

Accessibility Design Guide: Universal design principles for Australia's aid program

A Companion Volume to Development for All: Towards a disability-inclusive Australian aid program 2009-2014

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These icons symbolise the Millennium Development Goals (MDGs)—eight goals representing an agreement by world leaders to reduce poverty and enhance human development by 2015. More information about the MDGs is available online at www.ausaid.gov.au/keyaid/mdg.cfm

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Abbreviations

AusAID Australian Agency for International Development

BESIK Be Saneamentu, Igene iha Komunidade (Community WASH)

CRPD Convention on the Rights of Persons with Disabilities (United Nations)

GIZ *Deutsche Gesellschaft für Internationale Zusammenarbeit* (formally known as GTZ), federally-funded German aid organisation

ICT information and communication technology

ILO International Labour Organization

UN United Nations

UNESCO United Nations Educational, Scientific and Cultural Organization

WASH water, sanitation and hygiene

WHO World Health Organization

About these guidelines

Accessibility Design Guide: Universal design principles for Australia's aid program provides guidance on enabling people with disability to participate equally in social and economic life through the design and implementation of development initiatives.

This guide is a rich resource of ideas which development practitioners can consider when applying universal design. The aim is to support Australia's aid program so it minimises barriers and becomes more accessible to people with disability and other groups, including the elderly, pregnant women, children and people with a temporary illness or injury.

While based on good practice and successful implementation of universal design internationally, this guide is not meant to be prescriptive. It is based on the reality that the barriers people with disability face vary between developing countries and between locations in-country. It is also based on the reality that each development project is unique and faces its own challenges, locally or otherwise, that may prevent it from applying all universal design principles to the letter.

This Accessibility Design Guide supports Australia's own commitment to people with disability and supports its international obligations. It has been developed to support the many players involved in designing, appraising, implementing, monitoring or otherwise managing Australian aid activities funded through the Australian Agency for International Development (AusAID). This includes:

- › AusAID activity managers
- › contractors
- › non-government organisations, including Disabled People's Organisations
- › development partners, including partner governments.

It may also be of relevance to other donors and international aid organisations.

This guide is divided into two parts:

- › Part A discusses the importance of including people with disability in Australia's aid program and how doing so supports Australian and international commitments. It also provides context for how disability inclusion is integral to sustainable development.
- › Part B contains annexes providing practical guidance to consider across a range of sectors in which Australia's aid program is involved. It includes checklists, diagrams and examples to help practitioners integrate universal design principles into different thematic areas.

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Part A

1. Background

In producing the *Accessibility Design Guide: Universal design principles for Australia's aid program*, the Australian Government is responding to its national and international commitments in supporting people with disability, specifically through the physical (built) environment.

In producing this guide, the Australian Government has taken another step forward in supporting its disability-inclusive development strategy—*Development for All: Towards a disability-inclusive Australian aid program 2009–2014*.¹ *Development for All* marks a change in the way the aid program is designed and delivered. Its central premise is equality and the need to include people with disability in all aspects of development, to ensure that policies and programs are shaped to better take account of their requirements. This guide supports the implementation of *Development for All*'s first core outcome, which is 'Improved quality of life for people with disability.'²

The *Accessibility Design Guide* also supports Australia's response to *An Effective Aid Program for Australia: Making a real difference—Delivering real results*, published in 2011. In *Effective Aid* the government committed to 'enhancing the lives of people with disabilities' as one of the 10 development objectives of the aid program.³

Internationally, this guide supports Australian obligations under a range of United Nations (UN) agreements including, importantly, the Convention on the Rights of Persons with Disabilities (CRPD).⁴ This is the first international Convention to include an article on development (Article 32). As a party to the Convention, Australia is committed to ensuring that development activities are inclusive of, and accessible to, people with disability.

These guidelines are consistent with the CRPD's definition of 'universal design', meaning that the design of products, environments, programs and services are to be usable by all people, to the greatest extent possible, without the need for adaptation or specialised design. Universal design does not exclude assistive devices for particular groups of people with disability where this is needed.⁵

The World Report on Disability 2011 states that disability is a development issue because of its bidirectional link to poverty: disability may increase the risk of poverty and poverty may increase the risk of disability. An increasing body of research acknowledges that people with disability and their families are more likely to experience economic and social disadvantage than those without disability. The Australian aid program is committed to extending the benefits of development to all and to the promotion of dignity and wellbeing of people with disability.

¹ *Development for All: Towards a disability-inclusive Australian aid program 2009–2014*, Australian Government, 2008.

² *Principles of Universal Design and Universal Design Quick Reference*, the Centre for Universal Design, North Carolina State University, 1997, last updated 30 May 2011.

³ *An Effective Aid Program for Australia: Making a real difference—Delivering real results*, Australian Government, 2011.

⁴ CRPD, 2008. The CRPD represents the culmination of decades of effort to ensure that rights of people with disability are promoted and protected through an internationally agreed legal framework.

⁵ Article 2 Definitions, CRPD, 2008.

2. Definition of universal design⁶

While this guide primarily focuses on physical accessibility to the built environment it is important to also consider other dimensions of accessibility such as the social, communication and information systems within the built environment. This guide draws from the understanding of universal design as stated in the CRPD.

While the concept of universal design emerged primarily with people with disability in mind, universal design helps everyone with support and assistance needs including the elderly, pregnant women, children and people with a temporary illness or injury. Thus the benefits of implementing universal design are wide.

Applying the seven universal design principles in Box 1 will support practitioners to better meet the needs of as many users as possible.⁷ When working in developing countries, it is important to also take into account cultural, economic, engineering, environmental, gender and social contexts.

Box 1: Seven universal design principles

Principle 1: Equitable use

Design that is useful and marketable to persons with diverse abilities.

Principle 2: Flexibility in use

Design that accommodates a wide range of individual preferences and abilities.

Principle 3: Simple and intuitive use

Design that is easy to understand, regardless of the user's experience, knowledge, language skills, or concentration level.

Principle 4: Perceptible information

Design that communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

Principle 5: Tolerance for error

Design that minimises hazards and the adverse consequences of accidental or unintended actions.

Principle 6: Low physical effort

Design that can be used efficiently and comfortably and with a minimum of fatigue.

Principle 7: Size and space for approach and use

Design that provides appropriate size and space—for approach, reach, manipulation, and use, regardless of the user's body size, posture or mobility.

⁶ Article 2 Definitions, CRPD, 2008.

⁷ *Principles of Universal Design and Principles of Universal Design Quick Reference*, the Center for Universal Design, North Carolina State University, 1997, last updated 30 May 2011.

3. Inclusive development

Inclusive development requires understanding and tackling the barriers faced by marginalised groups. This section:

- › summarises some of the barriers faced by people with disability
- › outlines Australia's vision on disability-inclusive development
- › explores international development partners' approach to disability-inclusive development in line with the CRPD
- › explores accessible infrastructure
- › considers the cost of incorporating universal design
- › considers the cost of not incorporating universal design
- › discusses how the participation of local stakeholders helps reduce universal design costs.

3.1 Barriers faced by people with disability

More than 1 billion people, or 15% of the world's population, experience some form of disability.⁸

People with disability face many obstacles in their physical environment that prevent them from fully exercising their rights and participating in social, cultural and professional life on an equal basis with others. This includes access to education and health services, the opportunity to earn a living and the right to participate in family, community and political life. A barrier-free environment is key to social inclusion of people with disability.⁹ Improved accessibility also benefits society as a whole.

The International Disability and Development Consortium, in its statement on CRPD Article 9 Accessibility¹⁰, noted that people with disability are largely overlooked in development policies and programs. This includes:

- › physical and/or environmental accessibility—removing barriers
- › communication accessibility—providing accessible formats in alternative modes and means of communication
- › intellectual accessibility—providing reading formats and speaking in a way that is accessible to people with intellectual and/or learning disability
- › social and/or attitudinal accessibility—removing stigma and other negative behaviour against people with disability and their families and carers
- › economic accessibility (also referred to as 'affordability')—establishing this as a core requirement of a person's social and economic rights.¹¹

⁸ *World Report on Disability 2011*, World Health Organization and World Bank, 2011. Geneva, WHO Press.

⁹ 'How to design and promote an environment accessible to all?' *Policy Paper Accessibility*, Handicap International, 2009.

¹⁰ International Disability and Development Consortium Statement on Article 9 Accessibility, UN CRPD, prepared for the 4th meeting of the Committee on the Rights of Persons with Disabilities, October 2010.

¹¹ See also M Schulze, 'Understanding the CRPD', Handicap International (Ed), 2010.

3.2 Australia's vision on disability-inclusive development

The Australian Government is committed to improving the quality of life of people with disability, including through its aid program.

Following Australia's ratification of the CRPD in 2008, a first major step in its commitment was to release *Development for All*, Australia's first ever disability-inclusive development strategy. The government strengthened its commitment in 2011 with the release of *Effective Aid* which included 'promoting opportunities for all' as one of the aid program's five strategic goals and 'enhancing the lives of people with disability' as one of its 10 development objectives.

This guide is designed to support Australia in putting its commitment into practice.

3.3 The United Nations Convention on the Rights of Persons with Disabilities

The CRPD recognises that disability is an evolving concept, and that it:

... results from the interaction between persons with impairments and attitudinal and environmental barriers that hinders their full and effective participation in society on an equal basis with others.¹²

The CRPD also recognises:

... the importance of accessibility to the physical, social, economic and cultural environment, to health and education and to information and communication, in enabling persons with disabilities to fully enjoy all human rights and fundamental freedom.¹³

As a human rights instrument with an explicit social development dimension, the CRPD is both a treaty and a development tool. It specifies that disability be considered in all programming, rather than as a stand-alone thematic issue. It requires all States Parties¹⁴ to implement measures ensuring full and equal participation of people with disability in society.¹⁵ The articles most relevant to universal design are highlighted in Table 1.

¹² CRPD, Preamble (e), CRPD 2008.

¹³ *ibid.*, Preamble (v), 2008.

¹⁴ 'Discrimination on the basis of disability' means any distinction, exclusion or restriction on the basis of disability which has the purpose or effect of impairing or nullifying the recognition, enjoyment or exercise, on an equal basis with others, of all human rights and fundamental freedoms in the political, economic, social, cultural, civil or any other field. It includes all forms of discrimination, including denial of reasonable accommodation. Article 2 Definitions CRPD, 2008.

¹⁴ 'Reasonable accommodation' means necessary and appropriate modification and adjustments not imposing a disproportionate or undue burden, where needed in a particular case, to ensure to people with disability the enjoyment or exercise on an equal basis with others of all human rights and fundamental freedoms. Article 2 Definitions, CRPD, 2008.

On their website UNICEF defines States Party as follows—a 'State party' to a treaty is a country that has ratified or acceded to that particular treaty and is therefore legally bound by the provisions in the instrument. Introduction to the Convention on the Rights of the Child. Definition of key terms. States Parties is the plural of State Party.

¹⁵ *Outcome of the World Summit for Social Development*, Secretary General Report 63/133, July 2008; *Realising the Millennium Development Goals for Persons with Disabilities*, General Assembly Resolution 64/131, February 2009

Table1: Highlights of the Convention on the Rights of Persons with Disabilities

Article 1:

> enshrines equal enjoyment of all human rights and fundamental freedoms

Article 2:

> defines discrimination, which includes the denial of reasonable accommodation

Article 3:

> outlines the eight core principles that apply to the spirit of the rights of people with disability

> includes (b) non-discrimination and (f) accessibility, which requires all signatories to provide equitable access to the physical environment, transportation and information and communications technologies, as well as to public areas, urban and rural

Article 4

> realises and promotes all human rights and fundamental freedoms for all people with disability without discrimination of any kind

> requires people with disability and Disabled People's Organisations to be included in decision-making processes (Section 4.3)

Article 5

> calls for equal recognition of people with disability before the law

Article 9

> requires all signatories to provide equitable access to the physical environment, transportation and information, communication and other services, as well as to public areas, urban and rural (Box 2)

Article 32

> covers international cooperation, which includes committing countries to a number of measures and committing signatories to ensuring development activities are inclusive and accessible to people with disability (Box 3).

Box 2 details Article 9 Accessibility, which enshrines the right of access. Accessibility should be seen as complementary to all CRPD articles.

Box 2: Convention on the Rights of Persons with Disabilities—Article 9 Accessibility

1. To enable persons with disabilities to live independently and participate fully in all aspects of life, States Parties shall take appropriate measures to ensure persons with disabilities have access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, both in urban and in rural areas. These measures, which shall include the identification and elimination of obstacles and barriers to accessibility, shall apply to, inter alia:
 - buildings, roads, transportation and other indoor and outdoor facilities, including schools, housing, medical facilities and workplaces
 - information, communications and other services, including electronic services and emergency services.
2. States parties shall also take appropriate measures to:
 - develop, promulgate and monitor the implementation of minimum standards and guidelines for the accessibility of facilities and services open or provided to the public
 - ensure that private entities that offer facilities and services which are open or provided to the public take into account all aspects of accessibility for persons with disabilities
 - provide training for stakeholders on accessibility issues facing persons with disabilities
 - provide in buildings and other facilities open to the public signage in Braille and in easy to read and understand forms
 - provide forms of live assistance and intermediaries, including guides, readers and professional sign language interpreters, to facilitate accessibility to buildings and other facilities open to the public
 - promote other appropriate forms of assistance and support to persons with disabilities to ensure their access to information
 - promote access for persons with disabilities to new information and communications technologies and systems, including the Internet
 - promote the design, development, production and distribution of accessible information and communications technologies and systems at an early stage, so that these technologies and systems become accessible at minimum cost

Box 3 details a key CRPD Article, which deals with international cooperation and guides the implementation of the Development for All strategy. Article 32 states that countries agree it is important to work together to ensure the Convention is put into practice.

Box 3: Convention on the Rights of Persons with Disabilities—Article 32 International Cooperation

1. States Parties recognize the importance of international cooperation and its promotion, in support of national efforts for the realization of the purpose and objectives of the present Convention, and will undertake appropriate and effective measures in this regard, between and among States and, as appropriate, in partnership with relevant international and regional organizations and civil society, in particular organizations of persons with disabilities. Such measures could include, inter alia:
 - ensuring that international cooperation, including international development programmes, is inclusive of and accessible to persons with disabilities
 - facilitating and supporting capacity-building, including through the exchange and sharing of information, experiences, training programmes and best practices
 - facilitating cooperation in research and access to scientific and technical knowledge
 - providing, as appropriate, technical and economic assistance, including by facilitating access to and sharing of accessible and assistive technologies, and through the transfer of technologies.
 - The provisions of this article are without prejudice to the obligations of each State Party to fulfil its obligations under the present Convention.

3.4 Accessible infrastructure

Making infrastructure accessible requires implementing and respecting standards and guidelines for accessible buildings and facilities, incorporating inclusive design at planning stages, constructing in compliance with standards, and training and raising awareness of stakeholders.¹⁶

Where the aid program is involved in planning and/or constructing new buildings, facilities, roads and transport, Australia will work with partners to ensure designs are accessible to all and, where necessary, will apply the principles of reasonable adjustment or reasonable accommodation as applied in the Disability Discrimination Act.¹⁷ Reasonable adjustment under Australian law is similar to the meaning of reasonable accommodation as applied in the CRPD.¹⁸

These guidelines support partner countries to incorporate accessibility requirements into their building codes. Working with partner governments is essential to sustainable change.

¹⁶ Article 9 Accessibility, CRPD, 2008.

¹⁷ *Disability Discrimination Act 1992* (Cwlth), Act no. 135 of 1992, s 4. An adjustment to be made by a person is a reasonable adjustment unless making the adjustment would impose an unjustifiable hardship on the person.

¹⁸ Article 2 Definitions, CRPD, 2008. 'Reasonable accommodation' means necessary and appropriate modification and adjustments not imposing a disproportionate or undue burden, where needed in a particular case, to ensure to persons with disability the enjoyment or exercise on an equal basis with others of all human rights and fundamental freedoms.'

3.5 The cost of incorporating universal design

Universal design is not as costly as many might think, especially when accessibility is addressed during planning and construction. Some developers and owners assume costs are larger than they are. This can be due to lack of knowledge and experience. Others rely on inaccurate construction cost estimates.

Some studies conclude that costs for accommodating accessibility regulations are small in relation to gross domestic product (as low as 0.01%).¹⁹ A study commissioned by the *Deutsche Gesellschaft für Technische Zusammenarbeit* (GTZ), now known as *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ), outlines some cost estimates for incorporating universal design.²⁰ Providing fully accessible facilities increases building costs by as little as 0.5% to 1% if planned, designed and implemented from the outset.²¹ Handicap International estimates that this is the case for new buildings or facilities and that additional costs are as little as 1% to 2% for public buildings.²² Even refurbishment costs can be significantly reduced when adaptations are properly planned and managed. The cost of retrofitting for accessibility after building completion is far greater.

Another misconception relating to the cost of incorporating universal design is how much extra physical space is required. In many cases, it may only require rearranging and plan within existing space. This was demonstrated in an AusAID-funded project²³ in Port Moresby, Papua New Guinea. At the Elementary Teachers Training College, the wheelchair accessible toilet and shower room doubled as a night bathroom in the dormitory blocks, saving people from having to go outside of the main dormitory building at night.

3.6 Cost of not incorporating universal design

The cost of not incorporating universal design can be significant. Inaccessible environments limit economic, education, health, social and other opportunities for people with disability, and make them more dependent on others.

It is important to consider the following three components when working with universal design. Each component can affect the economic viability of family units and contribute to a cycle of poverty:

- › direct costs for people with disability, including access to services such as travel
- › indirect costs to support persons and/or family members of people with disability
- › opportunity costs of foregone income for people with disability.

People with disability living in remote rural areas often have difficulty in accessing social services and therefore remain marginalised. Access to public and private transport is a key factor in breaking down barriers. Providing access from home to roads, transport stops and between buildings is critical in ensuring increased access to a wide range of services.

Primary carers for people with disability are often women, whose wider participation in family and community activities can be restricted due to caring responsibilities. In addition, children who are carers are often denied long-term education, which restricts their employment and social opportunities.

¹⁹ Estimates for meeting the Americans with Disabilities Act (1990) and its 2008 amendments, conclude, for example, that 69% of actions cost nothing, 28% cost less than US\$1000 and just 3% cost more than US\$1000.

²⁰ R Wiman and J Sandhu, *Integrating Appropriate Measures for Persons with Disabilities in the Infrastructure Sector*, 2004.

²¹ RL Metts, 'Disability Issues, Trends and Recommendations for the World Bank', Social Protection Discussion Paper no.0007, 2000, World Bank.

²² E Plantier-Royon, 'How to design and promote an environment accessible to all?', *Policy Paper Accessibility*, Handicap International, 2009.

²³ Papua New Guinea Education Capacity Building Project, Elementary Teachers Training College, AusAID, 2004.

The cost of not incorporating universal design can be significant to individuals and their communities. For example, people who use a wheelchair can face physical barriers, stigma and discrimination in their local communities. These barriers can lead to lost opportunities to contribute economically to family and community. Barriers can also mean people with disability need increased assistance to participate. Designing community facilities to be accessible provides opportunity for people to access education, employment and public life. It also means less reliance on others to be able to participate and it helps reduce stigma.

3.7 Participation of local stakeholders to reduce universal design costs

Because of differences in local conditions, local stakeholder participation is key to cost-effective universal design. Good practice in one region is not necessarily even viable in another.

Infrastructure in developing countries is normally restricted by resources and so some project designers use local materials or techniques as much as possible to keep costs down. Involving local stakeholders can also help designers identify sources of locally available products and construction techniques that can be incorporated into design. It also helps identify ways in which people with disability and their families are modifying their environment.

This participation is also important because it encourages long-term buy in and ownership of community infrastructure. Wider participation can motivate local communities, including people with disability and Disabled People's Organisations, to be involved in on-going monitoring of facilities and in identifying when maintenance is required. These steps can reduce universal design costs.

3.7.1 Approach

To succeed, universal design needs to start with planning and proceed through implementation, monitoring and evaluation.

As this section outlines, it is important for universal design to avoid costly mistakes by:

- › being participative, sensitive and inclusive
- › being realistic
- › considering regulatory, structural, human behaviour and operational practices.

Participative, sensitive and inclusive

Participation is a fundamental principle of universal design. Governments, people with disability, non-government organisations, including Disabled People's Organisations, and other stakeholders need to be consulted early, starting with planning. Consultation needs to continue throughout design, implementation and monitoring and evaluation. This is consistent with the CRPD²⁴ which states that:

... persons with disabilities should have the opportunity to be actively involved in decision-making processes about policies and programmes, including those directly concerning them.

²⁴ CRPD, Preamble (o), CRPD, 2008.

Realistic

The *World Report on Disability 2011* notes that constructing an accessible environment is often best achieved when approached incrementally and in a realistic fashion. The aim is to build a 'culture of accessibility'.²⁵

Since it is not possible to bring all infrastructure in any country, developing or otherwise, to a universal access standard immediately or at one time, it is necessary to be realistic and to prioritise interventions and investments.

Regulatory, structural, human behaviour and operational practices

To work, universal design needs to consider regulatory, structural, human behaviour and operational practices. These all play an important role in planning and implementation.

Regulatory

Implementation of local policy, legislation and enforcement rules are needed for universal design principles to work. For rural markets to be effective, for example, those who sell and buy have to follow local rules and regulations such as hygiene, opening times and safety procedures. Lack of appropriate regulation, enforcement and maintenance can change pedestrian areas from being accessible and safe to being areas of danger and concern.

Structural

Universal design plays an important role in making markets work by providing physical structures, such as easily accessible entry points, wide entry doors, wide aisles, and ramps with railings and handles. It can also ensure selling surfaces are at the right height, water points have easy access levers and public toilets are designed for easy access.

Human behaviour

Without education and awareness, human behaviour can work against universal design and equal access. Taxi drivers and other transport operators can block road access, sellers can encroach on aisles with their produce, crowds can litter ramps and walkways and block or break water sources.

Operational

Poor operational practices, in new and existing infrastructure, can mitigate impact on universally designed infrastructure. For example, footpaths, ramps and other pedestrian facilities built in urban areas of developing countries, including in villages and rural towns, can become inaccessible if blocked by building materials, parked vehicles, rubbish or trading stalls.

²⁵ *World Report on Disability 2011*, World Health Organization and World Bank, 2011. Geneva, WHO Press.

4. Universal design in the Aid Management Cycle

AusAID structures the development of its aid programs using the Aid Management Cycle to ensure delivery within the parameters defined by Effective Aid.

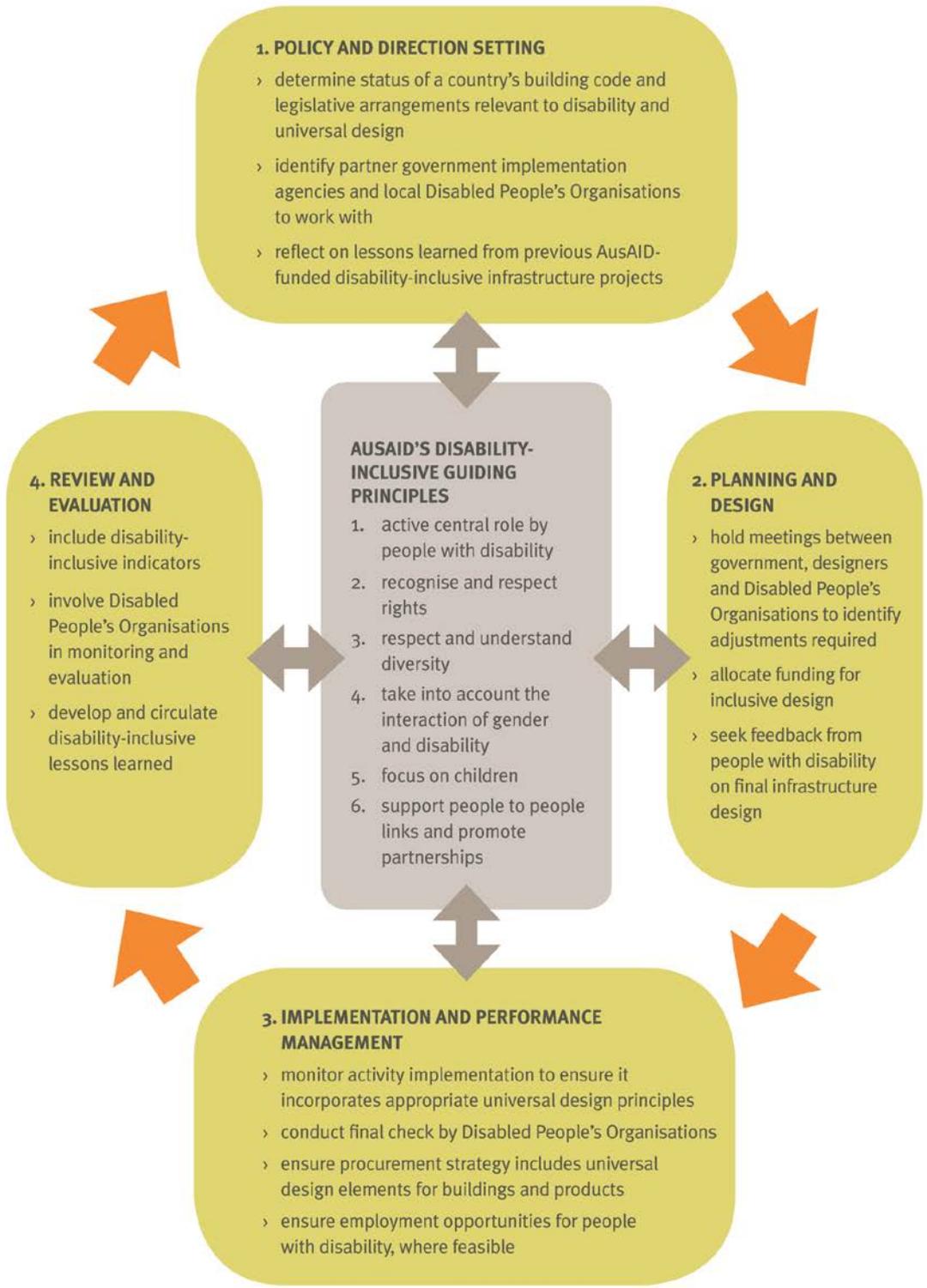
4.1 The Aid Management Cycle

The cycle's four overlapping phases are:

1. policy and direction setting
2. planning and design
3. implementation and performance management
4. review and evaluation.

Figure 1 illustrates the interaction between the four phases of the Aid Management Cycle. It also illustrates how the implementation of universal design in project management interacts with Development for All's guiding principles.

Figure 1: Universal design in AusAID’s Aid Management Cycle



4.1.1 Phase 1—policy and direction setting

This phase involves researching, analysing and consulting. The aim is to articulate the direction of an aid program in a given context. With universal design, it is important to:

- › Identify and understand a partner country’s legislative frameworks as a starting point. Some developing countries have legislative frameworks and policies on disability inclusion. Most do not have guidelines, codes or regulations on minimum universal design and infrastructure standards.
- › Identify the in-country Disabled People’s Organisations and other points of support. If there are no such organisations, identify, consult and work with disability activists or self-advocates.
- › Document lessons learned from all Australian projects that include disability and make this information available to infrastructure designers and other stakeholders for action.

4.1.2 Phase 2—planning and design

This phase involves planning and designing the ways in which AusAID will finance and resource individual investments. This includes how risks will be managed and how performance will be tracked.

With universal design it is important to approach planning and design by:

- › establishing collaboration between government representatives, infrastructure designers and Disabled People’s Organisations to set the parameters for the proposed design, including on available time and funding
- › considering the priorities of those with different types of disability, and design accordingly
- › incorporating universal design into the planning phase, so that costs are identified as part of the total construction cost, and not as an add on.

4.1.3 Phase 3—implementation and performance management

This phase involves AusAID managing investments to achieve agreed results. Universal design must be appropriate for the developing country context and recognise local issues and practices. It is important to involve Disabled People’s Organisations and promote employment opportunities for people with disability.

4.1.4 Phase 4—review and evaluation

This phase involves reviewing and evaluating the effectiveness of AusAID’s contribution and feeding results into future work. Development stakeholders need to document disability-inclusive lessons learned. These need to be widely circulated so they can be incorporated into the planning of Australian aid infrastructure projects.

5. Sectors of the aid program requiring universal guidelines

The Australian aid program provides assistance across a range of sectors including:

- › health
- › water, sanitation and hygiene
- › energy
- › housing
- › education
- › information and communication technology
- › transport infrastructure
- › rural development
- › law and justice
- › humanitarian action.

Universal design plays an important role in the infrastructure components of each of these sectors. The annexes to this Accessibility Design Guide set out how universal design measures can be applied to support Development for All.

Box 4 is a quick checklist of accessibility elements to consider under each sector. It is based on the Process of Access²⁶, a concept based on extensive stakeholder consultations and discussions involving people with a range of disability. It recognises the essential and sequential links between accessible information, transportation, public domains, outdoor areas and the built environment. This benefits everyone since people with and without disability need reliable information, efficient transport and accessible public areas to reach any activity, building, destination or service.

This checklist recommends that signage and information be provided as the first priority, followed by access to and within buildings and services (such as through car parking, pathways and roads).

²⁶ M Fox AM, Access Australia.

Box 4: Accessibility elements to consider

Item → Guidance

Information → Provide information about the environment or service in accessible formats.

→ Provide information at locations where people with disability will most likely find it, such as community centres, libraries and schools.

Signage → Provide signs that are readable, in Braille where possible.

→ Use non-reflective and colour contrasting materials.

→ Remove unnecessary or confusing signs.

Pathways → Provide accessible pathways between buildings and leading to the car park.

→ Ensure no breaks in path of travel, including with steps.

Rural roads → Acknowledge that rural roads are likely to be used by pedestrians with disability, as well as vehicles.

→ Allow for footpaths adjacent to roads through built-up areas.

Car parking → Provide accessible car parking spaces that will allow a person in a wheelchair to easily get into and out of a vehicle.

→ Ensure parking is close to building entrances.

Drainage → Cover drains that lie adjacent to pathways or corridors.

→ Cover drains that cross travel paths.

→ Construct grates or bridges over drains that are accessible.

Access to rooms → Provide ramped alternatives to ground floors.

→ Provide level access to all rooms.

→ Avoid unnecessary level changes.

→ Construct doors that are of an adequate width.

Toilets → Provide disabled access toilets into new or incorporate into existing infrastructure.

→ Construct handrails that are at correct height.

→ Provide sufficient room around toilet bowls and wash basins to allow easy manoeuvrability by people in wheelchairs.

Water → Provide drinking water close to households that is easily obtainable.

→ Provide washing facilities that allow for bathing by people with disability.

Stairways → Provide accessible handrails on both sides.

→ Provide adequate lighting.

Box 5 shows top 10 tips that can be used by AusAID and its partners to promote universal design in Australia's aid program.

Box 5: Top 10 tips for promoting universal design

- identify and understand a partner country's legislative framework and building standards and codes
- establish early collaboration between government representatives, infrastructure designers and Disabled People's Organisations
- consult with a representative range of disability groups as equal participants throughout the project cycle and after the project is complete, to assess the effectiveness of the design and to collect lessons learned
- learn how local people with disability and their families adapt their environments to make them more accessible
- include people with disability on general planning committees to ensure a better understanding of the barriers faced by people with disability
- include costs for inclusive design as part of overall construction costs and not as an add on
- ensure that contractors and consultants consider employing people with disability in design, construction and administration
- raise the importance of universal design with other development partners, using AusAID's Accessibility Design Guide as a reference tool
- advocate for universal design principles to be reflected in local laws and policies
- capture lessons learned to ensure that they are incorporated into planning of future Australian aid funded infrastructure projects and publicise good practice.

Part B

Annex A: Built environment

1. Purpose

Accessibility Design Guide: Universal design principles for Australia's aid program provides guidance on enabling people with disability to participate equally in social and economic life through the design and implementation of development initiatives.

This annex provides guidance that development practitioners can consider when applying universal design principles in the built environment. While based on good practice and successful implementation of universal design, this guide is not meant to be prescriptive. It is based on the reality that the barriers people with disability face vary between developing countries and between locations in-country. It is also based on the reality that development projects are unique and face their own challenges, locally or otherwise, relating to the built environment.

This annex starts with a general description of the importance of the built environment. It then explores built environment accessibility guidelines relating to accessibility for people with disability under the following headings:

- sensory
- outdoor environments
- horizontal areas
- vertical areas.

Recommendations on technical construction issues are included under each heading, based on information published by the United Nations (UN) Department of Economic and Social Affairs (UN Enable website)²⁷ and CBM²⁸.

The built environment annex ends with a list of resources.

This annex should be read in conjunction with the guidance in all other annexes of the Accessibility Design Guide.

²⁷ UN Enable's website has more recommendations on technical construction issues.

²⁸ CBM, previously known as the Christian Blind Mission, is one of the world's largest organisations working with people with disability in the poorest places.

2. General

Achieving equitable access requires understanding and applying all factors that can affect accessibility. The concept of *Process of Access* recognises the essential and sequential links between accessible information, transportation, public domains, outdoor areas and the built environment.²⁹

These guidelines define accessibility in the built environment in line with the definition found under Article 9 of the Convention on the Rights of Persons with Disabilities (CRPD), which means everyone should be able to:

- reach all places
- use and work their way around the built environment without assistance.³⁰

In developing countries, this means accounting for local conditions and standards. It also means using appropriate and affordable materials and practices.

²⁹ M Fox AM, Access Australia.

³⁰ Article 9 Accessibility, CRPD, 2008.

3. Key universal design principles to consider

Constructing an accessible barrier-free environment is often better achieved if approached incrementally and can focus upon building a ‘culture of accessibility’³¹ and removing basic environmental barriers. As the concept of accessibility becomes more ingrained and familiar, and as more resources become available, it becomes easier to raise standards and attain higher levels of mainstream disability inclusion.

Following the specific guidance under the four headings provided in this annex will result in a secure and accessible environment within and between buildings and in outdoor environments. This will promote opportunities for greater mobility and result in increased social and economic independence.

This guidance is grouped under four design requirement headings:

1. sensory, including tactile warnings, guide ways and information
2. outdoor environments, including obstructions, signage, street furniture, pathways, kerb ramps, pedestrian crossings, parking and children’s playgrounds
3. horizontal areas, including doors, entrance areas and lobbies, corridors, handrails and railings, bathrooms and toilets
4. vertical areas, including ramps, lifts and stairs.

3.1 Sensory accessibility

This section deals with sensory accessibility design requirements. Accessible information and communications is important for everyone, including people with low vision and blindness to navigate physical spaces. CBM has developed design principles on how the built environment in developing countries can help people with low vision and blindness to be mobile.³² This involves a consistent and continuous guiding system that includes tactile:

- › warnings
- › guide ways
- › information.

Lighting and good signage is an important aspect in providing a safe and secure environment, particularly for people with disability.

Communication within the environment is important. Adequate lighting allows for signage to be read. It is also necessary to enable people who use sign language or visual cues in speech to see their communication partners. Emergency communication systems must have both auditory and visual cues.

3.2 Outdoor environments

This section deals with the design requirements of accessible outdoor environments, including outdoor areas, open spaces and recreational areas. It covers obstructions, signage, street furniture, pathways, kerb ramps,

³¹ *World Report on Disability 2011*, World Health Organisation and World Bank, 2011, Geneva, WHO Press.

³² *Promoting Access to the Built Environment: Guidelines*, CBM 2008.

pedestrian crossings, parking and children's playgrounds.

3.2.1 Obstructions

Obstacles, protruding elements and anything else obstructing the path of travel should be removed or relocated. This includes:

- overhanging obstructions, such as electric cables, light fixtures, shop awnings, signs and vegetation
- fixed objects on pathway surfaces, such as bollards, garbage bins, poles, trees and other street furniture
- unfix objects on pathway surfaces, such as A-frame signs, commercial street furniture, planting tubs, retail and food carts, and stalls
- spaces below ramps and stairs.

Ideally obstructions need to be relocated from pathway surfaces and outside the path of travel in a continuous line. The recommended minimum width for a clear path of travel is 900 mm, with a minimum clear height of 2 m.

Guidelines to consider:

If obstructions cannot be relocated this way, they need to be clearly detectable which means they must:

- be a vertical shape rising from the pathway surface
- be placed on a 100 mm raised platform where possible
- have tactile markings on the ground around the obstacle with a minimum 30% luminance contrast to surrounding surfaces

Other guidelines to consider:

- overhanging obstructions should be mounted at a minimum clear height of 2 m
- fixed objects should be clearly identified with contrasting durable colour marking strips
- distance between bollards should be minimum of 1 m and have a regular vertical shape without protruding elements
- spaces below ramps and stairs should be blocked completely by protective rails, raised kerbs or marked with a tactile surface.



International Symbol of Access

3.2.2 Signage

Signage includes direction signs, emergency and hazard warnings, information notice boards and location signs. It must be clear, easy to read and understand, properly lit at night, visible and well located.

Guidelines to consider:

- sign surfaces should prevent glare and be of durable weather-resistant material
- colours should contrast with the surrounding surface to avoid confusing people with low vision and blindness
- colour combinations should be red and green or yellow and blue to avoid confusing people with low vision and blindness
- letters should be sized in proportion to the reading distance
- International Symbol of Access symbol should be used where appropriate (for example, in parking and toilets for people with disability).

3.2.3 Street furniture

Street furniture includes bus stops, fixed benches, garbage bins, lamp posts, mail boxes, planting tubs, public toilets, sign boards, telephone booths, ticket vending machines and water fountains.

Commercial street furniture includes A-frame signs, planting tubs, stalls, tables, unfixed chairs and vendor carts that are adjacent to travel paths. This type of furniture is usually privately owned by businesses or individuals.

Guidelines to consider:

1. position to allow for hazard-free passage of all people
2. install at regular intervals to provide sensory cues to those with low vision and blindness
3. identify location with textural changes in footpath surfaces
4. mount outlets and controls, such as mail boxes, public telephones, vending machines and water fountains, 850 mm to 1 m above the ground to enable access and ease of use
5. install seating at regular intervals (100 m to 200 m) and at prominent public facilities, such as bus stops, public service areas and public toilets, to enable rest opportunities
6. install level seating areas outside main circulation pathways, including spaces for wheelchairs
7. install adequate garbage bins to minimise dumping of rubbish that can obstruct pathways and increase pollution and hygiene hazards
8. allow recesses (designated refuse areas) for unfixed rubbish containers, such as skips, so they are not informally located on the path of travel
9. relocate commercial street furniture outside the path of travel
10. include in permits issued for commercial street furniture the boundaries needed for clear paths of travel, such as required circulation paths adjacent to a restaurant area.

3.2.4 Pathways

Pathways include paved and unpaved footpaths. They must be safe for all users, particularly people with low vision and blindness or mobility disability. Hazardous pathways are those that:

- are uneven and/or unpaved
- have holes
- are of poor quality
- are not wide enough
- have many steps and/or changes in level.

Guidelines to consider:

- clear of all obstructions
- seal or upgrade unpaved footpath surfaces, where possible, since these often become hazardous in adverse weather conditions
- construct slopes that do not exceed a gradient of 1:20
- for slopes that exceed 1:20, install ramps and allow for landings with minimum dimension of 1 m x 1 m every 9 m, to enable rest opportunities
- use smooth, continuous, non-slip and even surfaces for all pathways
- install a guide strip comprising a tactile line in a colour that contrasts with the pavement for people with low vision and blindness
- install tactile tiling on pedestrian routes of travel, with a minimum 30% luminance contrast to adjacent surfaces
- place tactile tiling at pedestrian crossings and around obstructions that are difficult for people with low vision and blindness to detect
- avoid stepped kerbs or, if required, ensure they are between 70 mm and 150 mm high
- place drains, grating and manholes outside pedestrian pathways to avoid potential changes in pathway texture and height
- cover all drains, gratings and manholes for safety, ensuring covers are level with the path surface and have narrow grid patterns
- choose plant varieties carefully, avoiding, for example, thorny and poisonous plants and plants that drop seeds and leaves.

3.2.5 Kerb ramps

Kerb ramps can include a small ramp built into the footpath to ease passage to the street. These are especially helpful for people with disability but also for cyclists, pedestrians with baby carriages and other groups. Well-designed kerb ramps enable people to deal with the level changes between pathways and street or building entrances with minimal disruption.

Guidelines to consider:

- position out of the line of pedestrian flow
- install in accessible car parking areas, at drop-off zones at main building entrances, at pathways with high usage and at street intersections
- position away from places where water might accumulate
- allow minimum width of 1 m and maximum slope of 1:10 (maximum 10 mm lip where the kerb meets the lower pavement)
- choose construction material texture that distinguishes ramps from main paths
- choose construction material of a contrasting colour to guide pedestrians with low vision and blindness.

3.2.6 Pedestrian crossings

Pedestrian crossings are also known as zebra crossings. They facilitate the safe and independent crossing of roads.

Guidelines to consider:

- implement the accessibility guidance in Annex H: Transport systems and infrastructure
- use a colour that contrasts with the road and surrounding kerbs to avoid confusing people with low vision and blindness
- identify kerb ramps with tactile markings to alert pedestrians of potential hazards or danger in level changes and traffic
- install traffic control signals that have appropriately-located push buttons, audible and visual signals and time intervals for people who cross slowly
- install guide strips leading pedestrians to traffic light push buttons, for security and guidance
- provide a coloured tactile marking strip on traffic islands
- raise crossings to the same level as the pathway so those using a wheelchair do not have to struggle with differences in height (raised crossings also act as speed bumps for approaching vehicles)
- introduce other traffic calming measures, such as speed bumps, to increase safe crossing for vulnerable groups.

3.2.7 Parking

Parking includes parking spaces and drop-off zones. Parking problems faced by people with disability include no or too few spaces, spaces that are not wide enough and/or spaces located too far from a main building entrance. Drop-off zone problems include no specified zones or poorly located zones.

Parking spaces

Guidelines to consider:

- provide one disability-reserved parking space for every 50 general parking spaces, noting that some municipalities require more than this
- locate disability-reserved parking spaces no more than 50 m from a main building entrance
- design parking spaces for people with disability that are a minimum width of 3.2 m (preferably 3.6 m) with an adjacent minimum 2.4 m wide shared space for wheelchair transfers
- provide same-level access from disability-reserved parking spaces to kerb ramps and pedestrian pathways where possible.

Drop-off zones

Guidelines to consider:

- design at a minimum 3.2 m wide for ease of mobility and safety
- make parking spaces for people with disability wide enough to accommodate two cars
- provide at transport stops, such as bus stops
- position within 30 m of accessible building entrances to reduce the need to travel long distances
- provide shelter with seating facilities for weather protection
- provide kerb ramps to negotiate changes in level from parks to footpaths
- provide clear signage to reduce potential for confusion
- provide tactile guide strips for improved security and safety
- consider installing bollards to define zones.

3.2.8 Children's playgrounds

Children's playgrounds include municipal or privately operated facilities where children gather to play on climbing equipment, seesaws, slides and swings.

Most children's playgrounds do not comply with universal design principles although increasing recognition and resources are being given to building and equipping them to maximise accessibility.³³ This enables children with disability to interact with peers from an early age and helps shape positive attitudes of peers.

Guidelines to consider:

- position imaginative and/or social play features to be more accessible by, for example, providing flat areas between climbing items such as frames and garden beds
- select handles and water feature tap ware that can be easily gripped
- create an easy circuit through the playground and its main features for ease of mobility and manoeuvrability
- position seats to be accessible and close together for rest and social engagement
- provide additional swinging opportunities, such as liberty swings.³⁴

³³ 'Inclusion of disabled children in primary school playgrounds', Joseph Rowntree Foundation. 2006.

³⁴ The Liberty Swing is a purpose-built swing accessible to people in wheelchairs. It enables a playground user to swing while seated in a wheelchair.

3.3 Horizontal accessibility

This section deals with horizontal accessibility design requirements. This covers building elements with horizontal access such as doors, entrance areas and lobbies, corridors, handrails and railings, as well as bathrooms and toilets.

3.3.1 Doors

Accessible doors include doors a person can operate in a single motion with little effort. They should not:

- be too narrow
- have incorrect hinging
- be heavy and hard to operate
- have an incorrect door swing direction.

Guidelines to consider:

- install each door with a door handle, extra pull handle, glazing, kick plate and sign
- select doors with a minimum of 2 m clear height to avoid head contact with the top of the door frame
- install single doors at recommended minimum clear opening of 850 mm
- install door hardware, such as latches, locks, handles and pulls, that can be easily grasped with one hand
- provide lever-type handles, not knobs, for ease of use
- avoid thresholds—if required position so height is not greater than 10 mm (level thresholds no higher than 6 mm)
- position low windows on outward swinging doors and doors in public corridors so users can see oncoming traffic
- position bottom edges of windows so they are no higher than 1 m from finished floor level (750 mm for children)
- use doors that swing outwards into public circulation spaces
- incorporate recesses at doors in corridors to avoid obstructing main traffic
- paint door and/or door frames in a colour of a minimum 30% contrast with the adjoining wall to help people with low vision and blindness identify them
- recess door mats flush with the floor finish and firmly fix so they are not a trip hazard
- install automatic sliding doors, where possible, where circulation space is restricted
- have a reliable power supply for automatic sliding doors and regularly maintain doors so they continue to function properly
- avoid frameless glass doors but, if used, clearly mark with a minimum 30% contrasting strip 1 m high (this is also the case for fixed glazing of glazed partitions which need to be clearly marked and protected by internal railings)
- avoid spring-operated doors which are hard to pull open and can be a hazard when swinging back (if spring-operated doors are used, two-way opening doors with an adjacent window are preferred)
- avoid door swings extending over steps or ramps and set back at least 1.5 m to avoid tripping and falling
- add an adjacent accessible door to a revolving door in case the revolving door gets stuck or cannot move
- position door swings to account for the space being entered (for example, with wheelchair access toilets, doors should open outwards or be sliding).

3.3.2 Entrance areas and lobbies

Entrance areas and lobbies should be accessible, easy to find, well lit and supported with clear and consistent signage.

Entrances

Guidelines to consider:

- make at least one entrance, preferably the main one, accessible by people using wheelchairs
- connect accessible pathways to accessible indoor and/or outdoor parking areas, drop-off areas, local public transit stops and public footpaths
- provide adequate covered space in front of entrances for shelter and protection from adverse weather conditions
- paint entrance doors in a colour that contrasts with surrounding surfaces
- provide lighting at entrances and along accessible pathways.

Lobbies

Guidelines to consider:

- place reception desks in clear view of entrance doors
- make lobbies accessible for people using wheelchairs and provide enough space for their manoeuvrability
- construct counters 850 mm ± 20 mm high for ease of mobility and engagement with staff or communication items like telephones
- provide access to facilities such as mailboxes, public telephones and water fountains, with controls 850 mm to 1.1 m high
- provide public seating outside main circulation paths so people can engage socially, rest or wait
- choose furnishings of colours that contrast with the floor and surrounding walls for easy manoeuvrability
- provide at least 10% of seats with backs and armrests for adequate rest support.

3.3.3 Corridors

Corridors need to be well lit and unobstructed.

Guidelines to consider:

- make length of corridors as short as possible
- design changes of direction at 90 degrees
- allow for an unobstructed clear path of travel with a minimum width of 1.5 m (preferably 1.8 m), for ease of mobility and manoeuvrability with other pedestrians (low traffic corridors should be a minimum 1 m width)
- provide appropriate resting facilities (Box A1).

Box A1: Resting facilities in corridors

The maximum distances people with mobility disability can walk without resting depends on factors such as slope and walking surface. Research conducted in the United Kingdom reveals that only 20% of people with mobility disability who use mobility aids, such as walking sticks, can walk 180 m without resting. It is also difficult for them to stand for more than 10 minutes at a time.

Universal design recommends providing seating wherever people have to wait and along main circulation paths.³⁵

3.3.4 Handrails and railings

Handrails and railings need to be properly configured and installed at an accessible height.

Guidelines to consider:

- provide handrails around all accessible balconies, galleries, hazardous areas, platforms, ramps, roofs and stairs for safety, assistance and rest opportunities
- install handrails at a minimum height of between 800 mm and 1 m
- check that installation arrangements are in line with safety and accessibility guidelines.

3.3.5 Bathrooms and toilets

Bathrooms and toilets include those in any form of accommodation, places of employment and public buildings.

Guidelines to consider:

- provide an accessible bathroom and/or toilet on each floor
- provide unisex-accessible bathrooms in office buildings, which can be used by people with disability and their assistant companion if of the opposite sex (in some countries this might be culturally inappropriate, however)
- provide separate facilities for males and females in schools, where feasible
- provide at least one toilet cubicle designed for wheelchair access in school ablution blocks
- install doors that are a minimum 850 mm clear width and preferably open out or slide
- provide sufficient space for people using wheelchairs or other assistive devices
- install easy-to-use amenities at a convenient height
- install adequate handrails and grab bars to assist people to and from a wheelchair and assist those with reduced strength

³⁵ *Promoting Access to the Built Environment: Guidelines*, CBM 2008.

- provide security and privacy features so users can easily close and lock bathroom or toilet doors.

Other technical guidelines to consider:

- install toilets to have a minimum dimension of 1.6 m x 2.4 m or 2.0 m x 2.7 m if a shower or bath is included (assuming an in-swinging door)
- locate toilets against the wall, diagonal from the entry door
- centreline toilets 450 mm to 500 mm from the wall
- firmly fix a grip rail next to the toilet, 800 mm high
- install accessories, such as mirrors, soap dispensers, tissue holders and towel-rails, at 900 mm to 1.1 m high
- firmly fix washbasins to the wall at a height of between 800 mm and 850 mm, with the centreline at least 450 mm from an adjacent wall
- fit single-lever mixer taps
- install showers instead of baths, where possible
- firmly fix showers 800 mm high, with horizontal grab rails to two walls
- attach shower heads to flexible hoses and preferably a fixed slider fitting with vertical 800 mm to 1.8 m high grab rail
- install a drop down or removable seat in showers
- provide female hygiene facilities that are easily accessible
- provide at least one conventional cubicle in male and female toilets to help people with ambulant disability
- provide cubicles for people with disability that are 900 mm wide, with grab rails on both sides of the toilet and with the door opening out.

3.4 Vertical accessibility

This section deals with vertical accessibility, which covers building elements enabling people to negotiate changes in level and reach upper floors in the built environment. Vertical accessibility components that make for an accessible environment and comply with universal design principles are covered in this section, including:

- multi-level building provisions
- avoiding unnecessary level changes
- installing ramps
- installing lifts
- installing emergency stairs.

3.4.1 Multi-level building provisions

People with disability are entitled to non-discrimination and should be able to access all floors of a building on an

equal basis to people without disability. The CRPD, Article 2 Definitions, encourages progressive implementation of accessibility and notes the issue of 'reasonable accommodation'.³⁶

For existing buildings undergoing refurbishment, reasonable access to all areas and floors should be the aim, with access to ground floor and public spaces as the minimum.

For new buildings, access to all services, facilities and levels should be incorporated into the design, such as the use of ramps to reach areas above ground level.

3.4.2 Avoiding unnecessary level changes

In general, avoiding unnecessary level changes is most desirable. Floors without gaps or changes in levels are the most effective and cost-efficient way to prevent vertical accessibility barriers.

Guidelines to consider:

- design or alter existing structures to avoid level changes, particularly at entrances
- avoid high thresholds that can obstruct the continuous path of travel
- minimise gaps between surfaces, such as at footpaths and transportation platforms.

³⁶ Article 2 Definitions, CRPD, 2008.

Box A2 provides guidance on when level changes may provide some protection for users.

Box A2: Providing beneficial level changes

At times it is beneficial to provide level changes for people with disability. Raised footpaths, for example, may offer greater safety for pedestrians with disability by delineating pedestrian zones from vehicular zones. Raised footpaths are also beneficial in areas where rain, snow or other weather conditions can render ground travel inaccessible to people with disability.

When level changes are required, ensure transitions between levels are addressed. For example, maintenance at pedestrian crossings is required for safety. This includes leaf, mud and snow removal.

3.4.3 Installing ramps

Ramps can provide barrier-free access into buildings and between floor levels. Compared with the option of installing a lift, internal and external ramps between floors can be inexpensive. Lifts to upper floors should only be considered where maintenance funding and technical capacity are available.

Guidelines to consider:

- provide ramps when stairs obstruct the free passage of pedestrians and people with disability
- provide at least one accessible entrance to a public building, preferably the principal entrance
- locate ramps immediately adjacent to entrances, lobbies and stairs
- calculate sufficient space for ramps and landings to provide appropriate slope and include rest and passing areas
- for existing buildings where re-design or refurbishment is proposed, provide reasonable access to all ground floor services and facilities
- for designs of new single and multi-level buildings, access to all services and facilities should be addressed and incorporated into any design, which could include upper floor access by way of a ramp.

Box A3 showcases an example of how constructing an inexpensive ramp can make a big difference to people with disability, in this case in a primary school in Papua New Guinea.

Box A3: Ramping up access in schools

When Clement’s parents enrolled him at a small primary school in Papua New Guinea, the number of steps to access classrooms made it very difficult for him to attend classes.

Clement’s parents spoke with the school principal and with the support of a local business constructed a ramp to make the school more accessible for children and adults. The ramp, installed at a relatively small cost, has made it easier for Clement to attend school. According to the principal the ramp is greatly appreciated by all of the school’s younger children who prefer to use it rather than climb stairs. They find it easier and safer to do so.

This is an example of how cooperation between parents, teachers and local business can improve the lives of people with disability as well as the wider community. It is significant step to creating a barrier-free learning environment and helps raise awareness in the local community on disability matters. Universal design features include the concrete approach to the ramp and a 90-degree turning bay at the top of the ramp.

Box A4 highlights the growing support for inclusive design by the National Department of Education in Papua New Guinea schools.

Box A4: Supporting accessibility in schools in Papua New Guinea

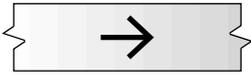
The Papua New Guinea National Department of Education (NDOE) strongly supports accessibility in its schools.

In two recent projects funded by AusAID, the NDOE has promoted approaches to making schools more accessible. One approach is for existing schools and the other for new schools.

1. Existing school buildings—in upgrading Kerevat National High School, East New Britain, architects built new classrooms in the open spaces underneath the existing high-set classrooms, using universal accessibility design principles for students with disability. As a result, a significant number of classrooms became fully accessible in the school.
2. New school buildings—as part of AusAID’s PNG Education Program, AusAID is procuring and building new kitset double classrooms in schools throughout the country. The standard kitset design has been modified to incorporate a ramp that complies with universal design principles.

Figure A1 shows three basic ramp configurations incorporating universal design principles. These configurations use a minimum amount of land with two having rest and passing areas.

Figure A1: Three basic ramp configurations



Guidelines to consider:

- Slope: 1:20 is the recommended minimum for a non-assisted person in a wheelchair. The slope can be increased to 1:14 where the wheelchair user is assisted. Greater than 1:12 is considered a hazard.
- Width: Varies according to use, configuration and slope, but the minimum is 1 m.
- Landings: Provide at least every 9 m, at every change of direction and at the top and bottom of every ramp. Landing width should be a minimum 1 m and clear from obstructions.
- Handrails: Provide on both sides and along the full length of every ramp, 900 mm to 1 m high, returning at ends or turning down to minimise injuries. Handrails should extend for a distance of minimum 300 mm at the top and bottom of ramps. For ramps wider than 3 m, an intermediate rail could be installed.

Surface and tactile markings: Surface material needs to be hard, non-slip and easy to maintain. Adequate drainage needs to be provided and ramp edges protected by a solid raised kerb. To alert people with low vision and blindness, tactile indicators at least 600 mm wide should be placed at the top and bottom of ramps, with minimum 30% luminance contrast to adjacent surfaces. A colour contrasting textual marking strip, at least 600 mm wide, should be placed at the top and bottom of ramps.

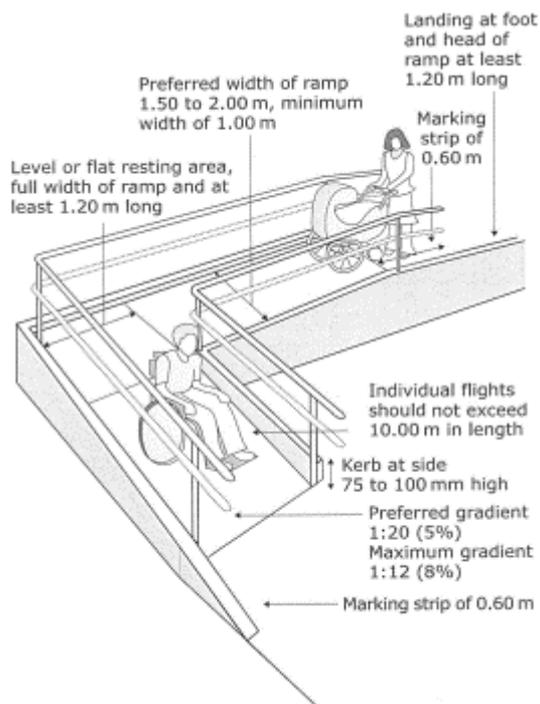
Figure A2 shows the incorporation of universal design principles, including correct configurations for slope and width, provision of landing and marking strips at the foot and head of a ramp, as well as inclusion of a level rest area at a ramp's turning point.³⁷

3.4.4 Installing lifts

The best way to provide people who have limited mobility with access to upper floors in a multi-storey building is with an accessible standard lift. However lifts are expensive, require a reliable electricity supply, regular and relatively high-cost maintenance and can be a safety hazard when electricity supply is variable.

³⁷ Promoting Access to the Built Environment: Guidelines, CBM, 2008.

Figure A2: Incorporating universal design guidelines on ramps



Guidelines to consider when installing lifts:

- ensure dimension of lift enables easy access by a person in a wheelchair
- install a handrail on at least two sides
- position the control panel so it is easily accessible and can be easily viewed
- install door re-opening activators, audio-visual signals and floor audio announcements
- install a non-skid floor
- select a door colour that contrasts with the colour of the walls, floor and the landing area in front of lift doors
- provide minimum lift floor space of 1.4 m x 1.6 m
- provide controls positioned 850 mm to 1.2 m high
- install Braille and tactile signage at the appropriate height.

3.4.5 Installing stairs

Stairs should provide safe access into buildings and between levels within buildings for all users. This is particularly important for those with low vision and blindness, as well as those with mobility disability. Poor staircase design is a common problem in many buildings in developing countries and it can lead to injuries.

Box A5 is a comprehensive list prepared by CBM³⁸ of key standard inclusions for staircase design incorporating universal design principles. This includes for steps, width, handrails, tactile marking and lighting.

Box A5: Staircase design complying with universal design

Steps

- All steps in one flight should be uniform.
- Steps should be 150 mm to 180 mm high and not less than 280 mm deep.
- Open riser staircases should not be used as they pose a risk.
- Angled risers are preferred to nosings, but if nosings are used they should be rounded and not project more than 40 mm.
- Nosings should have permanent colour contrasts to facilitate ease of use for people with low vision and blindness.
- Stair covering should be slip-resistant, firmly fixed and easy to maintain.
- Landings should be provided at least every 15 steps to assist people who cannot manage long staircases.
- Each landing should be at least 1.2 m long.

Width

- Clear width of stairways should be at least 1 m, preferably 1.5 m allowing for easy two-way traffic.

Handrails

- Handrails should be provided on both sides of a flight of stairs and on each side of landings.
- With wider stairs, intermediate handrails should be installed.
- Handrails should be positioned between 800 mm and 1 m above floor finish.
- Handrails must extend a minimum of 300 mm beyond top and bottom steps, turning to the wall.
- Handrails should be supported on brackets that do not obstruct continuous hand contact with the handrail.

Tactile marking

- Tactile warning strips should be provided at the top and bottom of stairs and at intermediate landings, to alert people with low vision and blindness to the location of the stairs.
- A textural marking strip is essential and should be at least 600 mm deep, extending over the full width of the stairs.

³⁸ *Promoting Access to the Built Environment: Guidelines*, CBM, 2008.

- To provide orientation for people with low vision, the marking strip should be in a colour that contrasts with the surrounding surface.

Lighting

- Staircases should be well lit during the day and at night when in use, with a preferred level of lighting between 150 Lux and 200 Lux.

Figure A3 shows specifications for the construction of stairs, incorporating the key universal design elements discussed in Box A5.³⁹

3.4.6 Emergency stairs

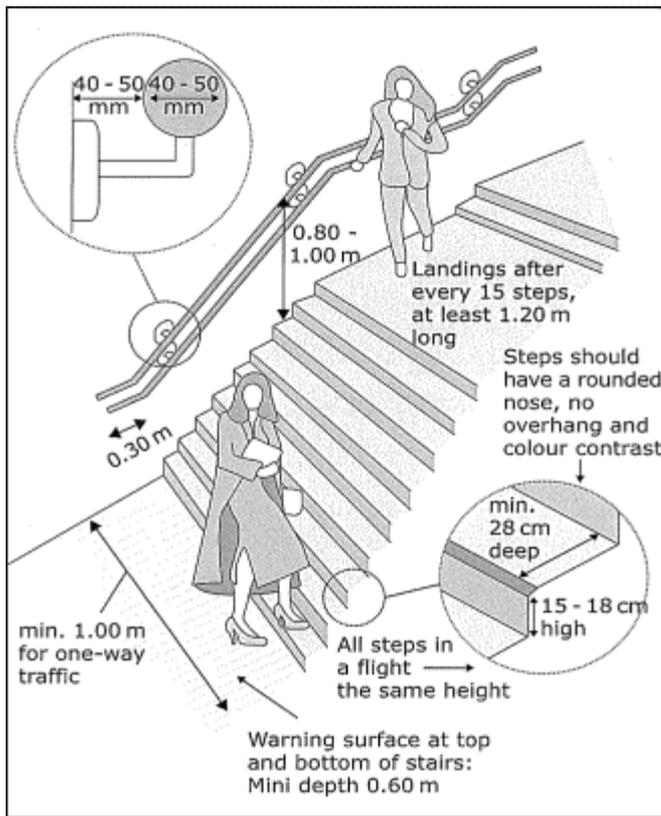
Most people with disability are unable to access stairs in an emergency when lifts are not operating. Universal design helps practitioners address this important need.

Guidelines to consider:

- consult local and fire control authorities, Disabled People's Organisations and people with a range of disability to determine emergency needs
- provide a rescue assistance area or standby space with direct access to an Emergency Exit where people can temporarily and safely await further instructions or assistance during emergency evacuation
- provide a rescue assistance area or standby space at each floor landing of Emergency Exit stairs or balconies in case of external stairs.

³⁹ *Promoting Access to the Built Environment: Guidelines*, CBM 2008.

Figure A3: Specifications for construction of stairs



4. Other resources

Many excellent manuals and guidelines are published by government agencies and non government organisations for architects, engineers and designers. These provide basic information on, and the data necessary for, an accessible environment.

Developed countries and some developing countries have accessibility codes and guidelines which must be adhered to for permission to build. As many developing countries do not have access to legislation, the guidelines and manuals described in this resources list will assist architects, engineers and designers to design accessible environments.

The list is divided into general resources and then selected accessibility standards and guides.

General

How to Build an Accessible Environment in Developing Countries

Handicap International France, 2008

This series of manuals is based on experiences in Cambodia. They promote understanding and knowledge of accessibility standards and techniques.

www.handicap-international.org.uk/resources/library

Design for All—Implications for Bank Operations

H Snider and N Takeda, World Bank, 2008

This paper informs World Bank task team leaders about the benefits of universal design and recommends ways in which it can be integrated as a component in World Bank projects.

http://siteresources.worldbank.org/DISABILITY/Resources/Universal_Design.pdf

Design Considerations for Accessibility

S Whybrow and J Grooms, University of New South Wales and Home and Community Care 2006

This booklet provides an overview of basic features of accessibility for public buildings. Includes considerations for car parking, kerb ramps, pathways, stairways, handrails, doors and doorways, corridors and toilets. Access issues are highlighted with pictures from Sri Lanka.

www.homemods.info/files/Design_Consideration1.pdf

International Best Practices in Universal Design: A Global Review

Canadian Human Rights Commission, 2006

This document provides an international overview of the technical information on accessibility criteria for the built environment being used by countries as they prepare to ratify the Convention on the Rights of Persons with Disabilities.

www.gaates.org/009BestPract.shtml

Promoting Access to the Built Environment: Guidelines

CBM, 2008

These guidelines reflect on international standards and recommendations about accessibility in the built environment. They have been developed to assist in creating accessible environments.

www.cbm.org/article/downloads/74836/CBM_Accessibility_Manual.pdf

Water and Sanitation for Disabled Persons and other Vulnerable Groups

H Jones and B Reed, Water, Engineering and Development Centre, Loughborough University, 2005

This book and CD-ROM focus on facilities for families in rural and peri-urban areas of low-income and middle-income countries. Many of the approaches and solutions outlined can also be applied in institutional settings, such as in schools and hospitals. They may also be applied in emergency situations.

<http://wedc/lboro.ac.uk/wsdp/>

Accessibility for the Disabled—A Design Manual for a Barrier Free Environment

UN Enable, United Nations Economic and Social Commission for Western Asia, 2004

This design manual, prepared by the Lebanese Company for the Development and Reconstruction of Beirut Central District, is available from the UN Enable website. It provides architects and designers with basic information and data for barrier-free environments.

www.un.org/esa/socdev/enable/designm/preface.htm

Homes without Barriers: A Guide to Accessible Houses

A Bullement, Building Research Association of New Zealand, 2001

This publication sets out guidelines for adapting existing homes to enable people with disability to live in their own home as long as possible.

www.homemods.info/resource/bibliography/homes-without-barriers-guide-accessible-houses

Selected accessibility standards and guides

International Organization for Standardization (ISO)

ISO 21542: Building construction—Accessibility and usability of the built environment (replaces ISO TR 9527: Building construction—Needs of disabled persons in buildings: Design Guidelines, 1994)

ISO, 2011

This document specifies a range of requirements and recommendations for many elements of construction, assemblies, components and settings. It also deals with aspects of accessibility managed buildings.

www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=50498

ISO Guide 71: Guidelines for standards developers to address the needs of older persons and persons with disabilities

ISO, 2001

This guide provides guidance to writers of relevant international standards on how to take into account the needs of older persons and persons with disability.

www.iso.org/iso/iec_guide_71_2001.pdf

ISO 7001:2007 Graphical symbols—Public information symbols (this document has been revised from ISO 7001:1990 Public information symbols)

ISO, 2007

This document specifies graphical symbols for the purpose of public information.

www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=41081

ISO 9241–171: Ergonomics of human-system interaction, Part 171: Guidance on software accessibility

ISO, 2008

This document covers issues associated with designing accessible software for people with physical, sensory and cognitive abilities, including those with temporary disability, and the elderly. It is intended for those who are responsible for the specification, design, development, evaluation and procurement of software platforms and software applications.

www.iso.org/iso/catalogue_detail.htm?csnumber=39080

ISO 9241–20: Ergonomics of human-system interaction, Part 20: Accessibility guidelines for information/communication technology equipment and services

ISO, 2008

This document provides guidelines for improving the accessibility of information and communication technology equipment and services such that they will have wider accessibility for use at work, in the home, and in mobile and public environments. It covers issues associated with the design of equipment and services for people with a wide range of sensory, physical and cognitive abilities, including those who are temporarily disabled and the elderly.

www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=40727

ISO 9241–151: Ergonomics of human-system interaction, Part 151: Guidance on World Wide Web user interfaces

ISO, 2008

This document provides guidance on the human-centred design of software web user interfaces with the aim of increasing usability.

www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=37031

Australian standards

AS1428.1: The mandatory access standard, primarily for public buildings

Australian Standards 2009

This document sets out minimum design standards for new building work, as required by the Building Code of Australia, to enable access for people with disability. It covers aspects of access to and within a building.

www.equalaccess.com.au/page/AustralianStandards/

AS1428.2: Design for access and mobility—Enhanced and additional requirements—Building and facilities

Australian Standards 1992

These standards set out requirements for the design of buildings and facilities for access for people with disability. Where appropriate, these requirements are additional to the minimum requirements of AS 1428.1.

www.equalaccess.com.au/page/AustralianStandards/

AS4299: Adaptable Housing

Australian Standards 1995

This document presents the objectives and principles of adaptable housing and provides guidelines on planning and design. Adaptable housing is the basis for the development of the accommodation needs

of users of all ages and abilities by making provision for future building modifications at minimum cost and disruption to the inhabitants.

www.equalaccess.com.au/page/AustralianStandards/

Disability Discrimination Act 1992 (Cwlth)

The Australian Disability Discrimination Act has been in effect since 1993 and prohibits discrimination against people with disability or their associates in a range of areas including transport, education, employment, accommodation and premises used by the public.

www.comlaw.gov.au

Disability (Access to Premises Building) Standards 2010 (Cwlth)

Commonwealth, 2009

These standards were formulated in accordance with S.31 (Disability Standards) of the Australian Disability Discrimination Act and aims to achieve better access to a wide range of public buildings. Improving building access gives more people more opportunity to access employment, education and services, and to connect with, and participate in, the broader community. The standards commenced operation in 2011 and are one part of the Australian Government's 10-year National Disability Strategy.

www.ag.gov.au/Humanrightsandantidiscrimination/Pages/DisabilityStandardsforPremises.aspx

AS1428.1-2009, Design for Access and Mobility—General requirements for Access— New Building Work

Australian Standards, 2009

This document sets out minimum design requirements for new building work, as required by the Building Code of Australia, to enable access for people with disability. It covers aspects of access to and within a building.

www.equalaccess.com.au/page/AustralianStandards/

Building Code of Australia

Building Code of Australia, 2011

This code is produced on behalf of the Australian Government and state and territory governments and has the status of building regulations by all states and territories. It is a uniform set of technical provisions for the design and construction of buildings and other structures throughout Australia and includes specific provisions in relation to access to and within buildings by people with disability. The code was revised in 2011 to align with the Disability Standards in the Disability Discrimination Act.

www.abcb.gov.au/en/about-the-national-construction-code/the-building-code-of-Australia

Asia and the South Pacific

Non-Handicapping Physical Environment for Disabled Persons: Guidelines

Social development division, UNESCAP 1995

These guidelines contain recommendations on planning and building design, public awareness initiatives, access policy provisions and legislation to promote barrier-free environments. The guidelines are intended to serve as a reference for decision makers and program personnel working on human settlement issues, especially those working in architecture, research and training, urban planning and management.

www.unescap.org/Publications

NZS 4121: New Zealand Standard Design for Access and Mobility-Buildings and Associated Facilities

Published by Standards New Zealand, the trading arm of the Standards Council, 2001

This standard sets out the requirements for the design of buildings, facilities within buildings, driveways, car parks, passages and any associated landscaping, and accessways for the use by people with disability.

www.standards.co.nz/4121+access+mobility+design

European Union

The European Concept for Accessibility (ECA) 2003

European Commission, 2003

This publication has united experts from 22 European countries to establish a harmonised European approach to accessibility. The ECA has provided an increased awareness among architects, planners, designers of the principles of design for all and of universal access. The concept of universal design, as enshrined in the ECA 'is the cornerstone of a fully inclusive society'.

www.eca.lu/index.php?option=com_docman&Itemid=26

Annex B: Health

1. Purpose

Accessibility Design Guide: Universal design principles for Australia's aid program provides guidance on enabling people with disability to participate equally in social and economic life through the design and implementation of development initiatives.

Health facilities can include:

- aid posts (small, generally rural buildings for basic health administration)
- village clinics
- sub-health centres
- rural and district health centres
- provincial hospitals
- metropolitan hospitals.

The primary users of these health facilities are people with disability, illness or injury, their families, carers and visitors, and staff.

This annex provides guidance development practitioners can consider when applying universal design principles in health infrastructure. While based on good practice and successful implementation of universal design, this guide is not meant to be prescriptive. It is based on the reality that the barriers people with disability face vary between developing countries and between locations in-country. It is also based on the reality that development projects are unique and face their own challenges, locally or otherwise, relating to health infrastructure.

This annex starts with a general description of the importance of universal design and health infrastructure. It then explores how universal design principles can influence and support the planning, designing and constructing of health facilities to provide better access to and within these facilities.

The health annex ends with a list of resources.

This annex should be read in conjunction with the guidance in annexes A: Built environment, C: Water, sanitation and hygiene facilities, I: Rural development and K: Humanitarian action.

2. General

In some developing countries health facilities are physically inaccessible by people with disability, often because of the need to use stairs for access. Planning and designing health facilities using universal design principles supports users to recover from health issues more quickly and makes them more comfortable during their treatment and recovery.

The design of health facilities in developing countries must satisfy local and national building codes as well as anti-discrimination laws where they exist. This is especially important since not all developing country governments have guidelines on the physical design of health facilities and the supply of furniture and equipment to ensure the needs of people with disability are met. Consulting widely with the user community, including people with disability and health care professionals, is a must. This includes consulting local Disabled People's Organisations.

The design of some areas of health facilities, such as waiting areas, is as important for those caring for or visiting patients as it is for patients. So too is the type and placement of furniture. Some types of chairs, for example, may not suit the elderly or people with disability who have difficulty rising to a standing position from a low seat.

The design of food preparation areas is also important, since in many countries preparing meals in health facilities is the responsibility of relatives, many of whom may be older or themselves with disability. Some hospitals provide basic facilities for food preparation and some of these are in line with universal design principles. An example is Papua New Guinea's Buka Hospital in Bougainville where architects commissioned local craftsmen to build a *Hauswin* (gazebo) in the grounds in accordance with universal design⁴⁰, so relatives of patients can prepare meals for patients and themselves.

Inclusion of universal design principles into new building designs presents an important opportunity for buildings to become accessible, often at minimal cost. Inclusions such as ramps and accessible toilet and shower facilities have a major impact.

⁴⁰ AusAID-funded Bougainville Health and Education Restoration Project, 1997. Project managers—SMEC International (previously known as Snowy Mountains Engineering Corporation); Architects—Alexander & Lloyd Australia.

3. Key universal design principles to consider

When starting a health program, it is important for stakeholders to:

- raise the issue of disability and vulnerability with target stakeholders
- provide information on accessible health infrastructure facilities
- encourage collaboration between Disabled People's Organisations, engineers, stakeholders and local authorities responsible for operating and maintaining the facilities
- encourage overall design to consider the needs of people with disability and other groups including the elderly, pregnant women, children and other people with a temporary illness or injury.

Guidelines to consider:

- Build the health facility as a single storey with a ground floor slab easily accessible from exterior pathways. Sometimes this is not possible because of issues such as land constraints, local terrain and weather conditions. In these cases install ramps and/or lifts, where they can be properly serviced and maintained. Ensure these comply with accessibility principles as a minimum pre-requisite.
- Consider locating outpatient care and emergency wards on lower floors, ensuring horizontal and vertical design are taken into account given the health facility's role and how patients use the facility. This includes how patients proceed through registration, initial screening and diagnostic services, as well as how they pay and access the pharmacy.
- Design each floor so it is as level as possible or has minimal level changes.
- Pay special attention to designing main reception areas. For example, ensure knee space under counters is high enough to accommodate people who cannot stand. This helps facilitate communication and enables staff and patients to attend to paperwork. Make chairs readily available and provide plenty of open space for those using wheelchairs.
- Provide doors wide enough to accommodate people using wheelchairs and those helping patients.
- Install directional signage that is clearly visible and easy to understand. Use pictographs to help those who are illiterate.
- Provide accessible and spacious toilet facilities in all wards and areas accessed by the public.
- Encourage use of appropriately designed equipment, such as hospital beds and chairs.
- Encourage use of elements that aid movement, such as ramps and handrails in corridors and near steps.
- Source low-cost alternatives to equipment that would normally be used, but which may prove unfeasible or impractical in developing countries. For example, where electric adjustable beds are impractical, use wedges, rolls and pillows to improve positioning and independent mobility in bed. Wooden blocks and slide boards also help patients get in and out of beds of differing heights on their own.
- Incorporate the needs of family members, carers and visitors, including by providing community food preparation areas, public ablutions, public shelters and waiting areas

Box B1 highlights the benefits of incorporating universal design during the primary design stage for the construction of health facilities under the Cambodia Health Sector Support Program 2.

Box B1: Implementation of universal design in Cambodia

The Cambodia Health Sector Support Program 2 included the construction of health centres and referral hospitals. The program is funded by AusAID, the United Kingdom's Department for International Development, France's Agence Française de Développement, Belgian Technical Cooperation, United Nations Population Fund, United Nations Children's Fund and the World Bank.

The Cambodian Government agreed that the new health facilities would be built to accommodate accessibility by people with disability. This included constructing access ramps with the maximum gradient of 5 degrees, equipping them with handrails and providing a double door entry to the facility.

As the project was still at the primary design stage, applying these types of universal design principles was still possible. Other accessibility features included clear signage in Khmer and English on doors and in clinical and support rooms.

4. Other resources

The Australasian Health Facilities Guidelines

Australasian Health Infrastructure Alliance, 2011

These standard guidelines are used by planners and designers of health facilities throughout Australasia and the Pacific.

www.healthfacilityguidelines.com.au/guidelines.aspx

Annex C: Water, sanitation and hygiene facilities

1. Purpose

Accessibility Design Guide: Universal design principles for Australia's aid program provides guidance on enabling people with disability to participate equally in social and economic life through the design and implementation of development initiatives.

This annex provides guidance development practitioners can consider when applying universal design principles in the water, sanitation and hygiene (WASH) sector. While based on good practice and successful implementation of universal design, this guide is not meant to be prescriptive. It is based on the reality that the barriers people with disability face vary between developing countries and between locations in-country. It is also based on the reality that development projects are unique and face their own challenges, locally or otherwise, relating to WASH facilities.

This annex starts with a general description of how universal design principles can be applied to WASH facilities so they are inclusive of people with disability and other groups, including the elderly, pregnant women, children and people with a temporary illness or injury. It then explores how universal design principles can influence and support the planning, design and construction of WASH facilities in rural and peri-urban areas. In these areas access to domestic water supply and sanitation is especially challenging for people with disability and other vulnerable groups.

The WASH annex ends with a list of resources.

This annex should be read in conjunction with the guidance in annexes A: Built environment, B: Health, E: Housing, F: Education, I: Rural development and K: Humanitarian action.

2. General

WASH facilities need to be well planned for people with disability, yet they seldom are.

Poor water resource management and inadequate sanitation is a major cause of poor health outcomes and can even cause impairment. For example, using contaminated water or not applying hygienic practices can lead to blindness.

Investing in WASH is a cost-effective way to improve health outcomes and reduce the prevalence of diseases leading to disability.⁴¹ Not investing in inclusive WASH can affect people with disability and other groups, including the elderly, pregnant women, children and people with a temporary illness or injury. For example, it can:

- exclude these groups from using communal facilities
- make these groups dependent on others for basic needs
- make these groups more susceptible to contracting disease.

Box C1 highlights the benefits of applying a collaborative approach when designing WASH facilities. It focuses on the implementation of the AusAID-funded Timor-Leste Rural Water Supply and Sanitation Program. This program is more commonly known by its Tetun name, *Be, Saneamentu, Igene iha Komunidade* (BESIK), meaning Community WASH.

Box C1: Timor-Leste's disability-inclusive WASH program

In Timor-Leste, the Rural Water Supply and Sanitation Program (BESIK) aims to maximise the participation of people living with disability in the implementation of WASH programs.

BESIK funded the Leprosy Mission to work with Disabled People's Organisations to undertake research identifying challenges for people living with disability and recommend options for disability-inclusive WASH. A forum on disability and WASH followed, providing a powerful stage to share challenges and the ways forward with WASH organisations and the Government of Timor-Leste.

After the forum, WASH organisations expressed commitment to maximise accessibility in WASH programs. BESIK and others supported a project that further investigated design approaches. This project involved an engineer from Australia and one from Timor-Leste, both of whom use a wheelchair. The engineers worked with BESIK and partner non-government organisations to develop people-centred designs for cost-effective options for inclusive programming. This culminated in a workshop bringing WASH partners and Disabled People's Organisations together to learn more about universal design.

At the workshop, technical notes on inclusive WASH were developed. These were included in Timor-Leste's National Directorate of Water and Sanitation. Disability-inclusion was also mainstreamed into sector policy and guidelines. Program budgets now have disability-related allocations and data is collected and monitored on access to WASH for people with disability through community planning tools.

BESIK II, the next phase of support, will focus on social inclusion approaches to ensure continued equitable access to WASH.

This collaborative approach involved many players, including people with disability as well as representatives from the Government of Timor-Leste, AusAID and WASH organisations. It illustrates how WASH facilities can incorporate universal design to benefit entire communities.

⁴¹ The Water Engineering and Development Centre, Loughborough University, has produced a wide range of publications, including fact sheets, papers and briefing notes, to support people with disability in a development environment. See also Annex A: Built environment.

3. Key universal design principles to consider

When starting a WASH program, it is important for stakeholders to:

- raise the issue of disability and vulnerability with target communities
- provide information on accessible water and sanitation facilities
- encourage collaboration between Disabled People's Organisations, engineers, stakeholders and local authorities responsible for operating and maintaining the facilities
- conduct baseline surveys, including questions relating to disability
- encourage overall design to consider the needs of people with disability and other groups, including the elderly, pregnant women, children and people with a temporary illness or injury.

3.1 Water facilities

Guidelines to consider:

- locate water sources near households where people with disability live (for example, provide a water pipe next to the house or install a storage tank nearby)
- provide people with easy and safe access to water source facilities (for example, build a wide, level path)
- adapt means of transporting water, such as carrying or hauling, so they are convenient for the user (for example, adapt jerry cans for wheelchairs)
- aim to minimise physical effort and potential injury when adapting means of transporting water
- provide access to a tap or pump handle, with enough space so people with disability can manoeuvre it
- provide a long pump handle, non-slip ramp or sitting block, to make using the water facility safer and less physically demanding
- provide taps that have lever action not twist action
- position taps at a height that gives people who are sitting, including in a wheelchair, easy access and greater physical control over use
- provide lifting mechanisms at wells and platforms at water points to reduce physical strain on the user
- provide apron and access areas around water sources that drain adequately so surfaces do not get wet and slippery with algae and/or mould
- design bathing facilities so they are private, comfortable and easily accessible (including getting in and out) for all users, but especially women
- ensure size and layout of internal rooms for bathing and hand washing is appropriate, including an internal water source and conforming to the guidelines outlined in Annex A: Built environment
- design bathing facilities at water sources, such as creeks or ponds, to provide comfortable access and a sheltered and secure environment
- design facilities to enable greater participation by people with disability in daily household activities, such as washing clothes, doing dishes and preparing and cooking food.

3.2 Sanitation facilities

Guidelines to consider:

- design in accordance with the recommendations specific to bathrooms and toilets outlined in Annex A:
Built environment
- build toilets so they are accessible, which involves including ramps to reach raised toilets, providing ways to easily open, close and lock doors, and providing non-slip floor surfaces
- locate external toilet facilities as close as possible to main buildings
- provide accessible pathways, ramps, weather protection and lighting between toilets and the main building
- provide raised toilet seats and handrails to support those who cannot use a squat toilet
- provide all toilets, including pit and composting toilets, with a water point and hand washing facilities to promote good hygiene
- provide toilet floors that can drain adequately to avoid slipping hazards and pooling of water
- provide security and privacy features so users can easily close and lock bathroom or toilet doors
- provide sufficient space for users and their helpers
- support female hygiene needs, by making change rooms, incinerators, wash facilities and showers accessible.

4. Designing water and sanitation facilities in rural and peri-urban areas

The special needs of designing WASH facilities in rural and peri-urban areas are covered in this section and include drawing water, transporting water, storing water and accessing stored water. This section also covers bathing facilities, washing clothes and dishes, and toilets.

4.1 Drawing water

Users need to be able to reach and operate water drawing mechanisms at water sources.

Guidelines to consider:

- promote apron and access areas around the water source to adequately drain so surfaces do not become wet and slippery from algae and/or mould build up
- promote design of hand-pump aprons and equipment that can be operated from outside aprons (for example, concrete aprons are often slippery so it is wise to install pumps near edges)
- use lifting devices at open wells (such as simple pulley arrangements, treadle pumps and hand pumps) that are easy for users to operate, especially those with weak arms or grips
- provide a safe area for users to stand or sit where wells are open and have no lifting mechanism
- install taps and tap stands (taps require little strength to operate compared to lifting devices and they can be installed at convenient heights)
- provide a shelf or platform on which to rest containers while they are being filled
- install tap handles with a lever action (not a twist action) since these are easier to use
- attach a flexible pipe to the tap so containers can be filled with one hand.

Box C2 highlights the potential for innovation at water sites by implementing universal design and ensuring increased accessibility for people with disability.

Box C2: Well adaptation for people with disability in Mali

In Mali, Water Aid collaborated with Sight Savers International to adapt village wells for people with disability. In consultation with users who are blind, simple adaptations were applied to make the wells easier and safer to use. For example, each well's opening was narrowed to reduce the danger of falling. A metallic plate was installed above the pulley wheel alerting users to the position of the water container, and a trench dug so users could easily draw water to their gardens.⁴²

⁴² Disability How to Note, Department for International Development, practice paper no. 11830-2007.

4.2 Transporting water

In many developing countries women and children fetch water in pairs or groups. This task can be time consuming and require a great deal of effort. As a result, the contribution of a person with disability to this group activity is valued, even if they can only perform one aspect of the task, such as carrying, but not drawing water.

Guidelines to consider:

- Adapt containers or crutches so water can be directly carried by people with disability on their head or back.
- Modify wheelchairs to enable users to carry water or pull trailers.
- Assess the best type of containers to use. Jerry cans, for example, can easily be carried by people with disability, but water spills out of them during filling and they are difficult to clean inside which can cause contamination. Buckets are easier to fill but they are more difficult to carry.

4.3 Storing water and accessing stored water

Storing and accessing water are essential needs, but can be major challenges for people with disability.

Guidelines to consider:

- provide close-fitting lids for containers with wide open tops, such as buckets and wide mouth jars, to avoid spills
- provide a tap fitted at the bottom of large containers to make pouring water easier and safer (including by people with limited arm movement)
- locate water storage facilities at the point of use, such as next to the bathing or laundry area or inside a toilet for hand washing.

4.4 Bathing facilities

Bathing facilities come in different forms with different levels of sophistication and costs. They range from a natural water source, such as a pond or stream, to specially designed concrete block built rooms with internal piped water.

Wherever possible, people with disability should have access to the same facilities as other family members.

Guidelines to consider for bathing at a water source:

- provide an easily accessible water point to ensure safety of users
- provide a sitting area, such as a concrete platform, timber bench or seat, next to the water source so people with disability can bathe with less assistance and without needing to sit or lie on wet or dirty floors
- provide a place for water containers, soap and clothes at sitting areas
- install handrails (such as rope or bamboo ones) and steps to help negotiate slippery and muddy banks around natural water sources used for bathing
- provide a simple shower arrangement, such as an overhead bucket or rope-pull, for people who find it difficult to move their arms enough to scoop water over themselves
- provide adequate space for carers so they can help those they are caring for to bathe.

Guidelines to consider for bathing in a separate area:

- provide opportunities for privacy to maintain dignity
- ensure size and layout of bathing rooms is adequate
- provide an internal water source where possible.

4.5 Washing clothes and dishes

Household tasks such as washing clothes and dishes, food preparation and cooking are often carried out in the same location as bathing and other water-related activities. People with disability can make an important contribution to these household tasks—especially since many are carried out at floor level. When applied, universal design principles can help make it easier for people with disability to participate in these activities.

Guidelines to consider:

- provide low-level platforms, stools and seats
- promote design of equipment that is multi-functional (for example, benches that can be used for bathing, washing clothes and washing dishes)
- install concrete laundry slabs at waist height for ease of access by those using a wheelchair.

4.6 Toilets

A wide range of toilet options are used in rural and peri-urban villages, from open defecation to sanitary water-flush systems.

Guidelines to consider:

- Use the guidance on the size and layout of inside toilets outlined in Annex A: Built environment.
- Position out-house toilets close to the main house so they are easily accessible.
- Provide all-weather paths and ramps to avoid people slipping and falling.
- Position sanitation facilities close to main buildings to provide a safe and secure environment. This is especially important for groups such as the elderly, pregnant women, children and people with temporary illness or injury who can be at personal risk if sanitation facilities are located far away.
- Provide a level of privacy to maintain personal dignity.
- Install handrails in all toilets, using the guidance in Annex A: Built environment. Select handrails that meet user needs. Different types include bamboo poles, steel or wooden frames, and knotted ropes suspended from roof beams. Sturdy and stable furniture can also serve as a handrail.
- Install toilet seating to the best standards possible for needs and context. Fixed raised toilet seats or pedestals may be problematic, for example, when the other members of a household use squat pans. It may be more appropriate, therefore, to provide a bucket with a movable toilet chair, an adapted wheelchair or a commode.
- Provide a water point in toilet cubicles, where possible. This is particularly important for women and adolescent girls. Ideally the water point should be piped or a container supplied from which water can be scooped or drawn.
- Provide support options in areas where defecation in the open is the usual practice. Options can include fixed poles, movable bricks, tree trunks, walking frames and walking sticks.

5. Other resources

Water and Sanitation for Disabled Persons and other Vulnerable Groups

H Jones and B Reed, Water, Engineering and Development Centre, Loughborough University, 2005

This book and CD-ROM focuses on facilities for families in rural and peri-urban areas of low and middle-income countries. Many of the approaches and solutions outlined can also be applied in institutional settings, such as in schools and hospitals. They may also be applied in emergency situations.

www.wedc.lboro.ac.uk/docs/research/WEJFK/

Integrating Appropriate Measures for Persons with Disabilities in the Infrastructure Sector

R Wiman and J Sandhu, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), 2004

This report, commissioned by GTZ on behalf of the German Ministry for Economic Cooperation and Development, provides an overview of key infrastructure issues including in the areas of water, sanitation and hygiene, relating to people with disability and development. GTZ is now known as Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ).

<http://unipd-centrodirittiumani.it/public/docs/en-disability-infrastructure-2004.pdf>

Sanitation for Primary Schools in Africa

B Reed and R Shaw, Water Engineering and Development Centre, Loughborough University, 2008

This booklet was developed from a study of primary school infrastructure in Kenya. It includes assessment tools and guidelines for water, sanitation and hygiene facilities in Africa.

[wedc.lboro.ac.uk/resources/books/Sanitation for Primary Schools in Africa - Complete.pdf](http://wedc.lboro.ac.uk/resources/books/Sanitation%20for%20Primary%20Schools%20in%20Africa%20-%20Complete.pdf)

Annex D: Energy solutions

1. Purpose

Accessibility Design Guide: Universal design principles for Australia's aid program provides guidance on enabling people with disability to participate equally in social and economic life through the design and implementation of development initiatives.

This annex provides guidance development practitioners can consider when applying universal design principles in energy solutions. While based on good practice and successful implementation of universal design, this guide is not meant to be prescriptive. It is based on the reality that the barriers people with disability face vary between developing countries and between locations in-country. It is also based on the reality that development projects are unique and face their own challenges, locally or otherwise, relating to energy solutions.

This annex starts with a general description of how universal design principles can be applied to energy solutions to make them affordable, locally produced, easy to install and accessible to people with disability. It then explores how universal design principles can be applied to such solutions.

The energy solutions annex ends with a list of resources.

This annex should be read in conjunction with the guidance in Annex A: Built environment.

2. General

Around 3 billion people, many of whom are poor and live in developing countries, cook and heat in their home using open fires and leaky stoves. They do so by burning biomass, such as wood, crop residues and animal dung, and coal. Nearly 2 million people a year die prematurely from illness attributable to indoor air pollution due to solid fuel waste.⁴³ The resulting smoke turns kitchens in the world's poorest countries into potentially harmful environments.

This indoor air pollution can lead to acute respiratory infections, blindness, cancer, chronic obstructive pulmonary disease, middle-ear infections, peri-natal conditions and pneumonia. There is also evidence of links between indoor air pollution and cancer, heart disease, low birth weight and tuberculosis.

Acute respiratory infection from spending large amounts of time inside close to a cooking place is a major contributor to disability and a primary cause of morbidity and mortality.

Most people with disability in the developing world live in rural areas where access to clean energy sources is limited. Most energy technologies available to them are inefficient and of low quality. In the absence of reliable grid power, local communities become 'self-generators', using diesel generators, kerosene lamps and lead acid batteries. Many of these sources emit pollutants with adverse climate, environmental and health effects.

The time taken by women and children to gather fuel reduces the opportunity for women to engage in alternative activities and for children to attend school. Access to affordable household electricity can increase the potential for people with disability to earn income from home-based microenterprises.

Inefficient energy production, such as three-stone hearths, and unsustainable fuels, such as coal and fuelwood that contribute to greenhouse gas concentrations in the atmosphere and climate change. Black carbon (soot) and particulates, such as smoke and dust, are also atmosphere-warming agents.

People with disability are vulnerable due to their restricted mobility and/or limited resources due to entrenched poverty.

⁴³ Indoor air pollution and health, Fact Sheet no. 292, World Health Organization, September 2011.

3. Key universal design principles to consider

While not specifically designed for people with disability, many well-tried universal design principles for energy solutions are affordable, efficient, easy to install and locally made. These include renewable energy sources such as on-site produced biogas for cooking, simple solar, battery and LED light packs for lighting. These also include chimneys, smoke hoods, improved stoves and improved ventilation. It is also important to consider changing patterns of behaviour.

A GTZ (now GIZ) study recommends that donors follow set strategies to benefit people with disability when using energy services.⁴⁴

Guidelines to consider:

- provide greater funding priority to household energy in the context of health promotion and poverty reduction, targeting women, children and people with disability who are among the most affected by indoor air pollution
- collect models of good practice for locally-available cooking, heating and lighting equipment and include people with disability in the process
- involve local Disabled People's Organisations in identifying and designing safe and accessible cooking implements⁴⁵
- incorporate interventions into inclusive development programs that raise awareness of the effects of unsuitable facilities and habits, including safe cooking, heating and lighting practices which are accessible to people with disability
- support the development of locally appropriate and accessible housing design that incorporates ventilation and universal design principles
- use enabling social protection measures to support income-generating activities by people with disability (for example, support access to electricity and tools by people with disability to enable them to establish small-scale businesses or industries)
- use targeted subsidies as part of future social protection programs to enable families that include people with disability to use sustainable energy sources.

⁴⁴ R Wiman and J Sandhu, *Integrating Appropriate Measures for Persons with Disabilities in the Infrastructure Sector*, 2004.

⁴⁵ Intermediate Technology Development Group.

4. Other resources

Integrating Appropriate Measures for Persons with Disabilities in the Infrastructure Sector

R Wiman, and J Sandhu, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), 2004.

This report, commissioned by GTZ on behalf of the German Ministry for Economic Cooperation and Development, provides an overview of key infrastructure issues including the provision of energy services relating to people with disability and development. GTZ is now known as *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ).

<http://unipd-centrodirittiumani.it/public/docs/en-disability-infrastructure-2004.pdf>

Annex E: Housing

1. Purpose

Accessibility Design Guide: Universal design principles for Australia's aid program provides guidance on enabling people with disability to participate equally in social and economic life through the design and implementation of development initiatives.

This annex provides guidance development practitioners can consider when applying universal design principles in housing. While based on good practice and successful implementation of universal design, this guide is not meant to be prescriptive. It is based on the reality that the barriers people with disability face vary between developing countries and between locations in-country. It is also based on the reality that development projects are unique and face their own challenges, locally or otherwise, relating to housing.

This annex starts with a general description of how universal design can be applied when building housing. It then explores how universal design principles can be applied to housing to reduce dependency, make housing safer for all users and reduce the chance of accidents.

Most importantly using these principles enables people to remain in the comfort and freedom of their houses for longer, which can also have economic benefits.⁴⁶

The housing annex ends with a list of resources.

This annex should be read in conjunction with the guidance in annexes A: Built environment, C: Water, sanitation and hygiene facilities and D: Energy solutions.

⁴⁶ A Bullement, 'Homes without Barriers: A Guide To Accessible Houses', Building Research Association of New Zealand (BRANZ), 2001.

2. General

For people with disability and other groups, including the elderly, pregnant women, children and people with a temporary illness or injury, comfortable, accessible housing is especially important. This is because these individuals spend more time in their homes and face challenges looking after and maintaining them. Houses that create barriers with structure, layout and even placement of furniture can put people with disability at risk of injury and result in premature loss of independence and associated health problems.

People with disability require housing that should be initially built with adaptable and liveable elements so modifications can be made without significant structural changes when required.

3. Key universal design principles to consider

The universal design guidelines and guidance in Annex A: Built environment apply to housing. However, specific design elements need to be considered when designing and building accessible housing. This involves ensuring that the following components are designed and built for accessibility, including maximum comfort and ease of use:

- location
- entrances
- indoor circulation
- windows
- bathrooms and toilets
- kitchens
- bedrooms
- living spaces
- interior finishes.

These individual components of housing are discussed in this annex.

3.1 Location

Residential housing designed and located in proximity to key infrastructure facilities and sited to take advantage of positive location aspects provides an easier and more secure environment.

Guidelines to consider:

- locate close to amenities, such as community facilities, employment opportunities, schools, shops and transport
- locate in a secure and safe environment, particularly where inhabitants have limited physical mobility
- locate on a relatively flat site for ease of access
- locate away from uncovered drains, flood plains or water courses which can result in hazardous and slippery conditions
- provide a pleasant outlook, given the amount of time often spent indoors
- shelter from prevailing winds
- include vehicle access right up to the house, to reduce travel distances and potential hazards
- construct with minimal steps to enable increased mobility and reduce the need for external support
- construct with minimal level changes—inside and outside—for ease of mobility and independent movement
- locate on the ground floor, in the case of multi-storey residential buildings.

3.2 Entrances

Easy accessibility between internal and external spaces, and between internal spaces, provides a safe transit point for people with limited mobility and people who use a wheelchair.

Guidelines to consider:

- make wide enough for wheelchair access
- provide adequate manoeuvring space
- install on level floor to reduce difficulty in moving from external to internal spaces
- provide built-in porch or canopy for shelter and protection from adverse weather conditions
- ensure well drained to avoid hazardous and slippery conditions
- provide even, non-slip surfaces
- provide ramped access for ease of dealing with more than one level and for easy entry from external to internal spaces
- design entrance to be visible from inside the house, for ease of access and ability to identify visitors
- provide seat or a parcel shelf for rest opportunities
- provide lighting for safety and security
- provide direct access to the garage at level, or by way of a ramp for safety and security
- install sounding devices, such as a door bell, to identify visitors
- install handrails on stairs to enable ease of access and for the safety of users.

3.3 Indoor circulation

Circulation through different spaces must be well planned for easy manoeuvrability, especially for people with limited mobility and people who use a wheelchair.

Guidelines to consider:

- incorporate spaces wide enough for wheelchair access
- build houses without stairs if possible
- build stairs, if required, with ramps and handrails and designed in line with the guidance in Annex A: Built environment
- assess whether internal doors are needed, given they can be major barriers and given that not all spaces need to be separated with doors
- ensure door hardware complies with the guidance in Annex A: Built environment.

3.4 Windows

Good natural light and ventilation is essential for any house and a high level of lighting is particularly important for people with low vision and blindness.

Guidelines to consider:

- provide maximum intensity of lighting at floor level, with minimal strong shadow or glare
- provide effective ventilation of rooms, which is essential in hot climates, to maximise cross ventilation
- install windows on opposite walls, preferably facing prevailing winds during the hot season
- design and place windows so they can be easily opened and closed for good cross-ventilation and to avoid accidents
- provide the right type of controls, such as levers, so windows can be opened and shut
- locate controls appropriately

3.5 Bathrooms and toilets

Domestic bathrooms and toilets should be designed and furnished for maximum comfort and ease of use.

Guidelines to consider include providing:

- minimum 850 mm width door, preferably opening out or sliding
- sufficient space for people using wheelchairs or other assistive devices
- easy-to-use amenities at a convenient height
- adequate handrails and grab bars to assist people to get to and from a wheelchair and to assist people with reduced strength
- security and privacy features so users can easily close and lock the bathroom or toilet door
- toilets with a minimum dimension of 1.6 m x 2.4 m, or 2.0 m x 2.7 m if a shower or bath is included, and with an in-swinging door
- toilets located against the wall diagonal from the entry door
- centreline toilets 450 mm to 500 mm from the wall
- firmly fixed grip rail next to the toilet, 800 mm high
- accessories, such as mirrors and towel rails, 900 mm to 1.1 m high
- firmly fixed washbasin to the wall at a height of between 800 mm to 850 mm, with the centreline at least 450 mm from an adjacent wall
- single-lever taps
- shower instead of bath
- showers fixed 800 mm high with horizontal grab rails to two walls
- shower head attached to fixed slider fitting, which is preferable, or flexible hose with vertical 800 mm to 1.8 m high grab rail
- drop-down or removable shower seat in shower.

3.6 Kitchens

Kitchens are the heart of the home. They are places where food is prepared and they are places of social interaction. This means they need to be accessible by cooks and others who gather there.

Guidelines to consider:

- provide work surfaces at a comfortable height for people using wheelchairs
- provide sufficient leg room under benches for people using wheelchairs
- strategically place regularly used equipment, such as the oven, cook top and sink, for easy access and safety of people using them, particularly when preparing hot foods
- provide low-level platforms, stools and seats for comfort and use by people with disability
- provide adequate ventilation for health and hygiene benefit, especially to reduce exposure to indoor air pollution from energy sources (Annex D: Energy solutions)
- provide ease of access to opening and closing of windows and doors.

3.7 Bedrooms

People who are ill or with disability can spend more time in their bedroom than other household members. Bedrooms therefore need to be designed and furnished well for maximum comfort and ease of use.

Guidelines to consider:

- provide adequate room for comfort and manoeuvring around the bed and other furniture
- provide a pleasant outlook, where possible
- locate the bedroom close to an accessible bathroom
- provide accessible clothing and other storage facilities
- provide privacy
- provide natural lighting and adequate artificial lighting, including a two-way switch for ease of access
- provide adequate good ventilation for health and hygiene benefit
- ensure windows and doors can be easily accessed for opening and closing.

3.8 Living spaces

Living spaces should be designed and furnished for maximum comfort and ease of use.

Guidelines to consider:

- provide spaces large enough to allow for easy manoeuvrability
- reduce the need for doors that are difficult to open and close
- avoid hazardous features
- design internal spaces that are larger, rather than smaller, to allow for easy accessibility (for example, combine dining and living areas).

3.9 Interior finishes

Interior finishes are critical in promoting accessibility and involve a large number of elements. Consider a wide range of finish types, bearing in mind that some are more suitable for people with disability than others.

Guidelines to consider:

- Assess the different characteristics of interior finishes, such as carpets, rugs, mats, vinyl sheets, floor tiles, bare concrete and earthen floors. Then select the best available for the need at hand. Examples:
 - carpet may be slip resistant but can be difficult to manoeuvre by someone using a wheelchair
 - rugs and mats can easily slip on hard floors and be difficult to manoeuvre by someone using a wheelchair
 - tiles and vinyl can be slippery and hazardous when wet
 - tiles, concrete and earthen floors can be noisy and difficult to keep clean.
- Assess wall finishes, bearing in mind that wheelchairs can damage walls. Install dados, which is timber skirting board generally up to 900 mm high, to reduce such damage.
- Carefully select colour and colour contrast, so people with low vision and blindness can easily distinguish walls from floors and other internal features.
- Provide artificial lights and lighting intensity appropriate to each interior area. A high level of artificial lighting during dark hours is particularly important for people with low vision and blindness.
- Install functional appliances, such as light switches and door handles, at a height that can easily be reached, including by someone sitting in a wheelchair.

4. Other resources

Homes without Barriers: A Guide to Accessible Houses

A Bullyment, Building Research Association of New Zealand, 2001

This publication sets out guidelines for adapting existing homes to enable persons to live in their own home as long as possible.

www.homemods.info/resource/bibliography/homes_without_barriers_guide_accessible_houses

Annex F: Education

1. Purpose

Accessibility Design Guide: Universal design principles for Australia's aid program provides guidance on enabling people with disability to participate equally in social and economic life through the design and implementation of development initiatives.

This annex provides guidance development practitioners can consider when applying universal design principles in the education sector. While based on good practice and successful implementation of universal design, this guide is not meant to be prescriptive. It is based on the reality that the barriers people with disability face vary between developing countries and between locations in-country. It is also based on the reality that development projects are unique and face their own challenges, locally or otherwise, relating to education.

This annex is designed to assist ministries of education to meet the universal design requirements in their national standards for all educational facilities, specifically those relating to providing accessible environments. It is of benefit to principals, teaching staff and others involved in school communities. It is also of benefit to architects, building contractors and others involved in planning the organisation of schools and school grounds to facilitate movement and participation of children with disability.

Schools in this annex refers to pre-schools and daycare facilities, early childhood centres, as well as primary, high and secondary schools (unless otherwise stated).

This annex starts with a general description of how universal design principles support inclusive education through planning and designing new schools and refurbishing existing schools. It then explores what inclusive education is and how universal design principles can be applied in education.

The education annex ends with a list of resources.

This annex should be read in conjunction with the guidance in annexes A: Built environment and C: Water, sanitation and hygiene systems.

2. General

The *World Report on Disability 2011* has reported that in low-income countries only 45.6% of males with disability and 32.9% of females with disability have completed primary school, compared with 56% of males and 42% of females without disability.⁴⁷

Inaccessible school buildings with poorly designed steps, tight entry ways, uneven paths, inaccessible toilets and poor natural lighting compound this problem. They make it even more difficult for students with disability to develop their potential and fully participate in school and the wider community. Physical barriers often prevent children with disability from attending school. Without an education, people with disability become even more disadvantaged, including socially and economically.

Schools often double as community refuge centres or marshalling points during a disaster or emergency, so making them accessible provides an opportunity for greater participation by the wider community.

Schools are an important community resource in other ways. They are places in which community attitudes towards people with disability can be modified and changed.

⁴⁷ *World Report on Disability 2011*, World Health Organization and World Bank, 2011. Geneva, WHO Press.

3. What is inclusive education?

Understanding inclusive education is important for universal design.

The conventional model for educating children with disability has been through specialised schools, organised around categories of disability. These schools are often in urban areas, frequently requiring children from rural and remote areas to enrol as boarders. Even when these arrangements provide specialised facilities and trained staff, studies show that relying on specialised schools often creates separate cultures and identities for people with disability.⁴⁸

The inclusive education model is radically different. It caters for all children, including those from marginalised or excluded groups, with or without disability.

Inclusive education focuses on effective learning for all children. The model recognises that each child is different and that schools and the education system need to change to meet the needs of all learners. It also helps provide teachers with the skills needed to support children's learning in a flexible way. This includes using different teaching methods to respond to children's needs, capacities and rates of development.

The model calls for suitable pre-service and in-service training of teachers, related to disability. It calls also for alternative flexible teaching methods based on child-centred learning. In addition, inclusive education requires specific teaching aids and equipment and, ideally, parent and community involvement.⁴⁹

Inclusive education has different levels, based largely on the level of support required. Some children attend regular schools and may, on a case-by-case determination, require special education such as one-on-one instruction.

Some community and school-based issues can affect how accessible travelling to school and within the school environment is for children with disability. A number of these issues are listed in Table F1.

⁴⁸ *Schools for All. Including disabled children in education*, Save the Children UK, 2002.

⁴⁹ *ibid.*

Table F1: Issues affecting access of children with disability travelling to school and in the school environment

Issues	Relating to
› willingness to go to school	› awareness campaigns, parental, teacher, administrative staff or peer attitudes, social context
› ability to go to school	› availability of mobility equipment, such as wheelchairs, for different levels of disability
› access to school	› distance from home, path or road conditions
› ability to enter and move around school premises	› building design, entrances, stairs, path conditions
› participation in school activities	› attitudes of everyone involved, building design, furniture design, provision of teaching aids, room arrangements, school grounds

4. Key universal design principles to consider

Making school facilities accessible to children with disability involves a large number of elements which, together, create a child-friendly environment and maximise education performance.

Elements include providing what children need to get to school, selecting an accessible school site, planning a school site and designing and building it.

Creating a child-friendly learning environment is another element, which requires a range of considerations such as furniture design and selection, design of special areas (for example, science rooms and library resource centres) and visual comfort.

Making school facilities accessible to children with disability goes even further and includes providing proper hygiene (toilet, shower and sink facilities), thinking about the school playground and taking into account the importance of providing for physical education.

These elements are all discussed in this annex as is the cost of providing accessible schools for inclusive education.

4.1 Getting to school

Guidelines to consider:

- provide accessible and safe paths for all children to travel to school
- provide alternative transport if no public transport is available, which could include modifying wheelbarrows and wheelchairs
- provide affordable transport options where walking and cycling are not options (for example, unassisted children in wheelchairs or students using crutches may have difficulty in accessing a school that is 500 m or more from their home)
- reduce road safety hazards and potential for abuse by encouraging adult supervision of children and safe pathways to get to school
- organise community participation to support improving and maintaining local roads for easier access to schools.

4.2 Selecting an accessible school site

Guidelines to consider:

- involve the community, including local stakeholders, Disabled People's Organisations and villagers, in site selection, especially for primary schools
- select a site as close as possible to the centre of the village where it is likely many children live
- develop a site that can accommodate present and future enrolments
- select a site that is away from major and distracting sources of noise and safety hazards, such as busy roads, industrial sites or local workshops.

4.3 Planning a school site

Guidelines to consider:

- provide single storey structures with accessible corridors, entries and internal doorways, for ease of access and safety
- provide lock-up security storage for equipment and resources
- provide essential facilities on the ground floor to avoid the need for access ramps to upper floors, including for essential facilities like accessible toilets, library, school assembly area, special education rooms and teachers' rooms
- provide external low-gradient ramps on sloped sites for access to upper floors
- provide external paths with a smooth, hard surface to facilitate safe movement from the school entrance to school buildings, between buildings, to outdoor teaching spaces, to playgrounds and to toilets
- install covers over drains that cross external paths and make them level with the path to avoid tripping
- provide clear signage and visual references so children with low vision and blindness can navigate easily
- minimise the distance between administration areas, essential facilities, teaching rooms and toilets when site planning to facilitate safe access and movement
- locate quiet classrooms and reading rooms away from noisy activities such as music classes, physical education activities, playgrounds and workshops (if unavoidable, install a sound barrier or orient windows and doors so they do not open directly into the noise source)
- orient buildings and construct eaves in hot regions to reduce sun load on walls and maximise natural light without sun penetration into rooms, which will involve orienting long walls with north – south facing windows and providing roof overhang or shading
- promote effective ventilation of rooms, especially important in hot climates
- maximise cross-ventilation by installing windows on opposite walls, preferably facing prevailing winds during the hot season
- reduce heat in buildings by planting trees to keep the ground cooler and provide a cooler breeze into school rooms
- plant trees to provide shade for outdoor play, although not too close to buildings because they will block natural light into school rooms.

4.4 Designing and building

Guidelines to consider:

- Install a false ceiling to reduce heat and reduce noise.
- Use sound absorbing (insulating) material where corrugated steel sheeting is used for roofing to substantially reduce reverberations, reduce noise from rain and reduce heat from sun. This can be commercially available material, such as fibreglass batts. It can also be local material, such as bamboo or coconut husk supported by wire netting, thatch or woven leaf.
- Install partition walls from floor to ceiling between teaching rooms.
- Provide good ventilation in the ceiling space so hot air can escape at the upper level of the roof and cooler air can enter at the lower level.
- Install raked ceilings in classrooms in hot climates to the same pitch as the roof, for good ventilation and to provide space for ceiling fans.
- Install ceilings at least 2.7 m above floor level or 3 m where there are ceiling fans.
- Paint ceilings in a light shade like beige to substantially increase natural light level.
- Paint all internal walls a light shade like beige to maximise daylight and reduce contrast between the inside and outside of rooms.
- Apply a minimum of 30% colour contrast between doors and door frames to improve identification of door space.
- Apply paint to external walls in a darker shade to avoid excessive contrast under sunlight.
- Install large windows, preferably on both sides of a teaching room, for natural light and cross ventilation.
- Enable children with low vision and blindness to sit with their back to a window, and not facing another window, to reduce the impact of sun glare.
- Provide window ventilation by installing vents below window sills and above window lintels, to create natural ventilation.
- Design and protect vents carefully so vermin and birds cannot intrude.

4.5 Creating a learning environment

To improve teaching-learning dynamics and performance of education activities, it is essential to provide a child-friendly environment. This involves careful consideration of education ergonomics. Education ergonomics include body sizes and physical comfort, general requirements to support flexible teaching and learning in classrooms, design of library resource centres and design of multipurpose rooms, science rooms and workshops.

When planning and designing for people using wheelchairs, local stakeholders should refer to local design standards in the first instance for specific requirements. Wheelchairs can be adjusted to suit growth of children, including width, seat height and foot-rest distance.

4.5.1 Furniture design and selection

Furniture should be well-designed and well-built so it is appropriate for all children, including those with disability.

Guidelines to consider:

- design and construct furniture to fit the user and maximise physical comfort
- construct all furniture so it is strong and stable to prevent easy tilting, including to:
 - locate legs so they are not offset from chairs, stools and tabletops, particularly important for supporting children with poor control of motion, balance or coordination skills
 - avoid furniture with wheels, such as those used on trolleys, which are dangerous and can be used, for example, by children with balance and mobility disability (who may use wheels to move themselves around)
 - select furniture that is easy to clean
 - select furniture with rounded edges to prevent injuries
 - avoid selecting the traditional student desk design that has a personal storage shelf under the desk table top and instead provide a separate pigeonhole shelf for students to use to store belongings
 - select simple tables with clear and sufficient room underneath for people using wheelchairs in classrooms, library and resource rooms, as well as dining areas
 - select tables at least 900 mm wide and 500 mm deep
 - provide at least one station with a top at suitable height for working while seated in multipurpose rooms, science rooms, other specialty rooms and workshops
 - avoid drawers, storage shelves or other obstructions underneath the station
 - provide a few adjustable tables or tables of various heights suited to those in a wheelchair, which can be easily moved to teaching spaces
 - provide some tables with tilting tops to facilitate the reading and writing needs of some children.

4.5.2 Furniture type and room arrangement

The choice of furniture type and room arrangement is essential to supporting student learning. Effective inclusion of children with disability in mainstream schools requires a 'pupil-centric' and flexible teaching approach rather than a conventional 'teacher-centric' approach.

Unlike traditional teaching methods, where students sit in rows facing the blackboard, flexible teaching requires more interaction between students and the teacher, and among students themselves. Flexible teaching involves whole-of-class instruction, small group activities and individual work.

Guidelines to consider:

- arrange furniture in flexible layouts, including forward-facing desks and desks arranged for group activities
- select some furniture designed and built to suit children with disability
- provide at least 10% of chairs with backs and armrests.

4.5.3 General requirements to support flexible teaching and learning in classrooms

A flexible classroom arrangement provides a wide range of opportunities for teachers and students to respond to class requirements. This supports a positive learning environment, noting that implementation of good design layout and universal design principles does not need to cost a lot of money.

Guidelines to consider:

- provide chairs of various heights, to match desk heights
- provide sufficient space for opportunities to arrange or re-arrange furniture and for people to move around the classroom, including those using wheelchairs
- design square or near square rooms, which are more functional and flexible than rectangular rooms and which reduce distances between users
- install blackboards and/or whiteboards, which are excellent teaching aids and give good contrast
- erect a blackboard on both end walls of the classroom to reduce reading distance and facilitate assigning tasks to different groups
- place storage shelves along window walls under window sills to avoid classroom hazards
- provide shelf tops for display of teaching aids and/or standing projects
- fix storage furniture and shelves along walls as a safety precaution
- install a lockable cupboard in which to keep materials and specialised learning equipment such as hearing devices and magnifying lenses
- construct partitions that are not too high when creating zones in lower-grade classrooms (for example, with movable shelves), so teachers can observe all children and so children can see teachers and read blackboards—if using temporary partitions, ensure the maximum height does not exceed 500 mm
- plan and identify a place outside the classroom where children can be taken if violent outbursts happen, so the safety of children is not compromised
- tape rugs and mats down to prevent slipping or tripping, especially for children with low vision and blindness
- design flexible seating arrangements for lower grades (for example, cushions, mats, and wooden blocks) so children are encouraged to work in small groups
- provide non-slip floor surfaces, especially for outdoor pathways exposed to rain
- provide a ‘calming’ corner in each classroom with relaxing colour shades, a mat and pillows where children can lie away from furniture or hard surfaces that could potentially cause injury
- install hooks and other hanging devices at various heights to display charts and work
- install storage areas in which to store possessions
- provide at least two exit doors if capacity in teaching and assembly spaces is above 50 people, for safety and evacuation
- avoid fully glazed doors which are hazardous, especially for children with low vision and blindness
- protect glazed windows with mesh (preferable) or bars to avoid breakage and injury.

4.5.4 Design of multipurpose rooms, science rooms and workshops

Specialty areas such as multipurpose rooms, science rooms and workshops should be designed so they are accessible to children with disability. Not doing so excludes this group from many important components of learning.

Guidelines to consider:

- provide utilities, such as electricity and water, on side benches as a safety measure
- arrange working tables in the centre of the room and keep sufficient space for wheelchair circulation.

4.5.5 Design of library resource centres

Library resource centres are an important school resource. They provide a learning space for children during class contact time and non-contact time. They allow children to engage in a quiet and positive learning environment while reading books, using computers and studying in private. Library resource centres need to be designed so they are accessible to children with disability.

Guidelines to consider:

- design areas so books and other materials are displayed at comfortable heights, no higher than 1.2 m, to make it easier for students to find and access them
- locate shelves along walls so children can get to them easily
- safely install computers along end walls or parallel to end walls to avoid glare from windows
- install wiring and electrical appliances to run along the top of walls or hide and tuck them away from walking areas to avoid tripping and potential danger
- install the height of computer tables to accommodate those using wheelchairs
- provide spaces for terminals to promote the use of computer-assisted learning.

4.5.6 Visual comfort—lighting, colours and signage

Visual comfort is essential for quality learning. It is especially important for people with hearing disability and intellectual disability, as well as those with low vision and blindness. Proper lighting makes it easier for students to read blackboards and see other teaching aids. It also enables them to see teachers' faces and lips and the faces of other children.

Visual comfort involves balancing natural and artificial lighting, paying attention to colour schemes and installing light points and ceiling fans in the correct position, for maximum benefit. It also involves positioning signage so it can be easily seen.

Guidelines to consider:

- ensure adequate natural light can enter classrooms and other essential rooms, particularly where power is not available
- provide a uniform light level, avoiding high contrasts and shadow areas
- locate light points over working benches and position to prevent children from working in their own shadow, especially at work benches installed along walls
- paint internal walls and ceilings a light shade, such as beige, to reflect light uniformly around the room
- avoid dark floor finishes, which means using lighter colours and finishes to make it easier to observe changes in floor surfaces and avoid obstacles
- avoid bright spots by placing light bulbs within 60° of the centre of the vision field of children and the teacher
- use matt finishes to avoid glare on blackboards and working surfaces
- install electric lights on the ceiling in a uniform pattern
- recess electric lights and cover with a protection mesh to prevent accidental breakages
- use diffusers, shields or hoods on lights to prevent breakage and avoid bright spots in the vision field
- install low-consumption compact fluorescent lamps with reflectors, not fluorescent tube lights with magnetic ballasts which can cause a disturbing stroboscopic effect, and be hazardous
- select colour schemes carefully with a preference for pastel shades, which provide visual comfort
- follow manufacturer specifications with artificial lights to achieve the best distribution of light and light levels, noting that the recommended light level for educational activities is a minimum 540 lux⁵⁰
- install on external pathways and in internal corridors uniform lighting, at a minimum light level of 200 lux
- provide signage in all rooms, especially to assist children with low vision and blindness, by:
 - locating signs at eye level of the average child or between 1.2 m and 1.5 m from floor level
 - placing signs about 200 mm from the door on either side of the handle
 - locating signs consistently for all doors around the school
 - keeping marking simple, using a colour code for each room or type of room
 - providing good colour contrast, such as black on a white background
 - providing sound and visual alarms for safety during evacuations and other non-routine movements.

⁵⁰ Lux is a measurement of the light intensity falling on a surface, as perceived by the human eye. Australian Standard 1680 outlines minimum lux levels for a wide range of built environments.

4.6 Hygiene—toilet, shower and sink facilities

At pre-school and in the first grades of primary school, teachers often teach hygiene and proper use of toilets. In secondary and high schools, older children need accessible hygiene facilities, such as change rooms, incinerators, toilets, showers and wash facilities. These need to be suitable for meeting menstrual hygiene needs. Privacy in hygiene facilities is essential at all levels, especially for girls and young women.

4.6.1 Toilet facilities

Provision of well designed and located toilet facilities is critical for students and teachers with a disability, particularly those who have difficulty with mobility and/or low vision and blindness. Availability of such facilities is a pre-requisite and one that has a positive effect on student enrolment and attendance.

Guidelines to consider:

- apply the guidance in Annex A: Built environment and Annex C: Water, sanitation and hygiene facilities, which supports universal design principle requirements for toilet users and their helpers
- provide at least one toilet for people with disability for every 500 students (depending on local culture and customs this toilet may serve girls and boys)
- provide a piped water point and tap in the toilet cubicle or a container from which water can be scooped
- take into account toilet numbers in school planning for matters such as growth in student numbers. In school planning, factor in the need for accessible toilets, even if a school does not have a child with disability enrolled
- provide a shower and a changing and/or washing area, which could be attached to the toilet area
- provide at least one accessible toilet per floor in multi-storey buildings
- attach toilets to classrooms in pre-schools so teachers are in close proximity to supervise and enforce proper hygiene
- install door locks, but only if they can be released from the outside. If they cannot, erect an 'Occupied – Vacant' sign
- install a sitting toilet for children who use a wheelchair, even where squat toilets are used by others, to assist with safe transfer onto the toilet and increase hygiene levels.

4.6.2 Shower facilities

Shower facilities need to be designed and constructed of materials that avoid potentially hazardous situations, such as slipping, while providing a safe and private environment for the user.

Guidelines to consider:

- construct a gentle slope for water drainage
- avoid hazardous showers that do not have trays or recesses where water collects
- provide a seat in the shower to enable users to rest and place personal items on
- partition wet areas from dry areas in showers
- select floor surfaces that can be easily cleaned and are slip resistant
- provide a drop down shower chair or portable plastic shower chair
- install all fittings flush to the wall or position them so they do not cause accidents or injury
- install bathroom doors so they open outward to prevent blockage if a child falls behind them.

4.6.3 Sink facilities

Well located and secured sinks provide an opportunity for washing without having to enter into bathrooms.

Guidelines to consider:

- install outside of toilet cubicles, noting the likely space restrictions inside cubicles
- provide a circulation space of 1 m by 800 mm in front of the basin
- install no higher than 700 mm for ease of access by all users
- firmly fix to the wall, without supports underneath, for ease of access by all users
- install a single lever action tap, rather than a twist action tap, where possible, so people who are sitting, including in a wheelchair, have easy access
- fix handles or bars firmly to the wall to help with transferring a student from a wheelchair to the toilet seat.

4.7 School playground and physical education

Physical education is designed so children can acquire physical and social skills, starting with basic balance or throw-and-catch activities, up to more complex, athletic activities and team games.

It is important that children with disability are able to participate to acquire physical and social skills. Schools should therefore provide and install equipment and facilities to cater for the needs of all students and a wide range of capabilities.⁵¹

Much equipment can be fabricated locally using few resources. The Disabled Village Children⁵² guide includes a wide range of low-cost ideas for children with disability.

Box F1 highlights the increasing impact of including universal design principles in the construction of schools throughout Indonesia under the Australia – Indonesia Basic Education Program (2006–11).

Box F1: Disability-inclusion in Indonesian schools

In Indonesia, AusAID supported improved access by children (and teachers) with disability to school through its \$395 million Australia – Indonesia Basic Education Program.

All schools built under the program from 2008 (1275) were required to provide access for people with disability. There were 1087 students (573 boys and 514 girls) with physical and learning difficulties enrolled in these schools in 2010. This included installing disabled toilets, handrails and ramps. The Government of Indonesia has since adopted these measures for all new schools. The program also assisted the Government of Indonesia to issue a regulation on inclusive education, supporting schools to include and better meet the needs of students with disability.

Under the current 2011–16, \$500-million education partnership with Indonesia, Australia continues to provide support through disability-inclusive education strategies. This includes through:

- › constructing or expanding up to another 2000 schools, creating around 300 000 new places facilitating access for children with disability by including disabled toilets, handrails and ramps
- › developing a training system for all 293 000 of Indonesia’s school principals, school supervisors and district education officials in school planning, including disability-inclusive education strategies.

⁵¹ D Werner, *Disabled Village Children: A guide for community health workers, rehabilitation workers, and families*, 1999, chapter 46.

⁵² *ibid.*, ‘Ideas for playground equipment and many other resources’.

4.8 The cost of providing accessible schools for inclusive education

Implementing an inclusive education system is a cost-effective alternative to the traditional segregated education system⁵³, enabling children with disability in poor, rural and remote locations to access and participate equally in schooling.

At school level, providing an accessible environment through universal design or refurbishment of existing facilities is not necessarily expensive. Sometimes it can cost nothing or just a small amount.⁵⁴ For example, orienting buildings towards natural light can reduce heat and create a comfortable, more accessible classroom without extra cost.

The United States Agency for International Development funded a study on how to improve accessibility to existing schools in Sri Lanka and produced a booklet entitled 'Improving Accessibility of Schools'.⁵⁵ This booklet provides guidance for making schools accessible.

Box F2 shows the checklist included in the booklet for turning existing schools into barrier-free environments.

Box F2: Turning existing schools into barrier-free environments

Access to ground floor classrooms

- › provide ramped alternatives to ground floor
- › provide level access to classrooms

Toilets

- › provide disabled access facilities, constructed new or incorporated into existing
- › provide accessible pathway to toilets

Water

- › provide adequate drinking water outlets
- › provide adequate washing facilities

Pathways and corridors

- › provide connect by accessible pathways
- › ensure no breaks in path of travel (steps or drains)

Drainage

- › cover drains that lie adjacent to pathways or corridors
- › cover drains that cross paths of travel
- › grates or bridges over drains should be accessible

Stairways

⁵³ UN Enable, Rights and Dignity of Persons with Disabilities.

⁵⁴ Education For All: The Cost of Accessibility: (Education Notes), World Bank 2005.

⁵⁵ USAID, John Grooms, Motivation, Disability Organisations Joint Front (DOJF), 2006..

- › provide accessible handrails on both sides
- › repair broken steps
- › provide adequate lighting

Signage

- › provide signs that are readable
- › use non-reflective and colour contrasting materials
- › remove unnecessary or confusing signs

Teacher facilities

- › provide accessible toilet for teachers
- › provide level access to teachers staff room (no steps)

Canteen

- › provide level access (no steps)
- › provide serving counter at 700 mm above floor level
- › provide adequate lighting at serving counter
- › organise furniture in room so it leaves clear space for easy passing

Car parking

- › provide accessible car parking space close to entrance

5. Other resources

Improving Accessibility of Schools

USAID, John Grooms, Motivation, Disability Organisations Joint Front (DOJF), 2006

This booklet focuses on how existing school facilities can be upgraded to include people with disability.

http://www.homemods.info/general_access_for_schools.pdf

Child Friendly Schools Infrastructure Standards and Guidelines, Primary and Tronc Common Schools

Rwanda Ministry of Education, 2009

These guidelines set out infrastructure standards for Rwandan schools. They include accessibility standards.

http://www.iiep.unesco.org/fileadmin/user_upload/Cap_Dev_Technical_Assistance/pdf/2010/Rwanda_Child_friendly_schools_infrastructure_standards_and_guidelines_May_20091.pdf

National Infrastructure Guidelines for Elementary and Primary Schools

Papua New Guinea National Department of Education and AusAID, 2009

This booklet, targeting school boards, provides guidelines for constructing schools in Papua New Guinea. It includes accessibility guidelines.

www.alexanderandlloyd.com.au

Education for All: The Cost of Accessibility (Education Notes)

World Bank, 2005

This study provides guidance on how cost is not a significant barrier to accessible design, although it is often perceived to be so.

<http://siteresources.worldbank.org/DISABILITY/Resources/280658-1172610312075/EFACostAccessibility.pdf>

Education in Emergencies: Including Everyone, Inter-Agency Network for Education in Emergencies, Geneva

H Pinnock, Inter-Agency Network for Education in Emergencies, 2009

This pocket guide outlines key principles for inclusive education and strategies for inclusive education in humanitarian emergencies.

<http://toolkit.ineesite.org/toolkit/Toolkit.php?PostID=1007>

Sanitation for Primary Schools in Africa, Water Engineering and Development Centre

B Reed and R Shaw, Water Engineering and Development Centre, Loughborough University, 2008

This booklet was developed from a study of primary school infrastructure in Kenya. It includes assessment tools and guidelines for water, sanitation and hygiene facilities in Africa.

http://wedc.lboro.ac.uk/resources/books/Sanitation_for_Primary_Schools_in_Africa_-_Complete.pdf

Schools for All: Including disabled children in education

Save the Children, UK, 2002

These guidelines are primarily aimed at education staff developing inclusive education practices, and focusing on including children with disability in schools.

<http://www.savethechildren.org.uk/resources/on-line-library/schools-for-all-including-disabled-children-in-education>

Educational Buildings Digest 18: Anthropometric Data and its use for Educational Building and Furniture Design

United Nations Educational, Scientific and Cultural Organization (UNESCO), 1984

This resource compiles anthropometric data from Asia and the Pacific as applied to educational buildings and furniture designs.

<http://unesdoc.unesco.org/images/0008/000819/081972eb.pdf>

Educational Buildings Digest 20: Safety Considerations in Educational Buildings and Furniture Design

UNESCO, 1988

This digest outlines how design principles and materials can be used to safeguard users of educational buildings and furniture.

<http://unesdoc.unesco.org/images/0008/000819/081974EB.pdf>

Embracing Diversity: Toolkit for Creating Inclusive, Learning-Friendly Environments

UNESCO, 2004

This toolkit contains six booklets of activities and tools for creating inclusive education environments.

<http://unesco.org.pk/education/icfe/resources/res5.pdf>

Minimum Standards for Education: Preparedness, Response, Recovery

Inter-Agency Network for Education in Emergencies, 2010

This handbook sets out 19 minimum standards, enhances the quality of educational preparedness, response and recovery, and increases access to safe and relevant learning opportunities.

www.preventionweb.net/english/professional/trainings-events/edu-materials/v.php?id=14414

Disabled Village Children: A guide for community health workers, rehabilitation workers and families

D Werner, Hesperian Foundation, 1999 (reprinted 2009)

This guide is primarily written for therapists, professionals, and community groups interested in rehabilitation. It outlines issues related to children with disability.

www.dinf.ne.jp/doc/english/global/david/dwe002/dwe00201.html

Annex G: Information and communication technology

1. Purpose

Accessibility Design Guide: Universal design principles for Australia's aid program provides guidance on enabling people with disability to participate equally in social and economic life through the design and implementation of development initiatives.

This annex provides guidance development practitioners can consider when applying universal design principles in the information and communications technology (ICT) sector. While based on good practice and successful implementation of universal design, this guide is not meant to be prescriptive. It is based on the reality that the barriers people with disability face vary between developing countries and between locations in-country. It is also based on the reality that development projects are unique and face their own challenges, locally or otherwise, relating to ICT.

This annex starts with a general description of how universal design principles can be applied. It then explores the design elements to consider to improve access to ICT systems for people with disability. It discusses how communication and information-access systems must be planned and configured so all users can send and receive information, regardless of ability, age or other challenges. It then discusses how accessibility forms an important component of procurement for aid projects.

The ICT annex ends with a list of resources.

This annex should be read in conjunction with the guidance in Annex A: Built environment.

2. General

Accessibility of ICT has improved dramatically in recent years, with significant benefits to people with disability. Telecommunications has become an essential tool for participating in all aspects of society. Access to ICT enables people with disability to be gainfully employed and more independent. Digital and multi-sensory information supports literacy through, for example, increasing access to books and enabling people to manipulate and read text.

Despite recent advances, people with disability can be excluded from accessing many ICT products and services. All people should be able to use products as shipped by manufacturers without having to modify them or acquire additional technologies to make them work for their needs.

ICT products and services rely on communicating and interacting through the three senses of seeing, hearing or touching. Relying on one sense only may exclude many people from gaining access from ICT. As examples, the use of colour to convey meaning needs to be supported by text, and information presented in images needs to be provided in text.

3. Key universal design principles to consider

Providing accessible ICT environments and equipment involves many elements, including telephones, public access terminals, television, information technology, and websites.

3.1 Telephones

Fixed line telephones should provide ease of access and be easy to use by an individual alone.

Guidelines to consider:

- large buttons with raised numbers
- volume control
- time-out control for slow dialling
- easy hold receiver
- large type
- high colour-contrast instructions
- extra socket to connect to computers.

Public telephones should also provide ease of access and be easy to use by an individual alone.

Guidelines to consider:

- standard key placement
- volume control to reduce ambient noise
- card insert that is easily accessible by a person in a wheelchair
- folding seat.

Mobile phones should be easy to use by an individual alone.

Guidelines to consider:

- same attributes as a fixed phone
- easy to hold
- specific function so menu contents can be read aloud to users
- screen with large characters
- screen with high contrast.

3.2 Public access terminals

It is important that public access terminals, such as automated teller machines, information systems, and points of ticket sale can be easily used by people with disability. This includes easy entrance and exit to public access terminals and ease of use of terminals and their functions.

Guidelines to consider:

- position terminals to provide personal and content security and avoid screen glare
- position at different heights to accommodate all users, including people using wheelchairs
- select terminals that have sounds, such as bleeps and clicks, or tactile responses confirming the terminal is activated (touch screens are inaccessible to most people with disability, especially those with low vision and blindness)
- ensure typeface is clear and instructions are legible
- provide a place to hang a walking stick to avoid cluttering access space.

3.3 Television

LED-backlit and plasma television sets and controls are usually user friendly for people with disability, although applying universal design principles can increase accessibility.

Guidelines to consider:

- select the right size of screen for group or individual use
- use subtitles and sign language or audio description if available
- ensure disaster warnings and information on other life-threatening events are available.

3.4 Information technology

Application of information technology resources consistent with universal design principles can make a substantial difference to the inclusion of people with disability in their home environment. It is important to make accessibility a priority from the early planning stages.

Guidelines to consider:

- Select hardware designed to help people with disability use computer technology. This includes input modes, such as keyboard and mouse. It also includes alternatives, such as a head pointer, mouth or head stick or touchscreen.
- Select significant software innovations to enhance accessibility, such as:
 - programs using minimal keyboard functions
 - clear graphics
 - voice synthesisers that can read text
 - webcam technology
 - greater bandwidth
 - better processing, which makes lip-reading and sign language possible.
- Incorporate innovations for people with disability as they become available.
- Promote best-practice material on universal design learning.
 - Update material to expand opportunities for people with disability through the innovative use of computer technology (such as www.cast.org).

3.5 Websites

Websites developed using universal design principles focus on accessibility. These are more usable for everybody, not just for people with disability. Web accessibility encompasses all disabilities that affect access to the web. This

includes auditory, cognitive, neurological, physical, speech and visual disabilities.

Creating accessible websites is not necessarily difficult. It involves four main principles for web developers and designers to consider when creating or improving web pages, as outlined below. These principles cover considerations such as plain language, clear layout on a web page, sufficient contrast and not relying on colour to convey meaning.

Guidelines to consider:

- Create perceivable information⁵⁶ and user interface by:
 - providing text alternatives for non-text content
 - creating captions and other alternatives for multi-media
 - creating content that can be presented in different ways
 - making content easier to see and hear.
- Develop operable user interface and navigation by:
 - making functionality available from a keyboard
 - giving users enough time to read and use content
 - not publishing content that can cause users to have seizures⁵⁷
 - designing so users can easily determine where they are on a site and then easily navigate through it to find content.
- Develop understandable information and understandable user interface by:
 - creating text that is readable and understandable to the broadest possible audience
 - making content appear and operate in a predictable way
 - helping users avoid and correct mistakes.
- Post strong content that can be reliably interpreted by:
 - creating content that is compatible with current and future user tools.

AusAID contracts require potential website content (such as reports from contractors) to be provided in an accessible format. Guidelines are available on AusAID's website to assist contractors in providing accessible documents⁵⁸.

4. Procurement

⁵⁶ Perceivable information: Perceive is to become aware of something by the use of senses. Web accessibility is based upon the assumption that people need to be able to perceive web content. They need to be able to input the information into their brain so they can process it. If the information cannot get into the brain, it is inaccessible. As obvious as that statement may sound, it is a principle frequently ignored by developers. Too many sites contain web content that cannot even be perceived by some who would like to access it. The webaim website provides a definition of Perceivable information.

⁵⁷ Individuals who have photosensitive seizure disorders can have a seizure triggered by content that flashes at certain frequencies for more than a few flashes. Flashing refers to content that can trigger a seizure (if it is more than three per second and large and bright enough). This cannot be allowed even for a second or it could cause a seizure. Turning the flash off is not an option since the seizure could occur faster than most users could turn it off. Therefore content of any size on a web page that flashes more than three times per second can cause seizure and should not be used. The W3 website provides further details on photosensitive seizure disorders.

⁵⁸ Web content accessibility guidelines for contractors, AusAID, 2012.

Accessibility forms an important component of procurement for aid projects. When conducting ICT procurements to provide infrastructure and services to people with disability, the procurement documentation (for example, request for tender documentation) must expressly outline the accessibility requirements for end-users. When procuring ICT services, including the development or maintenance of websites on behalf of AusAID, procurement documentation must require service providers to ensure the websites comply with the Web Content Accessibility Guidelines (WCAG) Version 2.

5. Other resources

Building an Inclusive Development Community: A Manual on Including Persons with Disabilities in International Development Programs

Mobility International USA, 2004

This manual includes a section on website access.

<http://www.miusa.org/publications/books/inclusivedevelopment>

Web Accessibility Initiative

W3C (World Wide Web Consortium) 1994–2012

This online initiative is a continuously updated working resource on international web accessibility standards.

<http://www.w3.org/WAI/>

Web Content Accessibility Guidelines (WCAG) 2.0

W3C (World Wide Web Consortium), 2012

These guidelines cover a range of recommendations for making web content more accessible. Following these guidelines will make content accessible to a wider range of people with disability, including those with blindness and low vision, deafness and hearing loss, learning disability, limited movement, speech disability, photo sensitivity and combinations of these.

<http://www.w3.org/tr/wcag/>

Circular 2012–2015

Australian Government Information Management Office, 2012

This circular states that all Australian Government websites need to conform to Web Content Accessibility Guidelines 2.0, Level A, by 31 December 2012 and conform to Level AA by 31 December 2014.

Annex H: Transport systems and infrastructure

1. Purpose

Accessibility Design Guide: Universal design principles for Australia's aid program provides guidance on enabling people with disability to participate equally in social and economic life through the design and implementation of development initiatives.

This annex provides guidance development practitioners can consider when applying universal design principles in the transport systems and infrastructure sector. While based on good practice and successful implementation of universal design, this guide is not meant to be prescriptive. It is based on the reality that the barriers people with disability face vary between developing countries and between locations in-country. It is also based on the reality that development projects are unique and face their own challenges, locally or otherwise, relating to transport systems and infrastructure.

This annex starts with a general description of how universal design principles can be applied, including to transport systems and infrastructure. It then explores the design elements to consider in support of better planning and design.

The transport systems and infrastructure annex ends with a list of resources.

This annex should be read in conjunction with the guidance in annexes A: Built Environment, B: Health, C: Water, sanitation and hygiene facilities, F: Education and I: Information and communication technology.

2. General

Inclusive transport that applies universal design principles is an important part of any comprehensive strategy to ensure the inclusion of people with disability. Transport infrastructure and means of transport that exclude people with disability limit educational opportunities, participation in the labour market and access to health and other social services.

Transport barriers start with the paths and walkways linking peoples' homes to public transport systems. Transport infrastructure design is often inadequate, which presents major structural barriers to mobility. This includes:

- pedestrian crossings
- bus stops
- train stations
- terminals used by minibuses
- other public transport vehicles.

In many developing countries, a high percentage of the population live in rural areas. While there may be modern buses and minibuses on some inter-urban trunk roads, travel to villages is often in old, multipurpose vehicles that have to negotiate poorly maintained roads while carrying people and goods. These vehicles are not easily accessible or comfortable, although some permit wheelchair transport.

Rural means of transport do not reach all villages. For example, it is estimated that more than one third of the population of Papua New Guinea live more than 10 km from a road.⁵⁹ In Nepal, Papua New Guinea, Timor-Leste and other developing countries, significant numbers of people with disability living in villages are isolated by a lack of access roads, poor footpaths and difficult river crossings. Often they can only travel if others are prepared to carry them for many hours.

Most means of transport and transport infrastructure are based on a compromise between conflicting interests such as quality versus cost, number of operators versus number of passengers and number of motorised versus number of non-motorised systems. When applied, universal design principles can lead to different design decisions, alternative compromises and better results.

Universal design principles should be applied to all means of transport, paths, roads and terminals. Doing so can make life much easier and more inclusive. The extent of potential problems was revealed in a review of access in India, Latin America and Southern Africa (Box H1).

⁵⁹ BJ Allen and M Lowe, Papua New Guinea Roads Priority Study: *Review of national roads in Papua New Guinea*, 2005, report for AusAID, Research School of Pacific and Asian Studies, Australian National University, Canberra 2005.

Box H1: Inclusive design to enable access to public transport

A review⁶⁰ of policy and legislative approaches to improved access in India, Latin America and Southern Africa revealed that people with disability are being denied access to train and bus stations by the need to negotiate steps and stairs, the absence of adequate seating and waiting areas, and non-accessible amenities such as high ticket booths, toilets and turnstiles. Unpaved bus stops do not provide enough space for wheelchairs. Bus stops with raised floors and kerbs prevent use by those in wheelchairs.

The absence of shelters at major bus stops is also problematic, leaving people with disability, as well as other passengers, without protection from the heat, rain, sun and wind.

At train and other transport stations, there are often dangerous gaps between platforms and vehicles. Vehicles themselves, whether buses, minibuses, multipurpose trucks or trains, are seldom easy to enter. They are also seldom safe to ride in for people carrying children, or people who are frail, unstable, using wheelchairs or with low vision and blindness.

⁶⁰ Venter et. al, 2002, *Enhanced accessibility for people with disabilities living in urban areas*. Unpublished Project Report PR/INT/248/02. Department for International Development. Engineering Knowledge and Research Project (United Kingdom).

3. Key universal design principles to consider

The universal design guidelines and guidance outlined below should be applied to all transport systems and infrastructure. This includes the following three broad categories which people with disability need for personal mobility as well as for education, health, social and work reasons.

1. Walking and carrying forms of transport, including backpacks, crutches, sticks, stretchers and walking frames on crossings, footbridges, footpaths, handrails, ramps and stairs.
2. Intermediate means of transport, including animal-drawn carts, bicycles, canoes, hand carts, motorcycles, motorised three-wheelers (such as autorickshaws and tuk-tuks), riding animals, small boats, tricycles, trolleys and wheelchairs.
3. Large-scale motorised transport, including airplanes, buses, bus rapid transit, ferries, large boats, minibuses, multipurpose trucks, taxis, trains and trams.

Universal design principles should be considered when designing and implementing programs for:

- transport infrastructure and associated traffic management systems
- transport policy
- public transport, including train and bus transit stations and water and air transport.

3.1 Transport infrastructure

Transport infrastructure and associated traffic management systems need to be designed and/or selected for accessibility. A wide range of infrastructure is needed to support and/or facilitate the use of the many different means of transport available, including the three broad categories noted above.

A wide range of associated traffic management infrastructure is also involved. This includes access barriers, doors, intersections and crossings, signals, signs, ticket machines, traffic calming measures and turnstiles.

Guidelines to consider:

- encourage appropriate access and integration so people can move between different forms of transport with ease and safety
- build so infrastructure can withstand external environment elements, such as rain, running water, sun, waves and wind, to protect infrastructure and those who use it
- enable efficient running of facilities to provide better service for users
- build so infrastructure is environmentally friendly for users by using appropriate materials, distinguishing between various uses, ensuring safety of users and maintaining infrastructure
- build in a sustainable manner to ensure long-term use.

3.2 Policy implications for the transport sector

People with disability, and other groups, including the elderly, pregnant women, children and people with a temporary illness or injury, are often disregarded in transport policy and planning even though improving mobility and access facilitates their participation in economic, political and social processes.

Strategies to make transport more inclusive include:

- learning from and working with Disabled People's Organisations
- working with municipalities and road authorities
- mainstreaming mobility and access for the whole community, including people with disability, during the early transport planning stage.

Availability of transport services has emerged as an important issue in a number of transport policies. It requires removing institutional and physical barriers and providing incentives to increase accessibility to transport and develop enabling policy.

3.3 Transport vehicles and access

To enhance accessibility of transport vehicles, it is important to consider a range of design principles and operational practices. Ways to enhance specialised public transport systems should be applied. Costs for these enhancements vary. Some have no cost.

3.4 Design principles

Public transport vehicles should adopt universal design. Standards are available for particular types of public transport vehicles, including bus rapid transit, buses, metros, railway carriages and trams.

Guidelines to consider for people using public transport:

- provide clear pictograms and large print route numbers and/or destination signs for those with low vision
- provide accessible, prioritised seats for passengers with disability and other groups, including the elderly, pregnant women, children and people with a temporary illness or injury
- install adequate hand grips and vertical stanchions at doors and inside vehicles to reduce potential for falls
- install comfortable hand grips and rails (generally 25 mm to 50 mm in diameter), painted in bright contrasting colours, to all steps and floors
- install floors with non-skid surfaces
- provide tactile information, such as floor markings, and an accessible bell for stopping the bus, for people with low vision and blindness
- install steps that make it convenient for passengers to enter (for example, 800 mm wide, 200 mm deep and start at 250 mm from ground level)
- provide a retractable first step, manual ramp or movable stool at bus entrance for semi-ambulatory passengers
- provide a convenient area for small bags.

Guidelines to consider for people using wheelchairs:

- seek low-cost options such as permitting friends or the driver to help a person using a wheelchair get into a vehicle and fold the wheel chair
- consider higher-cost options, such as lift-equipped buses and mechanical lifting devices
- explore opportunities for using low floor buses or high-floor buses with bridges that can serve all passengers from high platforms.

3.5 Operational practices

Many operational practices can be developed and/or adjusted to conform to universal design for a range of public transport modes. This includes buses, minibuses, multipurpose transport vehicles and rural taxis. Most operational practices that help passengers and road users with disability are often very low cost.

Guidelines to consider:

- establish regulatory mechanisms to enforce safe vehicle operation by private and informal sector transport operators
- establish positive reinforcements to encourage safety and courtesy to all passengers
- seek support from transport associations to provide disability awareness and sensitivity training to transport personnel, including drivers and fare collectors
- require transport vehicles to come to a complete halt at stops and remain stopped until passengers have entered and positioned themselves for their ride
- require audible announcements of routes and key stops (for example, clear calls from the driver or fare collector) with sufficient warning calls (for example, 'next stop')
- require audible and clear announcements at all transport terminals
- regulate the production of timetables
- encourage safe and predictable services
- discourage and/or regulate against practices and driver incentives to wait for excessive amounts of time, overload vehicles or practice unsafe operations, such as racing other transport vehicles to the next stop
- collect and assess disaggregated data on accidents and their causes
- gain public support for enforcing key safety practices by vehicle operators to reduce accidents and injuries caused by bad driving, passengers having to board or descend from moving vehicles, and/or passengers having to cross traffic lanes to access a vehicle.

3.6 Specialised public transport systems

There are many ways to enhance existing elements of transport systems to make them more accessible. This includes train stations and bus transit stations, water transport and air transport.

3.6.1 Train stations and bus rapid transit stations

Guidelines to consider:

- minimal gaps between the platform and entrance
- easy-to-read timetables and directions in accessible formats, such as large print or touch screens
- clearly marked platform edges with contrasting colours and tactile surfaces
- kerb ramps
- other accessible features.

3.6.2 Water transport

Guidelines to consider:

- accessible ramps from wharf to ferry
- accessible piers with simple boarding and disembarkation procedures
- accessible toilet facility in at least one cabin.

3.6.3 Air transport

Guidelines to consider:

- all domestic, short-haul aircraft to safely accommodate at least one wheelchair passenger with a travel assistant
- national and international airports to be fully accessible with appropriate boarding facilities
- accessible toilet facilities available in airports and on aircrafts.

4. Urban and rural transport infrastructure and the pedestrian environment

Specific universal design elements need to be considered when designing and building transport infrastructure that supports the pedestrian environment, including how people get from their home to transportation stops and hubs to their workplace, community and social services.

Elements include providing pathways and supporting infrastructure to promote safe and accessible journeys.

Facilitating safe and accessible rural transport infrastructure is strengthened by good design and consistent maintenance programs.

The design and construction of rural roads can facilitate safe use of roads by pedestrians through a number of simple construction inclusions that separate various users. Construction techniques and systems that segregate and protect roads, footpaths and bridges from weather elements and constant use should be included at the planning and design stage to support the safety of users and longevity of facilities.

4.1 Urban transport infrastructure

Urban infrastructure involves many components, including pedestrian pathways, clear space for footpaths, safe pedestrian and cycle interface, safe pedestrian crossings, clear signage and quality street lighting.

4.1.1 General

Guidelines to consider:

- apply the accessibility guidance in Annex A: Built environment, to the pedestrian environment, notably 'Open spaces and recreational areas that surround buildings'
- apply universal design standards to new construction as it can be achieved at lower cost when compared to retrofitting existing infrastructure.

4.1.2 Pedestrian pathways

Guidelines to consider:

- level pathways and ensure they are of adequate width to enable safe passing of all pedestrians and people using wheelchairs
- build ramps to public buildings for safe and easy access for pedestrians and people using wheelchairs.

4.1.3 Clear space for footpaths

Guidelines to consider:

- Calculate the amount of clear space required for footpaths based on the number of people and their means of locomotion. As a guide:
 - minimum 1 m is required for wheelchair access on ramps with 1.8 m for two wheelchairs to pass
 - 2 m wide footpaths are required, depending on pedestrian numbers, to make passing easy (footpaths less than 1.2 m are too narrow).
- Keep footpaths free of obstacles such as parked bicycles, motorcycles, trading stalls and, where possible, trees, signs and street furniture.

4.1.4 Safe pedestrian and cycle interface

Guidelines to consider:

- segregate pedestrian and cycle lanes where possible for ease of movement and safety of users
- provide mutual benefits for pedestrians and cyclists sharing facilities, such as kerb ramps with protected status on minor side roads
- aim for local consensus to resolve conflicts over use of space, such as where pedestrians feel threatened by fast-moving bicycles and motorcycles.

4.1.5 Safe pedestrian crossings

Guidelines to consider:

- clearly mark pedestrian crossings for motorists
- clearly mark tactile ramps for pedestrians
- install traffic light protection with audible signals at key crossings
- install pedestrian islands, with level access or pedestrian ramps, where crossing traffic lanes is difficult and unsafe, ensuring that islands do not constrain traffic lanes or form a pinch-point hazard for cyclists.

4.1.6 Clear signage

Clear and appropriately sized signage in public transport terminals is especially important for people with disability, including those with low vision and mobility problems.

Clear signage is important for people carrying loads. These people tend to concentrate more on their movement and less on their surroundings. They often do not, as a result, notice small signage.

Guidelines to consider:

- install large, and well-located signs (high contrast and large print) directing people to and from, and within, transport terminals that:
 - provide directions
 - highlight safe road crossings
 - provide public transport and safety information
- install an easily understood system of verbal announcements to help people with hearing disability
- use well recognised icons to help those who have reading difficulties
- provide at least one low ticket counter and/or ticket machine for people with disability and people using wheelchairs
- install tactile guides to and from, and within, transport terminals and stops to assist people with low vision and blindness
- install tactile warning strips at kerbs and all platform edges to assist people with low vision and blindness.

4.1.7 Quality street lighting in and around transport terminals and stops

Good street lighting is necessary to ensure transport operators, drivers, passengers and visitors can clearly see destinations and signs. Good lighting, particularly at terminals and stops, is a safety measure for all users, particularly passengers.

Guidelines to consider:

- correctly position street lighting at terminals and stops to maximise lighting benefit
- put in place an ongoing maintenance program for lights, including swift replacement of broken light bulbs.

4.2 Rural transport infrastructure

Facilitating rural transport requires the development and implementation of ongoing maintenance policies. Good maintenance will provide a secure and safe environment for both pedestrians and vehicles as well as extend the life and quality of the infrastructure.

Guidelines to consider:

- keep village paths, roads and tracks well maintained from overgrown vegetation and unnecessary obstacles
- encourage local communities to help maintain and keep paths, tracks and roads clear for increased accessibility
- maintain paths, tracks and roads so there are no loose surfaces, such as gravel or sand, which makes it difficult for cyclists, pedestrians and people using wheelchairs and walkers
- compact loose surfaces
- design footpaths in hilly and steep areas with zig-zags to reduce slope
- reduce erosion by avoiding short cuts between hairpin bends
- ensure zigzags are of different lengths
- cover cross drains with stone slabs to provide accessible access and avoid fall and trip hazards
- install signs or simple way markers, in contrasting paint colours, to help people navigate rural paths.

4.3 Rural roads

Rural roads are challenging for universal design in developing countries because of their multiple uses. Rural roads are important shared spaces. They are mostly used by pedestrians and the operators of public transport but also by intermediate means of transport, motor vehicles and by animals.

Traffic volumes are often low on rural roads, which can lull pedestrians and animals into complacency. This is particularly dangerous when vehicles are negotiating uneven and unpredictable rural road surfaces.

Rural roads serve as crossing points and meeting areas. They are important for connecting people to services such as local shops, markets, medical services and schools. In many countries, people live near rural roads to benefit from passing trade or transport. Houses are generally built on both sides of them.

Universal design requires consultation with local communities, including people with disability, on issues relating to road improvement programs. This includes land ownership, safety access and water access. If agreements cannot be reached on rural road issues, road engineers may have to adapt design standards to work within local reality.

Guidelines to consider:

- construct cross drains, side drains and shoulders so they are wide enough—this is fundamental to road design and vital for managing water flow
- consider customary land ownership and automatic public road reserve rights when providing space for pedestrian paths and drainage structures
- plan small modifications to road design for restricted road reserves, by increasing land use by 500 mm to 2.5 m, to avoid protracted disputes and compensation claims
- provide, in peri-urban and settlement areas, safe and adequate footpath access and access across roadside drains
- provide, in peri-urban and settlement areas, adequate space for drainage

4.4 Road construction

Road construction is integral to accessibility, from design through to construction. It is important to separate pedestrian and vehicular traffic, through footpaths and road shoulders. Road construction issues relating to universal design are dealt with in this section, including pedestrian and vehicular traffic, traffic flow and human behaviour, and road shoulders.

4.4.1 Pedestrian and vehicular traffic

Rural roads traditionally have low traffic speeds and low traffic volumes. When speed and volume increases, universal design can support segregating pedestrians and vehicles, for ease of movement and safety.

Guidelines to consider:

- Identify and manage areas of potential conflict between pedestrian and vehicular traffic, by applying special infrastructure and/or traffic management practices. This includes installing signs warning vehicle users to slow down when a rural road goes through a village, to protect pedestrians, animals and those involved in roadside activities.
- Consult with people with disability to identify areas of potential conflict.
- Build footpaths for pedestrian use only, to avoid conflict with vehicles and cycles.
- Install traffic calming measures by installing speed bumps, narrowing road width and changing road shape.
- Build lay-bys for public transport vehicles to pick up and set down passengers.
- Build special lanes for intermediate means of transport and pedestrian crossings and islands.

4.4.2 Traffic flow and human behaviour

Universal design has to account for the relationship between traffic flow and human behaviour and develop solutions accordingly.

Guidelines to consider:

- construct safe vehicle passing areas along narrow roads
- provide safe roadside spaces to enable pedestrians to move to the side in the face of approaching vehicles
- install traffic calming devices to reduce speed of vehicles and provide opportunities for safe pedestrian movement
- develop and promote road safety education programs to manage pedestrian and vehicle operator

behaviour as well as enforce safe road use practices.

4.4.3 Road shoulders

In some situations, footpaths with kerbs and ramps may not be needed or be desirable because of capital and maintenance costs. In these cases, other universal design solutions can be applied.

Guidelines to consider:

- provide more generous road shoulders in areas of intermediate traffic and pedestrian flow, which can be shared by pedestrians, users of intermediate means of transport and, temporarily, by stationary vehicles
- promote management practices to ensure road shoulders are not encroached upon, including by signage, signboards, parked vehicles, vegetation, vehicles and vendors and their products.

4.5 Water control and drainage

In many developing countries, the most important issue for sustainable road infrastructure is water control and good drainage. Poorly designed or badly maintained road drainage systems quickly cause puddles, mud and flooding. This, in turn, creates potholes and causes erosion. It also affects driver and pedestrian behaviour, as people may conflict when trying to avoid each other. A timely and well-implemented maintenance program is needed.

Guidelines to consider:

- design and construct carefully planned drainage systems, including adequate culverts and roadside drainage channels
- implement a timely maintenance program to help slow road deterioration

4.6 Bridges and drifts

The narrowest sections of rural roads are bridges and drifts. These can be challenging for pedestrians to cross.

Guidelines to consider:

- provide smooth and hard bridge surfaces for pedestrians and people using wheeled items such as bicycles, carts, wheelbarrows and wheelchairs
- provide adequate ramps for approaching bridges for people using wheeled items
- promote protection of pedestrians from vehicles by creating a space of at least 900 mm on one side of bridges or drifts
- install barriers, railings and walls to prevent people from falling off bridges or drifts

4.7 Embankments and cuttings

Steep embankments and cuttings are difficult for pedestrians and intermediate transport to climb. Problems are greatest for people with disability, the elderly, people carrying loads and animal-drawn carts. If such structures are required close to villages or rural routes, mitigating structures should be designed and built.

Guidelines to consider:

- provide gentler slopes for pedestrians to access
- provide alternative access routes for intermediate means of transport.

4.8 Side drains

In rural environments, side drains are critical for removing large amounts of water quickly. This has the benefit of protecting valuable infrastructure such as footpaths, roads and housing.

Guidelines to consider:

- provide adequate covers to span side drains wherever pedestrian access is required, including in villages and where rural routes cross roads, to enable villagers to cross wide drains
- use precast concrete covers where appropriate as these will provide a secure cover and be less of a safety hazard than less robust materials
- bolt down drain covers (if metal grids) to prevent them from being stolen and leaving dangerous holes.

4.9 Ramps

Ramp construction supports easier movement between levels, including from road level or to a formal footpath, from a footpath to a building, and in accessing a bridge or footbridge.

Guidelines to consider:

- design and construct ramps so they are accessible for people using wheelchairs and other wheeled transport
- build ramps from precast concrete, stone packing or other local resources to ensure they are secure and will not erode or wash away
- ensure ramps crossing side drains have gentle slopes of 5% to 6%.

4.10 Footpaths

Footpaths separate vehicular and non-vehicular areas and are used by people from all walks of life, particularly for shorter journeys. Ongoing maintenance of footpaths, including removing overgrown vegetation and filling potholes, is critical.

Guidelines to consider:

- construct footpaths on one or both sides of the road where appropriate—1.5 m to 2.0 m
- build footpaths using local, all-weather materials which can be easily traversed, such as cement blocks, concrete, stone packing or sun dried bricks
- design roads so vehicular traffic cannot encroach onto footpaths and ramps or other access elements built for people with disability by, for example, including a kerb or guardfence.

4.11 Short cuts

In rural areas there are usually several established trails where common road crossings are made as a short cut. These are in place of formal vehicular road alignment and are established especially where houses are on either side of a road, particularly where roads pass through villages.

Guidelines to consider:

- separate road and path design
- ensure that short cuts, particularly for pathways, are provided to serve people, particularly those with disability.

4.12 Drift, splashes and small fords

Pedestrians may have to wade through water over roads that pass through drift, splashes or small fords. Road bridges are a perfect solution, although they can be expensive to construct. In some circumstances a simple footbridge may be a more effective option.

Guidelines to consider:

- build in timber, at least 900 mm wide
- install adequate handrails and approach ramps
- use ramps, not steps, when accessing and egressing.

5. Other resources

Pedestrian Planning and Design Guide

New Zealand Transport Agency, 2007

This is New Zealand's comprehensive official guide to planning and design for walking. It sets out ways to improve New Zealand's walking environment.

www.nzta.govt.nz/resources/pedestrian-planning-guide/

Improving transport accessibility for all: guide to good practice

European Conference of Ministers of Transport, 2006

This guide covers universal design and policy issues and includes references to technical standards. It also provides details on some resource organisations. It was prepared for wealthy countries, although some principles and policies are relevant to developing countries.

<http://internationaltransportforum.org/pub/pdf/06TPHguide.pdf>

Enhancing the mobility of disabled people: Guidelines for practitioners (Overseas Road Note 21)

Department for International Development, Transport Research Laboratory Limited, 2004

These guidelines aim to improve mobility of urban and rural poor to help meet their livelihood needs.

www.transport-links.org/transport-links/filearea/Publications/

Access Exchange International

This website includes a wide range of information and documentation promoting accessible public transport for people with disability. It covers topics that this non-government organisation, based in the United States, deals with. This includes promoting, planning and implementing accessible bus, rail, and paratransit services for seniors and passengers with disability.

<http://www.globalride-sf.org/rnl.html>

Design for All—Implications for Bank Operations

H Snider and N Takeda, World Bank, 2008

This paper informs World Bank task-team leaders about universal design benefits and recommends ways in which universal design can be integrated into World Bank projects.

http://siteresources.worldbank.org/DISABILITY/Resources/Universal_Design.pdf

Inclusive Access and mobility in developing countries and transport strategy to improve accessibility in developing countries

M Kunieda, World Bank, Consultant, Transport and Urban Department, and P Roberts, World Bank, Lead Infrastructure Advisor, Transport and Urban Department, 2006

This paper advocates the need to mainstream the pedestrian environment into transport. It also describes an outline for the inclusive transport indicators needed to monitor accessibility and improve transportation, especially pedestrian infrastructure.

<http://siteresources.worldbank.org/INTTSR/Resources/07-0297.pdf>

Transport Strategy to Improve Accessibility in Developing Countries

Japan Society of Civil Engineers, RW Roberts and J Babinard, World Bank, 2009

This paper outlines guidance for addressing the access and mobility needs of people with disability and the elderly. It is written in the context of the World Bank's mission to reduce poverty and discusses the main challenges for providing inclusive transport. It draws attention to opportunities to learn from transport interventions and to current research. The paper was initially presented to the 10th International Conference on Mobility and Transport for Elderly and Disabled People, Japan, 2004. It was updated in 2009.

<http://trid.trb.org/view.aspx?id=891027>

Integrating Appropriate Measures for Persons with Disabilities in the Infrastructure Sector

R Wiman and J Sandhu, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), 2004

This report on key infrastructure issues, commissioned by GTZ on behalf of the German Ministry for Economic Cooperation and Development, provides an overview of key infrastructure issues relating people with disability and development.

<http://unipd-centrodirittiumani.it/public/docs/en-disability-infrastructure-2004.pdf>

Promotion of Non-Handicapping Physical Environments for Disabled Persons

United Nations Economic and Social Commission for Asia and the Pacific, 1995

This publication is intended for reference by decision-makers and program personnel working on human settlements issues, especially those in architecture, research and training, supporting self-help initiatives and non-government organisation networking, and in urban planning and management. Self-help organisations of people with disability and rehabilitation personnel involved in addressing access issues may also find the publication useful.

<http://www.independentliving.org/docs2/escap1995.html>

Forest Service Trail Accessibility Guidelines

United States Forest Service, 2006

These guidelines are designed for maximising the accessibility of trails in the National Forest System of the United States.

www.fs.fed.us/recreation/programs/accessibility/FSTAG.pdf

Sustrans (sustainable transport)

Sustrans (a United Kingdom based charity), 2012

This comprehensive website covers a range of topics including developing and promoting safe, user friendly and practical opportunities in the built environment for cyclists, walkers and wheelchair users.

www.sustrans.org.uk/

Review of the Suspension Bridge Programme Phase VI in Bhutan

Swiss Resource Centre and Consultancies for Development (Skat), 2009

This review covers a program implemented by Skat, which led to the construction of safe river crossings and rehabilitated suspension bridges to provide access and mobility to thousands of beneficiary households across Bhutan.

www.skat.ch/publications/prarticle.2005-09-29.1166988426

Travelling together: Disability inclusive road development in Papua New Guinea

Research coordinated by the Nossal Institute for Global Health and the Faculty of Architecture, Building and Planning, University of Melbourne, in partnership with Divine Word University, CBM Australia, the Papua New Guinea Assembly for Disabled Persons, and Cardno 2009–13

This research investigates how rural and urban road projects have impacted on the lives of people with disability and how people with disability are involved in road planning. It includes recommended approaches for engaging people with disability in road consultations, planning and management.

www.ni.unimelb.edu.au/inclusive_development/travelling_together_disability_inclusive_road_development_in_png

Summaries of First Research Findings

Mobility and Health, 2007

The document collates summaries of the initial findings of the Mobility and Health Programme that explored the links between mobility and health in poor communities in developing countries. The program brought together 25 researchers from Africa, Asia and Latin America. This version is a draft and authors request that initial findings not be quoted.

Final documents can be requested.

www.mobilityandhealth.org

Universal Design—Transportation Systems That Accommodate All Users, Including People With Disabilities and Other Special Needs

The Victoria Transport Policy Institute, 2012

These resources can help improve transportation planning and policy analysis. They were prepared by Victoria (Canada) Transport Policy Institute, an independent research organisation dedicated to developing innovative and practical solutions to transportation problems.

<http://www.vtppi.org/tdm/tdm69.htm>

World Report on Road Traffic Injury and Prevention

World Health Organization and World Bank, 2004

This World Report covers road traffic injury and prevention. It notes that road traffic injuries are a major but neglected public health challenge requiring concerted efforts for effective and sustainable prevention. Unsafe road traffic systems are seriously harming global public health and development.

<http://unipd-centrodirittiumani.it/public/docs/en-disability-infrastructure-2004.pdf>

Annex I: Rural development

1. Purpose

Accessibility Design Guide: Universal design principles for Australia's aid program provides guidance on enabling people with disability to participate equally in social and economic life through the design and implementation of development initiatives.

This annex provides guidance development practitioners can consider when applying universal design principles in the rural development sector. While based on good practice and successful implementation of universal design, this guide is not meant to be prescriptive. It is based on the reality that the barriers people with disability face vary between developing countries and between locations in-country. It is also based on the reality that development projects are unique and face their own challenges, locally or otherwise, relating to rural development.

People with disability face particular challenges in rural areas, including generally poorer access to the social and economic facilities and services available in urban areas. Rural development is a process that includes facilitating income generation by increasing agricultural productivity, stimulating non-farm employment, improving access to markets and managing natural resources in sustainable ways. This allows poor people of all abilities to build assets, reduce vulnerability to disasters and improve food security.⁶¹

This annex starts with a general description of how universal design principles can be applied to rural development and how they influence rural development planning at all levels. It then explores the universal design elements to consider in support of better planning and design, including:

- rural development issues and the need to mitigate remoteness
- rural development infrastructure
- resources available to assist understanding of universal design in rural development.

The rural development annex ends with a list of resources.

This annex should be read in conjunction with the guidance in annexes A: Built environment, B: Health, C: Water, sanitation and hygiene facilities, F: Education and I: Rural development.

⁶¹ 'Income generation for the rural poor: the Australian aid program's rural development strategy', AusAID. Canberra 2000.

2. General

2.1 Rural environments

The small populations and economies of rural areas are often dominated by agriculture, forestry and other natural resources. While there are fewer buildings, footpaths and roads in rural areas, than there are in urban areas, universal design principles still apply. In rural areas, most people live in towns and villages. A minority live in isolated dwellings, such as farmhouses.

Rural towns can be far from urban areas. Though smaller, some have modern urban infrastructure and facilities, such as electricity, paved roads, pedestrian pathways, public services, sewerage, shopping facilities and water. In more developed towns, the guidelines presented in Annex A: Built environment are widely applicable.

Rural villages vary greatly in their remoteness and levels of infrastructure. Some are connected by roads or waterways, but many can only be reached by footpaths. Houses are often constructed from local materials and many villages lack electricity, water and sewerage. Village infrastructure may include agricultural extension centres, community sanitation facilities, local administrative institutions, primary schools, religious buildings, standpipes, village dispensaries, village markets, water tanks and wells. The extent to which these facilities are accessible and usable by people with disability and elderly people determines how well such people can integrate into rural community life.

People with disability in rural areas are often the most marginalised due to inadequate access to suitable transport, specialised services and livelihood options. Owing to problems of difficult terrain and lack of transport infrastructure, many people are confined to their homes and their immediate surrounding area. Since most rural houses, local infrastructure and village buildings do not incorporate universal design principles, many people with disability are effectively denied access to community activities, schools, employment, health care, schools and social services, all of which reinforces their exclusion.

2.2 Key challenges for people with disability in rural environments

People with disability living in rural areas can face many unique challenges, including:

- difficulty in moving around their town or village because of rough paths that can be muddy, obstructed, rocky, sandy or uneven
- difficulty in getting to nearby roads, with footpaths often muddy, narrow, sandy and steep
- difficulty in crossing valleys and streams without adequate footbridges
- lack of regular, accessible and affordable public transport
- homes that are not accessible or constructed in line with universal design principles, including accessible bathroom facilities
- community facilities, health centres, markets, schools, shops and religious buildings that are not accessible or constructed in line with universal design principles
- lack of specialised public services related to low population densities and high unit costs
- lack of specialised technical services such as technicians who can make and/or repair audio mobility and visual aids
- difficulty in accessing larger centres and external services, due to poor transport infrastructure, inadequate public transport and great distances
- limited employment opportunities and livelihood options.

Some people with disability in rural areas have overcome these barriers by moving to areas that offer better livelihood opportunities and where transport options are greater. However, many people with disability cannot afford to move to such areas.

In recent years mobile phone technology, solar-powered electrical systems and internet availability in some rural areas have had a positive impact on the lives of many rural people. Although coverage is still limited in remoter areas, mobile phones have allowed people to access financial resources, healthcare support, market information and transport services. They have also enabled people with disability to access specialised support and participate more in economic activities.

Universal design for information technologies and innovative physical infrastructure are therefore important components of rural development. This is discussed further in Annex G: Information and communication technology.

2.3 Understanding and mitigating remoteness

Remoteness is a problem for many rural people, but particularly people with disability.

In Nepal, Papua New Guinea and Timor-Leste, for example, significant numbers of people with disability live in villages extremely isolated by high mountains, poor footpaths, difficult river crossings and lack of roads. More than one-third of Papua New Guinea's population are estimated to live more than 10 km from a road.⁶² Many live one or two days walk (for a fit person) away from a hospital or other specialist care unit. This means a person who is fit needs up to five days to attend an out-patient's clinic and return.

Lack of transport infrastructure and transport services means the elderly, sick and people with ambulatory disability can only travel if people are prepared to carry them for many hours. Similarly, people with low vision and blindness can only travel if people can guide them for hours or even days. Such physical barriers increase the proportion of people with disability because only those capable of walking long distances can access external services independently.

Not many advisers, researchers or program implementers, national or expatriate, visit the more remote areas. They find it difficult to justify the significant time and money needed to do so. Consequently, rural development planning and implementation is often based on visits to places just one or two hours away from a town that can be easily accessed by a motor vehicle (or motor boat). Many aspects of these 'accessible' villages are similar to the more remote villages. However, among the key differences will be those that are most important to people with disability, including the disempowering implications of extreme geographic inaccessibility.

Guidelines to consider:

- encourage rural development personnel at all levels to visit remote villages to understand the barriers faced by people with disability in these areas
- listen to people with various disabilities in more remote villages and bring their concerns and needs into rural development planning processes
- plan for addressing the specific access requirements of people with disability in remote areas.

⁶² BJ Allen and M Lowe, Papua New Guinea Roads Priority Study: *'Review of national roads in Papua New Guinea'*, 2005, report for AusAID, Research School of Pacific and Asian Studies, Australian National University, Canberra 2005.

3. Key universal design principles to consider

3.1 Universal design in rural development infrastructure

Rural development programs should encourage the application of universal design principles for all new rural infrastructure. Where appropriate, programs may use contracts and funding conditions to ensure universal design is applied in new infrastructure initiatives.

Where rural development programs are involved in agriculture production, crop marketing, crop processing and rural industries, effort should be made to examine universal design issues at all points in production, processing and marketing chains. Universal design should be included in the processes involved as well as incorporated into buildings and related transport systems.

Improving access for people with disability in rural areas requires concerted effort by rural development programs and local communities to raise awareness of disability issues and the advantages of universal design.

Where practicable, existing infrastructure, such as community centres, clinics, religious buildings, schools and shops, should be refurbished to incorporate universal design. This should be done with local materials, where appropriate.

Guidelines to consider:

- Agricultural markets, rural centres and shops—location of access routes, markets and shopping centres should be designed for easy and safe access for all (Annex A: Built environment). So too should the height and spacing of stalls and variations in horizontal and vertical dimensions.
- Health services—aid posts, health centres, rural posts and village clinics should be designed so people with disability can access them without fear of harm. Transport options for patients with disability coming from rural areas need to be available, safe and user-friendly (Annex B: Health). The same applies to out-reach services.
- Water, sanitation and hygiene infrastructure—water and sanitation systems should incorporate universal design principles. Communal water-sources should be accessible and safe, with appropriate operating mechanisms. This includes rivers, springs, streams, standpipes, water tanks and wells. Bathing and washing facilities and sanitation provision should be designed for safe and efficient use by people with diverse abilities (Annex C: Water, sanitation and hygiene facilities). This includes external or internal toilets
- Energy solutions—the distribution, supply and use of energy sources should incorporate universal design principles. Biogas generators, distribution systems for bottled gas, improved cooking stoves, mains electricity systems, micro-hydro systems, photovoltaic equipment and transport of fuel wood require designs and procedures that minimise hazards and are simple and intuitive to use (Annex D: Energy solutions).
- Housing—housing projects and/or staff housing should ensure dwellings are accessible. They should also ensure suitable locations with appropriate internal and external spaces. Horizontal and vertical access should follow universal design principles. This means manageable and protected access that requires low physical effort and allows for comfortable, efficient and flexible use (Annex E: Housing).
- Educational services—rural school buildings and compounds should be built to universal design standards with appropriate, flexible, intuitive and simple equipment and operational practices. Appropriate and accessible transport options may be needed (Annex F: Education).
- Communications and information technology services—development of mobile communication systems, public media, such as radio and television, and rural internet services should support a wide range of preferences and abilities (Annex G: Information and communication technology).

- Transport infrastructure—bridges, footpaths, jetties, quays and roads, such as crossings, islands and road shoulders, should be designed to be safe for all users. This includes pedestrians of various abilities (Annex H: Transport system and infrastructure).
- Means of transport that are vital for rural development—means of transport should be appropriate and accessible to all users with universal design principles applied to a wide range of transport. This includes:
 - large-scale motorised transport such as buses, ferries, minibuses, multipurpose trucks, rural taxis and trains
 - intermediate means of transport such as animal-drawn carts, bicycles, canoes, hand carts, motorcycles, riding animals, small boats, tricycles and wheelchairs
 - walking aids.
- Humanitarian—preparing for potential disasters, including disaster management activities, should incorporate all seven universal design principles (Annex K: Humanitarian action).

3.2 Improving and maintaining existing infrastructure

Rural communities and development programs can undertake many simple actions to improve accessibility and make it easier and safer for people to move about in the rural environment. Most actions require community awareness of disability and barriers faced by people with disability. They also require cooperation within communities to keep infrastructure and facilities in suitable condition. This can involve little or no cost.

The way maintenance and improvements are organised depends on local circumstances. Much can be done through voluntary work that can be arranged by community structures such as faith-based establishments, local government, non-government organisations and schools. Such structures could also delegate to paid workers. Engagement with people with disability and Disabled People's Organisations is essential. The main thing is for all people in rural communities to talk about the access problems faced by people with disability and to plan what can be done to bring universal design principles into local infrastructure.

Guidelines to consider:

- maintain and keep roads, tracks and village paths free of obstacles and vegetation
- maintain and clear pathways in and around markets
- keep entrances to shops and other buildings clear and free of obstructions
- maintain drains on roads, tracks and village paths so water runs off instead of forming mud
- compact areas of loose gravel and eliminate sandy sections of paths
- provide simple handrails, which may be constructed using local materials, on footbridges, ramps, steep paths and steps, as well as on paths close to open drains or other hazardous drops
- maintain access paths to bathing areas, sanitation facilities and water sources so they are accessible, clear and safe
- install operating mechanisms that are intuitive and simple to use
- provide footpaths and drainage ditch crossings next to roads running through villages
- make community centres, clinics, public buildings and schools easily accessible with handrails, ramps, tactile markings and wide doors as well as accessible toilet facilities (note that building refurbishment can often be achieved using local materials)
- make toilet facilities easily accessible with grab rails, enough manoeuvring space and suitably designed seats.

3.3 Stimulating employment

Rural development programs are often involved with schemes to increase agricultural production and the transportation, storage, processing and marketing of agricultural products. Planning discussions on using rural investment incentives, such as credit and grants, may provide valuable opportunities for:

- rural-based industries to provide employment opportunities for a range of groups, including people with disability
- rural industries to develop targets or quotas for employing people with disability
- all infrastructure and production processes to be based on universal design principles so there are no design issues preventing people with disability from being suitably employed in rural industries.

4. Other resources

The publications overviewed in Annex A: Built environment, are all relevant to the rural development sector. There is a need to take account of how local materials can be used to minimise costs and increase the involvement of local communities. Similarly, all publications relating to rural transport in Annex H: Transport systems and infrastructure, are directly relevant to accessibility issues in rural development, including references relating to the design and maintenance of footpaths and trail bridges.

The following publications and websites include specific information on issues and infrastructure relating to people with disability in rural environments.

Improving Rural Mobility—Options for Developing Motorised and Nonmotorised Transport in Rural Areas, World Bank Technical paper No.525

P Starkey, S Ellis, J.Hine, A Ternell, 2002

This report focuses on improving rural mobility by facilitating the provision of affordable means of transport and transport services. To deliver significant economic and social benefits, investment in transport must take an integrated approach.

[World Bank, Washington DC.](#)

Travelling together: Disability inclusive road development in Papua New Guinea

Research coordinated by the Nossal Institute for Global Health and the Faculty of Architecture, Building and Planning, University of Melbourne, in partnership with Divine Word University, CBM Australia, the Papua New Guinea Assembly for Disabled Persons, and Cardno 2009–13

This research investigates how rural and urban road projects have impacted on the lives of people with disability and how people with disability are involved in road planning. It includes recommended approaches for engaging people with disability in road consultations, planning and management.

www.ni.unimelb.edu.au/inclusive_development/travelling_together_disability_inclusive_road_development_in_png

Handbook: Accessibility and tool adaptations for disabled workers in post-conflict and developing countries

ISBN 9221095118

D Dili, International Labour Organization, Geneva, 1997

This handbook describes a number of adaptations that can be made to common hand tools and provides some accessibility guidelines for buildings.

www.ilo.org/skills/pubs/WCMS_107950/lang--en/index.htm

Annex J: Law and justice

1. Purpose

Accessibility Design Guide: Universal design principles for Australia's aid program provides guidance on enabling people with disability to participate equally in social and economic life through the design and implementation of development initiatives.

This annex provides guidance development practitioners can consider when applying universal design principles in the law and justice sector. While based on good practice and successful implementation of universal design, this guide is not meant to be prescriptive. It is based on the reality that the barriers people with disability face vary between developing countries and between locations in-country. It is also based on the reality that development projects are unique and face their own challenges, locally or otherwise, relating to law and justice.

This annex starts with a general description of how universal design principles can be applied to law and justice. It then explores the design elements to consider when planning, designing and constructing accessible law and justice facilities for people with disability.

The law and justice annex ends with a list of resources.

This annex should be read in conjunction with the guidance in annexes A: Built environment, C: Water, sanitation and hygiene facilities and D: Energy solutions.

2. General

Access to law and justice is fundamental to human rights. It is important that everyone, including people with disability, has access to and can participate in law and justice services. Universal design principles should be used to design the buildings that facilitate the delivery of such services.

Law and justice facilities include:

- court buildings
- police stations and lockups
- correctional services buildings
- community justice centres and legal aid offices.

3. Key universal design principles to consider

Physically accessible legal facilities not only assist people with disability, but contribute to greater access to justice services for others in the community such as the elderly, pregnant women, children and people with a temporary illness or injury.

Guidelines to consider:

- provide a barrier-free public environment in and around all law and justice facilities
- provide accessible toilets and washing facilities in all law and justice facilities
- provide public counters that are easily accessible by people using wheelchairs
- provide public access through doors, entrances and ramps to secure private waiting rooms, public areas and court rooms
- provide interactive facilities in court rooms to accommodate people with hearing disability or people who have low vision and blindness.

Cambodia has a high proportion of people with disability, including through injuries caused by exploded ordnances. Box J1 highlights how the Cambodia Criminal Justice Assistance Project has incorporated universal design, including accessible infrastructure.

Box J1: Cambodia Criminal Justice Assistance Project support to universal design

Since 1997 the AusAID-funded Cambodia Criminal Justice Assistance Project has worked to improve access for all Cambodians to the legal system. From 2010, capital works projects funded under the third phase of the project have incorporated some key universal design principles. This includes access ramps and public toilets accessible to people with disability in new construction and in renovations to community police posts, judicial police buildings and combination court facilities in a number of provinces.

The Regional Assistance Mission to the Solomon Islands (RAMSI) has worked in partnership with Solomon Islands government agencies to design, construct and refurbish a range of government buildings. Under the AusAID-funded RAMSI Law and Justice Program, this has included rehabilitation of key law and justice facilities such as correctional centres, courthouses and offices. This work has included universal design features such as construction of ramps and accessible toilets for people with disability for the:

- National Analytical Public Health Laboratory
- Sheriff's Office
- Solomon Islands Court House in Auki, Kalala Haus (this building houses the ministries of police and of justice) and the Ombudsman's Building.

Installation of ramps on the ground floor has been the most cost-effective approach for improving accessibility in Solomon Islands infrastructure to date.

RAMSI's infrastructure projects have generally followed the Building Code of Australia. RAMSI is now supporting the Ministry of Infrastructure Development to update its national code to include accessibility for people with disability.

4. Other resources

How to Build an Accessible Environment in Developing Countries

Handicap International France, 2008

This series of manuals is based on experiences in Cambodia with building accessible environments. They promote understanding and knowledge of accessibility standards and techniques.

http://www.handicap-international.fr/fileadmin/documents/publications/Manual2-2_light.pdf

Design for All-Implications for Bank Operations

H Snider and N Takeda, World Bank, 2008

This paper informs World Bank task team leaders about the benefits of universal design and recommends ways in which universal design can be integrated as a component in World Bank projects.

http://siteresources.worldbank.org/DISABILITY/Resources/Universal_Design.pdf

Design Considerations for Accessibility

S Whybrow and J Grooms, 2006

This booklet provides an overview of basic accessibility features required in Sri Lankan buildings and public spaces.

www.homemods.info/files/Design_Consideration1.pdf

International Best Practices in Universal Design: A Global Review

Canadian Human Rights Commission, 2006

This document provides an international overview of the technical information on accessibility criteria for the built environment being used by countries as they prepare to ratify the Convention on the Rights of Persons with Disabilities.

www.gaates.org/009BestPract.shtml

Promoting Access to the Built Environment: Guidelines

CBM, 2008

These guidelines reflect on international standards and recommendations about accessibility in the built environment. They have been developed to assist in creating accessible environments.

www.cbm.org/article/downloads/74836/CBM_Accessibility_Manual.pdf

Water and Sanitation for Disabled Persons and other Vulnerable Groups

H Jones and B Reed, Water, Engineering and Development Centre: Loughborough University, 2005

This book and CD-ROM focuses on facilities for families in rural and peri-urban areas of low and middle-income countries. Many of the approaches and solutions contained within may be applied in institutional settings, such as schools, hospitals and in emergency situations.

Accessibility for the Disabled—A Design Manual for a Barrier Free Environment

UN Enable, United Nations Economic and Social Commission for Western Asia, 2004

This design guidebook, prepared by the Lebanese Company for the Development and Reconstruction of Beirut Central District, is available from the UN Enable website. It provides architects and designers with basic information and data for barrier-free environments.

www.un.org/esa/socdev/enable/designm/preface.htm

Homes without Barriers: A Guide to Accessible Houses

A Bullement, Building Research Association of New Zealand, 2001

This publication sets out guidelines for adapting existing homes to enable people with disability to live in their own home as long as possible.

www.homemods.info/resource/bibliography/homes_without_barriers_guide_accessible_houses

Annex K: Humanitarian action

1. Purpose

Accessibility Design Guide: Universal design principles for Australia's aid program provides guidance on enabling people with disability to participate equally in social and economic life through the design and implementation of development initiatives.

This annex provides guidance development practitioners can consider when applying universal design principles with humanitarian action. While based on good practice and successful implementation of universal design, this guide is not meant to be prescriptive. It is based on the reality that the barriers people with disability face vary between developing countries and between locations in-country. It is also based on the reality that development projects are unique and face their own challenges, locally or otherwise, relating to humanitarian action.

This annex describes how universal design principles can support inclusive disaster risk reduction and humanitarian preparedness, response and recovery throughout planning, implementing and evaluating humanitarian activities. This includes people working on the link between recovery responses and longer-term development.

The humanitarian action annex ends with a list of resources.

This annex should be read in conjunction with the guidance in the other annexes of the Accessibility Design Guide.

2. General

People with disability are often among the most affected by disasters and conflict yet they are often ignored or excluded in the preparation for, response to, and recovery from disasters and conflict. They are also the most likely to be left behind during displacement and return home. People with disability are a diverse group and planning, designing or implementing activities relating to disasters and conflict needs to take this into account.

The lack of reliable statistics and data on people with disability in most developing countries is an issue for humanitarian response. It makes it difficult to identify people with disability. This challenge has an impact on the ability of responding stakeholders to develop appropriate disaster preparedness and response plans that incorporate the needs of people with disability. There are many challenges in making humanitarian action inclusive and accessible to all, including:

- failure to identify all needs or take into account the diversity of people's own resilience and abilities
- lack of adequate planning and education in disaster preparedness and response
- few specialised services, such as rehabilitation and assistive devices, available in crises
- inaccessible mainstream assistance and information available to sections of the community, including but not limited to people with disability
- lack of awareness within humanitarian agencies on the impact of programs on people with disability, with many emergency shelters, toilets and health facilities inaccessible
- harassment, discrimination and social stigma which can leave people with disability isolated and open to exploitation.

3. What is inclusive humanitarian action?

The Australian Government's commitment to providing support to preparedness and response to natural and man-made disasters is reflected in several AusAID policies, including:

- Humanitarian Action Policy⁶³
- Investing in a Safer Future: A Disaster Risk Reduction Policy for the Australian Aid Program, which defines disaster risk reduction as it is used by AusAID (Box K1)⁶⁴
- Framework for Working in Fragile and Conflict-Affected States.⁶⁵

The Humanitarian Action Policy, in particular, outlines the strategic framework for Australia's humanitarian action, including preparing for, responding to and recovering from natural and man-made crises. These policies are implemented in accordance with other AusAID policies, notably Development for All.

Many partners AusAID works with in humanitarian action have aimed to ensure their work is inclusive and accessible to people with disability.

Box K1: Definition and use of disaster risk reduction as used by AusAID

Disaster risk reduction

Disaster risk reduction is defined as the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters. It includes reduced exposure of hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

Disaster risk reduction involves integrating vulnerability and resilience considerations across the spectrum of development and humanitarian programming. All disaster risk reduction planning and programming should therefore incorporate the needs of people with disability.

Inclusive humanitarian action is achieved by planning, designing, implementing and evaluating disaster risk reduction and humanitarian activities that take into account a diversity of needs, including for people with disability. It also takes into account the abilities, skills, resources and knowledge of communities. At every stage of a disaster risk reduction activity the needs of all members of affected communities should be addressed as a whole. People with disability should not, in other words, be considered as a separate group.

4. Key universal design principles to consider

⁶³ Humanitarian Action Policy, AusAID, 2011.

⁶⁴ *Investing in a Safer Future: A Disaster Risk Reduction Policy for the Australian Aid Program*, AusAID, 2009.

⁶⁵ *Framework for Working in Fragile and Conflict-Affected States: Guidance for Staff*, AusAID, 2011.

The Humanitarian Action Policy identifies three phases of humanitarian action:

- disaster preparedness
- disaster and humanitarian response
- recovery.

This annex provides guidance on what to consider at each phase. It is important to note, however, that these phases are interconnected and can occur concurrently in practice.

The absence of inclusive programming during all stages of humanitarian action can have additional negative consequences for people with disability. For example, marginalising people with disability during decision making can lead to significant longer-term implications.

It is also important to consider people with disability during all stages within each phase. This includes analysis, data collection, design, implementation and evaluation. How to identify and include people with disability also needs to be considered. How to make activities accessible to all members of an affected community does too.

4.1 Disaster preparedness

Disaster preparedness should consider how projects can increase people's resilience to disasters and crises. It should provide an opportunity to ensure that disaster preparedness is inclusive and accessible to all community members. Activities should identify both current and future risks.

Guidelines to consider:

- involve and consult all community members, including Disabled People's Organisations and government agencies working with people with disability, to help identify risks and design and implement preparedness activities
- identify people in the community with functional needs, including temporary or permanent disability, to provide better preparation for disasters
- develop and design early warning systems to communicate information effectively to all users, which may involve incorporating diverse communication techniques, including for people with disability, such as large text, pictures and sounds
- design evacuation plans for all community members, including routes to take to safe sites
- provide education and access to education materials on preparedness, response and recovery procedures to all community members in accessible formats to help them understand community risks and how to respond during a disaster
- involve all community members in drills and emergency exercises, and provide the opportunity for them to provide feedback on their effectiveness.

4.2 Disaster and humanitarian response

Many standards, such as the Sphere Minimum Standards for Humanitarian Response, provide guidance on the minimum level of standard across a range of sectors, including sanitation and hygiene, shelter and water. In doing so, this guidance considers the needs of people with disability. These standards should be considered when planning disaster and humanitarian response options.

Guidelines to consider:

- consult with all community members, including Disabled People's Organisations, when conducting needs assessments to identify community priorities and specific needs of people with disability and other groups, including the elderly, pregnant women, children and people with temporary illness or injury
- orient people with disability to their environment as soon as possible
- identify how people will be able to access services being provided
- facilitate access to suitable assistive devices such as wheelchairs and crutches in evacuation or settlement processes to promote independence and improve access to all emergency response services
- design and use temporary shelter so it is accessible to all community members, in line with the universal design guidance in Annex C: Water, sanitation and hygiene systems and Annex E: Housing
- position and encourage people with disability and their families to be closest to well-lit areas, near food, water, sanitation and hygiene facilities
- protect civilians during disasters and conflict (this is an important and often neglected element)
- consider disability-specific protection initiatives during response planning, including physical and psychological safety
- consult with all community members, including from community groups and Disabled People's Organisations, to identify lessons learned from humanitarian response and how future activities could reduce risks.

4.3 Recovery

Recovery activities need to increase people's resilience to disasters and crises, rather than rebuilding infrastructure that contributed to the vulnerability in the first instance.

Recovery through 'building back better' helps ensure that infrastructure and other projects are accessible to all. Recovery needs to consider current and future risks, including those from climate change. Much of the guidance provided under 'Preparedness' applies to rebuilding and developing recovery activities.

Guidelines to consider:

- consult all community members, including people with disability and their families and Disabled People's Organisations, to determine their current abilities and needs to be resilient to risks
- apply the guidance included in all Accessibility Design Guide annexes to recovery activities
- determine how best to address the specific needs of people with disability in humanitarian crises when designing recovery and longer-term development activities
- determine how to identify people with disability and understand their needs before a crisis
- promote how people with disability can access mainstream assistance services
- promote a process for reunification of people with disability with their family members and carers as soon as possible.

5. Other resources

Design for All-Implications for Bank Operations

H Snider and N Takeda, World Bank, 2008

This paper informs World Bank task team leaders about the benefits of universal design and recommends ways in which universal design can be integrated as a component in World Bank projects.

http://siteresources.worldbank.org/DISABILITY/Resources/Universal_Design.pdf

The Impact of Climate Change on Persons with Disabilities

The Global Partnership for Disability & Development and the World Bank's Human Development Network—Social Protection/Disability & Development Team, 2009.

This publication summarises an e-discussion hosted by the above partners.

www.dpiap.org/resources/article.php?id=0000391&year=2010&genreid=09

Disability Checklist for Emergency Response

Handicap International, 2005

These general guidelines cover the protection and inclusion of injured persons and people with disability.

http://www.ucl.ac.uk/lc-ccr/centrepublishations/staffpublications/Impact_of_Climate_Change_on_Disability-Report-

How to Include Disability Issues in Disaster Management Following the Floods 2004 in Bangladesh

Handicap International, Dhaka: Handicap International & European Commission, 2005

This booklet provides practical information, tips and guidelines on good disaster preparedness. It focuses on how sharing information and remedial practices can help avoid undesirable situations during disasters.

<http://resourcecentre.savethechildren.se/rb?&=cmis/browser>

Ageing and Disability in Humanitarian Response, A Resource Book of Inclusive Practices

Waqas Ashfaq Qureshi (Ed) Ageing and Disability Taskforce (ADTF), 2011, supported by CBM

This resource book outlines the commitment of ADTF members towards mainstreaming disability in humanitarian response and recognising the need for focused action and the development of technical guidelines, initially for health, water, sanitation and hygiene facilities and shelter.

www.reliefweb.int/sites/reliefweb.int/files/resources/ADTF_report.pdf

Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response

Sphere Project, 2011

This internationally-accepted set of minimum standards covers core areas of humanitarian response. They incorporate themes relating to the needs of children, people with disability and those living with HIV and AIDS. It also covers gender and psychosocial issues.

http://www.sphereproject.org/dmdocuments/handbook/hdbkpdf/hdbk_full_sp.pdf

Humanitarian Action Policy

AusAID, 2011

This policy highlights the need for development programs to take into account the risks posed by disasters and conflict to the achievement of poverty reduction, sustainable development and security.

www.ausaid.gov.au/Publications/Documents/ausaid-hap-dec-11.doc

Investing in a Safer Future: A Disaster Risk Reduction policy for the Australian aid program

AusAID, 2009

This policy provides a framework for achieving reduced vulnerability and enhanced resilience of countries and communities to disasters.

www.ausaid.gov.au/Publications/Documents/disasterriskreduction.pdf

Displacement and resettlement of people in development activities

AusAID, 2012

This statement outlines the key principles underpinning AusAID's approach to development-induced displacement and resettlement.

www.ausaid.gov.au/aidissues/Documents/displacement-resettlement.pdf

Guidelines: Integrating displacement and resettlement safeguards

AusAID, 2012

These guidelines outline AusAID's roles and responsibilities when working with different partners. They include a checklist of issues AusAID staff need to consider during displacement and resettlement planning.

<http://ausaid.gov.au/aidissues/Documents/displacement-resettlement-guideline.pdf>

Framework for workings in Fragile and Conflict—Affected States: Guidance for Staff

AusAID, 2011

This framework prepared to help AusAID make better strategic and programming decisions on development assistance in complex situations of fragility and conflict.

http://www.usaid.gov/Publications/Pages/1345_8687_9985_5238_2253.aspx

Inclusion Made Easy: A quick program guide to disability in development

CBM, 2011

A guide focussing on disability--inclusive development principles and disability inclusion across a range of development sectors or program areas.

<http://cbm.org/Inclusion-Made-Easy-329091.php>
