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

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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

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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**.

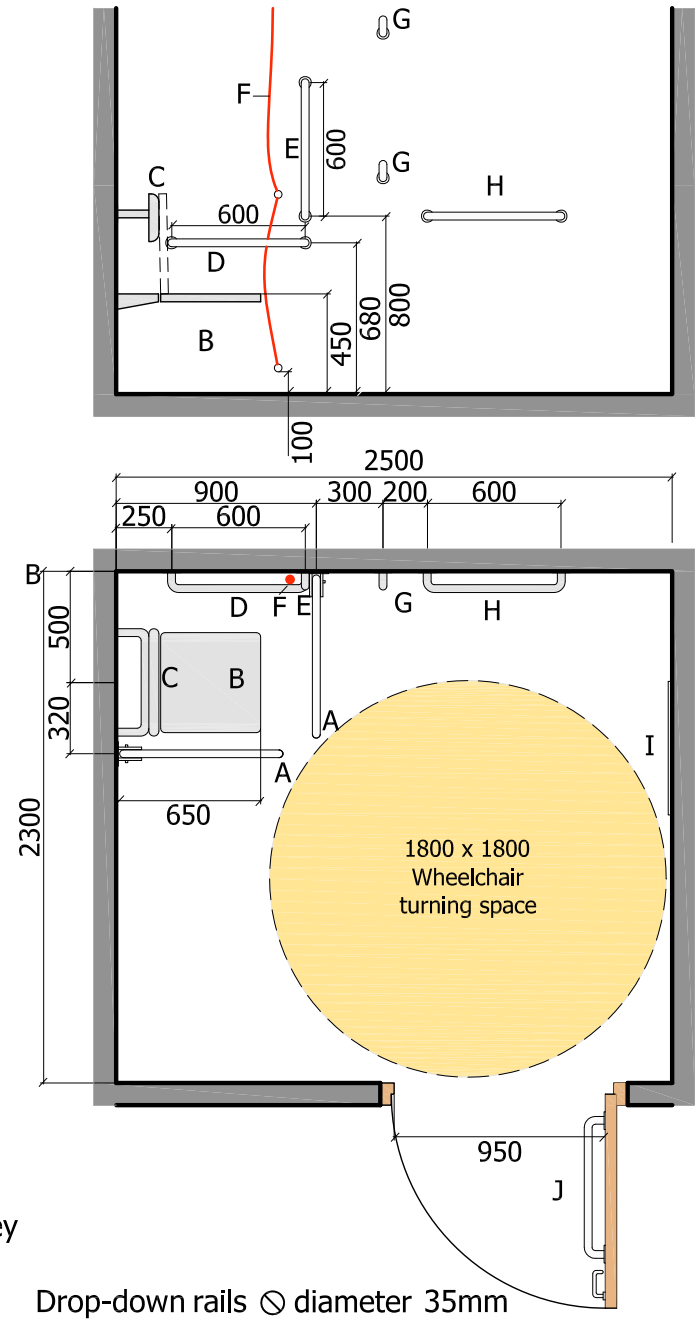
Checklist – Counters and checkouts
• Design counters to suit staff and customers in a seated and standing position.
• Provide a dual-height counter or a series of counters at different heights wherever possible.
• Provide a clear area of 2400mm x 2400mm in front of the counter for approach and manoeuvre.
• 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**.

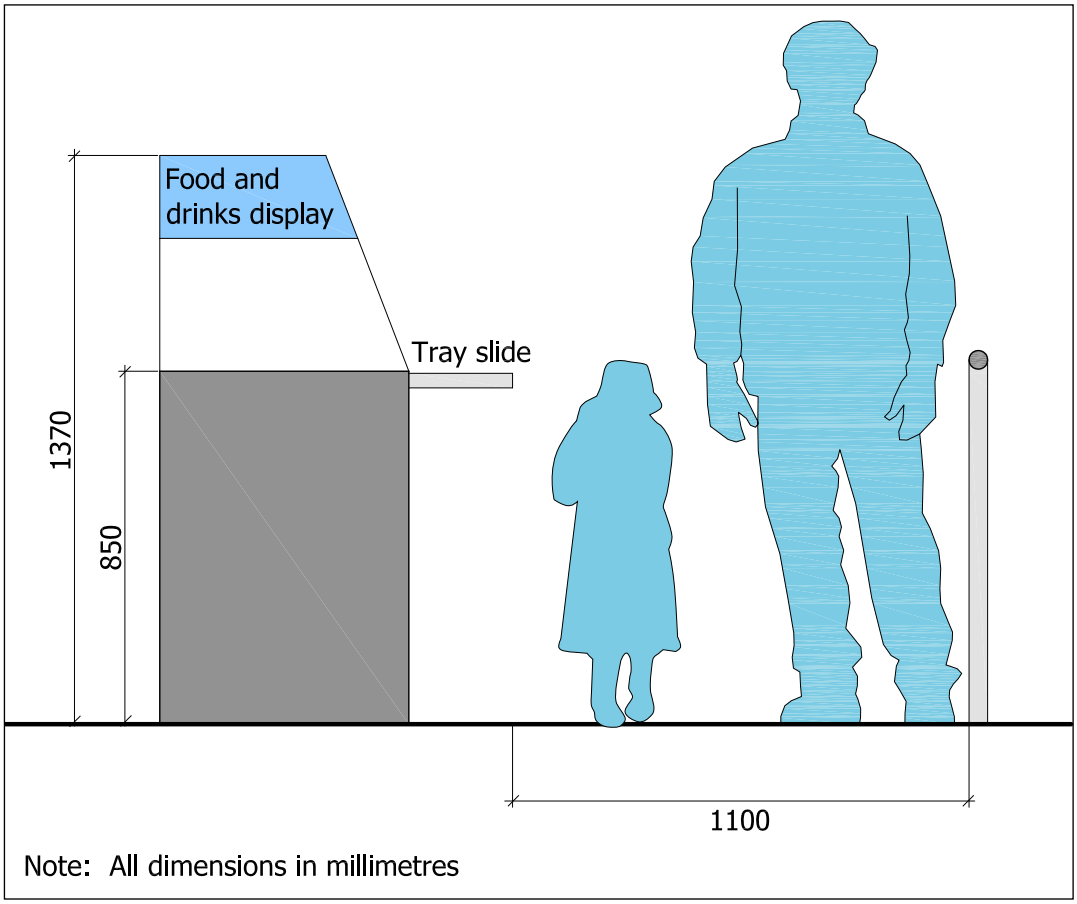
Tray storage should be clearly apparent and positioned adjacent to the beginning of a tray slide. The recommended height for tray storage is between 700mm and 1200mm above floor level. Trays should be designed to be easily gripped, with a raised edge to prevent items sliding or rolling off and with a 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

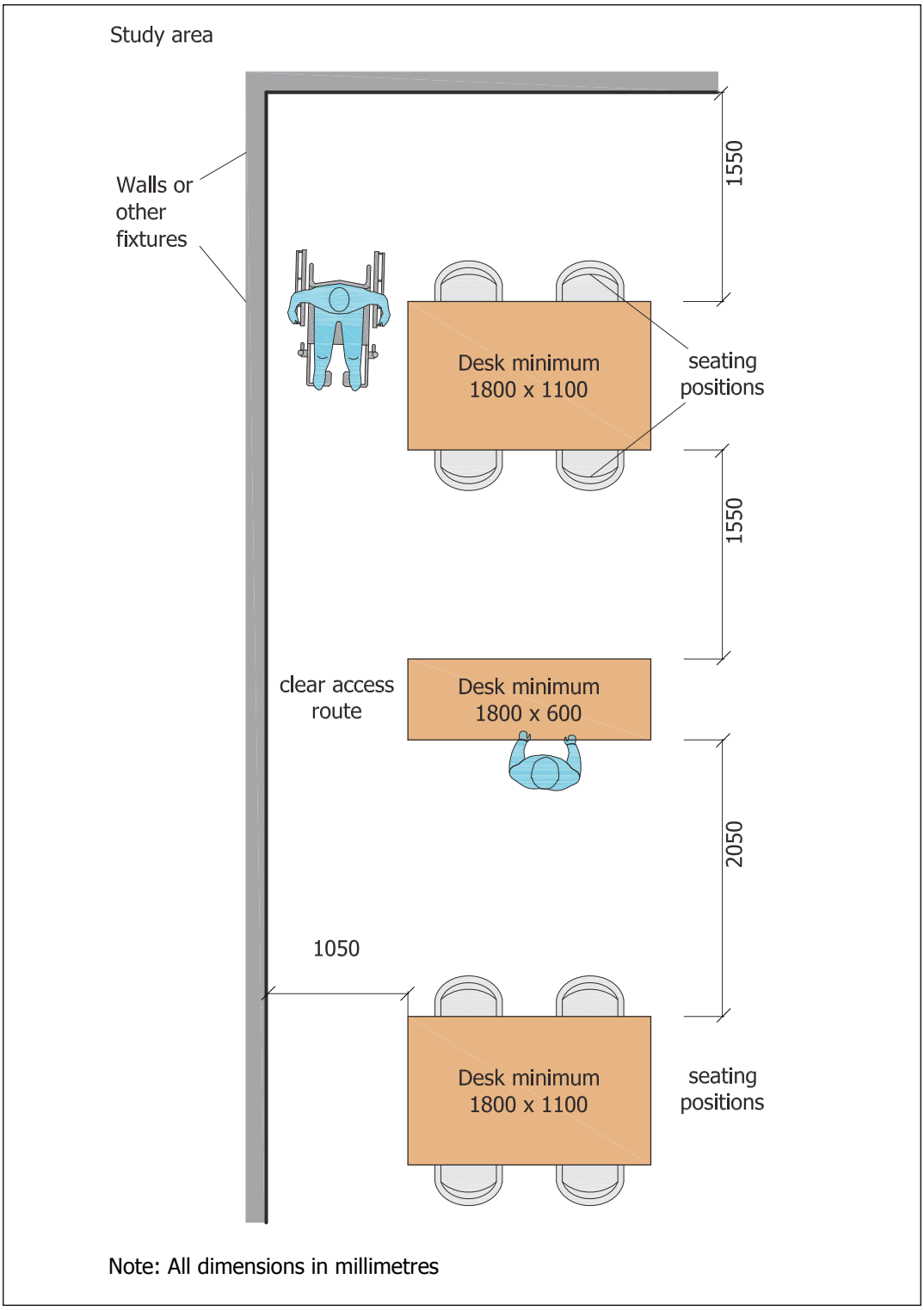
Areas for study should be provided in libraries, and in museums and galleries, where members of the public are able to access archive documents for research or general interest purposes.

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

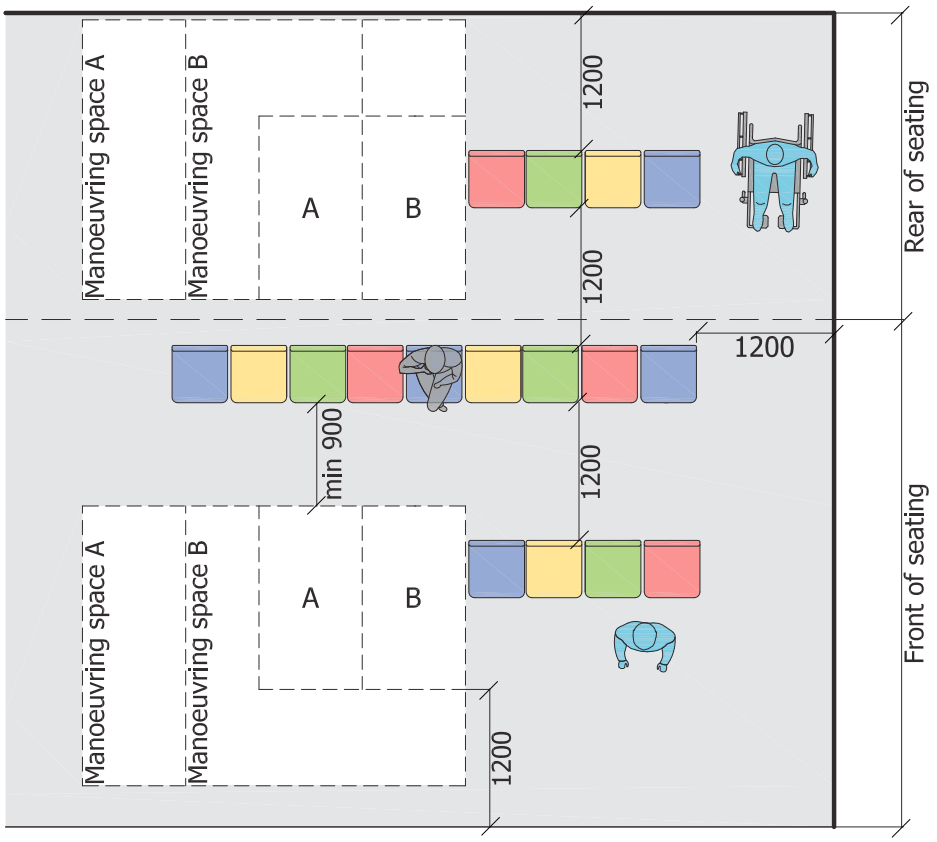
Audience seating may be arranged on raked or level floors. Whichever arrangement is adopted, sight lines from all seating positions should provide a good view of any speaker, screen, or presentation.

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.

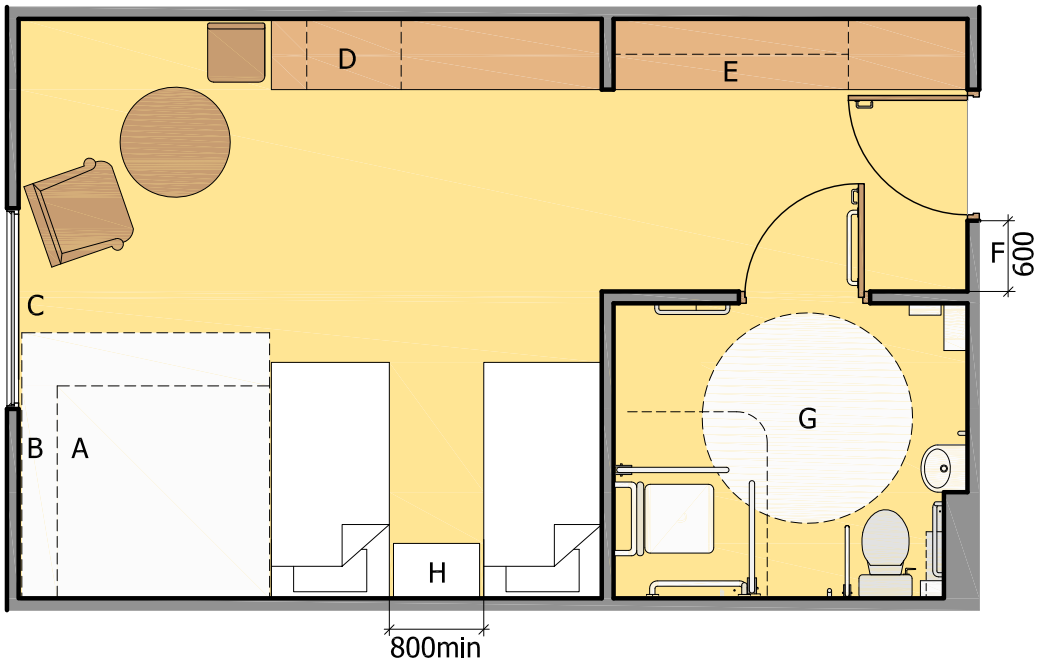
The amenities integral to bedroom accommodation, such as location and convenience in relation to other facilities and the enjoyment of a view, should be available to all guests on an equal basis. In small premises, such as bed and breakfast establishments in domestic properties where there is no lift, 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.

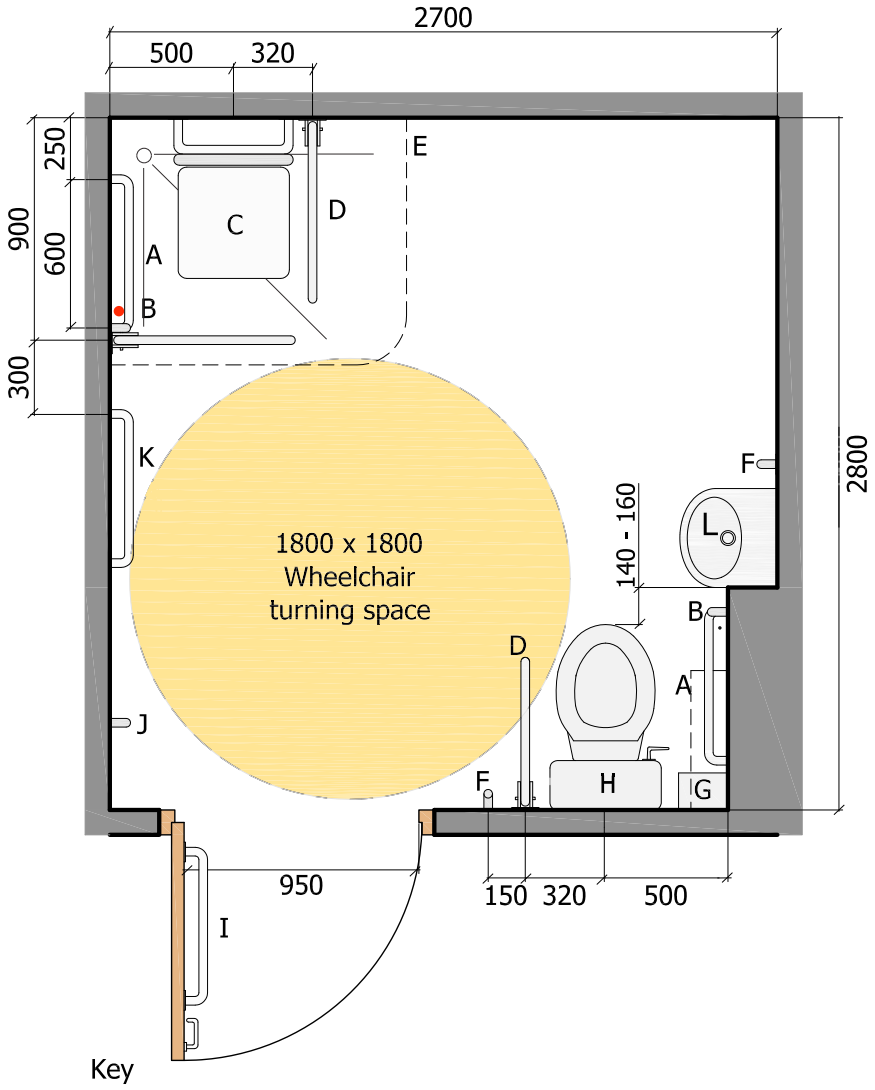


Key

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**.

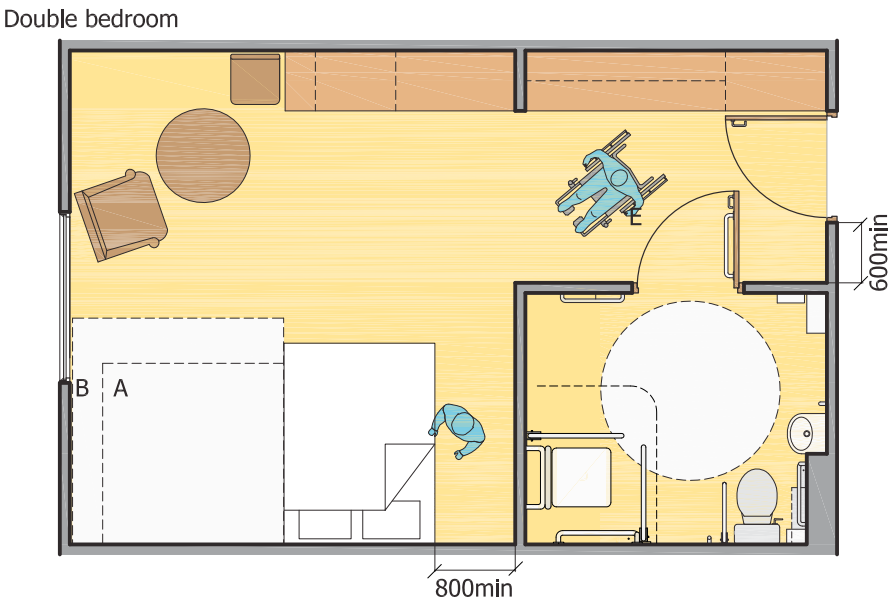
The controls for heating, ventilation, lighting, curtains or window blinds, radios, and televisions, as well as sockets for phone chargers, hair dryers and electronic equipment, should all be reachable from a seated position. They should be simple and easy to operate. Remote control units are ideal as they can be used from any point in the room.

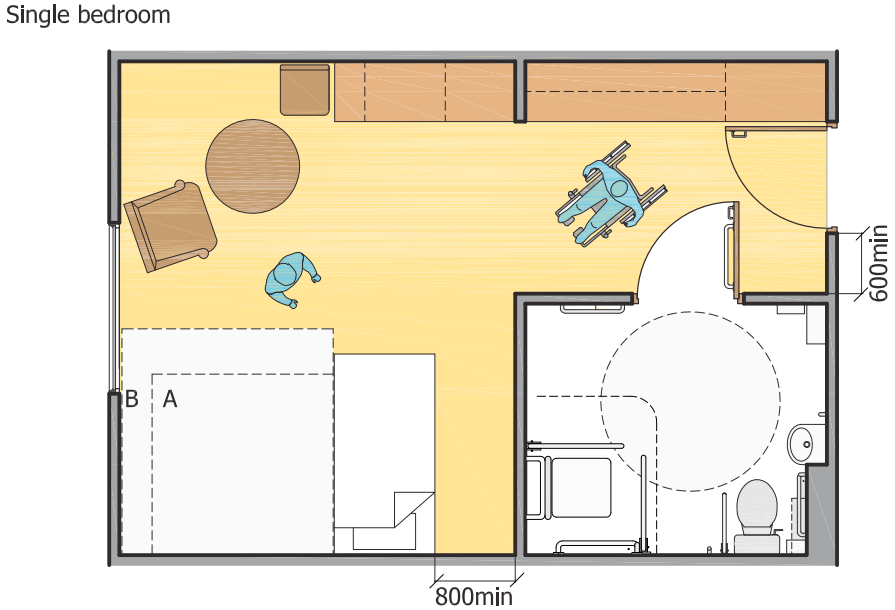
For further guidance on outlets, switches and controls, refer to **Booklet 4: Internal environment and services, Section 4.7**.

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.

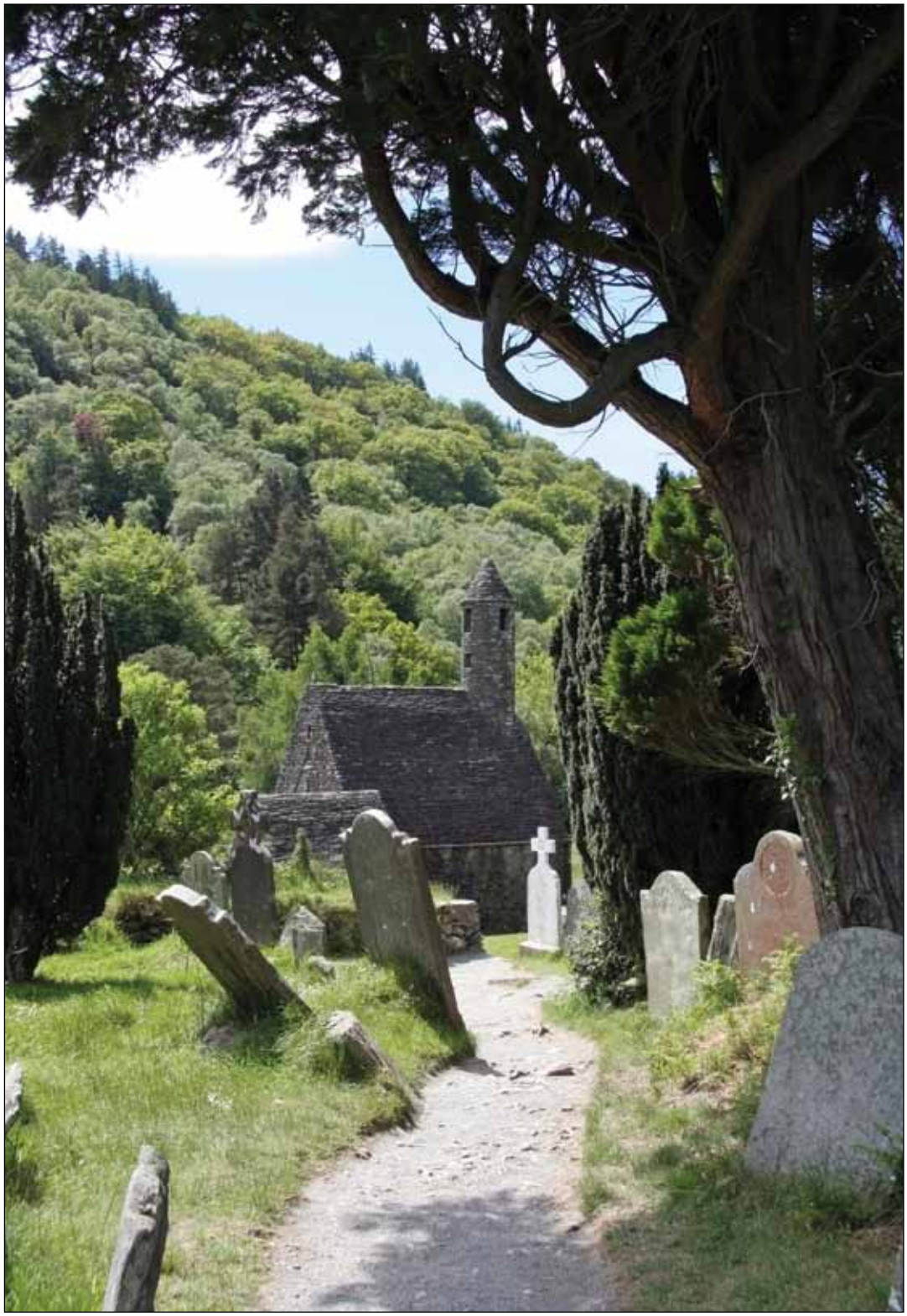


Image 7.16 Example of an urban park (Tamed landscape).

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

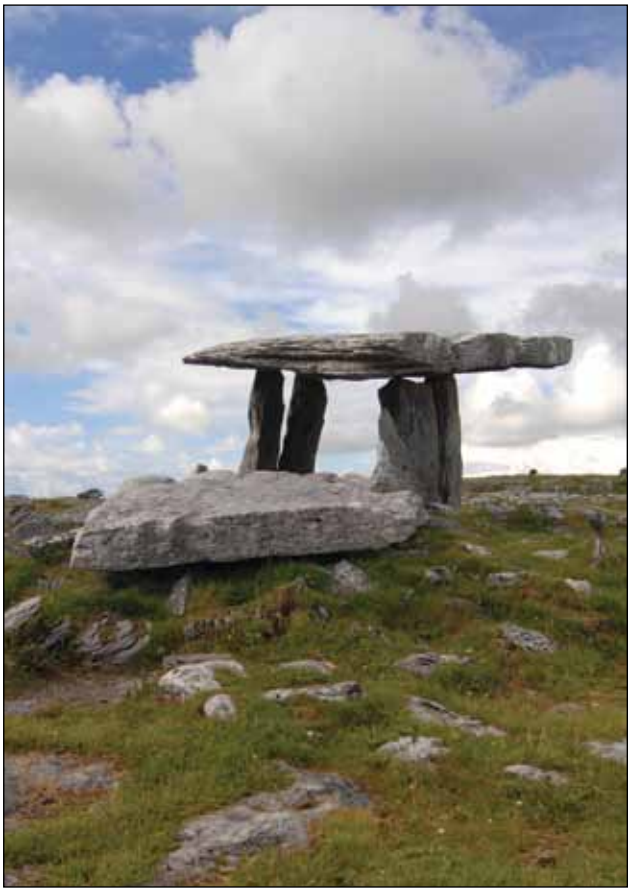
The natural landscape includes national parks, natural heritage areas, special areas of conservation and nature reserves, beaches, bogs, mountains and other remote places. Whilst it may not seem easy or necessary to make a mountain path accessible to a person using a wheelchair, for example, the underlying 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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