

Design Guide Part 9: Universal design and access to all

RIBA Stages 2 - 4

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1 Introduction

1.0 Prior Reading

It is imperative for readers of this document to first refer to the introductory Part entitled:

'Design Guide Part 1 – Principles and overview'.

Part 1 gives vital information and context that apply to all projects.

1.1 Purpose of the UEA Design Guide

The Design Guide (as a whole) is written for employees of the UEA, architects and external consultants and contractors. The purpose of the Guide is to act as a briefing document to give designers an overview of the design requirements, constraints and challenges presented by the UEA's specialist needs. It applies to all new-build and refurbishment projects controlling quality in the production of designs, specifications and the subsequent performance of buildings.

The Design Guide aims to discuss strategic matters and does not provide an exhaustive treatment of statutory or best practice design and compliance requirements; its primary purpose is to establish a starting point for design *briefs*. It is the responsibility of readers/duty holders to ensure subsequent designs are complete, compliant and able to meet the final approved brief when measured in use.

1.2 Purpose and Structure of this Part of the Design Guide

This section of the Design Guide is written for architects and designers from the Concept Design Stage (RIBA Stage 2) to the Technical Design Stage (RIBA Stage 4).

1.3 Interpretation

Any part of the Design Guide may be referenced in project contractual documentation in order for the UEA to control quality. The following interpretations apply:

Enforced requirements; the use of the word(s) 'shall', 'are required', 'is required' 'must' or 'will be' denotes a requirement that is non-negotiable and shall be used as the basis for designs, technical submissions and/or activities. If such a statement conflicts with a statutory obligation then a report to the Head of Engineering and Infrastructure shall be produced highlighting the conflict, for his or her final decision regarding compliance.

Requirements needing confirmation; the use of the word 'may' denotes a negotiable requirement or indication of a solution, where innovation and further calculation, design and discussion may be required to arrive at an optimised solution.

Quality; the Design Guide aims to arrive at the UEA's highest design aspirations and standards. It may be that, at the UEA's sole discretion, solutions are value engineered during

subsequent design iterations. Designers are encouraged to consider where value engineering may result in an improved financial performance shall funding constraints occur.

Currency of third party documents; where superseded standards and regulatory documents are referred to in the text, the reader shall apply current versions and disregard superseded versions.

Proof; where the word 'proof' is used e.g. 'proof is required', a written report or installation certificate must be produced for approval depending on context.

Approval and proof; all designs shall be approved by the UEA. Approval shall be interpreted as meaning written approval from either the UEA's appointed approving authority or by the Head of Engineering and Infrastructure where no other approving authority is appointed. Approvals shall be sought prior to design decision points or installation activities (depending on context) and shall be made in writing. Where approvals are sought, a written technical submission shall accompany the request setting out, with proof (e.g. calculations, drawings), the case for the approval. The purpose of the approval process is to ensure designs meet the strategic requirements of the UEA.

The obligations owed by external architects, consultants and contractors to UEA and their liabilities to UEA is not in any way diminished or otherwise reduced by the approval process. UEA is not taking over the roles and duties of the external architects; consultants and contractors who will remain fully and totally responsible for the design and/or works carried out by them or on their behalf by their staff; agents; sub-consultants or sub-contractors.

1.4 Version control and updates

Any new or amended content is highlighted in **yellow** so readers can easily identify changes from previous versions. Where no **yellow** highlights exist the document either remains unchanged or it is the first version to be published.

2 Introduction

The UEA requires a campus of equal opportunity that is accessible to all. In order to achieve this the UEA employs the concept of Universal Design. Universal Design “is the design and composition of an environment so that it can be accessed, understood and used to the greatest extent possible by all people regardless of their age, size, ability or disability. An environment (or any building, product, or service in that environment) shall be designed to meet the needs of all people who wish to use it.

This is not a special requirement, for the benefit of only a minority of the population. It is a fundamental condition of good design. If an environment is accessible, usable, convenient and a pleasure to use, everyone benefits. By considering the diverse needs and abilities of all throughout the design process, universal design creates products, services and environments that meet peoples' needs. Simply put, universal design is good design.

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3 General Principles

There are 7 Principles of Universal Design². These are developed to guide the design of environments, products and communications.

Principle 1: Equitable Use

The design shall be useful and marketable to people with diverse abilities.

Guidelines:

1. Provide the same means of use for all users: identical whenever possible; equivalent when not.
2. Avoid segregating or stigmatizing any users.
3. Provisions for privacy, security, and safety shall be equally available to all users.
4. Make the design appealing to all users.
5. Ensure dignity in use for all users.

Principle 2: Flexibility in Use

The design shall accommodate a wide range of individual preferences and abilities.

Guidelines:

1. Provide choice in methods of use.
2. Accommodate right- or left-handed access and use.
3. Facilitate the user's accuracy and precision.
4. Provide adaptability to the user's pace.

Principle 3: Simple and Intuitive Use

Use of the design shall be easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

Guidelines:

1. Eliminate unnecessary complexity.
2. Be consistent with user expectations and intuition.
3. Accommodate a wide range of literacy and language skills.
4. Arrange information consistent with its importance.
5. Provide effective prompting and feedback during and after task completion.

Principle 4: Perceptible Information

The design shall communicate necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

Guidelines:

1. Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
2. Provide adequate contrast between essential information and its surroundings.
3. Maximize "legibility" of essential information.
4. Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
5. Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

Principle 5: Tolerance for Error

The design shall minimise hazards and the adverse consequences of accidental or unintended actions.

Guidelines:

1. Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
2. Provide warnings of hazards and errors.
3. Provide fail safe features.
4. Discourage unconscious action in tasks that require vigilance.

Principle 6: Low Physical Effort

The design shall be sufficient such that it can be used efficiently and comfortably and with a minimum of fatigue.

Guidelines:

1. Allow user to maintain a neutral body position.
2. Use reasonable operating forces.
3. Minimize repetitive actions.
4. Minimize sustained physical effort.

Principle 7: Size and Space for Approach and Use

Appropriate size and space must be provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

Guidelines:

1. Provide a clear line of sight to important elements for any seated or standing user.
2. Make reach to all components comfortable for any seated or standing user.
3. Accommodate variations in hand and grip size.
4. Provide adequate space for the use of assistive devices or personal assistance.

4 Requirements

4.0 Introduction

These requirements are written with the assumption that statutory guidance for access (e.g. Building Regulations 2010, Approved Document M – Access to and Use of Buildings and BS 83003), health and safety issues, and compliance with the Equality Act 2010⁴ have been addressed. This guidance is to highlight UEA's additional requirements over and above these minimum standards.

4.1 General Principles

The UEA regards it as essential that the campus is easy and safe for everyone to use.

1. Design shall prioritise the health and wellbeing of all users of the environment.
2. Early and continuing consultation with people with specific access needs is essential to ensure this aim for each and every project. It is critical that people with a wide range of disabilities (i.e. all UCAS codes⁵) are consulted to ensure access for as many people as possible.
3. Low tech, elegant and green access solutions are always preferred as long as accessibility is not compromised (Equality Act 2010⁴).
4. On-going adjustments are expected dependent on people's specific needs and change of usage of the campus.
5. Repairs where items need refurbishment or replacement shall be undertaken with a view to these principles e.g. replacement of door handles, or lighting type, or socket covers of contrasting colours.

4.2 General Access

4.2.1 Information

1. Web pages shall provide detailed information on access across the campus.
2. Information shall be updated when routes or rooms are blocked (for repairs etc).
3. Signage across the campus shall highlight accessible routes, doors, lifts.
4. Consideration shall be given to both words and symbols being used to indicate where toilets and lifts are.
5. Sans serif font, clear contrast between background and text, suitable size font (particularly if it needs to be read from standing), coloured background preferred.
6. Consideration shall be given to location and height of signs so they are suitable to be read from standing and sitting positions.

4.2.2 Toilets

1. All taps shall be lever taps (where automatic taps are not required).

2. All toilet doors shall be light (see doors) i.e. door closers shall not be used on any toilet doors.
3. Signage shall be gender neutral where possible and use symbols and words. The signs shall indicate which side you transfer to.
4. Disabled toilets shall have sufficient space for wheelchair turning circle plus space for carer to assist.
5. Consideration shall be made to provision of “Changing Places” i.e. bench and hoist to allow changing of pads for someone with (e.g.) paraplegia. (Pg 37, reference 8)
6. Large levers for locking. Electronic locks are not recommended as too erratic.
7. Lighting shall be motion sensor linked (see also lighting section).
8. Full length mirrors shall be provided.
9. Contrasting colours shall be used for handrails, toilet seat, tiles behind sink, floor to walls (see also colours below).
10. Baby changing facilities shall be included where possible but not impede space for disabled users.

4.2.3 Changing Rooms

Each building shall include an extended WC facility meeting the Changing Rooms requirement according to the standard Changing Rooms specification which can be found at http://www.changing-places.org/install_a_toilet/design/changing_places_standards.aspx

4.2.4 Taps

1. All taps in all locations must be lever taps (where automatic taps are not required).

4.2.5 Rest rooms

1. Consideration shall be given to designing rest rooms into building plans.
2. These shall have space for a couple of people to sit and for one person to lie down.

4.2.6 Furniture

1. Consideration shall be made for flexibility of use, provision of:
 - a. Choose chairs with a consideration to ergonomic design and lower lumbar support.
 - b. Lockable wheels on lightweight tables and chairs.
 - c. Variable height tables, kitchen work surfaces and work benches.
 - d. If chairs are stackable they must have hand holes in back of chairs.
2. Consideration shall be given to the inclusion of knee hole spaces e.g. in a run of floor level cupboards in a kitchen. NB. These spaces must be kept clear (they are not a space for bins or storage).

3. Furniture shall not be heavy (if unavoidable consideration given to use of lockable wheels)
4. Lecture theatres shall have at least 2 wheelchair spaces
5. Consideration shall be given to flexible layouts that allow wheelchair users to choose where they sit

4.2.7 Stages

1. Where possible, stages should be avoided.
2. The stage must have step free access.
3. Raised stages shall have a clear and effective lip or barrier at the front to prevent falls.
4. Steps up to stage shall have handrails (see steps).
5. Furniture on the stage shall be easily moved (see furniture) including the podiums.
6. Microphones and slide changers must not be fixed in place.
7. Stages must accommodate all types of wheelchair/mobility scooters etc in a safe way and permit easy turning (360) and safe manoeuvring.

4.2.8 Temperature

The ability to change the temperature of an area e.g. an office or seminar room shall be included.

4.2.9 Power sockets

Many people with disabilities use equipment that needs to be recharged regularly. Multiple power points with contrasting colour cover plates shall be available at waist height around rooms.

4.3 Mobility Access

4.3.1 Pedestrian access

1. Paths must be linked up without steps (unless a ramp is also provided) and appropriate across the whole of the Research Park.
2. Paths shall be wide enough to allow 2 wheelchairs to pass each other, and ideally wide enough to allow 3 people to walk abreast (to allow for signing and walking).
3. Paths shall be made with a stable surface i.e. gravel can be used only if stabilised with hexagonal cell systems.
4. Dropped curbs at all possible crossing points. NB. Where temporary works block a dropped curb a temporary ramp must be provided nearby to ensure accessibility of routes.

5. "Design-out" clashes between car parking and accessible pathways and dropped kerbs i.e. paths must not end where they can be blocked by parked cars.
6. Flat rest areas for wheelchair users shall be provided on slopes.
7. Provide regularly spaced seating along routes. Seating shall provide options to transfer from wheelchairs, arm rests to push up from, and a variety with and without backs rests. Seating shall be manufactured from warm materials (no bare metal).
8. The use of bollards to restrict car access must not block wheelchair access.
9. The use of security gates to block vehicular access must allow wheelchair access around them. Consideration shall be given to an intercom so requests for vehicular access for accessibility can be made.
10. All footpaths must be adequately illuminated.
11. Path edges must be protected to prevent wheelchair users running off the edges.

4.3.2 Door access

1. Must be accessible for all users.
2. Consideration to keeping doors as light as possible (remove unneeded door closers).
3. Corridor doors shall be kept open with magnets (so they close in the event of fire) or power assisted.
4. All heavy doors shall be power assisted. (Heavy is >30 N force to open³).
5. Doorways shall be wide enough (775 mm minimum³).
6. Grab rails and handles shall not be cold (i.e. bare metal).
7. All lever and pull handles shall be of suitable dimensions and clearance.³
8. All door locks shall use large levers.

4.3.3 Lifts

1. Shall be large enough to allow wheelchairs to turn around and/or have space for a carer to share the lift e.g. the size of the lift in the Edith Cavell Building shall be the minimum size.
2. Signage in lifts shall be large clear and contrasting.
3. Auditory messages must be provided to inform users of floor levels and door opening and closing.
4. Lighting shall be bright enough to allow reading of signs (see lighting below).
5. Mirrors are needed in older smaller lifts where you have to reverse out.
6. A lift's location in the building shall be clearly signed.
7. Consideration shall be given to location of lifts with regards to access to lifts out of hours and at weekends.
8. Consideration shall be given to the provision of more than one lift in a building to allow for repairs, maintenance and break downs

9. Lifts shall be installed as full evacuation lifts to BS 9999 and operate as instructed by University Safety Services.

4.3.4 Steps and stairs

1. If possible steps shall be removed from the design (except for protected stairs between floors). Steps with associated ramps are acceptable (please note that steps may aid the mobility of those using leg prostheses for whom ramps can be problematic).
2. Ground floor fire escape routes shall never include steps.
3. Fire exit steps and staircases must be straight to allow for use of Evacuation Chairs.
4. All steps need handrails on both sides. External handrails must not be bare metal.
5. The contrast strip shall be on the nosing of the step (not before it).
6. Stair risers shall be solid (no floating stairs).
7. Glass must not be used for the tread or riser of stairs. Great care shall be used when considering the use of glass for the sides of stairways.
8. Consideration shall be given to putting a lip on the side edges of steps where there are gaps between the step and the wall – to prevent sticks and crutches from slipping off the step.
9. Consideration shall be given to recessed lighting of steps (see lighting section).
10. Stairs must not be spiral or curved such that they prevent the easy use of evacuation chairs.

4.3.5 Flooring

1. Flooring both internal and external shall be non-slip (even when wet).
2. Flooring shall be smooth and give low resistance to rolling.
3. Flooring shall contrast in colour with the walls (see colours below).
4. Flooring shall not “turn up” the wall without a colour change.
5. Door mats shall be a similar colour to surrounding floor⁷.

4.3.6 Alarms

1. All alarm pull cords must be located so they can be reached from the floor; e.g. so they can be reached from the floor beside the bed, not just from in the bed.
2. Refuge point alarms shall be clearly sign posted and instructions for use posted.
3. Refuge points must be located such that the noise generated by the fire alarm system does not prevent easy communication between the refuge point and the Lodge.
4. Fire alarms shall include a visual alarm (flashing light).

4.4 Vision Access

4.4.1 Colours^{3, 6}

1. Contrasting colours shall be used to distinguish one thing from another.
2. Different colours for floors and walls and doors.
3. Different colours for work surfaces (which shall be matt) from walls.
4. Handles shall be a different colour from doors.
5. Face plates for sockets and light switches shall be a contrasting colour compared to the switch and the wall.
6. A strong tonal difference between pavement and roadway and between street furniture and the surrounding paving is very helpful.⁶
7. Choice of colours and contrasts shall take into account colour blindness etc.
8. Choice of colours shall be made with consideration to reducing wash-out effect and enhancing natural skin tones so facial expressions are more easily readable.⁵

4.4.2 Lighting

1. All teaching spaces shall have natural light where possible
2. Flexible lighting options shall be provided with a view to light spectrum, light intensity, and window blinds.
3. Lighting must be sufficient and not create glare.
4. Bare bulbs are to be avoided. Translucent covers to diffuse lights are recommended.
5. Harsh strip lighting is not appropriate.
6. Flexible lighting to focus on the face of the presenter (so lip-reading is enhanced) and on a sign language interpreter in a lecture theatre or seminar settings.
7. The emergency lighting levels need to be greater level than normally required by building control in order to facilitate safe evacuation of disabled persons.
 - In high risk buildings up to 15 lux may be required (e.g. laboratories, workshops with rotating machinery, etc.)
 - In medium and low to risk buildings 3 lux is required (e.g. residences, learning and teaching spaces, corridors and emergency exits and office spaces)

Lighting guidance can be found in Design Guide Part 6: *General requirements for electrical systems*.

4.4.3 Glass partitions

There must be clear visual markings on all glass partitions, walls, barriers etc, at both standing and sitting height.

4.5 Hearing Access

Acoustic adjustments are complex. Please consult experts, particularly when installing hearing loops.

4.5.1 Acoustic environment;

1. Consideration shall be given to the acoustic noisiness of areas where many people have conversations i.e. foyers, bars, canteens.
2. Consideration shall be given to sound proofing between rooms.

4.5.2 Hearing loops

1. Reception desks shall have hearing loops.
2. Hearing loops shall be provided in all lecture theatres.
3. Consideration shall be given to provision of hearing loops in meeting rooms, seminar rooms and other teaching spaces.
4. Consideration shall be given to lines of sight, colours, lighting levels and space sufficient for someone to use sign language or lip reading for communication.⁹

Design Guide Part 8: *Access, alarms and communication systems* sets out the UEA's requirements for hearing loops.

5 References

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