffic. Many people with hearing difficulties use a hearing aid which amplifies all sounds caught by the microphone, making communications very difficult in noisy environments. Keeping background noise level low is essential. The selection of structural and surface materials can make a substantial difference in audibility. Auditoriums, meeting rooms and reception areas can benefit from additional sound enhancement such as a loop system. The careful design of illumination can assist in communication such as lip reading and sign language. Provision of visual information and visual alarm systems can communicate information to those who have hearing difficulties or who cannot hear. Designers should also consider the colour and size of rooms and even the furnishing arrangement as this is very important for visually based communication. Also the use of vibration as means of sensing others should be considered.

Sight

Vision allows an individual to be aware of the luminance of surfaces, objects, form, size and colour. For people who are blind or who have visual difficulties, the provision of suitable tactile walking surface indicators and tactile or acoustic warnings at hazardous locations, should provide information on using the built environment and should limit the risk of injury. The built environment can be designed for orientation by providing sound cues and tactile cues. An easily discernible system of ‘way finding’ should also be considered. For people with limited, but low vision, effective visual contrast between surfaces or objects helps to identify critical locations. Warning markings on glass surfaces, and markings on the edges of stair treads, help minimise hazards.

Differences in friction between one floor surface, or one stair tread surface, and the next should be avoided. Therefore, adjacent surfaces that display different standards of slip-resistance, or that depend on raised surfaces, should be carefully considered

Touch

In selecting surfaces in the built environment that people will need to touch (such as handrails, handles, knobs and controls, tactile information), it is important to select materials that avoid distress, injury or allergies. Surfaces should be free of abrasions. Metals that may cause adverse reactions when touched should be avoided.

(c) Mental abilities

Mental abilities include cognition, intellect, interpretation, learning and memory. People differ in their knowledge, their capacity to understand, reason, or interpret information. Designing for differences in these capacities helps provide a usable environment for the population at large, from the very young to the old, and people of diverse abilities. Means of communication in the environment should be designed to be immediately and easily understood, and correctly interpreted. As people age, some experience loss of memory or find it increasingly difficult to absorb new information, so changes in the environment should be carefully considered before implementation.

Design considerations that take account of mental abilities

Aural and visual messages should be simple, clear and have immediate impact. Figures, symbols and simple words are likely to be the most effective. Symbols should be instantly recognisable as representing images seen and activities undertaken in everyday life.

Way finding should be simple, such as tactile, graphic, audible or architectural cues that are easy to follow. Signage should be large and clear. Way-finding maps should be clear, indicate the person's whereabouts in the building or facility, and be free from extraneous information.

(d) Age and size

Accommodating the developing child

It is important to create environments that are safe, accessible and useable for children. Individual components should be safe and useable as age-appropriate. Learning to manage risk is an essential part of a child's development.

Accommodating ageing adults

Life span within the human population is increasing. More and more we expect to maintain an economic and social life within both the public and private domains as we age. However, many human faculties are in decline as we age, such as mobility, dexterity, stamina, strength, hearing, sight, or memory. Familiarity with a particular environment is important.

Diversity of size

The population contains a diversity of sizes and heights, from children, to the diversity in the height of fully-grown adults. The positioning of components and the heights of building elements such as steps should recognise the diversity of height. Increased weight and girth is now also a feature of the population.

Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'. http://www.cen.eu/cen/Sectors/Sectors/ISSS/About_ISSS/Documents/cclcgd006.pdf

A3 Further Reading

National and international standards and codes of practice

AS 1428.1-2001 Design for access and mobility. General requirements for access – New building work.

AS 1428.2-1992 Design for access and mobility. Enhanced and additional requirements – Buildings and facilities.

AS 1428.3-1992 Design for access and mobility. Requirements for children and adolescents with physical disabilities.

AS 1428.4-2002 Design for access and mobility. Tactile indicators.

BS 4800: 1989 Paint colours for building purposes (whilst the colours in this standard cannot be seen on CD-ROM or online the text can still be used).

BS 5395-1:2000 Stairs, ladders and walkways – Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders.

BS 5588-8:1999 Fire precautions in the design, construction and use of buildings – Part 8: Code of practice for means of escape for disabled people.

BS 5776:1996 (incorporating amendment No.1) Specification for Powered stairlifts

BS 6440:1999 (Incorporating amendment No.1) Powered lifting platforms for useby disabled persons – Code of practice.

BS 6440:1999 Powered lifting platforms for use by disabled persons – Code of practice (partially superseded by BS EN 81-40:2008. The remainder of BS 6440:1999 will eventually be superseded by EN 81-41: 2009 Safety rules for the construction and installation of lifts – Special lifts for the transport of persons and goods – Part 41: Vertical lifting platforms intended for use by persons with impaired mobility).

BS 6465-1:2006+A1:2009 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.

BS 6571-4: 1989 Vehicle parking control equipment – Part 4: Specification for barrier type parking control equipment.

BS 7036-1:1996 Code of practice for Safety at powered doors for pedestrian use – Part 1. General.

BS 7036-4:1996 Code of practice for Safety at powered doors for pedestrian use – Part 4. Low energy swing doors.

BS 7997:2003 Products for tactile paving surface indicators – Specification.

BS 8300:2009 (Incorporating amendment No.1) Design of buildings and their approaches to meet the needs of disabled people – Code of practice.

BS 8493:2008 (+A1:2010): Light reflectance value (LRV) of a surface – Method of test.

BS 8501:2002 Graphic symbols and signs – Public information symbols (AMD 16897).

BS EN 115:1995 Safety rules for the construction and installation of escalators and moving walkways.

BS EN 15838:2009 Customer contact centres, Requirements for service provision.

BS EN81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passengers lifts – Part 70: Accessibility to lifts for persons including persons with disability.

Building Regulations (Part M Amendment) Regulations 2010 (S.I. No. 513 of 2010).

Citizens Information Board – Accessible information for all (2009).

DD 266:2007 (Draft for Development) Design of accessible housing – Lifetime home – Code of practice.

I.S. EN 1991-1-1:2002 – Eurocode 1: Actions on structures Part 1-1: General actions – densities, self weight, imposed loads for buildings (including Irish National Annex: 2005).

I.S. EN 81-1: 1999 Safety rules for the construction and installation of lifts – electric lifts (Amd 1) (+A3:2009).

I.S. EN 81-2:1999 Safety rules for the construction and installation of lifts – hydraulic lifts (Amd 1) (+A3:2009).

I.S. EN 81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passenger lifts. Accessibility to lifts for persons including persons with disability (Amd A1:2005).

I.S. EN 997:2003 (+A1:2006) WC pans and WC suites with integral trap (AMD Corrigendum 14805) (AMD 16965).

IEC 60118-4:2006 Electroacoustics. Hearing aids. Induction loop systems for hearing aid purposes. Magnetic field strength (ISBN 978 0 580 50047 3).

International standard for Induction loops. IEC 60118-4.

Irish Code of Practice on Accessibility of Public Services and Information Provided by Public Bodies www.nda.ie/website/nda/cntmgmtnew.nsf/0/3DB134DF72E1846A8025710F0040BF3D/$File/finaldrcode_nda.htm

Key cards should conform to EN 1332. For further information on key cards please see: http://www.universaldesign.ie/useandapply/ict/itaccessibilityguidelines/smartcards/guidelines/smartcardguidelines/cards

Lifetime Homes Standard: http://www.lifetimehomes.org.uk

Norwegian Universal design of building standard, 2009.

Passenger Lift Design: The Machinery Directive 2006/42/EC; Lifts should conform to BS 6440.

National and international reference documents

2020 Vision – Sustainable Travel and Transport: Public Consultation Document. Department of Transport.

Bus Based Park and Ride – A Pilot Scheme. A Report to: Dublin Transportation Office. The TAS Partnership Limited, 2002.

City of London 2006 Facility Accessibility Design Standards. London, Canada, 2006 Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Gallaudet DeafSpace Design Guidelines 2010.

Department of Transport & the National Disability Authority Guidelines for Accessible Maritime Passenger Transport http://www.nda.ie/website/nda/cntmgmtnew.nsf/0/45AA46D1F77D7EF2802576DC005C5954?OpenDocument

Department of Transport, UK 'Traffic Signs Manual'.

Dublin City Council (2007) Variation (No. 21) of the Dublin City Development Plan 2005 – 2011. Available from: http://www.dublincity.ie/Planning/DublinCityDevelopmentPlan/VariationstotheDevelopmentPlan/Documents/AdoptedVariationNo21Spec.pdf.

Guidance on the use of tactile paving surfaces. Department for Transport, UK.

Guidelines for an accessible public administration. Towards full participation and equality for people with disability. Office of the Disability Ombudsman, Sweden.

Inclusive Mobility. Department for Transport, UK.

International Best Practices in Universal Design. A Global review. Canadian Human Rights Commission, 2006.

Irish Wheelchair Association: Best Practice Access Guidelines 2010.

Joseph Rowntree Housing Trust.

Parking for disabled people. Department for Transport, UK.

Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Rail Park and Ride Strategy for the Greater Dublin Area. Dublin Transportation Office, 1994.

Regulation of Bus services outside the Greater Dublin Area. Department of Transport.

"Sign Design Guide and Inclusive mobility," Oxley, P. (2003), Inclusive Mobility. Department for Transport, UK. www.mobility-unit.dft.gov.uk

Smarter Travel 'A Sustainable Transport Future' – A New Transport Policy for Ireland 2009 – 2020. Department of Transport.

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Image acknowledgements:

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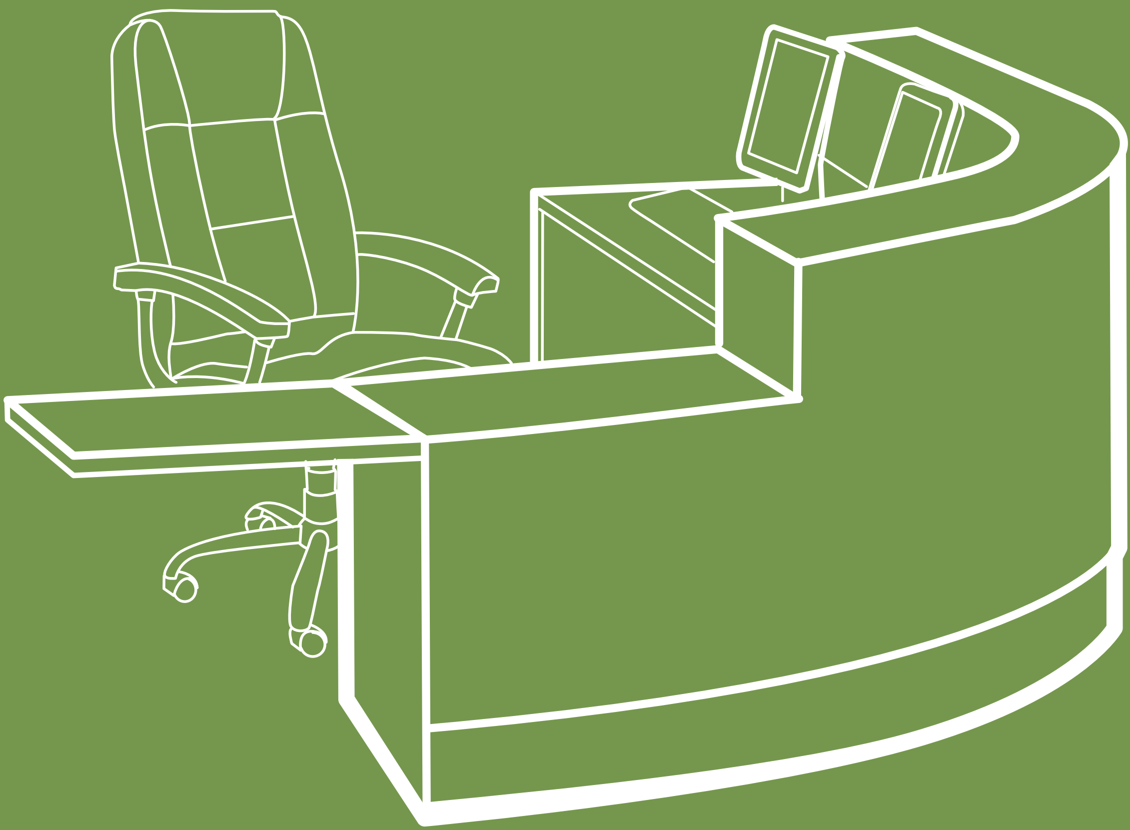
Building for Everyone:
A Universal Design Approach

Facilities in buildings

6



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Creating an environment that can be used by all people, regardless of their age, size, disability or ability.

The National Disability Authority's Centre for Excellence in Universal Design has a statutory role to promote the achievement of excellence in universal design in:

- the design of the built and external environment
- product/service design
- information and communications technologies (ICT)
- the development and promotion of standards
- education and professional development
- raising awareness of universal design

More information and updates on the website at: **www.universaldesign.ie**

Building for Everyone

Booklet 6 - Facilities in buildings

The other booklets from the
Building for Everyone series:

Booklet 1 - External environment and approach

Booklet 2 - Entrances and horizontal circulation

Booklet 3 - Vertical circulation

Booklet 4 - Internal environment and services

Booklet 5 - Sanitary facilities

Booklet 7 - Building types

Booklet 8 - Building management

Booklet 9 - Planning and policy

Booklet 10 - Index and terminology

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6.0 Objectives

The guidance in this booklet promotes the concept and philosophy of universal design and encourages developers, designers, builders and building managers to be innovative and think creatively about solutions that meet the needs of all building users regardless of age, size, ability or disability.

The objectives of the series of booklets are to:

- identify and promote best practice with regard to universal design of the built and external environment
- provide best practice guidelines that in no way conflict with the requirements of existing regulations in Ireland
- provide guidelines that are usable by and accessible to the target audience
- promote universal design in Ireland

This booklet aims to:

- identify and promote best practice for the design of a building's interior and the provision of facilities and equipment within the building with regard to universal design
- increase awareness of, and to encourage designers to identify, the needs of all those who require well-designed facilities and equipment within buildings in order to undertake daily activities
- highlight the wider benefits experienced by all when accessible and universally designed facilities and equipment are provided within buildings
- encourage designers to provide universal design solutions for facilities and equipment within buildings that look beyond the minimum requirements of national building regulations

6.1 Introduction

This booklet is part of the series "Building for Everyone – A Universal Design Approach," which aims to provide practical guidance on the universal design of buildings, places and facilities.

Universal design places human diversity at the heart of the design process so that buildings and environments can be designed to meet the needs of all users. It therefore covers all persons regardless of their age or size and those who have any particular physical, sensory, mental health or intellectual ability or disability. It is about achieving good design so that people can access, use and understand the environment to the greatest extent and in the most independent and natural manner possible, without the need for adaptations or specialised solutions (see full definition in **Appendix A1**).

Why universal design?

People are diverse - some are left-handed and some right-handed - and people vary in their age, size and functional capacities. Illness or disability (whether temporary or permanent) can also affect characteristics such as people's mobility, dexterity, reach, balance, strength, stamina, sight, hearing, speech, touch, knowledge, understanding, memory, or sense of direction. A reference list with these booklets indicates some of the key differences in human abilities that should guide design of buildings and of outdoor places. (See full description of Human Abilities in **Appendix A2**).

People of diverse abilities should be able to use buildings and places comfortably and safely, as far as possible without special assistance. People should be able to find their way easily, understand how to use building facilities such as intercoms or lifts, know what is a pedestrian facility, and know where they may encounter traffic.

Given the wide diversity of the population, a universal design approach that caters for the broadest range of users from the outset can result in buildings and places that can be used and enjoyed by everyone. That approach eliminates or reduces the need for expensive changes or retro fits to meet the needs of particular groups at a later stage.

It is good practice to ascertain the needs of the range of expected users as early as possible, and to check the practicality and usability of emerging designs with a diverse user panel.

Designing for one group can result in solutions that address the needs of many others. For example:

- level entry (Step-free) entrances facilitate not just wheelchair users but also people with buggies; people with suitcases or shopping trolleys; people using walking or mobility aids; and people with visual difficulties
- larger toilet compartments provide easier access to wheelchair users; those with luggage or parcels; parents with pushchairs or accompanying small children; those using walking or mobility aids; and larger-sized people
- clear, well-placed signage that uses recognised symbols or pictograms helps people with reading or cognitive difficulties, and those whose first language is neither English nor Irish

Sometimes one solution will not suit all and a range of options will need to be provided, for example:

- providing both steps and a ramp where there is a change in level
- providing parking ticket machines that offer slots at different heights to facilitate use at standing height, at sitting height, and by people of small stature

This series of booklets is for architects, engineers, planners, developers, designers, building contractors, building workers, building managers, and others involved in designing, commissioning and managing buildings and their surroundings. It provides guidance on a universal design approach to all new buildings, and the use and adaptation of existing environments.

Those who commission, design, construct or manage any part of the built and made environment also have a duty of care to adhere to relevant legislation and regulations including equality legislation, building regulations and health and safety regulations.

The guidance is based on a best practice approach drawing on up-to-date international best practice, guidelines and standards; previous guidance by the National Disability Authority; and extends beyond disability access matters to incorporate a universal design approach. The series is fully compatible with Part M (2010) of the Building Regulations and associated Technical Guidance Documents related to Part M.

A disability access certificate is required for new buildings other than dwellings (including apartment buildings) and certain other works (as set out in Article 20 D (1) of SI 351 of 2009) to which the Requirements of Part M of the Building Regulations apply, which commence or take place on or after 1 January 2012. Further details on these and other relevant standards, codes of practice, and professional codes of practice are listed in **Appendix A3** Further Reading.

The detailed guidance provided here does not represent the only possible solution. Designers may come up with other ways to meet a diversity of users. New materials and technologies that emerge may open up further possibilities of accommodating the diversity of the population.

Checklists are provided throughout the series and while they provide a summary of main considerations and technical criteria, they should not be regarded as a substitute for the main text or an exhaustive list.

An comprehensive **index** is available with the suite of booklets.

The Building for Everyone series is available online at **www.nda.ie** and **www.universaldesign.ie**. Electronic links are provided to relevant sections in the different booklets. As standards and requirements develop, the electronic versions of these booklets will be updated.

The electronic version is produced in accessible PDF format in accordance with the Web Content Access Guidelines 2.0. If you have any difficulties in this regard or require the document, or particular sections, in alternative formats, please contact the Centre for Excellence in Universal Design at the National Disability Authority, **info@ceud.ie** or (01) 6080400.

6.2 Terminology

Accessible facilities – Facilities that are designed for all users of a building or external environment, including the young and old, and those of all sizes, abilities, and disabilities.

Automated teller machine (ATM) – A machine for dispensing cash and undertaking other financial transactions, including checking an account balance and changing a personal identification number. Also commonly termed cash point, cash machine, or cash dispenser.

Building user – A person regardless of age, size, ability or disability using facilities in a building or associated external environment.

Payphone – A public telephone that requires payment on a call-by-call basis, either using coins, a prepaid telephone card, or a credit or debit card.

Personal identification number (PIN) – A personal four-digit code used to verify card-based payments.

Textphone – A telephone device that facilitates text communication and incorporates a screen and keyboard.

6.3 Design Issues

Integration, not afterthought: Many facilities in buildings will be designed and specified by the project team, for example, a built-in kitchen or refreshment area in a new building or refurbishment project. By considering the spatial and detailed requirements of such facilities at the outset, clients and designers will be able to provide facilities that meet the needs of the broadest range of people and be universally designed.

Other facilities – such as vending machines and telecommunications equipment, which are often free-standing and may be replaced or substituted periodically – may be selected by building managers or building occupiers after completion of a construction project or to supplement facilities in an existing building. In these cases, there is a risk that such new or additional facilities will be positioned in an unsuitable location, with insufficient space for access and manoeuvre and where they may present an obstruction to other building users. It is essential, therefore, that the provision of any facility or item of equipment should be considered as early as possible in the design process to ensure that adequate space is available in a suitable location in the building, even if the equipment is to be provided by others at a later stage.

In some cases, clients and designers should consider whether future changes in the occupancy or use of the building may necessitate the provision of additional or alternative facilities, and design the building in such as way as to easily accommodate future changes. This will require consideration as to the use of space, flexibility and, where electrically-powered or telecommunications equipment is likely to be installed, the provision of adequate power outlets and telephone sockets.

Checklist – Integration, not after-thought
• Consider the spatial and detailed requirements of facilities at the earliest possible design stage.
• Anticipate potential future requirements.

6.4 Reception Desks and Service Counters

Counters and service desks, including reception desks and information counters, should be accessible and understandable to everybody. This includes all visitors or customers in a building, as well as personnel who work on the staff side of the counter.

In larger buildings such as public service organisations, and in commercial offices, service counters and reception desks are likely to be large, with several positions for staff and customers. With this type of arrangement, there will be sufficient space to provide counters at different heights.

Image 6.1 Example of a low-level reception desk.

Reception desks should be placed conspicuously and in a direct, logical position in relation to the main entrance of a building to permit easy identification.

The reception desk should also be easy to find from key internal circulation routes such as the foyer, corridors, stairs or lifts.

Reception desks should be located away from potential sources of noise, such as a busy bar area or the main entrance doors in buildings, where there is likely to be significant external noise.

Image 6.2 Example of a reception desk with two levels.

Reception desks and service counters should incorporate a work surface at two different levels to facilitate use by people at a range of heights and in either a seated or standing position, as **Figure 6.1**.

The lower work surface should be a maximum of 760mm above floor level and have a clearance to the underside of 700mm. The lower section of counter should have a width of 1800mm (minimum 1500mm) to enable two people to sit alongside each other, or for two people to be positioned diagonally opposite each other. To enable people to sit comfortably and read or sign papers, the lower work surface should incorporate a knee recess 650mm deep. Where people are likely

Corridors in the communal areas of flats or groups of dwellings should be logically arranged and provide convenient access between the main communal entrance and each individual flat. Corridors should be at least 1200mm wide.

The recommended effective clear widths for doors in individual houses and flats are set out in the table below.

Effective clear opening width of door	Direction of approach and width of corridor.
800mm	Straight-on approach.
800mm	Right-angled approach via corridor at least 1100mm wide.
850mm	Right-angled approach via corridor less than 1150mm wide.

All doors within houses and flats should have a clear space of at least 300mm adjacent to the leading edge of the door to enable people to reach for the door handle and manoeuvre clear of the door swing.

Doors that open into rooms, such as living rooms, bedrooms and kitchens, should be positioned so that the hinge-side of the door is adjacent to a return wall.

Doors to bathrooms and toilets should be designed so that they can be opened from outside the room in an emergency. Refer to **Booklet 5: Sanitary facilities, Section 5.9**.

Guidance on door ironmongery is covered in **Booklet 2: Entrances and horizontal circulation, Section 2.6.5**.

edge of the counter should visually contrast with the work surface so that it is readily identifiable.

Where reception desks and service counters are required to incorporate glazed screens for security or other reasons, they should be clear and unobstructed.

The position of artificial lights, external windows, and any other light source should be carefully considered in relation to any glazed screen to avoid the potential for glare and reflection, as this may obscure visibility and impair communication. Posters and notices should not be stuck to screens as these will obscure visibility and may be visually confusing.

Where glazed screens are provided, a voice augmentation system (also called a speech enhancement system or voice transfer system) should be considered. This is likely to benefit everybody, including people with hearing difficulties, as the clarity and volume of speech is often reduced by the presence of a screen.

Image 6.3 Alternative view of a reception desk with two levels.

Reception desks and service counters should be evenly illuminated to a level of 200 lux. Lighting should be positioned to adequately illuminate the face of any member of staff, which will aid visual communication and lip reading.

A hearing enhancement system should be provided at all reception desks and service counters. Refer to **Section 4.10** in **Booklet 4: Internal environment and services**.

For details of queuing areas and temporary barriers, refer to **Section 2.4.3** in **Booklet 2: Entrances and horizontal circulation**.

Checklist – Reception desks and service counters
• Ensure desks and counters are accessible and understandable on staff and customer sides.
• Locate in a logical position with direct access from main entrance.
• Include counters at different heights, as **Figure 6.1**.
• Include knee recess for people in seated position.
• Provide 2440mm x 2440mm clear space for approach to desk.
• Ensure counter has visually-contrasting, upward-sloping leading edge.
• Ensure glazed screens are clear and unobstructed.
• Consider the use of a voice augmentation system in conjunction with glazed screens.
• Provide a hearing enhancement system, clearly signed.
• Ensure adequate illumination at counter level.

6.5 Waiting Areas and General Seating

General seating enabling people to wait and rest should be provided in all reception and waiting areas in public and commercial buildings. It is essential in buildings where people may have to wait for long periods such as in some healthcare settings.

In public transport facilities and airports where waiting is inevitable, seating should be provided in all main waiting locations and in close proximity to refreshment facilities, toilets and travel information. All seating should provide convenient access and comfortable facilities for everybody.

Seating should be readily apparent and clearly signed from any reception desk, service counter or information point. Access to seating should be direct and unobstructed and seats should always be located on a level floor and be positioned where they will not obstruct circulation routes.

Seating areas should incorporate spaces for people who use wheelchairs and electric scooters so that they can remain in their wheelchair or scooter and sit alongside companions. Such spaces are also useful for people with prams and pushchairs.

Spaces should be available to enable two people using wheelchairs or electric scooters and personal assistant to sit alongside each other.

A clear space at the end of a block of seating or within a row should be provided to enable an assistance dog to sit and rest, clear of any circulation route or seating aisle.

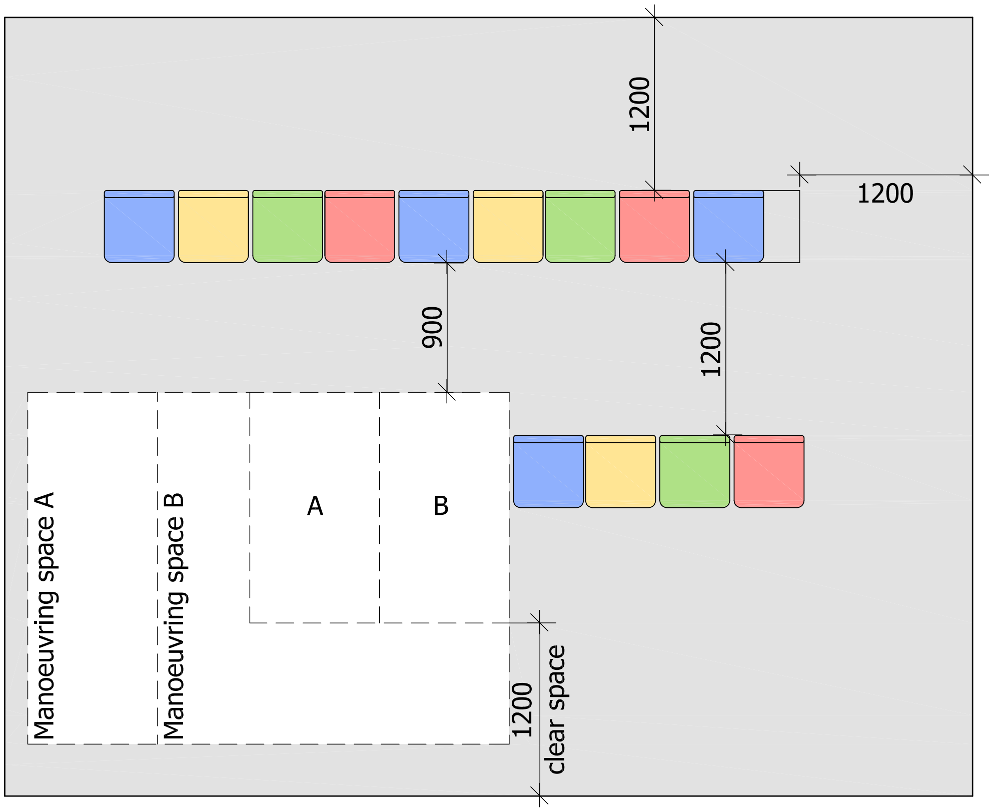
Rows of seats should be positioned with a clear space of 1200mm between the leading edge of one seat and the rear of the seat in front. A clear aisle width of at least 1200mm should also be provided to the front and rear of the block of seats, as in **Figure 6.2**.

Spaces for people using wheelchairs and electric scooters should be 900mm wide x 1600mm deep when positioned alongside fixed seats. However, to enable people to manoeuvre into position, a clear space of 2400mm x 2400mm should be provided.

The needs and preferences of a greater number of people can be met if different styles of seat can be provided within seating areas. This could include fixed seats; moveable seats; seats with and without armrests; and seats with higher backs. Perching seats may be appropriate in some areas, particularly if space is limited. For the comfort of everybody, it is preferred if all seats have a fixed cushion.

The standard height for a seat is typically 450mm. Some seats should be provided with a seat height between 450mm and 475mm as these tend to be more comfortable for people with mobility difficulties. Seats with a shallower depth than standard may be provided for people of smaller stature.

Figure 6.2 Key dimensions for general seating areas.



Space allowances for people using wheelchairs and scooters, as spaces A and B:

1600 x 900 when parked
2400 x 2400 clear space for manoeuvre

Note: All dimensions in millimetres

Perching seats should have a height of 500 to 750mm. It is recommended that all seats should be 500mm wide , but some should be wider to accommodate people of larger stature. A heel space at least 100mm deep makes it easier for people to stand up from a seat or perch. Seats with backrests are essential for additional support; armrests, positioned approximately 200mm above seat level, are also useful to lean against, and assist in getting in and out of the seat. Seats positioned or linked in a row should all be of the same style, such as all with armrests or all without. A mixture of seat styles in a single row can cause confusion for some people with visual difficulties.

All seats should visually contrast with the surrounding walls and floor surfaces to be readily identifiable. The use of floor finishes that are different in texture or colour can be useful to delineate seating areas from adjacent circulation routes or other facilities, particularly in large open-plan buildings. Refer also to **Section 4.4** in **Booklet 4: Internal environment and services**.

For seating in external environments, refer to **Section 1.5.4.7** in **Booklet 1: External environment and approach**.

For audience and spectator seating, refer to **Section 7.9.1** in **Booklet 7: Building types**.

Checklist – Waiting areas and general seating.
• Ensure all seating is readily apparent and clearly signed.
• Provide seating in all reception and waiting areas.
• Locate seating close to toilet facilities and a reception or information point.
• In public transport facilities, provide seating in all waiting locations.
• Make sure access to seating is unobstructed.
• Install seating areas that accommodate clear areas alongside seats for people with prams and pushchairs; people using wheelchairs and electric scooters; and for assistance dogs.
• Follow clear aisle widths and space between seats in **Figure 6.2**.
• Provide seats of different styles to suit different people.
• Consider perching seats where space is limited.
• Provide seats that visually contrast with surrounding surfaces.

6.6 Storage Facilities

Storage facilities encompass cupboards, drawers, and shelves that may be located in the workplace for general staff use or in hotels and residential facilities for storing personal effects. Shelves and racks in retail environments will be accessed by store staff and the general public.

Access to storage facilities should be direct and unobstructed. The location of storage facilities should be readily apparent or clearly indicated, particularly where access is available to members of the public.

Storage facilities should be solid, stable, and without sharp edges. They should contrast visually with adjacent surfaces and be adequately illuminated. Handles and any other items of projecting ironmongery should visually contrast with the mounting surface so they are readily identifiable.

Shelving should be positioned to suit people with different reach ranges; people of short stature; and not too low for people who can't bend down, for example, older people and people with mobility difficulties including people in a seated position. **Table 6.1** sets out recommendations for the height of shelving in storage facilities.

Table 6.1 Height of shelving in storage units			
	Height of shelving	**Depth of shelving**	**Distance between shelving units**
Seated approach with front access	650 to 1000 for frequent use 650 to 1150 for infrequent use	220	1200 where knee recess is provided 1400 without knee recess
Seated approach with side access	665 to 1060 for frequent use 630 to 1170 for infrequent use	220	1200
Standing approach	750 to 1500 for frequent use 700 to 1625 for infrequent use	Not stipulated	1200

All dimensions in millimetres

Where storage units such as filing cabinets or shelves are arranged in rows, the distance between the units themselves, and between the units and any adjacent wall or obstruction, should be at least 1400mm.

Clothes racks and hanging facilities in shops, hotel bedrooms, theatre foyers, and elsewhere should be accessible from a sitting or standing position, and to those of smaller stature. Pedestals and high hanging rails should be avoided.

To suit the broadest range of users including people of small stature, children, wheelchair users, and those with limited reach, hanging facilities should be positioned in the range 1200 to 1700mm above floor level.

Clothes rails should be positioned no higher than 1370mm above the floor and should provide a level approach to facilitate wheelchair access and those of smaller stature. If a level approach is not possible, such as where built-in cupboards with a plinth are installed, the clothes rail should be no higher than 1200mm.

In retail environments, shelves and displays should be positioned to enable goods to be viewed and selected easily. Oblique-angled shelves above 1000mm from the floor should be avoided as this arrangement limits visibility for people with a lower eye level. A vertical stacking approach for displayed goods will ensure maximum accessibility. In this arrangement, a proportion of every item for sale should be placed on a number of shelves at different heights.

For lockers in changing rooms, refer to **Section 5.10.10** in **Booklet 5: Sanitary facilities**.

Checklist – Storage facilities
• Ensure access to storage facilities to be direct and unobstructed.
• Install storage facilities that are solid and stable, with no sharp edges.
• Incorporate handles that visually contrast with doors and drawers.
• Ensure shelving and rails meet the recommendations in **Table 6.1.**
• Make sure aisle width between shelves and cabinets is 1400mm.
• Avoid the use of a plinth below clothes rails.
• Avoid angled shelves above 1000mm.
• Arrange goods on shelves vertically to maximise accessibility.

6.7 Public Telephones

Telephones for use by members of the public who need to make personal calls should be provided in all public service buildings, transport facilities, visitor attractions, and retail developments, such as department stores and shopping centres.

In some buildings where the use of telephones can be closely monitored, such as telephones provided at or adjacent to a reception desk, calls may be provided free of charge to the customer or visitor. In most other locations, it is likely that payphones will be provided. Telephones should be accessible to all members of the public.

Telephones are often provided in buildings to make inter-departmental calls, such as to contact or summon people for an appointment within a large organisation. Such telephones do not require payment, but should be accessible to everyone using the service. Similarly, telephones linked directly to a taxi or dial-a-ride service should be accessible, useable, and understandable to everyone wishing to use the facility.

For telephones in lift cars, refer to **Section 3.7.6** in **Booklet 3: Vertical circulation**.

Checklist – Public telephones
• Provide telephone facilities in public service buildings, transport facilities, visitor attractions, and retail developments.
• Ensure all telephone equipment is accessible, useable, and understandable to everyone, whether the service is provided free or for payment.

6.7.1 Payphones

Payphones should be provided in an accessible location and clearly signed. Wherever payphones are provided, at least one should be positioned at a height suitable for a person using a wheelchair. Where several payphones are provided, they should be positioned to suit people at a range of heights.

Image 6.4. Example of two payphones fitted at different heights.

All payphones should incorporate an inductive coupler and adjustable volume control within the handset to facilitate use by people with hearing difficulties. Inductive couplers are generally provided in all new payphones, but they can also be fitted retrospectively in existing telephones. Inductive couplers enable people who wear hearing aids fitted with a T switch to hear amplified sound directly through their hearing aid. The presence of payphones with inductive couplers should be clearly signed with the appropriate symbol, as **Figure 6.3**. The volume control device should enable the sound of incoming speech to be adjusted between 12 decibels and 18 decibels above the ambient noise level.

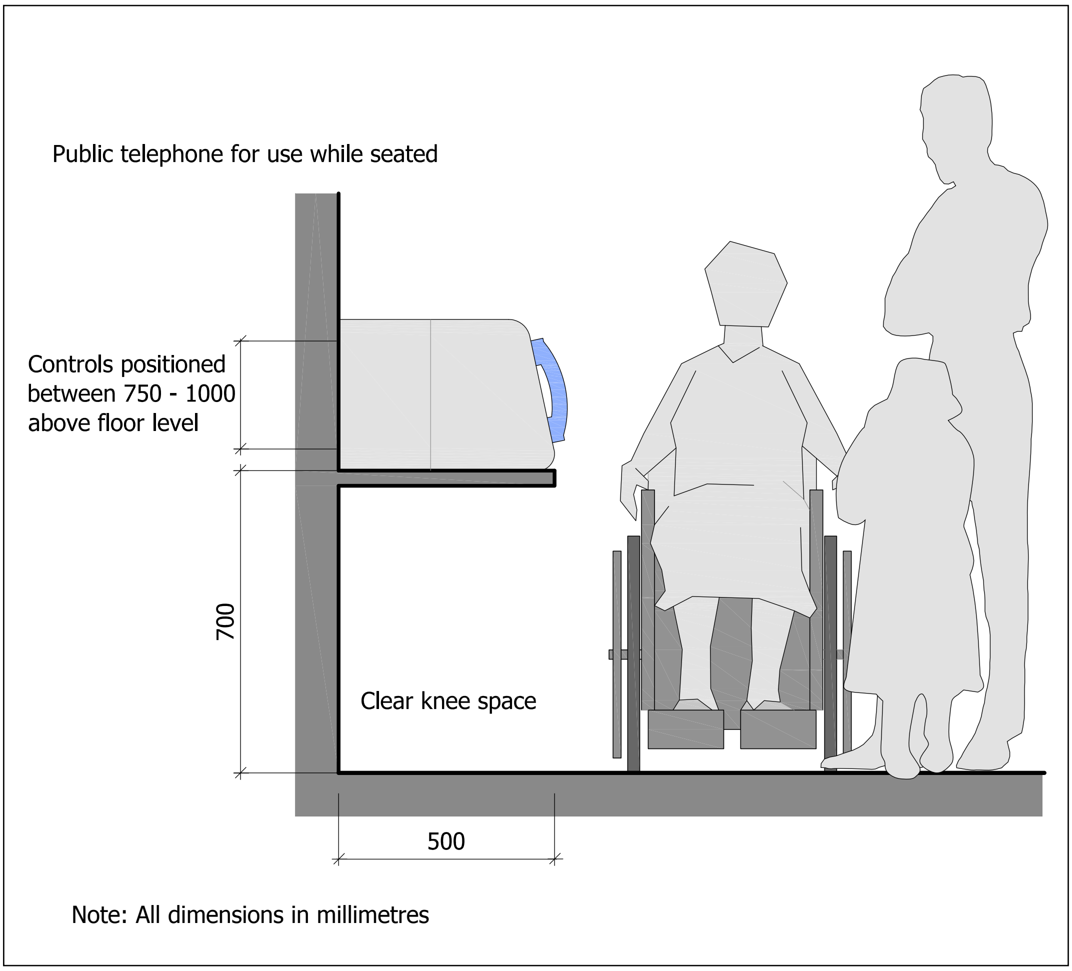
Figure 6.3 International symbol for an induction loop.

A clear floor area at least 2400mm x 2400mm should be provided in front of payphones to enable forward or side approach for people using wheelchairs and electric scooters.

The handset cord to all payphones should be at least 1000mm long so that it can be comfortably reached by people at a range of heights and by people seated either to the front or side of the telephone.

Where payphones are positioned at a lower level to facilitate access by wheelchair users, people of small stature, children, and those with limited reach, the controls should be positioned between 750mm and 1000mm above floor level and there should be a clear knee space under the telephone of 700mm high, as **Figure 6.4**. In situations where it is only possible to approach the payphone from the front, the knee space should be 500mm deep to enable a person in a seated position to reach and operate the controls.

Figure 6.4 Public telephone for use while seated.



Where payphones are provided at a higher level to facilitate use by some people in a standing position, the uppermost control should be no higher than 1370mm above floor level. Where several payphones are provided, they should be positioned at a range of heights.

All telephones should have push-button keypads, with the central number five incorporating a clear tactile marking. This is an invaluable orientation aid to many people with visual difficulties when using keypad facilities. Card and coin slots should be a funnel type as these are easier for all to use.

The telephone controls, adjacent shelf and associated instructions should all be well lit, with a recommended level of illumination of 200 lux.

A seat beside a telephone will benefit anyone who prefers to sit whilst using the telephone. The seat may be a fold-down or perch type, so that it does not obstruct access when not in use. Refer to **Section 6.5** above.

Checklist – Payphones
• Position payphones to suit people of different heights.
• Incorporate an inductive coupler and volume control in all payphones.
• Ensure payphones with inductive couplers to be clearly signed.
• Provide a clear area for approach, 2400mm x 2400mm.
• Ensure payphone handset cords are at least 1000mm long.
• Ensure height of controls are as **Figure 6.4.**
• Install payphones with push-button keypads with a tactile marking to the number five.
• Ensure coin and card slots are funnel type.
• Illuminate payphones to at least 200 lux.
• Consider the provision of a fold-down or perch type seat beside payphone.

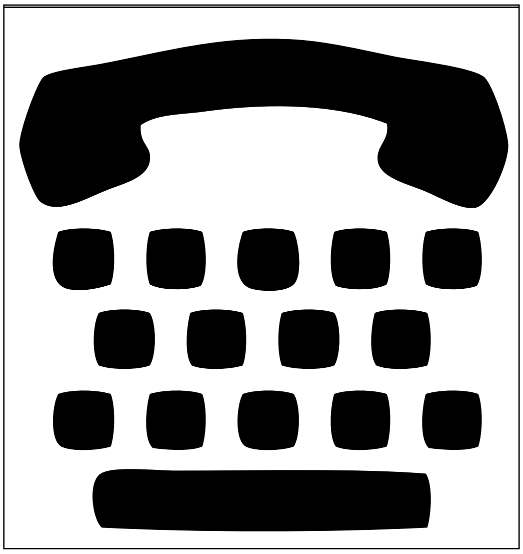
6.7.2 Textphones

Wherever public telephones are provided, a public textphone (also referred to as a pay textphone) should also be available. Textphones are an essential provision for public service organisations including hospitals, Garda stations, health centres, bus and train stations, hotels, and road recovery services.

The provision of textphone facilities at reception desks in public buildings should be considered. These can be used by reception and other staff to make and receive calls to people who prefer text-to-text communications, and also by members of the public who require textphone facilities. Where textphones are provided for use by staff in an organisation, they should be fully trained in using the equipment and also be familiar with the text relay service.

Image 6.5 Example of a textphone.

Image 6.6 International symbol for a textphone.



A textphone comprises a keyboard and screen linked to a telephone. The keyboard and screen may be an integral part of the telephone unit, such as in a pay textphone, or may be a standalone portable device that can be attached to a telephone receiver using an acoustic coupler. Textphones enable messages to be typed in using the keyboard and received by a similar device or relayed via a text relay service that translates text into voice messages and vice versa.

Image 6.7 Example of a textphone located at a public payphone.

Public telephones should always incorporate a shelf nearby to enable people to use a portable textphone. The shelf should be at least 250mm wide and 350mm deep, with a recommended 250mm height of clear space above. The clear height above the shelf is important to enable people to lift up and read a fold-down screen, and to use the keyboard.

Wherever textphone facilities are provided, they should be clearly indicated with the appropriate symbol, as **Image 6.6**.

Checklist – Textphones
• Provide a public textphone wherever payphone facilities are available.
• Consider the provision of a textphone at reception desks and service counters.
• Ensure staff are trained in using textphones and text relay services.
• Incorporate an adjacent shelf for portable textphones, recommended 250mm wide x 350mm deep with clear space of 250mm above.
• Make sure textphone facilities are clearly indicated.

6.7.3 Telephone booths

It may be preferable in some circumstances for a telephone for public use to be located within an enclosed telephone booth, or telephone room. This is particularly beneficial where people require a greater degree of privacy or where the background noise in an open plan area is likely to make communication difficult.

Telephone booths should be accessible and easy to use by all building users including people of small stature, children, wheelchair users, people with visual difficulties, and those with limited reach.

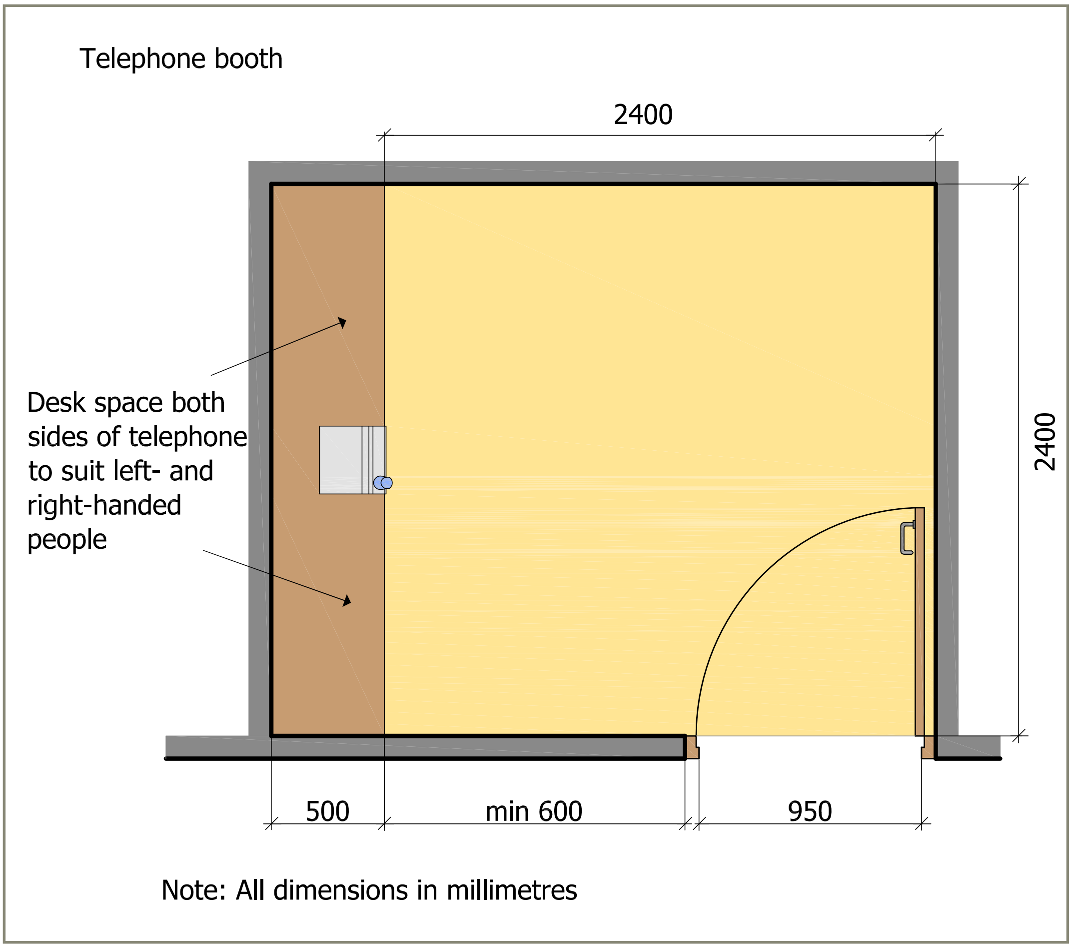
Telephone booths should incorporate a clear door opening width of 900mm. Clear space for access and manoeuvre should be provided on both sides of the door in accordance with **Section 2.6.4** in **Booklet 2: Entrances and horizontal circulation**. The telephone and associated shelf or desk should not encroach into the clear space. **Figure 6.5** illustrates possible arrangements for a telephone booth with inward- or outward-opening doors.

Where a telephone booth accommodates a telephone laid on a table top or desk, the telephone unit should have sufficient cord to enable a person to pick up the whole unit and move it to their preferred position in order to see the digits or to position it conveniently adjacent to paperwork on the desk.

If a wall-mounted telephone is provided, it should be meet the recommendations in **Section 6.7.1** above to facilitate approach and use by people in a seated position. A moveable seat should be provided. A shelf 500mm deep should be provided to both sides of the telephone to facilitate use by left- and right-handed people.

An embossed sign combining the telephone symbol with the International Symbol of Access should be clearly displayed outside the telephone booth and mounted between 1400mm and 1700mm above floor level, within 150mm of the door opening. Directional signs should clearly highlight the location of the telephone.

Figure 6.5 A plan of a telephone booth.



Checklist – Telephone booths

- Consider the provision of a telephone booth for increased privacy and to reduce background noise levels.
- Ensure booths have a clear door opening width of 900mm and a manoeuvring space as **Section 2.6.4** in **Booklet 2: Entrances and horizontal circulation**.
- Ensure un-fixed telephones have a long cord to enable them to be repositioned within the booth.
- Provide a desk or fixed shelf adjacent to the telephone to suit left- and right-hand use.
- Provide signage to clearly indicate the location of the telephone facilities.

6.8 Coin and Card-Operated Machines

Machines for dispensing money, tickets or small goods, such as drinks, confectionery, and items for personal care, should be accessible, useable and understandable to everybody, simple to understand, and easy to operate. They should be positioned in an accessible location and be readily apparent. Machines such as ticket dispensers and automated teller machines (ATMs) should be clearly signed.

All coin- and-card operated machines should be located on a level floor, with a clear floor area at least 2400mm x 2400mm in front. This will enable wheelchair or electric scooter users to approach from the front or side. Free-standing machines should not be mounted on a plinth as this can inhibit close access for some people and may place the controls out of reach. If the use of a plinth cannot be avoided, it should not project beyond the face of the machine and controls should be within the recommended height limits when measured above the surface of the access route.

Instructions for coin- and card-operated machines should be readily apparent and should use a large, clear typeface that is at least 16 point, and that uses both upper and lower case letters. All instructions should be concise and easy to understand, supplemented wherever possible with universally recognised symbols and unambiguous diagrams. Instructions should contrast visually with the background surface so that they are readily apparent. Instructions may also be provided in Braille.

All controls should be capable of being easily operated with one hand, without the need to grip or twist. Push-button controls, pull handles, levers, and sensors are preferred. Buttons should be at least 20mm diameter and slightly raised above the surrounding surface so as to be identifiable by touch. No control should require a force greater than 19.5 N to operate.

Controls and instructions to all coin- and card-operated devices should be illuminated to a level of 200 lux.

Wherever possible, procedures should be in place to summon the assistance of a member of staff if a person is unable to use a machine for any reason.

This is particularly important for ticket-dispensing machines such as in car parks or public transport facilities, as it will ensure that no one is penalised or disadvantaged for not being able to purchase a ticket.

In external environments, a canopy – extending to a recommended depth of 1200mm from the building face – should be provided above any external machine, to offer some protection from the rain. The canopy should provide at least 2200mm height clearance so as not to cause an overhead obstruction.

Checklist – Coin and card operated machines
• Ensure coin- and card-operated machines are simple to understand and operate.
• Locate machines where they are readily apparent.
• Make sure ticket machines and ATMs are clearly signed.
• Provide a clear space for approach to machines of 2400mm x 2400mm.
• Avoid the use of plinths.
• Ensure instructions are readily apparent and easy to understand.
• Use at least 16 point text and incorporate upper and lower case letters.
• Use pictograms to supplement text wherever possible.
• Provide instructions in Braille.
• Ensure controls are easily operated with a single hand.
• Make sure buttons are at least 20mm diameter and slightly raised above the mounting surface.
• Ensure a maximum 19.5 N force to operate any control.
• Ensure adequate illumination of at least 200 lux.
• Ensure procedures are in place to summon assistance.
• Provide a canopy over machines in external environments.

6.8.1 Ticket dispensers and vending machines

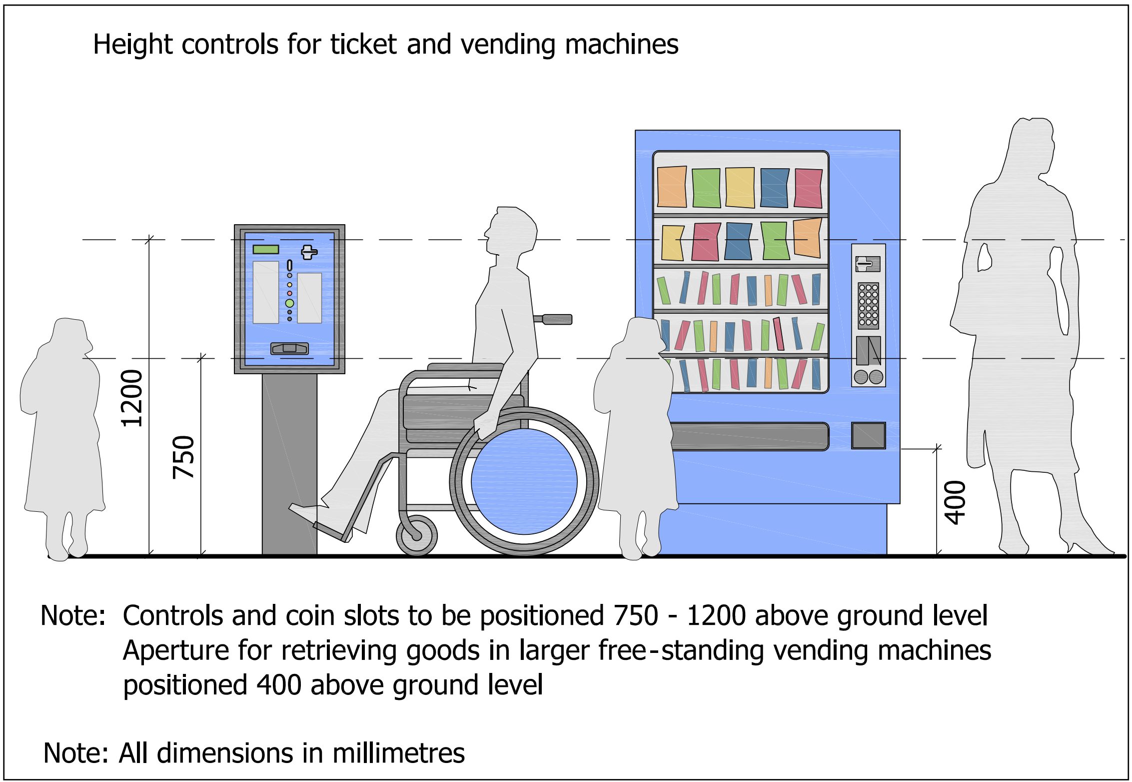
The operable parts of ticket dispensers and vending machines should be positioned between 750mm and 1200mm above floor level, as in **Figure 6.6**. Any apertures for retrieving tickets, coins, and goods should be large enough to enable a person to use their whole hand. They should not be so small as to require the use of only the ends of fingers or one or two fingers as this will present difficulties to people with reduced manual dexterity.

For wall-mounted vending machines, the dispensing drawer or tray should be positioned within the same limits for operable parts, that is, between 750mm and 1200mm above floor level. For larger, free-standing drink and snack dispensers, where this is likely to be impractical, the aperture for retrieving goods should be at least 400mm above the floor, as in **Figure 6.6**.

For ticket dispensers designed to be reached from inside a car such as those in multi-storey and underground car parks, refer to **Section 1.4.5** in **Booklet 1: External environment and approach**.

For vending machines in toilet facilities, refer to **Section 5.10.17** in **Booklet 5: Sanitary facilities**.

Figure 6.6. Height of controls for ticket and vending machines.



Checklist – Ticket dispensers and vending machines

- Ensure height of controls is as **Figure 6.6.**
- Make sure apertures for retrieving goods enable the use of a whole hand.

6.8.2 Automated teller machines (ATMs)

ATMs are commonly located in both internal and external environments. They are often inset into the external walls of banks and supermarkets, but may also comprise free-standing secured units positioned inside banks or shopping centres, within the open-plan foyer of a building, or in an external forecourt.

The location of ATMs should be clearly signed. The preferred position for signage is above the ATM where it faces forwards and to both sides. This enables the sign to be seen clearly, from across a road, for example, and also on the approach along an access route on either side. Where ATMs are located externally, signage should be illuminated.

The approach to ATMs should be level and free of obstructions. In external environments, if a cross-fall is necessary to allow proper drainage and prevent the formation of puddles on a footpath, the gradient should not exceed 1 in 50.

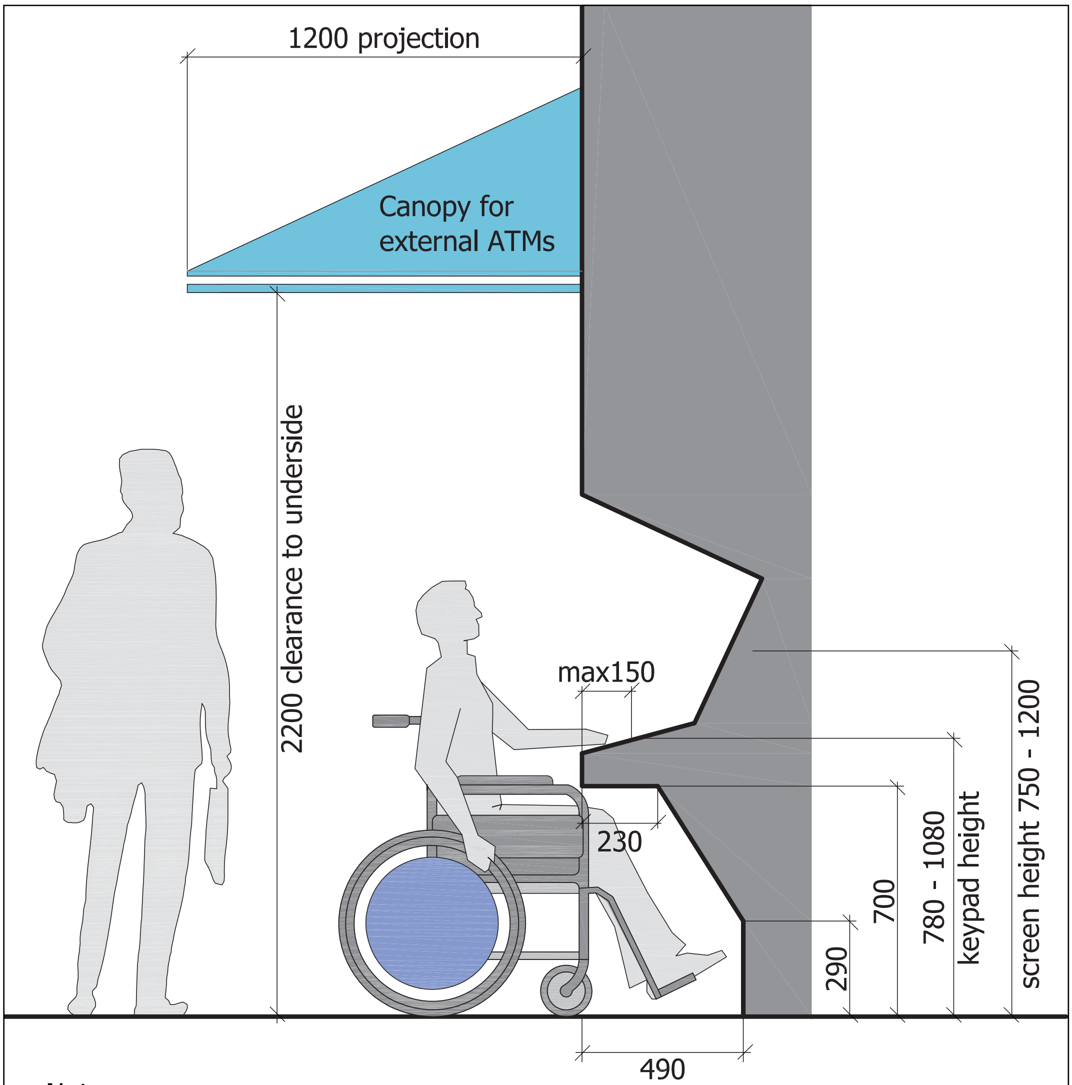
There should be a clear area at least 2400mm x 2400mm in front of ATMs to enable forward or side approach for people using wheelchairs or electric scooters. An area of this dimension also affords an element of privacy at ATMs if the queue starts outside the area. The area leading up to and around ATMs should be illuminated to a level of at least 200 lux.

Wherever possible, external ATMs should be protected by a canopy, extending to a recommended depth of 1200mm from the building face and with a clearance of 2200mm to the underside. External ATMs should also be orientated to reduce the incidence of direct sunlight on the screen as this can obscure visibility.

A knee space 490mm deep x 700mm high should be provided at ATMs to facilitate frontal approach for wheelchair users, as **Figure 6.7**. The knee space should be 1500mm wide (minimum 1000mm).

should be tilted up by 15 degrees (+/- two degrees) towards the user and should not be more than 150mm from the leading edge of the machine. They should be at a height of 780 to 1080mm above ground or floor level.

Figure 6.7 Key dimensions for ATMs.



Note:
- 2400 x 2400 clear space for approach in front of ATM
- Knee recess 1500 wide
- Screen tilted 55 to 70 degrees from horizontal
- Keypad tilted 15 degrees from horizontal

Note: All dimensions in millimetres

Keys on keypads should be 15mm x 15mm and spaced at 18.2mm between centres, allowing a gap of 3.2mm between keys. Keys should be raised at least 1mm above the surrounding surface and preferably be slightly concave.

Numeric keypads should follow the same layout as a telephone, rather than a calculator. Numerals should be 10mm high and should contrast visually with the key. A raised pip on the ‘5’ key assists orientation for people with visual difficulties. Keys should be matt finished, and lighting should be arranged so as to avoid any reflections.

Screens should be 750 to 1250mm above the ground, and tilted 55 to 70 degrees from horizontal. Screens should be 230mm wide and 250mm high to accommodate 18 point text.

Instructions for the use of ATMs should be simple and clear. Text should be a minimum of 18 point. Where use of an ATM involves reading screen text, the speed of text flow should be such as to allow time to pause and consider each instruction. Individual users should be able to control the rate of screen change or scrolling: this should not be preset as the time required by different people will vary widely. There should be good visual contrast between the text and screen background, and a logical sequence of commands. Screen software for ATMs can be designed so as to recognise individual users and to adjust the size and speed of screen information accordingly. A choice of language should be available for on-screen instructions.

The keypad and screen should be evenly illuminated to a level between 200 lux and 300 lux. Lighting should be positioned so that is does not present a source of glare or create reflections on the screen.

Voice output technologies and bluetooth are now being considered as new solutions to enable more people especially those with visual difficulties to operate ATM machines.

The way of inserting the card and the order or structure of commands should not be changed without warning, as this may confuse customers with visual difficulties and other people who are accustomed to the machine.

Card-insertion points should be positioned at a height of 950 to 1000mm. There should be an illuminated bar immediately above the slot, which should flash when a card is inserted or withdrawn. The mouth or lead-in for the card should be wide with a gradual reduction in area up to the intake. When a card is ejected, it should protrude at least 25mm to facilitate grasping. The force required to insert or retrieve a card from the slot should be no more than 22.2 Newtons.

Cash, receipts and statements ejected by ATMs should project at least 25mm to enable people to grasp and remove them easily. The force required to remove any of these items should not exceed 22.2 Newtons.

Receipts and statements should be printed in a bold, clear typeface that is as large as possible, enabling them to be read easily. Alternatives could also be offered, such as larger print documents posted or emailed to a home address or on-screen information in a larger typeface.

Where ATMs incorporate a cash-deposit facility, the opening for envelopes should preferably be motorised. Where this is not possible, drawers or flaps should be capable of being operated with a single hand and require a force no greater than 22.2 Newtons.

Outdoor parking meters should either be in an adequately lit area or have a guide light for the coin or card slot.

For further information on public access terminals Please refer to 'About Public Access Terminals Accessibility' on the Centre for Excellence in Universal Design's website.

Checklist – Automated teller machines
• Ensure signage is clearly visible from the front and side.
• Illuminate external signage.
• Provide a clear area for approach, 2400mm x 2400mm, and a level surface.
• Illuminate approach area to a minimum of 200 lux.
• Ensure external ATMs are protected by a canopy.
• Orientate ATMs to minimise the likelihood of glare on the screen.
• Provide a clear knee space to facilitate frontal approach for wheelchair users.
• Ensure keypads are tilted upwards and comprise large keys with clear numerals.
• Include instructions that are simple and easy to understand.
• Ensure screen text is minimum 18 point and contrasts visually with the screen background.
• Employ screen change and scrolling controlled by user.
• Ensure choice of language is available for on-screen instructions.
• Make sure illumination at the keypad and screen is between 200 and 300 lux.
• Ensure the card-insertion point is wide.
• Make sure cards, cash, receipts and statements all project at least 25mm to facilitate grasping.
• Include printed material with a large, bold typeface.
• Ensure the force required to operate cash-deposit drawers and to retrieve card does not exceed 22.5 Newtons.

6.9 Kitchen and Refreshment Facilities

Where kitchen facilities and areas for making refreshments are provided in buildings, they should be accessible, useable and understandable to everyone. They should be located on an accessible route and be in close proximity to associated dining or seating areas. An open-plan arrangement for kitchen and dining areas is preferable as this maximises circulation space and avoids the need for people to pass through doors whilst carrying trays, plates or drinks.

Checklist – Kitchen and refreshment facilities
• Locate close to dining or seating areas.
• Consider an open-plan arrangement to facilitate easier circulation between kitchen and dining areas.

6.9.1 Layout and work surfaces

Kitchens should incorporate work surfaces and appliances at different levels to cater for people who work at different heights. Lower work surfaces should also incorporate a clear knee space underneath to enable people to sit whilst using appliances or preparing food.

Wherever possible, work surfaces at two different heights should be provided within a kitchen or refreshment area to cater for a wide range of people, as in **Figure 6.8**.

An alternative arrangement is to provide adjustable-height work surfaces. These should be electrically operated so that they are easy to adjust to meet individual needs.

Fixed-height work surfaces for people who are standing should be 900mm high and work surfaces for people who are seated should be 760mm high. For people who are seated, a clear knee space 700mm high x 600mm deep x 800mm wide should be provided directly below hobs, sinks, and task areas, and adjacent to appliances including ovens, washing machines, dishwashers, refrigerators, and freezers.

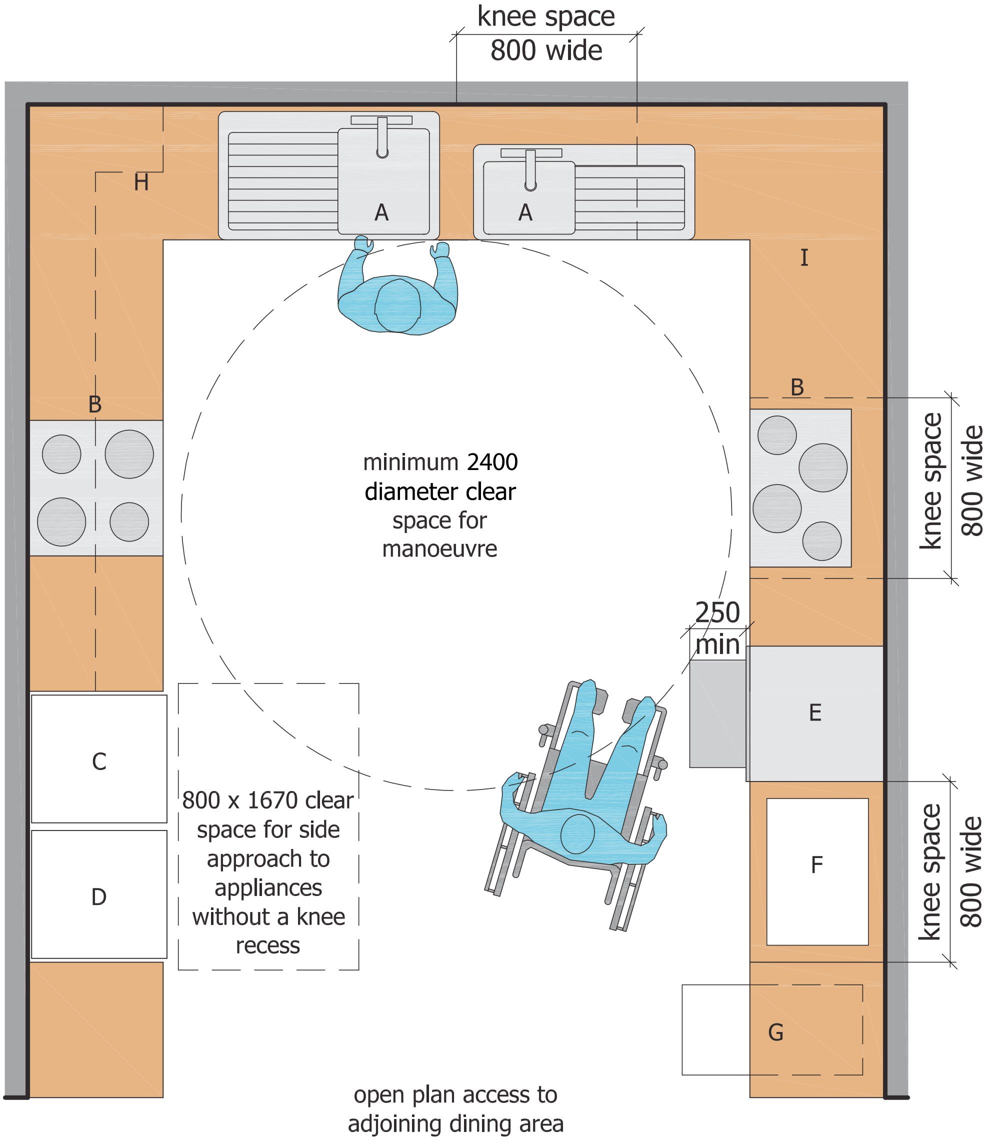
The side on which the knee space is located should relate to the direction of opening of appliance doors and the location of any controls. Knee spaces should be clear of any support brackets, legs, pipes, and cables. To enable convenient approach to any knee recess and alongside any appliance requiring sideways access, a clear space 1370mm long x 800mm wide should be provided.

Where fixed base units are provided, they should incorporate a 150mm deep x 250mm high toe recess to facilitate easier access to counters for wheelchair users.

Where refreshment areas provide a limited range of facilities for tasks of relatively short duration, for example, equipment for making drinks only or for heating food in a microwave oven, it may be acceptable to provide a single-height work surface for all users, 850mm high, in place of dual-height work surfaces. A work surface of this height should not be provided in kitchens where full meals are prepared as it is likely to be uncomfortable and unsuitable for people undertaking tasks of longer duration.

Kitchens with work surfaces and appliances on three sides should incorporate a turning area 2400mm in diameter, clear of all units, as shown in **Figure 6.8**. Kitchens or refreshment facilities with work surfaces on two sides, and where access is possible at both ends, should provide a clear space 1100mm wide between all units, as shown in **Figure 6.9**.

Figure 6.8 Kitchen layout with dual-height work surfaces.



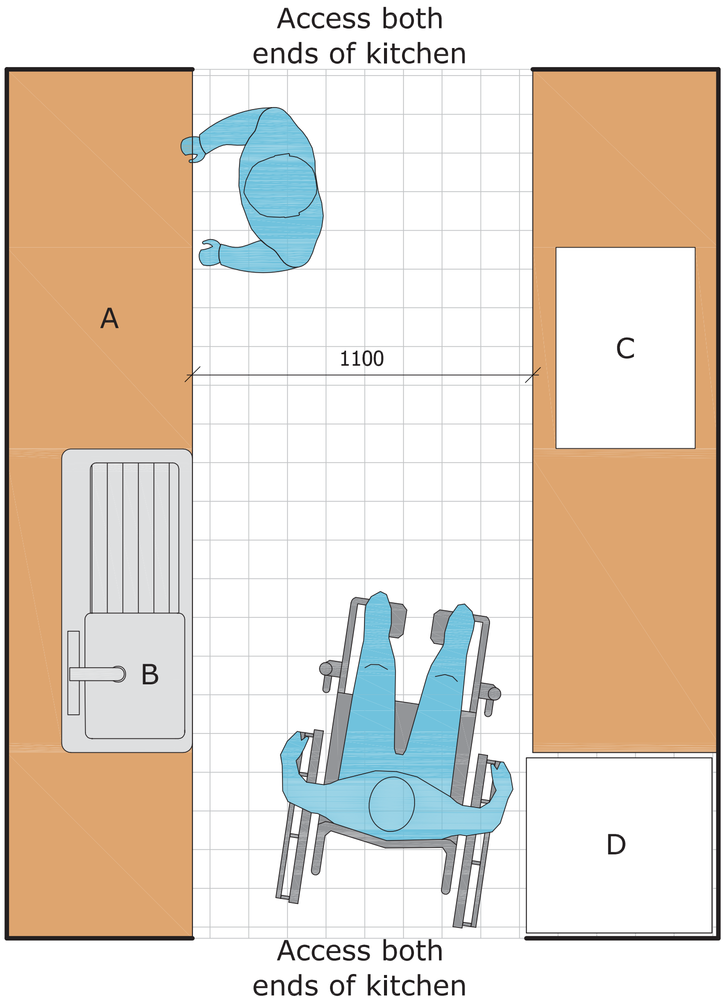
Note:

- Work surface for people in a standing position to be 900 high with cupboard units below
- Work surface for people in a sitting position to be 760 high with clear knee space 700 high x 600 deep x 800 wide

A. Sink bowl max 150mm deep and insulated on underside
B. Hob
C. Refrigerator raised on 200mm plinth
D. Freezer raised on 200mm plinth
E. Oven with side-hinged door
F. Microwave
G. Movable storage unit
H. Wall-mounted units (shown dotted) may be positioned above the work surface. All cupboards to open 180 degrees
I. Heat resistant work surfaces

Note: All dimensions in millimetres

Figure 6.9 Galley-style kitchen with single-height work surfaces.



Note:

A. Single-height work surface and appliances for shared use 850 high
B. Sink bowl max 150mm deep and insulated on underside
C. Microwave
D. Refigerator and freezer raised on 200mm plinth

Note: All dimensions in millimetres

The layout of all kitchens and refreshment facilities should be designed to minimise travel distance and avoid the need to carry items across a room. This will benefit everyone and will reduce the likelihood of congestion when more than one person is using the facility. The position of task areas and appliances should be logical and facilitate effective and efficient use of all storage, preparation, cooking and cleaning areas.

L-shaped and U-shaped arrangements are generally the most efficient and compact. They also provide a continuous work surface, which is useful to people who need to slide rather than carry items from one work area to the next. It is particularly beneficial for hobs and sinks to be positioned on a continuous section of counter, so that kettles and saucepans can be filled with water and slid along rather than lifted.

Galley-style kitchens with parallel work surfaces on opposite sides are generally less efficient and require items to be carried from one side of the kitchen to another.

Image 6.8 Example of a well-designed, accessible kitchen with easy access to the living space.

The provision of pull-out boards in addition to fixed work surfaces may provide an alternative or supplement to the use of lower-height counters. They are particularly useful adjacent to hobs, ovens, and refrigerators. They need to be secure and able to take weight of saucepans etc without bending or wobbling. They may also be suitable where space is limited and it is difficult to provide the recommended clear knee space beneath work surfaces due to storage requirements. Pull-out boards should contrast visually with surrounding surfaces so that they are clearly visible when pulled out. The leading edge of the board should be easy to grip and slide in and out.

Work surfaces in kitchens and refreshment areas should contrast visually with wall and floor surfaces. Cupboard doors and drawer fronts should also contrast visually with adjacent surfaces so that all are clearly identifiable.

Checklist – Layout and work surfaces
• Incorporate work surfaces and appliances at different levels, as shown in **Figure 6.8.**
• Ensure standing-height surfaces are 900mm high and surfaces for seated approach are 760mm high.
• Provide clear knee space to lower work surfaces and appliances for people in a seated position.
• Consider the use of adjustable-height units.
• Provide a clear area of 2400mm diameter between units in L- or U-shaped arrangement.
• Provide a clear width of 1100mm between parallel work surfaces with access at both ends.
• Install an efficient kitchen layout that comprises a continuous work surface.
• Consider the use of pull-out boards to supplement work surfaces.
• Ensure work surfaces to visually contrast with adjacent walls and floors.

6.9.2 Storage in kitchen and refreshment areas

Adequate storage facilities should be provided in kitchens and refreshment areas to enable items to be stored and retrieved safely and conveniently. The provision of adequate storage is likely to reduce clutter on work surfaces that may otherwise obstruct the use of appliances and task areas. Storage facilities should be accessible, useable and understandable to everyone using the kitchen or refreshment area.

Storage facilities may include pull-out units with banks of drawers that are accessible on both sides, or swing-out shelves that avoid the need for a person to bend and reach into a below-counter cupboard. Where space is at a premium, the use of storage units on castors, or trolleys with drawers or open containers, may be considered. These could be located under fixed work surfaces and moved away when clear knee space is required.

Where moveable units incorporate a suitable flat upper surface, they may also be used as an additional low worktop. Cupboard units in the corner of rooms should be fitted with rotating carousel units to enable everyone to access the full range of items. Open shelves fitted above lower-height work surfaces should be no higher than 1150mm above floor level.

High-level, wall-mounted cupboards may be provided to supplement storage capacity. However, as these are likely to be beyond the reach of many people, they should not be used for items in regular use. They could be used, for example, to store surplus crockery and provisions, as long as adequate supplies are available within easy reach at a lower level.

Image 6.9 Example of well-designed, accessible cupboards, fridge, and oven.

Drawer and cupboard door handles should all be easy to grip and should contrast visually with the drawer or door surface. Small knob handles and recessed pulls should be avoided as they are difficult for many people to use.

Pull-handles are preferred; they should be mounted close to the top of base units and close to the bottom of higher, wall-mounted cabinets. Hinged cupboard doors should be capable of swinging open to 180 degrees so that the door, when open, does not obstruct access and manoeuvring space, or present a head-height hazard.

Image 6.10 Example of accessible cupboards.

Checklist – Storage
• Ensure storage facilities are safe to use and facilitate easy retrieval of goods.
• Consider the use of pull-out units, swing-out shelves, carousels and trolleys to facilitate easy access.
• Install handles that are easy to use and contrast visually with the drawer or door front.
• Make sure cupboard doors are hinged to 180 degrees.

6.9.3 Sinks and appliances

Sinks should be positioned with their centreline no closer than 460mm to any side wall, cupboard unit, or a return in the work surface. Sink bowls in kitchens that are set into lower-height counters to enable use by people in a seated position should be no deeper than 150mm.

As a person's knees and legs will be positioned close to the base of the sink, the underside of the sink bowl should be insulated and there should be no abrasive surfaces or sharp edges. The water supply pipes and waste outlet underneath the sink should be fixed as close to the rear wall as possible so that they do not project into the clear knee space. Hot water pipes should be insulated wherever there is a possibility that the pipes could be reached or touched inadvertently. Sinks and appliances set into adjustable-height units should be fitted with flexible pipe connectors to the water supply and waste pipes, and should enable the sink to reach the lower and upper adjustable limits.

Sink taps should be lever type, with the lever requiring a quarter turn between off and full flow. The outlet should be a tall swivel-neck mixer type, positioned so that the outlet can be twisted over the draining board to fill kettles and saucepans. This removes the need for a person to hold large items while filling them with water. Taps should be positioned within easy reach, which may necessitate placement to the side rather than the rear of a sink unit.

Pop-up plugs, operated with a lever, are generally easier for many people to use than plugs with chains. The lever should be clearly visible and easy to use with a single hand.

Hot water supplied at sinks should not exceed 40 degrees Celsius for safety reasons. The water pressure supplied via sink taps should be adjusted so that the water does not spray or splash people using the sink or adjacent surfaces.

Image 6.11 Example of an accessible sink.

Image 6.12 Example of an adjustable-height, accessible sink. Note the sink may be raised or lowered as suits the user.

Hob and oven units should be separate so that each can be placed at their optimum height, and positioned with a work surface between them.

Ceramic hobs are preferable as these enable saucepans to be slid from one surface onto another rather than be lifted.

The work surface either side of a hob and oven should be heat-resistant so that saucepans and dishes can be transferred directly.

Image 6.13 Example of an accessible ceramic hob.

Hobs positioned over a knee recess should be insulated on the underside. Hob controls should be easy and safe to operate, and should be located at the front of the unit rather than the side so that they are within easy reach of all users especially those with limited strength and reach, which will reduce the risk of burning. Electric hobs should incorporate a means of warning that the rings are still hot once they are switched off. Burners on gas hobs should be self-igniting so that they can be operated easily with a single hand.

Ovens provided for people in a seated position should be positioned so that the lower rim is 760mm above floor level.

Ovens provided for people in a standing position should have the lower rim 850mm above floor level.

Oven doors should be side hung and should open to 180 degrees so as not to interfere with the approach space or present a hazard to other people. Ovens with side-hung doors should have a heat-resistant pull-out board directly below the oven, extending at least 250mm x the full width of the oven. The shelf or board should be capable of supporting a heavy dish or tray.

Image 6.14 Example of an accessible kitchen design.

Oven controls should be positioned between 750mm and 1050mm above floor level, with any displays no higher than 1200mm. Controls should be clearly visible, simple, and easy to operate with a single hand.

Microwave ovens should be mounted on a surface or built in to a unit so that the base of the oven is no more than 850mm above floor level. The uppermost control should be no more than 1150mm above floor level and the controls should be easy to understand.

Cooker hoods generally have fixed controls that are out of the reach of many people. Wherever possible, switches should be reorganised or repositioned to be within reach of everyone expected to use the kitchen. In some cases, the use of a low-level pull cord may be appropriate.

Consideration should be given to the provision of a refrigerator, freezer, dishwasher, and washing machine installed on a 200mm-high plinth. This will create easier access for wheelchair users and people who may not be able to bend to access the lower shelves and drawers of floor-standing appliances. Such provision is likely to depend on the overall space available, as the use of a plinth will reduce the opportunity for work surfaces typically installed above such appliances.

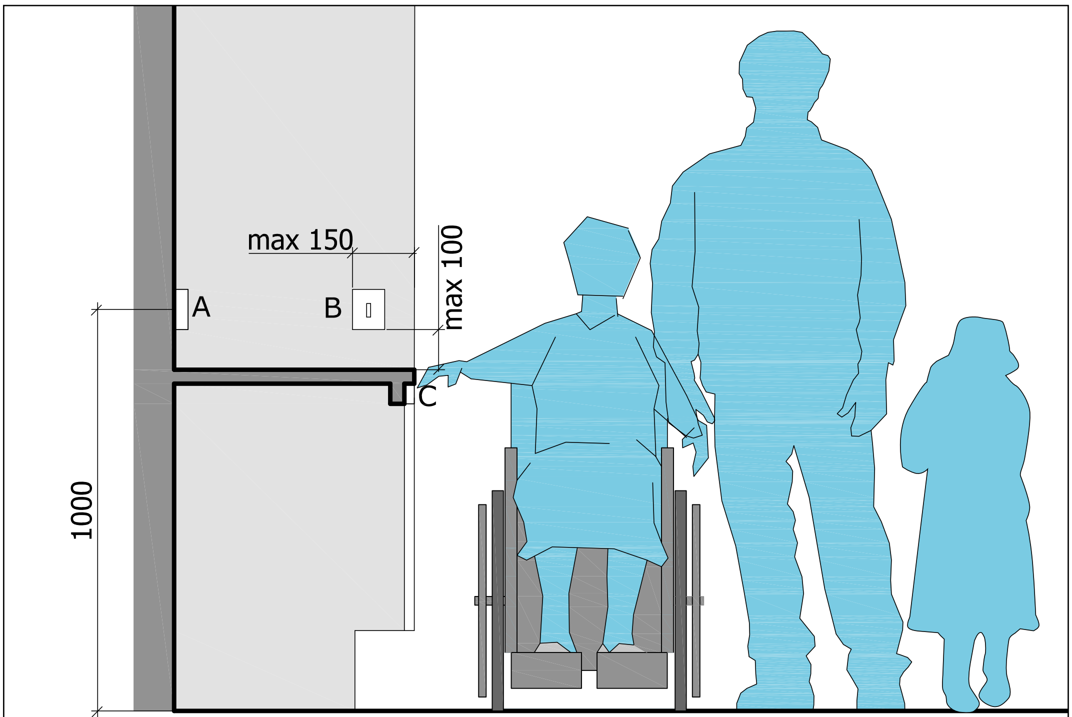
A first aid cabinet, fire blanket, and a multi-purpose, hand-held type fire extinguisher should be provided at 450 to 1300mm above floor level and should be easily accessible, useable, and understandable to those needing to use the equipment.

Kitchen utensils and crockery, if provided, should contrast with the worktop colour, to assist people with visual difficulties.

6.9.4 Switches and socket outlets

Switches for built-in appliances and socket outlets for portable appliances in kitchens and refreshment areas should be clearly visible and positioned within easy reach, as shown in **Figure 6.10**.

Figure 6.10 Position of switches and sockets.



Note:

A. Socket on rear wall above knee access
B. Socket on return wall or side of unit above fixed base unit
C. Isolating sockets on rear wall above fixed base units

Note: All dimensions in millimetres

Where there is a clear knee space under a work surface, switches and sockets may be positioned on the wall at the rear of the work surface, no more than 1000mm above floor level. Where there is no clear space below a work surface, switches and sockets should be positioned on a return wall, no more than 100mm above the work surface or 150mm back from the front edge.

Switches for socket outlets positioned on the rear wall should be located on the front fascia as they will be much easier to operate in this location. However, socket outlets should not be positioned on the fascia as trailing leads and flexes would present a hazard in this location.

Where adjustable-height sinks, hobs, and work surfaces are provided, wall-mounted switches and socket outlets should be positioned where they will not obstruct movement of the work surface or frame.

Switch and socket housings should visually contrast with the wall or other mounting surface.

Refer also to **Section 4.7** in **Booklet 4: Internal environment and services.**

Checklist – Switches and socket outlets
• Ensure switches and sockets are clearly visible and within reach.
• Position switches and sockets no higher than 1000mm above floor level where a knee space is provided.
• Position switches and sockets towards the front of the work surface or on a return wall where there is no knee space.
• Avoid the potential for trailing leads and flexes.
• Carefully position switches and sockets adjacent to adjustable-height units.
• Make sure switch and socket plates visually contrast with the surrounding wall surface.

6.10 Windows

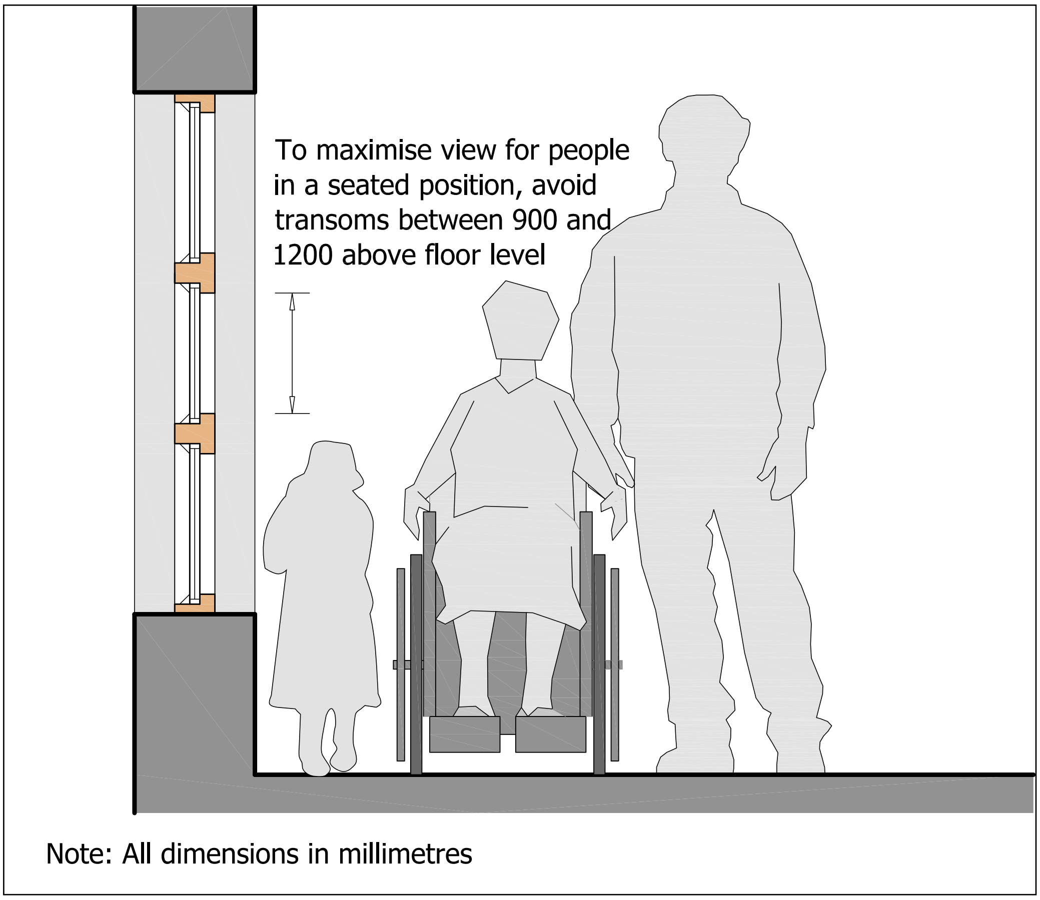
Windows are essential in buildings to provide natural lighting and ventilation. They also provide a visual link with the external environment, which can aid orientation and wayfinding within a building or site. A good view through a window can greatly enhance the usability and enjoyment of a room or space in a building.

The location, size, and number of windows in a room or building will depend on a number of factors, including the requirement for natural light and ventilation, thermal performance, security, safety, and privacy - balanced against the need to avoid glare and overheating from direct sunlight.

In rooms where it is important for people to be able to see clearly through a window, the position of the sill and any horizontal framing members should be carefully considered.

To enable people who are seated to enjoy an unobstructed view, the zone of a window between 900mm and 1200mm above floor level should be free of transoms, as shown in **Figure 6.11**.

Figure 6.11 Position of window transoms.



Where windows are designed to be opened manually, the approach and controls should be accessible. Windows should not open outwards onto circulation routes or where they may cause an obstruction or potential hazard. In toilets, bathrooms and kitchens, wherever windows are to be opened manually, they should be positioned where access is not obstructed by sanitary appliances, built-in units, or work surfaces.

Windows located at first-floor level and above should be fitted with a restrictor device that prevents the window from being opened more than 100mm. This is to prevent the handle from being placed out of reach when the window is open and also to avoid the risk of any person having to lean too far through an open window in order to reach the handle to close it. Restrictor devices can be released in order to facilitate window cleaning and maintenance.

Handles and locks should be positioned between 800mm and 1000mm above floor level. All window handles should be operable with a single hand, preferably with a lever action, and should not require precise hand control. Twist-turn handles or knobs should not be used. The force required to lift a lever handle with a rounded or oval cross-section should be no greater than 5.5 Nm and 8 Nm to press down. The force required to both press down and lift a lever handle with a rectangular cross-section should be no greater than 4 Nm. (Nm is a measure of torque force, which is the force in Newtons (N) exerted over a distance of one meter (m), perpendicular to the angle of rotation.) Sideways-sliding windows should be capable of being opened and closed with minimal force.

The use of electrically-powered window-opening devices should be considered in all cases where handles are likely to be out of reach. Such devices may comprise wall-mounted switches or a hand-held remote-control unit. Where wall-mounted switches are provided, they should be clearly identified, should contrast visually with the surrounding surfaces, and should be positioned between 750mm and 1000mm above floor level.

Checklist – Windows
• Ensure window provision balances environmental performance with safety, security, privacy, and visual comfort.
• Avoid transoms between 900mm and 1200mm above floor level.
• Install window controls that are accessible, useable, understandable, and positioned between 800mm and 1000mm above floor level.
• Use lever handles that require minimal force to operate.
• Ensure windows do not present an obstruction or hazard when open.
• Ensure windows at first floor level and above do not open more than 100mm.
• Consider electrically-powered, remote-control devices for opening and closing windows that are out of reach.

A1 Definition of Universal Design

Universal Design

'Universal Design refers to the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or disability.'

Synopsis of the Disability Act, 2005.

A2 Human Abilities and Design

The following piece of text is an extract from European Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'.

It states that: Physical, sensory and mental abilities vary from person to person and for individuals as they get older. Diversity is normal. Designers need to be aware of difference across the range of human abilities, and of associated design considerations.

(a) Physical abilities

This includes walking, balance, handling, pulling, pushing, lifting and reaching. Many activities involve simultaneous use of more than one of these skills. Physical strength and stamina may also affect people's abilities to perform these actions.

Walking

For some people walking on the level or up gradients is difficult. Some people may have a limited walking range, may have difficulty with turning movements or may use mobility devices such as crutches or a walker. They may need to stop frequently, to regain strength or catch breath. Design considerations include provision of handrails, seats at regular intervals, convenient set-down parking and adequate time for slower pedestrians at road crossings. Designers should also consider the needs of people walking and engaging in sign language when designing access to and from buildings plus within the buildings themselves.

Balance

Balance limitations can affect someone's gait or control of hand movements. Design considerations include handrails, regular seating, and providing controls within easy reach. A surface against which a person may stumble against or walk into should be designed to limit abrasion.

Handling

A significant minority of people are left-handed. Some people may have restricted use or no use of one or both hands, or may have limits on strength or precision. Facilities and components should be designed to be suitable for use with either hand or with one hand only. Handling includes gripping, grasping and manipulation. Each of these has a different purpose with specific design considerations. For instance, components should be designed to be easily held. The circumference of the supporting structure and stability are critical. Manipulation involves the moving, turning and twisting of components with a hand or hands. For those who have limited manipulation abilities, size and shape and ease of movement are critical. Another option to consider is to design for manipulation by using a pushing, pulling or pressing action using a clenched fist, or by using the wrist or the elbow.

Strength and endurance

Strength and endurance may be required on sloping paths and floors, stairways and long travel distances, when sustained effort may be needed.

For those with limited endurance, frequent resting-places are essential.

People generally find it easier to push a component, than to pull it. This is particularly so if the individual uses a wheelchair. Self-closing devices on manual doors can be difficult for some people to operate, particularly if the doors are required to resist wind forces. For these reasons, doors that open and close automatically are preferred.

Lifting

Activities such as opening a vertically sliding sash window and an upward opening access gate, should be designed to be easily operated with minimal force.

Reaching

Design has a role to play in ensuring that key components in a building or environment are in easy reach, bearing in mind the range of people's sizes and abilities. Having components within easy reach is particularly important for those with more severe limitations in mobility. The reach range is dependant on the height and arm length of the person, use of the arms, and the balance and mobility of the upper body. A 'comfortable reach range' has been defined as one that is appropriate to an activity that is likely to be frequent and in need of precise execution and that does not involve stretching or bending from the waist. Putting things within comfortable reach can ensure use by a greater number of people. An 'extended reach range' has been defined as one that is appropriate to an activity that is likely, neither to need precision nor to be frequent and that can involve stretching or bending from the waist.

(b) Sensory abilities

Speech

Some conditions affect the capacity for or quality of speech. Two-way communication can be facilitated by environments designed to minimise barriers to hearing low or indistinct speech.

Hearing

People differ in their capacity to hear sound, to determine its direction, its source, to discern pitch, frequency, volume and variation and to separate out different sounds. Hearing quality is important for communication, for information, and for detection of hazards such as traffic. Many people with hearing difficulties

use a hearing aid which amplifies all sounds caught by the microphone, making communications very difficult in noisy environments. Keeping background noise level low is essential. The selection of structural and surface materials can make a substantial difference in audibility. Auditoriums, meeting rooms and reception areas can benefit from additional sound enhancement such as a loop system. The careful design of illumination can assist in communication such as lip reading and sign language. Provision of visual information and visual alarm systems can communicate information to those who have hearing difficulties or who cannot hear. Designers should also consider the colour and size of rooms and even the furnishing arrangement as this is very important for visually based communication. Also the use of vibration as means of sensing others should be considered.

Sight

Vision allows an individual to be aware of the luminance of surfaces, objects, form, size and colour. For people who are blind or who have a visual difficulties, the provision of suitable tactile walking surface indicators and tactile or acoustic warnings at hazardous locations, should provide information on using the built environment and should limit the risk of injury. The built environment can be designed for orientation by providing sound cues and tactile cues. An easily discernible system of 'way finding' should also be considered. For people with limited, but low vision, effective visual contrast between surfaces or objects helps to identify critical locations. Warning markings on glass surfaces, and markings on the edges of stair treads, help minimise hazards.

Differences in friction between one floor surface, or one stair tread surface, and the next should be avoided. Therefore, adjacent surfaces that display different standards of slip-resistance, or that depend on raised surfaces, should be carefully considered

Touch

In selecting surfaces in the built environment that people will need to touch (such as handrails, handles, knobs and controls, tactile information), it is important to select materials that avoid distress, injury or allergies. Surfaces should be free of abrasions. Metals that may cause adverse reactions when touched should be avoided.

(c) Mental abilities

Mental abilities include cognition, intellect, interpretation, learning and memory. People differ in their knowledge, their capacity to understand, reason, or interpret information. Designing for differences in these capacities helps provide a usable environment for the population at large, from the very young to the old, and people of diverse abilities. Means of communication in the environment should be designed to be immediately and easily understood, and correctly interpreted. As people age, some experience loss of memory or find it increasingly difficult to absorb new information, so changes in the environment should be carefully considered before implementation.

Design considerations that take account of mental abilities

Aural and visual messages should be simple, clear and have immediate impact. Figures, symbols and simple words are likely to be the most effective. Symbols should be instantly recognisable as representing images seen and activities undertaken in everyday life.

Way finding should be simple, such as tactile, graphic, audible or architectural cues that are easy to follow. Signage should be large and clear. Way-finding maps should be clear, indicate the person's whereabouts in the building or facility, and be free from extraneous information.

(d) Age and size

Accommodating the developing child

It is important to create environments that are safe, accessible and useable for children. Individual components should be safe and useable as age-appropriate. Learning to manage risk is an essential part of a child's development.

Accommodating ageing adults

Life span within the human population is increasing. More and more we expect to maintain an economic and social life within both the public and private domains as we age. However, many human faculties are in decline as we age, such as mobility, dexterity, stamina, strength, hearing, sight, or memory. Familiarity with a particular environment is important.

Diversity of size

The population contains a diversity of sizes and heights, from children, to the diversity in the height of fully-grown adults. The positioning of components and the heights of building elements such as steps should recognise the diversity of height. Increased weight and girth is now also a feature of the population.

Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons and persons with disabilities'.
http://www.cen.eu/cen/Sectors/Sectors/ISSS/About_ISSS/Documents/cclcgd006.pdf

A3 Further Reading

National and international standards and codes of practice

AS 1428.1-2001 Design for access and mobility. General requirements for access – New building work.

AS 1428.2-1992 Design for access and mobility. Enhanced and additional requirements – Buildings and facilities.

AS 1428.3-1992 Design for access and mobility. Requirements for children and adolescents with physical disabilities.

AS 1428.4-2002 Design for access and mobility. Tactile indicators.

BS 4800: 1989 Paint colours for building purposes (whilst the colours in this standard cannot be seen on CD-ROM or online the text can still be used).

BS 5395-1:2000 Stairs, ladders and walkways – Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders.

BS 5588-8:1999 Fire precautions in the design, construction and use of buildings – Part 8: Code of practice for means of escape for disabled people.

BS 5776:1996 (incorporating amendment No.1) Specification for Powered stairlifts

BS 6440:1999 (Incorporating amendment No.1) Powered lifting platforms for useby disabled persons – Code of practice.

BS 6440:1999 Powered lifting platforms for use by disabled persons – Code of practice (partially superseded by BS EN 81-40:2008. The remainder of BS 6440:1999 will eventually be superseded by EN 81-41: 2009 Safety rules for the construction and installation of lifts – Special lifts for the transport of persons and goods – Part 41: Vertical lifting platforms intended for use by persons with impaired mobility).

BS 6465-1:2006+A1:2009 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.

BS 6571-4: 1989 Vehicle parking control equipment – Part 4: Specification for barrier type parking control equipment.

BS 7036-1:1996 Code of practice for Safety at powered doors for pedestrian use – Part 1. General.

BS 7036-4:1996 Code of practice for Safety at powered doors for pedestrian use – Part 4. Low energy swing doors.

BS 7997:2003 Products for tactile paving surface indicators – Specification.

BS 8300:2009 (Incorporating amendment No.1) Design of buildings and their approaches to meet the needs of disabled people – Code of practice.

BS 8493:2008 (+A1:2010): Light reflectance value (LRV) of a surface – Method of test.

BS 8501:2002 Graphic symbols and signs – Public information symbols (AMD 16897).

BS EN 115:1995 Safety rules for the construction and installation of escalators and moving walkways.

BS EN 15838:2009 Customer contact centres, Requirements for service provision.

BS EN81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passengers lifts – Part 70: Accessibility to lifts for persons including persons with disability.

Building Regulations (Part M Amendment) Regulations 2010 (S.I. No. 513 of 2010).

Citizens Information Board – Accessible information for all (2009).

DD 266:2007 (Draft for Development) Design of accessible housing – Lifetime home – Code of practice.

I.S. EN 1991-1-1:2002 – Eurocode 1: Actions on structures Part 1-1: General actions – densities, self weight, imposed loads for buildings (including Irish National Annex: 2005).

I.S. EN 81-1: 1999 Safety rules for the construction and installation of lifts – electric lifts (Amd 1) (+A3:2009).

I.S. EN 81-2:1999 Safety rules for the construction and installation of lifts – hydraulic lifts (Amd 1) (+A3:2009).

I.S. EN 81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passenger lifts. Accessibility to lifts for persons including persons with disability (Amd A1:2005).

I.S. EN 997:2003 (+A1:2006) WC pans and WC suites with integral trap (AMD Corrigendum 14805) (AMD 16965).

IEC 60118-4:2006 Electroacoustics. Hearing aids. Induction loop systems for hearing aid purposes. Magnetic field strength (ISBN 978 0 580 50047 3).

International standard for Induction loops. IEC 60118-4.

Irish Code of Practice on Accessibility of Public Services and Information Provided by Public Bodies www.nda.ie/website/nda/cntmgmtnew.nsf/0/3DB134DF72E1846A8025710F0040BF3D/$File/finaldrcode_nda.htm

Key cards should conform to EN 1332. For further information on key cards please see: http://www.universaldesign.ie/useandapply/ict/itaccessibilityguidelines/smartcards/guidelines/smartcardguidelines/cards

Lifetime Homes Standard: http://www.lifetimehomes.org.uk

Norwegian Universal design of building standard, 2009.

Passenger Lift Design: The Machinery Directive 2006/42/EC; Lifts should conform to BS 6440.

National and international reference documents

2020 Vision – Sustainable Travel and Transport: Public Consultation Document. Department of Transport.

Bus Based Park and Ride – A Pilot Scheme. A Report to: Dublin Transportation Office. The TAS Partnership Limited, 2002.

City of London 2006 Facility Accessibility Design Standards. London, Canada, 2006 Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Gallaudet DeafSpace Design Guidelines 2010.

Department of Transport & the National Disability Authority Guidelines for Accessible Maritime Passenger Transport http://www.nda.ie/website/nda/cntmgmtnew.nsf/0/45AA46D1F77D7EF2802576DC005C5954?OpenDocument

Department of Transport, UK 'Traffic Signs Manual'.

Dublin City Council (2007) Variation (No. 21) of the Dublin City Development Plan 2005 – 2011. Available from: http://www.dublincity.ie/Planning/DublinCityDevelopmentPlan/VariationstotheDevelopmentPlan/Documents/AdoptedVariationNo21Spec.pdf.

Guidance on the use of tactile paving surfaces. Department for Transport, UK.

Guidelines for an accessible public administration. Towards full participation and equality for people with disability. Office of the Disability Ombudsman, Sweden.

Inclusive Mobility. Department for Transport, UK.

International Best Practices in Universal Design. A Global review. Canadian Human Rights Commission, 2006.

Irish Wheelchair Association: Best Practice Access Guidelines 2010.

Joseph Rowntree Housing Trust.

Parking for disabled people. Department for Transport, UK.

Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Rail Park and Ride Strategy for the Greater Dublin Area. Dublin Transportation Office, 1994.

Regulation of Bus services outside the Greater Dublin Area. Department of Transport.

"Sign Design Guide and Inclusive mobility," Oxley, P. (2003), Inclusive Mobility. Department for Transport, UK. www.mobility-unit.dft.gov.uk

Smarter Travel 'A Sustainable Transport Future' – A New Transport Policy for Ireland 2009 – 2020. Department of Transport.

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Image 6.10 courtesy of AccessibleLifestyle.com

Image 6.11 courtesy of Granberg Interiors of Sweden.

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The Building for Everyone Series has been printed on environmentally friendly paper stock.

designed by catalysto°

Building for Everyone:

A Universal Design Approach

Building types

7

Centre for Excellence in Universal Design

Creating an environment that can be used by all people, regardless of their age, size, disability or ability.

The National Disability Authority's Centre for Excellence in Universal Design has a statutory role to promote the achievement of excellence in universal design in:

- the design of the built and external environment
- product/service design
- information and communications technologies (ICT)
- the development and promotion of standards
- education and professional development
- raising awareness of universal design

More information and updates on the website at: **www.universaldesign.ie**

Building for Everyone

Booklet 7 - Building types

The other booklets from the
Building for Everyone series:

Booklet 1 - External environment and approach

Booklet 2 - Entrances and horizontal circulation

Booklet 3 - Vertical circulation

Booklet 4 - Internal environment and services

Booklet 5 - Sanitary facilities

Booklet 6 - Facilities in buildings

Booklet 8 - Building management

Booklet 9 - Planning and policy

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7.0 Objectives

The guidance in this booklet promotes the concept and philosophy of universal design and encourages developers, designers, builders and building managers to be innovative and think creatively about solutions that meet the needs of all building users.

The objectives of the series of booklets are to:

- identify and promote best practice with regard to universal design of the built and external environment
- provide best practice guidelines that in no way conflict with the requirements of existing regulations in Ireland
- provide guidelines that are usable by and accessible to the target audience
- promote universal design in Ireland

This booklet aims to:

- identify and promote best practice for access to and understanding of the design of a wide range of buildings with regard to universal design
- increase awareness of, and to encourage designers to identify, the needs of all those who require access to a wide range of buildings to undertake daily activities
- highlight the wider benefits experienced by all when accessible and universal designed features of buildings are provided
- encourage designers to provide universal design solutions for a wide range of buildings that look beyond the minimum requirements of national building regulations

7.1 Introduction

This booklet is part of the series "Building for Everyone – A Universal Design Approach," which aims to provide practical guidance on the universal design of buildings, places and facilities.

Universal design places human diversity at the heart of the design process so that buildings and environments can be designed to meet the needs of all users. It therefore covers all persons regardless of their age or size and those who have any particular physical, sensory, mental health or intellectual ability or disability. It is about achieving good design so that people can access, use and understand the environment to the greatest extent and in the most independent and natural manner possible, without the need for adaptations or specialised solutions (see full definition in **Appendix A1**).

Why universal design?

People are diverse - some are left-handed and some right-handed - and people vary in their age, size and functional capacities. Illness or disability (whether temporary or permanent) can also affect characteristics such as people's mobility, dexterity, reach, balance, strength, stamina, sight, hearing, speech, touch, knowledge, understanding, memory, or sense of direction. A reference list with these booklets indicates some of the key differences in human abilities that should guide design of buildings and of outdoor places. (See full description of Human Abilities in **Appendix A2**).

People of diverse abilities should be able to use buildings and places comfortably and safely, as far as possible without special assistance. People should be able to find their way easily, understand how to use building facilities such as intercoms or lifts, know what is a pedestrian facility, and know where they may encounter traffic.

Given the wide diversity of the population, a universal design approach that caters for the broadest range of users from the outset can result in buildings and places that can be used and enjoyed by everyone. That approach eliminates or reduces the need for expensive changes or retro fits to meet the needs of particular groups at a later stage.

It is good practice to ascertain the needs of the range of expected users as early as possible, and to check the practicality and usability of emerging designs with a diverse user panel.

Designing for one group can result in solutions that address the needs of many others. For example:

- level entry (Step-free) entrances facilitate not just wheelchair users but also people with buggies; people with suitcases or shopping trolleys; people using walking or mobility aids; and people with visual difficulties
- larger toilet compartments provide easier access to wheelchair users; those with luggage or parcels; parents with pushchairs or accompanying small children; those using walking or mobility aids; and larger-sized people.
- clear, well-placed signage that uses recognised symbols or pictograms helps people with reading or cognitive difficulties, and those whose first language is neither English nor Irish

Sometimes one solution will not suit all and a range of options will need to be provided, for example:

- providing both steps and a ramp where there is a change in level
- providing parking ticket machines that offer slots at different heights to facilitate use at standing height, at sitting height, and by people of small stature

This series of booklets is for architects, engineers, planners, developers, designers, building contractors, building workers, building managers and others involved in designing, commissioning and managing buildings and their surroundings. It provides guidance on a universal design approach to all new buildings, and the use and adaptation of existing environments.

Those who commission, design, construct or manage any part of the built and made environment also have a duty of care to adhere to relevant legislation and regulations including equality legislation, building regulations and health and safety regulations.

The guidance is based on a best practice approach drawing on up to date international best practice, guidelines and standards; previous guidance by the National Disability Authority; and extends beyond disability access matters to incorporate a universal design approach. The series is fully compatible with Part M (2010) of the Building Regulations and associated Technical Guidance Documents related to Part M.

A disability access certificate is required for new buildings other than dwellings (including apartment buildings) and certain other works (as set out in Article 20 D (1) of SI 351 of 2009) to which the Requirements of Part M of the Building Regulations apply, which commence or take place on or after 1 January 2012. Further details on these and other relevant standards, codes of practice, and professional codes of practice are listed in **Appendix A3** Further Reading.

The detailed guidance provided here does not represent the only possible solution. Designers may come up with other ways to meet a diversity of users. New materials and technologies that emerge may open up further possibilities of accommodating the diversity of the population.

Checklists are provided throughout the series and while they provide a summary of main considerations and technical criteria, they should not be regarded as a substitute for the main text or an exhaustive list.

A comprehensive **index** is available with the suite of booklets.

The Building for Everyone series is available online at **www.nda.ie** and **www.universaldesign.ie**. Electronic links are provided to relevant sections in the different booklets. As standards and requirements develop, the electronic versions of these booklets will be updated.

The electronic version is produced in accessible PDF format in accordance with the Web Content Access Guidelines 2.0. If you have any difficulties in this regard or require the document, or particular sections, in alternative formats, please contact the Centre for Excellence in Universal Design at the National Disability Authority, **info@ceud.ie** or (01) 6080400.

7.2 Terminology

Accessible Facilities – Facilities that are designed for all users of a building or external environment, including the young and old, and those of all sizes, abilities, and disabilities.

Building user – A person regardless of age, size, ability or disability using facilities in a building or associated external environment.

Horizontal framing member – A horizontal bar running across a window.

Lift core – A standard industry term for the lift/lift shaft used to service an apartment complex / multi-story building.

Plinth – The base or platform upon which a structure or fixed furniture fixture, such as a cupboard, rests.

Raked – The degree to which seating in an auditorium or theatre slopes. A seating rake is where the seats are on terraces (so they slope overall), rather than flat on the floor. This helps sight lines and means you can see over the people in front of you.

Transom – A horizontal crosspiece across a window or separating a door from a window over it.

7.3 Design Issues

Every building has a particular function or range of functions, and its design should ensure that people working in or visiting the building can access and use its facilities.

Some buildings or parts of buildings, such as shops and offices, have only one specific function and should generally conform to guidelines pertinent to these building types. Other buildings, however – particularly larger, multi-use buildings such as community halls – require designers and developers to think more creatively so that the use of the building can be easily adapted to achieve a range of functions. Multi-use buildings are likely to require the careful interpretation and application of a wide range of design guidelines to ensure they are flexible in use, but still convenient and accessible to all.

The use of materials, detailing and general appearance may differ widely for buildings serving a range of purposes, yet the overall aim is the creation of buildings and environments that are universally designed.

In the broadest sense, all types of building, new and old, and all types of landscape, should to the greatest extent possible be accessible to all people in Ireland and to all its visitors, to the greatest extent possible.

7.4 Transport Buildings

This section covers bus, coach and railway stations, harbour and airport terminals, and motorway service areas. Taxi ranks are covered in **Booklet 1: External environment and approach, Section 1.4.8**.

The majority of the detailed guidance in previous booklets is applicable to the design of transport terminals. The design of entrances and horizontal circulation is covered in **Booklet 2**; vertical circulation in **Booklet 3**. The provision of hearing enhancement systems, lighting and surface finishes is covered in **Booklet 4: Internal environment and services**. Guidance on the provision of sanitary facilities is covered in **Booklet 5**, and guidance relating to coin- and card-operated machines, public telephones, information counters, reception and waiting areas and seating is covered in **Booklet 6: Facilities in buildings**.

The provision of universally designed transport starts not at the door of the bus, train, boat or aeroplane, but at the point where someone leaves their home or workplace to undertake a journey.

Access to the external environment, including pedestrian and vehicular environments, is covered in **Booklet 1: External environment and approach** and should be fully considered as an integral part of a journey experience. The sections below deal with the transport buildings and terminals themselves.

Image 7.1 Example of a well-lit, accessible bus stop with seating provided for those waiting.

7.4.1 Location

The location of transport buildings such as bus, coach and railway stations should be carefully considered in relation to the communities they serve and the proximity of public buildings and services, shops, and other local facilities.

As journeys by any individual mode of transport are rarely made in isolation, it is beneficial if different modes of transport can be co-located, such as in a transport interchange that provides rail, bus, and coach services. The convenient co-location of such facilities will promote public transport and have the added benefit of contributing toward a sustainable transport strategy. Where this cannot be provided, bus and coach stations should be located as close as possible to other transport services.

In all terminals and transport buildings, facilities should be provided for a taxi service, and to enable private cars to drop off and collect passengers close to the building entrance.

At railway stations, motorway service areas, harbours, and airports, car parking facilities should be provided, including proximate and prioritised parking for car users with disabilities; parents with small children; older people; and those who have difficulty walking short/medium distances, as **Booklet 1: External environment and approach**.

Checklist – Location
• Consider location in relation to other community facilities and public services.
• Ensure different modes of transport are co-located.
• Incorporate taxi ranks and setting-down points.
• Provide designated accessible car parking bays at railway stations, motorway service areas, harbours, and airports.

7.4.2 Size and layout

The size of transport buildings – such as bus and coach stations – will be dictated largely by the number of services, frequency of use, and expected passenger numbers.

In general, a well-designed, efficient layout that minimises travel distances for passengers is likely to be the most accessible and convenient one for everyone to use.

The layout should enable passengers to quickly identify the service they require, for example: a platform, bus or coach boarding point or departure area. It is preferred that passenger facilities are centrally located so that they are easy to identify.

Image 7.2 Young mother with baby and stroller beside a railway track.

Image 7.3 Example of an airport terminal with signage for departure gates.

A simple layout that is easy to understand by a wide range of users is particularly beneficial in large terminals, such as airport and harbour terminals, and principal bus and railway stations. Users may include older people; people with disabilities; foreign visitors; people with visual difficulties; or those who might become confused easily.

Movement through these buildings should be as direct as possible and in a logical sequence, with adequate space for the expected number of people in order to avoid congestion. Wherever pedestrian access routes are provided to link adjacent transport services, such as an airport terminal and railway station, they should be under cover.

On large sites, such as at harbours and airports, a universally designed route should be provided to link all external facilities, including building entrances, bus and coach stops, taxi ranks, parking areas, and setting-down points. The route should also link directly to public pavements at the perimeter of the site to facilitate convenient access for pedestrians.

Entrances to large buildings, such as railway stations, should have doors that are permanently open so that access is unimpeded for all. If it is not possible to have a door-free entrance for security or environmental reasons, entrance doors should be fully automatic. For further guidance, refer to **Booklet 2: Entrances and horizontal circulation, Section 2.4**.

Checklist – Size and layout of transport buildings
• Ensure the building layout is logical, easy to understand, and minimises travel distances for passengers.
• Make sure services and facilities are logically arranged and readily identifiable.
• Locate passenger facilities centrally, wherever possible.
• Ensure links between terminals are under cover.
• Link all external facilities, site, and building entrances by an accessible route.

7.4.3 Passenger facilities

All transport buildings should provide adequate seating areas, because waiting is inevitable, whether for a short or long period. Seating should be provided in all main waiting locations and in close proximity to refreshment facilities, toilets and travel information. For further guidance, refer to **Booklet 6: Facilities in buildings, Section 6.5**.

In buildings where left luggage facilities are provided, they should be accessible to people of different standing heights, as well as those seated in wheelchairs.

If the facilities include banks of coin-operated lockers, they should be provided at a range of heights. Locks and key fobs should contrast visually with the locker door and be easy to operate. Any numbering or coding system should be easy to follow and include large tactile letters or digits and clear, simple, visible instructions.

Accessible toilet facilities in transport buildings should be accessible from the main concourse level, and should be located as close as possible to the point of departure and arrival. This will allow people to access them immediately before boarding and on arrival. The overall arrangement of toilet facilities and the size of cubicles should acknowledge the increased likelihood that people will have luggage or shopping bags, and that parents and carers may need to keep children under close supervision by sharing a cubicle. Consideration should be given to providing toilets with facilities for assisted changing, as described in **Booklet 5: Sanitary facilities, Section 5.6.2**.

All toilet facilities should be equipped with a public address system so that people are alerted to important information. For further guidance, refer to **Booklet 5: Sanitary facilities**.

An external area, at least 12 sq m, should be provided close to transport buildings to enable assistance dogs to relieve themselves. This is particularly important in terminals where people are departing for or arriving from a long journey. The area should be secure and preferably enclosed with a 1200mm-high fence and gate. The gate should be equipped with a latch or handle that is easy to operate. A free supply of bags should be provided in conjunction with a dog waste bin, which should be positioned in an accessible location and be emptied regularly. The area should be designated for use by assistance dogs only and a sign highlighting this should be clearly displayed.

Guidelines for designated dog relief areas (Irish Guide Dogs for the Blind):

- Designated relief areas for guide dogs and assistance dogs should be situated away from areas with excessive noise and activity. The relief area should be within easy reach of your premises, with level access and suitable signage.
- Relief areas should be enclosed for safety purposes by a 1220 to 1830mm-high barrier. The area should be a 2000mm x 3000mm (minimum) to 3000mm x 5000mm. The entrance or exit to the relief area should be secured with a latch.
- There are various surfaces that are considered suitable for a relief area. These surfaces include grass, concrete, bark dust, absorbent sand and astro-turf. It can be beneficial to have a drainage facility, for example gutter, in the relief area also. The flooring should be laid at a slant of around 3.4% to assist drainage.
- Biodegradable disposal bags and a disposal bin should be provided. Water bowls with fresh water should also be available.
- The relief area should also have adequate and evenly distributed lighting.
- The relief area and equipment should be cleaned regularly and well-maintained.

For guidance on facilities such as seating and information counters, public telephones, coin and card-operated machines, refer to **Booklet 6: Facilities in building**.

Checklist – Passenger facilities
• Provide suitable seating in all main waiting locations.
• Ensure left luggage facilities are accessible to all passengers.
• Locate accessible toilet facilities in the main concourse level and close to the point of departure and arrival.
• Provide toilet facilities large enough to facilitate easy access by people with luggage and people supervising children.
• Consider the provision of facilities for assisted changing.
• Ensure public address systems extend to all toilet facilities.
• Provide an external area to enable assistance dogs to relieve themselves.

7.4.4 Travel information

Everyone who uses public transport needs information to enable them to plan their journey. Timetables, journey times, pricing information, the availability of particular facilities and last-minute updates should all be available in a range of formats, including visual and audible.

Clear, concise, accurate and timely information is crucial to people making journeys on all transport modes. For passengers with mobility difficulties, quality information can be the difference between being able to make a journey or not.

Information on the transport environment can be divided into three levels: Level 1 information, such as urgent safety information or immediate departures. Level 2 information, such as general timetable information, information about how to make a complaint, and general safety information. Level 3 information, such as advertising. It is important that these three levels of information are clearly distinguished.

Essential information, particularly safety instructions, should be easy to find, and should not be obscured by advertising.

The design of new information sources (such as new timetable leaflet or website) provides a great opportunity to ensure information is accessible to all at minimal cost. The design brief should specify requirements around the style, content, and formatting of information to maximise ease of use.

Timetables and journey times are published in printed format for most forms of transport. These should include information on intermediate stops, as these are often crucial when planning a journey. The information in timetables may be complex, but it should be presented visually in a clear and logical format so that it is easy for everyone to understand. The National Adult Literacy Agency (NALA) provides guidelines on its website on plain English writing. These guidelines include using short sentences and everyday language and avoiding the use of jargon. Timetables should be available inside transport terminals in an accessible location and should follow the advice given for signage in **Booklet 4: Internal environment and services, Section 4.11** and printed information in **Booklet 8: Building management, Section 8.6.2**.

Timetable and journey information should be available via a telephone service as an alternative for people who cannot read timetables. The service should also be accessible to people using a textphone. The telephone service should be staffed by operators who can answer specific queries. It should be available 24 hours a day, 365 days a year.

Where a menu of ‘talking timetables’ is used, the sequence of information should be logical and considered carefully so as not to frustrate or confuse the people using it.

Talking timetables cannot be used by many people with hearing difficulties, and should therefore be provided as a supplement to an operator service, rather than be the sole source for obtaining information.

Some passengers may experience difficulties with traditional website design. Many people with visual difficulties use a screen reader to access a website. A screen reader is a piece of software that reads out the text from a website in a synthesised voice. However, some websites are not designed with accessibility in mind and for that reason screen reader users will find it difficult or impossible to access content on these sites. Websites that have sound clips or that require the use of the mouse for navigation, for example, also present problems.

It is better to design and build a website to be accessible from the outset. This can save time and the costs involved the rework and maintenance. Operators should consider the use of journey planners on websites and maps. These offer the potential for detailed and precise journey details to be worked out before or during the trip. Information that is presented visually (such as on a map) should also be available in text format for people with visual difficulties.

Journey pricing information should be available in advance to allow people to budget for their journey and to make the necessary arrangements for payment upon arrival at the terminal. Not everybody uses credit or debit cards, and many people, including older people and people with disabilities, choose not to carry large amounts of cash for security reasons. At the terminal, prices should be clearly displayed. This, again, will benefit foreign travellers who may not be confident understanding or communicating using the Irish or English language.

Many people, either through necessity or choice, require information about the availability of particular facilities on a journey. People travelling with infants may want to check in advance about the availability and whereabouts of baby-changing and bottle-warming facilities. People who use wheelchairs may want to check that a destination station has step-free access and that a train has a wheelchair-accessible toilet facility. On a long journey, most travellers will want to know in advance if there are on-board refreshment facilities or if they should purchase food and drink at the terminal. Information should be readily available to enable people to adequately prepare for their journey and to travel in comfort to their expected destination.

For those arriving at the transport facility, travel information for connecting services – including flights, rail, bus and taxis – should be clearly sign posted. Connecting travel information should also be made available at designated points and in written form. Information on signage is provided in **Booklet 4: Internal environment and services, Section 4.11** and **Booklet 8: Building management, Section 8.6**.

Last-minute updates should be available, both prior to leaving home and at the terminal itself. Delays in travel schedules are annoying for everyone but can cause particular difficulties for people with disabilities, parents with young children, and people with certain medical conditions. Inside transport terminals, information relating to delays and cancellations or to alternative journey arrangements should be delivered aurally to all parts of the building, in addition to the visual displays in the main areas. Further information on acoustics may be found in **Booklet 4: Internal environment and services, Sections 4.9** and **4.11**.

When transport services are scheduled, consideration should be given to the time allowed between connecting services so that everybody has time to transfer from one location to another. Where there are long travel distances between platforms, terminals or boarding areas, buggy-type transport, travelators, and low floor buses should be provided to assist people with mobility difficulties as appropriate.

On arrival at the destination, details of connecting services (including plane, rail, light rail, bus, taxi, and hackneys) and other relevant local information should be available.

Image 7.4 Shows a wheelchair user accessing light rail. Note the level interface between platform and tram car allowing level access for all users.

Checklist – Travel information
• Provide all travel information in a range of formats.
• Ensure information is as simple as possible and easy to understand.
• Make sure timetables include information on intermediate stops.
• Ensure timetables are logically arranged and easy to follow.
• Display timetables in an accessible location.
• Provide journey information in alternative formats including large print and via a telephone and textphone service.
• Ensure pricing and payment details are clearly visible.
• Ensure easy to understand information about on-board facilities is available prior to making a journey.
• Ensure information about facilities at intermediate stops and interchanges is readily available.
• Ensure last-minutes changes to journey information are readily available and communicated in a range of formats.
• Allow adequate time between connecting services to enable people to transfer comfortably.
• Provide buggy-type transport in larger terminals to assist people with mobility difficulties, families with young children, and people with low stamina.

7.5 Office Buildings

This section covers all types of office and administrative buildings, including public service buildings and voluntary sector, and private and commercial offices. It covers offices that may range in size from a small, single-roomed tenancy in a multi-occupancy building to a large, open-plan commercial development.

All offices whether serving a public function or for private use only, should be universally designed so that people, regardless of age, size or disability could visit or work there.

7.5.1 Entrances and circulation

All entrances to an office – whether they are the principal entrance or a staff entrance – should be accessible and easily identifiable.

In multi-tenanted office buildings, the entrance to each tenancy should be accessible, in addition to the common, shared or public entrance to the building.

All circulation routes within an office building should be well maintained and free of obstacles. In open-plan offices, circulation routes should be clearly defined, for example, through the use of floor surfaces of contrasting colours; a change in texture of floor coverings; or the careful placement of furniture. Potential obstructions or hazards should be adequately guarded and visually highlighted. The width of circulation routes should follow the guidance for corridors, as set out in **Booklet 2: Entrances and horizontal circulation, Section 2.5.1**.

Checklist – Office buildings
• Ensure all entrances are accessible.
• Make sure the width of circulation routes is sufficient.
• Ensure circulation routes are free of obstacles and clearly defined.
• Ensure potential obstacles are highlighted and adequately guarded.

7.5.2 Internal environment

Offices should achieve an appropriate level of environmental performance in order to provide a healthy and comfortable environment for employees and visitors alike. This will involve the provision of good air quality, adequate ventilation, and an effective heating system.

Mechanical ventilation and air-conditioning systems should be maintained so as to achieve acceptable standards of filtration and dust extraction, and to reduce the likelihood of unwanted machine noise.

Heating should be controllable and monitored to ensure it is run in an energy-efficient manner. For further guidance, refer to **Booklet 4: Internal environment and services**.

Individual areas within an office that require or would benefit from a quiet environment, such as a meeting room or interview area, should be located away from external sources of noise. The internal layout of an office can also be used to advantage to separate quiet work areas from potentially noisy facilities, such as refreshment areas. The size and shape of individual rooms and the acoustic performance of the building fabric and its furnishings can all influence the acoustic environment and should be tailored to suit the requirements of the particular workplace or room.

The provision of adequate and adjustable lighting is imperative in office areas. A lighting design that provides flexibility and user-control is ideal and will suit the widest range of people particularly those with visual difficulties and cognitive and mental ability issues. Lighting can affect people with cognitive and mental difficulties, for example, strobe lighting/bright lights shining into eyes. In offices, where background lighting is provided by artificial means, local and task lighting should be provided to enable people to supplement and control the level and direction of light in their immediate environment.

Checklist – Internal environment
• Provide good air quality, adequate ventilation, and heating.
• Ensure all services are well maintained.
• Provide adequate lighting that allows flexibility and individual user-control.
• Locate quiet rooms away from internal and external sources of noise.
• Design internal environment for acoustics.

7.5.3 Workstations and storage

Working areas and workstations should be adaptable so that they meet the needs and preferences of as many employees as possible. This may involve the flexible arrangement of furniture, the provision of height-adjustable desks, and the provision of items of assistive equipment. L-shaped desks are generally preferred as they enable people to reach both sides of the desk more easily. Chairs should be adjustable in height and have removable armrests, as well as a neck- or headrest.

The policy of 'hotdesking', whereby employees utilise a different desk or workstation on different occasions, is discouraged for general use as it can make it difficult for areas to be tailored to meet individual need.

Many people are more comfortable in familiar environments where they know the layout and the whereabouts of particular personnel. A dedicated hotdesking area may be an appropriate facility within a large office where required for transient personnel such as those visiting from other offices, although the capacity to modify a workstation may still be required.

Storage facilities are essential in offices and should be designed to be accessible and useable by everyone, even if sections of storage are kept locked or otherwise secured for confidentiality or other reasons.

Access to storage facilities should be direct and unobstructed and the location should be readily apparent or clearly indicated.

Storage facilities should be solid, stable, and without sharp edges. They should contrast visually with adjacent surfaces and be adequately illuminated. Handles and any other items of projecting ironmongery should contrast visually with the mounting surface so they are readily identifiable. Where shelving is an integral part of storage facilities, it should be positioned at different heights to suit people with different reach ranges, including people in a seated position. Drawers should be easy running so that they are accessible to everyone. For further guidance on storage facilities, refer to **Booklet 6: Facilities in buildings, Section 6.6**.

Where storage facilities comprise filing cabinets or shelves arranged in rows, the distance between the units themselves and between the units and any adjacent wall or obstruction should be at least 1400mm. If a knee recess is provided in order to access shelving units, the distance may be reduced to 1200mm.

Checklist – Workstations and storage
• Ensure working areas and workstations are adaptable.
• Provide particular items of furniture and equipment to meet individual needs.
• Avoid hotdesking for staff at a permanent place of employment.
• Ensure storage facilities are accessible to all staff and well designed.
• Provide direct unobstructed access to storage.

7.6 Retail Outlets and Shopping Centres

This section covers the full range of retail outlets from small shops to large department stores, supermarkets, shopping centres, and retail parks.

All retail premises and associated external areas should be universally designed to facilitate equitable access for customers and to enable full access to employment.

Guidance on access to the external environment, including pedestrian areas, car parking facilities, setting-down points, and public transport links, is covered in **Booklet 1: External environment and approach**.

7.6.1 Internal circulation

In all shops, an efficient layout that maximises the sales area but also provides adequate access routes for internal circulation is paramount.

For people to feel welcome and valued as customers, shops should be comfortable and facilitate independent access to all areas including goods displays, fitting rooms, cashiers, customer service points and toilets.

If shops are too cramped or aisles too narrow, access for some people may be denied altogether and for many others the shopping experience will be a negative one.

In large shops, such as department stores, there is likely to be a hierarchy of access routes. Wider, principal routes usually lead directly from the entrance to any lifts, stairs, and escalators; secondary routes are usually within display areas for viewing goods.

The principal access routes should have a minimum clear width of 2000mm to enable people to move in both directions and pass each other with ease. If large numbers of people are expected at any one time, and in locations such as immediately adjacent to a series of entrance doors, this dimension should be increased.

Secondary access routes, such as those within sales areas, should be at least 1500mm wide, and should incorporate passing places. This will allow people to pass each other comfortably and safely, and enable people using wheelchairs or scooters to turn.

All access routes should be well maintained, free of obstacles, and have adequate headroom. Circulation routes should be clearly defined, for example, through the use of floor surfaces of contrasting colours; a change in texture of floor coverings; or the careful placement of displays. Potential obstructions or hazards should be adequately guarded and visually highlighted.

The guidance on horizontal circulation in **Booklet 2: Entrances and horizontal circulation, Section 2.5.1** in relation to the width, layout and identification of access routes is also applicable. Guidance on stairs, lifts and escalators is included in **Booklet 3: Vertical circulation**.

Checklist – Internal circulation in retail outlets and shopping centres
• Provide an efficient layout with adequate circulation routes.
• Ensure all access routes are unobstructed and clearly defined.
• Make sure potential hazards are highlighted and adequately guarded.
• Ensure access is available to all display areas and to all facilities.

7.6.2 Display and storage in shops

Shop display units, such as shelving, rails and cabinets, should be solid, stable and without sharp edges. All units should contrast visually with adjacent surfaces for ease of identification and be adequately illuminated. Handles and any other items of projecting ironmongery should visually contrast with the mounting surface so they are readily identifiable.

Shelves and displays should be positioned to enable goods to be viewed and selected easily by people at a range of heights. Oblique-angled shelves above 1000mm from the floor should be avoided as this arrangement limits visibility for people with a lower eye level. A vertical stacking approach for displayed goods will ensure maximum accessibility. In this arrangement, a proportion of every item for sale should be placed on a number of shelves at different heights. Guidance on the height of shelving is given in **Booklet 6: Facilities in buildings, Table 1**.

Image 7.5 Example of supermarket shelving.

Front-opening refrigerators and freezers are considered more accessible than chest-type units, as they do not require people to stretch out and down at the same time. They are also better suited to a vertical stacking arrangement whereby the full range of goods can be displayed within a suitable height range. Doors on freezer units, both wall and chest type, often have vacuum seals that make them difficult to open. Sliding doors and lids provided with a D-shaped handle are generally easier for people to use.

Image 7.6 Example of front-opening freezers in a supermarket.

Free-standing displays within aisles should be avoided, as they reduce the effective width of the circulation route and are a potential hazard to people with visual difficulties.

Pyramids of goods at the ends of supermarket aisles, stacked on top of each other rather than on shelves, are often unstable and should also be avoided.

Clothes rails should be positioned no higher than 1370mm above the floor and should provide a level approach to facilitate access by people who are short in stature, or using a wheelchair or scooter.

Checklist – Display and storage in shops
• Ensure display units are solid, stable, and adequately illuminated.
• Ensure all displayed goods are clearly visible and in easy reach.
• Use a vertical stacking arrangement to ensure all goods are within easy reach.
• Use front-opening refrigerators and freezers with sliding doors in preference to chest-type units and units with vacuum seals.
• Avoid the use of free-standing displays.
• Provide clothes rails within reach of people in a seated and standing position.

7.6.3 Counters and checkouts

Where counters are provided to view, exchange, or pay for goods, they should be universally designed. Counters should be designed to facilitate people who are standing; people who are short in stature; people using wheelchairs; and people who need to sit in a chair whilst being served. Counters should also facilitate staff who use wheelchairs or who need to be seated.

Image 7.7 Older person at supermarket checkout.

Depending on the size of the shop and arrangement of service positions, dual-height counters may be appropriate, or, alternatively, a series of separate counters at two different heights. Lower-height counters for seated use should have a surface a maximum height of 760mm above floor level and a clearance to the underside of 700mm. The counter should have a width of 1800mm (minimum 1500mm) to enable two people to sit alongside each other, or for two people to be positioned diagonally opposite each other. The surface should incorporate a knee recess 650mm deep. Where people may be seated on both the staff and customer side, the knee recesses should be positioned diagonally so that the counter is not excessively deep. The upper counter surface should be between 950mm and 1100mm above floor level. A clear area of 2400mm x 2400mm should be provided on both sides of the counter to enable people to approach and manoeuvre with ease.

Counters where payment is made should incorporate an upward-sloping leading edge towards the customer as this makes it easier for many people to pick up small items such as notes and receipts. The leading edge of the counter should contrast visually with the work surface so that it is readily identifiable.

Image 7.8 Example of checkout with two counter levels.

Refer also to **Booklet 6: Facilities in buildings, Section 6.4**.

In supermarkets and other large shops where multiple checkouts are provided, they should be arranged to be accessible to all shoppers, including people with pushchairs and prams, and people using wheelchairs and scooters.

If checkouts are arranged back to back, all aisles should be equally accessible. This arrangement also offers customers a choice of transferring goods to the left or right and operating payment terminals on a particular side, which is beneficial to some people.

A hearing enhancement system, such as an induction loop, should be provided to all service positions at counters and to all checkouts. The presence of the system should be clearly signed and staff should be trained in using the equipment.

Refer also to **Booklet 4: Internal environment and services, Section 4.10**.

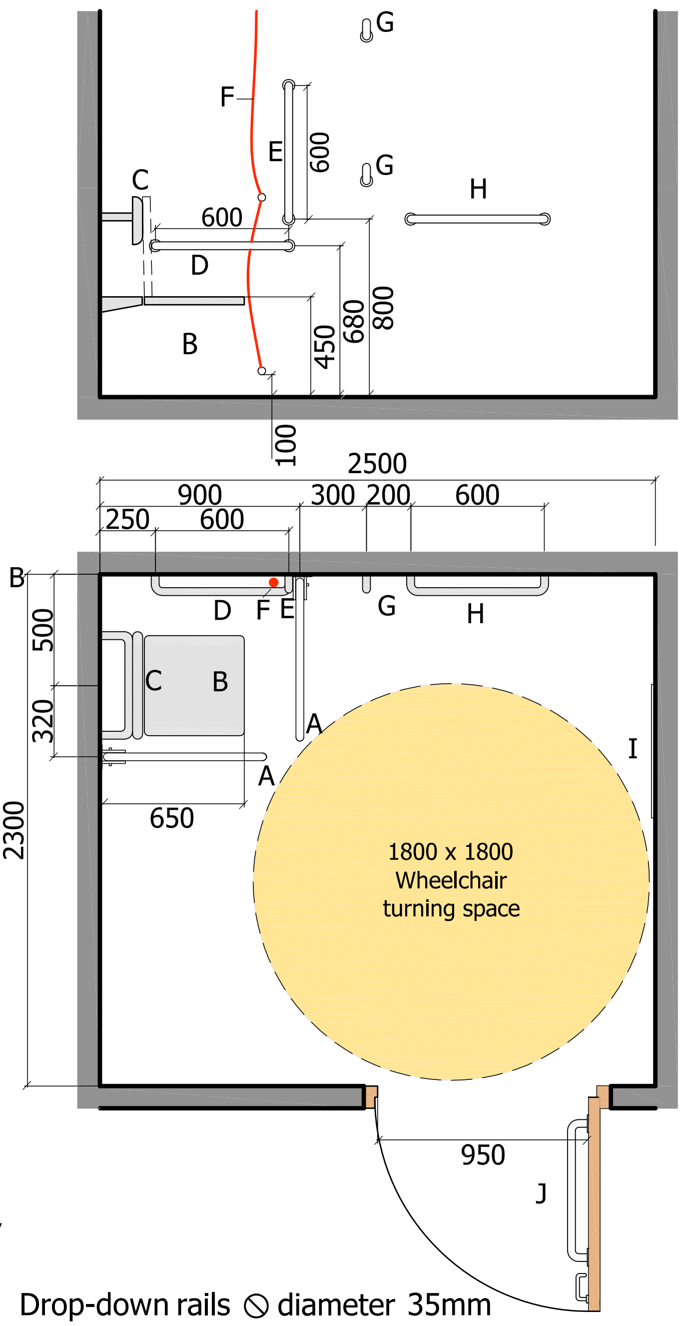
Checklist – Counters and checkouts
• Design counters to suit staff and customers in a seated and standing position.
• Provide a dual-height counter or a series of counters at different heights wherever possible.
• Provide a clear area of 2400mm x 2400mm in front of the counter for approach and manoeuvre.
• Ensure the leading edge of payment counters visually contrasts with the counter surface and slopes upwards.
• Ensure checkout aisles are wide enough for all customers and facilitate both left- and right-hand transfer of goods.
• Provide a hearing enhancement system at all counters and payment positions.

7.6.4 Fitting rooms

Wherever fitting rooms are provided for customers to try on clothes, they should be universally designed. At least one self-contained unisex accessible fitting room should have minimum dimensions 2300mm x 2500mm and a layout as illustrated in **Figure 7.1**.

Where more than one accessible fitting room is provided, the layout should be reversed to provide a choice of left- or right-hand transfer.

Figure 7.1 Self-contained fitting room (wall elevation and plan).



Key

A. Drop-down rails ⦸ diameter 35mm
B. Fold-down seat (upright position shown dotted)
C. Seat backrest
D. Horizontal grabrail ⦸ diameter 35mm
E. Vertical grabrail ⦸ diameter 35mm
F. Alarm pull-cord ●
G. Clothes hook between 1050 - 1700
H. Towel Rail
I. Mirror from 600 - 1600
J. Horizontal rail to assist door closing

Note: All dimensions in millimetres

The fitting room should provide sufficient space for people with buggies and people with wheelchairs to manoeuvre and transfer to and from the fold-down seat.

The fold-down seat should be padded; have an integral or separate backrest; and be securely fixed to the wall. Seats with hinged front legs should be avoided as the legs may prevent wheelchair users; parents with strollers; guide dog users; and those using walking or mobility aids from manoeuvring easily within the room.

Seats should be checked and tested regularly to ensure the fixings are secure and that the seat is weight-bearing.

Fixed and drop-down horizontal and vertical grabrails should be provided in the locations shown in **Figure 7.1** to offer support. Drop-down grabrails should be designed to be held in the upright position when not in use, but be easy to release when required. Drop-down grabrails without vertical support struts are preferred so that the struts do not impede movement around the fitting room. If struts are required to provide the necessary strength, they should be set back at least half the length of the grabrail when in the horizontal position.

Adequate space should be provided on both sides of the fitting room door in accordance with the guidance in **Booklet 2: Entrances and horizontal circulation, Section 2.6.4**.

A mirror, extending from 450mm to 1800mm above floor level, should be provided. This is to enable people to view themselves full-length when either sitting or standing. Mirrors that extend to floor level should be avoided as they can be visually confusing by appearing to be a door or wall opening.

Clothes hooks or rails should be positioned between 1050mm and 1700mm above floor level. Clothes hooks should be positioned at two heights to help those of small stature or using a wheelchair to use the hook. Consideration of a bell/buzzer for assistance located in the fitting rooms should be made.

Checklist – Fitting rooms
• Ensure fitting rooms are accessible to everyone.
• Provide at least one self-contained unisex accessible fitting room, as **Figure 7.1** and **7.2.**
• Provide adequate space for manoeuvre on both sides of the fitting room door.
• Provide a mirror for full length viewing and clothes hooks at a suitable height.

7.6.5 Equipment and assistance in shops

The provision of suitable equipment in retail outlets, in particular supermarkets and other large shops, benefits all customers and facilitates independent access.

Shopping trolleys are essential in supermarkets and some other large shops. Trolleys should be available in a range of sizes and styles, including standard trolleys; trolleys to carry smaller baskets; trolleys suitable for wheelchair users, older people, people of smaller stature, and those using walking or mobility aids; and trolleys with one or two seats for infants and small children.

The provision of powered wheelchairs with integrated shopping baskets should also be considered.

The appropriate number of each type should be readily available when required and they should be kept clean and dry. Trolleys, especially their wheels, should be maintained properly. One stiff wheel that causes the trolley to pull to one side can be difficult for everyone to use, but particularly difficult for someone who uses a walking aid; someone who has reduced strength in their hands; or for a person of small stature.

Image 7.9 Example of an electric scooter with front-mounted basket.

Self-service weighing facilities should be highly visible, easy to use, and positioned within easy reach, with a clearance to the underside of 700mm to facilitate access etc. They should also be convenient to use by people of different heights when standing.

Weighing facilities should have scales that are easy to read, with easy access to the controls for printing out labels. Keypads should be in alphabetical order, and should incorporate pictures of the products as well as text. Tactile information on the keypads will benefit customers with visual difficulties, as will audible instructions.

Personal assistance should be readily available to any customer who needs it, whether to locate a particular item, weigh out produce, or to carry goods. In existing smaller premises, personal assistance may be appropriate in overcoming the occasional shortcoming in physical aspects of the building, such as high shelves or narrow aisles where these are unavoidable.

Providing adequate, well-designed facilities that maximise independent access for all customers is always the optimum. Careful design and management can minimise the need for people to require personal assistance. For information on signage see **Booklet 4: Internal environment and services, Section 4.11**.

Where background music is played through a public address sound system, it should be at a comfortable noise level for the majority of people. If it is too loud, customers who wear hearing aids may experience considerable discomfort. Some people may not be able to hear speech clearly or communicate effectively whilst the music is playing, therefore adequate breaks in the music should be provided. For information on acoustics see **Booklet 4: Internal environment and services, Section 4.9**.

Checklist – Equipment and assistance in retail outlets
• Ensure shopping trolleys meet the needs of a range of customers.
• Consider the provision of powered wheelchairs with integral shopping baskets for loan.
• Ensure all trolleys are well maintained, clean, and dry.
• Provide self-service weighing scales within reach of all customers and ensure they are easy to operate.
• Ensure procedures are in place to provide personal assistance to customers when required.
• Provide regular breaks when playing music over public address systems and ensure the sound level is not too high.

7.7 Restaurants, Bars and Cafés

This section covers the customer areas in cafés and restaurants, snack bars, canteens, public bars and lounges. Self-catering kitchen and refreshment facilities are covered in **Booklet 6: Facilities in buildings, Section 6.9**.

7.7.1 Layout and seating

Service areas including food and service counters, bar areas, seating, and toilets should be universally designed. The layout of all premises should be clear and logical with unobstructed access routes to facilitate easy and independent access throughout.

Facilities such as 'please wait to be seated' positions, ordering counters, cashiers and toilets should all be clearly apparent. For information on signage see **Booklet 4: Internal environment and services, Section 4.11**.

In new buildings, it is preferred that all areas within a storey are at the same level. However, if a raised or sunken seating area is provided, the change in level should be served by a ramp and steps and be accessible to everyone.

Wherever there are different categories of seating, such as self-service and table-service, lounge-style seating and tables and chairs, internal and external, they should all be accessible to every customer.

In existing buildings, where changes in level are unavoidable and the provision of both ramps and steps is impractical, a minimum of two-thirds of the total floor area should be accessible.

Tables and chairs should be arranged with clearly identifiable and adequate aisles to provide everybody with a choice of seating positions. Tables should not be positioned randomly or too closely as this is likely to obstruct or restrict access for many people.

Wherever food is consumed, tables should have a minimum clearance of 700mm to the underside, although it is preferable for some to have a clearance of 750mm to enable people using wheelchairs with armrests to sit closer to the table. In areas for drinking only, it is acceptable for some lower-height tables to be provided. Where bars and counters are used for dining, a section should be provided at a height of 750mm above floor level, with a clearance of 700mm to the underside and length of 1500mm to accommodate a wheelchair user and their companion. This will also serve people who are short in stature.

Where fixed tables are used, chairs should be easily removable to enable access by people using wheelchairs.

The use of fixed chairs in association with fixed tables should be avoided as they can be very difficult for people with ambulatory difficulties and wheelchair users to access, and they offer minimal flexibility.

Adequate space should be provided between adjacent tables to enable people to move comfortably into a seated position. Customers of larger size should also be considered in the provision of seating.

Tables and chairs should be selected to provide effective visual contrast with surrounding surfaces so that they are clearly identifiable. A proportion of chairs should have armrests. For further guidance on seating, refer to **Booklet 6: Facilities in buildings, Section 6.5**.

High chairs should be available in premises where small children are admitted.

Checklist – Layout and seating for bars and restaurants
• Provide a clear and logical layout, ensuring access to the full range of services.
• Ensure access routes and aisles between seats are unobstructed and clearly identifiable.
• Locate facilities on the same level within a storey wherever possible.
• Ensure raised or sunken seating areas are served by a ramp and steps.
• Make sure all categories of seating are accessible.
• Ensure all customers have a choice of seating position.
• Provide tables and seats to suit a wide range of customers.
• Use removable chairs if tables are fixed in position.
• Ensure tables and chairs visually contrast with surrounding surfaces.
• Provide some chairs with armrests.

7.7.2 Self-service facilities

In self-service cafés and restaurants, food display cabinets and shelves, tray slides, and cashier areas should all be universally designed. The layout should be clear and logical to facilitate easy access and efficient service.

In large self-service facilities where substantial numbers of people are expected, queuing lines may be beneficial. Queuing lines should be at least 1100mm wide and clearly marked with queuing rails, which should be firmly fixed to the floor and be arranged in parallel, logical lines. The rails should be rigid so that they can be used as a handrail for support, and they should contrast visually with the surrounding surfaces. For further details on queuing rails, refer to **Booklet 2: Entrances and horizontal circulation, Section 2.4.3**.

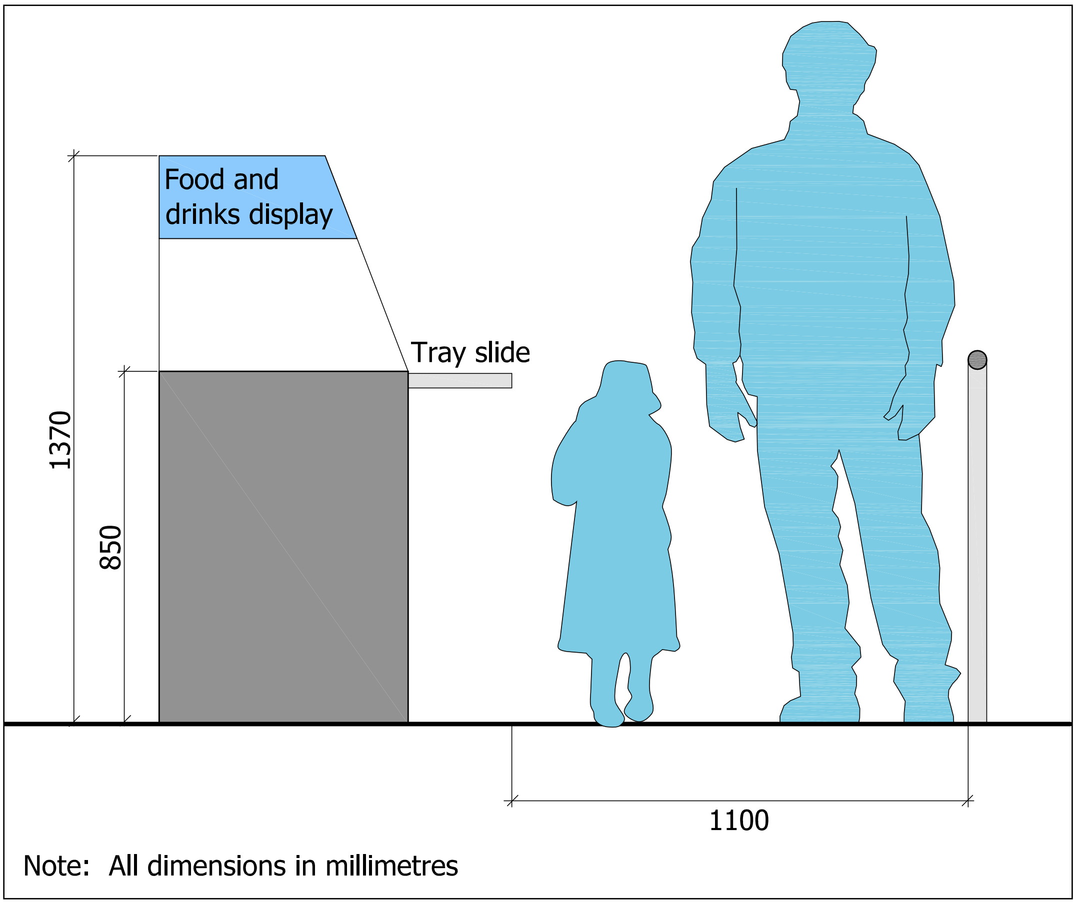
Tray storage should be clearly apparent and positioned adjacent to the beginning of a tray slide. The recommended height for tray storage is between 700mm and 1200mm above floor level. Trays should be designed to be easily gripped, with a raised edge to prevent items sliding or rolling off and with a slip-resistant finish.

The tray slide in self-service facilities should be continuous from the first food or drink display unit through to the cashier position, or cutlery and condiment area, whichever is positioned last in the sequence. If there is any break in the tray slide, such as when cashiers are positioned on a central island, assistance in carrying trays should be readily available. Any changes in direction of the tray slide should enable the tray to be slid safely around a corner without it having to be lifted or otherwise supported. The tray slide should be positioned 850mm above floor level. It is preferable if the main dispensing counter is at a similar level to the tray slide to enable items to be moved easily onto the tray, as **Figure 7.2**.

Food and drink display units are likely to require more than one shelf in order to maximise capacity. However, shelves that are too high may be beyond the reach of some people or may place items out of sight. Wherever possible, shelves should be no higher than 1370mm. If shelves are required above this height, they should be stocked with duplicate items so that the full range of food and drink is available at an accessible level.

For guidance on vending machines, refer to **Booklet 6: Facilities in buildings, Section 6.8.1**.

Figure 7.2 Self-service tray slide.



Checklist – Self service facilities
• Ensure the layout of self-service facilities is clear and logical.
• Consider the use of queuing lines and rails where large numbers of people are expected.
• Ensure tray storage is clearly visible and trays are easy to grip and hold.
• Provide continuous tray slide, positioned 850mm above floor level.
• Display the full range of food items no higher than 1370mm.

7.7.3 Customer service and management

Customer service is paramount in establishments such as cafés, bars, and restaurants. A welcoming universal approach to all customers is key to a successful business.

In venues where tables and chairs can be moved, management procedures should ensure that circulation areas are maintained and that convenient access is available to all tables to facilitate freedom of choice to customers.

Toilets should be kept clean at all times and be regularly monitored, particularly at busy times. In some buildings, where there is particularly heavy use of toilet facilities, management procedures should ensure that toilet paper dispensers, soap and hand towels are restocked before they run out.

In restaurants and other establishments where reservations can be made by telephone, a textphone should be available and staff should be trained in using the equipment. Staff responsible for taking calls should also be trained in using the speech-to-text telephone relay service.

Staff in restaurants and cafés should receive training in how to deliver a universal service to all customers.

Assistance dogs are exempt from standard health and hygiene regulations and are therefore allowed into areas where food and drink are consumed, including carvery restaurants, even if food is stored and prepared there. Staff should ensure sufficient space is made available for assistance dogs to rest adjacent to their owners and away from circulation routes.

Checklist – Customer service and management
• Ensure all staff adopt a welcoming, universal approach to customer service.
• Ensure circulation routes and aisles between tables are kept clear of obstructions.
• Keep toilets clean and check supplies of toilet paper, soap, and towels regularly.
• Provide a textphone for telephone bookings.
• Ensure staff are trained in using textphones and the speech-to-text telephone relay service.
• Provide sufficient space for assistance dogs to rest adjacent to their owners.

7.7.4 Outdoor smoking areas

Since the implementation of the smoking ban in March 2004, smoking has been forbidden in enclosed workplaces, including bars, cafes, restaurants, nightclubs, and lounges. However, the provision of outdoor smoking areas is permitted, subject to certain requirements of the Public Health (Tobacco) Act 2002. It is not obligatory to provide outdoor smoking areas, but employers may provide them at their own discretion.

Under the law, an outdoor smoking area is defined as:

- a place or premises, or part of a place or premises, that is wholly uncovered by any roof, fixed or mobile
- an outdoor place or premises that is covered by a roof, so long as not more than 50% of the perimeter (outside) is covered by a wall, windows, gate or similar

Where such facilities are provided, they should be universally designed. They should be located where they can be easily accessed from the main seating or bar area and clearly identified with appropriate signage. Doors should be easy to open and follow the guidance for external doors in **Booklet 2: Entrances and horizontal circulation, Section 2.6.1**.

The smoking area should be sufficiently large to enable a person using a wheelchair or electric scooter to turn comfortably and for a number of people to congregate. A minimum size of 2400mm x 2400mm is recommended.

Seating should be provided in these areas for people with mobility difficulties and care should be taken in the design to remove any obstacles for those with visual difficulties.

Ashtrays should be provided and cleared regularly to maintain as clean an environment as possible.

Image 7.10 Example of smoking area signage.

Checklist – Outdoor smoking areas
• Ensure outdoor smoking areas are accessible to everyone and have a minimum area of 2440mm x 2440mm.
• Ensure outdoor smoking areas are easily accessed from the main bar, lounge, or seating area and clearly signed.

7.8 Museums, Galleries and Libraries

This section covers cultural buildings including museums, art galleries, exhibition centres, visitor information centres, and public and research libraries. It may also be relevant to buildings occupied by professional institutions in which exhibits and events are held and attended by institute members and the general public, and which offer research and library facilities. All such establishments should be accessible and useable.

Many museums and art galleries are located in historic buildings and the buildings themselves are an inherent part of the cultural and educational experience. Where this is the case, the guidance in **Section 7.13** is also relevant.

The layout of all cultural and educational buildings should be logical and easy to understand. For many visitors, the building will be unfamiliar and may only be visited once. A well-designed layout will ensure that everyone is able to identify and locate areas of interest and maximise the benefit and enjoyment of their visit.

Where documents and artefacts are held in archives, such as in local history and some research or scientific libraries, the archive storage facility should be accessible to staff and visitors. Facilities such as common rooms, lounges, and refreshment areas in buildings, such as professional institutions and other establishments, should be accessible.

Assistance dogs should be admitted to all parts of museum, gallery, and library buildings, including café and restaurant facilities.

Interactive displays are effective at engaging children and other people in many museums and visitor centres. Wherever these are used, buttons, switches and handles should be easy to use by all ages and abilities and positioned within reach of as wide a range of people as possible.

Image 7.11 Example of signage for assistance dogs.

Many museums and art galleries, particularly those located in historic buildings, involve travelling long distances between exhibits. Where this is the case, information should be provided near the entrance about the size and layout so that visitors can plan their visit and allow for time to rest as required. The provision of wheelchairs on loan will help some visitors to access the venue in comfort. Seating should be provided at regular intervals along corridors and in galleries, including some seats with armrests, as **Booklet 6: Facilities in buildings, Section 6.5**.

Visitor information centres (sometimes referred to as interpretation centres) are often in association with an outdoor attraction, interpretative centre, historic feature, or archaeological site. The buildings should be accessible to staff and visitors.

Interpretation centres typically provide models and replicas of outdoor features as a service to people who do not wish to venture into the landscape itself. These displays should be accessible and useable by all persons including information in written, aural, visual and tactile form.

The provision of signage and information, including tactile maps and models, is covered in **Booklet 4: Internal environment and services, Section 4.11**.

Checklist – Museums, galleries and libraries
• Ensure the building layout is logical and easy to understand.
• Ensure archives are accessible to staff and visitors.
• Provide facilities, such as lounges and refreshment areas, that are accessible to all.
• Ensure that assistance dogs are permitted in all areas of the building.
• Ensure interactive displays are accessible to everyone and easy to use.
• Provide information in advance where there is a long distance between exhibits.
• Provide wheelchairs for loan.
• Provide seating at regular intervals along circulation routes and in galleries.
• Ensure information is available in a range of formats.

7.8.1 Information and interpretation

Information about a venue should be available in advance of a visit to enable people to plan their journey and make any necessary preparations.

Information relating to the accessibility of the venue and any services or facilities available should be clearly indicated.

Information should be available in a range of formats including on a website, a printed leaflet (including large print) and via a telephone operator. For further guidance on information and communications, refer to **Booklet 8: Building management**.

A map of the building and site, clearly indicating the location of key facilities – such as toilets, refreshment areas, information desks, and exhibit, gallery or library areas – should be provided. Maps should incorporate symbols wherever possible, with any lettering in clear type. For further guidance on signage and information, refer to **Booklet 4: Internal environment and services, Section 4.11**.

The provision of tactile maps and models should be considered as an aid to orientation and navigation as they facilitate independent access for many people with visual difficulties. Tactile maps are a useful way of representing the internal layout of a building and can be produced in a form that can be easily carried by a person as they move around. Tactile models are better suited to representing three-dimensional landscapes and larger sites, as suggested above for visitor information centres. For further guidance, refer to **Booklet 4: Internal environment and services, Section 4.11.5**.

Visual displays in museums and galleries should always be accompanied by an audio guide, which should be universally designed and available to anyone who chooses to use it. Although audio guides are commonly produced for people with visual difficulties, they are beneficial to and enjoyed by many others.

Audio guides in foreign languages are invaluable to many visitors. The handset and headgear comprising an audio guide should be easy to operate and provide the user with a degree of control over the information they are accessing, taking into consideration people with dexterity and reach limitations. It may be appropriate to layer information contained in the audio guide to enable the user to select their preferred level of description detail or orientation information.

Where static displays have an audio component, such as voiceover or soundtrack, it is preferable if there is an integral volume control to enable people to adjust the sound level to meet their individual need. The volume should return to a pre-set level after each use to avoid being left at too low or too high a level for other people. Where a series of static displays each have an audio component, there should be sufficient distance between them and an overall, well-balanced acoustic environment to minimise overspill and to reduce background noise.

In some cases, such as in historic buildings, where areas of the building remain physically inaccessible to some visitors, videos, DVDs or photographs coupled with audio description could be used to illustrate and describe the area, feature or view. For example, where a church tower is open for public access on selected days in the year to enable people to enjoy the view and explore the tower roof, but where access is via a narrow spiral stair, a photographic display or audiovisual presentation should be provided at ground level to provide an alternative experience of the view and tower roof.

Checklist – Information and interpretation
• Ensure information is available about a venue in advance of a visit, in a range of formats.
• Provide a map of the building and site clearly indicating the location of key facilities.
• Consider the provision of tactile maps and models to aid orientation and wayfinding.
• Provide audio guides to accompany visual displays that are designed to suit a range of users, taking into consideration people with dexterity and reach limitations.
• Include a volume control on audio soundtracks and voiceovers to static displays.
• Place displays with simultaneous soundtracks a suitable distance apart and in a well-designed acoustic environment.
• Consider the use of various media to provide an alternative experience of an inaccessible location.

7.8.2 Displays and exhibits

Displays and exhibits in museums and galleries should be universally designed. Where articles are enclosed in display cases, the glass should be non-reflecting.

The illumination of exhibits should safeguard artefacts on display by avoiding damage caused by some forms of lighting. Certain items, such as watercolour paintings, cloths and books, may require a maximum level of illumination of 50 lux to prevent deterioration. However, at this low level, many people may not be able to view or read the documents clearly. In such situations, the use of gradual transition lighting leading into and away from display areas will provide time for eyes to adjust and reduce the potential for discomfort caused by sudden changes in lighting levels and glare.

The use of lighting strips at floor level can be used to highlight the route in an area that has low levels of lighting. Labels accompanying exhibits should be well lit, but positioned carefully so that they not present a source of glare within an area of lower illumination.

Where displays require close viewing or involve interactive controls, they should be designed to provide a knee recess so that people using wheelchairs can approach from the front and sit facing the exhibit.

Labels for items in display cases should be mounted at an angle of 45 degrees for ease of viewing and positioned towards the front of the display.

Wherever possible, objects should be mounted on an inclined surface, at a maximum height of 1000mm above floor level, to facilitate viewing by people at a range of eye levels.

To maximise legibility for all visitors, labels and explanatory information on a display panel should be in minimum 18 point type and in a sans serif font. Explanatory information and guidebooks should be printed in 14 point sans serif font (minimum 12 point), with alternative formats available on request. Further guidance on printed information is available in **Booklet 8: Building management, Section 8.6.2**.

Where possible, labels using raised lettering that can be read by touch should also be provided. The provision of plastic magnifying glasses, available on loan, will assist many visitors to examine exhibits and labels.

Many people, particularly those who have visual or cognitive difficulties, will benefit from being able to touch objects and exhibits as a way of appreciating their size, nature and form, and as a means of exploring for themselves the item on display. In some venues, it may be acceptable for objects to be touched or handled by any visitor at any time. However, in many cases, particularly where historic artefacts are on display, handling of objects will have to be controlled or supervised to some extent. Where this is the case, opportunities to touch objects could be facilitated via a guided touch tour or handling session. These could include actual objects from the collection as well as replicas and supplementary items that help to explain or demonstrate a particular feature. The use of sound to accompany touching tours can help establish the context for the collection, such as period or cultural music or sounds from the natural environment.

Tactile images can also be used to complement audio guides, to accompany guided tours, or as standalone objects for visitors to explore. Tactile images can be produced to represent pictures in a gallery, images of buildings, technical diagrams and graphs, and designs, such as those on fabrics and wallpaper.
The main forms of tactile image production are with the use of swelled paper, thermoform, and embossed graphics. Swelled paper images are typically used to represent black and white line drawings or diagrams, where the black areas are represented by a raised line on the paper. Thermoforms comprise moulded plastic images and can be used to represent pictures and images. Embossed graphics are created by using dots punched into paper. Specialist advice should be sought in relation to the development and production of tactile images using any of these methods.

For further guidance on tactile maps and models, refer to **Booklet 4: Internal environment and services, Section 4.11.5**.

Checklist – Displays and exhibits
• Install non-reflecting glass in display cabinets.
• Use transitional lighting for circulation routes leading into and out of areas of low illumination.
• Consider the use of lighting strips at floor level.
• Incorporate a knee recess in exhibits requiring close access in order to view items or operate controls.
• Mount objects on an inclined surface, no higher than 1000mm above floor level.
• Ensure labels to exhibits are well lit but do not present a potential source of glare.
• Mount labels within display cases at 45 degrees.
• Ensure text on labels is minimum 18 point sans serif font and text on printed information is 14 point.
• Use tactile lettering wherever possible.
• Provide alternative formats for all written information.
• Provide magnifying glasses for loan.
• Provide opportunities for people to touch exhibits such as a guided touch tour or handling session.
• Provide tactile images of pictures, images, graphics, and information.

7.8.3 Study areas

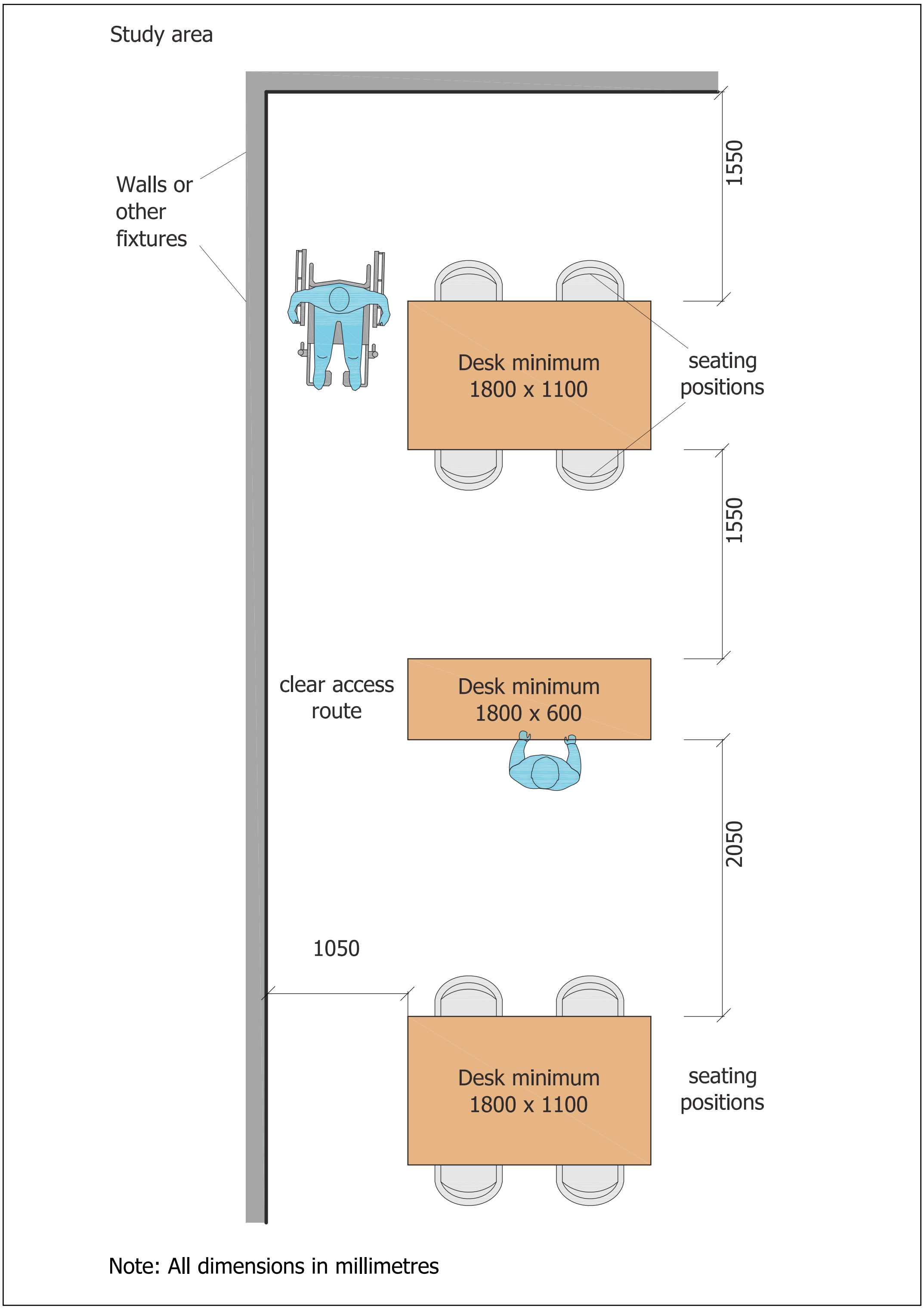
Areas for study should be provided in libraries, and in museums and galleries, where members of the public are able to access archive documents for research or general interest purposes.

The extent of the study area will be determined by the nature of the establishment, the number of people expected at any one time and the type of document or artefact being viewed. The study area should be universally designed for staff and visitors.

Desks should be positioned with adequate space on each side to enable people to circulate comfortably and sit without obstructing others, as **Figure 7.3**.

Desks with a fixed work surface should have a height between 725mm and 750mm and a clearance of 700mm to the underside. In some cases, the provision of electrically-operated, adjustable-height desks or work surfaces is likely to be beneficial and will facilitate access to the broadest range of people. Each desk should have easy access to a power socket and be adequately illuminated with background and adjustable task lighting. Refer also to the guidance in **Section 7.5.2** above for lighting in office environments.

Figure 7.3 Example of a study area.



Where computers are provided, they should be positioned where there is adequate space for people sit comfortably at the desk and lay out papers or books to either side. There should also be sufficient space for people to rest their hands and arms in front of a keyboard when not typing, and to use a mouse effectively with a straight wrist.

At least one computer should incorporate assistive technology such as screen readers and software to enable the font size to be increased on screen.

A number of large-print keyboards and ergonomically designed keyboards should be available, and they should be compatible with all computer terminals to facilitate maximum flexibility for users regardless of age, size, ability, and disability.

A keyboard with integral Braille display unit will be beneficial to some people, as will equipment such as a scanner-reader that converts text in a document or book to speech.

Computer screens should be adjustable so that each person can position the screen to suit their individual need. Screens should not be permanently fixed to a wall or stand as this will render them unusable by some people, particularly those who need to view the screen at very close range.

7.8.4 Library shelving

Image 7.12 Example of library shelf layouts.

Image 7.13 Alternative example of library shelf layout.

Library shelves should be arranged logically in parallel rows. The distance between the units themselves and between the units and any adjacent wall or obstruction should be at least 1400mm. Designers should be aware of providing a range of shelving heights. If a knee recess is provided in order to access shelving units, the distance may be reduced to 1200mm. For further guidance on shelving and storage facilities, refer to **Booklet 6: Facilities in buildings, Section 6.6**.

Checklist – Study areas
• Provide an accessible study area in venues where documents and archives may be viewed.
• Ensure desks are arranged to provide convenient access, with dimensions in accordance with **Figure 7.3.**
• Consider the provision of electrically-operated, adjustable-height desks.
• Provide a power socket and task lighting to each workstation.
• Ensure computer desks are large enough to use comfortably and provide adequate space either side for laying out papers.
• Ensure computer screens are adjustable and not permanently fixed to a wall or stand.
• Consider the provision of assistive technology.
• Arrange library shelves in rows with adequate space between them.

7.9 Entertainment, Conference and Lecture Facilities

This section covers theatres, cinemas, concert halls, lecture, and conference facilities, all of which comprise audience or spectator seating, speaker or performance areas, and associated facilities. The guidance is also relevant to classrooms and seminar rooms in educational, workplace, and other establishments.

Facilities for spectators, participants, delegates, and members of an audience, as well as for speakers, lecturers and performers, technical support staff, and visitors, should all be universally designed The overall arrangement of associated facilities, such as toilets, refreshment, lounge, and back-stage areas, should enable convenient access and full participation for all.

All such facilities should be equipped with an induction loop to enhance sound quality and audibility for hearing aid users. For information on induction loop systems please see **Booklet 4: Internal environment and services, Section 4.10.1**.

Box office and ticket counters should be universally designed in accordance with the guidance in **Booklet 6: Facilities in buildings, Section 6.4**.

7.9.1 Audience seating

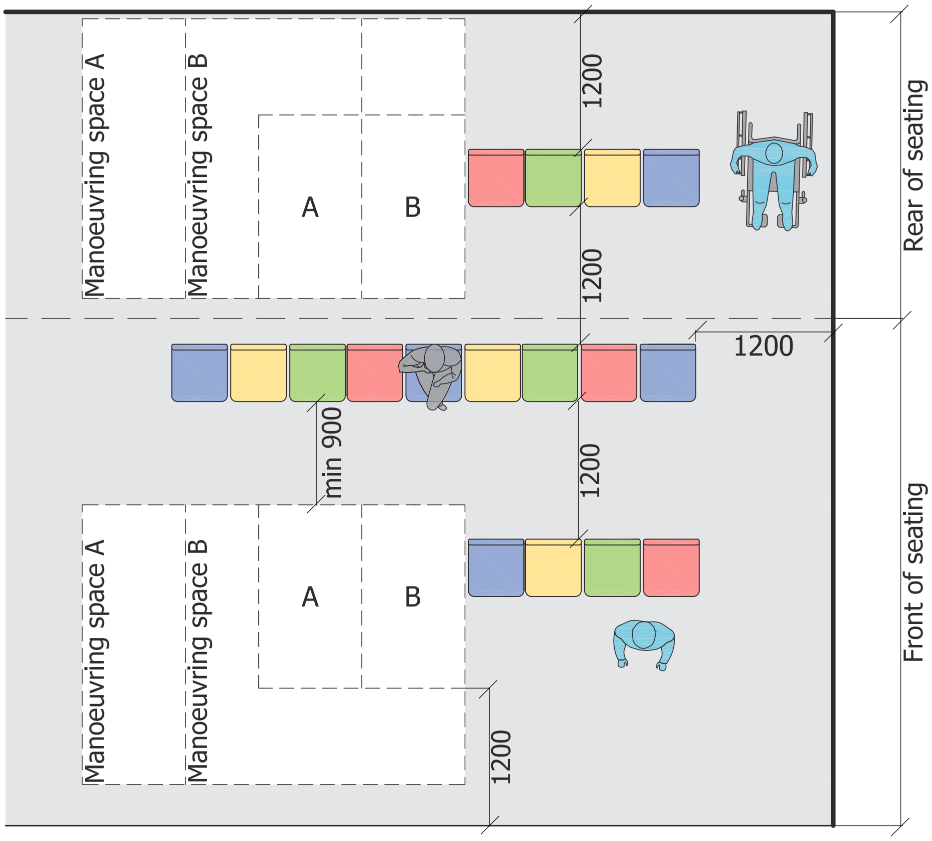
Audience seating may be arranged on raked or level floors. Whichever arrangement is adopted, sight lines from all seating positions should provide a good view of any speaker, screen, or presentation.

Uninterrupted sight lines are particularly important for people who lip-read and use sign language, and for people viewing speech-to-text screens.

Access to all seating should be unobstructed and clearly identified. Access to spaces for people using wheelchairs should be as direct as possible. All seats should provide effective visual contrast with floor and wall surfaces to aid identification.

Where seating in auditoria is fixed, the layout should accommodate permanent spaces for people using wheelchairs. The spaces should be positioned in different parts of the auditorium to provide a choice of seating position. They should not be positioned where they will segregate people from the rest of the seating area. Spaces should accommodate two people using wheelchairs seated side by side and provide sufficient space to manoeuvre, as **Figure 7.4**. The spaces should have a fixed seat to one side for a companion. If the spaces are not required by people using wheelchairs, they may be occupied by other members of the audience seated on loose chairs. The size and position of the spaces should ensure that, when occupied, unobstructed escape routes are maintained.

Figure 7.4 Permanent spaces for wheelchair and scooter users in auditoria.



Space allowances for people using wheelchairs and scooters, as spaces A and B:

1600 x 900 when parked
2440 x 2440 clear space for manoeuvre

Note: All dimensions in millimetres

In rooms where seating is not permanently fixed, such as in seminar and meeting rooms, all seating positions should be universally designed. People using wheelchairs and other audience members or participants should enjoy an equitable degree of choice in seating position. Seats should be arranged to provide convenient access between rows or around the perimeter of a room and to facilitate adequate escape in the event of an emergency.

Space for assistance dogs to rest alongside their companion should be provided adjacent to some seats, away from access aisles and emergency escape routes.

Where raked floors are used, seating positions for people using wheelchairs should incorporate a guard rail to guard any change of level. The seating position should have a flat floor, even if the rest of the auditorium has an inclined floor, as it can be uncomfortable for people to sit for long periods on a sloping surface.

In large auditoria where there are several seating spaces for people using wheelchairs in different locations and potentially at different floor levels, each seating space should have access to unisex accessible toilet facilities. Members of the audience should not have to travel long distances or between floors in order to access suitable toilet facilities. The number of toilet facilities, including accessible toilets, should reflect the likelihood that a large number of people will use the facilities during a relatively short time period, such as an interval. The location of all toilets should be clearly signed.

Checklist – Audience seating
• Ensure good sight lines from all seating positions.
• Make sure access to seating areas is clearly identified and unobstructed.
• Provide direct access to spaces for people using wheelchairs.
• Locate spaces in different parts of the auditorium to provide a choice of seating position.
• Ensure spaces accommodate two people using wheelchairs and are adjacent to a fixed seat, as **Figure 7.4**.
• Ensure spaces have a level floor, even if the auditorium floor is raked.
• Provide a guard rail to protect any change in level.
• Ensure all spaces have access to unisex accessible toilet facilities at the same floor level.
• Ensure all seats provide effective visual contrast with surrounding surfaces.
• Arrange moveable seating to provide convenient access for all.
• Provide space for assistance dogs adjacent to some seats.
• Install toilet facilities designed to serve a large number of people during intervals in a performance.
• Ensure all toilets are clearly signed.

7.9.2 Performers' facilities

Backstage areas, such as dressing rooms, offices, storage areas, and sanitary facilities in theatres and other performance-related buildings, should be universally designed.

Any backstage entrance or 'stage door' should be accessible as this may be the primary route by which performers and backstage staff enter and leave the building. It should not be regarded as a secondary entrance or be any less accessible than the main building entrance. Refer to **Booklet 2: Entrances and horizontal circulation, Section 2.4**.

Within the building, routes between the main entrance, auditorium and backstage areas should be accessible. All facilities should be readily identifiable and clearly signed to assist people who are not familiar with the building Refer to **Booklet 4: Internal environment and services, Section 4.11**.

Dressing rooms and sanitary facilities for performers should be designed to meet the needs of performers of all sizes, ranges of movement, and abilities. Where appropriate, they should include shower and changing facilities. For further guidance on sanitary facilities, refer to **Booklet 5: Sanitary facilities**.

Checklist – Performers' facilities
• Ensure all backstage areas are universally designed.
• Make sure backstage entrance or stage door is accessible.
• Ensure routes between front of house and backstage areas are accessible and clearly signed.
• Provide dressing rooms and sanitary facilities that are accessible to all.

7.9.3 Speakers' facilities

Equipment such as lecterns for speakers or lecturers should be adjustable in height to meet individual need. The lower front edge should range in height between 800mm and 1100mm and the lectern surface should be inclined to an angle of 30 degrees from horizontal. Where lecterns incorporate a table for mounting a laptop or overhead projector, the surface should be no higher than 800mm. Lecterns should incorporate a light to illuminate any reading material.

Where a desk (or desks) are used for a panel of speakers, they should have a maximum surface height of 760mm and a clearance of 700mm to the underside. There should be sufficient clearance between the desks and any rear wall or podium edge to facilitate safe and convenient access for all.

Where conference or lecture facilities comprise a speaker platform or raised podium, it should be universally designed. If access to the raised area is via a ramp or steps, it is preferred that they are designed in accordance with the guidance in **Booklet 3: Vertical circulation, Sections 3.5** and **3.6**.

However, if the change in level is significant and it is impractical to construct a ramp, a vertical rise platform lift should be provided. The platform lift should provide convenient access to the raised podium, but should be screened so that it can be used discreetly. Refer to **Booklet 3: Vertical circulation, Section 3.9.4**.

Checklist – Speakers' facilities
• Install height-adjustable, inclined lecterns, with the front edge between 800mm and 1100mm.
• Ensure tables for laptops and overhead projectors are no higher than 800mm.
• Provide desks for speakers with a surface height of 760mm and 700mm clearance to the underside with sufficient clear space for convenient access.
• Ensure speaker platforms and podiums are accessed by a ramp and steps.
• Make sure vertical rise platform lifts used to access podiums are screened.

7.10 Religious Buildings

This section covers religious buildings of all faiths, including places of worship, meeting rooms, and facilities for burial and cremation. Whilst respecting some cultural restrictions, all such buildings should be universally designed to suit all people.

Access to and within all religious buildings should facilitate full participation by everyone attending for worship or prayer; all religious officials, leaders, employees and volunteers; as well as anyone visiting the premises for secular activities or architectural interest.

Many historic churches and cathedrals incorporate potential physical barriers, such as internal changes in level and raised altars, which can be difficult to modify due to the status of the building. These were originally designed to facilitate traditional forms of worship with established rites. However, in many cases, adopting a flexible approach to the way in which services are arranged will result in greater inclusion for the whole congregation. A raised altar allows those of smaller stature to see what is happening.

Additionally, the provision of communion at various level, flat points, allows access for all. Some churches have successfully repositioned the altar within the nave where it is located at the same floor level as the congregation. This enables everybody to receive communion without having to negotiate chancel steps and a raised altar rail. This is often possible because of the amount of space available within churches, which were usually originally designed for a much larger congregation than is now the norm.

The use of removable seating, which can be set out in different arrangements or positions, provides further flexibility in the way services are delivered. For services at which only a small congregation is expected, such as a christening where only family and close friends are attending, a more intimate arrangement of seats may be appropriate. For services with a large congregation, seating can be arranged to maximise overall capacity whilst retaining adequate access to all areas and facilities.

Consideration should also be given to seats with armrests, to aid elderly people and those with mobility difficulties with sitting and standing up.

Checklist – Religious buildings
• Provide access to religious buildings that enables people to fully participate in religious and secular activities.
• Consider that forms of worship should be flexible in order to overcome potential barriers in some historic churches.
• Consider the use of removable seating to increase flexibility and provide more options in the way services are delivered.

7.10.1 Facilities for seating and prayer

Where seating is provided – such as for a congregation in a church, members in a meeting house or friends and family in a cemetery chapel – it should comprise a number of removable seats, or be entirely flexible in arrangement.

Where extra spaces are provided for people within a fixed-seated layout (whether that be for parents with buggies; people using walking or mobility aids; wheelchair users; or extra manoeuvring space for those who are frail) these spaces should be provided in a range of positions to provide a degree of choice and to enable people to observe traditions or conventions that may dictate the use of a particular location of the building. This may occur, for example, at a wedding in which the bride's family and friends are traditionally seated on one side of a central aisle, and the groom's family and friends on the other. It is also conventional practice at funeral and memorial services for a deceased person's immediate family to be seated at the front of the congregation and other people behind.

The availability of wheelchair spaces and for those using strollers and walking aids throughout the seating area, or the flexibility to modify the seating arrangement for each occasion, will facilitate inclusion in a natural and discreet way.

Seating spaces for all users should be easy to access with sufficient space for manoeuvre. Furniture and the floor colour on routes should contrast to make it easy for people with visual difficulties to find their way to convenient seating. The size and arrangements of spaces to accommodate wheelchair users; parents with strollers; people using walking or mobility aids; and guide dog users, should follow the guidelines in **Section 7.9.1**. Further guidance on general seating is covered in **Booklet 6: Facilities in buildings, Section 6.5**.

In buildings, such as mosques and temples, where the custom is for people to stand, sit or kneel on the floor for worship and prayer, consideration should be given to people for whom this is not practical. Seats should be provided in appropriate locations to enable people with restricted stamina or mobility to be fully involved. One possible arrangement for new buildings is to provide ramped access to a sunken area within a prayer hall. This enables people seated on chairs or using wheelchairs to be at the same height as other people during prayer.

However, the provision of such an area should offer an alternative facility, rather than serve to segregate people.

Checklist – Facilities for seating and prayer
• Provide a choice of seating position to all members of the congregation.
• Include spaces for wheelchair users; parents with strollers; people using walking or mobility aids; and guide dog users in a range of positions.
• Ensure spaces for wheelchair users; parents with strollers; people using walking or mobility aids; and guide dog users facilitate easy access.
• Consider the provision of a sunken area within a prayer hall to enable people in a seated position to pray at the same level as other people.

7.10.2 Other facilities in religious buildings

Where speaker platforms or equipment such as lecterns are provided, refer to the guidance in **Section 7.9.3**.

The provision of a hearing enhancement system such as a permanent induction loop should be provided to enable full participation by people who wear hearing aids. Refer to **Booklet 4: Internal environment and services, Section 4.10.2** for further guidance.

Toilet facilities that are universally designed should be provided in all religious buildings, meeting houses, crematoria and cemetery chapels. Particular religious and cultural requirements in relation to the provision of sanitary facilities should be observed, such as the provision of washing facilities in mosques. Refer to **Booklet 5: Sanitary facilities** for further guidance on sanitary facilities.

Checklist – Facilities
• Provide speaker platforms and lecterns, as **Section 7.9.3.**
• Provide a hearing enhancement system, as **Booklet 4: Internal environment and services, Section 4.10.**
• Provide accessible toilet facilities, as **Booklet 5: Sanitary facilities.**

7.11 Hotel, Guest and Residential Accommodation

This section covers hotels, motels, hostels, guest houses, bed and breakfast establishments, and self-catering holiday properties, as well as residential accommodation, such as student halls, hostels, and visitors' accommodation in healthcare buildings. All of these building types should be universally designed and be able to offer choice and flexibility to guests.

Every establishment, from a budget hostel to a five-star international hotel, should provide equitable access to the services and facilities it offers. In a hostel, for example, where facilities such as a common room, self-catering kitchen, and laundry facilities are available in addition to bedrooms and bathrooms, all should be available and accessible to all guests. In a five star hotel, the full range of facilities and all grades of bedroom, suite or penthouse should be available and accessible to any guest.

Hotels and similar accommodation should provide the following services for those using the facility who may require help:

On arrival, greet the person in reception and assist them with checking in.

Offer to guide or accompany them to their room after check-in.

It would be helpful to tell the person exactly where certain things are located, for example, the breakfast room, the swimming pool and other facilities. An orientation tour of their room will also be helpful. This will involve telling the person where objects are located, including light switches, bed, wardrobe, bathroom, shower, toilet, power points, hair dryer, towels, tea/coffee making facilities, and the telephone. Tell the person that you are describing the room from left to right. Inform the person of the emergency escape route from their room

For many of these building types, particularly hotels, motels, hostels, and guest houses, the availability of multiple bedrooms provides the opportunity to offer facilities that meet a range of visitor needs and preferences.

The provision of interconnected rooms offers flexibility and is particularly beneficial to people wanting to remain together whilst retaining a degree of privacy, for example, families, individuals with assistants, etc. However, bedrooms are not the only consideration.

Associated recreation and social facilities such as swimming pools, gymnasiums, restaurants, bars, lounges, crèches, meeting and function rooms, and external facilities, such as gardens and terraces, should be accessible and available for all guests to use.

Staff-only areas should be universally designed.

In hostels and self-catering holiday accommodation, kitchen facilities should be accessible and useable by all guests. Detailed guidance on kitchen facilities is covered in **Booklet 6: Facilities in buildings, Section 6.9**.

Checklist – Hotel, guest and residential accommodation
• Ensure all facilities within any residential establishment are available and accessible to all guests.
• In larger establishments with multiple bedrooms, provide facilities to meet a range of needs.
• Consider the provision of interconnected bedrooms to meet specific needs
• Ensure all staff areas are universally designed.
• Ensure self-catering kitchen facilities are accessible, as **Booklet 6: Facilities in buildings, Section 6.9.**

7.11.1 Bedrooms

With the exception of hostels offering shared sleeping accommodation, bedrooms in guest and residential accommodation should include a mix of single, twin, family, or double room formats. Wherever possible, a choice of rooms should be available to meet individual preference.

In large establishments, at least one in every twenty bedrooms should be accessible to wheelchair users; people using walking or mobility aids; and guide dog users. Where more than 5% are accessible this is likely to benefit other people due to increased space allowances and easier access to fixtures and fittings. The bedrooms should provide sufficient space for people to access all facilities and items of furniture and to manoeuvre conveniently around the room.

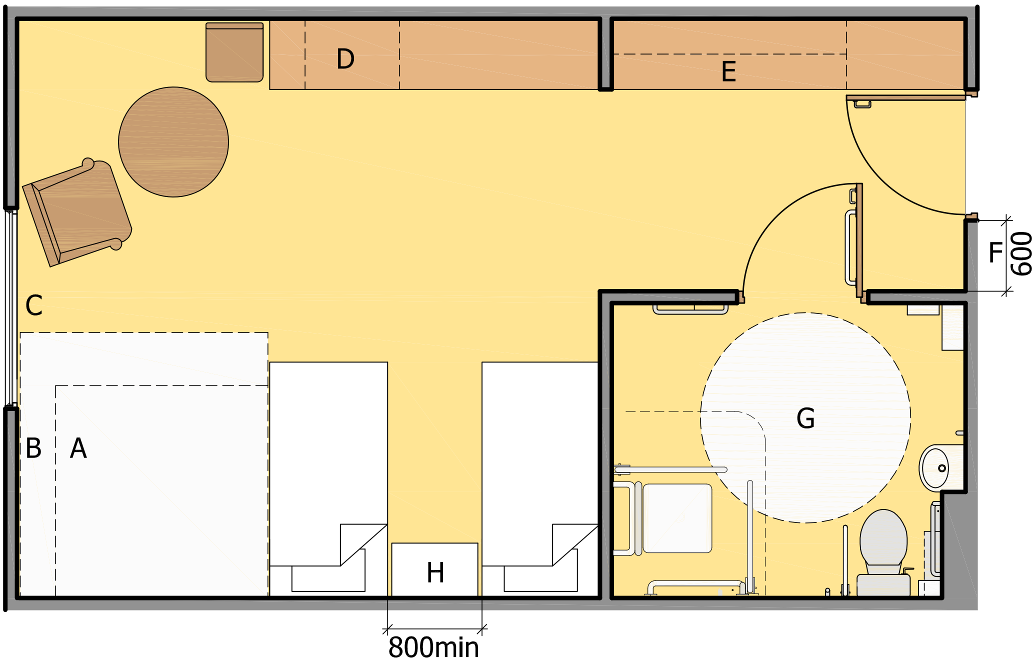
Figure 7.5 illustrates the key dimensions for an accessible bedroom and gives examples of single and double bed arrangements. Rooms should be arranged to permit alternative bed positions, enabling both left- and right-hand transfer from a wheelchair to the bed.

The amenities integral to bedroom accommodation, such as location and convenience in relation to other facilities and the enjoyment of a view, should be available to all guests on an equal basis. In small premises, such as bed and breakfast establishments in domestic properties where there is no lift, it will be necessary to provide accessible bedrooms on the entrance level. Where lifts are available, such as in larger, purpose-designed hotels, accessible bedroom accommodation should be fully integrated with other rooms. Refer to the NDA's 'Safe evacuation of all' document for further information.

The location of all bedrooms should be carefully considered in relation to evacuation requirements and to sources of external noise such as traffic and noise from adjacent facilities such as lift motor rooms and air handling equipment. This is particularly important for people who wear hearing aids, who may be adversely affected by background noise and interference from equipment or electrical supply cables. For further guidance on the acoustic design of buildings, refer to **Booklet 4: Internal environment and services, Section 4.9**.

Well-designed windows are important for good, natural lighting, natural ventilation, and to provide a view. Where windows can be opened, handles and locks should be positioned between 800mm and 1000mm above floor level. All window handles should be operable with a single hand, preferably with a lever action, and should not require precise hand control. The position of the window sill and any horizontal framing members should be carefully considered to enable people who are seated to enjoy an unobstructed view. The zone of a window between 900mm and 1200mm above floor level should be free of transoms. For further guidance on windows, refer to **Booklet 6: Facilities in buildings, Section 6.10**.

Figure 7.5 Example of a bedroom layout.



Key

A. 1800 x 1800 clear space to enable a wheelchair user to turn fully and transfer onto and off the bed

B. 2250 x 2100 clear space also facilitates the use of a mobile hoist

C. Window height to facilitate viewing at a range of eye levels
Window controls to be positioned at a range between 800 and 1000 above floor level

D. Clear knee space to desk and vanity counters

E. Level access to clothes rail in wardrobe

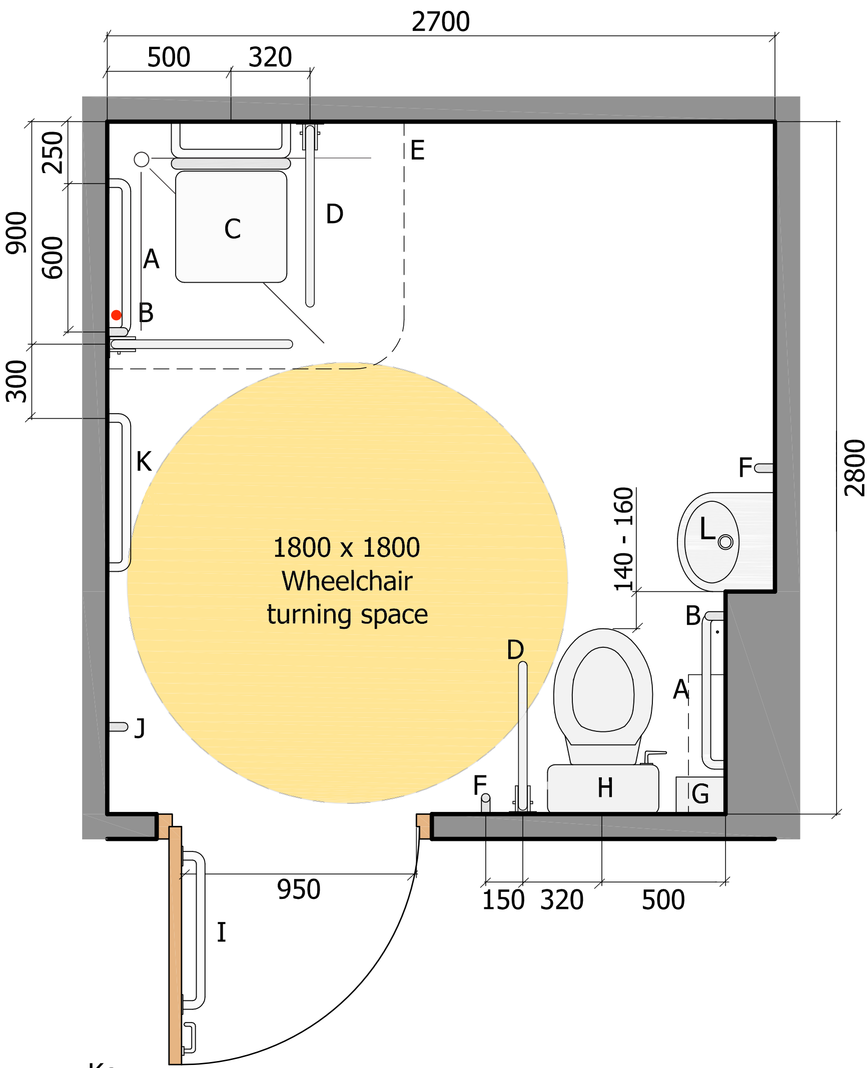
F. 600 wide clear space adjacent to leading edge of door

G. For detail of bathroom for independent use, see Figure 7.6 and booklet 5 - Sanitary facilities

H. 800 clear space between beds enables a person to assist with transfer from opposite side of the bed.

Note: All dimensions in millimetres

Figure 7.6 Example of an accessible shower with WC. This layout should be used when providing accessible hotel rooms.



Key

A. Horizontal grabrail ⦸ diameter 35mm
B. Alarm pull-cord ●
C. Fold-down seat
D. Drop-down rails
E. Shower curtain
F. Vertical grabrail ⦸ diameter 35mm
G. 950 high shelf for colostomy bags
H. Flat-topped close-coupled cistern providing a back rest
I. Horizontal rail to assist door closing
J. Clothes hook between 1050 - 1700
K. Towel rail
L. Wash Basin

For detailed annotations and additional dimensions of corner WC arrangement refer to Figures 7.5, 7.7 and booklet 5 Sanitary facilities

Note: All dimensions in millimetres

Artificial lighting in bedrooms should be adjustable, easy to control, and should provide good colour rendering. Reading or task lights should be available at the bedside and at any desk or dressing table. General lights should have two-way switching so that people can control the lights from the bed as well as when first entering the room. Table lamps that are easily knocked over or that have complex switching arrangements or trailing cables should be avoided. All light fittings should be fitted with diffusers to eliminate the potential for glare.

For further guidance on internal lighting, refer to **Booklet 4: Internal environment and services, Section 4.5.1**.

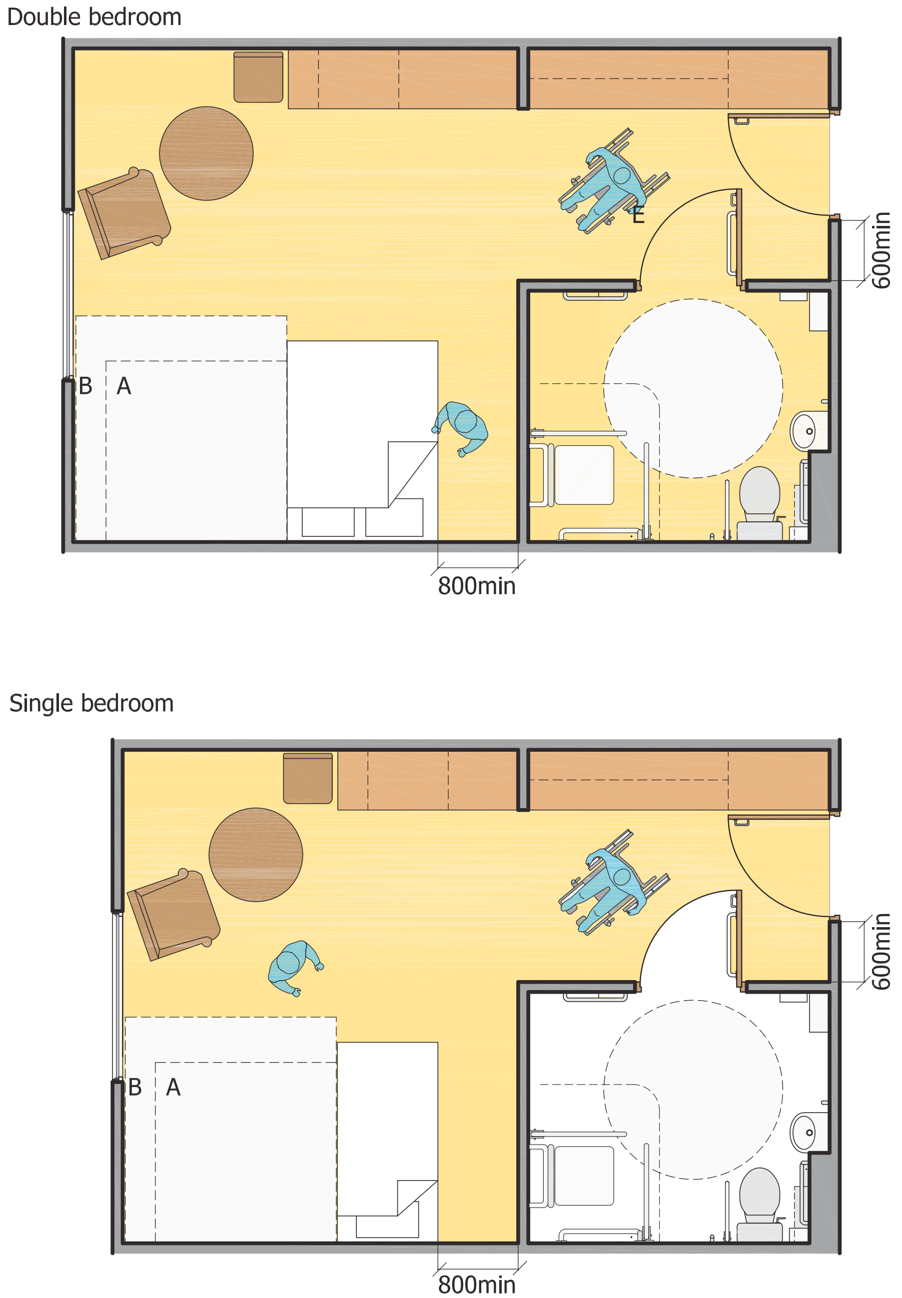
The controls for heating, ventilation, lighting, curtains or window blinds, radios, and televisions, as well as sockets for phone chargers, hair dryers and electronic equipment, should all be reachable from a seated position. They should be simple and easy to operate. Remote control units are ideal as they can be used from any point in the room.

For further guidance on outlets, switches and controls, refer to **Booklet 4: Internal environment and services, Section 4.7**.

Good indoor air quality in bedroom accommodation is important for everyone, but essential for some people with respiratory conditions.

Indoor air quality is significantly affected by dust concentrations in bedrooms, particularly in the bed itself and in surrounding areas. This can be improved by minimising ledges and other areas in the room that may collect dust. Headboards should be timber or other solid materials rather than fabric finished. Window blinds could be a non-fabric type and be used instead of heavy curtains, which may also harbour dust. Synthetic-filled duvets, quilts and pillows are preferable for many people rather than those filled with feather or down.

Figure 7.7 Alternative bedroom layouts. Note wet room bathroom with level entry shower.



Note:

A. 1800 x 1800 clear space to enable a wheelchair user to turn fully and transfer onto and off the bed

B. 2250 x 2100 clear space also facilitates the use of a mobile hoist

Note: All dimensions in millimetres

Bedroom doors should be fitted with electronic card-operated locks wherever possible, as these are generally easier to use than keys. The lock should have a funnelled entry to help direct the card into the slot and provide both visual and audible indication that the lock has been released. A flat card can be difficult for many people to pick up from a flat surface, so something attached to the card such as a fob or tag to help retrieval is useful.

Key cards used by hotel guests to access their rooms should conform to EN 1332 Identification Card Systems- Machine readable cards standard. For more information on key cards please see http://www.universaldesign.ie/useandapply/ict/itaccessibilityguidelines/smartcards/guidelines/smartcardguidelines/cards.

Entry systems that require the simultaneous use of two hands should be avoided. Wherever wide-angle door viewers are provided, they should be positioned at two heights, 1050mm and 1500mm above floor level.

Bedroom doors in guest and residential accommodation will always be required to be fire resisting, which can result in them being heavy to open if the overall door mechanism and items of ironmongery are not carefully considered.

The use of swing-free door-closing devices or powered door-opening devices may be appropriate, and will help to ensure that all guests are able to independently access and leave the room.

For further guidance on door ironmongery, refer to **Booklet 2: Entrances and horizontal circulation, Section 2.6.5**; for automatic door systems, refer to **Section 2.6**; and for door security and entry systems, refer to **Section 2.6.7**.

Beds should be 450 to 480mm high (measured from the floor to the upper surface of the mattress) to facilitate easy transfer for people using a wheelchair, and the bed should have firm edges to the outer rim. A clear space at least 1800mm x 1800mm should be maintained to the side of the bed for access and transfer between a wheelchair and the bed.

In rooms equipped for a mobile hoist, beds should have a clearance of 150mm to the underside and that continues to the full length of the bed on both sides. In these rooms, a clear space 2100mm x 2250mm should be provided for the hoist. An 800mm-wide zone should be provided on the opposite side of the bed for an assistant.

Clothes rails in accessible bedrooms should be positioned no higher than 1370mm above the floor and provide a level approach to facilitate wheelchair access. If a level approach is not possible, such as where built-in cupboards with a plinth are installed, the clothes rail should be no higher than 1200mm. A clear space of at least 1100mm should be maintained in front of a wardrobe for easy access.

Where televisions are provided in guest accommodation, they should be equipped to display Teletext and other subtitles. A television listening aid or portable room loop should be available on request for guests with hearing difficulties. All telephones should incorporate an inductive coupler and volume control.

For further guidance on hearing enhancement systems, refer to **Booklet 4: Internal environment and services, Section 4.10**. For further guidance on telephones, refer to **Booklet 6: Facilities in buildings, Section 6.7**.

An assistance alarm, incorporating pull cord and reset button, should be provided in each accessible bedroom, positioned where it can be reached from the bed and from an adjacent floor area. For further guidance on assistance alarms, refer to **Booklet 5: Sanitary facilities, Section 5.10.1**.

For guidance on fire detection and alarm systems, refer to **Booklet 4: Internal environment and services, Section 4.12**.

Checklist – Hotel bedrooms
• Ensure a choice of room format is available to meet individual need.
• Ensure at least one in twenty rooms in large establishments are accessible to wheelchair users; those using walking aids; and guide dog users, with the dimensions and facilities illustrated in **Figure 7.6** and with level-entry shower.
• Where more than one room is provided for wheelchair users, provide a choice of left- and right-hand transfer.
• Ensure all bedrooms enjoy an equitable level of amenity and convenience in relation to other facilities.
• Integrate accessible bedrooms with other bedroom accommodation where lifts are available.
• Ensure bedrooms are protected from traffic noise and noise from internal machinery such as plant rooms and lifts.
• Ensure bedroom windows provide adequate natural light, ventilation and a view.
• Position window handles between 800mm and 1000mm above floor level and ensure they are easy to open.
• Avoid horizontal framing members on windows between 900mm and 1200mm.
• Install adjustable artificial lighting that is easy to control and provides good colour rendering.
• Ensure all lights have diffusers.
• Provide two-way switching to the main lights.
• Avoid the use of trailing cables and lamps that can be easily knocked over.
• Ensure controls for all services and appliances are reachable from a seated position and easy to operate.
• Consider the use of remote control units wherever possible.
• Ensure good indoor air quality to all bedrooms.
• Ensure bedroom doors are easy to open.
• Consider the use of electronic card-operated locks and powered door-opening devices or swing-free door-closing devices.
• Select beds carefully to facilitate easy transfer by wheelchair users; those with dexterity and reach limitations; and people of smaller stature.
• Position clothes rails where they can be reached easily.
• Provide television listening aids or portable room loops on request.
• Install assistance alarm in all accessible bedrooms.

7.11.2 Bathrooms

In guest and residential accommodation, the design of toilets, shower rooms and bathrooms should meet the needs of all potential guests and residents. All facilities should be safe, usable and independently accessible.

The preferred arrangement is for en-suite bathroom facilities. Wherever possible, en-suite facilities should be provided for accessible bedrooms, even if they are not provided for all residents in the building.

If an en-suite arrangement is not possible, unisex accessible bathroom or shower room facilities should be provided as close as possible to any accessible bedroom accommodation. If only one accessible en-suite bedroom is provided in an establishment, the en-suite should contain an accessible shower and WC on the basis that accessible showers are usable by a greater number of people than baths.

Separate accessible toilet, shower, and changing facilities should be provided for staff, as appropriate.

In holiday apartments and other properties that are let as self-contained units, bathrooms may not necessarily be en-suite, particularly if there is only one bathroom shared by two or more bedrooms. Whatever the overall arrangement, the bathroom should be easily accessed from the entrance, each of the bedrooms, and the main living areas.

Where a number of properties are grouped together in a site, a proportion should include a bathroom or shower room accessible to wheelchair users, people using walking aids, and guide dog users.

For detailed guidance on bathrooms and shower rooms, refer to **Booklet 5: Sanitary facilities, Section 5.7**.

Checklist – Guest and residential bathrooms
• Provide en-suite bathrooms to all bedrooms wherever possible.
• Provide en-suite facilities to accessible bedrooms, even if they are not provided in other bedrooms.
• Provide unisex accessible bathrooms and shower rooms close to bedrooms where there are no en-suite facilities.
• Provide separate accessible sanitary facilities for staff.
• In self-contained holiday units, ensure the bathroom to be easily accessed from the entrance, each bedroom and the main living areas.
• Where a number of self-contained units are grouped together, provide a proportion with bathrooms and shower rooms accessible to wheelchair users, people using walking aids and guide dog users.
• Refer to **Booklet 5: Sanitary facilities** for detailed guidance on bathrooms and shower rooms.

7.12 Housing

This section covers the design of new housing, including individual dwellings and flats. The guidance is also applicable to residential conversions and refurbishments where every opportunity should be taken to maximise accessibility for occupants and visitors alike.

This section does not cover the design of residential accommodation, such as nursing homes, or the design and adaptation of dwellings to accommodate people with particular disabilities.

The aim for all new housing and, wherever possible, housing conversions and refurbishments should be to construct homes that are universally designed and easily adapted to meet the changing needs of occupants over time. This will provide everyone with greater choice in terms of where they live, and will enable people to remain in their own homes as their needs change.

By incorporating features into dwellings that enable convenient and cost-effective adaptation in the future, and with careful consideration as to the layout and provision of adequate space for people to manoeuvre, dwellings will be convenient for as broad a range of households and visitors as possible.

The technical guidance in this section builds upon the 16-point Lifetime Homes standards promoted by the Joseph Rowntree Housing Trust, but also covers flats, town houses, and dwellings where there is no living space at the entrance level, and extends the technical criteria to include communal car parking facilities.

Checklist – Housing
• Ensure all new housing, housing conversions, and refurbishments are universally designed.
• Consider that housing design should meet the changing needs of occupants and visitors.

7.12.1 Car parking

Where car parking is provided within the curtilage of a site for an individual house, the space should be 3600mm wide x 7000mm long. A space of this size will enable car doors to be fully opened for ease of access and also provide sufficient space for access to the car boot. Part of the width could be shared with a path as long as the surface is firm and level and capable of taking the weight of a vehicle.

Communal car parking facilities, such as those provided in association with flats or a group of dwellings, should incorporate at least one designated accessible parking bay for each lift core associated with the parking area. If more than one car parking area is provided in conjunction with flats or a group of dwellings, at least one designated accessible parking bay should be provided in each area. Where underground parking is provided at the base of a block of flats, at least one designated accessible parking bay should be provided adjacent to each lift core.

The dimensions, configuration and marking of designated parking bays in communal car parks should be the same as for public buildings, as set out in **Booklet 1: External environment and approach, Section 1.4.4**.

Checklist – Car parking
• Ensure car parking space for an individual house is 3600mm wide x 7000mm long.
• Incorporate at least one designated accessible car parking bay for each lift core in communal car parks to blocks of flats.
• Provide at least one designated accessible car parking bay in each car parking area where more than one car parking area is provided.
• Provide at least one designated accessible car parking bay adjacent to each lift core in an underground car park.
• Ensure the dimensions and arrangement of designated accessible car parking bays are as **Booklet 1: External environment and approach, Section 1.4.4.**

7.12.2 Setting-down points

A setting-down point should be provided close to the entrance of a block of flats or the communal entrance to a group of dwellings. The setting-down point should be located on level ground. It should incorporate both a dropped kerb to provide convenient access for people using wheelchairs or walking aids and people using strollers. It should also include a kerbed section so that people can access or alight from vehicles such as taxis using a portable or fold-down ramp.

The dimensions, configuration and marking of setting-down points is set out in **Booklet 1: External environment and approach, Section 1.4.7**.

Checklist – Setting down points
• Provide a setting-down point close to the entrance of a block of flats or communal entrance to a group of dwellings.
• Ensure setting-down points are on level ground, with a section of dropped kerb and a kerbed section.
• Follow the dimensions and arrangement of setting-down points in **Booklet 1: External environment and approach, Section 1.4.7**.

7.12.3 External approach

The approach to all entrances, including entrance doors to individual houses, communal entrances to flats or to a group of dwellings, should ideally be level. Routes between facilities on a site, such as communal car parking and the entrance to a block of flats, should also ideally be level. In new buildings, the finished level of the internal floor at entrance level should be accurately specified so that this can be achieved. Where it is not possible to provide a level approach, for example on conversion projects where the existing site has a significant incline, the approach should be gently sloping or ramped.

Where approach routes on larger sites have a gradient between 1 in 60 and 1 in 25, regular resting places should be provided out of the way of the line of travel.

Approach routes with a gradient of 1 in 25 should have level landings at maximum 19m intervals; routes with a gradient of 1 in 33 should have landings at no more than 25m intervals. Approach routes with gradients steeper than 1 in 25 should be designed as external ramps.

Wherever a ramp is provided, steps should be available alongside to meet the needs of all building users, particularly people with balance difficulties and those who have problems walking up and down gradients. Detailed guidance on the design of external steps and ramps is available in **Booklet 1: External environment and approach, Section 1.5.2**.

For further guidance on external access routes, including recommendations for path widths, cross-fall gradients and surfacing, refer to **Booklet 1: External environment and approach, Section 1.5.1**.

Where steps are provided as part of an approach route to an individual house, they should follow the guidance in **Booklet 1: External environment and approach, Section 1.5.2**, with one exception. The use of tactile hazard warning surfacing is not required where the steps are within the curtilage of an individual private house. The use of tactile hazard warning surfacing is recommended for external steps providing access to a communal entrance to flats or a group of houses.

Approach routes to individual houses from the site boundary should be at least 900mm wide if they are separate from the drive. However, the approach to a house could be linked to the drive as long as the overall width of the car parking area is at least 3600mm, as **Section 7.12.1** above.

If a gate is provided to an individual house at the curtilage of the site, it should provide the clear opening width set out in the table below.

Minimum clear opening width of gate	**Direction of approach and width of footpath.**
800mm	Straight-on approach.
800mm	Right-angled approach via footpath, minimum 1500mm wide.
825mm	Right-angled approach via footpath, minimum 1200mm wide.
900mm	Right-angled approach via footpath, minimum 900mm wide.

Checklist – External approach
• Provide level access to main entrance doors wherever possible.
• Provide level access between facilities on communal sites.
• Where level access is not possible, ensure access routes are gently sloping or ramped and incorporate landings at regular intervals.
• Ensure external access routes, ramps, and steps are designed in accordance with the guidance in **Booklet 1: External environment and approach.**
• Ensure paths to individual houses are at least 900mm wide.
• Install gates that provide the clear opening width set out in the table above.

7.12.4 Entrances

Entrances to houses, flats and groups of dwellings should be readily identifiable and easy to access. To aid identification during the hours of darkness, all entrances should have an external light either above or to the side of the door. Good lighting will help occupants to identify callers and facilitate easier operation of locks and entry systems.

Some form of weather protection should be provided at all entrances. This may be in the form of a projecting canopy or a recessed entrance. A canopy should extend the full width of the landing in front of the entrance door. It is preferable that canopies are suspended or cantilevered above the entrance to avoid the need for posts or columns that may obstruct the access route.

At the entrance to individual houses, a clear landing area at least 1500mm x 1500mm should be provided.

At the communal entrance to flats or groups of dwellings, a level landing area at least 2400mm x 2400mm, clear of any door swings and other obstructions, should be provided. The area recommended for communal entrances is greater than that for individual houses as the entrance is more likely to be used by several residents simultaneously. The area correlates with that recommended for the entrance to non-domestic buildings, as covered in **Booklet 2: Entrances and horizontal circulation, Section 2.4**.

If an entrance lobby is provided to a communal entrance, it should be designed in accordance with the guidelines in **Booklet 2: Entrances and horizontal circulation, Section 2.4.1**.

The entrance hall in an individual house is recommended to incorporate an area at least 1500mm x 1500mm to enable a person to manoeuvre easily around the door swing and close the door behind them.

Doorbells and intercoms to individual houses should be positioned no higher than 1200mm above the external ground level.

For guidance on door security and entry systems, refer to **Booklet 2: Entrances and horizontal circulation, Section 2.6.7**.

The threshold of every entrance door should be level. The threshold to all other external doors, such as external kitchen doors, patio doors, balcony doors, roof terraces, bin stores, and any communal facilities, should also be level.

Doors to communal entrances should be designed in accordance with the guidelines in **Booklet 2: Entrances and horizontal circulation, Sections 2.6.1** and **2.6.4**.

The entrance doors to individual houses and flats should provide an effective clear width of 800mm and incorporate a 300mm unobstructed space adjacent to the leading edge.

Guidance on door ironmongery is covered in **Booklet 2: Entrances and horizontal circulation, Section 2.6.5**. Doors should be fitted with an electrical spur to facilitate future fitting of remote control door opening devices. See **Section 7.12.7**.

Checklist – Entrances
• Ensure entrances are easy to identify and easy to access.
• Ensure all entrances have an external light.
• Ensure entrances have some form of weather protection.
• Provide a clear landing at least 1500mm x 1500mm in front of the entrance to individual houses.
• Provide a clear landing at least 2400mm x 2400mm in front of communal entrances.
• Ensure the entrance hall in an individual house incorporates an area at least 1500mm x 1500mm.
• Ensure communal entrance lobbies are designed in accordance with the guidance in **Booklet 2: Entrances and horizontal circulation, Section 2.6.1**.
• Install doorbells no higher than 1200mm above ground level.
• Ensure every entrance and all other external doors have a level threshold.
• Ensure entrance doors to individual houses have a clear width of 800mm and 300mm clear space adjacent to the leading edge.
• Ensure doors to communal areas of flats are designed in accordance with the guidance in **Booklet 2: Entrances and horizontal circulation, Sections 2.6.1 and 2.6.4**.

7.12.5 Horizontal circulation in housing

The layout of individual houses and flats should facilitate convenient circulation for everyone and enable people using wheelchairs, walkings aids, and strollers to manoeuvre easily through doors and to turn through 360 degrees within each room, corridor and lobby or hallway area. Corridors in individual houses and flats should be at least 900mm wide.

Corridors in the communal areas of flats or groups of dwellings should be logically arranged and provide convenient access between the main communal entrance and each individual flat. Corridors should be at least 1200mm wide.

The recommended effective clear widths for doors in individual houses and flats are set out in the table below.

Effective clear opening width of door	Direction of approach and width of corridor.
800mm	Straight-on approach.
800mm	Right-angled approach via corridor at least 1100mm wide.
850mm	Right-angled approach via corridor less than 1150mm wide.

All doors within houses and flats should have a clear space of at least 300mm adjacent to the leading edge of the door to enable people to reach for the door handle and manoeuvre clear of the door swing.

Doors that open into rooms, such as living rooms, bedrooms and kitchens, should be positioned so that the hinge-side of the door is adjacent to a return wall.

Doors to bathrooms and toilets should be designed so that they can be opened from outside the room in an emergency. Refer to **Booklet 5: Sanitary facilities, Section 5.9.**.

Guidance on door ironmongery is covered in **Booklet 2: Entrances and horizontal circulation, Section 2.6.5**.

Checklist – Horizontal circulation in housing
• Ensure all houses and flats are arranged to provide convenient access throughout.
• Provide sufficient space to enable wheelchair users , those using scooters, parents with strollers, people using walking aids, and guide dog users to move through doorways and turn through 360 degrees.
• Ensure corridors within flats and houses are at least 900mm wide.
• Ensure corridors in communal areas are at least 1200mm wide.
• Ensure the width of doors and corridors are as set out in the table.
• Make sure all doors within houses and flats have a clear space of at least 300mm adjacent to the leading edge of the door.
• Ensure doors that open into rooms have their hinges adjacent to a return wall.
• Design bathroom and toilet doors so that they can be opened outwards in an emergency.
• Consider wet-room type showers in new houses.
• Consider reinforced or solid walls in bathroom/bedroom to take grab bars.
• Consider reinforced ceiling to provide for future hoist.

7.12.6 Vertical circulation in housing

The design of steps and stairs in individual dwellings and in the communal areas of flats should follow the guidance in **Booklet 3: Vertical circulation, Section 3.5.1**.

One or more passenger lifts, or preferably evacuation lifts, should be provided in the communal areas of blocks of flats of three or more storeys to facilitate easy access to each floor level for every resident and visitor.

Lifts should serve all floor levels, including underground parking and floors containing communal facilities such as a laundry. In multi-storey blocks of flats, it is preferable if more than one lift can be provided so that convenient access can be maintained when a lift is out of action due to breakdown or for routine maintenance.

Guidance on the provision of passenger lifts and evacuation lifts is covered in **Booklet 3: Vertical circulation, Section 3.7** and **3.8**. Further guidance on emergency evacuation is included in **Booklet 8: Building management**, plus further guidance covering safe evacuation is covered in the NDA publication 'Safe evacuation for all'.

In blocks of flats arranged over two or three storeys, the provision of an enclosed vertical rise platform lift may be appropriate. One should certainly be provided in blocks of flats where there is no passenger lift and where four or more dwellings are located on the upper floors. Guidance on the provision of vertical rise platform lifts is covered in **Booklet 3: Vertical circulation, Section 3.9**.

In blocks of flats arranged over two storeys in which up to three flats are located on an upper floor, it may be acceptable for the platform lift not to be installed at the outset, provided that provision is made for the future installation of a platform lift. Future provision should include adequate space in an appropriate location, structural support or framing and the availability of a suitable electrical supply.

In individual houses that are arranged over two or more storeys, provision should be made for the future installation of a platform lift, homelift or stairlift. The platform lift, homelift or stairlift should be capable of serving the entrance level and all other floor levels of the house. Future provision includes adequate space in an appropriate location, structural support, framing or trimming of floor joists and the availability of a suitable electrical supply.

Homelifts (also termed 'through-floor lifts') are able to serve two different floor levels and are typically installed to link a ground floor living room and first floor main bedroom. In this scenario, houses designed to enable future installation of a homelift need to be planned so that the main bedroom is located directly above the living room. Alternative locations are possible for a homelift, such as between ground floor and first floor circulation areas, storage areas or other rooms.

Homelifts typically require an area 1500mm x 1000mm for the homelift platform and mechanism. They also require clear space in front of the 1000mm dimension for access and egress.

Stairlifts, including chair stairlifts and perching stairlifts, are designed for domestic use, where they can be tailored to meet an individual's needs and where a person can be fully trained in using the equipment. They require adequate space at the top and bottom landing so that they can be parked when not in use without causing an obstruction. At the top of the stairs, a space 400mm wide x 200mm long should be provided in addition to the required clear width of corridors or landings to enable people to transfer safely onto and off the stairlift and to allow for the projecting stairlift track. At the bottom of the stairs, a clear space 700mm long x 400mm wide should be provided for the stairlift to be parked in the rest position. This space should be in addition to any hallway or corridor and should be clear of door openings, door swings and any fittings.

Checklist – Vertical circulation
• Design steps and stairs in accordance with the guidance in **Booklet 3: Vertical circulation, Section 3.5.1.**
• Provide one or more passenger lifts (preferably evacuation lifts) in the communal areas of blocks of flats of three or more storeys.
• Ensure lifts serve all floors, including underground carparks and other facilities.
• Provide an enclosed vertical rise platform lift in blocks of flats of two or three storeys.
• Design passenger lifts in accordance with the guidance in **Booklet 3: Vertical circulation, Section 3.7.**
• Design platform lifts in accordance with the guidance in **Booklet 3: Vertical circulation, Section 3.9.**
• Where a platform lift is not installed at the outset, provide space, services, and structural support to facilitate easy installation in the future.
• Design individual houses to facilitate the future installation of a platform lift, homelift or stairlift.

7.12.7 Services in housing

In houses and flats, consideration should be given to the provision of a power supply in the form of fused spurs or capped outlets. This will facilitate the installation of equipment and additional lighting required for future adaptations. Provision should be made for items such as a platform lift, homelift or stairlift, ceiling track hoist, electric shower, automatic controls to window opening devices, electric doors, intercoms, and additional task lighting in the kitchen.

Domestic meters and consumer units should be located where they can be easily read by people in a standing or sitting positions, and should be positioned at a height between 1200mm and 1400mm.

Thermostatic radiator valves should be provided to all radiators, except where the temperature is controlled by a room thermostat. They should be located at a recommended height of 400mm above floor level. Where this is not possible, the use of a remote sensor and control in a more accessible location should be considered.

The mains water stop-tap should be located where it can be easily accessed and operated.

Guidance on outlets, switches and controls is covered in **Booklet 4: Internal environment and services, Section 4.7**.

Checklist – Services
• Provide sufficient fused spurs or capped outlets to facilitate the future installation of equipment and additional lighting.
• Position consumer units and meters at a height between 1200mm and 1400mm where they cab be easily accessed.
• Provide thermostatic radiator valves to all radiators, 400mm above floor level, except where room thermostats are located.
• Position the mains water stop-tap where it can be easily reached and operated.
• Design outlets, switches and controls in accordance with the guidance in **Booklet 4: Internal environment and services, Section 4.7.**

7.12.8 Individual rooms

Individual houses and flats should provide a range of accessible rooms and facilities that will facilitate independent use and enjoyment of the dwelling for occupants and visitors. Wherever possible, facilities such as a living room, kitchen, and an accessible toilet should be provided at the principal floor level. (The principal floor level would normally be the entrance level of the dwelling.)

The living room and kitchen facilities do not have to be separate or enclosed rooms but may comprise designated areas within an open-plan arrangement. The living room should include a space that can be used as a temporary sleeping area and should be sufficiently large to accommodate a single bed, cupboard and drawers, with a 1200mm-wide clear space to the side of the bed for access and for the transfer to and from the bed. The principal floor level should also incorporate space and be plumbed for the future installation of a level-access shower.

Detailed guidance on the provision of sanitary facilities in dwellings in covered in **Booklet 5: Sanitary facilities, Section 5.9**.

In each main living area, the kitchen, and at least one bedroom, sufficient space should be provided to facilitate easy access by people using wheelchairs, scooter users, and people who use walking aids. An unobstructed turning area at least 1500mm in diameter or an ellipse at least 1700mm x 1400mm long should be provided. Turning spaces should be clear of radiators and other heaters. In bedrooms, the turning space should be located at the side of the bed.

Checklist – Individual rooms
• Provide a range of rooms and facilities in houses and flats.
• Wherever possible, locate the main living room, kitchen, and an accessible toilet at the entrance level.
• Provide an area within the living room that can be used in the future as a temporary sleeping area.
• Provide a toilet or bathroom that can be easily converted to incorporate a level access shower.
• Ensure the kitchen, main living area, and at least one bedroom incorporate an unobstructed turning area for wheelchair users, scooter users and people who use walking aids.

7.13 Historic Buildings and Sites

This section covers historic buildings, historic gardens and landscapes, archaeological sites, and protected structures in Ireland that represent the country's unique heritage.

Historic buildings and sites are a living record and expression of the country's social and cultural development, which have developed over centuries and should continue to be preserved for future generations.

Historic buildings and sites to which the public has access should, as far as is practicable, be universally designed. Where it is not possible for a whole building or site to be universally designed, at least part of it should be accessible.

Everybody should have the opportunity to visit or work within Ireland's historic places and be able to do so with ease and dignity. All events and activities associated with historic buildings and sites should also be universally designed.

The Architectural Heritage Advisory Unit of Department of the Environment, Heritage and Local Government will shortly publish a guidance document entitled 'Access, Improving the Accessibility of Historic Buildings and Places'. The publication will be part of the 'Advice Series', a series of publications designed to guide those responsible for historic buildings on how best to repair and maintain their properties. NDA and the Architectural Heritage Advice Unit collaborated on the development of this publication and it is intended that it will:

- increase understanding of the principles of conservation and universal design
- improve awareness and understanding of the relevant legislation and policy
- provide guidance on preparing an access strategy
- provide illustrated examples of successful solutions where access to historic buildings and places has been improved

Sometimes the best and most appropriate way to make historic places more accessible is through management solutions that may sometimes require little physical intervention or alteration of historic fabric. Well-planned access strategies, developed at the outset, can avoid excessive intervention and cost. Where intervention is required, careful, sensitive and elegantly designed solutions should be prepared and carried out by those with the necessary expertise and experience. Consultation with the relevant stakeholders, including people with disabilities; people of any age, size or ability; and local authority access, planning, building control and architectural conservation officers, will assist in developing appropriate solutions. The guidance also emphasises that in order to improve access to historic buildings and places successfully, it is necessary to address both conservation and accessibility needs in an integrated manner.

Many aspects of universal design – such as the availability and format of information prior to arrival and during a visit, the delivery of appropriate customer service and improved awareness amongst staff and volunteers of diverse user needs, such as people of any age, size ability or disability – are key considerations and should be the subject of continuous review and improvement. These all contribute to the visitor experience and general enjoyment, as well as improving accessibility to services and information for everyone.

The use of well-designed signage and landmark features to aid orientation around a building or site will improve access for all visitors.

Signage can be designed to be in keeping the historic characteristics of the building or site so that it complements the overall aesthetics. It should be placed or fixed in position in a way that is reversible so that there is no lasting damage or adverse effect on the historic fabric. Wherever possible, the principal routes for circulation around a building or across a landscape or site should be the same for everyone, and should be logically arranged in the context of the historic fabric or nature of the landscape.

The opportunity to improve physical access to historic buildings and sites may arise as part of a programme of repair, improvement or adaptation and should be undertaken in a way that maximises accessibility without compromising the historical significance or characteristics of a site. New-build visitor facilities incorporating interpretation centres, toilets, and cafés should be universally designed.

Checklist – Historic buildings and sites
• Ensure historic buildings and sites are accessible wherever possible.
• Consider that at least a part of an historic site should be accessible in situations where the whole site cannot be made accessible.
• Ensure all events and activities at historic sites are accessible.
• Review information and customer service issues continuously.
• Use well-designed signage to improve wayfinding.
• Take every opportunity to improve physical access such as during repair and maintenance programmes.
• Ensure new-build visitors facilities are universally designed.

7.13.1 Conservation principles

One of the acknowledged principles of conservation is to ensure that buildings remain in active use. The survival of many historic buildings depends on their ability to serve a useful purpose so that they continue to be cared for and maintained.

It is preferable that buildings retain the use for which they were originally designed and constructed, as in this way they will preserve more of their original character. However, this is not always possible; good conservation practice should enable a building to evolve and adapt to meet the changing needs of society and the community served by the building, while retaining its particular historical significance. Changes that facilitate improved access for all are an essential factor in the long-term viability and sustainability of any historic building or site.

Where major interventions or additions are required, these should add to the distinctive qualities rather than compete with or overwhelm the building or place, and in time, they should become valued elements in their own right. In some instances, the appropriate design solution may be to adopt the historic style, however care should be taken to ensure authenticity of detailing and specification, as pastiche versions will only detract from the original.

More often, a contemporary design of high quality will be most appropriate and the approach should generally strive for minimal visual impact and high quality of material. These new elements should not visually dominate.

Checklist – Conservation principles
• Ensure, wherever possible, that historic buildings remain in active use.
• Ensure, wherever possible, that buildings retain their original purpose.
• Consider new uses that may enable historic buildings to remain viable.
• Ensure any changes facilitate improved access for all.
• Ensure extensions and alterations to historic buildings are sympathetic to the original structure.

7.13.2 Making changes to historic buildings

When making changes to historic buildings, construction methods that are reversible, or predominantly reversible, should be used wherever possible. This offers the potential for the structure or fabric to be returned to its original form at some point in the future. In every aspect of work, from repairs and refurbishments projects to major additions, only materials and workmanship that are appropriate to the building or site should be utilised.

Alterations to buildings and sites should minimise the impact on the original fabric. Changes that adversely affect the character of a building either internally and externally are likely to be considered inappropriate.

Where alterations are being considered to parts of the original building fabric, they should be seen as contributing to the historical development of the building or structure. Many historic buildings have been added to or altered over generations and changes implemented in the twenty-first century should be regarded as a continuation of this process.

Depending on the current use of an historic building, or any proposed change of use, it may be necessary to make changes to enable the building to perform an improved or new function in the future.

Checklist – Making changes to historic buildings
• Use construction methods that are reversible or substantially reversible.
• Use materials and workmanship appropriate to the building or site.
• Minimise the impact on the original building fabric wherever possible.
• View new changes as a continuation of the historical development of a building or site.

7.13.3 Detailed design of historic buildings

This section covers issues pertinent to key elements of heritage buildings and sites. It does not provide standardised design criteria as this is not appropriate for historic buildings and sites.

In every case, creative and innovative solutions – ones that suit the context and character of the building or site in question – should be sought to overcome particular barriers to access. The case studies linked to this section provide examples of buildings in which access has been improved in a sensitive and successful way.

7.13.3.1 Entrances

The aim in every building should be for the main entrance to be universally designed. The presumption is not that a ramped or accessible entrance should be to the rear of a building or via a service entrance. Similarly, the main entrance should be permanently available rather than sometimes dependent on the provision of a temporary ramp.

In many historic buildings, entrances are raised above ground level for practical or aesthetic reasons. In some properties, the entrance and internal floor level were required to be raised above the external ground level in order to prevent water ingress during flooding. In others, particularly in larger properties, the entrance was raised to increase the sense of grandeur and was an integral part of an imposing plinth or portico accessed by steps.

The key considerations in relation to improving access to entrances in heritage buildings are likely to relate to the integrity of the overall façade and whether the addition of a ramp or alterations to steps will detract from the symmetry, proportion and balance.

Wherever possible, a ramp should be provided to accompany steps, but it will need to be carefully considered so that it does not detract from the character or symmetry of the building.

In some cases, such as where the change in level is relatively small and there is sufficient external space, it may be appropriate to modify the external ground levels in order to provide level access at the entrance door threshold.

7.13.3.2 Doors

In historic buildings, doors are typically an integral part of the design, with the size, proportion and detailing contributing to the character of the property. Many doors, both external and internal, can be very heavy due to their size and solid construction. This will make access difficult for many people, but could be overcome through the use of automatic or powered door-opening devices. As technology advances, such devices are becoming more slimline and discreet.

In some buildings, it may be appropriate to hold selected doors open to facilitate easier access throughout. Where doors are required to be fire-resisting, they could be held open using electromagnetic door hold-open devices.

Wherever possible, door thresholds should be level to facilitate easy access for all and to avoid potential trip hazards. However, in some buildings, a raised threshold will be an integral component of the door or building structure, such as raised sill plates in a timber-framed building. The use of temporary fillets either side of the raised sill plate provides an alternative method of bridging the change in level on either side of the door. Where raised or stepped thresholds are provided as a means of preventing water ingress to a building, an alternative means of weatherproofing will need to be found if external ground levels are modified or an external landing created at floor level in order to improve access. Adequate drainage will be required externally and an appropriate weather seal should be added to the base of the door.

For further guidance on the use of automatic door systems, refer to **Booklet 2: Entrances and horizontal circulation, Section 2.6.6**.

7.13.3.3 Ramps

Ramps are generally preferable to platform lifts as they can be used independently at all times. Platform lifts can break down and may have to be taken out of action periodically for servicing and maintenance. This can result in a particular area of a building not being accessible to some people. Ramps, however, can take up a lot of space, particularly if they have a substantial rise, and require a series of ramp slopes and intermediate landings.

Platform lifts can be used but are often reserved for wheelchair users; this can serve to segregate people, and is of no benefit to people pushing strollers and pushchairs, or for people using trolleys.

Where ramps are provided, they should follow the guidance in **Booklet 1: External environment and approach, Section 1.5.2 for external ramps** and **Booklet 3: Vertical circulation, Section 3.6 for internal ramps**.

All ramps in historic buildings should be carefully detailed so that features such as skirting boards, dado rails, and panelling are dealt with sensitively.

Temporary ramps are typically unsightly and often require the intervention of management personnel, particularly if they are portable and are only put in place when the need arises.

Temporary ramps are not considered suitable as a long-term solution. They may be considered suitable as a short-term solution while approval for permanent modifications are made, where access to a building or room is required for a short period of time such as when a facility is temporarily relocated, or when access to a building or room is very infrequent. Temporary ramps should follow the same design criteria as permanent ramps in relation to ramp gradient, slope length, the spacing of intermediate landings and the provision of handrails.

7.13.3.4 Staircases

The central staircase within many historic properties is a key feature and expression of the grandeur of the place. In many cases, it will not be appropriate to make any significant adjustments, even if the step size and profile or the handrails do not meet current requirements. However, improvements may still be possible to the stair covering and artificial lighting.

Handrails and balustrades are often highly decorative and an integral part of the stair design, but may not be sufficiently high or of a profile that is easy to hold. In some cases, the provision of supplementary handrails, designed to be in keeping with the original handrail, may be possible, either mounted on an outside wall or positioned immediately adjacent to the existing balustrade.

It may be easier and more appropriate to undertake modifications to improve access to a secondary staircase in a building and to designate this as an alternative access route. It should not be designated as a route solely for people with mobility difficulties, but should be available to everyone using a building.

Passenger lifts or preferably Evacuation lifts – Where there is more than one floor level or a significant change in level within a storey, the preferred option is for the installation of an evacuation lift. The location of a lift within an historic building will require careful consideration to ensure it is easy to access at all floor levels whilst minimising structural modification to the existing building fabric. Guidance on the design of passenger lifts is covered in **Booklet 3: Vertical circulation, Section 3.7**.

7.13.3.5 Platform lifts

Where it is not possible to install a passenger lift, the provision of a vertical-rise platform lift may be appropriate. Platform lifts can be free-standing, and typically require less in the way of structural modifications to the existing building structure, which is advantageous in most circumstances. If sufficient space is available, platform lifts can be installed within the stairwell of a building or in an open-plan area to provide access to a gallery. In such instances, they require no major structural intervention and can rest on the existing floor surface as the lower floor level. For further guidance on the design of platform lifts, refer to **Booklet 3: Vertical circulation, Section 3.9**.

Checklist – Detailed design for heritage buildings and sites

- Ensure main entrances are universally designed and permanently available wherever possible.
- Consider the effect of changes to an entrance elevation on the character and symmetry of the building.
- Consider modifying external ground levels to overcome smaller changes in level.
- Investigate the use of discreetly positioned automatic door opening devices for heavy doors.
- Consider the use of hold-open devices to internal fire doors.
- Ensure door thresholds are level wherever possible or incorporate temporary fillets where they are required to be raised.
- Provide ramps in preference to platform lifts wherever possible to facilitate independent access at all times.
- Ensure ramps are carefully detailed, particularly where they abut features such as skirting boards, dado rails and panelling.
- Consider portable ramps as a short-term or temporary solution rather than a permanent solution.
- Consider the provision of a supplementary handrail to stairs where the existing handrail cannot be modified.
- Investigate the availability of an alternative to stairs, which should be available to everyone.
- Consider the practicalities of installing a passenger lift (preferably an evacuation lift) where it will minimise the need for structural changes to the building.
- Consider the use of a vertical rise platform lift where it is not possible to install a passenger lift.

7.14 Outdoor Access

This section covers access to the outdoor environment, encompassing natural, tempered, and tamed landscapes in all their forms.

Natural environments include places such as peatlands, mountains and beaches that are largely untouched by human intervention, apart from the addition of discreet footpaths, signs, and possibly gates or enclosures.

Tempered landscapes include places such as country parks, cemeteries, waterways, and golf courses, which retain much of the landscape's original form, but have been formed and controlled over time by the people who oversee the activities there.

Tamed landscapes include facilities such as playgrounds, urban parks and city squares, all of which have been designed and created to provide specific amenities in a controlled environment.

Image 7.14 Example of a natural environment.

Image 7.15 Example of a tempered landscape.

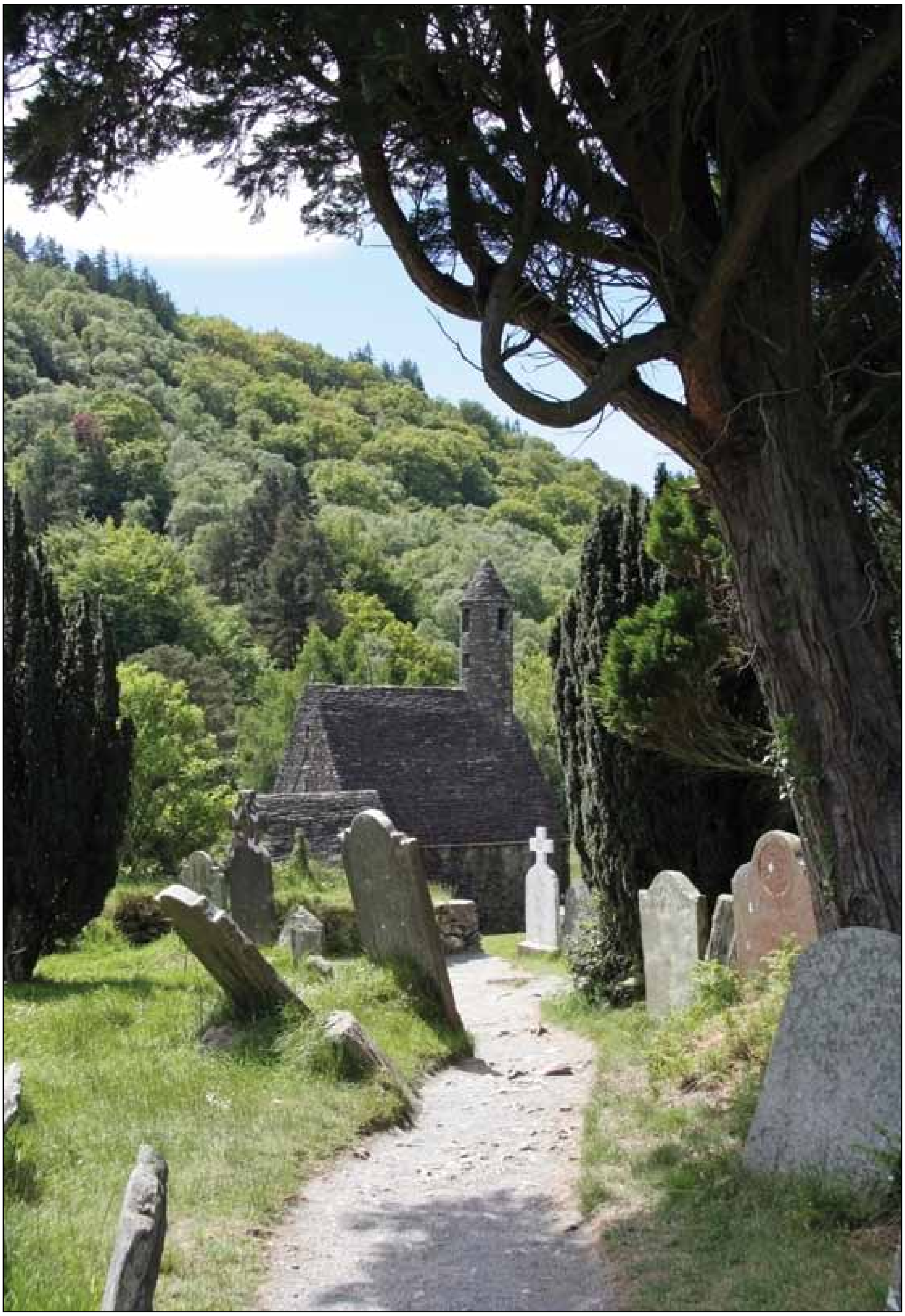


Image 7.16 Example of an urban park (Tamed landscape).

People access all forms of landscape in two 'ways', the most obvious is for the purpose of making a particular journey or visit or for recreation. It is important that people regardless of age, size or disability can access and enjoy the landscape and outdoor amenities, and be able to share in outings with family or friends.

To facilitate access to outdoor environments, people should be able to access information about a place so that they can prepare, assess potential challenges, and make their own informed choices.

Information should be available in the form of published guides, via the internet and via helplines or tourist information centres. Information should always include references to accessibility and any facilities provided.

Where maps are provided, they should illustrate path gradients highlighting steep paths, See **Booklet 1: External environment and approach, Section 1.5**, and other challenges such as gates or uneven surfaces as well as facilities such as car parking areas, toilets, and information displays.

Detailed aspects of the external environment, such as vehicular access, the design of pedestrian access routes, changes in level, surface materials and street furniture, are covered in **Booklet 1: External environment and approach**.

Checklist – Outdoor access
• Provide information about an environment in a range of formats to enable people to plan a visit.
• Provide information about services and accessibility.

7.14.1 Types of landscape

This section describes the three types of landscape – natural, tempered and tamed – and sets out the context for the promotion of universal access in each.

7.14.1.1 Natural landscape

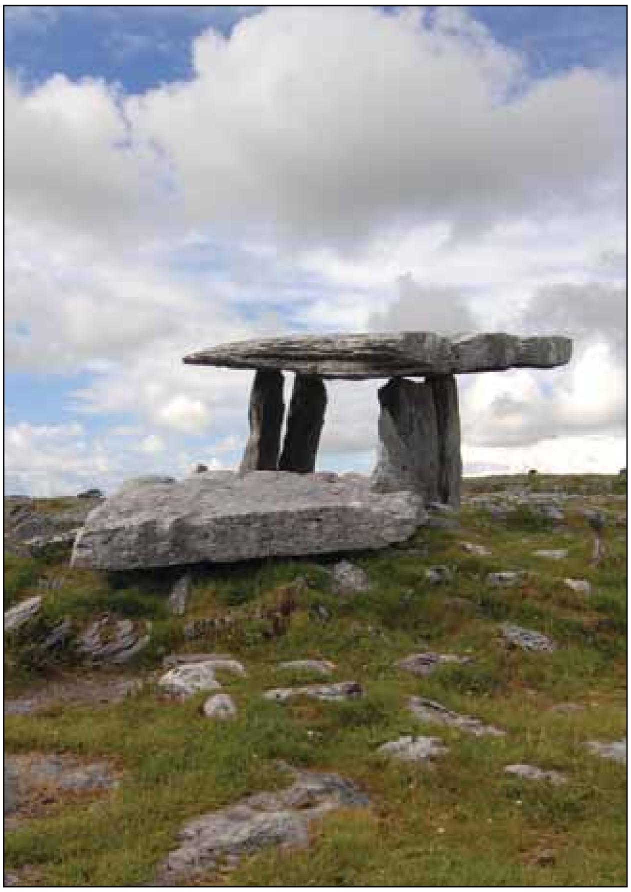
The natural landscape includes national parks, natural heritage areas, special areas of conservation and nature reserves, beaches, bogs, mountains and other remote places. Whilst it may not seem easy or necessary to make a mountain path accessible to a person using a wheelchair, for example, the underlying consideration should always be to provide universal access. This approach maximises opportunity for people of diverse abilities to access and enjoy the landscape.

Image 7.17 Example of a natural landscape with a couple pushing pram on a beach.

Most visitors to remote places are unlikely to venture out alone, and remote places become much more accessible when assisted. Furthermore, outside support is not generally expected in remote places and individuals and groups usually prepare to be self-sufficient. Potential obstacles such as stiles or gates onto a mountain path should be easy to negotiate, without having to make special provision, and without affecting the challenge of the pursuit. A path may reduce the difficulty of access for some people and a well-designed path or route will enable access for many.

This does not mean that all natural landscapes are expected to be as accessible as urban landscapes. What it does mean, however, is that if a new element, such as a route or signage, is to be provided, good accessibility should be the goal. Where alterations to existing environments or facilities are being undertaken, they should be made to be as accessible as possible. Changes in the environment should not inadvertently create obstacles to access, and existing obstacles should be removed where possible. Access routes should be well maintained so that they are safe and as easy as possible to use.

Image 7.18 Example of a natural landscape with an ancient dolmen.



7.14.1.2 Tempered landscape

The tempered landscape includes country parks, historic and archaeological sites, woodlands, caravan parks and golf courses, involving both permanent and temporary amenities.

Although these landscapes appear natural, they have been formed and controlled to a great extent by the activities and livelihoods of the people who have lived and worked there. In the past, people have cleared forests for timber and drained land for agriculture and this has changed the landscape. People have planted hedgerows and built walls to enclose land and corral animals, and woodlands have been planted to create shelter and microclimates, habitats and visual amenity.

Image 7.19 Example of a tempered landscape and a heritage site.

In the more recent past, further interventions have been made in these landscapes, on a more detailed scale, such as the creation of rights of way, gates, fences and signs, all of which facilitate access across the terrain. These features should be universally designed and provide the maximum opportunity for everybody to enjoy, experience and partake in outdoor activities. Tempered landscapes typically also have buildings associated with them such as interpretative centres, public toilets and cafés. These should all be universally designed and follow the guidelines in the appropriate booklets in this series.

7.14.1.3 Urban landscape

The urban environment is entirely the creation of human activity. We make pavements, steps and ramps, create bollards, signage and artificial lighting, lay out car parks, market squares and public parks. We do all this to function in our everyday lives and to create beautiful, ordered places that are expressive of our cultural identity.

Universal access requires us to build inclusiveness into planning and construction processes as we create and alter these environments. See **Booklet 9: Planning and policy**.

7.14.1.4 Tamed landscape

The tamed landscape includes many types of amenities in towns, villages and urban environments such as playgrounds, sports grounds, cemeteries, parks, squares, streets and gardens. The tamed landscape describes places subjected to a high degree of human intervention, which are typically urban in character.

The natural and tempered landscapes are commonly visited by choice and characteristically involve a degree of challenge. By contrast, it is necessary for everyone to negotiate the public spaces in villages, towns and cities in order to carry out daily activities. Such places should not therefore present a challenge to access or use, and it should be possible for everybody to enjoy the spaces with the highest level of independence.

Image 7.20 Example of a tamed landscape.

Image 7.21 Example of a tamed landscape and heritage site.

Checklist – Types of landscape
• Where alterations are planned or new facilities provided, ensure that accessibility is maximised.
• Avoid the creation of new obstacles when changes are made to an environment.
• Ensure existing routes and facilities are well maintained at all times.
• Ensure all buildings associated with outdoor environments are accessible to all.

7.14.2 Mountains

Mountains pose many difficulties for people who wish to access them, yet this is often the motivating force for people to try. Whether people are mountaineering, hill walking, orienteering, or undertaking a pilgrimage, reaching the destination and arriving safely back is a satisfying experience.

Consideration should be given to universal access, even in remote places, to ensure that a right of way is not blocked by a cattle grid, for instance, or that signage offers clear information. These are often issues for land managers, who should ensure that rights of way are maintained.

Image 7.22 Hill walking in Ireland.

Some terrain, particularly in mountainous areas, can be difficult for people to negotiate. A gradient of 1:10 or steeper may be extremely difficult and dangerous for some people using wheelchairs or motorised scooters. This is the point in the natural landscape where accessibility, particularly for people with mobility difficulties, will require some form of assistance or physical provision. Where it is appropriate to provide a ramp or steps, they should be designed with shallow gradients, handrails, landings, and resting places, and firm, non-slip surfaces, as described in **Booklet 1: External environment and approach, Section 1.5.2**. Resting places should be considered for longer routes and should be sheltered wherever possible, for instance, beside a wall or existing vegetation.

There may be opportunities within the natural landscape, such as in areas where telecommunications masts and wind turbines are located, to permit access via service tracks. Where this is the case, the provision of a small car park, accessible gates, and a simple information panel will greatly enhance the potential for people who may not be able to access local or uneven footpaths.

Image 7.23 Negotiating a mountainous forest trail.

Checklist – Access to mountains
• Ensure that all rights of way are well maintained and provide unobstructed access.
• Consider the provision of paths with shallow gradients or ramps with sheltered resting places in some locations.
• Maximise opportunities to facilitate access by vehicles by using existing service tracks.

7.14.3 Peatlands

Indiscriminate access to raised bogs, blanket bogs, and fens, which constitute Ireland's peatlands, causes erosion and damage to the delicate habitats and the archaeology associated with them. On the other hand, it is only by visiting these bogs that the public can fully understand their ecological importance and sensitivity, and learn about conservation. Networks of paths and boardwalks across sites give some protection because they keep people off the delicate surface and can direct them away from sensitive areas. Where this form of management is implemented, information panels, car parks, and paths should all be universally designed.

Image 7.24 Example of peatland with a road running through it.

Checklist – Access to peatlands
• Consider the use of boardwalks to provide access for viewing peatlands.
• Ensure all information, car parking areas and paths are accessible to all.

7.14.4 Beaches

Beaches offer a unique experience of being in wide-open space, of being close to the sea and very often of being in touch with extremes of weather. They are the focal point of many holiday destinations and tourist areas, with recreation and leisure facilities located close by. However, the often wide expanse of a beach can present difficulties in terms of orientation and wayfinding for some people. In addition to this, the variable nature of the sand or pebbles presents difficulties to certain people, in particular to those pushing prams or pushchairs and people using wheelchairs or motorised scooters.

Image 7.25 Example of a beach in Ireland.

The provision of firm boardwalks over the surface of the sand or pebbles is one way of providing a suitable level route along a seafront or onto a beach. Some flexible and temporary surfaces made from timber or recycled plastic boards or mats may also be appropriate, and can be rolled out to give greater access onto the otherwise soft or uneven surface. Such provision will also assist with orientation for people with visual, cognitive and learning difficulties.

In some areas it may be appropriate to consider the provision of 'beach wheelchairs'. These are designed to be non-corrosive and waterproof, with wide tyres that do not sink into soft sand. Some are also suitable for rough terrain and snow.

The wide expanse of beaches and the noise generated by large numbers of holidaymakers, coupled with the noise from crashing waves, means that communication via markers such as flags can be effective, particularly for people with hearing difficulties. However, this will not be effective for people with visual difficulties; they tend to benefit more from audible announcements or audible warning signals in areas that are patrolled by lifeguards.

All lifeguards should be trained in providing assistance and communicating effectively with diverse user groups such as people with disabilities and people of any age or ability.

Sand dunes are frequently under threat from erosion caused by too many visitors. Like peatlands, they are places that people enjoy visiting, and need to visit in order to learn more about them.

The provision of path and boardwalks facilitate access whilst minimising erosion; all should be universally designed.

Checklist – Access to beaches
• Consider the use of boardwalks to provide access along a seafront or to access a beach or sand dunes.
• Consider the provision of beach wheelchairs for loan.
• Use flags or other markers to provide visual warnings or to highlight access points.
• Provide audible warning signals or announcements where appropriate.
• Ensure lifeguards are trained in communicating with diverse user groups such as people with disabilities and people of any age or ability.

7.14.5 Conservation areas

Conservation areas, including national parks, natural heritage areas and special areas of conservation by their nature must have restricted access to protect wildlife, habitats and cultural artefacts. While paths facilitate increased access, they also protect sensitive areas by guiding people along designated routes. All paths should be universally designed.

Natural heritage areas often include information points and hides in order to experience and learn about the flora and fauna. Where hides or screens are used, peepholes should accommodate viewing from different heights. Most people are more comfortable viewing from a seated position and lower heights also suit children.

Where seating is provided, it should be accessible to everyone and include clear spaces to facilitate approach by people using wheelchairs and motorised scooters. Many people, including those with visual difficulties, are able to identify birds by their songs. Interpretive information should support this by being available in alternative formats.

Checklist – Natural Heritage Areas
• Ensure all paths in conservation areas are accessible to everyone.
• Install hides and screens suitable for people with different eye levels.
• Incorporate spaces for wheelchair and scooter users, parents with strollers, people using walking aids, and guide dog users in seating areas.
• Provide information in a range of formats.

7.14.6 Viewing points

Viewing points are popular places for people to enjoy the natural landscape without having to tackle the challenges of moving through it. Although they primarily focus on the view of a landscape, the updraft from a cliff edge or the thundering sound of a waterfall and its refreshing spray can be exhilarating for everybody and provides a sensory, as well as a visual, experience.

Viewing points are frequently located close to car parks, where designated spaces for people with disabilities should be provided, as **Booklet 1: External environment and approach, Section 1.4**.

Where access to a viewing point involves crossing a road, it is imperative to consider good sightlines, signage and surfacing to indicate the crossing point. Where the viewing point is some distance from a car park, information should be clearly displayed indicating the distance and nature of the route to enable people to make choices and be adequately prepared. The presence of steps, for example, should be clearly indicated in advance to provide adequate warning to people using wheelchairs or motorised scooters, and for parents pushing prams or pushchairs.

Where a step-free route is not practical, access to an alternative viewing area may still be possible and is likely to be preferable to no access at all. For example, where steps are required to access a viewing point at the top of a waterfall, an alternative viewing area at the bottom with level access from a car park is still likely to provide a spectacular view and close encounter with the natural feature. Information about the characteristics of both routes and viewing points should be provided in the car park so that people are prepared and are able to make informed choices about the route they take.

Many viewing points will be located in elevated positions and require barriers and guardrails for protection.

Safety is of primary importance and the provision of a safety barrier, 920mm high, will allow most people, including wheelchair users, people of smaller stature, and children, to see over it. If it must be higher than this, it may be possible to provide seating or a viewing point away from a barrier that allows people to see over it. Gaps in railings should be less than 100mm so that children cannot get their heads stuck.

The safety barrier may also be useful for providing a ledge to lean on when looking through binoculars. A fixed telescope that is adjustable in height and with legroom beneath will allow many people to use it.

Checklist – Viewing points
• Incorporate designated accessible car park spaces at viewing points.
• Ensure crossing points are in a safe location and clearly signed.
• Provide information indicating the nature of routes and distances to viewing points.
• Provide an alternative step-free viewing area where access to the main viewing point is difficult.
• Ensure suitable barriers are provided in elevated locations.

7.14.7 Country parks

Country parks are often associated with historic buildings, arboreta and gardens, or picturesque landscapes, and typically cover a large area. The distance between a car park and key facilities may present difficulties to some people due to the actual distances involved or the nature of the terrain. Public transport setting-down points outside a park boundary can also be problematic.

The provision of car and coach parking should enable people to alight close to the main facilities, when required. It may also be appropriate to establish an arrangement whereby public service buses drop off and collect passengers at one or more locations within the site, rather than at a remote point along the park boundary or at the end of a long drive.

The size and nature of country parks is such that organised and ongoing maintenance will be required, often requiring paths or access routes that are accessible to vehicles. This type of infrastructure provides the opportunity for circuitous paths, or overlapping and alternative routes with different or multiple functions that are universally designed.

Where running tracks are provided around a park, these generally require a firm, even surface with no trip hazards, characteristics that also render them suitable for many other people. In some instances, the use of surfacing of different grades will be necessary; other factors such as path widths, signage, and tactile warnings will need to be carefully coordinated to ensure the safety of everyone using the park.

Image 7.26 Example of an accessible bridge in a park setting.

In a country park, most people expect to experience a safe and comfortable environment that is still 'natural' in essence. Careful selection of surfacing materials is essential both to achieve universal access and to maintain the character of the setting.

Signage and information is important in highlighting the location of facilities or areas of interest within a country park. Signage should be clear and consistent, clearly visible and easy to understand. The provision of a range of maps – including printed leaflets, display boards and tactile models and maps – is important for all visitors to a country park. For further guidance on signage, refer to **Booklet 4: Internal environment and services, Section 4.11**.

Checklist – Access to country parks
• Locate car parks and setting-down points close to the main facilities.
• Investigate whether public service buses could drop off and collect passengers at suitable locations within a site.
• Maximise the use of service tracks for other vehicles or to provide firm paths around a site.
• Carefully select surface materials for paths to ensure easy access for all.
• Provide a comprehensive system of signage throughout the park.
• Provide maps and guides in a range of formats.

7.14.8 Woodlands and arboreta

Woodlands can be a source for timber production, a habitat for wildlife, and a place for recreation and amenity. The carrying capacity for different types of recreational activities depends on the size and nature of the woodland. At the simplest level, people find woodlands a pleasant environment to wander through and come into contact with nature. More active recreation can take place in forests, where the presence of suitable tracks may allow cycling and rambling. The cover provided by trees makes woods a suitable place for military-style games such as paintball. The terrain and cover of woodlands also encourage orienteering and horseriding activities. The settings and shelter they provide are ideal for caravan and camping sites.

Image 7.27 Wheelchair user crossing a bridge in a wooded area.

Woodlands can be diverse in character and whilst some may have difficult terrain, many will be easy to access. As with all places mentioned so far, adequate information provided upfront will enable people to make choices about a potential visit and to arrive prepared for the challenges they face.

Image 7.28 Wheelchair user crossing a bridge in a wooded area.

Where ornamental or exotic trees are planted as an arboretum, people will want not only to admire the trees but also to identify and study them. People are often interested in the botanical and Irish names of trees, not just the common ones. Labels and information should therefore be readily identifiable, positioned within easy viewing distance or reach, and incorporate raised letters or symbols in addition to well-contrasted text (minimum 18 point).

The shapes and texture of leaves, the scent of flowers, leaves and fruit and the feel of bark are all important in enjoying and understanding trees, so it should be possible for everyone to get close to important specimens.

Image 7.29 Wheelchair user using forest path.

Checklist – Access to woodlands and arboreta
• Ensure suitable information is available in a range of formats in advance of a visit.
• Make sure labels and information are easy to read and incorporate raised text and symbols.
• Facilitate close access to important specimens.

7.14.9 Picnic areas

Picnic areas should be located on level sites in sheltered microclimates, with the option of shade provided by vegetation, the natural landscape or adjacent buildings for people with sensitive skin. Picnic areas should be easily and directly accessible from an associated car park and clearly signed. However, this does not necessarily mean they should be immediately adjacent as this makes the picnic area a less desirable place to be and will expose people unnecessarily to exhaust fumes and noise from vehicles.

Picnic tables and seats should be designed so that they do not topple when unbalanced. A clearance of 700mm to the underside and a tabletop surface 750 to 850mm above ground level should facilitate universal use.

Where tables and chairs are joined in the same construction, people should not have to climb across beams or other supports in order to access the seats and space should always be available for a person using a wheelchair to sit at the table.

A firm, level surface of 2000mm width around the perimeter of the picnic table and seats will provide comfortable and convenient access for all users including wheelchair users; parents with strollers; people using walking aids; and guide dog users. The surface should be well drained and flush with the surrounding ground level.

Litter bins should have an overall height of approximately 1300mm, a bin opening at 1000mm above ground level, and a lid to prevent litter being blown around.

Provision of sanitary facilities adjacent to picnic areas will facilitate a wide range of users.

Checklist – Picnic areas
• Locate picnic sites on level ground in sheltered, shaded areas.
• Locate picnic sites in close association with a car park, but not immediately adjacent.
• Provide firm, level picnic tables with clear space for wheelchair users.
• Provide a 2000mm wide zone around the perimeter of picnic tables.
• Ensure adequate litter bins are provided.

7.14.10 Campsites and caravan parks

Campsites and caravan parks should have a logical layout to aid orientation around a site. The layout should incorporate clear access routes, plots for tents and caravans, and clearly identifiable facilities, such as office, sanitary, and other facilities. An orderly layout will also help minimise the possibility of people tripping on the guy wires of tents, by keeping them away from the main access routes.

Sanitary, laundry, washing, and cooking facilities, where provided, should all be universally designed. Spaces for campers who require close access to accessible toilets and other facilities should be available if required.

Plug-in electric points should be mounted on posts so that they are within reach of all campers, and should contrast visually with adjacent surfaces so that they are clearly visible.

Where paths, steps and ramps are provided within the campsite or caravan park, they should be universally designed. For detailed guidance on the design of these features, refer to **Booklet 1: External environment and approach, Section 1.5.2**.

Where there are no permanent access routes, such as on fields used as temporary campsites, consideration should be given to the provision of temporary removable surfaces to facilitate easier access to key facilities.

Fire rings, barbeques and cooking stands should only be provided where there is no risk of fire hazard to nearby vegetation. The surface around them should be solid with a perimeter of minimum 2000mm clear access. Cooking grills and tray heights should be easily adjusted. A fire point should be accessible, with water or sand and a bucket readily available to extinguish the fire when it is no longer needed.

Checklist – Campsites and caravan parks
• Ensure camp sites and caravan parks are logically arranged with clear access routes.
• Make sure all main facilities are readily identifiable and accessible to everyone.
• Ensure post-mounted electric points visually contrast with surrounding surfaces.
• Consider the use of temporary removable surfaces for temporary campsites.
• Provide a 2000mm wide clear zone to the perimeter of fire rings and barbeques.
• Provide height-adjustable cooking grills and trays.
• Ensure that fire points and extinguishers are easy to access.

7.14.11 Waterways

Waterways encompass canals, some sections of navigable rivers, marinas, and harbours. These are increasingly being used for recreation, with canals in particular having been revitalised in recent years. Travelling on Ireland’s waterways offers an extraordinary alternative view of the landscape and should be available to everyone who chooses to pursue it.

Towpaths on canals and navigable rivers offer an ideal opportunity for recreation, not just for travelling along but also for fishing and even bathing. Whilst towpaths are typically flat for long stretches, they can also pose challenges when they go over, rather than under, bridges or across weirs and locks. In any of these instances, when repairs or alterations are required, the opportunity should be taken to maximise accessibility. Careful consideration should be given to the provision of non-slip surfacing, warning signs and the installation of guardrails or handrails, as with any situation that might pose a hazard.

Image 7.30 Example of a canal with towpath shown.

Marinas, landing stages and jetties for angling should all be universally designed, as should associated facilities such as car parking and public toilets. Any fittings, such as waste water disposal, taps for drinking water, and electric points, should be designed to be accessible and safe for everyone to use.

Marinas and harbours may benefit from maps and signage, particularly if they cover a large area and encompass alternative access routes. Rules and regulations associated with waterways, potential hazards, public facilities, and information on wildlife should all be clearly displayed and available in alternative formats.

Image 7.31 Example of an accessible riverfront boardwalk.

Checklist – Waterways
• Provide accessible routes on towpaths where changes in level occur.
• Ensure towpath surfaces are non-slip, firm and level.
• Provide adequate guarding and warning signs in hazardous locations.
• Ensure access routes, landing stages and jetties in marinas and harbours are accessible.
• Make sure car parks and toilets associated with waterways are accessible to all.
• Provide information and maps in a range of formats.

7.14.12 Archaeological sites

Whilst many archaeological sites are in grassy fields, the insertion of sensitively designed paths will assist in orientation and access, whilst routing people away from environmentally sensitive areas and minimising trampling of meadow habitats.

For longer distances and very sensitive sites it may be desirable to implement a bus transportation service from a car park to a monument.

Refer also to **Section 7.8.1** for guidance on visitor information and interpretation centres.

Checklist – Archeological sites
• Consider the use of sensitively designed paths or boardwalks to protect delicate sites.
• Consider the use of bus transportation services from a car park to a site.

7.14.13 Temporary events

Many of the places considered in this section are open all year and are permanently accessible to the general public. However, many temporary events, including ploughing championships, county shows, funfairs, concerts, and festivals, are held in places such as open fields or gardens that do not have a permanent infrastructure.

Temporary events should be no less accessible than permanent facilities and environments, although some of the challenges and solutions required to achieve universal access may well be quite different.

If unprotected, access routes across fields and along grass paths will inevitably become muddy and inaccessible with intense use. The provision of duckboarding or wood chippings provides a drier surface but is unlikely to be suitable for everyone.

Purpose-made, non-slip synthetic or timber planking generally provides a firmer surface and is more robust, although care should be taken to ensure that the jointing does not become a tripping hazard.

Temporary portable sanitary facilities should be provided where no permanent facilities exist on a site, or in order to supplement permanent facilities on occasions when use of the site is greater than normal, such as at festivals, concerts, and community galas. Temporary portable sanitary facilities should be as accessible as permanent facilities, regardless of their location.

On large sites, such as at music festivals, accessible toilets should be provided at regular intervals in order to minimise travel distances, and should be accompanied by an appropriate means of access such as a pathway and ramp.

All sanitary facilities should be clearly identified and have a regular programme for cleaning and maintenance. For further guidance on sanitary facilities, refer to **Booklet 5: Sanitary facilities**.

The location of portable sanitary facilities should take into account the need for vehicle access, for delivery and emptying. At sites where the frequent use of temporary sanitary facilities is expected, an area can be designated and provided with the appropriate water supply and drainage. This will enable direct connection to mains services and avoid the need for chemical-based toilets, which many people find less desirable to use.

Signage, even when temporary, should be designed to be universally designed and should follow the guidance in **Booklet 4: Internal environment and services, Section 4.11**.

All facilities associated with temporary events should be robust, in order to withstand the weather and being moved around from place to place.

Private gardens are sometimes open to the public on a temporary basis. Whilst the small scale of gardens can inhibit access, due to narrow paths, overhanging vegetation, and uneven surfaces, designing for universal access may create a new perspective for the garden. Many gardens have a hierarchy of spaces, with terraces and seating areas that provide ideal locations for people to rest, view the garden and to socialise.

Staff, volunteers and managers of temporary events and owners of gardens open to the public should be trained in meeting the needs of all potential visitors and in providing a universally designed service.

Checklist – Temporary events
• Ensure temporary events are no less accessible than permanent facilities and environments.
• Ensure access routes are firm, non-slip and as level as possible.
• Make sure temporary sanitary facilities are as accessible as permanent facilities.
• On larger sites, provide accessible toilets at regular intervals and include a suitable path and ramped access.
• Provide permanent infrastructure for water supply and drainage on sites frequently used for temporary events.
• Provide signage throughout a site to identify all key facilities.
• Ensure all staff, volunteers and organisers are trained in delivering accessible events.

7.14.14 Parks

Parks in towns and cities offer places for rest and recreation. They have traditionally been designed as a 'natural' space within the city or for the display of horticultural talent. They are for the enjoyment of people of all ages and abilities and are also important for their environmental benefits. Some parks specialise in historical context, ecological habitat, or sport as part of a broader network of open spaces, while others offer more comprehensive facilities for recreation, combining open grass areas with trees, floral displays, and play equipment.

In parks and gardens that are protected because of their historical context, access issues are no less relevant. It can be a relatively simple matter to design and incorporate a signage system or to provide information that is universally designed. It takes a little more skill to introduce sympathetic visual and tactile elements that warn of hazards for people with visual difficulties, young children, or people with cognitive or learning difficulties.

Changes to infrastructure, such as the route of a path or the introduction of a ramp can be significant in a historical garden, requiring care and creativity to identify successful solutions. The same applies to built artefacts, such as pergolas, glasshouses, and pavilions that furnish historic gardens, as well as the houses associated with them.

In all parks, street furniture, such as seats, litter bins, lights, and signs, should all be placed in a logical formation and beyond the boundary of an access route so that they do not present an obstruction or hazard. Placement of seats at regular intervals benefits people with restricted mobility or stamina. For further guidance on street furniture, refer to **Booklet 1: External environment and approach, Section 1.5.4**.

It is traditional in Ireland to close parks between sunset and sunrise. Spaces that do remain open, such as linear parks, should have the main paths well lit for ease of access and orientation as well as safety.

Checklist – Parks
• Ensure items of street furniture are logically placed beyond the boundary of access routes.
• Provide lighting to the main paths of parks that remain open after dark.

7.14.15 Cemeteries

Cemeteries are often used as an amenity for tourism and recreation, as well as by friends and relatives of the deceased.

In larger cemeteries, paths are normally designed to serve small maintenance vehicles and hearses, which results in them being inherently more accessible for pedestrian use. In other cases, paths should be designed in accordance with the guidance in **Booklet 1: External environment and approach, Section 1.5.1**.

Water taps that are easy to operate and that incorporate a hook to hold a watering can while it is being filled – or a short hose to fill a can or vase sitting on the ground – will benefit many people attending to floral tributes. Compost bins and litter bins for general waste should be accessible and easy to reach.

Refer also to **Section 7.10** for information on religious buildings.

Checklist – Cemeteries
• Ensure all paths are accessible to everyone.
• Ensure facilities such as water taps and bins are easy to access and use.

7.14.16 Playgrounds, play structures and equipment

Playgrounds and play equipment should be universally designed for all children, their parents, carers, teachers and supervisors.

Everybody should have the opportunity to play. It is an important way of gaining social, physical, and emotional skills. Through play, people meet challenges in a fun way within a safe environment. Through imagination, many ordinary places become play spaces, such as a low wall along which to walk, a rail on which to swing, or a tree behind which to hide. The environment should stimulate children to play.

Acknowledging that play is about challenge, a good play space will present a range of activities for a wide range of ability. Making play spaces accessible does not reduce the challenge for children and offers opportunities for greater interaction and for shared experience. Through inclusive play, children learn about themselves and gain an appreciation of their similarities and differences. They can build friendships, learn about cooperation and compromise and can take pleasure in diversity without prejudice.

The physical challenges presented by structures for climbing, swinging, and sliding are the most common form of play in playgrounds. These elements can easily be designed to facilitate universal access, so that everybody can share the experience.

Many designs can be bought 'off the peg' from play equipment companies, whose products have been tested for appropriate health and safety standards.

Rubberised play surfaces are easy to clean and are better able to cushion falls than wood chippings, gravel, or grass, which get worn away and can act as animal litter. Where possible, playgrounds should be fenced in to prevent animals (except assistance dogs) from entering.

A self-closing gate is essential; it should be at least 800mm wide to facilitate easy access for people using wheelchairs and motorised scooters, and parents or carers pushing prams and pushchairs, including double buggies. Gate latches should be easy for children to use.

Sandpits should be covered when not in use to prevent cats from using them as litter. The cover should be made in such a way so as to be easy for a child to remove, and should be non-slip.

Consideration should be given to the way in which all children use play equipment. A child who uses a wheelchair, for example, may be able to transfer onto a slide or climbing structure, but needs a way of returning to the wheelchair after completing the course. All children learn to develop balancing skills through play, and some may benefit from the provision of appropriate handrails and supports on play equipment.

The design of playgrounds and play equipment should maximise sensory stimulation. Strong contrasts in colour, texture and sound are enjoyed by many children, but are particularly beneficial to children with sensory difficulties. This can be explored through the use of different materials, such as the feel, smell or sound of wood in contrast to metal or plastic, the colour of materials and by selecting objects that make sounds or create echoes.

To ensure that parents or grandparents, regardless of ability, can supervise young children, appropriate seating should be provided in playgrounds. See **Booklet 1: External environment and approach, Section 1.5.4.7** for further guidance on seating.

Checklist – Playgrounds, play structures and equipment
• Ensure play areas are accessible to all.
• Ensure play equipment facilitates universal access.
• Ensure playgrounds are fenced to prevent access by dogs.
• Ensure gates provide a clear opening width of at least 800mm and are self-closing.
• Cover sandpits when not in use.
• Ensure the surface of play areas is able to cushion falls and meet relevant safety standards.
• Ensure play areas are designed to maximise sensory stimulation.

7.14.17 Gardens and courtyards

Gardens and courtyards are intimate external spaces that are often provided in a building complex as places of interest and rest. For instance, on an industrial, business or education campus, these spaces will be used as a setting for lunch, informal discussion, or a rest from the intensity of work. In addition, some private gardens open temporarily to the public, as discussed in **Section 7.14.13** above, and gardens may form part of a larger park. All of these should be universally designed.

In industrial, business or education campuses, the designer should consider the work activities that are carried out in order to provide successful antidotes for work-related stress. A person who works physically hard will want a comfortable seat; a person who looks at a computer screen all day will want a relaxing and varied view with, for instance, changes in light and shade and distance; and a person who is frequently on the telephone or working in a noisy environment will want some quiet space to relax in, or at least a place where the sound of water or birdsong distracts from general background noise.

Water features, especially ponds, should be designed so that they do not present a safety hazard. Edging should be firm and non-slip and should contrast in colour with the surrounding surface.

Raised beds should be designed for use by people with mobility difficulties, wheelchair users, and people of smaller stature.

Everybody benefits from a garden that stimulates the senses; people may like to touch and smell plants, or listen to birdsong, the sound of fountains, running water, the breeze rustling through plants, or the sound of windchimes. These can all create a sense of perspective and depth of space as well as being a source of delight.

Trees, shrubs, and green and flowering plants can be used to soften the visual and acoustic environment, and give pleasure to people through their look, smell, feel and sound. They can also provide sensory clues to help people locate themselves in a space.

Whether positioned around buildings or used to form a garden, plants can be used to create features that stimulate the senses and are enjoyable for everyone. Where appropriately used, plants in gardens contribute to a healthier environment. They may also provide habitats for fauna, such as birds and butterflies, which are also a source of pleasure and interest for everybody. Some trees and shrubs can be used as wayfinders if positioned at key locations in the garden. Garden furnishings and sculptures can also act as wayfinders.

Gardens and areas of planting associated with buildings, such as planting beds close to a building entrance, should be well maintained. All plants should be cut back or trimmed so that they do not overhang paths or seating areas. Creeping plants should not become a tripping hazard and leaf debris should be regularly cleared so that paths remain visible and do not become slippery.

Garden furniture should be designed so that it is sympathetic to the surroundings and accessible to the broadest range of users including wheelchair users, parents with strollers, people using walking aids, and guide dog users. Further advice on seating and other items are covered in **Booklet 1: External environment and approach, Section 1.5.4.7**.

Checklist – Gardens and courtyards

- Provide gardens where possible in association with buildings to provide areas for rest, relaxation and informal meetings.
- Optimise sensory stimulation and interest within garden design.
- Provide adequate protection to water features so that they do not present a safety hazard.
- Ensure all garden areas are adequately maintained so that plants do not obstruct access routes and fallen leaves do not present a trip hazard.
- Provide suitable garden furniture.

A1 Definition of Universal Design

Universal Design

'Universal Design refers to the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or disability.'

Synopsis of the Disability Act, 2005.

A2 Human Abilities and Design

The following piece of text is an extract from European Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'.

It states that: Physical, sensory and mental abilities vary from person to person and for individuals as they get older. Diversity is normal. Designers need to be aware of difference across the range of human abilities, and of associated design considerations.

(a) Physical abilities

This includes walking, balance, handling, pulling, pushing, lifting and reaching. Many activities involve simultaneous use of more than one of these skills. Physical strength and stamina may also affect people's abilities to perform these actions.

Walking

For some people walking on the level or up gradients is difficult. Some people may have a limited walking range, may have difficulty with turning movements or may use mobility devices such as crutches or a walker. They may need to stop frequently, to regain strength or catch breath. Design considerations include provision of handrails, seats at regular intervals, convenient set-down parking and adequate time for slower pedestrians at road crossings. Designers should also consider the needs of people walking and engaging in sign language when designing access to and from buildings plus within the buildings themselves.

Balance

Balance limitations can affect someone's gait or control of hand movements. Design considerations include handrails, regular seating, and providing controls within easy reach. A surface against which a person may stumble against or walk into should be designed to limit abrasion.

Handling

A significant minority of people are left-handed. Some people may have restricted use or no use of one or both hands, or may have limits on strength or precision. Facilities and components should be designed to be suitable for use with either hand or with one hand only. Handling includes gripping, grasping and manipulation. Each of these has a different purpose with specific design considerations. For instance, components should be designed to be easily held. The circumference of the supporting structure and stability are critical. Manipulation involves the moving, turning and twisting of components with a hand or hands. For those who have limited manipulation abilities, size and shape and ease of movement are critical. Another option to consider is to design for manipulation by using a pushing, pulling or pressing action using a clenched fist, or by using the wrist or the elbow.

Strength and endurance

Strength and endurance may be required on sloping paths and floors, stairways and long travel distances, when sustained effort may be needed.

For those with limited endurance, frequent resting-places are essential.

People generally find it easier to push a component, than to pull it. This is particularly so if the individual uses a wheelchair. Self-closing devices on manual doors can be difficult for some people to operate, particularly if the doors are required to resist wind forces. For these reasons, doors that open and close automatically are preferred.

Lifting

Activities such as opening a vertically sliding sash window and an upward opening access gate, should be designed to be easily operated with minimal force.

Reaching

Design has a role to play in ensuring that key components in a building or environment are in easy reach, bearing in mind the range of people's sizes and abilities. Having components within easy reach is particularly important for those with more severe limitations in mobility. The reach range is dependant on the height and arm length of the person, use of the arms, and the balance and mobility of the upper body. A 'comfortable reach range' has been defined as one that is appropriate to an activity that is likely to be frequent and in need of precise execution and that does not involve stretching or bending from the waist. Putting things within comfortable reach can ensure use by a greater number of people. An 'extended reach range' has been defined as one that is appropriate to an activity that is likely, neither to need precision nor to be frequent and that can involve stretching or bending from the waist.

(b) Sensory abilities

Speech

Some conditions affect the capacity for or quality of speech. Two-way communication can be facilitated by environments designed to minimise barriers to hearing low or indistinct speech.

Hearing

People differ in their capacity to hear sound, to determine its direction, its source, to discern pitch, frequency, volume and variation and to separate out different sounds. Hearing quality is important for communication, for information, and for detection of hazards such as traffic. Many people with hearing difficulties

use a hearing aid which amplifies all sounds caught by the microphone, making communications very difficult in noisy environments. Keeping background noise level low is essential. The selection of structural and surface materials can make a substantial difference in audibility. Auditoriums, meeting rooms and reception areas can benefit from additional sound enhancement such as a loop system. The careful design of illumination can assist in communication such as lip reading and sign language. Provision of visual information and visual alarm systems can communicate information to those who have hearing difficulties or who cannot hear. Designers should also consider the colour and size of rooms and even the furnishing arrangement as this is very important for visually based communication. Also the use of vibration as means of sensing others should be considered.

Sight

Vision allows an individual to be aware of the luminance of surfaces, objects, form, size and colour. For people who are blind or who have visual difficulties, the provision of suitable tactile walking surface indicators and tactile or acoustic warnings at hazardous locations, should provide information on using the built environment and should limit the risk of injury. The built environment can be designed for orientation by providing sound cues and tactile cues. An easily discernible system of 'way finding' should also be considered. For people with limited, but low vision, effective visual contrast between surfaces or objects helps to identify critical locations. Warning markings on glass surfaces, and markings on the edges of stair treads, help minimise hazards.

Differences in friction between one floor surface, or one stair tread surface, and the next should be avoided. Therefore, adjacent surfaces that display different standards of slip-resistance, or that depend on raised surfaces, should be carefully considered

Touch

In selecting surfaces in the built environment that people will need to touch (such as handrails, handles, knobs and controls, tactile information), it is important to select materials that avoid distress, injury or allergies. Surfaces should be free of abrasions. Metals that may cause adverse reactions when touched should be avoided.

(c) Mental abilities

Mental abilities include cognition, intellect, interpretation, learning and memory. People differ in their knowledge, their capacity to understand, reason, or interpret information. Designing for differences in these capacities helps provide a usable environment for the population at large, from the very young to the old, and people of diverse abilities. Means of communication in the environment should be designed to be immediately and easily understood, and correctly interpreted. As people age, some experience loss of memory or find it increasingly difficult to absorb new information, so changes in the environment should be carefully considered before implementation.

Design considerations that take account of mental abilities

Aural and visual messages should be simple, clear and have immediate impact. Figures, symbols and simple words are likely to be the most effective. Symbols should be instantly recognisable as representing images seen and activities undertaken in everyday life.

Way finding should be simple, such as tactile, graphic, audible or architectural cues that are easy to follow. Signage should be large and clear. Way-finding maps should be clear, indicate the person’s whereabouts in the building or facility, and be free from extraneous information.

(d) Age and size

Accommodating the developing child

It is important to create environments that are safe, accessible and useable for children. Individual components should be safe and useable as age-appropriate. Learning to manage risk is an essential part of a child’s development.

Accommodating ageing adults

Life span within the human population is increasing. More and more we expect to maintain an economic and social life within both the public and private domains as we age. However, many human faculties are in decline as we age, such as mobility, dexterity, stamina, strength, hearing, sight, or memory. Familiarity with a particular environment is important.

Diversity of size

The population contains a diversity of sizes and heights, from children, to the diversity in the height of fully-grown adults. The positioning of components and the heights of building elements such as steps should recognise the diversity of height. Increased weight and girth is now also a feature of the population.

Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'.
http://www.cen.eu/cen/Sectors/Sectors/ISSS/About_ISSS/Documents/cclcgd006.pdf

A3 Further Reading

National and international standards and codes of practice

AS 1428.1-2001 Design for access and mobility. General requirements for access – New building work.

AS 1428.2-1992 Design for access and mobility. Enhanced and additional requirements – Buildings and facilities.

AS 1428.3-1992 Design for access and mobility. Requirements for children and adolescents with physical disabilities.

AS 1428.4-2002 Design for access and mobility. Tactile indicators.

BS 4800: 1989 Paint colours for building purposes (whilst the colours in this standard cannot be seen on CD-ROM or online the text can still be used).

BS 5395-1:2000 Stairs, ladders and walkways – Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders.

BS 5588-8:1999 Fire precautions in the design, construction and use of buildings – Part 8: Code of practice for means of escape for disabled people.

BS 5776:1996 (incorporating amendment No.1) Specification for Powered stairlifts

BS 6440:1999 (Incorporating amendment No.1) Powered lifting platforms for useby disabled persons – Code of practice.

BS 6440:1999 Powered lifting platforms for use by disabled persons – Code of practice (partially superseded by BS EN 81-40:2008. The remainder of BS 6440:1999 will eventually be superseded by EN 81-41: 2009 Safety rules for the construction and installation of lifts – Special lifts for the transport of persons and goods – Part 41: Vertical lifting platforms intended for use by persons with impaired mobility).

BS 6465-1:2006+A1:2009 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.

BS 6571-4: 1989 Vehicle parking control equipment – Part 4: Specification for barrier type parking control equipment.

BS 7036-1:1996 Code of practice for Safety at powered doors for pedestrian use – Part 1. General.

BS 7036-4:1996 Code of practice for Safety at powered doors for pedestrian use – Part 4. Low energy swing doors.

BS 7997:2003 Products for tactile paving surface indicators – Specification.

BS 8300:2009 (Incorporating amendment No.1) Design of buildings and their approaches to meet the needs of disabled people – Code of practice.

BS 8493:2008 (+A1:2010): Light reflectance value (LRV) of a surface – Method of test.

BS 8501:2002 Graphic symbols and signs – Public information symbols (AMD 16897).

BS EN 115:1995 Safety rules for the construction and installation of escalators and moving walkways.

BS EN 15838:2009 Customer contact centres, Requirements for service provision.

BS EN81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passengers lifts – Part 70: Accessibility to lifts for persons including persons with disability.

Building Regulations (Part M Amendment) Regulations 2010 (S.I. No. 513 of 2010).

Citizens Information Board – Accessible information for all (2009).

DD 266:2007 (Draft for Development) Design of accessible housing – Lifetime home – Code of practice.

I.S. EN 1991-1-1:2002 – Eurocode 1: Actions on structures Part 1-1: General actions – densities, self weight, imposed loads for buildings (including Irish National Annex: 2005).

I.S. EN 81-1: 1999 Safety rules for the construction and installation of lifts – electric lifts (Amd 1) (+A3:2009).

I.S. EN 81-2:1999 Safety rules for the construction and installation of lifts – hydraulic lifts (Amd 1) (+A3:2009).

I.S. EN 81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passenger lifts. Accessibility to lifts for persons including persons with disability (Amd A1:2005).

I.S. EN 997:2003 (+A1:2006) WC pans and WC suites with integral trap (AMD Corrigendum 14805) (AMD 16965).

IEC 60118-4:2006 Electroacoustics. Hearing aids. Induction loop systems for hearing aid purposes. Magnetic field strength (ISBN 978 0 580 50047 3).

International standard for Induction loops. IEC 60118-4.

Irish Code of Practice on Accessibility of Public Services and Information Provided by Public Bodies www.nda.ie/website/nda/cntmgmtnew.nsf/0/3DB134DF72E1846A8025710F0040BF3D/$File/finaldrcode_nda.htm

Key cards should conform to EN 1332. For further information on key cards please see: http://www.universaldesign.ie/useandapply/ict/itaccessibilityguidelines/smartcards/guidelines/smartcardguidelines/cards

Lifetime Homes Standard: http://www.lifetimehomes.org.uk

Norwegian Universal design of building standard, 2009.

Passenger Lift Design: The Machinery Directive 2006/42/EC; Lifts should conform to BS 6440.

National and international reference documents

2020 Vision – Sustainable Travel and Transport: Public Consultation Document. Department of Transport.

Bus Based Park and Ride – A Pilot Scheme. A Report to: Dublin Transportation Office. The TAS Partnership Limited, 2002.

City of London 2006 Facility Accessibility Design Standards. London, Canada, 2006 Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Gallaudet DeafSpace Design Guidelines 2010.

Department of Transport & the National Disability Authority Guidelines for Accessible Maritime Passenger Transport http://www.nda.ie/website/nda/cntmgmtnew.nsf/0/45AA46D1F77D7EF2802576DC005C5954?OpenDocument

Department of Transport, UK 'Traffic Signs Manual'.

Dublin City Council (2007) Variation (No. 21) of the Dublin City Development Plan 2005 – 2011. Available from: http://www.dublincity.ie/Planning/DublinCityDevelopmentPlan/VariationstotheDevelopmentPlan/Documents/AdoptedVariationNo21Spec.pdf.

Guidance on the use of tactile paving surfaces. Department for Transport, UK.

Guidelines for an accessible public administration. Towards full participation and equality for people with disability. Office of the Disability Ombudsman, Sweden.

Inclusive Mobility. Department for Transport, UK.

International Best Practices in Universal Design. A Global review. Canadian Human Rights Commission, 2006.

Irish Wheelchair Association: Best Practice Access Guidelines 2010.

Joseph Rowntree Housing Trust.

Parking for disabled people. Department for Transport, UK.

Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Rail Park and Ride Strategy for the Greater Dublin Area. Dublin Transportation Office, 1994.

Regulation of Bus services outside the Greater Dublin Area. Department of Transport.

"Sign Design Guide and Inclusive mobility," Oxley, P. (2003), Inclusive Mobility. Department for Transport, UK. www.mobility-unit.dft.gov.uk

Smarter Travel 'A Sustainable Transport Future' – A New Transport Policy for Ireland 2009 – 2020. Department of Transport.

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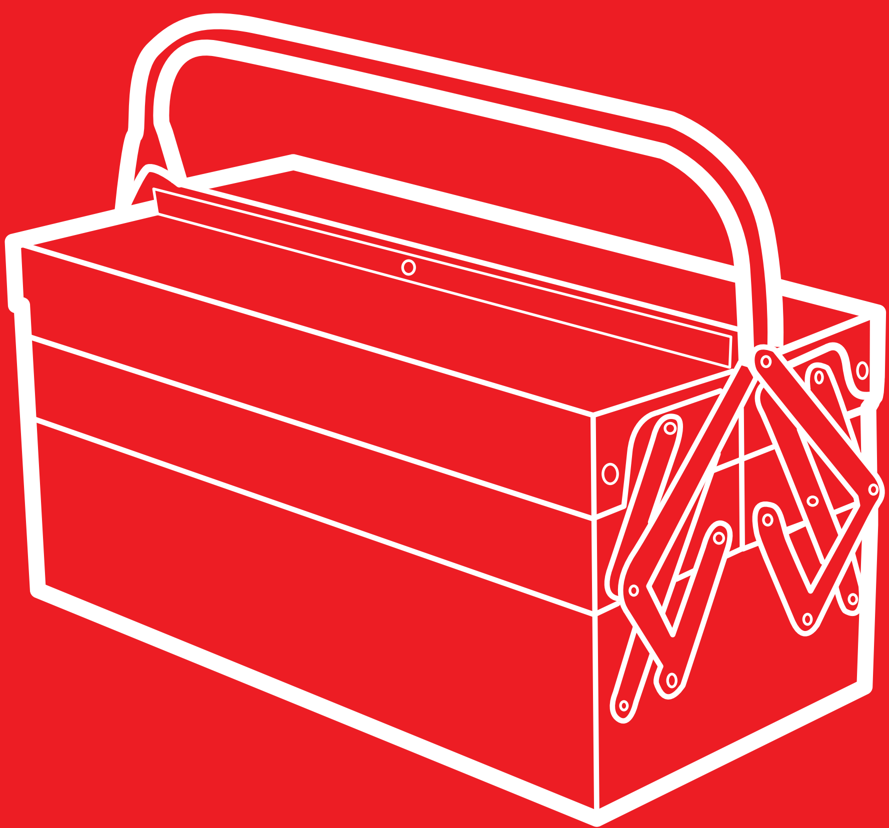
Building for Everyone:

A Universal Design Approach

Building management

8



Centre for Excellence in Universal Design

Creating an environment that can be used by all people, regardless of their age, size, disability or ability.

The National Disability Authority's Centre for Excellence in Universal Design has a statutory role to promote the achievement of excellence in universal design in:

- the design of the built and external environment
- product/service design
- information and communications technologies (ICT)
- the development and promotion of standards
- education and professional development
- raising awareness of universal design

More information and updates on the website at: **www.universaldesign.ie**

Building for Everyone

Booklet 8 - Building management

The other booklets from the
Building for Everyone series:

Booklet 1 - External environment and approach

Booklet 2 - Entrances and horizontal circulation

Booklet 3 - Vertical circulation

Booklet 4 - Internal environment and services

Booklet 5 - Sanitary facilities

Booklet 6 - Facilities in buildings

Booklet 7 - Building types

Booklet 9 - Planning and policy

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8.0 Objectives

The guidance in this booklet promotes the concept and philosophy of universal design and encourages developers, designers, builders and building managers to be innovative and think creatively about solutions that meet the needs of all building users.

The objectives of the series of booklets are to:

- identify and promote best practice with regard to universal design of the built and external environment
- provide best practice guidelines that in no way conflict with the requirements of existing regulations in Ireland
- provide guidelines that are usable by and accessible to the target audience
- promote universal design in Ireland

This booklet aims to:

- identify and promote best practice and understanding of the management of buildings with regard to universal design
- increase awareness of, and to encourage building managers to identify, the needs of all those who require access to a wide range of buildings to undertake daily activities
- highlight the wider benefits experienced by all when effective building management and universal designed features of buildings are provided
- encourage building managers to provide effective building management and universal design solutions for a wide range of buildings that look beyond the minimum requirements of national building regulations

8.1 Introduction

This booklet is part of the series "Building for Everyone – A Universal Design Approach," which aims to provide practical guidance on the universal design of buildings, places and facilities.

Universal design places human diversity at the heart of the design process so that buildings and environments can be designed to meet the needs of all users. It therefore covers all persons regardless of their age or size and those who have any particular physical, sensory, mental health or intellectual ability or disability. It is about achieving good design so that people can access, use and understand the environment to the greatest extent and in the most independent and natural manner possible, without the need for adaptations or specialised solutions (see full definition in **Appendix A1**).

Why universal design?

People are diverse - some are left-handed and some right-handed - and people vary in their age, size and functional capacities. Illness or disability (whether temporary or permanent) can also affect characteristics such as people's mobility, dexterity, reach, balance, strength, stamina, sight, hearing, speech, touch, knowledge, understanding, memory, or sense of direction. A reference list with these booklets indicates some of the key differences in human abilities that should guide design of buildings and of outdoor places. (See full description of Human Abilities in **Appendix A2**).

People of diverse abilities should be able to use buildings and places comfortably and safely, as far as possible without special assistance. People should be able to find their way easily, understand how to use building facilities such as intercoms or lifts, know what is a pedestrian facility, and know where they may encounter traffic.

Given the wide diversity of the population, a universal design approach that caters for the broadest range of users from the outset can result in buildings and places that can be used and enjoyed by everyone. That approach eliminates or reduces the need for expensive changes or retro fits to meet the needs of particular groups at a later stage.

It is good practice to ascertain the needs of the range of expected users as early as possible, and to check the practicality and usability of emerging designs with a diverse user panel.

Designing for one group can result in solutions that address the needs of many others. For example:

- level entry (Step-free) entrances facilitate not just wheelchair users but also people with buggies; people with suitcases or shopping trolleys; people using walking or mobility aids; and people with visual difficulties.
- larger toilet compartments provide easier access to wheelchair users; those with luggage or parcels; parents with pushchairs or accompanying small children; those using walking or mobility aids; and larger-sized people.
- clear, well-placed signage that uses recognised symbols or pictograms helps people with reading or cognitive difficulties, and those whose first language is neither English nor Irish

Sometimes one solution will not suit all and a range of options will need to be provided, for example:

- providing both steps and a ramp where there is a change in level
- providing parking ticket machines that offer slots at different heights to facilitate use at standing height, at sitting height, and by people of small stature

This series of booklets is for architects, engineers, planners, developers, designers, building contractors, building workers, building managers and others involved in designing, commissioning and managing buildings and their surroundings. It provides guidance on a universal design approach to all new buildings, the use and adaptation of existing environments.

Those who commission, design, construct or manage any part of the built and made environment also have a duty of care to adhere to relevant legislation and regulations including equality legislation, building regulations and health and safety regulations.

The guidance is based on a best practice approach drawing on up to date international best practice, guidelines and standards; previous guidance by the National Disability Authority; and extends beyond disability access matters to incorporate a universal design approach. The series is fully compatible with Part M (2010) of the Building Regulations and associated Technical Guidance Documents related to Part M.

A disability access certificate is required for new buildings other than dwellings (including apartment buildings) and certain other works (as set out in Article 20 D (1) of SI 351 of 2009) to which the Requirements of Part M of the Building Regulations apply, which commence or take place on or after 1 January 2012. Further details on these and other relevant standards, codes of practice, and professional codes of practice are listed in **Appendix A3** Further Reading.

The detailed guidance provided here does not represent the only possible solution. Designers may come up with other ways to meet a diversity of users. New materials and technologies that emerge may open up further possibilities of accommodating the diversity of the population.

This booklet covers issues that are essential to all organisations, whatever their size or purpose and irrespective of the type of building or environment they occupy. All the issues are essential in achieving universal design.

Building management encompasses the many practical tasks involved in the day-to-day operation of a building, including building maintenance, planning for emergency evacuation, customer service and staff training. Effective building management is essential in ensuring that people are able to access, understand and use a building safely, conveniently and independently.

Effective communications are essential in ensuring people are able to access, understand and use information easily, in a suitable format and at the time it is needed. All organisations will need to consider how best to communicate with customers and staff and, for many, with the rest of the world via the internet.

An access audit is an essential component of planning for change within any building or environment, with recommendations for improvements taken forward into an access plan. This process is an integral part of the building management task and is an effective means of implementing change.

Checklists are included in each section. They provide a summary of the main considerations and technical criteria that are discussed in detail in the main text and illustrated in the accompanying diagrams. The checklists should not be regarded as a substitute for reading the main text and are not an exhaustive list of all the relevant issues. They are provided to give a quick reference and may be used as an aide-mémoir, for example, when reviewing design proposals or undertaking an access audit.

A comprehensive index is also available with the suite of booklets.

The Building for Everyone series is available online at **www.nda.ie** and **www.universaldesign.ie**. Electronic links are provided to relevant sections in the different booklets. As standards and requirements develop, the electronic versions of these booklets will be updated.

The electronic version is produced in accessible PDF format in accordance with the Web Content Access Guidelines 2.0. If you have any difficulties in this regard or require the document, or particular sections, in alternative formats, please contact the Centre for Excellence in Universal Design at the National Disability Authority, **info@ceud.ie** or (01) 6080400.

8.2 Terminology

Accessible facilities – Facilities that are designed for all users of a building or external environment, including the young and old, and those of all sizes, abilities and disabilities.

Building – A permanent or temporary structure of any size that accommodates facilities to which people have access.

Building user – A person regardless of age, size, ability or disability using facilities in a building or associated external environment.

Egress – Independent emergence of a person from a building and the immediate vicinity.

Evacuation – Egress in an emergency situation, from a place of danger to a place of safety.

Extranet – A private network that uses the internet to securely share part of an organisation's information or operations with others such as suppliers, customers or other businesses. An extranet may form part of an organisation's intranet that is extended to outside users.

Intranet – An in-house website that serves the employees or members of an organisation. An intranet is not a site accessed by the general public.

Internet – A worldwide system of computer networks that uses the public telecommunication network to link millions of computers for communication purposes.

8.3 Design Issues

The role of building management: The accessibility and usability of a building relies as heavily on good management as it does on the physical characteristics of the environment.

Good management is essential to the effective functioning of a building at all levels, from policy making and strategic planning to practical tasks, such as restocking toilet tissue, soap and paper towels.

Good management practice will ensure that suitable emergency evacuation procedures are in place, regularly reviewed, practised, and communicated effectively to everyone who uses the building. It will ensure that staff and volunteers receive appropriate training and that customer service is exemplary throughout the organisation. All of these issues contribute to the correct functioning of a building and that it's facilities are accessible, useable, and understandable to all.

Poor management may mean that elements or areas of a building become difficult for people to use due to lack of maintenance. This may be the case where door self-closing devices are not regularly maintained and consequently become very stiff to operate, or in cases where a corridor is dimly lit because light bulbs have not been replaced.

Poor management may also result in facilities such as lifts being taken out of action for routine servicing at a time when their availability is essential.

Good management will consider the needs of all building users regardless of age, size, ability or disability and ensure that facilities such as these are always available, with routine servicing undertaken out of hours.

Checklist – The role of building management
• Good management is essential to the effective functioning of a building.
• Good management pays particular attention to the maintenance of accessibility to all building users, regardless of age, size, ability or disability, and to those features of a building that are critical to maintaining accessibility.

8.4 Building Management

A well-managed building is welcoming, safe and convenient for everyone to use. Good management and effective customer service can improve the accessibility and usability of even a badly-designed building.

By contrast, poor management and a lack of attention to customers' need can compromise the most accessible venue.

A badly fitting door, for example, which catches on the carpet as it is opened, presents an obstacle to many people. Building managers must ensure that accessibility to a building and the services it offers is not inhibited by poor maintenance nor by the actions of employees, customers or visitors.

Building management encompasses a range of practical tasks including cleaning, maintenance, servicing, and repairs. It also covers operational issues such as customer service, staff training and emergency evacuation procedures.

The nature of these tasks will vary widely depending on the size and function of the building. Effective management of heating and ventilation services will also help to ensure the energy use in a building is kept to a minimum, as will early treatment of defects in the building's fabric.

In larger organisations, there may be a dedicated team of building management and human resources personnel who undertake these functions in-house, or a small team who outsource the practical tasks, such as cleaning and maintenance.

Smaller organisations, such as a residents' association with a small community building, may have to undertake these tasks themselves, and seek training to develop skills or obtain voluntary support.

The production of an access handbook is one way of listing and explaining the features and facilities of a building that must be maintained in order to ensure universal design for all.

A template access handbook is available to download on the NDA's website. The handbook should include a set of plans of the building that indicate all the locations where clear dimensions must be maintained for access and safety. It should also include a listing with appropriate commentary of all the features that facilitate access for all people regardless of their age, size, ability or disability within the building, such as automatic door-opening devices, assistance alarms, platform lifts, and others.

An explanation of particular colour schemes within a building may also be useful as these will have been carefully selected in order to provide effective visual contrast between surfaces and fixtures and this contrast should be maintained during future redecoration.

The access handbook should be kept together with the safety file or building manual and be available for all staff to consult. Please also refer to the NDA publication Access Handbook Template - A Tool to Help Manage the Accessibility of the Built Environment available as a free download on the NDA's website

Checklist – Building management
• Prepare an access handbook to record and explain features of a building that are key to universal design for people regardless of their age, size, ability or disability.
• Ensure the access handbook is available for all staff to consult.

8.4.1 Access audits

An access audit is a means of assessing the accessibility of a building or environment against predetermined criteria. It is used to identify existing barriers to access and to guide an action plan for improvements. The audit is the first step on a long journey, and is not an end in itself.

It is important that anyone commissioning an audit has a clear plan for how they are going to use the audit report, and has communicated those expectations to the auditor.

An access audit should be undertaken whenever alterations or refurbishment works are planned to a building or environment so that improvements to access can be incorporated from the outset.

Access audits are not restricted to buildings; they are also applicable to facilities in outdoor environments, such as country parks, play areas, and cemeteries, to name but a few.

Access audits are an essential tool in planning for change where buildings and services are available to members of the public. However, they are also useful in places of employment as a means of identifying improvements that will facilitate easier access for members of staff, including existing and future employees. When undertaking an access audit of a workplace, current staff should be consulted wherever possible in order to highlight existing barriers to access and in order to address individual need when recommending improvements or alterations to the building fabric or fixtures.

In addition to looking at the physical features of a building, access audits should include an assessment of issues such as communications, information, customer service and staff training should also be reviewed. These make a significant contribution to the accessibility of services in all organisations.

The NDA publication *Guidelines for Access Auditing of the Built Environment* offers comprehensive best practice guidelines on how to carry out an access audit. The sections below supplement these guidelines.

The NDA's Centre for Excellence in Universal Design also provides guidance on carrying out a web accessibility audit - http://www.universaldesign.ie/useandapply/ict/webaccessibilityauditing

Checklist – Access audits
• Undertake an access audit to identify works required to improve accessibility and usability of building and facilities.
• Undertake an access audit in particular whenever alterations or refurbishment works are planned in order to identify potential improvements.
• Consider access audits for places of employment as well as for buildings or environments available to members of the public.
• Assess issues such as communications, information, customer service and staff training in addition to physical features.
• Refer to Guidelines for Access Auditing of the Built Environment for comprehensive guidelines.

8.4.1.1 Audit recommendations

Access audits are likely to include a number of recommendations for improving access. These may range from items that are relatively easy to implement in-house, such as the provision of information in large print, to substantial physical alterations, such as the installation of an evacuation lift. Other recommendations – such as redecoration to improve visual contrast – can often be incorporated into routine maintenance schedules. Some will require extensive consultation with different statutory authorities and consequently may take some time to implement.

Recommendations in an access audit should always be thoroughly considered, and it should be borne in mind that there may be several different ways of overcoming an existing barrier.

In some cases, there may be one or more simple changes that can be made in the short term, whilst funding or permissions are obtained for longer-term, permanent solutions.

For example, if the entrance to an existing building has a series of steps, it is likely, subject to there being sufficient space available and obtaining the relevant permissions, that the construction of a permanent ramp will be recommended. However, it may take several months before the permanent ramp is completed and during this time the main entrance will remain difficult or impossible for some people to access. The recommendations in an access audit should include short-term improvements that may, in this example, include the provision of a temporary ramp or the availability of an alternative accessible entrance.

In other situations, there may be more than one possible solution to overcome a particular barrier; if so, they should all be set out in the access audit.

For example, if a particular service is located in a room that is inaccessible to some people, two obvious solutions are available: one is to implement physical changes that will make the room universally designed, and the other is to relocate the service to another room that is already accessible. Within each of these two solutions there may indeed be further options such as how to make the existing room accessible. All possible options should be explored and set out in the access audit for the client to consider further.

Checklist – Audit recommendations
• Always consider different ways of overcoming an existing barrier to access.
• Set out in an access audit all short- and long-term, temporary and permanent solutions.
• Set out alternative solutions to an existing barrier, where more than one option is possible.
• Always aim for solutions that will provide the most equitable means of access and a universal design approach.

8.4.1.2 Priority ratings and categories

Some clients require recommendations to be prioritised in order to give them a clearer understanding of which items really should be implemented, and in what order. Where this is the case, priority ratings should be discussed and agreed in advance with the client.

It is important that priority ratings reflect the urgency and importance of the task, irrespective of the size of the work or how long it is likely to take to implement. Priority ratings should not be confused with categories, which are discussed below.

Table 8.1 below sets out an example of priority rating definitions together with items that may fall within each band. It is important to note that items within each band may vary considerably in size and complexity.

Essential items, for example, may include the installation of an evacuation lift, a passenger lift, or platform lift to a building with more than one floor level where there is currently no means of vertical circulation other than the stairs. Although this item is significant and may take several months to complete, it is considered essential in ensuring access and usability of the services and facilities. Therefore the process of implementation should be commenced with a degree of urgency.

Other essential items might include the procurement of a portable induction loop for use in various locations in a building. This will be much quicker and easier to implement, but still represents an essential item to service users.

Table 8.1 Example of priority ratings	
Priority rating	Definition and examples of access audit recommendations.
1 (Immediate)	Items that present a potential risk to the health and safety of building users. Examples include: Removal of items obstructing emergency exit routes both inside and outside a building. Repairing loose handrails to steps and ramps.
2 (Essential)	Work that is essential in order to improve access to services and facilities. All items are important and should be implemented with a degree of urgency. Examples include: Provision of designated accessible parking bays within an existing car park. Installation of an evacuation lift, passenger lift or platform lift. Creation of a universally designed toilet. Provision of a portable induction loop.
3 (Best practice)	Work that is recommended in order to meet best practice guidelines and to improve access for all building users. Examples include: Provision of audio guidance to supplement printed information. Provision of supplementary tactile and Braille signage within certain areas of a building.

Categorising the recommendations in an access audit is useful for many clients and, where required, should be discussed and agreed with the client in advance. In larger organisations, tasks can be categorised or attributed to different departments such as building management (maintenance and cleaning tasks), human resources (staff training) and capital planning (substantial physical alterations). Categories can also be used to establish a likely timescale for implementation, although care should be taken to ensure that such categories are not confused with priority ratings which, as described above, have an inherent degree of importance and urgency.

Tables 8.2 and **8.3** below set out examples of categories that could be used to classify recommendations in an access audit. **Table 8.2** categorises recommendations according to departments in an organisation, and is useful in situations where responsibility for implementing tasks needs to be established as part of the audit process. **Table 8.3** categorises recommendations according to the likely timescale for implementation. Items that require immediate attention – such those that pose a potential risk to health and safety and those that can be easily and quickly implemented – can be highlighted in this way.

It may be decided that other recommendations should be implemented in the short, medium or long term, or that they require review on an ongoing basis. Both tables include the same recommendations. It is important to note that the use of categories defined by timescale is not necessarily an expression of the urgency or importance of a recommendation, but more of a realistic assessment of the order in which changes can be made.

Table 8.2 Example of categories defined by departments in an organisation		
Category reference	Category name	Examples of access audit recommendations.
A	Building maintenance	Remove furniture currently obstructing emergency exit route. Regularly test hearing enhancement systems. Replace worn entrance matting.
B	Cleaning	Remove cleaning equipment stored in accessible toilet. Modify cleaning regime, possibly involving a change in cleaners' working hours, to ensure circulation routes are not wet whilst the building is open to the public. Obtain the correct equipment and materials to effectively clean the specialist floor surface.
C	Human resources	Arrange disability awareness training for new reception staff. When online services are implemented, ensure web authors are fully briefed in the development of accessible websites. Provide large-print format of information for existing regular service users.
D	Building management	Improve visual contrast between surfaces and fixtures during next redecoration. Review and practice emergency evacuation procedures. Ensure the access handbook is regularly updated.
E	Capital planning	Upgrade the existing lift to an evacuation lift. Improve the car park layout and increase the number of designated accessible bays when procurement of the adjacent site is complete. Consider options for relocating a particular department to a more accessible location in advance of a new service becoming publicly available.

Table 8.3 Example of categories defined by likely timescale for implementation		
Category reference	Category name	Examples of type of work covered by access audit recommendations.
A	Immediate	Remove furniture currently obstructing emergency exit route. Provide large print format of information for existing regular service users. Remove cleaning equipment stored in accessible toilet.
B	Short term	Replace worn entrance matting. Arrange disability awareness training for new reception staff. Obtain the correct equipment and materials to effectively clean the specialist floor surface.
C	Medium term	When online services are implemented, ensure web authors are fully briefed in the development of accessible websites. Modify cleaning regime, possibly involving a change in cleaners' working hours, to ensure circulation routes are not wet whilst the building is open to the public. Improve visual contrast between surfaces and fixtures during next redecoration.
D	Long term	Consider options for relocating a particular department to a more accessible location in advance of a new service becoming publicly available. Upgrade the existing lift to an evacuation lift. Improve the car park layout and increase the number of designated accessible bays when procurement of the adjacent site is complete.
E	Ongoing	Regularly test hearing enhancement systems. Review and practice emergency evacuation procedures. Ensure the access handbook is regularly updated.

Checklist – Priority ratings and categories
• Agree and clearly define priority ratings in advance with the client.
• Ensure that priority ratings are not confused with categories.

8.4.1.3 Access plan

An access audit is often the first stage of a process of improvement for a building or environment and the services delivered from it. The recommendations from the audit should be taken forward to form an access plan, which sets out a strategy for implementation.

The development of an access plan will help to ensure that access is an ongoing consideration within an organisation. It should also help to identify opportunities for implementing change within any programme of planned or routine maintenance. An access plan should ideally be cross-functional, and include responsibilities of different areas of the organisation such as ICT, customer services, HR, health and safety, safety, or procurement, as well as the building responsibility. It is important that access audits be reviewed / revisited periodically, for example every three years.

An access plan should set out targets, outcomes and a timeframe for completion of identified improvements.

In some cases, such as where significant structural alterations are required, it may be appropriate to set out targets for different stages.

These stages could include the receipt of various statutory permissions, completion of a fundraising programme, and the commencement and completion of construction works. The access plan should be reviewed regularly and updated whenever goals are achieved. As well as driving a programme of change, the access plan will provide documentary evidence of an organisation's commitment to improving a universally designed environment and of successfully bringing about positive change.

Checklist – Access plan
• Take forward the recommendations from the access audit to prepare an access plan.
• Ensure the access plan sets out targets, outcomes and a timeframe for completion of identified improvements.
• Ensure that access is an ongoing consideration within an organisation.
• Ensure that the access plan is regularly reviewed and updated.

8.4.2 Customer service

The delivery of good customer service is a priority for all organisations and is the key to a successful business.

For public service organisations and businesses, such as shops and restaurants, customer service is a daily and integral part of their operation. For other businesses such as factories or research establishments, direct interaction with customers or clients may be infrequent or more typically in the form of written communications as opposed to face-to-face meetings. Nonetheless, all interaction with customers and clients is important and should promote the ethos of universal design for people regardless of their age, size, ability or disability.

Good customer service should encompass effective communication, whether face-to-face, via the telephone, textphone or video link, via email, or in printed format. Staff should be able to manage the expectations and needs of all customers and service users so that everyone is able to access, use and understand the services they require.

The provision of assistance for customers and clients may be required in some circumstances and this is a key component of customer service.

Some people may require assistance in locating or retrieving items in a shop, for example, or in finding their way to a particular department in a large building.

Assistance should be readily available and tailored to meet the customer's individual need. Some people may require or prefer to have assistance using a platform lift, but it should not be assumed that everybody who uses the lift will require or want assistance.

Checklist – Customer service
• Ensure customer service in all situations promotes the ethos of universal design for people regardless of their age, size, ability or disability.
• Ensure customer services encompass effective communications, in the different formats that suit different customers.
• Provide tailored assistance to customers when required.

8.4.3 Staff training

Everybody in an organisation contributes to the efficient running of a building. All members of staff in an organisation, including volunteer staff, are recommended to undertake appropriate training to know and understand what are the difficulties faced and what facilities or measures promote access to all, regardless of age, size, ability or disability.

This training could be one-to-one training by a supervisor, use of video or eLearning tools, contractors, or formal classroom training. Staff and volunteers should be fully aware of features within buildings and environments that help to facilitate universal design for people, such as unobstructed circulation routes, the availability of suitable seating and clear signage.

Staff should also be aware that certain actions may inadvertently create barriers to access, such as placing large waste bins in the transfer area of an accessible toilet, removing or covering signage during redecoration, or obstructing circulation routes with boxes or surplus furniture.

Where particular items of equipment are installed, such as textphones, platform lifts, and induction loops, staff should be fully trained in the use and maintenance of this equipment.

Checklist – Staff training

- Provide training to all staff and volunteers in an organisation around what promotes and what inhibits access for all.
- Provide training in the use of equipment such as textphones, platform lifts and induction loops.

8.4.4 Building maintenance

All buildings require regular maintenance to ensure that they function as efficiently as possible, are safe and clean to use and to minimise deterioration of the building fabric.

Older buildings are likely to require more in the way of fabric repairs and replacement than newer buildings, but even entirely new structures should have in place a scheduled maintenance programme and procedures for undertaking ad hoc repairs.

Regular, effective maintenance is an essential component in ensuring universally designed buildings.

Tenders for work in relation to a building should explicitly seek written information to be included on how safety and access issues are to be addressed during the works, and these commitments on maintenance of access to all should be incorporated into contract documentation. Specific issues to cover would include keeping routes free of obstruction; adequate warning of hazards to have regard for people with visual difficulties; and provision of alternative means of access/egress that are usable by people with disabilities if main access/egress temporarily out of action.

Procedures should be in place to facilitate the prompt repair or replacement of components in a building.

Light bulbs should be replaced as soon as they have blown in order to maintain adequate lighting levels. If floor finishes become worn, they should be replaced before they present a slip or trip hazard. Door handles and other door ironmongery should be repaired or replaced if they become loose or damaged or are no longer functioning correctly.

Items such as these may be considered relatively minor to some people, but to others they present a significant barrier to access and also make the building unsafe for many people.

Planned maintenance of a building is likely to include internal and external redecoration. Whenever internal redecoration is planned, particular care should be taken to ensure that colour schemes are designed to maximise visual contrast between surfaces and fixtures. Conversely, in buildings where this has not previously been considered, the opportunity should be taken during redecoration to improve visual contrast. For further guidance on visual contrast, refer to **Booklet 4: Internal environment and services, Section 4.4.3**.

In buildings that are to remain in use while redecoration is underway, particular care should be taken to ensure that decorators' work areas are adequately guarded and that circulation routes are not obstructed.

External redecoration is likely to require the use of ladders, scaffold towers or mobile lifting platforms. Where these are positioned within or adjacent to access routes, they should be adequately protected so as not to present an obstruction or hazard to people moving around the building.

Historic building fabrics need particular care when it comes to restoration, and specialist conservation designers and contractors will be required for their sustainable preservation. See **Booklet 7: Building types, Section 7.13.1** for more information.

Features in the external environment, including access routes, planting areas, signage, and lighting, should also be adequately maintained.

Access routes should be kept clear of obstructions at all times and this may require the regular removal of litter, dead leaves, and other items. Some surfaces may be prone to become slippery when wet or if moss or mould is permitted to grow. If this is the case, they should be regularly cleaned. Planting adjacent to access routes should be regularly cut-back so that it does not encroach into an access route either at low- or high-level.

External signage should be regularly checked to ensure it is clearly visible. Any planting adjacent to signage should be regularly cut-back to ensure that the sign is clearly visible at all times and from all directions.

External lighting is essential for illuminating access routes, entrances and exits during the hours of darkness and should be fully functioning at all times.

It is important to mention the value of highlighting accessibility and safety concerns in any relevant documentation, such as requests for quotes, supplier tenders and particularly the supplier's safety statement or work method statement.

It is recommended that safety concerns like guarding, keeping routes unobstructed, and ensuring availability of safe alternative facilities (such as lifts) are covered in the supplier's work method statement. Additionally it is recommended that contractor staff undergo disability equality training, to build confidence that these requirements work on the ground.

All equipment including ventilation and air conditioning systems, lifts, platform lifts, automatic door-opening devices, alarms, and communication systems should be regularly tested and serviced according to manufacturers' recommendations and relevant European and international standards.

The timing of routine tests and servicing should be carefully planned to minimise disruption to building occupants and to ensure that access is not unnecessarily prevented.

Wherever possible, in public-service buildings, offices and other premises visited by the general public, equipment, such as lifts and platform lifts, should be tested out of normal working hours so that full access can be maintained when the building is in use.

If it is necessary to carry out tests or servicing when the building is in use, advance warning should be given to inform building occupants that this is the case and alternative arrangements put in place to enable staff and visitors to access the necessary services and facilities.

Checklist – Building maintenance
• Ensure procedures are in place for undertaking scheduled maintenance and adhoc repairs.
• Ensure carefully-designed colour schemes are preserved during redecoration.
• Make sure decorators' work areas are guarded and positioned so as not to obstruct access routes.
• Ensure external access routes are kept clear of overhanging vegetation, fallen leaves and litter.
• Keep vegetation well trimmed so as not to obscure external signage.
• Clean external access routes regularly where they are prone to moss and mould.
• Ensure external lighting is well maintained at all times.
• Test and service all equipment and machinery regularly.
• Wherever possible, ensure testing and repair of essential equipment, such as lifts, is undertaken out of hours.
• Ensure procedures to maintain areas during works are built-into tender and contract documentation.

8.4.5 Cleaning

All buildings should be cleaned regularly. Some buildings such as healthcare and laboratory environments will require a particularly high standard of cleanliness and guidelines or regulations relating to these and other such building types should be followed. Other buildings or parts of buildings may require daily or weekly cleaning, depending on the frequency and type of use.

Regular and effective cleaning contributes to the maintenance of a safe and healthy environment that is pleasant for everyone to use.

All areas and facilities in a building should be cleaned, including facilities that may not be used very often but are essential in providing access for all people.

All buildings should provide a dedicated cleaners' room with a cleaners' sink or bucket sink and in multi-storey buildings, cleaners' rooms should be provided on each floor level.

The provision of suitable cleaners' rooms should ensure that cleaning materials and equipment are not stored in inappropriate locations, such as in the transfer area of accessible toilets where they will obstruct access.

Internal floor surfaces require regular cleaning to ensure they are safe to use, maximise their durability, as well as being attractive to look at and hygienic. The slip-resistance of sheet and tile finishes may be compromised if they are not cleaned regularly or if they are cleaned using the wrong materials or equipment. The perception of light reflectance and colour of a floor finish may also be affected if the surface is not regularly maintained and this may compromise the effectiveness of a carefully designed colour scheme.

The correct method and materials should always be used to clean floor finishes and manufacturers' guidance should be followed in all cases. Information on cleaning regimes should be retained in the building manual and be available for relevant personnel to view. Ideally, floors should not be left wet after cleaning if the building is still in use as they will present a slip hazard.

The cleaning regime should ensure that floors are cleaned to a dry finish wherever possible. If floors are still wet, they should be adequately guarded using temporary signs. The signage should follow the sign design guide guidance regarding colour contrast and lettering. The signs should be removed as soon as the floor is dry.

Generally, floor materials should be selected so that they do not become slippery when wet. More specifically, the standard building cleaning regime should be such that the floor is dry by the time the building is open to the public. In cases where there is a spillage, and the building is already open to the public, a person should be designated to stand beside the spillage until it is cleaned up. The floor should be fully dry following the clean up.

Checklist – Cleaning
• Ensure all buildings are cleaned regularly to ensure the environment is safe and healthy.
• Ensure all buildings incorporate a dedicated cleaners' room.
• Clean floor surfaces regularly with appropriate materials to maintain slip-resistance and other characteristics.
• enaure information about cleaning methods and materials is retained in the building manual.
• Endeavour to clean floors to a dry finish wherever possible.
• Use guarding and temporary signage wherever surfaces remain wet.

8.5 Emergency Evacuation

Every organisation should have in place policies, procedures and equipment to facilitate the safe evacuation of everyone in an emergency. Universal design for people requires not only convenient access to buildings and services but an environment that facilitates safe, independent, and dignified evacuation for all.

Design solutions that facilitate independent evacuation should be fully explored and incorporated into buildings wherever possible. If they are not, there are likely to be significant implications for the ongoing operation and management of the building, which will mean additional running costs.

Good design and thorough planning are likely to result in reduced operational costs and will also result in a building that is better for everyone to use.

In new buildings, procedures and routes for emergency evacuation should be fully considered at the outline and detailed design stages.

Good planning should result in the elimination of potential problems, such as internal and external changes in level, which may preclude independent evacuation for some people, particularly those who may walk slowly or have other mobility difficulties. If these are not addressed at the design stage, they are likely to require additional management resources once the building is complete, such as the provision of personal assistance, the use of assistive equipment, and associated training, all of which have significant ongoing financial implications.

The position of a building on a site, the manipulation of external ground levels and a well-designed internal layout can all be used to make a building more convenient to access and safer for everyone to evacuate.

Fire engineering technologies should be considered from the outset as these may offer innovative solutions that improve safety and reduce the need for potentially costly future adaptations.

Fire safety systems (also referred to as life safety systems) including fire detection and alarms, emergency escape lighting, fire suppression systems, wayfinding, and smoke control systems should also be considered at an early design stage. These will all form part of the emergency evacuation system and should be used to facilitate, wherever possible, independent evacuation of everybody in a building.

The use of systems, such as those facilitating a phased or progressive evacuation, should be explored at an early stage as they may influence issues such as the size and layout of adjoining compartments in a building and the fire resistance of particular elements of construction.

In existing buildings, emergency evacuation procedures should be continuously under review, and improved or adapted when necessary. People who require assistance or auxiliary aids in order to evacuate a building safely may join the staff. Procedures should be in place to consult with individual members of staff from the outset to discuss and implement a personal evacuation plan.

The needs of people who visit a building, or attend for a meeting or conference, may vary on a daily basis and should constantly be reviewed so that the needs of everyone can be accommodated safely and efficiently.

When existing buildings are to be refurbished or converted, all aspects of emergency evacuation should be considered at the design stage. As with new buildings, this should ensure that all aspects of emergency evacuation including exit routes, fire safety systems, signage, equipment, and procedures are able to facilitate safe evacuation for all.

In buildings with more than one floor level, evacuation of people from areas of the building other than the exit level is likely to present one of the biggest challenges to designers and building managers. In smaller premises, such as those with only two floor levels that are served by a platform lift or stairs only, the use of evacuation chairs may be considered as a potential means of assisting people to the exit storey. However, the use of evacuation chairs should not be considered a panacea solution for moving people vertically in a building as they have significant disadvantages from the user's point of view. Their use also depends on the availability of assistance, which means they do not facilitate independent evacuation - which should be the aim in all situations.

Evacuation chairs vary widely in style from lightweight metal-framed folding seats with two wheels to battery-powered portable stair climbers that are able to carry people whilst remaining seated in their own wheelchair, including self-propelled and electrically-powered wheelchairs.

The lightweight folding style of evacuation chair requires people to transfer out of their wheelchair into the evacuation chair. This is suitable for some people, but not all.

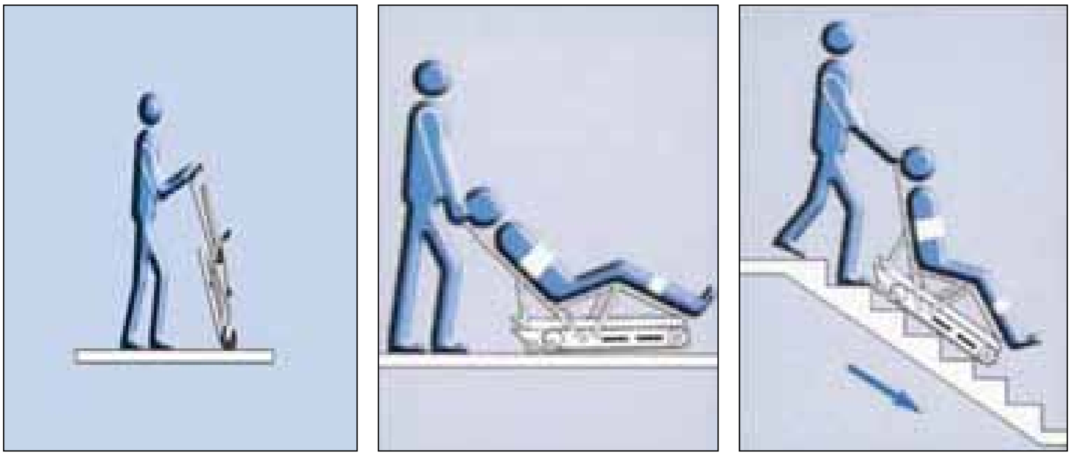
Some people risk significant injury if they are required to transfer out of their own wheelchair and for other people, the evacuation chair will be unable to provide sufficient support to enable them to be evacuated safely or with any degree of comfort.

The use of powered evacuation chairs addresses some of these issues, as they enable people to remain seated in their own wheelchair.

However, many people regard the use of evacuation chairs as undignified and some experience high levels of anxiety whilst using the equipment. The use of evacuation chairs should only be considered where all other means of facilitating independent evacuation have been explored.

Image 8.1 Examples of evacuation chairs.

Image 8.2 Illustration on how to use evacuation chairs.



In many situations, particularly in multi-storey buildings, the preferred means of evacuation from floor levels other than the exit storey is via an evacuation lift. This is a lift specifically designated for evacuation purposes. Evacuation lifts are constructed with additional protection against fire and are able to facilitate unassisted escape in the event of an emergency.

Evacuation lifts enable people who are not able to use stairs to safely and quickly access the exit storey of a building. The availability of an evacuation lift in a building reduces reliance on other people and is better able to facilitate independent evacuation for all.

In new buildings, the provision of one or more evacuation lifts should be considered, depending on the size and expected occupancy of the building. In existing buildings, where a new lift is proposed to improve access between floor levels, consideration should be given to installing a new evacuation lift to IS EN 81-70 standard 'Safety rules for the construction and installation of lifts – Particular applications for passenger and good passenger lifts.' Accessibility to lifts for persons including persons with disability (Amd A1:2005) to facilitate safe, independent and dignified evacuation for everybody and ensuring the relevant technical and safety systems are incorporated.

It may also be possible to upgrade an existing lift to evacuation lift standard.

As many people with disabilities are unable to use stairs unassisted, it is necessary to ensure that they can stay in a safe location until help arrives. A common way to facilitate this need is through the provision of refuge areas within protected stair enclosures. This is not always possible and may not always be desirable, particularly when dealing with existing buildings where space in the stairs is limited or where larger numbers of people who require assistance to escape are anticipated.

The use of refuge areas will often require a person with a mobility difficulty to wait whilst others escape past them. It should be realised that people can become fearful and concerned about being left behind. It is essential that the use of refuges is discussed fully in advance with those who might need to use them. This will need to be discussed with employees as part of the drawing up of Personal Emergency Evacuation Plans (PEEPS). Where people are unfamiliar with the use of refuge spaces or the spaces' locations in a building, the intervention of staff will be necessary to provide direction and reassurance. It may also be necessary for staff to remain with those waiting in refuge areas to assist with the use of communication systems or provide general support.

Refuges should be provided so that people with mobility difficulties are not placed at a greater risk from fire than other occupants. This will usually require an assessment of the numbers of people likely to require the use of a refuge space and assistance with vertical evacuation of the building. Inherent in this assessment is the availability and suitability of appointed staff who can provide assistance.

The subject of refuge areas is covered in more detail in Booklet 3: Vertical circulation and in NDA publication 'Safe evacuation for all'.

Checklist – Emergency evacuation
• Ensure policies, procedures and equipment are in place to facilitate safe evacuation for everyone.
• Aim to facilitate independent evacuation wherever possible.
• Consider procedures and routes for emergency evacuation at the design stage.
• Consider fire engineering technologies and fire safety systems from the outset.
• Continuously review emergency evacuation procedures in existing buildings.
• Ensure evacuation procedures include the needs of individual visitors to a building.
• Consider the best means of evacuating people from floor levels other than the exit storey.
• Wherever possible, provide an evacuation lift to facilitate unassisted escape.

8.5.1 Evacuation planning

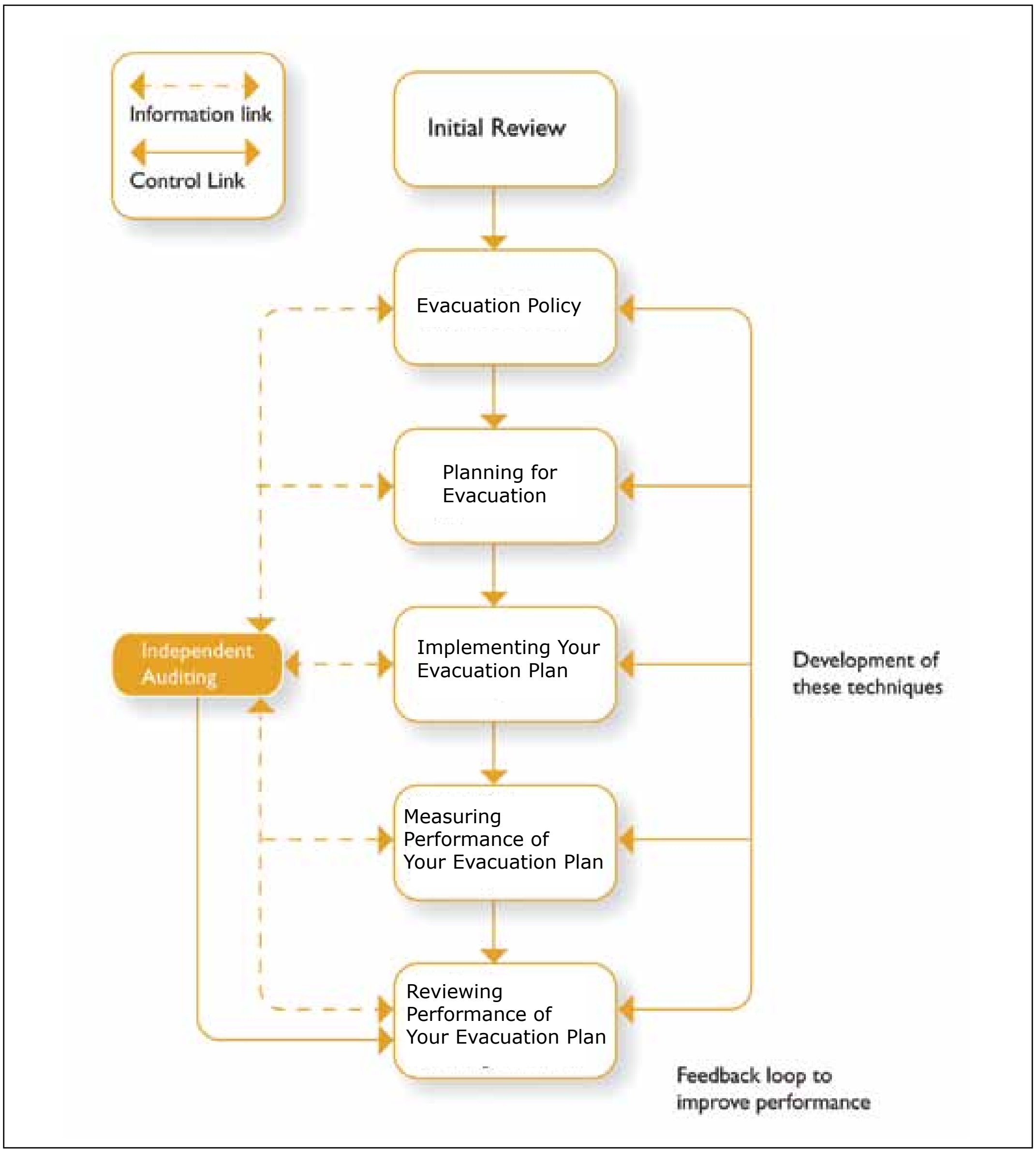
Achieving safe evacuation for all requires a structured planning process. This applies to the design of new buildings, the implementation of refurbishment and conversion projects, and existing buildings.

Comprehensive guidance on evacuation planning is available in the NDA publication ***Safe evacuation for all*** – this can be downloaded from the NDA's website – www.nda.ie.

The Risk Assessment Checklist in Appendix 3 of the Safe evacuation for all publication may be a useful starting point to inform an appropriate plan of action.

The flowchart in **Figure 8.1** below illustrates the key processes involved in evacuation planning and the paragraphs below summarise the aims and objectives of each stage.

Figure 8.1 Key elements of an emergency evacuation management system



8.5.1.1 Initial review

This first stage takes an overview of the existing situation and establishes the desired outcomes of the evacuation planning process. In this stage, all information relating to emergency evacuation including any fire certificates, safety policies and statements, fire safety systems, lifts, and previous activations of the fire alarm should be gathered. Details of staff training in relation to emergency evacuation and any feedback from building users should also be collated.

The needs of everybody using the building should also be established at this stage so that the evacuation plan can be developed accordingly.

The needs of people who use a building regularly such as staff in an office and students in a college could be established using surveys, questionnaires or during face-to-face interviews.

Questionnaires may also be applicable to people attending a venue for a training course or other pre-planned event and for contractors undertaking a pre-arranged task.

Where people are able to visit buildings unannounced such as to some public-service buildings, people should be encouraged to seek information about evacuation procedures and to alert staff if they are likely to require any form of assistance. Refer also to **Section 8.5.3 Consultation** below.

8.5.1.2 Evacuation policy

All organisations should have a formal policy in relation to emergency evacuation and the policy objectives should state clearly that the needs of everyone will be met in order to achieve safe evacuation for all.

The policy should acknowledge the various statutory requirements that impact on fire safety and clearly state who holds responsibility within an organisation for safe evacuation.

8.5.1.3 Planning for evacuation

This stage of the evacuation planning process involves the development of a plan that will facilitate the safe evacuation of everyone in a building.

The plan will consider the needs of everyone using a building so that arrangements can be discussed and agreed in advanced.

8.5.1.4 Implementation

The implementation stage involves making physical changes, where required, to the building and its fire safety systems, communicating the evacuation plan and training staff.

The evacuation plan should also be tested regularly to ensure that people are familiar with the evacuation routine, that the systems and procedures work effectively and that they continue to meet the needs of everyone in the building.

8.5.1.5 Measuring performance

The effectiveness of the evacuation plan should be monitored, with measurements taken wherever possible as a means of recording performance on an ongoing basis.

The monitoring process will help to highlight potential problems and enable modifications to be made to the plan as circumstances change. Issues that can be measured will vary according to the type and size of building, but are likely to include evacuation times for fire drills, the degree of awareness amongst staff of particular procedures, the regularity of maintenance and testing of safety systems and equipment and staff satisfaction in relation to the effectiveness of the plan.

8.5.1.6 Reviewing performance

The evacuation plan should be regularly reviewed to ensure that it continues to meet the objectives established in the initial review.

Whenever changes occur to the building or its occupants, the suitability of the evacuation plan should be reviewed and amended to ensure it continues to facilitate safe evacuation for all.

8.5.2 Personal emergency evacuation plans

In buildings that are used regularly by people who require assistance during evacuation, individual personal emergency evacuation plans (PEEPs) should be developed.

This applies in all cases where it is known (or identified during a process of enquiry) that an individual may require assistance during an emergency evacuation and covers staff, volunteers, contractors and some visitors. It is also applicable in cases where an individual requires assistance on a temporary basis, such as while recovering from a broken leg and using a wheelchair or crutches to aid mobility.

PEEPs should always be prepared in direct consultation with the individual to whom it relates and it should be tailored to meet the individual's particular capabilities.

The PEEP should be developed within the context of the organisation's emergency management systems and should take into account the characteristics of the building and its safety systems.

A PEEP is not a transferable document – a person cannot take their PEEP from a particular place of work and expect it to be applied without modification to another building or another organisation. PEEPs are entirely specific to an individual, to a particular building and within a particular management system.

A PEEP developed in conjunction with a person attending a training course may only be applicable for the duration of the course, but is essential in ensuring the safety of the person in that particular setting. The PEEP is an essential component in facilitating full access to employment, services and training.

The use of an emergency evacuation questionnaire is an effective way of identifying people who need assistance in an emergency. This is certainly recommended for staff and people who are known to the organisation, such as regular contractors and visitors. The questionnaire sets out pertinent information relating to the existing evacuation plan and seeks to identify the type of assistance required. The information gathered in the questionnaire can then be used, in discussion with the individual, to prepare and record aspects of the PEEP.

Questionnaires should be available in a range of formats, such as electronic or large print, and assistance should be available in reading, understanding, and recording responses when required.

A sample emergency evacuation questionnaire is included in the publication *Safe evacuation for all* available on the National Disability Authority website.

As with the evacuation planning process outlined in the section above, it is essential that PEEPs are continuously reviewed and improved or modified where necessary.

In some cases, changes to a PEEP will be required to reflect physical alterations in a building or to its safety systems. In other cases, modifications will be required because an individual's capabilities have changed, because they have been assigned to a different place of work or because people previously designated to provide assistance are no longer available. Changes such as these could occur at any time and PEEPs should be promptly reviewed and updated in consultation with the individual so that safe egress is ensured at all times.

Scheduled reviews of PEEPs may be incorporated into the evacuation planning process, but there should also be an expectation that change will be required at other times and procedures established to enable this to happen promptly.

Checklist – Personal emergency evacuation plans
• Develop a PEEP for every individual in a building who requires assistance.
• Consult directly with the individual to establish needs and preferences and to agree the plan.
• Consider the use of an emergency egress questionnaire, which should be available in a range of formats.
• PEEPs should be continuously reviewed and updated.

8.5.3 Consultation

Consultation is essential in the development of effective emergency evacuation procedures. Individuals, groups and organisations that should be consulted include:

- People of any size, age, ability or disability who use the building on a regular basis.
- Organisations representing people of any age size ability or disability.
- Staff who will be involved in implementing the evacuation procedures, such as those designated as fire wardens or fire marshals and those designated to provide assistance.
- The relevant fire and rescue service.
- Landlords and other building occupiers.
- Professional advisers with a specialist knowledge of access issues, fire safety, and emergency evacuation procedures.

In many buildings, the individual needs of visitors are unknown. This is likely to be the case in buildings freely accessed by members of the public, such as shops and supermarkets, museums and galleries, transport terminals, and other assembly buildings. In these environments, the preparation of egress plans to meet individual needs is unrealistic, yet it must be assumed that there will be people who require assistance and the evacuation plan must acknowledge and provide for this. In these instances, the advice of organisations representing people of any age size ability or disability, and appropriate professional advisors, is likely to be invaluable.

In buildings where there is more than one organisation, such as in multi-tenanted offices and shopping centres, it is important that each organisation is aware of procedures established by the other tenants and by any landlord or operator controlling the common areas.

Fire safety systems in multi-tenanted buildings should be linked so that all building occupants are alerted to the out-break of fire in any single area. Evacuation procedures for each tenancy should be compatible and collectively facilitate the safe egress of every person from the building.

Checklist – Consultation in the development of effective emergency evacuation procedures
• Ensure effective consultation with all individuals and with relevant groups and organisations as part of evacuation planning.
• Ensure that evacuation procedures for different tenants in a multi-occupancy building are compatible.
• Liaise with landlords and operators of the common parts of buildings in relation to emergency evacuation procedures and safety systems.

8.6 Communications

Communication and information are vital to the proper provision of any service. Information can be made available in many ways, including printed material, signage and notice boards, by telephone, from staff, and via the internet; and all should be universally designed.

Public bodies and other service providers should ensure full access to all information and to mainstream services for all.

Service providers and building managements are encouraged to let building users know that their communication and information needs can be met in different ways or in different formats where requested.

8.6.1 People with hearing difficulties

Individuals and organisations involved in delivering lectures, seminars, public meetings, or training events should ensure that information is available in accessible and understandable formats and that alternative forms of communication are available when required.

Alternative forms of communication could include the use of an Irish Sign Language interpreter, lip speaker, or the use of real time captioning. As qualified experts will need to be booked in advance, prior notification of any needs will therefore need to be made.

Where appropriate and requested in advance, spoken information should be available in alternative formats such as Irish Sign Language. Equipment such as textphones, video relay services or real time captioning may also be requested. Many people with hearing difficulties are able to lip read and the physical environment should facilitate this by clearly illuminating the person's face.

Personnel giving the information should be trained in speaking clearly and directly to others to facilitate effective lip reading. It may also be appropriate to provide written versions of some types of information, such as directions, maps and guides, opening times, and lists of services or contacts. This will vary depending on the organisation and services available.

Lip speakers may be required to facilitate one-to-one communication at a meeting or private consultation or to aid understanding at a seminar or conference. A lip speaker is a hearing person who aids communication between people with hearing difficulties using unvoiced speech. Lip speakers repeat a speaker's message silently, reproducing the shape of words, rhythm and stress used by the speaker. People with hearing difficulties who are able to lip read are able to access and understand the information via the lip speaker.

In all locations where spoken information is given, such as reception desks, ticket offices, and service desks, an induction loop should be provided to benefit people who wear hearing aids fitted with a T-switch. For further guidance on induction loops, refer to **Booklet 4: Internal environment and services, Section 4.10.1**.

Textphones should be considered for all reception desks in public buildings to facilitate use by reception and other staff to make and receive calls to people who prefer text-to-text communications. Where textphones are provided for use by staff in an organisation, they should be fully trained in using the equipment and also be familiar with the text relay service. For further guidance on textphones, refer to **Booklet 6: Facilities in buildings, Section 6.7.2**.

A video relay service is a telecommunication service that enables people to communicate over the telephone using a sign language interpreter. The video relay service uses a videophone or webcam to provide a visual link between the sign language user and interpreter. The interpreter acts as a neutral, non-participating third party, as with speech-to-text interpreters. A video relay service should be considered for organisations that provide information over the telephone as an alternative or supplement to text-to-text communications.

Real time captioning (also referred to as palantype, speedtext or speech-to-text display) is the simultaneous display of spoken announcements, presentations or lectures in a readable format and should be considered for public events, seminars, conferences and in learning environments. The readable information can be displayed on a computer or television screen, overhead projector, or other type of audiovisual device, depending on the number of viewers and the arrangement of the venue in which the service is being provided.

Where real time captioning is used for seminars or educational purposes, transcripts of the presented material can be easily produced and circulated to participants if required.

Real time captioning is not the same as speedtext. A speedtext operator is trained in condensing language, thus transmitting the meaning of the points discussed, not the actual word-for-word transcription. Speedtext is not a verbatim service.

Checklist – Communications
• Ensure all forms of communication and information are universally designed.
• Ensure all methods of communication and formats of information are clearly apparent and readily available.
• Ensure the availability of alternative formats is actively promoted by service providers.
• Provide alternatives to spoken communication at public meetings, lectures and seminars, where required and requested in advance, such as an Irish Sign Language interpreter, lip speaker, or real time captioning.
• Ensure adequate lighting is available to facilitate lip reading and communication using sign language.
• Provide an induction loop in locations such as reception desks, ticket offices, and service desks, as **Booklet 4: Internal environment and services, Section 4.10.1**.
• Consider the provision of a textphone for reception desks in public buildings.
• Consider the provision of a video relay service.

8.6.2 Printed information

For many organisations, printed material is the most common format for the provision of information. All printed information should be carefully considered and well-designed.

A well-designed leaflet with a logical layout, clear print, and information that is easy to understand will help everyone who reads it. Small print and a cluttered layout can be difficult for everyone to understand and may discourage people from accessing relevant information.

Useful information that is easily extracted from a document will reflect well on an organisation, is likely to be more welcoming and will encourage more people to access, use and understand the appropriate services and facilities.

The National Council for the Blind of Ireland (NCBI) has created 'clear text' guidelines on producing written information that is accessible and usable to everyone www.ncbi.ie/files/make_it_clear_ncbi.doc

The Royal National Institute of Blind People (RNIB) clear text guidelines have been used to develop these guidelines.

With more material now being presented on websites, such as reports and documents it is important that these are useable and accessible for as wide an audience as possible. Where possible provide this type of information in accessible PDF or HTML format. See **Section 8.6.4** on making websites accessible.

The following checklist is guidance to support authors of printed documents to make them more usable and accessible

Checklist – Printed information
• Ensure printed information is well-designed and easy to read.
• Make sure information is logically arranged, clear and concise.
• Keep sentences and words short wherever possible.
• Avoid splitting words using a hyphen at the end of a line.
• Avoid acronyms and jargon.
• Explain abbreviations where their use is essential.
• Consider the use of diagrams or flowcharts to explain complex information.
• Use pictograms and graphics to supplement written information.
• Avoid the use of distracting graphics and pictures overlaid with text.
• Use a consistent format for page numbering or other references.
• Provide a contents list for longer documents.
• Leave space between paragraphs of text and between columns of text.
• Arrange text left-aligned and horizontal.
• Avoid wrapping text around images.
• Provide adequate space on forms for people to write.
• Ensure information and instructions on forms are easy to understand and unambiguous.
• Use a sans serif font with good letter spacing and good line weight.
• Avoid the use of wholly capitalised words.
• Ensure adequate visual contrast between text and background.
• To emphasise text, use bold text instead of italics or underlining.
• Ensure standard documents use at least 12 point type for a font like Helvetica or Arial with larger letters, or 14 point type for a font like Times Roman with lower-size lettering.

- Use a font size of 16 point or above in large print documents.
- Select a font which has clear number shapes.
- Offer a range of background colours for printed documents to meet individual need.
- Ensure words are spaced evenly.
- Use single spacing on a computer, or in typeset documents 14 point leading where text is in 12 point.
- Use matt, not glossy, paper.
- Ensure that paper has sufficient weight to prevent text being seen through from the back.

8.6.3 Audio information

Audio information should be available as an alternative to printed information and is particularly valuable to people with visual difficulties who do not read large print or Braille.

Audio information is also beneficial to people who have difficulties reading documents and people who can understand and speak a language but who do not read it. The provision of audio information in other languages is beneficial to people whose first language is not Irish or English.

Depending on the size and nature of the organisation, audio information may be created in-house or it may be produced by a specialist audio transcription agency. In general, information for individual customers may be suitable for in-house production, while more complex documents and large publications are likely to require the specialist skills of a transcription agency to structure and present information that is easy for people to listen to and navigate.

Audio information covers a number of different formats, including the conventional audio cassette tape, CD, Daisy CD, and MP3 download.

Daisy CD (also termed a digital talking book or Daisy talking book) is a combination of audio and electronic text. The Daisy player or special computer software enables a person to see the book on a screen while corresponding portions of text are highlighted and read out.

Audio information is increasingly offered in full-text digital format for download, circulation by email, and on CD. Electronic files can then be transferred onto a personal computer where it can be accessed through the use of large screens or software that is able to customise font size for an individual viewer. Electronic text can also be converted into synthesized speech using screen reader software or translated into Braille. It is also important to highlight the provision of transcripts for any podcasts or audio clips published to the web for those who have hearing difficulties.

Specialist advice should be sought by any organisation producing or commissioning audio information. A useful source of information is COTIS (Confederation of Transcribed Information Services), which provides guidelines on the production of audio information including basic principles, recording techniques, reading skills, describing illustrations, labelling, and general presentation. www.cotis.org/uk.

Checklist – Audio information
• Provide audio information as an alternative to printed information.
• Consider the benefits of providing audio information in a range of languages.
• Consider whether audio information is suitable for in-house production or requires the specialist skills of a transcription agency.
• Consult specialist organisations such as COTIS when planning or commissioning audio information.

8.6.4 Websites

The internet provides access to a vast array of services and information as well as access to a global communication network. Websites are often the first source of information for people wishing to visit a place or particular attraction, to find out about services and to obtain contact information.

Websites also enable people to purchase and arrange delivery of almost any product, from fresh food to furniture, clothes and toys, to mention but a few, all from the comfort of their home. The internet enables people to communicate easily, directly, and relatively cheaply with other people and organisations around the world.

Websites have the potential to make a wide range of services, information and communications easily accessible and understood. Well-designed accessible websites carry many advantages, including the ability to attract a wider audience and be used more successfully by everyone. The content of accessible websites is more easily transferred to other media outputs such as mobile telephones, interactive digital television, and handheld computers, which broaden its application and usability. Accessible content in websites also increases recognition by search engines, leading to higher rankings and a greater number of web page viewings, which is important for many organisations.

A badly designed website can present a barrier to many people, making information hard to extract or denying access altogether. Simple visual features such as a small font size, inadequate visual contrast between the background colour and text or the presence of distracting graphics can make a web page difficult to read.

The coding used to structure, format, and identify web content is not immediately visible to the user but dramatically affects accessibility and understanding. Coding that does not conform to the appropriate guidelines may make the website difficult to navigate or completely inaccessible in cases where it is not compatible with a user's screen reader, other software, or media player.

Websites, as with any other service or form of communication, should be universally designed. This is essential for internet websites that are publicly available and is also recommended for intranet and extranet websites. Achieving universal design requires good planning, adherence to best practice guidelines and regular user testing.

Any individual or organisation commissioning the development or review of a website should ensure that every possible step is taken to maximise accessibility from the outset. This will involve the application of the most up-to-date standards and guidelines, which are represented by the Web Content Accessibility Guidelines (WCAG). These guidelines have been established by the Web Accessibility Initiative, www.w3.org/WAI, and are continuously being tested, reviewed and updated. When followed, WCAG aim to make websites, web applications, and other web content accessible to people with disabilities.

Websites should be tested and evaluated by potential users during the design and development stages and on a regular basis once they are available online. The testing should be undertaken by a range of people who use different hardware, software, and access technologies in order to eliminate any potential difficulties and technical problems.

A number of automated testing tools (sometimes referred to as automated conformance testing tools) that enable websites to be tested to assess compliance with particular guidelines and standards, such as the WCAG, are available. These are a useful aid to compliance testing, but are not able to fully predict how different people will chose to interact with features on a web page or respond to information and instructions given on any website. It is important that the input of individuals with a range of skills should always form part of the testing and ongoing review process.

The Centre for Excellence in Universal Design maintains a number of resources for the procurement, development, management, and editing of accessible and usable web content.

Checklist – Websites
• Ensure websites, web applications and web content are universally designed.
• Ensure intranet and extranet websites are as accessible as internet websites.
• Ensure all websites adhere to the Web Content Accessibility Guidelines.
• Ensure all websites are tested during the design and development stages by a range of potential users.
• Use automated testing tools to assess compliance with the relevant guidelines.

A1 Definition of Universal Design

Universal Design

'Universal Design refers to the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or disability.'

Synopsis of the Disability Act, 2005.

A2 Human Abilities and Design

The following piece of text is an extract from European Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'.

It states that: Physical, sensory and mental abilities vary from person to person and for individuals as they get older. Diversity is normal. Designers need to be aware of difference across the range of human abilities, and of associated design considerations.

(a) Physical abilities

This includes walking, balance, handling, pulling, pushing, lifting and reaching. Many activities involve simultaneous use of more than one of these skills. Physical strength and stamina may also affect people's abilities to perform these actions.

Walking

For some people walking on the level or up gradients is difficult. Some people may have a limited walking range, may have difficulty with turning movements or may use mobility devices such as crutches or a walker. They may need to stop frequently, to regain strength or catch breath. Design considerations include provision of handrails, seats at regular intervals, convenient set-down parking and adequate time for slower pedestrians at road crossings. Designers should also consider the needs of people walking and engaging in sign language when designing access to and from buildings plus within the buildings themselves.

Balance

Balance limitations can affect someone's gait or control of hand movements. Design considerations include handrails, regular seating, and providing controls within easy reach. A surface against which a person may stumble against or walk into should be designed to limit abrasion.

Handling

A significant minority of people are left-handed. Some people may have restricted use or no use of one or both hands, or may have limits on strength or precision. Facilities and components should be designed to be suitable for use with either hand or with one hand only. Handling includes gripping, grasping and manipulation. Each of these has a different purpose with specific design considerations. For instance, components should be designed to be easily held. The circumference of the supporting structure and stability are critical. Manipulation involves the moving, turning and twisting of components with a hand or hands. For those who have limited manipulation abilities, size and shape and ease of movement are critical. Another option to consider is to design for manipulation by using a pushing, pulling or pressing action using a clenched fist, or by using the wrist or the elbow.

Strength and endurance

Strength and endurance may be required on sloping paths and floors, stairways and long travel distances, when sustained effort may be needed.

For those with limited endurance, frequent resting-places are essential.

People generally find it easier to push a component, than to pull it. This is particularly so if the individual uses a wheelchair. Self-closing devices on manual doors can be difficult for some people to operate, particularly if the doors are required to resist wind forces. For these reasons, doors that open and close automatically are preferred.

Lifting

Activities such as opening a vertically sliding sash window and an upward opening access gate, should be designed to be easily operated with minimal force.

Reaching

Design has a role to play in ensuring that key components in a building or environment are in easy reach, bearing in mind the range of people's sizes and abilities. Having components within easy reach is particularly important for those with more severe limitations in mobility. The reach range is dependant on the height and arm length of the person, use of the arms, and the balance and mobility of the upper body. A 'comfortable reach range' has been defined as one that is appropriate to an activity that is likely to be frequent and in need of precise execution and that does not involve stretching or bending from the waist. Putting things within comfortable reach can ensure use by a greater number of people. An 'extended reach range' has been defined as one that is appropriate to an activity that is likely, neither to need precision nor to be frequent and that can involve stretching or bending from the waist.

(b) Sensory abilities

Speech

Some conditions affect the capacity for or quality of speech. Two-way communication can be facilitated by environments designed to minimise barriers to hearing low or indistinct speech.

Hearing

People differ in their capacity to hear sound, to determine its direction, its source, to discern pitch, frequency, volume and variation and to separate out different sounds. Hearing quality is important for communication, for information, and for detection of hazards such as traffic. Many people with hearing difficulties

use a hearing aid which amplifies all sounds caught by the microphone, making communications very difficult in noisy environments. Keeping background noise level low is essential. The selection of structural and surface materials can make a substantial difference in audibility. Auditoriums, meeting rooms and reception areas can benefit from additional sound enhancement such as a loop system. The careful design of illumination can assist in communication such as lip reading and sign language. Provision of visual information and visual alarm systems can communicate information to those who have hearing difficulties or who cannot hear. Designers should also consider the colour and size of rooms and even the furnishing arrangement as this is very important for visually based communication. Also the use of vibration as means of sensing others should be considered.

Sight

Vision allows an individual to be aware of the luminance of surfaces, objects, form, size and colour. For people who are blind or who have visual difficulties, the provision of suitable tactile walking surface indicators and tactile or acoustic warnings at hazardous locations, should provide information on using the built environment and should limit the risk of injury. The built environment can be designed for orientation by providing sound cues and tactile cues. An easily discernible system of 'way finding' should also be considered. For people with limited, but low vision, effective visual contrast between surfaces or objects helps to identify critical locations. Warning markings on glass surfaces, and markings on the edges of stair treads, help minimise hazards.

Differences in friction between one floor surface, or one stair tread surface, and the next should be avoided. Therefore, adjacent surfaces that display different standards of slip-resistance, or that depend on raised surfaces, should be carefully considered

Touch

In selecting surfaces in the built environment that people will need to touch (such as handrails, handles, knobs and controls, tactile information), it is important to select materials that avoid distress, injury or allergies. Surfaces should be free of abrasions. Metals that may cause adverse reactions when touched should be avoided.

(c) Mental abilities

Mental abilities include cognition, intellect, interpretation, learning and memory. People differ in their knowledge, their capacity to understand, reason, or interpret information. Designing for differences in these capacities helps provide a usable environment for the population at large, from the very young to the old, and people of diverse abilities. Means of communication in the environment should be designed to be immediately and easily understood, and correctly interpreted. As people age, some experience loss of memory or find it increasingly difficult to absorb new information, so changes in the environment should be carefully considered before implementation.

Design considerations that take account of mental abilities

Aural and visual messages should be simple, clear and have immediate impact. Figures, symbols and simple words are likely to be the most effective. Symbols should be instantly recognisable as representing images seen and activities undertaken in everyday life.

Way finding should be simple, such as tactile, graphic, audible or architectural cues that are easy to follow. Signage should be large and clear. Way-finding maps should be clear, indicate the person's whereabouts in the building or facility, and be free from extraneous information.

(d) Age and size

Accommodating the developing child

It is important to create environments that are safe, accessible and useable for children. Individual components should be safe and useable as age-appropriate. Learning to manage risk is an essential part of a child's development.

Accommodating ageing adults

Life span within the human population is increasing. More and more we expect to maintain an economic and social life within both the public and private domains as we age. However, many human faculties are in decline as we age, such as mobility, dexterity, stamina, strength, hearing, sight, or memory. Familiarity with a particular environment is important.

Diversity of size

The population contains a diversity of sizes and heights, from children, to the diversity in the height of fully-grown adults. The positioning of components and the heights of building elements such as steps should recognise the diversity of height. Increased weight and girth is now also a feature of the population.

Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'.
http://www.cen.eu/cen/Sectors/Sectors/ISSS/About_ISSS/Documents/cclcgd006.pdf

A3 Further Reading

National and international standards and codes of practice

AS 1428.1-2001 Design for access and mobility. General requirements for access – New building work.

AS 1428.2-1992 Design for access and mobility. Enhanced and additional requirements – Buildings and facilities.

AS 1428.3-1992 Design for access and mobility. Requirements for children and adolescents with physical disabilities.

AS 1428.4-2002 Design for access and mobility. Tactile indicators.

BS 4800: 1989 Paint colours for building purposes (whilst the colours in this standard cannot be seen on CD-ROM or online the text can still be used).

BS 5395-1:2000 Stairs, ladders and walkways – Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders.

BS 5588-8:1999 Fire precautions in the design, construction and use of buildings – Part 8: Code of practice for means of escape for disabled people.

BS 5776:1996 (incorporating amendment No.1) Specification for Powered stairlifts

BS 6440:1999 (Incorporating amendment No.1) Powered lifting platforms for useby disabled persons – Code of practice.

BS 6440:1999 Powered lifting platforms for use by disabled persons – Code of practice (partially superseded by BS EN 81-40:2008. The remainder of BS 6440:1999 will eventually be superseded by EN 81-41: 2009 Safety rules for the construction and installation of lifts – Special lifts for the transport of persons and goods – Part 41: Vertical lifting platforms intended for use by persons with impaired mobility).

BS 6465-1:2006+A1:2009 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.

BS 6571-4: 1989 Vehicle parking control equipment – Part 4: Specification for barrier type parking control equipment.

BS 7036-1:1996 Code of practice for Safety at powered doors for pedestrian use – Part 1. General.

BS 7036-4:1996 Code of practice for Safety at powered doors for pedestrian use – Part 4. Low energy swing doors.

BS 7997:2003 Products for tactile paving surface indicators – Specification.

BS 8300:2009 (Incorporating amendment No.1) Design of buildings and their approaches to meet the needs of disabled people – Code of practice.

BS 8493:2008 (+A1:2010): Light reflectance value (LRV) of a surface – Method of test.

BS 8501:2002 Graphic symbols and signs – Public information symbols (AMD 16897).

BS EN 115:1995 Safety rules for the construction and installation of escalators and moving walkways.

BS EN 15838:2009 Customer contact centres, Requirements for service provision.

BS EN81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passengers lifts – Part 70: Accessibility to lifts for persons including persons with disability.

Building Regulations (Part M Amendment) Regulations 2010 (S.I. No. 513 of 2010).

Citizens Information Board – Accessible information for all (2009).

DD 266:2007 (Draft for Development) Design of accessible housing – Lifetime home – Code of practice.

I.S. EN 1991-1-1:2002 – Eurocode 1: Actions on structures Part 1-1: General actions – densities, self weight, imposed loads for buildings (including Irish National Annex: 2005).

I.S. EN 81-1: 1999 Safety rules for the construction and installation of lifts – electric lifts (Amd 1) (+A3:2009).

I.S. EN 81-2:1999 Safety rules for the construction and installation of lifts – hydraulic lifts (Amd 1) (+A3:2009).

I.S. EN 81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passenger lifts. Accessibility to lifts for persons including persons with disability (Amd A1:2005).

I.S. EN 997:2003 (+A1:2006) WC pans and WC suites with integral trap (AMD Corrigendum 14805) (AMD 16965).

IEC 60118-4:2006 Electroacoustics. Hearing aids. Induction loop systems for hearing aid purposes. Magnetic field strength (ISBN 978 0 580 50047 3).

International standard for Induction loops. IEC 60118-4.

Irish Code of Practice on Accessibility of Public Services and Information Provided by Public Bodies www.nda.ie/website/nda/cntmgmtnew.nsf/0/3DB134DF72E1846A8025710F0040BF3D/$File/finaldrcode_nda.htm

Key cards should conform to EN 1332. For further information on key cards please see: http://www.universaldesign.ie/useandapply/ict/itaccessibilityguidelines/smartcards/guidelines/smartcardguidelines/cards

Lifetime Homes Standard: http://www.lifetimehomes.org.uk

Norwegian Universal design of building standard, 2009.

Passenger Lift Design: The Machinery Directive 2006/42/EC; Lifts should conform to BS 6440.

National and international reference documents

2020 Vision – Sustainable Travel and Transport: Public Consultation Document. Department of Transport.

Bus Based Park and Ride – A Pilot Scheme. A Report to: Dublin Transportation Office. The TAS Partnership Limited, 2002.

City of London 2006 Facility Accessibility Design Standards. London, Canada, 2006 Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Gallaudet DeafSpace Design Guidelines 2010.

Department of Transport & the National Disability Authority Guidelines for Accessible Maritime Passenger Transport http://www.nda.ie/website/nda/cntmgmtnew.nsf/0/45AA46D1F77D7EF2802576DC005C5954?OpenDocument

Department of Transport, UK 'Traffic Signs Manual'.

Dublin City Council (2007) Variation (No. 21) of the Dublin City Development Plan 2005 – 2011. Available from: http://www.dublincity.ie/Planning/DublinCityDevelopmentPlan/VariationstotheDevelopmentPlan/Documents/AdoptedVariationNo21Spec.pdf.

Guidance on the use of tactile paving surfaces. Department for Transport, UK.

Guidelines for an accessible public administration. Towards full participation and equality for people with disability. Office of the Disability Ombudsman, Sweden.

Inclusive Mobility. Department for Transport, UK.

International Best Practices in Universal Design. A Global review. Canadian Human Rights Commission, 2006.

Irish Wheelchair Association: Best Practice Access Guidelines 2010.

Joseph Rowntree Housing Trust.

Parking for disabled people. Department for Transport, UK.

Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Rail Park and Ride Strategy for the Greater Dublin Area. Dublin Transportation Office, 1994.

Regulation of Bus services outside the Greater Dublin Area. Department of Transport.

"Sign Design Guide and Inclusive mobility," Oxley, P. (2003), Inclusive Mobility. Department for Transport, UK. www.mobility-unit.dft.gov.uk

Smarter Travel 'A Sustainable Transport Future' – A New Transport Policy for Ireland 2009 – 2020. Department of Transport.

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Building for Everyone:

A Universal Design Approach

Planning and policy

9

Centre for Excellence in Universal Design

Creating an environment that can be used by all people, regardless of their age, size, disability or ability.

The National Disability Authority's Centre for Excellence in Universal Design has a statutory role to promote the achievement of excellence in universal design in:

- the design of the built and external environment
- product/service design
- information and communications technologies (ICT)
- the development and promotion of standards
- education and professional development
- raising awareness of universal design

More information and updates on the website at: www.universaldesign.ie

Building for Everyone

Booklet 9 - Planning and policy

The other booklets from the
Building for Everyone series:

Booklet 1 - External environment and approach

Booklet 2 - Entrances and horizontal circulation

Booklet 3 - Vertical circulation

Booklet 4 - Internal environment and services

Booklet 5 - Sanitary facilities

Booklet 6 - Facilities in buildings

Booklet 7 - Building types

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9.0 Objectives

The guidance in this booklet promotes the concept and philosophy of universal design and encourages developers, designers, builders and building managers to be innovative and think creatively about solutions that meet the needs of all building users.

The objectives of the series of booklets are to:

- identify and promote best practice with regard to universal design of the built and external environment
- provide best practice guidelines while recognising existing regulations in Ireland
- provide guidelines that are usable by and accessible to the target audience
- promote the achievement of universal design in Ireland

This booklet aims to:

- clearly demonstrate how the concept of universal design can add value to the planning process in Ireland
- provide guidance, information and examples of good practice, signposting other relevant literature and useful contacts
- explain the role of planning authorities in delivering universally designed environments, and
- explain how the approach to consultation could be improved in support of these processes

9.1 Introduction

This booklet is part of the series "Building for Everyone – A universal design Approach," which aims to provide practical guidance on the universal design of buildings, places and facilities.

Universal design places human diversity at the heart of the design process so that buildings and environments can be designed to meet the needs of all users. It therefore covers all persons regardless of their age or size and those who have any particular physical, sensory, mental health or intellectual ability or disability. It is about achieving good design so that people can access, use, and understand the environment to the greatest extent and in the most independent and natural manner possible, without the need for adaptations or specialised solutions (see full definition in **Appendix A1**).

Why universal design?

People are diverse - some are left-handed and some right-handed - and vary in their age, size and functional capacities. Illness or disability (whether temporary or permanent) can also affect characteristics such as a person's mobility, dexterity, reach, balance, strength, stamina, sight, hearing, speech, touch, knowledge, understanding, memory, or sense of direction. A reference list with these booklets indicates some of the key differences in human abilities that should guide the design of buildings and of outdoor places. (See full description of Human Abilities in **Appendix A2**).

People of diverse abilities should be able to use buildings and places comfortably and safely, as far as possible without special assistance. People should be able to find their way easily, understand how to use building facilities such as intercoms or lifts, and know what is a pedestrian facility, and know where they may encounter traffic.

Given the wide diversity of the population, a universal design approach, which caters for the broadest range of users from the outset, can result in buildings and places that can be used and enjoyed by everyone. That approach eliminates or reduces the need for expensive changes or retro fits to meet the needs of particular groups at a later stage.

It is good practice to ascertain the needs of the range of expected users as early as possible, and to check the practicality and usability of emerging designs with a diverse user panel.

Designing for one group can result in solutions that address the needs of many others. For example:

- level entry (Step-free) entrances facilitate not just wheelchair users but also people with buggies; people with suitcases or shopping trolleys; people using walking or mobility aids; and people with visual difficulties
- larger toilet compartments provide easier access to wheelchair users; those with luggage or parcels; parents with pushchairs or accompanying small children; those using walking or mobility aids; and larger-sized people
- clear, well-placed signage that uses recognised symbols or pictograms helps people with reading or cognitive difficulties, and those whose first language is neither English nor Irish

Sometimes one solution will not suit all and a range of options will need to be provided. For example:

- providing both steps and a ramp where there is a change in level
- providing parking ticket machines that offer slots at different heights to facilitate use at standing height, sitting height, and by people of small stature

This series of booklets is for architects, engineers, planners, developers, designers, building contractors, building workers, building managers and others involved in designing, commissioning and managing buildings and their surroundings. It provides guidance on a universal design approach to all new buildings, and the use and adaptation of existing environments.

Those who commission, design, construct or manage any part of the built and made environment also have a duty of care to adhere to relevant legislation and regulations including equality legislation, building regulations and health and safety regulations.

The guidance is based on a best practice approach, drawing on up-to-date international best practice, guidelines and standards; previous guidance by the National Disability Authority; and extends beyond disability access matters to incorporate a universal design approach. The series is fully compatible with Part M (2010) of the Building Regulations and associated Technical Guidance Documents related to Part M.

A disability access certificate is required for new buildings other than dwellings (including apartment buildings) and certain other works (as set out in Article 20 D (1) of SI 351 of 2009) to which the Requirements of Part M of the Building Regulations apply, which commence or take place on or after 1 January 2012. Further details on these and other relevant standards, codes of practice, and professional codes of practice are listed in **Appendix A3** Further Reading.

The detailed guidance provided here does not represent the only possible solution. Designers may come up with other ways to meet a diversity of users. New materials and technologies that emerge may open up further possibilities of accommodating the diversity of the population.

Checklists are provided throughout the series and while they provide a summary of main considerations and technical criteria, they should not be regarded as a substitute for the main text or an exhaustive list.

A comprehensive **index** is also available for the suite of booklets.

The Building for Everyone series is available online at **www.nda.ie** and **www.universaldesign.ie**. Electronic links are provided to relevant sections in the different booklets. As standards and requirements develop, the electronic versions of these booklets will be updated.

The electronic version is produced in accessible PDF format, in accordance with the Web Content Access Guidelines 2.0. If you have any difficulties in this regard or require the document, or particular sections, in alternative formats, please contact the Centre for Excellence in universal design at the National Disability Authority, **info@ceud.ie** or (01) 6080400.

The purpose of this guidance booklet is twofold. Firstly, it aims to provide the planning profession in Ireland with greater awareness of the value of universal design in shaping of our built and natural environment. Secondly, it aims to provide guidance on how to deliver, promote and achieve universal design within the planning system. It demonstrates how universal design can be integrated into the planning process through careful consideration of the context and place, and well-drafted policies in conjunction with a collaborative approach to design.

Whilst this booklet features project examples, it does not provide technical guidance on design specifications. Technical guidance on design specifications can be obtained from other booklets in the Building for Everyone series, which are referred to throughout this document.

9.2 Terminology

Accessible – Facilities that are designed to be accessible and understandable to all users of a building or external environment.

Building – A permanent or temporary structure of any size that accommodates facilities to which people have access.

Building user – A person regardless of age, size, ability or disability using facilities in a building or associated external environment.

Settlement hierarchy –A way of arranging settlements into a hierarchy based upon their population or some other criteria

Speed Tables – Traffic calming feature normally installed as part of a traffic calming scheme that helps to reduce vehicle speeds by introducing modest up-and-down changes in the level of the street, thereby requiring drivers to decelerate. They are the same width as the road and rise to meet the grade of the pavement, providing safe and comfortable crossings. One benefit of speed tables is that people cross at the point where drivers decrease speed.

9.3 Why is Universal Design Important for Planning

9.3.1 The importance of universal design

Universal Design is a philosophy as much as a design code. It is a way of thinking, a mindset that is fully inclusive of all aspects of what the Planning and Development Act 2000 refers to as 'proper planning and sustainable development'. It involves a considered approach to place making based on an integrated assessment and understanding of the context and user needs. Universal Design permeates the principles that underpin our national and regional planning priorities and can therefore add value at all levels in our planning system creating responsive, functional, inclusive and sustainable cities and towns.

9.3.2 Universal design in Ireland

Estimates of the proportion of people with a disability in Ireland range from 9.3% (Census 2006) to 17-20% (National Disability Survey 2006). The proportion of the population in older age groups is rising, and the incidence of disability rises with age. Maintaining functional capacity over the life course in increasingly important. While there are no statistics covering size at the moment there is evidence of a significant increase in the levels of obesity.

In Ireland, sustained economic growth and development has expanded the urban capacity of our towns and cities. Whilst there have been some well-considered development plans and strategies delivered, the majority have resulted in environments that are difficult for someone who is not able-bodied or not a car driver. The implications of poor design are the creation of extensive suburbs with little or no access to public transport, inadequate supporting community facilities. The result is a built environment that is frequently characterless and designed in a way that fails to recognise or meet the needs of all of its users and their changing needs over time. The intention of this booklet is to guide on all considerations and to improve all aspects of planning.

9.3.3 Universal design is important for planning for the following reasons

- It helps us avoid bad development and help us to deliver genuinely sustainable solutions for communities
- It helps us to create better places - for all abilities and all age groups - equitable, inclusive, participative and accessible
- It avoids the need for wasteful and inefficient retro-fitting of solutions, as a these matters should be considered at the outset of the design process
- It informs genuinely integrated strategies for land-use, transportation and urban design
- It creates greater efficiencies for public infrastructure investment and produces better economic development models
- It widens the audience and market for well considered development projects enhancing commercial viability
- It helps provide an environment in which people can age and retain their independence

Image 9.1. Example of crossing point.

9.4 Development Plans

9.4.1 Introduction

The principles of universal design should be considered at every level of planning, from macro-level strategic planning and the National Spatial Strategy (NSS), to Regional Planning Guidelines (RPG), to Development Plans, Area Plans and development control. Departmental officials and Ministers develop overall strategy, regional planning bodies develop regional guidance, local authority officials, and councillors prepare development plans and area plans, and local planners apply development control.

Incorporating these universal design principles at each level of planning can make for a hierarchy of settlements that accommodate a range of services and facilities that are accessible to all.

It is also important to incorporate universal design principles into service planning, for example for housing, shopping or transport. An integrated approach can deliver more sustainable solutions.

The focus of this booklet is at the operational level of the planning system, which consists of:

- making development plans and local plans
- implementing the plan through planning permission (unless exempted)
- planning enforcement

In addition, the regional authorities have responsibility for drawing up and implementing Regional Planning Guidelines (RPGs) to support strategies for regional development.

The implementation of the physical planning system in Ireland is the responsibility of the local planning authorities, in other words, local councils. At this level, the planning system primarily consists of the preparation of a development plan, development control (i.e. the planning application process) and enforcement.

Table 9.1 Roles of planning authority and public in Irish planning		
Aspect	**Planning Authority - (Primary Role)**	**Role of Public**
Development Plan	Elected members	Consultation - public must be consulted before the plan is adopted
Development Control (planning application / permission process)	Manager	Comments and objections: individuals are entitled to comment on / disagree with development proposals at planning application stage. Individuals may also appeal decisions to An Bord Pleanála
Enforcement	Manager	Objections - individuals can notify the local authority about, or take action through the courts against, unauthorised development

9.4.1.1 Development plans and local plans

The Development Plan contains the objectives and plans for land use and management in the Council's functional area. It consists of a Written Statement and maps which set out the zoning for different areas. The Development Plan guides decisions on planning applications. Local Plans may set out detailed objectives for a smaller area, such as a particular town or city district, or a developing area.

9.4.1.2 Development control

All development, unless specifically exempted, needs planning permission before the development proceeds. Dealing with planning applications is called Development Control. This requires all development proposals (such as proposals to build on or change the use of land) to be checked against the policies and objectives specified in the Development Plan to ensure that the proposal conforms to the aims and intentions set out in the plan.

9.4.1.3 Enforcement

Planning Enforcement is in effect this is the policing aspect of planning, and may cover new building, extensions or alterations, and changes of use. Enforcement involves checking that all development actions, have obtained planning permission and are therefore legal or authorised, and taking appropriate action where there are breaches.

9.4.2 Consultation on the content and scope of plans

Development plans should reflect the needs and issues of an area and help to initiate the design process from the bottom up. Primarily, the objective of the plan should be to ensure that places function appropriately in the context of the needs of all members of that community.

In producing plans in a transparent and inclusive manner, consultation should span the diversity of the community to which the plan applies, both at the start of the plan making process and at the various stages of the review. Good practice community involvement embraces a wide range of activities guided by the purpose for which the consultation is being undertaken and who is being consulted. Different methods and techniques should therefore be considered according to different sections of the population.

The approach to consultation within the planning process should focus on information and participation.

Information – providing information in a timely and accessible way

Participation – listening to and helping people to express their views at the proper time and in the proper forum at a point where these views can be taken on board.

Effective consultation with representative groups, their advocates and local access officers (see **Section 9.5.4**) is important so the plan or proposal is centred on user needs. Existing networks that represent the interests and concerns of groups within the community provide a means of obtaining a range of perspectives and can provide guidance on the most appropriate consultation methods in addition to providing access to existing guidance on a particular aspect of the built environment.

In providing opportunities for participation, specific types of consultation methods, such as focus groups or work shops, should be considered for smaller numbers of people. These approaches can deliver a more effective means of providing information and enabling feedback. More generally, for all consultation exercises, information and documents should be provided in accessible locations, at convenient times and in formats that allow scalability to larger print. **Table 9.2** sets out key questions applicable to consultation on development plans.

Table 9.2 Key questions for consultation on development plans
Has consideration been given to all sections of the community during the development plan consultation?
Have adequate measures been used to engage with 'hard to reach groups'?
Has contact been made with representative organisations?
Have public consultation events been organised at accessible locations?
Is plan documentation available at accessible locations and in accessible formats?

9.4.3 Consultation events

The format of consultation events should reflect the needs of all potential key stakeholders. The level of preparation will depend on the type of meeting or event being catered for, and in the case of open meetings, early consideration of participants' needs, which can allow for effective adjustments to be made, will be required. Specific considerations relating to appropriate venue attributes are set out in the Venue Checklist included in **Appendix 7**.

It is important also to ensure awareness of participants' needs. For example the National Disability Authority's (NDA) *Ask Me: Guidelines for Effective Consultation with People with Disabilities* contains advice on consultation with people with disabilities in addition to dealing with the traditional barriers to effective consultation.

9.4.4 Content of development plan

Appropriate universal design policies and objectives tailored to meet the particular needs of an area should be included at all levels of the development plan. Both the written statement and zoning objectives map provide opportunities to incorporate universal design principles within the development plan.

In preparing the written statement, an understanding of the needs of the community will also emerge from analysis of relevant studies and evidence. Planners should be aware of the role that these studies, such as social infrastructure audits, can play in creating more supportive and universally designed environments. Social infrastructure audits identify the provision of social, community and recreational infrastructure in a defined area. Through an assessment of the current and future infrastructure needs which the policies in the written statement can address.

Within the planning policy framework there is an increasing emphasis on design and the role that good design guidance can play in creating successful places. A range of urban design principles are already established as part of the *Urban Design Manual, A Best Practice Guide*. A successful place depends on the consideration of a diverse range of human needs as well as the established range of urban design concerns. Principles of universal design should underpin and be integrated with urban design policies and guidance incorporated into development plans.

Design as a process is just as integral to the qualities of the finished product as the policy framework. Policies and objectives should therefore introduce procedural considerations that promote familiarisation with and implementation of universal design practice. These considerations can include

- Policies that demonstrate universal design considerations with respect to a particular site or area
- Requirements for the planning applicant to have regard to appraisal of universal design issues or other information as is contained within site development briefs
- Requirements for the applicant to produce Access Statements (See **Appendix 6**)

Guidance on incorporating universal design principles into the following thematic sections of the written statement are given detailed consideration in the remaining sections of this chapter:

- Creating universally designed neighbourhoods, the importance of mixed use
- Drafting housing policies
- Drafting transport and movement policies
- Drafting economic development policies
- Drafting retail policies
- Drafting public realm and amenity policies
- Improving wayfinding and signage
- Drafting heritage policies

9.4.5 Creating universally designed neighbourhoods; the importance of mixed use

Mixed-use developments tend to deliver better integrated neighbourhood planning solutions than single-use developments. They can make a positive contribution to the vitality and attractiveness of neighbourhoods, play a role in extending housing choice and promote sustainable modes of transport.

The pattern and density of urban development also has a major influence on travel patterns and Plans should encourage high movement activities and mixed use areas at locations of maximum accessibility to public transport. The concept of mixed use is closely related to that of transport and movement, which is discussed in **Section 9.4.11**.

Development plan zoning objectives can enable a mix of uses and activities on an area basis. One example of this approach is demonstrated by the Adamstown Strategic Development Zone (SDZ), South County Dublin highlighted in **Image 9.2**. The Adamstown Planning Scheme, 2003 (as amended by variation), sets out a policy framework that has delivered an integrated mix of uses at neighbourhood scale. Please see www.adamstown.ie for further information.

The *Adamstown Access for All Strategy* was also developed as a design guide supporting implementation of the SDZ. The Strategy promotes the provision of adequate pedestrian facilities to provide ease of movement for people including those with disabilities, children, families, older persons, people with mobility difficulties and the design and provision of accessible car parking facilities and associated infrastructure. It was developed through consultation with representative groups and provides a useful mechanism for delivering inclusive access and universal design objectives.

9.4.6 Neighbourhood planning

Image 9.2 Adamstown strategic development zone.

Demonstrates universal design by:

- providing amenities, employment and services that meet design requirements to allow people of all ages, sizes, abilities and disabilities to work, shop and enjoy recreation locally or to travel with ease.
- facilitating a mix of house types, sizes and tenures that will allow all sections of society to remain part of the community and use its facilities throughout the lifecycles.
- providing alternatives to the private car through the provision of infrastructure to include transport interchange, dedicated bus routes, a network of pedestrian and cycle links and the provision of seating for people to rest at appropriate intervals.
- being close to public transport and local services.
- including grade densities.
- incorporating permeable pedestrian and cycling environment.
- providing accessible open space for all kinds of activity.
- overcoming the issue in many housing estates of the design and provision of cul-de-sacs making distances to bus stops / shops very long for older people and people with mobility difficulties.

Given the advantages of mixed use neighbourhoods in terms of the proximity of facilities and services that can meet people's day to day needs, managing the overall quality of these areas should focus on maintaining viability, enhancing permeability and improving the quality of pedestrian routes and spaces.

Incorporating community facilities within neighbourhood centres and mixed use areas is also an essential part of neighbourhood planning. Delivering these facilities can provide the opportunity to address universal design principles. This is demonstrated by the Primary Care Centre shown in **Image 9.3**, which among other features, incorporates level access and provides necessary pictorial, verbal, tactile information to enable safe and comfortable use for all.

9.4.7 Community facilities

Image 9.3 An example of community facilities at a primary care centre

Demonstrates universal design by:

- incorporating setting down points.
- ensuring level access from the street that is suitable for wheelchairs and buggies.
- installing a series of counters at different heights.
- using an automatic door.
- locating fixtures and fittings at suitable heights.
- using colour contrast.
- providing signage for orientation and guidance and includes Braille notation.
- fitting a number of hearing loops.

9.4.8 Policy statements on housing

The aim for all new housing and, wherever possible, housing conversions and refurbishments should be to deliver homes that are universally designed and easily adapted to meet the changing needs of occupants over time. This will provide greater choice in terms of where they live, and will enable people to remain in their own homes as their needs change. By incorporating features into dwellings that enable adaptation, and with careful consideration as to the layout and provision of adequate space for people to manoeuvre, dwellings will be convenient for as broad a range of households and visitors as possible.

The *Sustainable Residential Development in Urban Areas Guidelines*, refer to the importance of universal design and state that the development of sustainable neighbourhoods should be guided by 'considering people's diverse needs and abilities throughout the design process, which reflects the life cycle approach, and environments that meet the needs of all can be achieved.'

With regard to access to and within buildings, the Guidelines advocate adaptability, stating that 'Circulation within housing layouts, including access to individual buildings, should have regard to the varying needs of occupants over their lifetimes, including needs associated with mobility difficulties and the normal frailty associated with old age.'

The *Urban Design Manual* accompanying the Guidelines (DoEHLG, 2009), refers to 'inclusivity' and 'adaptability' among a number of criteria that are designed to be used at pre-application meetings, in the assessment of planning applications and at appeals. **Tables 9.3** and **9.4** list relevant indicators with respect to these criteria which can assist in evaluating residential proposals in these terms.

Table 9.3 Indicators of inclusivity
Inclusivity - How easily can people use and access the development?
New homes meet the needs of a range of people and households.
Design and layout enable easy access and use by all.
There is a range of public, communal and / or private amenity spaces and facilities for children of different ages, parents, people with disabilities and older people.
Areas defined as public open space that have either been taken in charge or privately managed will be clearly defined, accessible, useable and open to all.
New buildings present a positive aspect by avoiding unnecessary barriers.

Table 9.4 Indicators of adaptability
Inclusivity - How easily can people use, and access the development now and in the future?
Designs demonstrate good practice lessons, such as the knowledge that certain house types are proven to be ideal for adaptation.
The homes are energy-efficient and equipped for challenges anticipated from a changing climate.
Homes can be extended without ruining the character of the types, layout and outdoor space.
The structure of the home and its loose fit design allows for adaptation and subdivision, such as the creation of an annex or small office.
Space in the roof or garage can be easily converted into living accommodation.

9.4.9 Promoting lifetime homes

The concept of lifetime homes was developed by the Joseph Rowntree Foundation (**See Appendix A5**). It proposed 16 design criteria ranging from car parking width, approaching gradients, entrances, bathroom layouts etc., which have been successfully incorporated into a number of new homes, particularly in the UK.

Examples of Irish guidance and policy documents where the concept of "Lifetime Homes" is increasingly being acknowledged includes *Variation No. 21 of the Dublin City Development Plan 2005 – 2011* which refers to the need for universal design techniques to be implemented as a pre-requisite to an inclusive society. The Variation acknowledges international best practice regarding adaptable and lifetime homes and states the Council will attempt to encourage and implement such standards with regard to access.

The *Wexford County Development Plan 2007 – 2013* also incorporates an approach to addressing accessibility and housing for all and highlights the importance of providing 'lifetime homes'. Standards within the plan require at least 20% of dwellings in new housing estates of 10 dwellings or more to be adaptable to providing accommodation for people with disabilities. The plan also sets out technical standards for the design of such dwellings.

9.4.9.1 New draft Lifetime Homes standard under development in the UK

'Lifetime Home, Code of Practice - DD 266: 2007 Design of Accessible Housing' is a 'Draft for Development' that is based on work by the British Standards Institution (BSI). It extends the thinking behind Lifetime Homes by providing a regulatory framework that can be applied to all new housing development in the same manner as Part M of the Building Regulations does in Ireland. It is important to note that the publication of DD 266 does not render the applicability of the concept of lifetime homes redundant as the illustrative nature of the sixteen point criteria is the first step in embracing the concept of adaptable homes.

The publication of DD266 extends the work on lifetime homes initiated by the Joseph Rowntree Foundation with its 16 key design elements (See **Appendix A5**).

9.4.10 Sample housing policy text

The following model text is suggested for inclusion in the housing chapter of the written statement of development plans. Housing development should be delivered as part of a neighbourhood planning approach that integrates land use and movement. Proposed housing should be located within walking distance of public transport facilities and essential local services. All new housing, housing conversions and refurbishments where possible should be Universally Designed for all regardless of age, size, ability or disability and designed to meet the changing needs of occupants. For applications for more than five units, proposals should be required to demonstrate:

- a mix of tenures
- useable and accessible play for all
- safe and direct links to nearby schools and neighbourhood centres
- units that are designed to lifetime homes standards
- legibility and sense of place
- integrated local services, where required
- consideration of Home Zones, where appropriate and safe for vulnerable road users. See **Section 9.4.25** Residential streets – home zones

Where duplex housing is included within the unit mix, provision should be made for people with mobility difficulties through the provision of accessible and adaptable habitable rooms at ground level.

9.4.11 Policy statements on transport and movement

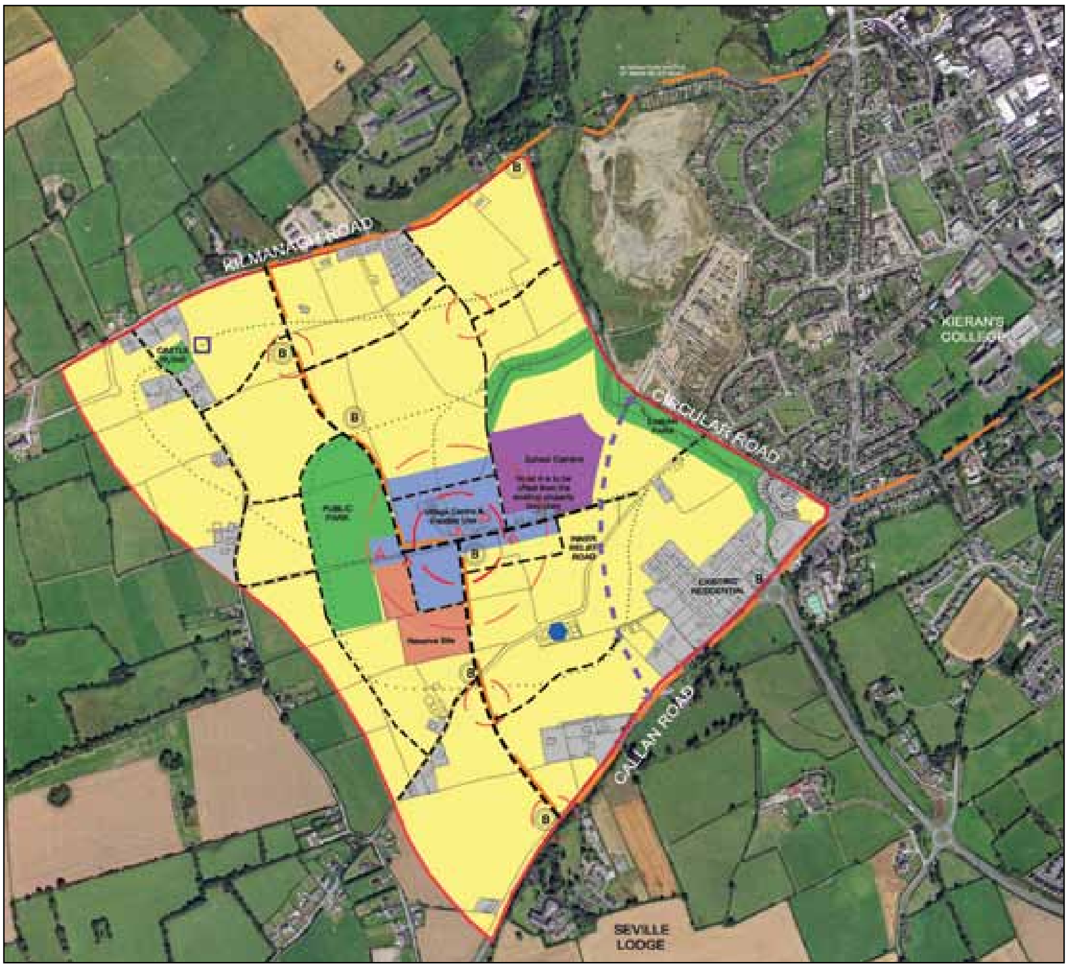
Well-planned environments should have easy access to public and private transport systems, and transport points such as bus stops should be within easy distance for people. Universal design is not just about access to individual buildings, it is about how easily people can get around and to where they want to go. Key factors in creating an accessible environment are the location of services and of good transport links. Safe routes between key places that are designed to be easy to use by all individuals are another essential feature.

Inadequacies in transport provision (either in terms of access to the system itself or the level of service provided by the system) may create barriers that limit individuals and groups from fully participating in a range of activities, such as employment, education, health care and shopping. The loss or lack of mobility can also cause isolation and reduce an individual's independence, which can lead to poor health.

There are also sections within the community that may not have access to a car, so local services and a public transport system that is appropriately designed, needs to be provided in close proximity to homes. Universal design planning can play an important role at the strategic scale in assessing systematically the distances from neighbourhoods to places of work, healthcare facilities, education, convenience retailing and social facilities.

A good example of the integration of public transport infrastructure in layout and design is demonstrated by the *Kilkenny Western Environs Local Area Plan 2004* (**Image 9.4**), which considers access to public transport infrastructure and walking distances. *The Craughwell Local Area Plan 2009 -2015* (Galway County Council) also considers walking distances and identifies three walkbands in the village; a 200m and a 400m Village Core Walkband and a 200m Train Station Walkband. Policies within the plan seek to promote development and community facilities within these walkbands to ensure that these developments are accessible.

Image 9.4 Sustainable neighbourhood planning Kilkenny Western Environs local area plan.



9.4.12 Travel chain analysis

In assessing whether an urban environment is universally designed or accessible, the complete travel chain should be considered. At the macro level this would include:

- an individual's house
- the street
- access to the public transportation network
- provision within the vehicle itself
- the drop off point
- the destination building
- the interior of the destination building
- infrastructure - paths and the distance to transport points
- the room within which the intended function would take place.

At the micro level or in considering the universal design of the destination building within this network, this would include the:

- drop-off point
- approach
- entrance
- reception information
- lift or escalator or staircase
- upper lift lobby
- corridor
- internal door
- room
- Iitended function
- toilet
- return route
- exit

It is important that all elements of the travel chain are consistently accessible and easy to plan and follow for a journey to be possible. Route assessments, including consideration of the quality of the routes and distances between points in the travel chain, can be useful in establishing whether elements of the chain are inconsistent or poor. In assessing appropriate locations for seating, rest areas and designated parking areas, reference should be made to the recommended maximum distances without a rest included in **Table 9.5**.

Table 9.5 Recommended maximum distances without a rest

Mobility difficulties	**Distance (Metres)**
People with visual difficulties	150
Wheelchair users	150
People with ambulatory difficulties without walking aid	100
People using walking aid, e.g. Walking stick	50

9.4.13 Street design (road and footpath layout)

Road and footpath layout makes an important contribution to the creation of universally designed environments. In considering the approach to their design, reference should be made to the *Manual for Streets* (Department of Transport, UK, 2007), which recommends the consideration of:

- a user hierarchy which focuses on the needs of pedestrians
- the needs of people of all ages and abilities
- desire lines within movement networks
- the use of quality audits systems which demonstrate how designs meet objectives for the area

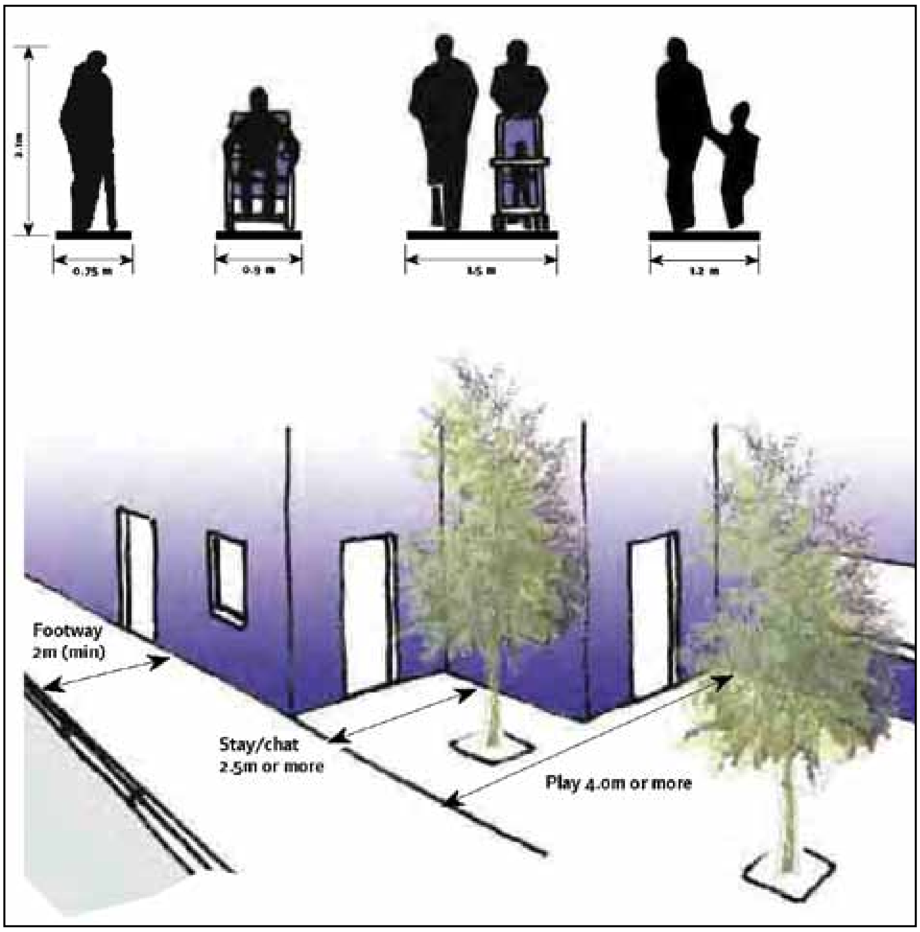
During the analysis of movement patterns within existing urban areas, provision for pedestrian users as part of this hierarchy should include:

- reducing traffic volumes
- traffic speed reduction

- re-allocation of road space to pedestrians
- provision of direct access at grade crossings (e.g. Dished footpaths)
- improved pedestrian routes on existing desire lines
- new pedestrian alignment or grade separation

The provision of appropriate footpath widths is particularly important in meeting needs of pedestrian users. **Figure 9.1** illustrates the recommended design parameters for footpaths and the provision of a minimum unobstructed width of two metres, from *Manual for streets* (UK) (MfS). Additional space should be considered where there is heavily trafficked streets, adjacent uses such as schools and shops and areas of high pedestrian flow.

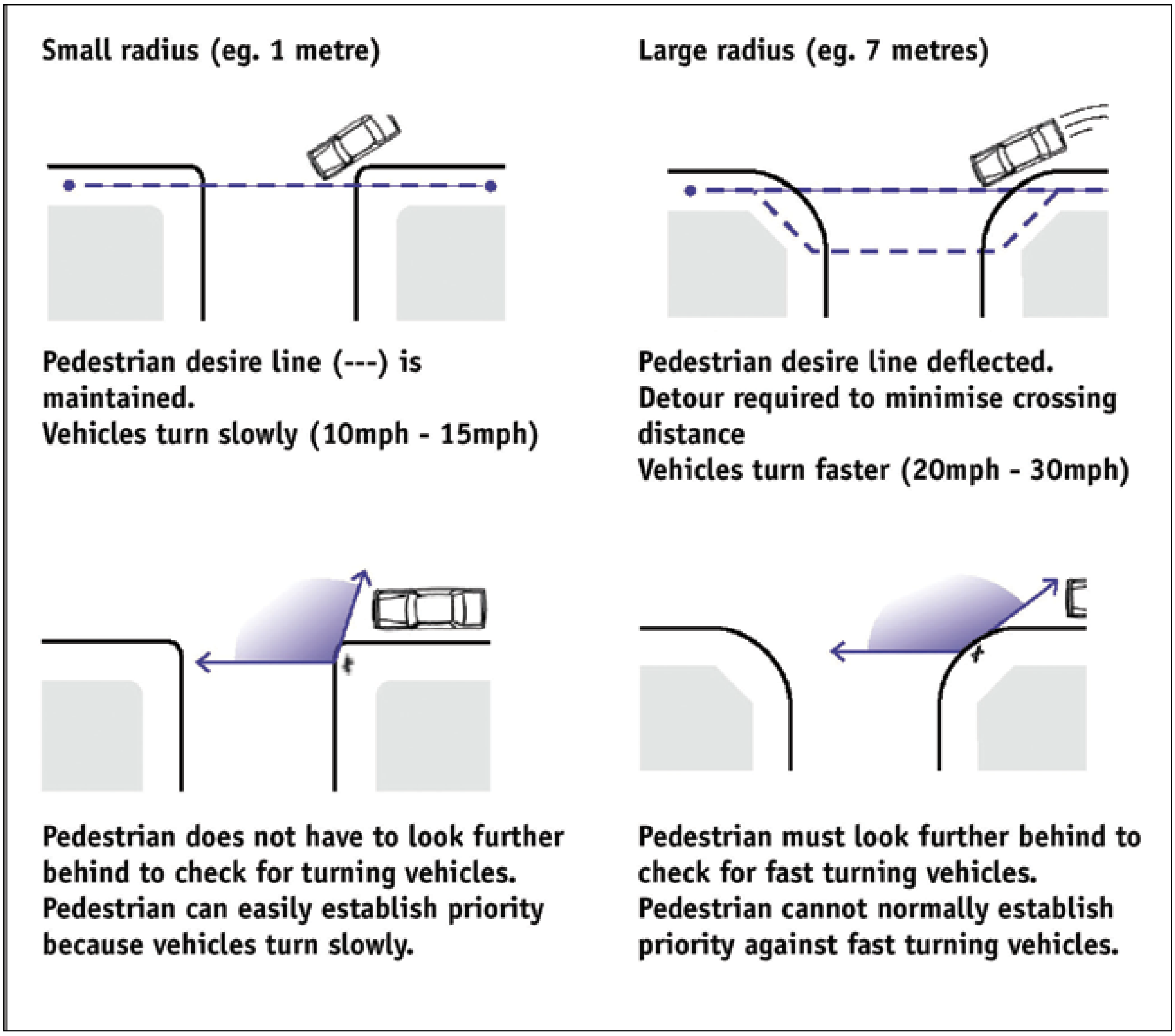
Figure 9.1 Footpaths and Pedestrian Areas (MfS, 2007).



The quality of pedestrian routes can also be improved by maintaining pedestrian desire lines at side-road junctions. The size of corner radii as shown in **Figure 9.2** can either help or hinder pedestrian movement in this regard. In the case of smaller corner radii, these can help to minimise the need for pedestrians to deviate from their desire line and shorten the journey to cross the road. For crossings, designers should avoid curved sections of kerbing as this can make it difficult for people with visual difficulties to orientate themselves before crossing. Matched dished kerbs at crossing points should be located at the opposite side of the road to enable users to cross the road efficiently and safely. The timing of pedestrian lights are important as some lights change immediately making it impossible for older people or people with mobility difficulties to cross the road safely.

Further information on universally designed pedestrian environments and transport infrastructure can be found within **Booklet 1: External environment and approach, Section 1.5**.

Figure 9.2 The effects of corner radii on pedestrians (MFS, 2007).



9.4.14 Car parking and set-down spaces

Provision of adequate and nearby car parking and set-down spaces is essential to ensuring accessibility to residential developments, town centres, recreational areas and other visitor locations. Within schemes, dedicated accessible car parking should ideally be located within 50 metres (*Inclusive Design*, Department of Transport (UK), 2005) of the facilities served by the car park or with reference to distance standards in **Table 9.5**. For designated accessible car parking spaces arranged either in a perpendicular or parallel layout to the path or pavement, sufficient space for a person to alight from a car and move safely around parked vehicles to an accessible pedestrian route should also be included.

Booklet 1: External environment and approach, Section 1.4.1 provides guidance on standards for the provision of accessible car parking. The guidance advocates the provision of four spaces in every 100, and one space for every 100 after for buildings not normally visited by the public. For buildings that the public are likely to visit the following standards should apply:

- 1 space within 5 – 25 spaces
- 3 spaces within 25 – 50 spaces
- 4 spaces within 50- 75 spaces
- 5 spaces within 75 – 100 spaces
- 3 spaces per 100 thereafter

A review of car parking standards in a sample of development plans spanning 2010 was undertaken to illustrate the application of standards in development plans. The survey found that the requirement for the provision of accessible car parking spaces ranged from 2% to 10% (**See Table 9.6**). A majority of the surveyed plans calculated the requirement as a percentage of the total car parking provision with additional policies relating to the location of spaces for people with disabilities. The Galway County Development Plan, as highlighted in **Table 9.6**, has incorporated the NDA recommended standard for accessible car parking.

Table 9.6 A sample review of car parking standards within development plans	
Development plans	**Requirements**
Roscommon County Development Plan 2008 – 2014.	2 – 5% of total car parking provision.
Dublin City Development Plan 2005 – 2011.	4% of total car parking provision.
Dun Laoghaire Rathdown Development Plan 2009 – 2015.	4% of total car parking provision.
Cork City Development Plan 2009 – 2015.	5% of total car parking provision.
Louth County Development 2009 – 2016.	10% of total car parking provision.
Galway County Development Plan 2009 – 2015.	1 space within 5 – 25 spaces.
	3 spaces within 25 – 50 spaces.
	4 spaces within 50 – 75 spaces.
	5 spaces within 75 – 100 spaces.
	3 spaces per 100 thereafter.

In cities and areas of high public transport accessible car parking facilities should be provided at a minimum standard of 5% or 6% of the overall provision. The number of spaces may need to be greater at facilities that specialise in accommodating people with disabilities.

9.4.15 Sample transport policy text

Planning has a significant role in promoting universal design as it seeks to influence the broad patterns of settlement and travel movement, and ensures that key services are sited in the most accessible and useable areas. Density, distance from facilities, and viability of public transport are all related. Proposals for new development are required to:

- ensure a reasonable choice of access by all modes of transport to new development
- provide opportunities for people to walk or cycle for work or leisure purposes
- consider and improve road safety with priority given for vulnerable road users including people with disabilities, children, older people and all other pedestrians and cyclists
- minimise the level of traffic growth and congestion on the strategic and local road network

9.4.16 Policy statement on economic development

Universally designed business environments will benefit both employees and employers by creating better work environments. A universal design approach can also help to satisfy legal requirements under the Equality Acts, by meeting the needs of customers and employees with disabilities. These acts have legal requirements preventing discrimination in the provision of goods and services to customers with disabilities, and preventing discrimination against employment of people with disabilities. Businesses are required to reasonably accommodate staff or customers with disabilities.

Detailed design considerations with respect to employment related development should ensure that there are accessible routes of travel, particularly from arrival points to the building entrance. The design of the internal environment should have regard to **Booklets 2** to **7** in addressing visual and auditory information, lighting, storage, seating and work space layout.

Waterford Institute of Technology, Health Science Building (**Image 9.5** incorporates a number of universal design features including automatic doors, wheelchair and stroller accessible entrances, designated parking areas and suitable routes for horizontal and vertical circulation. As an example of best practice, Waterford Institute of Technology also received the Environmental Accessibility Award for demonstrating commitment to employing people with disabilities.

Image 9.5 Example of access routes within a health science building. Note: No tactile strip at base of steps, the lack of contrasting nosings on the stairs and the general lack of colour contrast within this area.

9.4.17 Sample economic development policy text

The council will facilitate economic development that provides employment opportunities to all members of society including those of any age, size, ability or disability. To achieve this, it is the policy of the planning authority to:

- facilitate the provision of employment opportunities at strategic locations, working in partnership with development and employment agencies
- promote sustainable economic development within the administrative area along strategic public transport corridors
- support the re-use of brownfield sites that can demonstrate existing high levels of accessibility and connectivity and promote these locations for office based employment as part of mixed use development
- ensure consideration of needs for accessible and useable building and facilities is built-in from the outset through a universal design approach

- encourage the preparation of mobility management plans for employees' home to work transportation. The Design should take account of transport arrangements for the diversity of users
- in association with other agencies, community and voluntary groups encourage the development of community based enterprises, cooperatives, enterprise centres and starter units of a range of sizes for new and expanding businesses and firms and
- encourage the development of live-work units as part of mixed use developments where such accommodation can be provided without detriment to the amenities of adjoining residents

Image 9.6 Example of a sports centre.

9.4.18 Retail policy statements

Retail environments have a role to play in allowing people to meet their daily shopping needs and food requirements independent of access to private transport. *The Retail Planning Guidelines* (DoEHLG, 2005) acknowledge the role local convenience retail has in meeting the needs of older people, people with disabilities, and those who are poorly served by public transport and have no access to a car. Retail strategies and subsequent development plan policies provide a framework for ensuring that the vitality and viability of towns is maintained.

Beyond identifying settlements and accessible locations that will be the focus of additional retail provision, in most cases it will also be necessary to improve existing town centre environments. All retail premises and associated areas of the public realm should be universally designed to facilitate equitable access for customers and employees. **Image 9.7** provides a good example of accessible retail environments by providing level access from other areas of the centre, locating in close proximity to public transport facilities and delivering high quality and appropriately used materials.

An audit assessment to examine areas or weakness, and consider the opportunity to improve universal access, can be useful. Examples of such improvements could be:

- the quality and range of public transport facilities
- improving linkages between car parks, public transport facilities and the main shopping area
- the quality and availability of street furniture e.g. seating
- pavement width and removal of clutter
- sufficient and safe provision of pedestrian links and controlled and uncontrolled crossing points
- the provision of pictorial, verbal and tactile wayfinding information
- the setting up of a town centre management initiative whose remit may include the consideration of licensing, discouraging the proliferation of signage and street clutter in addition to managing the quality of paving materials.

Image 9.7 Universally designed retail environments

Demonstrates universal design by:

- using clear and consistent paving.
- incorporating wide pathways.
- ensuring minimal street clutter.
- using blister surfacing for pedestrian crossing points.
- using corduroy hazard warning surfacing.

9.4.19 Universally designed retail environments

In planning retail development, applicants should demonstrate that they are accessible by public transport; promote safety and improved pedestrian movement. They should demonstrate how proposals will improve the town centre's overall attractiveness. A development levy may seek contributions towards resolving transport or access issues, or towards specific improvements as listed in **Section 9.4.11**.

Further guidance on access to the external environment, including pedestrian areas, car parking facilities, setting-down points, and public transport links is provided in **Building for Everyone Booklet 1: External environment and approach**.

9.4.20 Sample retail policy text

The continued promotion of the town centre as the location for new commercial and retail development is consistent with universal design principles in providing facilities at a central easily-reached location. The retail strategy should:

- provide clear guidance on where major new retail floor space would be acceptable, particularly where this can be integrated with public transport provision
- ensure an equitable, efficient and sustainable spatial distribution of main centres across the plan area
- sustain and enhance the vitality and viability of the potential of the district and local centres to provide for daily convenience shopping needs
- encourage and facilitate the preservation and enhancement of the convenience retail role of smaller villages and centres

9.4.21 Public realm and amenity policy statements

The 'public realm' is a collective term for the spaces between buildings where the general public have access. It includes streets, squares, parks and other open spaces and should be designed to be attractive, accessible, understandable and usable for all.

The quality of the public realm in our cities, towns and villages can be a significant factor in the quality of the lives of all people who live and work in them. Public spaces designed with care and implemented with skill engender a sense of pride in a place, enable all persons to use them with ease, may discourage crime, promote healthy living and increase land values. Conversely, poorly conceived public spaces often reinforce negative perceptions of a place, and all too often public realm is overlooked as the left over spaces between buildings.

Achieving the highest standards of design and use of the public realm is an important consideration in the planning and design of urban environments and presents a number of challenges and opportunities relative to universal design.

Image 9.8 Example of a riverfront amenity park and boardwalk that provides equitable access to a high quality and well-designed amenity area.

Image 9.8 Riverfront amenity park and boardwalk

Demonstrates universal design by:

- incorporating clearly defined pathways.
- using minimal visual or physical clutter.
- ensuring level gradient on main pathways.
- ensuring close proximity to and good quality linkages with the town centre.

The provision of safe, legible and well lit routes and spaces adds value to our urban environment, and there is considerable scope to ensure that the public realm continues to evolve in a manner that is genuinely inclusive. While the detailed design and construction of spaces and places will determine their success, planners have a key role in ensuring that the principles of universal design become a material consideration in developments affecting the public realm. Adamstown (See **Image 9.12**) provides a good example of clear and consistent approach to the public realm.

Street furniture and seating that provides resting areas, should be provided at intervals of no more than 50 metres with reference to distances set out in **Table**

9.5. Seating should also be required in commonly used pedestrian areas, bus stops and at transport interchanges. **Building for Everyone Booklet 7: Building Types** provides further guidance regarding the design of public realm including parks and play spaces.

A good example of amenity space incorporating play facilities, seating and rest areas is provided by Chimney Park, Dublin Docklands (**Image 9.9**), which was designed in response to extensive consultation with stakeholders and local groups and includes creative features for all ages.

Image 9.9 Chimney Park.

9.4.22 Improving wayfinding and signage

Legibility is a design concept which makes it easier for people to work out where they are and where they are going. Not only does it minimise the length of journeys by avoiding wrong turns, for some it may make journeys possible to accomplish in the first place. It should considered as part of public realm design and in its simplest form is based on movement relative to fixed points within the environment. Elements such as landmark buildings, natural features, clear sightlines and vistas in conjunction with signage and information contribute towards legibility and perform important functions for wayfinding, particularly for people with cognitive difficulties.

In addition to natural and existing features within the streetscape or landscape, clear and coherent signage should be provided in a way that is accessible and easily understood by all. The appropriate provision of signage in the public realm requires planning control. Planning control is important to ensure the appropriate provision of signage in the public realm from a universal design perspective. Town centre management initiatives may be better positioned to control signage and ensure that their design communicates necessary information effectively to the user, regardless of the user's abilities.

Signage should be easily identifiable, clearly legible, distinguishable from its background and consistent in their design. An example of a specific wayfinding system that provides clear and consistent directional information and maps is demonstrated below (See **Image 9.10**).

Image 9.10 Example of wayfinding system.

For vulnerable road users, such as people with mobility or sensory difficulties, audible devices and tactile paving should be used at controlled pedestrian crossings, and tactile paving used at dropped kerbs and to warn of other hazards.

Booklet 4: Internal environment and services provides guidance on the design of effective signage that will help people to navigate both internal and external spaces. For additional information on signage and information provision, please refer to the Sign Design Guide “Sign Design Guide and Inclusive mobility” Oxley, P. (2003) Inclusive Mobility. Department for Transport, UK. www.mobility-unit.dft.gov.uk and Inclusive Mobility.

Booklet 1: External environment and approach and the Traffic Management Guidelines (DOT, 2005) provide detailed information on pedestrian environments and facilities for people with mobility difficulties. Good Practice Guidelines on Accessibility of Streetscapes (LGMSB, March 2009) also includes guidance on the use of tactile paving and the design of crossing points.

Image 9.11 Example of well-designed signage.

This signage is designed to be easy to follow with:

- clear print.
- pictorial signs.
- arrows to signal direction.

9.4.23 Shared spaces

Shared space is an urban design concept aimed at integrated use of public spaces. It encourages traffic engineers, urban planners and experts from other fields to consult with users of public space when planning and designing streets and squares in both built and non-built environments. The concept shares some characteristics with living streets.

Image 9.12 Example of shared space in an urban setting.

Shared space removes the traditional segregation of motor vehicles, pedestrians and other road users. Conventional road priority management systems and devices such as kerbs, lines, signs and signals are replaced with an integrated, people-oriented understanding of public space, such that walking, cycling, shopping, and driving cars become integrated activities.

9.4.24 Shared spaces and stakeholder engagement

Planners should be mindful of these challenges presented by shared spaces and should engage with representative organisations in considering such schemes. Further information is available from the Department for Transport (UK) Shared Space Project Stage 1: Appraisal of Shared Space Report for Department for Transport November 2009 and research reports commissioned by the Guide Dogs for the Blind Association. http://www.guidedogs.org.uk/sharedstreets.

Image 9.12 Public realm

Demonstrates universal design by:
• incorporating clear and consistent paving.
• incorporating wide pathway.
• ensuring minimal street clutter.
• using blister surfacing for pedestrian crossing points.
• using corduroy hazard warning surfacing.

9.4.25 Residential streets – home zones

Universal design for residential streets is about providing clear accessible streets that support walking and encourage social interaction between the whole community.

Home zones are residential streets in which the road space is shared between drivers of motor vehicles and other road users, with the wider needs of residents in mind. The aim is to change the way that streets are used and to improve quality of life, by making them places for people, not just for traffic.

One of the objectives of home zones is to benefit the less mobile, such as children, older people and people with mobility difficulties who can reclaim their local territories from exclusively car-oriented activities.

9.4.26 Sample public realm / amenities policy text

It is important that the public realm and amenity spaces are planned, designed and managed to be accessed used and enjoyed by everyone, regardless of age, size ability or disability.

Development plan policies should:

- promote greater connectivity and permeability throughout the settlement through the provision of a network of well connected public spaces and streets, with materials, and signage that is easily interpreted by all
- ensure public space is located close to public transport connections and interchanges
- ensure that masterplans and local area plans clearly identify a range of access options for all public spaces
- require accessibility audits where public realm strategies or individual schemes are being advanced
- require public amenities, such as public toilets and seating, to be provided at regular intervals, and clearly signposted with a consistent quality of design and access

Formal recreational facilities within a space should be located close to pathways, parking bays and set down points. Features within parks and spaces, such as fountains, landscaping and foliage, should be designed to maximise sensory stimulation. Where appropriate, vehicle speeds should be kept low to provide a safer place for all pedestrians and cyclists.

Crossing points and routes should be clearly identifiable, appropriately located with respect to facilities and follow pedestrian desire lines. Tight corner radii should be required, to make it easier for pedestrians at crossing points. See **Figure 9.2**.

9.4.27 Drafting heritage policies

Development plans articulate a range of policies in relation to the preservation and enhancement of protected structures, architectural conservation areas, scenic routes, landscape and habitat designations. Planning policy will highlight the sensitivity of these locations to new development and the steps to be taken to ensure their protection, but may not fully address the concept of universal design.

Booklet 7: Building Types provides comprehensive coverage of how the principles of universal design can be achieved relative to historic buildings and sites, natural environments and landscapes, mountains, beaches, conservation areas, country parks, woodlands and arboreta, picnic areas, campsites, waterways, temporary events, parks, cemeteries, playgrounds, gardens and courtyards. Also see DoEHLG Advice guide: Access- improving the accessibility of historic buildings and places.

While **Booklet 7: Building Types** explores the implications of universal design for heritage, it must be acknowledged that planners need to develop and apply a robust policy framework within which universal design can be realised and implemented alongside existing heritage and conservation policy. Where appropriate, measures should also reflect objectives of the *Code of Practice on Heritage Sites*, which requires public bodies to ensure that, as far as practicable, the whole or part of a heritage site in its ownership, management or control and to which the public has access, is accessible to people with disabilities and can be visited by them with ease and dignity.

It can often be difficult to adapt built heritage without compromising the character that informs its heritage status. Best practice heritage planning can only be achieved if planners and designers acknowledge the importance of universal design through appropriate policy provisions, considered design responses and balanced determination of planning applications.

By their nature, features of built or natural heritage significance will often be particularly difficult to adapt to access for all people. Landscapes such as beaches, forests, or rugged mountainous terrain will be inherently difficult to access due to the characteristics that make them attractive in the first place.

In this context, while the principles of universal design warrant careful consideration by planners where heritage is concerned, there will be inherent limitations to the degree of conformity that can be achieved. The inevitable challenge for planners is to strike an appropriate balance between the need to preserve, protect and enhance, and the need to ensure equitable opportunities for access to, and understanding of, heritage features. (**Image 9.13**) and (**Image 9.14**) illustrate accessible features that do not detract from the natural character of the area.

Image 9.13 Regional park

Demonstrates universal design by:

- incorporating clearly defined pathways.
- including minimal visual or physical clutter.
- laying predominantly level routes.
- ensuring edge of each path is delineated with colour-contrasting paint.
- providing accessible parking, picnic areas, and frequent seating / rest areas.

Image 9.14 Example of wheelchair accessible tóchar.

While accessibility audits should be carried out for all heritage sites and buildings, there will inevitably be more opportunities to improve existing sites where extensions or the development of ancillary facilities and infrastructure, such as visitor centres, are proposed. In such instances, any new buildings or associated open space and infrastructure should be fully compliant with universal design principles. Where there are opportunities to upgrade existing pathways, address gradients, re-consider parking provision, improve public transport access then these should be factored in to proposals.

The general objective should be to make as much of the built and natural heritage as accessible as possible by prioritising and balancing conservation and access requirements.

9.4.28 Sample heritage policy text

Planners and designers should ensure universal design principles are considered and met as appropriate on sites of natural or built heritage significance through effective development planning and management. Sample development plan policies could include the following:

- The Council will expect proposals to make provision for safe and easy access by all people regardless of size, age, disability or ability, as may be deemed practicable in the particular circumstances and in the light of other design and conservation considerations that may apply

- As appropriate to the type, location and scale of development proposed, features of built or natural heritage significance should accommodate universal design measures whenever possible, without causing injury to, or undermining the integrity of those characteristics that make the feature special in the first place
- An access statement should be submitted as part of the planning application document demonstrating how access for all has been considered within the proposed development
- In relation to specific constraints to accessibility to which the alteration would affect the character of the designated site / structure, the applicant will be required to submit a management plan that will establish mitigation measures, in the interest of ensuring universal access for all people regardless of age, size, ability or disability.

9.4.29 Local area plans

Much of the advice in preceding sections will apply to drafting local area plan (LAPs) policies and objectives. LAPs by their nature can be prepared at a more detailed scale and address specific objectives for incorporating universal design features. As a targeted response to delivering change at the local level, planning authorities should engage early on with stakeholders and developers in order to identify the delivery and phasing of infrastructure. The approach to be considered should vary according to context, and whether the LAP is being prepared for areas designated for growth, with a view to delivering urban extensions or areas requiring regeneration, where the implications of major brownfield sites will be considered. In either case, site specific responses should be tailored to the area and to views gathered during community consultation.

9.4.30 Existing town and villages

In relation to the LAPs that are required to be produced as directed by statute, the primary focus should be on retaining existing positive features and subsequently improving accessibility and useability within the existing built environment. Policies should ensure that existing features that aid personal mobility for all people within the built environment are retained and protected. The LAP should establish a regulatory framework that is consistent with the approach set out in the development plan whereby universal design features will be incorporated within all new development proposals.

9.4.31 Regeneration areas

Brownfield sites in many cases represent the most appropriate development opportunities to consolidate growth and facilitate sustainable communities. LAPs can provide frameworks for the development of such sites in addition to masterplans detailing aspects of delivery. Guidance contained within LAPs should retain the existing features that currently assist mobility and to exploit opportunities to augment permeability and to integrate development with the wider area. Plans of this nature should focus on:

- consultation with the existing community
- strategic and local links with the surrounding area

Useful examples include the North Lotts Planning Scheme (Dublin Docklands, 2006) and draft Poolbeg planning scheme (Dublin Docklands, 2008).

9.4.32 Urban extensions

It is essential that LAPs created to manage the future growth of designated areas incorporate the principles of universal design to ensure equitable access to facilities. Given the nature of urban extensions and greenfield sites, ease of access and use of existing services and convenience retailing will be of primary importance. LAPs should avoid proposals that are based on the assumption of access to private transport and either provide facilities that meet an identified need or enhance linkages to existing facilities having regarding to acceptable walking distances. An example of a LAP produced for a large greenfield site at the edge of an existing urban area is provided by the South Lissywollen, Athlone Town - Local Area Plan (Athlone Town and Westmeath County Council).

9.5 Development Management

9.5.1 Development management

This chapter outlines how the principles of universal design can be incorporated within the planning application process. The approach here is consistent with the aims of the Department of the Environment, Heritage and Local Government, June 2007 - *Development Management Guidelines* that promote positive, responsive and high standards of planning.

Development management is a collaborative effort between the applicant's design team and the planning authority staff where principles of universal design can be considered in order to deliver successful places for all in terms of function, amenity, access, safety and maintenance.

Experience has shown that if needs of all users are not fully incorporated from the beginning of the design process, Design solutions will be subsequently provided in a segregated and non-inclusive manner. Retro fitting if required, will prove to be costly. The planning application process should therefore integrate the needs of all users from the outset by referring to the principles of universal design and including the requirements of people of any age, size, ability or disability.

- Site development briefs
- Pre-application consultation
- Access statements
- Accessibility and quality audits of the completed development

9.5.2 Site development briefs

Design briefs should be produced for particularly important, sensitive or large scale development sites. In providing guidance on the location, quantum and phasing of the proposed development, briefs can specify particular universal design issues that are relevant at the project level.

Design briefs are typically structured according to stages within the design process and should be made available as part of a Local Area Plan or at the outset of a pre-application consultation. Should a person requiring assistance to review the plans etc a member of the local authority staff with suitable training should be on hand to help the person review the application.

9.5.2.1 Stage 1: Appreciating the context

- Describe the site and its context
- Summarise relevant Development Plan policies and objectives relevant to the subject site including universal design objectives
- Identify the constraints
- Establish development aims

9.5.2.2 Stage 2: Creating the urban structure and making the connections

- Establish existing links through the site from the surrounding area, including those with the immediate local surroundings or wider settlement; the most direct and safe links are likely to attract more users
- Assess need for type, quantum and design of uses in conjunction with stakeholder consultation

9.5.2.3 Stage 3: Detailing the place

- Detail the universal design issues, standards and criteria that evidence gathered during Stage 1 and 2
- Refer the applicant to relevant planning guidance and universal design support materials

9.5.2.4 Stage 4: Following up

- Undertake an access audit that reviews relevant universal design conditions attached to the site

9.5.3 Pre-application consultations

Pre-application consultations provide opportunities to advise prospective applicants of universal design principles that are relevant to the proposal, and of other procedural requirements, such as:

- the implications of Building Control legislation, including provisions in relation to fire safety, access and evacuation for all people regardless of age, size, ability or disability
- application for a Disability Access Certificate as a requirement by the Building Control Authority
- the necessity to ensure that the design implications of accessibility for all are addressed in the approach routes to buildings, including the location of car parking and other related issues
- the NDA's suite of booklets *Building for Everyone: A Universal Design Approach*
- organisations representing groups in society including people with disabilities, older people and those with mobility difficulties for whom consultation may be arranged

Universal design principles should provide a means of informing pre-application discussions. It is also good practice to encourage Access Officers (See **Section 9.6.4**) to attend at least one meeting, particularly with respect to larger schemes. In addition to highlighting important considerations at the pre-application consultation, local planning authorities may, within their planning application form, request the submission of specified additional information (Dublin City Council (2007) Variation (No. 21) of the Dublin City Development Plan 2005 – 2011. Requesting universal design principles to be considered in this context will ensure applicants think proactively about universal design early in the design process

The checklist in **Table 9.7** can help inform pre-application discussions by highlighting information that Planning Officers and / or the applicants may wish to consider. It can be made available on the Planning Authority's website so that applicant may have a chance to take it into consideration when preparing for pre-application consultations. In advance of pre-application consultations, applicants should also be required to submit information on how universal design will be addressed within the proposed development in the format of a draft Access Statement (See **Appendix A6**).

Table 9.7 Universal design pre-application checklist
Would the design benefit from consultation with representative organisations (See **Section 9.6.4**)?
Would the proposal benefit from the submission of an Access Statement?
Has the applicant been advised of the concept and principles of universal design, and guidance contained in Buildings for Everyone Booklets?
Does the proposal require specialist advice from an Access Officer? Could Access Officers be included as part of the universal design pre-application process?
Has the applicant been advised of the procedural requirements such as the implications of Building Control legislation, including provisions in relation to access for people with disabilities (including Disability Access Certificates)?
Has the applicant been advised of key design issues that will need to be considered within the proposal, such as: • access routes and road layout • convenient and safe location of car parks and access routes • pedestrian environments that are logical and easy to follow • level pedestrian routes with sufficient path width • designated parking for people with disabilities and parents with children • clear signage • appropriate materials and design of the public realm.

9.5.4 User-centred design: Stakeholder assessment and involvement

Consultation is an important aspect of any scheme but larger proposals should formalise efforts to engage with stakeholders and the local community. The starting point should be establishing the relevant stakeholders and the nature of the local community with respect to a proposal. Determining how and to what extent they should become involved, should reflect the nature and scale of the project.

For large scale projects, developers should be encouraged to involve communities and enable them to participate in the process. The concept of user involvement is important to the implementation of universal design and involving the community, disability and user groups as part of access audits and / or site appraisal can provide important input into the design brief.

Standard appraisal methodologies, such as the World Health Organisation's (WHO) Health Impact Assessment, recognise the importance of qualitative information, including the opinions, experience and expectation of those likely to be most directly affected

9.5.5 Assessing the planning application

Table 9.8 provides a checklist for assessing a planning application in Universal Design terms.

Table 9.8 Universal design planning application / access statement checklist
Has the applicant submitted an Access Statement?
If yes, does it • explain how universal design principles have been addressed in the design of the development? • demonstrate what groups the applicant has consulted with and how consultation with potential users has influenced access arrangements? • demonstrate how the context appraisal and policy review has shaped the design of the scheme? • explain and justify the way the buildings, routes and open spaces are set out and why entrances have been placed where they are?
Has a plan been submitted that shows how people gain access to, through and from the development with respect to surrounding roads, footpaths and sight lines?
Will the place be easy to understand, maintain and adapt?
Is the layout accessible, understandable and easy for everyone to use?
Will all potential users including persons of any age or size or having any particular physical, sensory, mental health, or intellectual ability or disability be able to access and evacuate the site, move around the area, and enter the buildings?
Will the movement network support convenient, safe and appropriate travel?

Under Article 28 of the Planning Regulations 2001 planning authorities give notice of planning applications to prescribed bodies where, in the opinion of the authority, the development would be relevant to the functions of that body. In addition to the prescribed bodies referred to in Article 28, the applicant may also wish to consult with representative organisations and stakeholder bodies, particularly where major applications are concerned.

Consideration of universal design can also be required by introducing formal procedures for public consultation at site and area level and pre-application discussions. In depth discussions can influence a better design.

Formal procedures such as the requirement for access statements as detailed in **Appendix 6** are also important components of a successful design outcome and should be addressed within plan policies.

9.5.6 Sample conditions

Suggested planning conditions that may be attached to permissions with respect to different thematic areas are set out below.

9.5.6.1 Housing

It is advised that in addition to covering construction standards that text be included to ensure sufficient quantum and choice of dwellings for people with mobility difficulties e.g. people with disabilities and older persons: For housing estates of 5 dwellings or more, a minimum of 20% of dwellings shall be adaptable to provide accommodation for people with disabilities. Details of such proposals shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development.

Reason: To provide sufficient quantum and choice of dwellings for the provision of accommodation for people with mobility difficulties

The development hereby permitted shall be carried out and completed at least to the construction standards set out in the planning authority's Residential Site Development Standards document and the planning authority's Taking in Charge Policy as appropriate. Prior to commencement of development, the developer shall agree with the authority, in writing, the procedures for inspection and monitoring of the development by the authority to ensure compliance with these standards, and shall thereafter comply with the agreed procedures during the construction of the overall development. Following completion, the development shall be maintained by the developer, in compliance with these standards, until taken in charge by the planning authority.

Reason: To ensure that the development is carried out and completed to an acceptable construction standard including universal design

9.5.6.2 Retail - shop front design

Prior to the commencement of development, a Shop Front Design Scheme for the development shall be submitted for the written agreement of the Planning Authority. The scheme shall provide guidance on the following items:

a) High standard of design and materials that relate to the architectural composition of the building on which they are fitted and the surrounding townscape

b) Identification of zones on the building frontages that can be used for signage

c) Guidance on lighting fixtures and lux levels

d) Identification of zones for shop window display

e) Safe and convenient access for people regardless of age, size, ability or disability

When the Shop Front Design Scheme has been approved by the Planning Authority, details of any shop fronts and / or signage for individual retail units shall take account of the guidance in the approved scheme.

Reason: In the interest of visual amenity and a proper standard of development

Prior to the commencement of development, details of shop fronts and signage (including lettering size, general style, materials and colours) that accord with the Shop Front Design Scheme agreed under the terms of the above condition, shall be submitted for the written agreement of the Planning Authority. Details shall be implemented in accordance with the details agreed.

9.5.6.3 Car parking

Accessible car parking spaces are set out in **Section 9.4.14**. These spaces shall be located adjacent to building entrances and suitably signposted. Further information on car parking, drop off areas and seating see **Booklet 1: External environment and approach**.

Reason: In the interests of road and pedestrian safety and mobility

The developer shall provide designated car parking spaces for accessible parking in accordance with the standards set out in the Development Plan. Such spaces shall be located close to, and accessible from, the proposed development. Details of the places allocated and accessibility measures to be put in place, shall be submitted to, and agreed in writing with, the planning authority prior to the commencement of development.

Reason: To provide for sufficient accessible car parking spaces, and for appropriate access to such spaces, in accordance with standards set out in the Development Plan in the interests of sustainable transportation and universal design

Prior to occupation of the development, a Mobility Management Plan shall be submitted for the written agreement of the Planning Authority. The plan shall limit reliance on private transport to access the site and should seek to maximise use of public transport, walking and cycling for all users. Procedures for monitoring and review of the plan and for regular reporting to the planning authority shall be included.

Reason: In the interests of Sustainable Transportation and Accessibility

9.5.6.4 Heritage

The applicant will be required to submit a management plan that will establish mitigation measures in relation to specific constraints to accessibility where alteration would affect the character of the designated site / structure.

Reason: In the interest of providing universal design for the development that the integrity of the protected structure is maintained and that the proposed repair works are carried out in accordance with good conservation practice with no unauthorised or unnecessary damage or loss of historic building fabric

Conservation and universal design experts should be employed to manage, monitor and implement the works on site and to ensure adequate protection of the historic fabric, the accessibility and useability of during the works.

Further information is available from the National Disability Authority's 'Heritage guidance document

9.5.6.5 Public realm / amenities

All facilities and amenities open to the public or staff should be fully accessible to all people regardless of age, size, ability or disability, in accordance with the agreed plans. Details of paving design (including tactile and blister paving), surface gradients [etc] shall be submitted to, and agreed in writing with, the planning authority.

Reason: In the interest of public safety and mobility

An accessibility audit will be submitted on completion of the works demonstrating compliance with proposals set out in planning documentation and conditions standards and materials.

Reason: In the interest of public safety and mobility

Prior to the commencement of construction on each plot, samples of all proposed external finishing materials (including roof, wall, window, door and balcony treatments) shall be submitted to and approved in writing by the Planning Authority. Balcony surrounds should generally be opaque. Sample panels of 2000mm x 2000mm of the materials shall be erected on site and once approved, retained for the duration of the development for quality control purposes. Development shall be carried out in accordance with the approved samples.

Reason: In order to achieve a high standard of design and finish

Details of proposed street furniture and public lighting, including bus stops, seating, lighting standards and litter bins shall be submitted to the Planning Authority for written agreement prior to commencement of construction on site.

Reason: In the interests of visual amenity and pedestrian access

Notwithstanding the submitted plans, the following details shall be submitted to and approved in writing by the planning authority prior to the commencement of development on site. The details shall be implemented in accordance with the approved submission:

a) Traffic calming details

b) Design, construction and materials details for proposed raised tables, crossing points and other traffic calming features to be provided on all street within the development

c) Details of shared surface treatments

Reason: In the interest of pedestrian and traffic safety

Notwithstanding the submitted details, prior to the commencement of construction of any of the road, pavement, raised junction, entrance treatments, crossings, cycleways, on-street parking bays or other street finishing details, construction details and material samples shall be submitted for the written agreement of the Planning Authority that includes details on the accessibility and useability of the environment. Sample panels of 3000mm x 3000mm of the material shall also be erected on site and once approved, retained for the duration of development for quality control purposes. Development shall be carried out in accordance with the approved samples.

Reason: In the interest of visual amenity, environmental quality and development control

Prior to the commencement of development on site, a detailed landscape plan with full works specification shall be submitted for the written agreement of the Planning Authority. The full works plan should deal with all open spaces and paved areas (including in-curtilage parking) within the site. The plan should include hard and soft landscaping proposals, boundary treatments, details of tree and shrub planting etc. The following shall be included:

- Details of seating and street furniture within public spaces and semi private spaces. See **Table 9.5** Distances without rest
- Details and specifications for play facilities for a range of ages, sizes, abilities and disabilities to be provided within the development.
- Details of the surface treatments for walkways linking housing and ancillary public and semi private open space.
- Details of semi private open space in order to establish direct or improved access from all units.
- Detailed proposals for the future maintenance / management of all landscaped areas

Reason: In the interests of amenity

9.6 Implementation

Development Plan or Local Area Plan policies and objectives are implemented through development management decisions and the completion of developments in accordance with these decisions.

Assessing whether a policy is having the desired effect can be undertaken once the development process is completed to the appropriate standard and specification, data is collected and appropriate indicators, that measure changes in the environment, are developed.

9.6.1 Enforcement

Development that has taken place without consent or where the terms of permission have not been met comes under the remit of planning enforcement. Enforcement is critical to developing a culture of high quality development outcomes.

Monitoring compliance with planning conditions and approved plans will enable local authorities to carry out effective enforcement under Part VIII of the Planning and Development Act 2000. It is particularly important to establish whether developments have been completed according to the specified design standards, prior to the taking in charge of housing estates.

9.6.2 Taking in charge of estates

As per Circular Letter PD 1/08, certain core facilities and infrastructure within housing estates are required to be taken in charge on request including public roads and footpaths, unallocated surface parking areas, public lighting, and public open spaces.

In accordance with this Circular, Planning authorities must specify their construction or design standards for public roads, footpaths, services and open spaces in residential development in their taking in charge policy. These policies should specify standards that are consistent with universal design principles and the Building for Everyone guidance series. Materials should be good quality and durable in order to minimise future maintenance costs. It should be also be noted that the Department's Recommendations for Site Development Works for Housing Areas (1998) is currently being updated to reflect the requirements for sustainable communities, such as more pedestrian friendly layouts.

Once standards have been introduced, it is essential that planning authorities monitor compliance to ensure that these are effectively delivered. In addition to ensuring that effective procedures are in place to monitor and inspect construction, effective delivery requires:

- early identification of the areas to be taken in charge
- appropriate planning conditions (See **Section 9.4.8**)
- the provision of adequate financial security

9.6.3 Monitoring

Monitoring and review of developments is essential to understanding the effectiveness of universal design policies set out in the Development Plan. The identification of indicators such as those suggested below, and analysis of data will enable benchmarks to be set in the future and corrective action to be taken where targets are not met.

Suggested indicators include the:

- number of lifetime homes completed (enabling compliance with development plans standards for lifetime homes to be measured)
- number of applicants submitting Access Statements

9.6.4 Role of access officers

Section 26 (2) of the Disability Act 2005 requires that public bodies appoint an officer (Access Officer) to provide or arrange for and co-ordinate the provision of assistance and guidance to persons with disabilities in accessing its services. The involvement of Access Officers in the planning process can help to ensure that universal design principles are incorporated into the design of a development from the earliest stage. It is suggested that planning staff should receive some specific training in relation to disability access and universal design. In particular, it may be valuable to identify a lead within the planning team who develops specific expertise in this area. The Access Officer may be able to play a role in training planning staff on issues of disability accessibility. Planning staff may consult the Access Officer where more in-depth expertise is required, and may find it useful to include the Access Officer or another access expert in pre-application consultation, in guiding on decision-making, and in advising on enforcement, in relation to significant developments

The Access Officer should have an integrated role within the Planning Department of the local authority and throughout the planning process. Depending on the availability of resources, key areas for involvement of Access Officers in the planning process include:

- pre-application consultation: Access Officers should attend at least one pre-application meeting, depending on the complexity of the development and its proposed use (e.g. public building, transport interchange, town centre retail development etc)
- decision making: The Access Officer should be consulted throughout the decision making process. The Planner's Report accompanying the decision should include a section on accessibility. In addition, the Access Officer should review and assess the Access Statement and assist in preparing relevant conditions for grants of permission
- enforcement: Access Officers could assist with enforcing planning permissions for larger developments (e.g. retail developments, public open space etc). This could include attending a site inspection with the planner which may help to identify detailed elements of the project that are inconsistent with the plans or non compliant with conditions leading to substandard development

Access Officers clearly have an existing role in promoting accessibility, however the extent of their commitments within the local authority may mean that identifying a lead within the planning team, who develops expertise in relation to universal design, may offer a more practical solution.

9.6.5 Licensing

Section 254 of the Planning and Development Act 2000 refers to licensing of appliances, apparatus and structures on public roads. A licence is required under Section 254 for the erection, construction, placement or maintenance of a number of appliances, apparatus and structures, including: vending machines, town or landscape map for indicating directions or places, hoarding, fence or scaffold, advertisement structure, cable, wire or pipeline, telephone kiosk or pedestal.

The placing of such appliances, apparatus and structures on public roads and pavements can be of particular concern in terms of enabling access and ease of movement for everyone. There are numerous examples of cluttered streetscapes around Ireland which can be difficult for many people to navigate. Excessive signage, ill-placed street furniture (seating, bins, bollards etc) and barriers can create discontinuities and obstacles in movement thus presenting hazards, in particular to people with disabilities and people with visual difficulties.

When assessing licence applications, local authorities should ensure that accessibility for all users is maintained. This will involve considering the usability of the area by all members of the community and the impact that the structure will have on accessibility. The environs of the site and existing appliances, apparatus and structures should also be assessed in conjunction with the impacts that the proposed structure may have. Any granting of a licence should be monitored for compliance with conditions of the permission or should be coordinated using a system for town centre management.

A1 Definition of Universal Design

Universal Design

'Universal design refers to the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people, regardless of their age, size, ability or disability.'

Synopsis of the Disability Act, 2005.

A2 Human Abilities and Design

The following piece of text is an extract from European Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'.

It states that: Physical, sensory and mental abilities vary from person to person and for individuals as they get older. Diversity is normal. Designers need to be aware of difference across the range of human abilities, and of associated design considerations.

(a) Physical abilities

This includes walking, balance, handling, pulling, pushing, lifting and reaching. Many activities involve simultaneous use of more than one of these skills. Physical strength and stamina may also affect people's abilities to perform these actions.

Walking

For some people walking on the level or up gradients is difficult. Some people may have a limited walking range, may have difficulty with turning movements or may use mobility devices such as crutches or a walker. They may need to stop frequently, to regain strength or catch breath. Design considerations include provision of handrails, seats at regular intervals, convenient set-down parking and adequate time for slower pedestrians at road crossings. Designers should also consider the needs of people walking and engaging in sign language when designing access to and from buildings plus within the buildings themselves.

Balance

Balance limitations can affect someone's gait or control of hand movements. Design considerations include handrails, regular seating, and providing controls within easy reach. A surface against which a person may stumble against or walk into should be designed to limit abrasion.

Handling

A significant minority of people are left-handed. Some people may have restricted use or no use of one or both hands, or may have limits on strength or precision. Facilities and components should be designed to be suitable for use with either hand or with one hand only. Handling includes gripping, grasping and manipulation. Each of these has a different purpose with specific design considerations. For instance, components should be designed to be easily held. The circumference of the supporting structure and stability are critical. Manipulation involves the moving, turning and twisting of components with a hand or hands. For those who have limited manipulation abilities, size and shape and ease of movement are critical. Another option to consider is to design for manipulation by using a pushing, pulling or pressing action using a clenched fist, or by using the wrist or the elbow.

Strength and endurance

Strength and endurance may be required on sloping paths and floors, stairways and long travel distances, when sustained effort may be needed.

For those with limited endurance, frequent resting-places are essential.

People generally find it easier to push a component, than to pull it. This is particularly so if the individual uses a wheelchair. Self-closing devices on manual doors can be difficult for some people to operate, particularly if the doors are required to resist wind forces. For these reasons, doors that open and close automatically are preferred.

Lifting

Activities such as opening a vertically sliding sash window and an upward opening access gate, should be designed to be easily operated with minimal force.

Reaching

Design has a role to play in ensuring that key components in a building or environment are in easy reach, bearing in mind the range of people's sizes and abilities. Having components within easy reach is particularly important for those with more severe limitations in mobility. The reach range is dependant on the height and arm length of the person, use of the arms, and the balance and mobility of the upper body. A 'comfortable reach range' has been defined as one that is appropriate to an activity that is likely to be frequent and in need of precise execution and that does not involve stretching or bending from the waist. Putting things within comfortable reach can ensure use by a greater number of people. An 'extended reach range' has been defined as one that is appropriate to an activity that is likely, neither to need precision nor to be frequent and that can involve stretching or bending from the waist.

(b) Sensory abilities

Speech

Some conditions affect the capacity for or quality of speech. Two-way communication can be facilitated by environments designed to minimise barriers to hearing low or indistinct speech.

Hearing

People differ in their capacity to hear sound, to determine its direction, its source, to discern pitch, frequency, volume and variation and to separate out different sounds. Hearing quality is important for communication, for information, and for detection of hazards such as traffic. Many people with hearing difficulties

use a hearing aid which amplifies all sounds caught by the microphone, making communications very difficult in noisy environments. Keeping background noise level low is essential. The selection of structural and surface materials can make a substantial difference in audibility. Auditoriums, meeting rooms and reception areas can benefit from additional sound enhancement such as a loop system. The careful design of illumination can assist in communication such as lip reading and sign language. Provision of visual information and visual alarm systems can communicate information to those who have hearing difficulties or who cannot hear. Designers should also consider the colour and size of rooms and even the furnishing arrangement as this is very important for visually based communication. Also the use of vibration as means of sensing others should be considered.

Sight

Vision allows an individual to be aware of the luminance of surfaces, objects, form, size and colour. For people who are blind or who have visual difficulties, the provision of suitable tactile walking surface indicators and tactile or acoustic warnings at hazardous locations, should provide information on using the built environment and should limit the risk of injury. The built environment can be designed for orientation by providing sound cues and tactile cues. An easily discernible system of 'way finding' should also be considered. For people with limited, but low vision, effective visual contrast between surfaces or objects helps to identify critical locations. Warning markings on glass surfaces, and markings on the edges of stair treads, help minimise hazards.

Differences in friction between one floor surface, or one stair tread surface, and the next should be avoided. Therefore, adjacent surfaces that display different standards of slip-resistance, or that depend on raised surfaces, should be carefully considered

Touch

In selecting surfaces in the built environment that people will need to touch (such as handrails, handles, knobs and controls, tactile information), it is important to select materials that avoid distress, injury or allergies. Surfaces should be free of abrasions. Metals that may cause adverse reactions when touched should be avoided.

(c) Mental abilities

Mental abilities include cognition, intellect, interpretation, learning and memory. People differ in their knowledge, their capacity to understand, reason, or interpret information. Designing for differences in these capacities helps provide a usable environment for the population at large, from the very young to the old, and people of diverse abilities. Means of communication in the environment should be designed to be immediately and easily understood, and correctly interpreted. As people age, some experience loss of memory or find it increasingly difficult to absorb new information, so changes in the environment should be carefully considered before implementation.

Design considerations that take account of mental abilities

Aural and visual messages should be simple, clear and have immediate impact. Figures, symbols and simple words are likely to be the most effective. Symbols should be instantly recognisable as representing images seen and activities undertaken in everyday life.

Way finding should be simple, such as tactile, graphic, audible or architectural cues that are easy to follow. Signage should be large and clear. Way-finding maps should be clear, indicate the person’s whereabouts in the building or facility, and be free from extraneous information.

(d) Age and size

Accommodating the developing child

It is important to create environments that are safe, accessible and useable for children. Individual components should be safe and useable as age-appropriate. Learning to manage risk is an essential part of a child’s development.

Accommodating ageing adults

Life span within the human population is increasing. More and more we expect to maintain an economic and social life within both the public and private domains as we age. However, many human faculties are in decline as we age, such as mobility, dexterity, stamina, strength, hearing, sight, or memory. Familiarity with a particular environment is important.

Diversity of size

The population contains a diversity of sizes and heights, from children, to the diversity in the height of fully-grown adults. The positioning of components and the heights of building elements such as steps should recognise the diversity of height. Increased weight and girth is now also a feature of the population.

Ref: CEN/CENELEC Guide 6 'Guidelines for standards developers to address the needs of older persons & persons with disabilities'.
http://www.cen.eu/cen/Sectors/Sectors/ISSS/About_ISSS/Documents/cclcgd006.pdf

A3 Further Reading

National and international standards and codes of practice

AS 1428.1-2001 Design for access and mobility. General requirements for access – New building work.

AS 1428.2-1992 Design for access and mobility. Enhanced and additional requirements – Buildings and facilities.

AS 1428.3-1992 Design for access and mobility. Requirements for children and adolescents with physical disabilities.

AS 1428.4-2002 Design for access and mobility. Tactile indicators.

BS 4800: 1989 Paint colours for building purposes (whilst the colours in this standard cannot be seen on CD-ROM or online the text can still be used).

BS 5395-1:2000 Stairs, ladders and walkways – Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders.

BS 5588-8:1999 Fire precautions in the design, construction and use of buildings – Part 8: Code of practice for means of escape for disabled people.

BS 5776:1996 (incorporating amendment No.1) Specification for Powered stairlifts

BS 6440:1999 (Incorporating amendment No.1) Powered lifting platforms for useby disabled persons – Code of practice.

BS 6440:1999 Powered lifting platforms for use by disabled persons – Code of practice (partially superseded by BS EN 81-40:2008. The remainder of BS 6440:1999 will eventually be superseded by EN 81-41: 2009 Safety rules for the construction and installation of lifts – Special lifts for the transport of persons and goods – Part 41: Vertical lifting platforms intended for use by persons with impaired mobility).

BS 6465-1:2006+A1:2009 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances.

BS 6571-4: 1989 Vehicle parking control equipment – Part 4: Specification for barrier type parking control equipment.

BS 7036-1:1996 Code of practice for Safety at powered doors for pedestrian use – Part 1. General.

BS 7036-4:1996 Code of practice for Safety at powered doors for pedestrian use – Part 4. Low energy swing doors.

BS 7997:2003 Products for tactile paving surface indicators – Specification.

BS 8300:2009 (Incorporating amendment No.1) Design of buildings and their approaches to meet the needs of disabled people – Code of practice.

BS 8493:2008 (+A1:2010): Light reflectance value (LRV) of a surface – Method of test.

BS 8501:2002 Graphic symbols and signs – Public information symbols (AMD 16897).

BS EN 115:1995 Safety rules for the construction and installation of escalators and moving walkways.

BS EN 15838:2009 Customer contact centres, Requirements for service provision.

BS EN81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passengers lifts – Part 70: Accessibility to lifts for persons including persons with disability.

Building Regulations (Part M Amendment) Regulations 2010 (S.I. No. 513 of 2010).

Citizens Information Board – Accessible information for all (2009).

DD 266:2007 (Draft for Development) Design of accessible housing – Lifetime home – Code of practice.

I.S. EN 1991-1-1:2002 – Eurocode 1: Actions on structures Part 1-1: General actions – densities, self weight, imposed loads for buildings (including Irish National Annex: 2005).

I.S. EN 81-1: 1999 Safety rules for the construction and installation of lifts – electric lifts (Amd 1) (+A3:2009).

I.S. EN 81-2:1999 Safety rules for the construction and installation of lifts – hydraulic lifts (Amd 1) (+A3:2009).

I.S. EN 81-70:2003 Safety rules for the construction and installation of lifts – Particular applications for passenger and good passenger lifts. Accessibility to lifts for persons including persons with disability (Amd A1:2005).

I.S. EN 997:2003 (+A1:2006) WC pans and WC suites with integral trap (AMD Corrigendum 14805) (AMD 16965).

IEC 60118-4:2006 Electroacoustics. Hearing aids. Induction loop systems for hearing aid purposes. Magnetic field strength (ISBN 978 0 580 50047 3).

International standard for Induction loops. IEC 60118-4.

Irish Code of Practice on Accessibility of Public Services and Information Provided by Public Bodies www.nda.ie/website/nda/cntmgmtnew.nsf/0/3DB134DF72E1846A8025710F0040BF3D/$File/finaldrcode_nda.htm

Key cards should conform to EN 1332. For further information on key cards please see: http://www.universaldesign.ie/useandapply/ict/itaccessibilityguidelines/smartcards/guidelines/smartcardguidelines/cards

Lifetime Homes Standard: http://www.lifetimehomes.org.uk

Norwegian Universal design of building standard, 2009.

Passenger Lift Design: The Machinery Directive 2006/42/EC; Lifts should conform to BS 6440.

National and international reference documents

2020 Vision – Sustainable Travel and Transport: Public Consultation Document. Department of Transport.

Bus Based Park and Ride – A Pilot Scheme. A Report to: Dublin Transportation Office. The TAS Partnership Limited, 2002.

City of London 2006 Facility Accessibility Design Standards. London, Canada, 2006 Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Gallaudet DeafSpace Design Guidelines 2010.

Department of Transport & the National Disability Authority Guidelines for Accessible Maritime Passenger Transport http://www.nda.ie/website/nda/cntmgmtnew.nsf/0/45AA46D1F77D7EF2802576DC005C5954?OpenDocument

Department of Transport, UK 'Traffic Signs Manual'.

Dublin City Council (2007) Variation (No. 21) of the Dublin City Development Plan 2005 – 2011. Available from: http://www.dublincity.ie/Planning/DublinCityDevelopmentPlan/VariationstotheDevelopmentPlan/Documents/AdoptedVariationNo21Spec.pdf.

Guidance on the use of tactile paving surfaces. Department for Transport, UK.

Guidelines for an accessible public administration. Towards full participation and equality for people with disability. Office of the Disability Ombudsman, Sweden.

Inclusive Mobility. Department for Transport, UK.

International Best Practices in Universal Design. A Global review. Canadian Human Rights Commission, 2006.

Irish Wheelchair Association: Best Practice Access Guidelines 2010.

Joseph Rowntree Housing Trust.

Parking for disabled people. Department for Transport, UK.

Promoting Safe Egress and Evacuation for people with Disabilities - National Disability Authority.

Rail Park and Ride Strategy for the Greater Dublin Area. Dublin Transportation Office, 1994.

Regulation of Bus services outside the Greater Dublin Area. Department of Transport.

"Sign Design Guide and Inclusive mobility," Oxley, P. (2003), Inclusive Mobility. Department for Transport, UK. www.mobility-unit.dft.gov.uk

Smarter Travel 'A Sustainable Transport Future' – A New Transport Policy for Ireland 2009 – 2020. Department of Transport.

A4 People with Disabilities by Disability Type

Table 9.9 People with disabilities by disability type

	Total	% of Population	
Seeing	**50,600**	**1.19**	
Moderate difficulty	27,600	0.65	
A lot of difficulty	20,700	0.49	
Cannot see	2,300	0.05	
Hearing	**57,600**	**1.36**	
Moderate difficulty	35,200	0.83	
A lot of difficulty	20,600	0.49	
Cannot hear	1,800	0.04	
Speech	**35,300**	**0.83**	
Moderate difficulty	16,800	0.40	
A lot of difficulty	12,200	0.29	
Cannot speak	6,400	0.15	
Mobility and dexterity	**184,000**	**4.34**	
Moderate difficulty	57,000	1.34	
A lot of difficulty	62,200	1.47	
Cannot do	64,900	1.53	
Moving around home	**101,200**	**2.39**	
Moderate difficulty	50,200	1.18	
A lot of difficulty	38,400	0.91	
Cannot do	12,700	0.30	
Going outside of home	**128,900**	**3.04**	
Moderate difficulty	53,700	1.27	
A lot of difficulty	49,900	1.18	
Cannot do	25,300	0.60	

Walking for about 15 minutes	**160,000**	**3.77**	**31,000 wheelchair users. 83,000 use walk aids**
Moderate difficulty	47,200	1.11	
A lot of difficulty	52,900	1.25	
Cannot do	60,000	1.42	
Using hands and fingers	**79,000**	**1.86**	
Moderate difficulty	33,900	0.80	
A lot of difficulty	30,900	0.73	
Cannot do	14,300	0.34	
Remembering and concentrating	**113,000**	**2.67**	
Moderate difficulty	54,900	1.29	
A lot of difficulty	43,800	1.03	
Cannot do	14,300	0.34	
Remembering important things	**77,600**	**1.83**	
Moderate difficulty	39,100	0.92	
A lot of difficulty	27,600	0.65	
Cannot do	10,900	0.26	
Forgetting where I put things	**85,800**	**2.02**	
Moderate difficulty	44,600	1.05	
A lot of difficulty	30,400	0.72	
Cannot do	10,800	0.25	
Concentrating for 10 minutes	**77,900**	**1.84**	
Moderate difficulty	35,000	0.83	
A lot of difficulty	29,800	0.70	
Cannot do	13,100	0.31	

Intellectual and learning	**71,600**	**1.69**	**18,900 have dyslexia / SLD**
A little difficulty	12,000	0.28	3,400 have ADD
Moderate difficulty	25,900	0.61	5,300 have autism
A lot of difficulty	24,800	0.58	50,400 ID
Cannot do	8,900	0.21	
Intellectual functions	**27,700**	**0.65**	
A little difficulty	4,000	0.09	
Moderate difficulty	9,100	0.21	
A lot of difficulty	10,300	0.24	
Cannot do	4,300	0.10	
Interpersonal skills	**22,300**	**0.53**	
A little difficulty	4,600	0.11	
Moderate difficulty	7,200	0.17	
A lot of difficulty	7,200	0.17	
Cannot do	3,400	0.08	
Learning everyday skills	**55,000**	**1.30**	
A little difficulty	10,200	0.24	
Moderate difficulty	19,500	0.46	
A lot of difficulty	18,700	0.44	
Cannot do	6,700	0.16	
Diagnosed with intellectual disability	**50,400**	**1.19**	
A little difficulty	14,000	0.33	
Moderate difficulty	24,200	0.57	
A lot of difficulty	9,000	0.21	
Cannot do	3,200	0.08	
Emotional, psychological and mental health	**110,600**	**2.61**	**31,200 depression**

A little difficulty	25,300	0.60	13,500 anxiety disorders
Moderate difficulty	46,300	1.09	5,300 schizophrenia
A lot of difficulty	35,100	0.83	3,100 bipolar disorder
Cannot do	4,000	0.09	
Pain	**152,800**	**3.60**	
Moderate difficulty	74,900	1.77	
A lot of difficulty	73,100	1.72	
Cannot do	4,700	0.11	
Breathing	**71,500**	**1.69**	
Moderate difficulty	45,000	1.06	
A lot of difficulty	25,200	0.59	
Cannot do	1,300	0.03	
Total persons with a disability*	**393,800**	**9.29**	

Note on method for deriving this table

These figures are based on the National Disability Survey 2006 – First Results with the exception of the last line of the table giving total number of people with disabilities which comes from Census 2006.

Based on census sample from national disability survey

The numbers of people recorded as having a disability is sensitive to the definition of disability used and to whether face to face or other survey methods are used. A higher recorded prevalence of disability generally means inclusion of more people at the milder end of the spectrum of difficulty.

The National Disability Survey suggested the total prevalence rate for disability could be between 17% and 20%, compared to a figure of around 9% recorded in the Census that year. The National Disability Survey was based on follow-up interviews with a sample of the people who had reported in the 2006 Census that they had a disability, plus a small sample of people who had said they did not have a disability. While most of the "yes" sample and of the "no" sample offered consistent answers in both the Census and the National Disability Survey, there were some differences, partly due to covering a broader range of conditions in the National Disability Survey, i.e. pain and breathing difficulties, contributing to the higher estimate of disability prevalence recorded in the National Disability Survey.

The table is based on the detailed breakdown by disability type and by age of respondents to the National Disability Survey who were drawn from the Census "Yes" to disability sample. There is a greater level of detail available for this group, and it is statistically more reliable for subgroups, being based on a larger sample (some 14,500) compared with just 1,550 in the Census "no" sample. The table may underestimate to some extent the total number of people with different conditions, particularly among those experiencing lower levels of difficulty.

Not mutually exclusive

The numbers of people with different kinds of impairment are not mutually exclusive, and many people have more than one kind of impairment.

Broad order of magnitude for levels of difficulty by age-group

Tables 14.1 to 22.1 of the National Disability Survey 2006 – First Results gave a percentage breakdown by age-group within each level of difficulty for the different classes of impairment. These have been used to estimate the number of people in each age group with different levels of difficulty. The percentages were applied directly for the under 18 and 65+ age groups, and for the 18-64 age-group by subtraction. The resulting numbers, shown in italics, have been rounded to the nearest 100. However the figures are not accurate to this level of precision, they only give an indication of broad orders of magnitude, being based on percentages from small sub-sample data then applied to rounded numbers.

A5 Lifetime Homes Standards

Table 9.10 Lifetime Homes Standards	
Car Parking	Where car parking is adjacent to the home, it should be capable of enlargement to attain 3300mm width.
Access for Car Parking	The distance from the car parking space to the home should be kept to a minimum and should be level or gently sloping.
Approach	The approach to all entrances should be level or gently sloping.
External Entrances	All entrances should be illuminated, have level access over the threshold and have a covered main entrance.
Communal Areas	Communal stairs should provide easy access and, where homes are reached by a lift, it should be fully accessible.
Doors and Hallways	The width of internal doorways and hallways should conform to Part M, except that when the approach is not head on and the hallway width is 900mm, the clear opening width should be 900mm rather than 800mm. There should be 300mm nib or wall space to the side of the leading edge of the doors on entrance level.
Wheelchair Accessibility	There should be space for turning a wheelchair in dining areas and living rooms and adequate circulation space for wheelchairs elsewhere.
Living Room	The living room should be at entrance level.
Two or more storey requirements	In houses of two or more storeys, there should be space on the entrance level that could be used as a convenient bed space.
WC	In houses with three bedrooms or more there should be a wheelchair accessible toilet at entrance level with drainage provision enabling a shower to be fitted in the future. In houses with two bedrooms the downstairs toilet should conform at least to Part M.

Bathroom and WC Walls	Walls in the bathroom and WC should be capable of taking adaptations such as handrails.
Lift Capability	The design should incorporate provision for a future stair lift and a suitably identified space for a through the floor lift from the ground floor to the first floor, for example to a bedroom next to the bathroom.
Main Bedroom	The design and specification should provide a reasonable route for a potential hoist from a main bedroom to the bathroom.
Bathroom Layout	The bathroom should be designed for ease of access to the bath, WC and wash basin.
Window Specification	Living room window glazing should begin no higher than 800mm from the floor level and windows should be easy to open/operate.
Fixtures and Fittings	Switches, sockets, ventilation and service controls should be at a height usable by all (i.e. between 450 and 1200mm from the floor).

Source: Joseph Rowntree Foundation

A6 Access Statements

Access statements

An access statement is a development management mechanism, used to explain and justify the approach to access within the scheme that is being applied for and how the design of the scheme responds to the needs of all potential users. They are especially important for large-scale projects so that the applicant can demonstrate how accessibility has been taken into account.

Access statements are useful in that they:

- encourage the applicant to think carefully about the quality of their planning proposal (this should improve the general quality of applications)
- give applicants the opportunity to explain and justify their plans to officers, councillors and the people they consult
- help people to negotiate changes to plans, as they can set out ideas for discussion
- control the way buildings are built, used and managed

Whilst the requirement for an access statement has not formally been introduced in the Irish context, a number of planning authorities in Ireland have introduced the requirement for design statements within the statutory Development Plan. The statements usually consist of both text and graphics, but is not intended to duplicate planning application documents.

The wider use of design statements is promoted for all planning authorities within the Urban Design Manual, A Best Practice Guide. As a matter of best practice access statements should also be required as part of the development management process and submitted with the application.

In terms of content, these statements could:

- show how Development Plan, Local Area Plan policies are taken into account
- include any consultation carried out with community groups, access groups
- explain how surrounding roads, footpaths and sightlines will be linked
- illustrate access to and access within the building itself
- include diagrams showing how people can move to and through the place – including vehicles, bikes and pedestrians
- describe how levels change within public spaces, including pavement and dropped kerbs, bus stops, parking spaces, including blue badge holders, at train stations and parks
- include information on the visibility of entrances and access to the building through entrance areas or front doors, as well as access to facilities such as toilets
- show that people with disabilities will not be segregated but will be able to move around within a building at all levels and use the same entrances, corridors and rooms as everyone else without detour
- detail how access for the emergency services will be provided

A7 Venue Checklist for Consultation Events

Table 9.11 Venue checklist for consultation events
Venue Checklist
The organiser has visited the venue to establish whether the venue is suitable, the facilities and provision is made for people with disabilities and any potential access problems?
There is physical access to and inside the venue?
The venue has been subject to an accessibility audit?
Are toilets, lifts, refreshment areas accessible to the meeting or function rooms being used for the event?
Can delegates with mobility difficulties use the same entrance as other delegates?
Can wheelchair users use ramped access routes independently?
Have venue staff been trained in disability and accessibility awareness?
Accessible car parking is available, preferably on site and close to the entrances (within 50m) for people with mobility difficulties?
Routes and entrances from the car park are accessible with no major obstructions?
Language support professionals have been arranged?
The programme is structured to allow for breaks?
Speakers have been advised to talk clearly, not too fast and to face the audience?
Easily identified support staff are available to familiarise participants with their surroundings?
The event area is large enough and has been arranged to allow for movement?
The registration and event area is clearly indicated?
Event information is made available in alternative formats?

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Index and terminology

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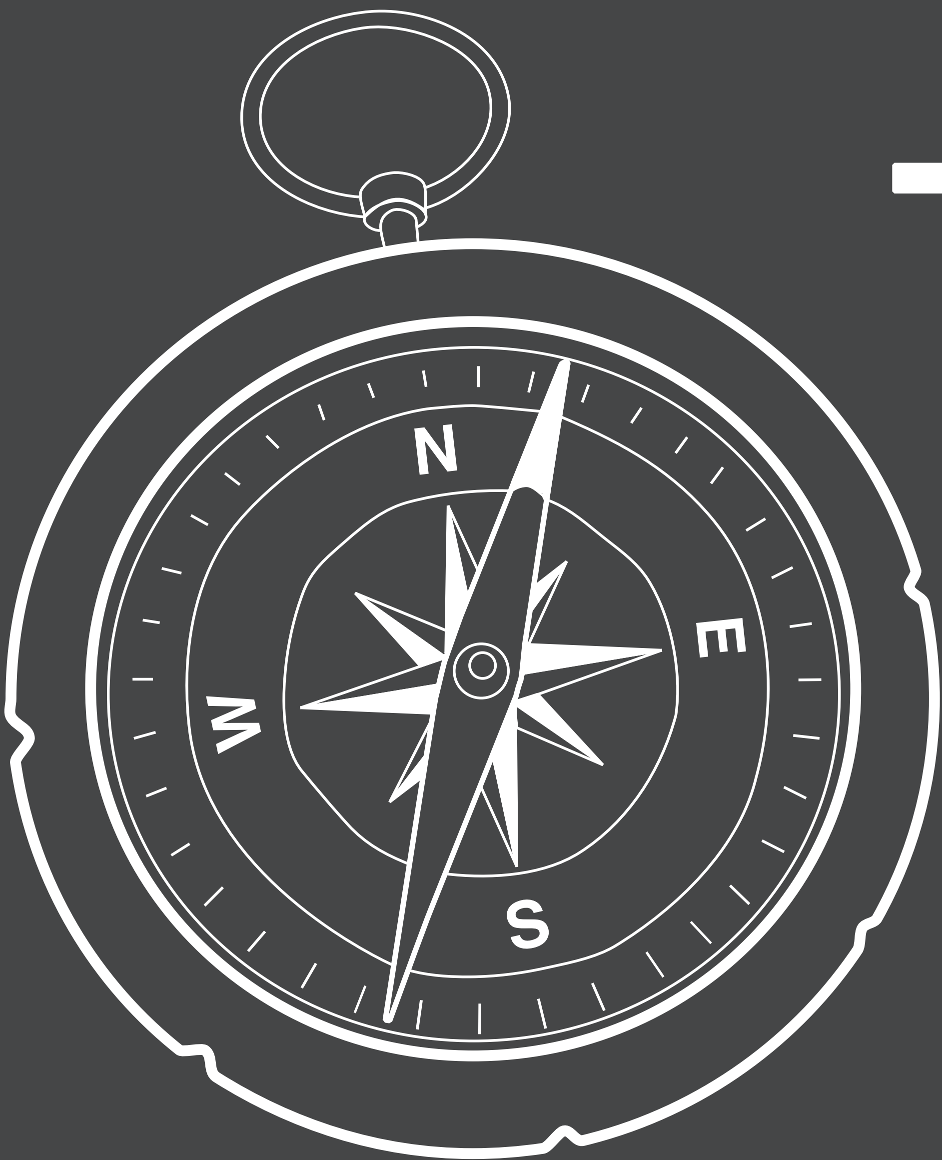

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Terminology

Access route – Any route in an internal or external environment whether it is level, gently sloped, ramped or stepped that is available and understandable for a person to use. In external environments, access routes comprise paths, pavements and other pedestrian routes, such as a right of way through a public space.

Accessible – With respect to buildings, or parts of buildings, means that people, regardless of age, size, ability or disability, are able to both access and use the building and its facilities.

Accessible design – Design focussed on principles of extending standard design to people with some type of performance limitation to maximize the number of potential customers who can readily use a product, building or service.

Accessible facilities – Facilities that are designed for all users of a building or external environment, including the young and old, and those of all sizes, abilities, and disabilities.

Acoustics – Characteristics relating to sound.

Automated teller machine (ATM) – A machine for dispensing cash and undertaking other financial transactions, including checking an account balance and changing a personal identification number. Also commonly termed cash point, cash machine, or cash dispenser.

Bathroom – A room comprising a bath, WC, washbasin, and associated accessories.

Building – A permanent or temporary structure of any size that accommodates facilities to which people have access. A building accommodating sanitary facilities may include a toilet block in a public park or shower facilities at a campsite. A temporary building may include portable toilet facilities such as those provided at outdoor events.

Building user – A person regardless of age, size, ability or disability using facilities in a building or associated external environment.

Clear width – The width between handrails.

Coir matting – A coarse kind of carpet made from coconut fibre usually used as a floor mat in matwells at building entrances.

Communal – An area that a group of individual people will share for a common purpose. A communal changing area will be a room for people to change and will typically comprise an open area with minimal privacy.

Designated car parking – Car parking spaces reserved for the use of car users with disabilities, whether as motorists or passengers.

Dog-leg/Switch back stairs – Configuration of stairs between two floors of a building, often a domestic building, in which a flight of stairs ascends to a half-landing before turning 180 degrees and continuing upwards. The flights do not have to be equal, and frequently are not.

Door ironmongery – A collective term for components including hinges, handles, locks and self-closing devices, which are used to facilitate the correct functioning of a door. May also be termed 'architectural ironmongery' or 'door furniture'.

Dropped kerbs – A lowered section of kerb between a pavement and carriageway forming a level or flush crossing point. Also referred to as dished kerbs.

Egress – Independent emergence of a person from a building and the immediate vicinity.

Escalator – A moving stairway.

Evacuation – Egress in an emergency situation, from a place of danger to a place of safety.

Evacuation lifts – Lifts designed to continue operating in the event of a fire, which have special design features to ensure safety.

Extranet – A private network that uses the internet to securely share part of an organisation's information or operations with others such as suppliers, customers or other businesses. An extranet may form part of an organisation's intranet that is extended to outside users.

Family toilets – A toilet compartment or washroom designed to meet the needs of a family group or adults supervising young children, which provides a range of facilities including baby-changing area, children's and adult WCs, in a single room.

Fillet – A decorative filler piece on the floor between balusters.

Grille or grill – An opening of several slits side by side in a wall or metal sheet or other barrier, usually to let air or water enter and/or leave but keep larger objects including people and animals in or out.

Handed – Referring to the layout of a room, this term means the provision of both left- and right-handed arrangements in a building.

Horizontal framing member – A horizontal bar running across a window.

Inclined platform stairlift – A stairlift incorporating a fold-down platform for wheelchair users and support rails that follows the incline of a stair. Also termed wheelchair stairlift and platform stairlift.

Intranet – An in-house website that serves the employees or members of an organisation. An intranet is not a site accessed by the general public.

Internet – A worldwide system of computer networks that uses the public telecommunication network to link millions of computers for communication purposes.

Kerbed upstand – Strip used to form a raised edge (for example 150mm high) at floor level.

Laid to falls – Paving and drainage that relies on fall to carry away water. Fall may also be referred to as slope or, more correctly, gradient. By making one part of the pavement higher than another, gravity will cause the water to move in a preferred direction.

Lift core – A standard industry term for the lift/lift shaft used to service an apartment complex / multi-story building.

Matwell – Entrance Door Matting Systems set into a frame in the floor.

Nosing – An edge part of the step tread that protrudes over the riser beneath in a flight of stairs.

Park and ride – The formal provision of car parking linked with either bus or rail services.

Passenger lift – A conventional motorised lift enclosed within a structural shaft and rising one or more storeys within a building. Lift and door movement is automatic.

Path – A pedestrian route that has no adjacent vehicle carriageway and includes paths in countryside locations as well as paths in urban and residential environments.

Pavement – A pavement is the part of a roadway used by pedestrians and is adjacent to the vehicle carriageway.

Payphone – A public telephone that requires payment on a call-by-call basis, either using coins, a prepaid telephone card, or a credit or debit card.

Person with mobility difficulties – A person who is able, either with or without personal assistance, and who may depend on prostheses (artificial limbs), orthoses (callipers), sticks, crutches or walking aids, to walk, provided that particular design features are installed or available.

Personal identification number (PIN) – A personal four-digit code used to verify card-based payments.

Plinth – The base or platform upon which a structure or fixed furniture fixture, such as a cupboard, rests.

Raked – The degree to which seating in an auditorium or theatre slopes. A seating rake is where the seats are on terraces (so they slope overall), rather than flat on the floor. This helps sight lines and means you can see over the people in front of you.

Refuge area – Areas within a building separated by fire-resisting construction and provided with a safe route to a storey exit, where people with mobility difficulties can await assistance for their evacuation.

Reverberation – The reflection of sound within a room or space.

Riser – The vertical portion between each tread on the stair.

Sanitary facilities – A collective term for toilet, shower, bathing and changing facilities in buildings.

Self-contained – A single facility, such as a shower or changing area that is enclosed by walls or cubicle partitions. A self-contained facility will provide greater privacy than communal facilities.

Setting-down point – A designated area close to a building entrance or other facility where passengers can alight from a car or taxi.

Settlement hierarchy –A way of arranging settlements into a hierarchy based upon their population or some other criteria.

Shower room – A room comprising a shower, WC, washbasin, and associated accessories, such as en-suite facilities in residential accommodation.

Soffit – The underside of any construction element, the underside of a flight of stairs.

Speed Tables – Traffic calming feature normally installed as part of a traffic-calming scheme that helps to reduce vehicle speeds by introducing modest up-and-down changes in the level of the street, thereby requiring drivers to decelerate. They are the same width as the road and rise to meet the grade of the pavement, providing safe and comfortable crossings. One benefit of speed tables is that people cross at the point where drivers decrease speed.

Stairlift – A device mounted on a support rail that follows the incline of a stair and incorporates either a seat with footrest (chairlift) or standing platform and perch (perching stairlift). Stairlifts are designed for domestic use only. Also termed chair stairlift and domestic stairlift.

Step nosing – The leading edge of a step or landing.

Street furniture – Items located in street and other pedestrian environments such as lamp posts, litter bins, signs, benches, and post boxes.

Tactile paving surface – A profiled paving or textured surface that provides guidance or warning to pedestrians with visual difficulties.

Textphone – A telephone device that facilitates text communication and incorporates a screen and keyboard.

Transfer arrangement – The technique adopted by wheelchair users to transfer from a wheelchair to a WC or shower seat and back. The technique will depend on individual preference and the layout and size of the toilet or shower compartment. Common terms for describing transfer arrangements include lateral (side) transfer, angled (oblique) transfer, frontal, or rear transfer. Transfer may be assisted or unassisted. A left-hand transfer means that a person transfers to their left when seated in a wheelchair.

Transom – A horizontal crosspiece across a window or separating a door from a window over it.

Travelator – A moving walkway designed to transport people quickly over a long distance in large buildings. Travelators are usually level, but may have a slight incline where a vertical change in level is also required.

Tread – The part of the stairway that is stepped on.

Unisex – Facilities that are usable by males and females. Unisex toilets or changing areas may be located adjacent to single-sex washrooms or changing areas but have an independent access. Unisex accessible toilets may be accessed by a person with an assistant, carer, or companion of the opposite sex.

Universal Design = Useable = Understandable - Understanding user needs – For example an older person may require many resting places due to discomfort when walking for long distances.

Vertical platform lift – A guarded platform that travels vertically and is designed to accommodate one wheelchair user and one companion. Vertical platform lifts do not require a structural shaft, but are required to be enclosed if they rise more than 2000mm. Also termed vertical lifting platform; vertical-rise platform lift; short-rise platform lift (up to 2000mm rise); enclosed platform lift; hydraulic platform lift; and scissor lift.

Vision panel – A fixed, glazed panel set into a door that enables people to see through from one side of the door to the other. May also be termed 'viewing panel.'

Visual contrast – Colour and/or tonal contrast between surfaces and fixtures, designed to improve visual clarity.

Washroom – The term for a room or area accommodating toilet cubicles and associated facilities, such as washbasins, hand dryers, and urinals (in facilities for males).

Waterless WC – A WC that does not use water to flush and is not connected to traditional water supply pipes or a waste drainage system. Waterless WCs may be used in remote areas, such as forestry sites, fairgrounds, car parks, and construction sites.

Wayfinding – A collective term describing features in a building or environment that facilitate orientation and navigation.

Wet room – A shower room in which the floor and walls are all waterproof. The shower area can be accessed without crossing a threshold or stepping into a shower tray.

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