UNIVERSAL DESIGN: INTRODUCTION

WHAT IS UNIVERSAL DESIGN?

Universal design is the design of buildings, products or environments to make them accessible and usable to all people of different ages and abilities over time, without the need for adaptation or specialised design.

PRINCIPLES OF UNIVERSAL DESIGN

The Seven Principles of Universal Design were developed by the Center for Universal Design, North Carolina State University, with a consortium of universal design researchers and practitioners from across the United States. The principles may be applied to evaluate an existing design or guide the design process.

GOALS OF UNIVERSAL DESIGN

The Center for Inclusive Design and Environmental Access at the University at Buffalo developed eight goals intended to improve performance, health and wellness, and social participation. The goals define the outcomes of universal design in ways that can be measurable.

- **Body fit**: Accommodating a wide range of body sizes and abilities.
- **Comfort**: Keeping demands within desirable limits of body function and perception.
- **Awareness**: Ensuring that critical information for use is easily perceived.
- **Understanding**: Making methods of operation and use intuitive, clear, and unambiguous.
- **Wellness**: Contributing to health promotion, avoidance of disease, and protection from hazards.
- **Social Integration**: Treating all groups with dignity and respect.
- **Personalization**: Incorporating opportunities for choice and the expression of individual preferences.
- **Cultural Appropriateness**: Respecting and reinforcing cultural values, and the social and environmental contexts of any design project.

ADOPTION IN AUSTRALIA

Universal design within Australia can be found in design for accessibility and adaptability and is supported by legislation such as the *Disability Discrimination Act 1992* and initiatives such as the *National Disability Strategy 2010-2020*.

The adoption of universal design has been driven by growth in the number and proportion of older people in the Australian population. A recent focus on the residential sector recognises that many options in the current housing market do not accommodate this growing group, particularly those with mobility issues. Standards and guidelines such as AS 4299 and the *Livable Housing Design Guidelines (LHDG)* outline design features which can be incorporated to respond to the changing needs of occupants. Certain jurisdictions may mandate certification of a proportion of housing units within a development to a particular performance level as evidence of design conformity to the guidelines.

APPLICATION OF UNIVERSAL DESIGN

Universal design within the built environment involves creating accessible, usable and inclusive spaces for all users. It is not dependent on technical standards or codes but may follow the design requirements or guidelines for accessibility and adaptability as a means of applying quantitative and qualitative parameters. The designer may elect to go beyond the minimum prescribed requirements to enable their design to be more inclusive. For residential developments, this can involve including elements of accessible housing, adaptable housing and livable housing.

In applying universal design to buildings, the designer should first ascertain the minimum requirements before considering qualitative improvements to the proposed environment, product selection and inclusion of other design elements. To best incorporate universal design, these considerations should be made in the initial design stage.

Factors affecting user abilities
Consider how different users may interact with the building or environment.

- Age: From infants to the elderly.
- Mobility: Body size, ease and method of movement, possible injuries.
- Sensory: Vision, hearing, touch.
- Cognitive: Perception, attention, familiarity.
- Activity: Encumbrances, speed.
- State: Awareness, attentiveness, energy levels, mood.

Definitions
Accessible: means having features to enable use by people with a disability and providing safe, equitable and dignified access to housing, including the services and facilities within that housing.

Adaptable: means having features that may be provided in new housing or readily retrofitted to existing housing, in accordance with one of the three classes of adaptable housing (Classes A, B or C) as defined in AS 4299. Adaptable housing accommodates lifestyle changes without the need to demolish load bearing elements or substantially modify existing services.

Livable: means having features in accordance with one of the three levels of performance, Silver, Gold and Platinum, set out in the *Livable Housing Design Guidelines (LHDG)*. Livable housing includes design that allows key living spaces to be readily and cost effectively adapted to meet the changing needs of occupants.

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PRINCIPLES OF UNIVERSAL DESIGN

Principle	Description	Guidelines
Principle 1: Equitable Use	The design is useful and marketable to people with design abilities.	1a. Provide the same means of use for all users: identical whenever possible; equivalent when not. 1b. Avoid segregating or stigmatizing any users. 1c. Provisions for privacy, security, and safety should be equally available to all users. 1d. Make the design appealing to all users.
Principle 2: Flexibility in Use	The design accommodates a wide range of individual preferences and abilities.	2a. Provide choice in methods of use. 2b. Accommodate right- or left-handed access and use. 2c. Facilitate the user's accuracy and precision. 2d. Provide adaptability to the user's pace.
Principle 3: Simple and Intuitive Use	Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.	3a. Eliminate unnecessary complexity. 3b. Be consistent with user expectations and intuition. 3c. Accommodate a wide range of literacy and language skills. 3d. Arrange information consistent with its importance. 3e. Provide effective prompting and feedback during and after task completion.
Principle 4: Perceptible Information	The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.	4a. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information. 4b. Provide adequate contrast between essential information and its surroundings. 4c. Maximise "legibility" of essential information. 4d. Differentiate elements in ways that can be described (i.e. make it easy to give instructions or directions). 4e. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.
Principle 5: Tolerance for Error	The design minimises hazards and the adverse consequences of accidental or unintended actions.	5a. Arrange elements to minimise hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded. 5b. Provide warnings of hazards and errors. 5c. Provide fail safe features. 5d. Discourage unconscious action in tasks that require vigilance.
Principle 6: Low Physical Effort	The design can be used efficiently and comfortably and with a minimum of fatigue.	6a. Allow user to maintain a neutral body position. 6b. Use reasonable operating forces. 6c. Minimise repetitive actions. 6d. Minimise sustained physical effort.
Principle 7: Size and Space for Approach and Use	The design is useful and marketable to people with design abilities.	7a. Provide a clear line of sight to important elements for any seated or standing user. 7b. Make reach to all components comfortable for any seated or standing user. 7c. Accommodate variations in hand and grip size. 7d. Provide adequate space for the use of assistive devices or personal assistance.

Relevant websites
Center for Inclusive Design and Environmental Access, University at Buffalo
idea.ap.buffalo.edu

Center for Universal Design North Carolina State University
projects.ncsu.edu/ncsu/design/cud/

Livable Housing Australia
www.livablehousingaustralia.org.au

Relevant documents
Livable Housing Australia, *Livable Housing Design Guidelines*

NATSPEC TECHnote *DES 037 Accessible housing*

NATSPEC TECHnote *DES 039 Universal design: Slip resistance*

NATSPEC TECHnote *DES 040 Universal design: Trip avoidance*

Relevant standard
AS 4299 *Adaptable housing*