trust Affordable homes. Exceptional care.

2

Daylight Spaces

Contents

Contributors

INCH

INCH Architecture + Design is a dynamic social enterprise architecture and research practice based in Glasgow, Scotland.

INCH was established to assist & support third sector organisations, charities and communities to further their ideas and ambitions in realising capital projects and improving the constructed spaces in which we inhabit. Underpinning all our projects is our social intent and objectives – these define the company and our long-term aspirations.

INCH Director Lesley Palmer and principal contributor to this research has extensive experience of working closely with housing associations and registered social landlords throughout Scotland on both new-build and refurbishment projects for Scotland's dedicated older people's housing stock.

UrbanPioneers

UrbanPioneers I Stadtpioniere is a Landscape Architecture and Art Practice founded by Marion Preez and Liane Bauer specialising in projects that are unique by creating enduring designs that fit best the parameters of the project, context and client.

UrbanPioneers I Stadtpioniere encompasses analysis, planning, design and management of the open spaces and explore creative and innovative thinking. With the combined background of landscape architecture and art they generate functional, coherent and site specific concepts that are playful, capture the users, create interest, educate and connect people and communities. Bespoke elements representing typical features of the surrounding, its history, telling a story or underlining specific functions are characteristic for their designs, thus creating identification, ensuring the success of the project and long-term benefits to the local community.

UrbanPioneers I Stadtpioniere work in public realm design, way-finding, interpretation, public art projects, regeneration, public squares and learning spaces.

Graphical House

Graphical House is a design consultancy based in Glasgow, producing thoughtful, crafted work across digital, analogue and environmental applications. We have specialist experience in way-finding, signing and landmark creation.

We believe that design is a dialogue. It must be intuitive, functional and memorable to be effective.

We read, collaborate, research and discuss, spending time with our clients and reaching out to their audiences to ensure that we have the best possible understanding of their needs and aspirations. Our approach is specific to every project we undertake.

Graphical House carries out projects of varying scales and scopes, both locally and internationally.

Trust Housing

Trust has been operating since 1973 and is now a market leader in the provision of social housing, care and support services for older people across the whole of Scotland. Much has changed over this time period and whilst the core values remain the same how we deliver services is unrecognisable from our origins back in the 1970's and we understand that we will look very different again in the next 40 years. We recognise that the needs and aspirations of our customers are changing and we will require to provide accommodation and services which are flexible and able to cater for a divergent customer group.

The Older People's Change Fund was established as part of the Reshaping Care for Older People Programme for Change 2011-2021 as a means to provide the opportunity for developing and trialling initiatives to reshape older people services. North Lanarkshire Council agreed to fund these studies from their Change Fund resources with a view to focussing on what we can do with existing assets.

Trust has been delighted to be part of the team producing these studies and we are already implementing some of the practical suggestions flowing from this work with great impact.

North Lanarkshire's Health and Social Care Partnership

Planning for an increasing older population is a key priority for North Lanarkshire's Health and Social Care Partnership and for our partners from other services and organisations. By working together we can help ensure there are a range of options and supports available for older people in North Lanarkshire to help people live safely and well and as independently as possible in their own home for longer.

We recognise the importance of high quality, well designed, affordable housing in helping older people continue to live for longer in their own home and recognise the particular contribution that specialist housing for older people has in respect of providing additional housing support to help older people stay socially connected and supported in their daily activities.

The provision of well designed, high quality specialist housing for older people is crucial in meeting the housing and support needs of older people and is becoming even more important as we continue to support more older people at home as opposed to long term care.

Therefore this research is welcomed by the partnership, improving our understanding of the impact the environment of specialist housing has on older individuals and crucially what changes or modifications we can consider to improve the environment and subsequent outcomes for older people living across sheltered and very sheltered housing in North Lanarkshire.

Preface

We are in a transitional period in relation to the future of older people housing, the types of housing we provide and the way in which we design. Society's demand for an integrated community is driving statutory design policies to become fully inclusive. As a result, the differences between specialist housing design, such as sheltered or amenity housing and general housing design, are being designed-out.

Traditionally, it has been considered that 'older people' housing caters predominately for the +65, but who are the +65 and what are the implications of their needs on our existing housing stock?

The +65 can no longer be considered as a homogeneous group of people, they are an increasing demographic who are mobile, vocal in their demands and in the future many may still be employed.

Lifetime Homes Principles is one of the most influential pieces of design guidance published and it informed how we design today.

In Scotland, the principles were integrated into our Building Technical Standards with the result that all housing (both public and private) must comply to the space standards and construction method requirements. The principle being that our homes are designed and constructed to adapt over time to suit the changing needs of the tenant.

Therefore, in theory, we should be moving into a period of housing construction whereby the housing which we build today should be able to support the tenant and their changing needs for their future. With the exception of acute care needs, our general amenity housing today should be the older people housing of tomorrow

This has the potential to change the role of older people housing in the future. Rather than being a housing model which is designed to suit care support, it will be designed to suit quality standards, which has the potential to support a variety of care models.

This design guide has been commissioned by Trust Housing Association with grant funding from North Lanarkshire's Health and Social Care Partnership in recognition of the changing future needs of an ageing population; changing best practice and design principles for older people housing and the desire by Trust to invest in it's existing housing for the benefit of current and future tenants.

This design guide has been prepared to help unravel the complexities of remodelling existing older people housing to make our housing developments more attractive and accessible for everyone, regardless of age or ability.

It will provide a foundation of practical knowledge to aid clients and developers to make practical alterations to existing older people housing developments.

The guide forms part of a collection of design guides which review best policy and practice, design and practical alterations to existing older people housing.

The design guide is divided into 4 parts: the importance of daylight and types of daylight spaces; best practice design principles; design guidance; and recommendations for moving forward. Included in each section are illustrated examples of the points raised.

These documents represent the culmination of four years research and design collaboration, and we hope you find them of interest.

Introduction

Previous research has indicated that older people need to obtain greater levels of vitamin D, contained in sunshine to prevent metabolic deficiencies and insulin resistance. However, the value of outdoor spaces attached to many specialist services is often undervalued and under designed.

Experience has suggested to Trust Housing Association that improved external spaces can encourage older people to be more active and more sociable thereby improving outlook and quality of life. This improves the attractiveness of developments and creates stronger communities within specialist housing.

This design guide will consider the following issues:

- The key elements required to ensure easy and attractive access to external spaces and daylight
- The key elements to improving the wish to use these spaces
- The attractiveness of the developments as contributed to by external spaces and the main entrances
- The opportunities for older people using the spaces actively and as independently as possible

This research project will provide the commissioning agency and any partners with clear guidance on how the external space around specialist services can be used and designed for older people to greater effect.

Aims & objectives

This guidance sets the context for the provision of and access to daylight spaces within older people housing developments. It considers urban setting, relationship between building and outdoor space, outdoor activities and their benefits as well as increasing daylight and access to daylight indoors.

The document sets out guidance on the following:

1. Creating attractive daylight spaces linked to the building
This explains how the positioning of the building has an influence on the daylight spaces (for example shade, shelter, over the seasonal changes). It also explores the benefits of external spaces close and far away from buildings and the physical as well as visual connections between the internal spaces (both communal and private), the fabric of the building and the external spaces. This gives an overview of the different building typologies within Trust and how the outdoor spaces can relate to these.

2. Creating attractive daylight spaces offering a range of outdoor activities
This explores a range of activity categories that could be provided for and encouraged within the daylight spaces. It goes into detail of the benefits and gives examples of specific activities.

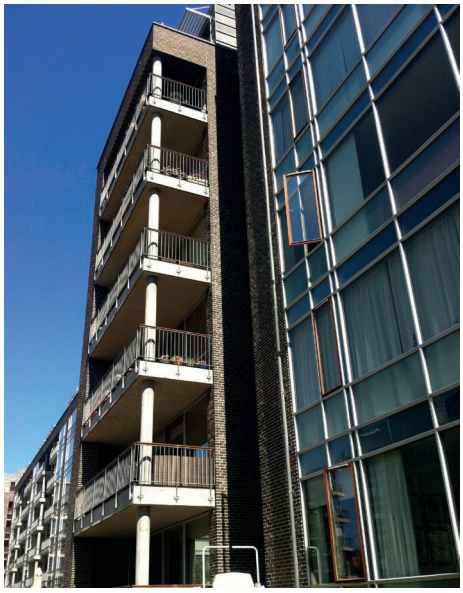
3. Creating a variety of attractive daylight spaces
This explains site specific requirements and responses to the existing outdoor spaces of a development. It explores different types of daylight spaces and how to utilise the existing daylight spaces.

4. Providing barrier-free access to daylight spaces
This section outlines recommendations for alterations to the existing building layout and fabric to provide access to daylight spaces both internally and externally.

5. Enhancing daylight & views within internal spaces
This provides guidance on increasing natural light levels into existing rooms and areas, considers the changing needs of an elderly tenant and how best their home can be adapted to provide better light and views.

Figure 01
Image credit: INCH Architecture

Figure 02
Image credit: INCH Architecture



Scope & form of guidance

This guidance relates to the design of outdoor and internal spaces and their fittings. It does not make reference to the performance of the building fabric or site specifics, which would be required to be established as part of a detailed design review.

This guidance covers the design of existing housing developments for older people (very sheltered, sheltered and amenity). It does not make reference to development or dwelling size but instead makes assumptions on design attributes prevalent in such developments.

A number of site visits were made by the design team to existing older people housing developments during the initial research stages of the project and observations made, which helped inform the guidance within this document.

In addition, desktop analysis of other housing developments throughout Europe was carried out, along with a detailed reading period whereby the design team reviewed current best practice and design guidance relative to the design of older people housing and external space and the benefits of daylight and accessing amenity.

Illustrations are provided throughout the design guide. These are intended to demonstrate possible but not definitive solutions and other arrangements may be equally appropriate.

Definition of terms

Activity:
Energetic, bodily activity, action or movement undertaken by someone or a group of people.

Area:
A surface, especially an open, unoccupied piece of ground.

Barrier-free:
An environment (buildings & other facilities such as transport, acoustic & visual communication, information sources etc) which is accessible to and usable by someone with a disability without assistance.

Daylight opening:
An area glazed or unglazed which is capable of permitting daylight to an internal area.

Development:
Any building or grouping of buildings for residential use.

Disability:
A physical or mental impairment that has a 'substantial' and 'long-term' negative effect on your ability to do normal daily activities. (Equality Act 2010)

Effective width:
The resultant distance between which something can pass, for example for a ramp the effective width is the distance between handrails.

External spaces:
External spaces are spaces open to the elements.

Level access:
Access via an area of uniform elevation. An access with an overall maximum change in level of 15mm.

Open space/outdoor space:
Open spaces are external spaces open to the elements.

Principle of two senses:
The availability of sufficient information to allow for the simultaneous use of two of the five senses.

Ramp:
A ramp is a surface with a gradient of 1:20 to not more than 1:12. A gradient of less than 1:21 is not considered a ramp. A surface with a gradient of greater than 1:12 is considered too steep to negotiate safely and is not recommended.

Space:
An extent or expanse of a surface or three-dimensional area.

Spatial concept:
The definition of the relationship between us and objects, as well as the relationships of objects to each other.

Spatial design:
(This) is a relatively new discipline that crosses the boundaries of traditional design disciplines such as architecture, interior design, landscape architecture and landscape design as well as public art within the Public Realm. It focuses upon the flow of space between interior and exterior environments both in the private and public realm.

Transitional spaces:
Transitional spaces are the places, areas and rooms which occupy the space between inside and outside, acting as both buffer zone and physical link.

Universal design:
A broad spectrum of design principles which include building design, products and environments that are inherently accessible to all people without the need for a special configuration either in design, action or lifestyle.

Wheelchair accessible:
Access with adequate dimensioning for the use of wheelchairs.

Anthropometric Data

Anthropometry – the measurements of the physical body – plays an important role in architecture and product design and is principally used for the understanding of the proportions of the human body in relation to its environment. Changes in ability leads to changes in proportion of the body and subsequently impacts on the design of the physical environment in which the body inhabits. For example, if we understand the height of someone's eye level when seated or lying down, we can ensure the placement of a window cill permits a clear view out.

Figure 03

Anthropometric detail of a wheelchair user

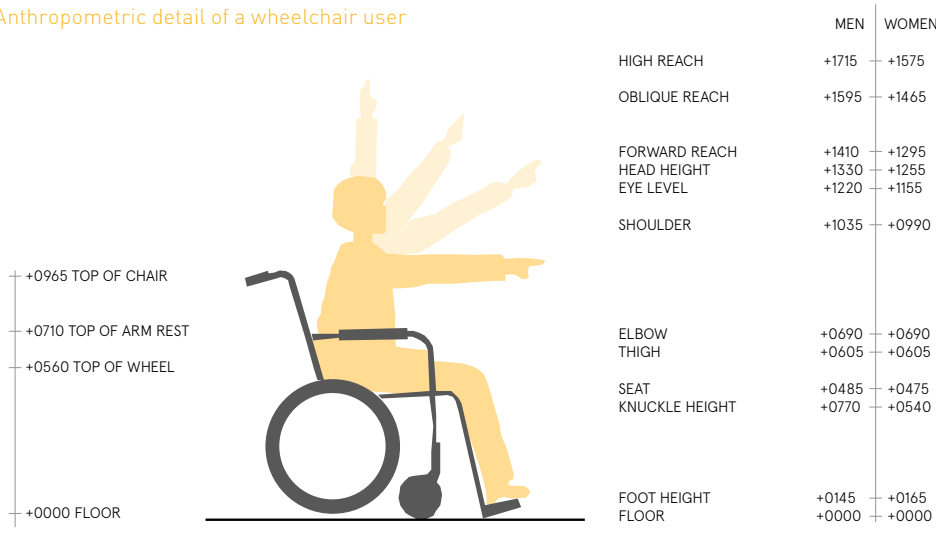


Figure 04

Anthropometric data of a seated person

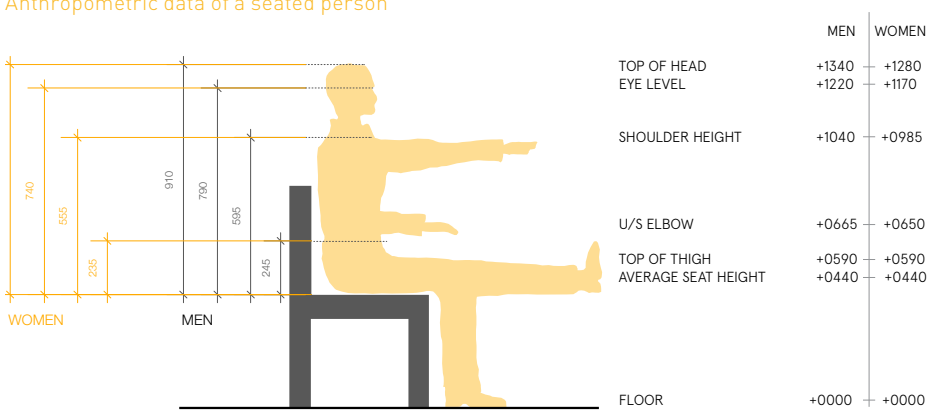


Figure 05

Anthropometric data of a standing person

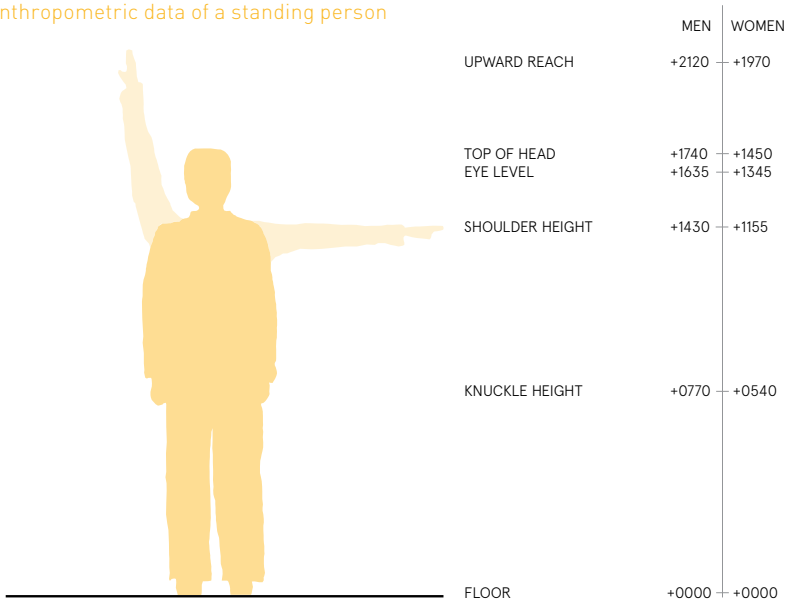
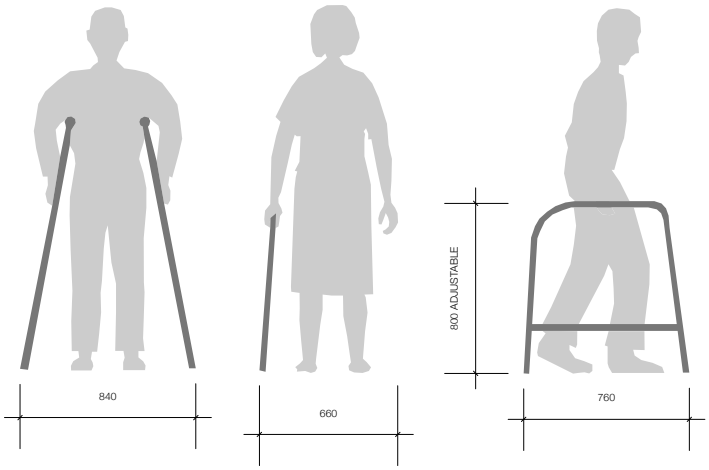


Figure 06

Anthropometric data persons with walking aids



Daylight

Providing access to amenity space and increasing internal levels of daylight are important and assume universal design principles for designing good quality general housing. Yet many older-people housing developments in the UK are not daylight-conscious and overlook the importance of daylight provision to the older tenant.

One of the founding principles of universal design is that fundamental design principles are inherently universal in their application regardless of age or ability. Therefore it is crucial for designers and client bodies to approach any future design proposals for older people housing with a 'universal design attitude'. What is appealing for a young tenant can be equally as appealing for an elderly tenant.

The importance of daylight

There is significant research into the positive effects exposure to sunlight or daylight has on the human body and mind. Below is a brief summary of some of the benefits:

- Most of our Vitamin D is obtained from exposure to sunlight and this is needed to help our bodies to regenerate bone. This is vital for elderly people because a deficiency in vitamin D, adds to the risk of injury as a result of falling.
- Increased exposure to daylight has been attributed to improving the circadian rhythm (body clock) and also improving appetite, lethargy and the desire to be social – common ailments of an ageing person.
- Daylight provides high illuminance and permits excellent colour discrimination and colour rendering. Good levels of daylight provide a good environment for better viewing.

The importance of increased light levels

It is widely understood that older people require twice the light levels than a 45 year old requires.[1] This can be attributed to the likely increase in age related visual impairments such as loss of sight or difficulties with visuoperceptual ability.

Normal age related changes in vision can include:[2]

- Reduced visual acuity
- An increase in the amount of light needed to see
- An increase in the negative effects of glare
- More time required to adapt to marked changes in light level
- A reduction in size of the peripheral visual field
- Decreased contrast sensitivity
- Decreased depth of perception
- Changed colour vision (gradual loss of the blue/violet part of the colour spectrum)
- Blurring from 'floaters'
- Light flashes or momentary distortion of images

Increased light levels can be achieved by increasing both the artificial light levels within a room and also increasing provision of and access to daylight.

How external spaces can contribute to everyday life

External spaces provide the best source of daylight.

It is generally understood that the provision of external spaces has a positive effect on the physical and mental health of all (regardless of age or generation): being outdoors supports stress relief and boosts individual well-being.

Outside spaces have also been understood to provide specific therapeutic benefits and over the past ten years 'generation and illness' specific garden therapeutic design principles have been developed. The principles, are based on increased contact and active involvement with nature. There is a trend towards greater integration of garden therapy principles within health programmes in general and in particular within elderly living environments. The benefits of garden therapeutic principles are:

1 Light & Lighting Design for People with Dementia. DSDC
2 Visuoperceptual Difficulties in Dementia, Alzheimer's UK

- Positively stimulates the physical and mental health of elderly, ill and mobility restricted people
- Active involvement with nature encourages an increase in physical activity, which provides other health benefits
- Stimuli of the senses
- Encouraging & sustaining the natural circadian rhythm (day-night rhythm)

"In any social and people-orientated setting [...] (open spaces) may become the focus of communal life since not only are they private but are also usually larger than any space inside the home. They provide 'neutral ground' and 'escape' from the busy internal environment."(Marshall and Pollock, 2012:page 98)

Older and frail people are less mobile due to their physical and mental limits and depend on the immediate surrounding of their home more often. To ensure that everyone, despite their age and health, can benefit from the versatile and positive effects of outdoor spaces they have to be designed to be barrier-free with adequate consideration of various generation specific requirements.

To encourage tenants to use their external spaces it is important to promote activities which can take place outdoors, both in and around the garden. These activities will increase exposure to natural light, as well as help to address lack of physical activity and therefore contribute to health and well-being on several levels.

To summarise:
External spaces

- Provide escape from internal environment
- Provide stress relief and boost well-being
- Support day-night rhythm
- Increase physical activity and stimuli of senses

To ensure access to external spaces

- They have to be barrier-free
- Generation specific requirements and potential users to be considered

Figure 07
Image credit: INCH Architecture

Figure 08
Image credit: INCH Architecture

Activities

External spaces provide the best source of daylight. To encourage tenants to use their external spaces it is important to promote activities which can take place outdoors, both in and around the garden. These activities will increase exposure to natural light, as well as help to address lack of physical activity and therefore contribute to health and well-being on several levels.

"Activity is a critical means by which we express ourselves and interact with the world around us and as such, activities are essential to human existence, health and wellbeing." (College of Occupational Therapists, 2007)

"Lack of activity and lack of pleasure in activity are associated with higher rates of mortality or depression, reduction in social functioning, physical wellbeing, increased isolation and loss of quality of life." (Mozley, Sutcliffe, Bagley, Cordingley, Challis, Huxley & Burns. (2004). Alessi, Yoon, Schnelle, Al-Samarrai & Cruise, 1999) in (Marshall and Pollock, 2012:page 167)

A study by South West Public Health Observatory (SWPHO) and the charity Sustrans has shown that "lack of physical activity could cause as many as 36,815 premature deaths in England each year". Their statistics show "that major health gains could be made" by higher "physical (activity) levels among people aged 40-79".

According to a study by Lancet (March 2013) alongside smoking, hypertension, obesity and alcohol, physical inactivity is "one of the top risk factors for death and disability in the UK". Today it is recommended by the government that adults should undertake two and a half hours of moderate activity every week. (www.sustrans.org.uk/press-releases/inactive-lifestyles-kill-estimated-36815-people-england-each-year)

To encourage and increase the use of the outdoors it is important to remember why people use them:

- Access is easy and barrier-free
- It feels secure
- There are things that can be undertaken, either on their own or in a group, or something can be looked at or observed
- The external spaces are attractive and welcoming

External spaces can offer a huge potential for a whole range activities from straightforward breaks to communal or messy activities. Understanding what kind of activities can take place in the external spaces of a development and how these can fit within the framework of work distribution, time, responsibilities and decision making, helps to plan, design and equip them. Activities have not only an impact on the external spaces but also on the transitional and internal spaces and their relationship between them.

Communication between the housing organisation and staff enables the exchange of good practice experience, learning from and with each other, trying out and integrating new gained knowledge within existing working routines.

According to Hazen and McManus (Marshall and Pollock, 2012:page 167-177) there are different types of outdoor activities:

- Activities that encourage social interaction
- Activities that enable a person to achieve their creative potential and self-expression
- Activities that assist physical health, activity and exercise
- Activities that engage the brain
- Activities that restore and reinforce log-held skills, abilities and knowledge
- Activities that provide multi-sensory stimulation
- Activities that are less physical such as sitting, watching, reflecting
- Activities in evening

Activities that encourage social interaction

Our experience of the social world directly contributes to our sense of wellbeing and emotions such as satisfaction, belonging, pleasure or, conversely ill-being, anxiety, fear and oppression. (Kelly, 2007)

Table-based activities

- Outdoor eating which could include garden produce
- BBQ's or picnics
- Crosswords, board games, card games or jigsaw

Animals

- Caring, feeding and helping to clean chickens or rabbits
- Providing food for wild birds, which allows observing and hearing birds without having to care for them

Growing plants

- Working together ordering plants and seeding, planting, growing, maintaining and harvesting
- Some tenants will have grown plants and looked after their own garden

Activities that enable a person to achieve their creative potential and self-expression

Garden related activities:

- Individual activities like drawing, painting, flower arrangements or stencilling with leaves
- Communal activities like decorating the indoors according to the season with garden plants, flowers or fruit

Activities that assist physical health, activity and exercise

The outdoor spaces are ideal for physical activity and exercise, and older people should maintain endurance, strength, balance, stretching and flexibility and fine and gross motor skills in order to prevent diseases and treat chronic illnesses.

Benefits from working outdoors, especially gardening:

- "Increases levels of physical activity and maintains mobility and flexibility
- Encourages use of all motor skills including walking, reaching and bending
- Improves endurance and strength
- Reduces stress levels and promotes relaxation
- Provides stimulation and interest in nature and the outdoors
- Improves well-being as a result of social interaction
- Stimulates the senses"
- Enjoyable form of exercise

(Marshall and Pollock, 2012:page 172)

Activities that help with endurance by increasing heart rate and breathing:

- Garden work such as raking leaves and path sweeping
- Walking through outdoor areas
- Lawn mowing

Activities that help with strength by improving and maintaining muscle strength:

- Pushing a wheelbarrow
- Lifting and carrying garden supplies such as pots, watering cans, bags of compost or mulch
- Stacking and washing pots

Activities that help with balance, helping to control and maintain body position which will prevent falls or falling related injuries:

- Using a sensory path or practicing steps
- Picking berries, fruit, seeds
- Rising to a standing position from seat, bench or raised bed

Activities that help with stretching and flexibility to help to retain a range of movement:

- Bending and reaching over raised bed
- Emptying bags of mulch or compost
- Reaching for tools, berries, fruits, seeds

Fine and gross motor skills

- Collecting flowers
- Seeding
- Weeding

Activities that engage the brain
Wildlife related activities:

- Use identification cards or books for birds, insects and small mammals which can be left at tables or windows indoors
- Maintain bird table with water and food
- Observe insect hotel, bird or bat boxes

In 2011 Bupa started working together with RSPB (Royal Society for the Protection of Birds) to bring wildlife gardening into their care homes. Creating more homes for birds and other creature such as ponds, hedgehog hotels, bird boxes or having the right plants in the garden, this initiative encourages interaction with the wildlife as well as wildlife related activities.

Activities that restore and reinforce long-held skills, abilities and knowledge

Tenants "(...) may well know much about growing fruit and vegetables and flowers, or have life-long interests in birds and wildlife. Being outside and maintaining those skills and abilities are an important aspect of reinforcing the sense of self as well as promoting orientation to time and to the seasons. Reminiscence arises from almost all outside activities especially if those activities have been tailored to past habits and memories." (Marshall and Pollock, 2012:page 175)

Activities that provide multi-sensory stimulation

Addressing all five senses all year-round on a daily basis will help to compensate for sensory changes and losses.

Activities for visual stimulation:

- Observing the external spaces from the indoors
- Observing wildlife in garden and at feeders

Activities for tactile stimulation:

- Feeling the texture and weight of fruit and vegetables when harvesting
- Feeling the change of temperature during the day

Activities for gustatory stimulation:

- Preparing fruit and vegetables from the garden for lunch, dinner or BBQ
- Gathering fruit for a tasting event

Activities for auditory stimulation

- Listening to insects or birds
- Listening to grasses, plants or trees moving in the wind

Activities for olfactory stimulation

- Smelling herbs or flowers
- Smelling the sausages on BBQ

Activities that are less physical such as sitting, watching, reflecting

Activities which are less strenuous but nevertheless encourage to use the outdoors:

- Watching trees, leaves, grasses moving in the wind
- Watching chickens running around and picking their food
- Watching visiting children play (providing play equipment makes a family visit with young children much more pleasurable for the families as well as other tenants)
- Watching sunrise and sunset

Activities in evening

Activities to enjoy the outdoors in the evening or at night:

- Evening walk before going to bed
- Drinking a cup of tea before bedtime
- Observing the night sky and listing to night sounds

Summary of 'Activites' (Hazen and McManus in Marshall and Pollock, 2012:page 167-177)

References for 2.0 Daylight

Pollock, A. and Marshall, M. (ed.) (2012) Designing outdoor spaces for people with dementia, Greenwich: Hammond Press.

Wulf, H. (2008) 'Wohnen mit Zukunft', In Rau, U. (ed.) Barrierefrei - Bauen für die Zukunft, Bauwerk Verlag.

Sustrans. (2013) Inactive lifestyles kill an estimated 36,815 people in England each year, (Online), Available: www.sustrans.org.uk/press-releases/inactive-lifestyles-kill-estimated-36815-people-england-each-year (28 March 2013).

Types of Daylight Spaces

Daylight spaces are places which permit exposure to natural light – be that an internal or external space.

Access to sunlight or daylight is important to help ensure our general health and well-being and this can be achieved in residential developments through the design, implementation and management of several types of daylight spaces.

- External spaces
- Transitional spaces
- Internal spaces

External spaces

External spaces are spaces open to the elements. They provide an escape from the internal environment, contribute to stress relief, bring joy and provide opportunities to increase physical activity in easy and accessible ways. External spaces contribute to the physical and mental well-being of the individual and can increase life expectancy.

Independent from the size of the site the external spaces should offer spatial diversity. Using the outdoors is not only about the experience of distance and the feeling of security, but rather the sensible use of different features that create a vibrant but safe environment. Introducing elements specific to the site, for example an adjacent woodland edge or meadow, can turn a green space into a rich space with varied experiences. (Wulf. (2008) p.295)

The overall design and the continuous connection between the external spaces should be well balanced, matching the everyday and specific interests, uses and demands of the residents, staff and neighbours without overstimulation.

Transitional spaces

Transitional spaces are the places, areas and rooms which occupy the space between the inside and the outside, acting as both buffer zone and physical link.

Transitional spaces commonly consist of:

- Porch/Portico
- Loggia
- Entrance lobby/Vestibule
- Patio/Deck
- Conservatory
- Sun buffer space/sunspace

In addition to transitional spaces there are also transitional objects such as:

- Doors
- Threshold
- Stairs and Ramps

The design of transitional spaces is very important to ensure the transition from inside to outside is efficient in terms of environmental performance (heat, light and energy consumption, comfort) and practical in its design and aesthetic.

Figure 09

Image credit: INCH Architecture

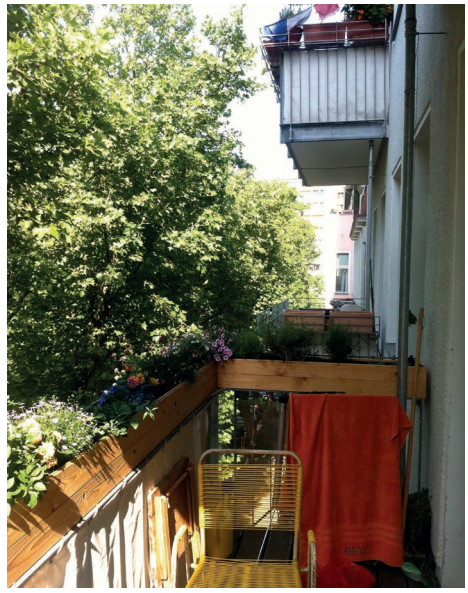


Figure 10

Image credit: INCH Architecture

A well-designed transitional space should:

- Provide a clear, direct route between the inside and outside
- Be clearly visible from the outside
- Provide a clear visual connection between the inside and outside (This can help reinforce a feeling of security and pre-empting weather conditions).
- Provide overhead cover at the entrance door
- Have an accessible entrance
- Have artificial lighting both internally and externally which illuminates the entrance door
- Provide a draught lobby
- Provide a space for removing and storing outdoor clothing
- Have a slip resistant floor surface or entrance matwell

Internal spaces (and natural light)

We have previously outlined the importance of exposure to daylight on our health and well-being and discussed this in relation to getting access to outside spaces. However, it is also important, where possible, to maximise exposure to natural light whilst indoors. Particularly this is important to do so where tenants are less mobile and more likely to remain at home.

Traditionally older people housing developments have been located in low to medium density residential areas and designed to be sympathetic to the surrounding context. The resultant design is often 16 or more individual apartments arranged in a linear plan over two storeys with domestic sized windows and doors, a pitched roof and conservatory to the garden. In the context of the street the development's aesthetic is a large dwelling.

In this arrangement communal rooms such as the lounge and dining room, which are designed to accommodate tenants plus guests, consequently become large deep-plan rooms with little opportunity for natural light to penetrate through the domestic sized windows, which are further adorned with pelmets, curtains and blinds.

Therefore, maximising opportunity for natural light to penetrate into internal rooms should be an important design consideration and one which is understood and maintained by all parties, such as client bodies, designers and developers.

The practicalities of re-configuring the internal layout of an existing development are limited. Disruption to tenants, services and cost being prohibitive. Therefore, to increase opportunity for access to daylight to less mobile tenants and the internal spaces they inhabit, we will consider the architectural elements, which can be reasonably adapted or added to optimise daylight.

These include (but are not limited to):

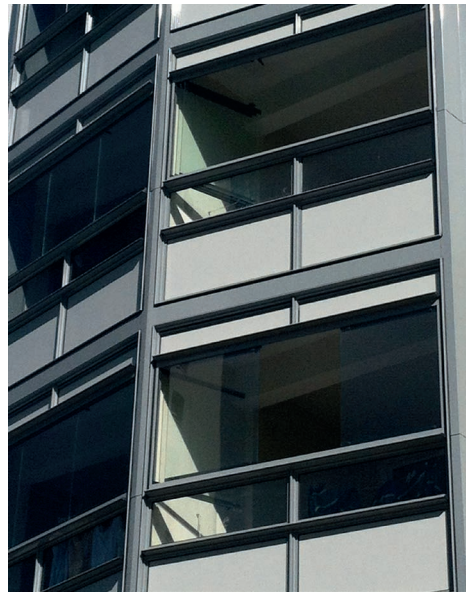
- Communal areas and their relationship to natural light
- Circulation areas
- The apartment or dwelling and opportunity to maximise daylight
- Window dressing and optimising daylight penetration

Figure 11

Image credit: INCH Architecture

Figure 12

Image credit: INCH Architecture



Design Considerations

Design principles are used to describe fundamental ideas about best practice design. Applying these principles to the spaces and its elements will bring them together into one coherent design.

Design principles for external spaces

The following outlines what each external space should provide and feel like as a general principle.

1. Make the outdoors accessible
(Barrier-free access, handrails, furniture, design suits residents needs, use of existing materials and planting, toilet access)

2. Diversify the outdoor spaces
(Quiet areas, communal areas, areas to allow a variety of activities)

3. Enhance the planting
(All year interest, biodiversity)

4. Stimulate all senses
(Sound, sight, touch, smell and taste)

5. Future proofing
(Ensure quality maintenance, staff training, anticipate changing conditions)

To achieve the above mentioned design principles certain factors need to be considered:

Site-specific requirements and response
Each property and every site is unique in its setting, users and demands. While some properties might require a long-term, staged improvement plan for other properties smaller interventions might be all that is needed.

Quite often potentials are not recognised and are usually under-utilised. Sheltered areas could easily be turned into a quiet seating area or a bleak wall or an uninviting fence could be improved with climbing plants.

The first step to improve the open spaces is to recognise opportunities as well as challenges. In order to understand these, the existing external spaces should be surveyed in relation to position, exposure, wider surrounding, views, existing conditions and buildings as well as user demands. In order to gain different perspectives this should be undertaken as a team. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.28)

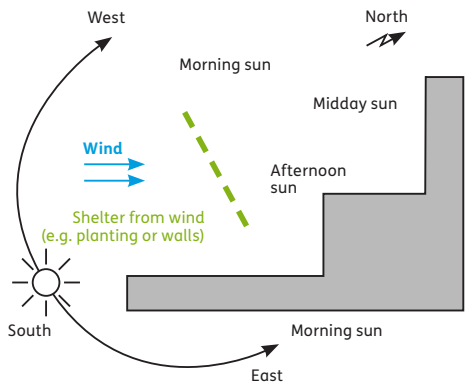
Common qualities and challenges:

- Keep or reinstate well tried elements
- Levels and access
- Limited outdoor space
- Connection between external and internal functional spaces such as toilets, storage or utility rooms or communal spaces
- Climate and elements (shelter against wind/rain/cold/sun)
- Bleak and monotone outdoor spaces

Orientation
Every site is unique with its climatic and microclimatic conditions. External spaces should be designed to suit the sun-path and local wind and microclimate conditions. In order to optimise the use and activity of these spaces the following aspects should be considered:

- Analyse sun-path to determine sunny and shady areas during the day and over the seasons
- Provide several areas to maximise sun access at all times of the day and sunlight during winter months
- Determine prevailing wind direction in order to provided shelter
- Create transitional spaces to provide shelter as well as maintaining thermal comfort internally

Figure 13
Effect of sun-path and wind condition on the external spaces.



Transitional (external) spaces

External spaces close to buildings

Barrier-free and attractive spaces in close proximity to the building animate the everyday, independent and communal use of the outdoors.In buildings with several levels, terraces and balconies offer external spaces for less mobile tenants .

External spaces at ground level should include:

- Clear overview and access give safety for residents and staff
- Connection to main exit of the building
- Meeting point within the communal area in front of the building as a starting point for activities
- Short distance to communal areas to allow access for all mobilities
- Seating areas
- Connection to path network
- Spontaneous meeting for all mobilities
- Activities for the whole community without much organisation
- Well signed public toilet in close proximity
- Main and secondary paths with different lengths of tour
- Level topography in areas close by
- Edible plants or fruits
- Storage for garden tools/ workshop/blankets etc close by
- Room/space to get changed/ with coats, hats etc

Terraces and balconies in the upstairs:

- Make small outdoor breaks possible and add to personal well being
- Adequate dimensioning for people with various mobility
- Covered with roof to allow use in all weather conditions
- Extend common areas
- Short use of external space during everyday life
- Views to wider area allows the individual to be part of everyday life
- Offer a safe and secure outdoor place

External spaces further away from buildings

External spaces which are further away from buildings allow spatial distance and retreat from everyday life. Nevertheless with views to the building they allow safety and contact. Attractive destination points which are visible from the building can be an inspiration for a visit.

As a special space those areas are attractive points for independent and mobile residents and are an encouragement for movement when resting points are given in between. Main and secondary paths can offer different lengths of walks.

Areas should be enclosed (walls, railings, fences, hedges) if there are tenants who tend to run away but views to the building(s) should be maintained.

References for 4.0 Design Considerations

Pollock, A. and Marshall, M. (ed.) (2012) Designing outdoor spaces for people with dementia, Greenwich: Hammond Press.

Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) Freiräume für Pflegeheime, Land NÖ, Gruppe Raumordnung, Umwelt und Verkehr, Abteilung Umweltschutz und Raumordnungsförderung und Gruppe Gesundheit und Soziales, St. Pölten: Abteilung.

Shackell, A. and Walter, R. (2012) Greenspace design for health and well-being, Edinburgh: Forestry Commission.

Design Guidance: External Spaces

Types of external spaces

Whilst all five design principles (refer to Design Principles and Considerations for External Spaces) generally apply to all external spaces certain areas will have specific design requirements and can be divided into three categories:

Access in and around the building

- Entrance spaces
- Parking

Security and Privacy

- Boundaries

In the garden

- Central communal areas
- Small communal areas for retreat
- Paths
- Open Areas
- Gardens/Allotments
- Spaces for observing/ less active spaces
- Areas for Smokers
- Areas for staff

Access in and around the building

Entrance spaces

As the main entrance is the 'business card' of the property it should be a welcoming, representative area and be appropriately designed. Shelter from the weather should be provided, "(...) yet have sufficient sunlight to benefit the users and keep the planting and hard surfaces in a healthy state." (Marshall and Pollock, 2012:page 98)

The main entrance is also as an area to socialise and to communicate. Seating which is sheltered from the weather and suitable for people with various mobilities allow communication and participation of everyday life within the development as well as the wider area. These areas should not negatively impact the pedestrian traffic.

In order to avoid conflict between users those areas for vehicles and pedestrians need to be clearly defined:

- Clear zoning of areas
- Enough space/dimensions
- Connection to public footpaths without crossing streets
- Integrated area for emergency vehicles

Elderly people can be sensitive to sudden noise and blinding light. Therefore entrances and parking areas should not be in front of tenants windows.

Deliveries should have direct access to the building and be sheltered from all weather conditions. Areas should be positioned in a way that tenants are not being disturbed during their sleep and afternoon nap.

(Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.38-39)

For activities and their benefits in Entrance Spaces refer to:

- 'Activities that encourage social interaction' (p.13)
- 'Activities that are less physical such as sitting, watching, reflecting' (p.14)
- 'Attributes for good design' (p.24)

Parking

Parking spaces allow tenants to observe but they are also intense and noisy. The following aspects should be considered:

- No parking spaces in front of residents rooms
- Sheltered bike parking should be provided for visitors and staff close to entrances
- Visitor parking spaces should be further away from the front of building

(Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.39)

Parking spaces can also be temporarily used as a market space with mobile vans (for example bakery, butcher or fishmonger) or market stalls to service tenants and their neighbours directly.

Refer to section 'Attributes for good design' (p.24)

Figure 14

Example of zoning for Entrance Spaces

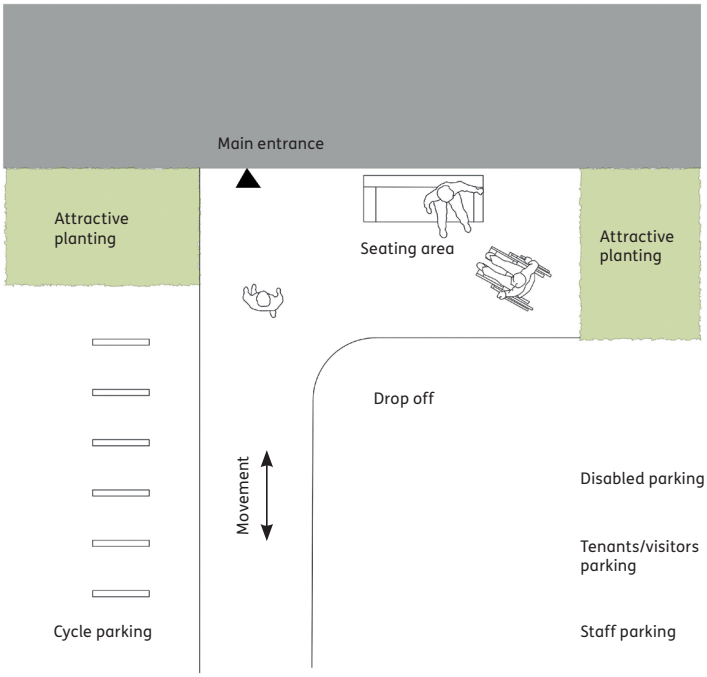
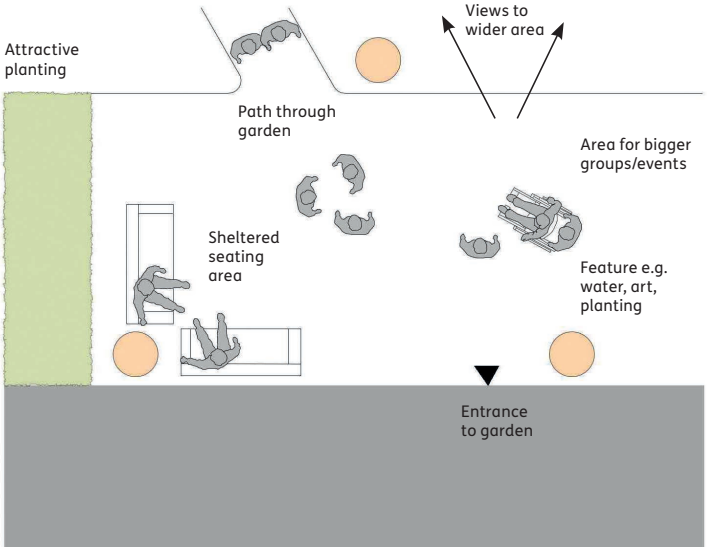


Figure 15

Example of zoning for Central Communal Spaces



Security and privacy

Boundaries
Boundaries add to the spatial orientation of external spaces as well as adding safety for the tenants. Boundaries which are not obvious as such (for example by adding planting) offer a safe space for movement. Deliberate positioning and characteristics (height, materials, opacity or colour) guide the interaction with the wider surrounding with more or less openness. Boundaries can also be used to create privacy, distance or keep unwanted stimulations away.

Refer to section 'Attributes for good design' (p.24).

In the garden

Central communal areas
Central communal areas are for gathering, hanging out, communicating and observing. They should be emphasised through their design, for example using water features, art objects or perennial planting. Play, sport or therapeutic equipment or animals can be also situated within this area to provide entertainment for tenants as well as non-tenants. The area should be designed to allow flexible and temporary uses like events or markets.

Stimulating views from seating areas offer 'occupation for the eyes', this can include perennials, bird feeders, pond, visual connections to the wider surrounding or to the building. Shelter from sun, wind and rain should be considered.

As these areas will be used for events or other group activities they should:

- Be large enough for the number of people that might use it and accommodate bigger groups with various mobilities
- Be in close proximity to buildings and ideally linked to internal communal spaces
- Be accessible from main exit and main path
- Be sheltered from wind
- Be ideally sunny in spring but half shade in Summer
- Provide shade from sun
- Be usable for wheelchair users
- Have user-friendly furniture and other flexible furniture
- Provide views into wider area

(Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.33-34)

For activities and their benefits in central communal areas refer to:

- 'Activities that encourage social interaction' (p.13)
- Activities that assist physical health, activity and exercise' (p.13)
- 'Activities that engage the brain' (p.14)
- 'Activities that are less physical such as sitting, watching, reflecting' (p.14)
- 'Activities in the evening' (p.14)
- 'Attributes for good design' (p.24).

Small communal areas for retreat
Some people need quiet spaces, a place to escape, relax, talk, observe, contemplate and be private. If there is enough ground, a place to 'retreat' can be very helpful and much appreciated. They can be situated along paths, at observing points or in close proximity as well as further away from buildings. Screening through pergolas, taller planting (for example hedges or perennials), walls or topography can act as seclusion. "(...) plants with memories attached, perfume, and colour can help to achieve a restful and healing place. However, this place of retreat should be very carefully located and designed so that it has an element of privacy but is still visible to the staff from a well-used interior space." (Marshall and Pollock, 2012:page 148)

For activities and their benefits in Spaces for retreat refer to:

- 'Activities that engage the brain' (p.14)
- 'Activities that restore and reinforce long-held skills, abilities and knowledge' (p.14)
- 'Activities that are less physical such as sitting, watching, reflecting' (p.14)
- 'Activities in the evening' (p.14)
- 'Attributes for Good Design' (p.24).

Paths

Paths are spaces for movement and the backbone of the spatial design. They connect to the wider surroundings and between the different areas within the external space. The availability of different lengths of walks corresponds to people with different physical conditions. "Paths should lead somewhere, at the very least around a feature and back again so that there is a journey to be accomplished. Features might include a tree, a sculpture, a summer house or simply a route through an arch or pergola. Paths should not lead to dead ends or locked gates - these can exacerbate a sense of frustration and cause confusion in wayfinding." (Marshall and Pollock, 2012:page 146)

Paths should provide:

- Clear difference between main and side paths (for example material, colour, width or edging)
- Different surfaces offer varied experiences, for example material or colour
- Consistency, non-slip, good drivable (wheel chair, walking frame) and easy to shuffle along surfaces
- Ideally no ramps
- Seating possibilities at regular intervals
- Different areas along paths to offer opportunity to rest, meet, observe or being active
- Parking and shunting areas for wheelchairs
- Shelter from weather conditions (wind, sun, rain)

For activities and their benefits on paths refer to :

- 'Activities that assist physical health, activity and exercise' (p.13)
- 'Activities that restore and reinforce long-held skills, abilities and knowledge' (p.14)
- 'Activities that provide multi-sensory stimulation' (p.14)
- 'Activities in the evening' (p.14)
- Attributes for good design' (p.24)

Open areas

Open areas are spaces without specific functions and are therefore multi-functional, adaptable and can, to a certain degree, accommodate different activities. However they nevertheless require connection to paths and other areas. Some might require services like water or electricity. Exposure to wind, rain and sun and lack of equipment limit the use of open areas significantly and need therefore be considered.

Views over open areas can offer a feeling of width and openness. They can make the surroundings feel bigger when positioned at the edge of the site plot, without being enclosed by hedges or fences. This can also be achieved through open areas out with the site plot, again without the use of hedges or fences as boundaries. Central open areas instead can give the external space a focus.

The maintenance of open areas can be reduced by including extensive planting, for example meadows.

Figure 16

Seating area under pergola along path. Screening through pergola can act as seclusion

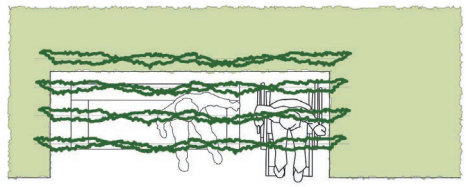
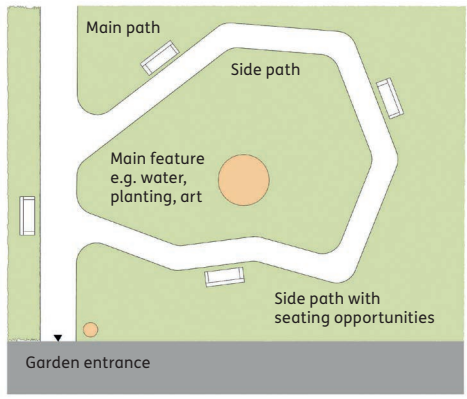


Figure 17

Example of main and side path



For activities and their benefits in open areas refer to:

- 'Activities that encourage social interaction' (p.13)
- 'Activities that assist physical health, activity and exercise' (p.13)
- 'Activities that engage the brain' (p.14)
- 'Activities that restore and reinforce long-held skills, abilities and knowledge' (p.14)
- 'Activities that provide multi-sensory stimulation' (p.14)
- 'Activities that are less physical such as sitting, watching, reflecting' (p.14)
- 'Activities in the evening' (p.14)
- 'Attributes for good design' (p.24)

Gardens/Allotments
Garden areas, allotments or raised beds offer the opportunity to stay active and exercise in an enjoyable, non-sport focused way. Many residents will have tended to their own garden, grown flowers and vegetables and can provide a link to their past as well as keeping them fit. It can be a very social activity and strengthens the community bond and friendships.

For activities and their benefits in gardens/allotments refer to:

- 'Activities that assist physical health, activity and exercise' (p.13)
- 'Activities that restore and reinforce long-held skills, abilities and knowledge' (p.14)
- 'Activities that provide multi-sensory stimulation' (p.14)
- 'Attributes for good design' (p.24)

Spaces for observing/less active
Residents who are less fit or prefer passive participation tend to enjoy areas that enable others to be active - be it a playground for the grandchildren, allotment areas with seating opportunities near by or a pen with animals.

In Switzerland for example, animals rapidly become an integral part in rehabilitation therapy and care homes for elderly to stimulate all senses such as touch, smell, taste, sound etc but also to give the residents the opportunity to built a bond/relationship with another being, to love and to feel loved, to be given some responsibility without being overwhelmed.

For activities and their benefits in spaces for observing/less active refer to:

- 'Activities that are less physical such as sitting, watching, reflecting' (p.14)
- 'Animals' (p.37)
- 'Attributes for good design' (p.24)

Areas for smokers
Providing dedicated outdoor areas for smokers should be considered as smoking is prohibited in internal communal areas and the size of apartments limits smoking and socialising in a group. A dedicated seating area or pavilion would give smokers an opportunity to be together. Nevertheless smoking should be omitted close to entrances and windows to avoid disturbance of other tenants and staff.

For further design guidance refer to 'Attributes for good design' (p.24).

Areas for staff
If the site allows, staff will benefit from their own outdoor area. Separate external areas for staff provide a place to get fresh air, have their meals or cup of tea, calm down and meet in a convivial place. This should not be underestimated as a way of benefitting the whole community as a happy and relaxed staff means happier and more relaxed residents. Areas for staff should ideally have an alternative door, be visually concealed, for example by a hedge and be designed according to their wishes (deck chairs, tables). (Marshall and Pollock, 2012 p.155)

For further design guidance refer to 'Attributes for good design' (p.24).

Figure 18
Raised beds with seating, Normand Park, Fulham. Image credit: UrbanPioneers

Figure 19
Seating area infront of aviary, Therapy Animal Park Eckenstein, Basel. Image credit: UrbanPioneers

Attributes for good design

The different types of external spaces can contain a number of various elements. 'Design guidance: External Spaces' features elements that are suitable for elderly tenants, which contribute to a diversity of external spaces and enable a range of activities:

- Adequate dimensioning
- Surfaces
- Access
- Boundary treatments
- Planting
- Furniture
- Sport and Fitness equipment
- Water
- Management & Maintenance

Adequate dimensioning
The dimensioning of communal areas is guided by the questions 'For what?' and 'For whom?' allowing space for:

- Movement and free space
- Everyday and elderly fitted equipment
- Different mobilities (wheelchair, walking frame, bed)
- Different activities for individuals, small and larger groups

By doing this the independent and accompanied use of the external spaces is assured for tenants of all abilities. When designing communal areas the eye level from a sitting as well as an upright position needs to be considered. Outside spaces should be enjoyed in any weather and every effort needs to be made to maximise shelter from sun, wind or rain and must be a key consideration in any layout. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.33)

Communal areas
Communal areas are spaces for communication, observation or retreat. Within the design they should be emphasised by their dimension and arrangement of elements, for example water features or art works according to their purpose.

They need to accommodate enough space for seating, walking frames and wheelchairs. In order to position wheelchairs towards the same view beside benches and to manoeuvre, a free space of minimum 1.2m is required.

Sun and wind conditions need to be carefully considered for the design of communal areas. Possible turbulences have to be avoided. Views to perennial beds, bird feeders, ponds etc offer interesting observation points. Views to the surroundings for example church spire, panorama view or to other spaces connect to the wider area.

Paths
Paths form the structure of the open spaces. They provide a safe surface to walk on as well as a directional guide for people with impaired memory and/or impaired vision.

Primary and secondary paths can be made distinguishable by different widths and/or surface materials. Each path should have a continuous surface material to help orientation. In general they should be seen from communal areas.

Primary paths:
Minimum 1.8m wide to allow the passing of two wheelchairs

Secondary paths:
Minimum 1.2m wide

Camber of path:
Maximum 2% for drainage

The width of the path should not be restricted by furniture, lighting columns, handrails, walls or bins.

The change of direction, for example crossings, turn offs or bends have to be provided with an adequate radius to allow easy access for wheelchairs and walking frames. These have to be chosen in accordance to the path width and the angle of the change of direction.
(Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.50)

For design guidance refer to:
Scottish Government 'Technical Handbook - Domestic' (2015).

Surfaces
Surfaces should be slip-resistant during all weather conditions but nevertheless shuffle friendly and with low resistance to rolling. Obvious gaps can be seen as barriers and should be therefore avoided. Free water drainage has to be given at all times. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.49)

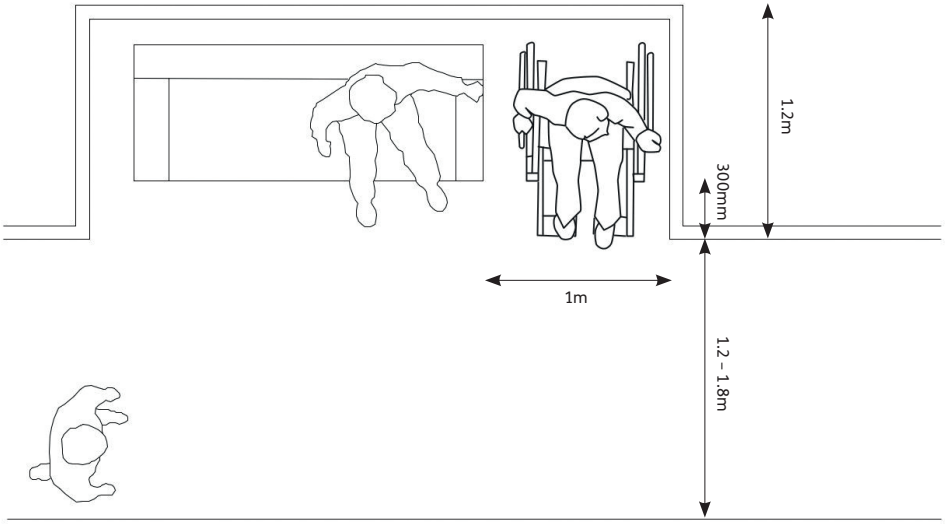
For design guidance refer to: Scottish Government 'Technical Handbook - Domestic' (2015)

Colour and patters
Surfaces should be easily visible and in contrast to the surroundings, not be reflective or shiny. Light surfaces can help orientation as they sit in contrast to the surroundings but they can also add uncertainty. Light colours and smooth surfaces reflect light stronger and can therefore be a hazard for visual sensitive people. Surfaces with consistent and path typical colour (buff, greys and black) are more appropriate than coloured surfaces as they are more likely to be seen as paths.

With dark or black surfaces in a natural surrounding other irritations are given; visibly impaired people might read black surfaces as holes or level changes. Therefore strong light/dark contrast should be avoided when designing paths and communal spaces. Nevertheless strong contrasts can be used when highlighting tripping hazards as steps or for the change of use of certain areas.

Figure 21
Seating area with central feature, Aberdour Old School Sensory Garden. Image credit: UrbanPioneers

Figure 20
Dimensions for seating area with wheelchair space Wulf, H. (2008). Wohnen mit Zukunft. In: Rau, U. (ed.) Barrierefrei - Bauen für die Zukunft. Bauwerk Verlag p.300



Materials
Concrete:
Good rolling properties. Slip-resistant surfaces can be achieved by a minimal roughened surface structure (for example with a brush). Different greys can be achieved through additives or aggregates.

Asphalt:
Good rolling properties.
The colour shade can be varied by rolling chipping or addition of other aggregates into the surface, for example glass.

Concrete or natural stone slabs:
Ideal are bigger slabs with slip-resistant and non-reflective surfaces and minimal gaps.

Concrete or natural stone paving:
Simple paving patterns with bigger paving stones and minimal gaps.
No cobbles should be used.

Resin-bound gravel:
Not suitable as it tends to be slippy in wet conditions.

Self-binding surfaces:
This surface treatment is suitable for secondary paths or smaller areas, offering a different walking experience. The gravel should be of small size (0/3mm) with a gravel layer of 4mm for low rolling resistance.
It needs to be maintained annually.

Edging
Edgings are used to support the path surfaces and sub-layers but can also have a design function. Important boundaries can be emphasised through height, width or colour but should not create a trip hazard and be in contrast to the surroundings.

Possible edging are standard kerbs, flush kerbs or wood. Should the adjacent area be accessible, level access has to be provided.

Services
Manhole covers or duct covers should be level with surroundings and in the same material or similar colour to the surrounding surface.

Lighting columns
As part of a light concept plan, paths and areas to be lit are chosen, and priorities regarding duration and intensity of the light decided. The lighting of paths, entrances and exits are particularly important and should be inviting as well as signal security. A continuous illumination is important, which is given when the individual luminous elements overlap. The luminosity should be neither too strong nor dim and should definitely not blind people. Especially useful are bollard lights with a hidden light source. For bigger areas, lights with higher light columns are more appropriate. In close proximity to buildings the choice of lighting column and position should be chosen by avoiding light disturbances of bedrooms.

Lighting of the open spaces can be undertaken creatively for example spot lights can emphasise special elements within the garden but should be further away from buildings and exterior communal areas to avoid direct light. Automatic motion detectors, time switches or twilight timer should be installed to use energy economically.

Access routes & parking spaces

In order to avoid conflict and accidents, access roads and parking spaces should be separated from the open space used by the tenants.

Noise level and light (front lights) disturbances from accessing cars and vans have to be considered when designing access roads and parking spaces. Noise protection walls or high planting can create some protection. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.52)

If barriers or bollards are being used to restrict vehicular access, they should be installed at minimum distance of 900mm centres. These elements should be in contrast to the surroundings to be clearly visible by partially sighted people.

Main access/emergency vehicle access
Within the area of the main access, pedestrian and vehicles spaces have to be seperated and visually clearly distinguishable either by change of material or ground markings. Narrow roads without adequate turning space should be avoided.

Delivery access
These should be far from the main access. Possible noise disturbances for the tenants in the early morning have to be considered. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.52)

Parking spaces
The number of car parking spaces is determined by the available space and the requirement of each development. They need to be in accordance with the councils policies.

Wheelchair parking spaces should be located as close as possible to relevant entrances and have to be marked accordingly.

An accessible route should lead to the main entrance of the development but also to any other entrances that provides access for particular groups (for example visitors or staff). Routes should be without ramps or slopes to allow easy access for all mobilities and should contain no barriers, for example kerbs, steps or other objects. Furniture should be located outwith the width of the route.

Permeable surfaces can be used for parking spaces.

For design guidance of access routes and parking spaces refer to:

- Types of external spaces (p.19)
- British Standard 8300:2009+A1:2010 Design of buildings and their approaches to meet the needs of disabled people – Code of practice
- Scottish Government, Technical Handbook - Domestic (2015)'

Boundary treatments

Boundaries can offer orientation and safety but also restriction, especially for people with dementia.

Particularly for tenants with dementia, boundaries can cause agitation or aggression. By using hedges, shrubs, climbers or perennials as screens, boundaries can be designed almost invisible or discreet. This will create a feeling of comfort and safety rather than reinforcing the feeling of limitation and hostility.

Railings and fences should be safety adequate but should allow views across in standing and seated position.

Railings and fencing
Fencing should be constructed to restrict climbing, but should be kept to a minimum to avoid feeling imprisoned. This can also be achieved by screening with planting of hedges, climbers or perennial planting. The choice of fencing material and design should be orientated on the character of the open space, buildings or typical fencing within the area. Typical fencing should have a minimum height of 1.4m. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.62)

Gates
Paths leading to a visible locked gate can cause frustration and confusion and should therefore be disguised to look like a continuation of the fence or railing. The dimension of the gate should be adequate for its use.

Figure 22
Glass asphalt. Image credit: UrbanPioneers

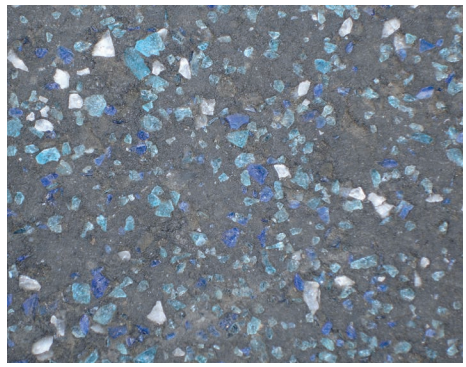


Figure 23
Permeable surface for parking area, IBA Hamburg. Image credit: UrbanPioneers

Figure 24
Mesh fencing with planting, Basel. Image credit: UrbanPioneers

Walls
Freestanding walls are used to create spaces as boundaries of the open space (for example noise protection wall or screen), for raised beds or as retaining walls for level changes. Planted walls offer change during the seasons as well as habitat for animals and therefore observing opportunities for tenants. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.58)

Potential materials for freestanding walls could be: concrete, bricks, natural stone, mix of timber construction or willow

Potential materials for retaining walls could be: concrete, wood, steel, dry stone walls or gabions

An engineer should be consulted for the structural integrity of walls.

Planting

Plants can be used as design elements such as boundaries, sheltered areas, spatial division or for their colour, texture, scent and form. Through the positioning and choice of plants different characters can be created, for example homogenous and calm areas or heterogenous and contrasting spaces In addition they can also stimulate our senses: seeing, hearing, smelling, tasting and feeling.

'Plants can (...) be a great source of activity, for example, vegetables, fruit and herbs can be grown and harvested, bulbs and annuals can be picked and arranged, planting beds can be weeded and it is always useful to have some raised beds for people who struggle to bend or who use a wheelchair.' (Pollock and Marshall, 2012:page 151)

Avoid using

- Poisonous plants such as ivy, yew or foxglove. The Royal Horticultural Society has information on 'Potentially harmful garden plants' on their website. (www.rhs.org.uk/advice/profile?pid=524)
- Avoid thorny or vigorous plants unless required to deter intruders

The use of adequate planting requires expert knowledge.

Views
Plantings are being viewed from different distances and heights; from inside buildings (tenants rooms, communal areas, balconies or terraces) or from within the external spaces (standing, sitting or lying down). This results in various viewing heights which have to be considered. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.45)

Effects according to height
Low planting - ground level

- Don't effect view
- Allow views between two joined spaces
- Can be accessible
- Can be viewed as patterns or pictures

Low planting - knee height

- Reduces movement
- Allows undisturbed views
- Can be read as a carpet when seen from above
- Can be used as boundary

Waist-high planting - between knee and waist height

- Allows view
- Can be used to indicate directions or boundaries
- Can mask fences or railings
- Can be a viewpoint

High planting - above eye level when standing

- Forms physical and visual barrier
- Can form spaces of privacy or seclusion
- Can form a roof (pergola)
- Allows views below (trees)
- Can be a background for other planting
- Can act as solitaire

(Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.45)

Form and size of planting
Continuous forms, such as planting area or cut hedges, appear architectural, formal and require intensive maintenance. Irregular forms appear more natural through their flowing lines and forms. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.46)

Familiarity/recognition
Throughout our lives we experience places and people which memories can be triggered by images or smells. Roses, lavender or wet leaves can act as memory triggers through their sight, smell or connection to a specific season. These triggers are personal, and depend on the tenant's age, experiences and/or social-economic background. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.46)

Colours
Foliage, flowers, fruit and bark are the colour carrier of plants. The effect of colour depends on the hue/shade, intensity, lightness and saturation.Warm-coloured plants with white, yellow, red or orange hues can be seen well by sight impaired people. White and yellow plants can be used to brighten dark and shady areas. With advanced age the blue to lavender colour range is harder to discern for the eye. This doesn't mean plants of this range should not be used at all, but they are of less benefit to the tenants.

Scent
Scented plants should be specifically chosen and can be distinguished by, for example scented flowers (lavender), scented foliage (katsura tree), night/evening scented (honeysuckle) or touch scented (thyme). Plants with a strong and heavy scent (mock orange) can have an unpleasant effect and shouldn't be planted in close proximity to eating areas or tenants rooms. A mix of scents should be avoided. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.46)

All year interest
Plantings should be created with a year round interest in mind so that there is always something to enjoy. This includes "plants that announce the seasons (...), colourful flowers and foliage, evergreen or shapely plants, plants that move in the breeze, plants that look good in the rain". (Pollock and Marshall, 2012:page 151)

Plants of interest according to the season:

Spring: bulbs (crocus, daffodil), spring flowering shrubs (magnolia), fruit trees (apples, cherries)

Summer: shrubs/trees with colourful foliage, summer flowering plants (buddleia, roses), perennials, annual summer flowers (sunflowers)

Autumn: shrubs/trees with attractive autumn leaves (sycamore) or fruit (rowan)

Winter: shrubs/trees with flowers (arrowwood), colourful shoots (dogwood), evergreen plants (ivy) or grass flowers/seed heads (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.46)

Biodiversity
Plants attract birds and wildlife, which can provide tenants with enjoyment and make the outdoor spaces an attractive place to visit and observe from the indoors.

Auditive and haptic stimuli
Plants can also give auditive stimuli (leaves rustling, the creaking of branches) or haptic stimuli (touching flowers, fruit and leaves). (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.47)

'Manufacturing' possibilities
Plants can be used for 'manufacturing activities' such as arts and crafts. Vegetables, fruit plants, seed heads (lavender or salvia), branches (corkscrew hazel) or leaves can be used in group creative classes. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.47)

Edging
Edging for planting beds along lawns, for example kerbs, tree trunks or metal edging hinder residents to enter or roll into the beds. It also avoids grass growing into the beds and can add to the overall design of the open space.

Trees
Trees indicate the seasons throughout the year by their flowers, leaves and fruits. People from their own rooms and from balconies will enjoy watching the branches of a tree, the bird life and the change of the seasons.

The choice of a tree is guided by its function and site conditions. When planting new trees, the choice of quality is to be preferred to quantity. It is more appropriate to plant three bigger and mature trees than seven small trees which will reach their optimum size only within 10 years time. The maximum height of a tree has to be considered within the design with enough space for roots, distance to building(s) and other trees, and with a minimum distance of 1m from tree trunk to path. If positioned closer to a path the use of root protection would be required.

Trees should be small or medium sized, except where there is a park-sized outdoor space. Trees in close proximity to paths and seating areas should not have heavy leaf fall to avoid surfaces becoming slippery or fruit or seeds that might hit a person underneath. (Pollock and Marshall, 2012:page 152)

Existing trees
Mature trees are invaluable and a real asset to every property. They give character, maturity and a sense of timelessness to the development. They provide shade, protect from sun, wind and rain, are focal points, meeting points, have unequalled recognition value, indicate the season and hence help with orientation and memory.

Trees also increase the estate value as they suggest high quality living. Leafy streets are generally considered an affluent, well tended and cared for area. The same applies for playgrounds, hospitals, housing schemes as well as assisted living schemes. Trees are seen as an indicator of good quality.

Existing individual/groups of selected trees or woodlands might be protected with a Tree Preservation Order (TPO) as their removal would have a significant impact on the environment and its enjoyment by the public. In order to fell these trees a consent needs to be obtained from the local authority.

Fruit trees
Espalier plants or fruits can be used for facade greening with an adequate planting area (width and depth) and irrigation provided.
In order for tenants to harvest fruit (espalier fruit) themselves the distance from the path needs to be considered.

Hedges
Hedges can be used for shaping spaces, covering fences, offering protection from views, noise or wind, or as guiding elements along paths.

Cut hedges can be planted with one or several species, and have to be cut at least annually (April-October, depending on species) to preserve existing path cross-sections and views.

Free growing hedges with various native species or ornamental shrubs offer all year interest (colour, flower and fruit) and are extremely valuable for wildlife, which can be a great observation spot for tenants. A cut is recommended every 3 to 5 years to keep strong flowering.(Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.47)

Shrubs
Group of shrubs
Different flowering times and fruit offer tenants changing aspects over the season, the effect of the whole group of shrubs is the main focus.

Single shrubs
They can be used creating focal points by chosing species with a unique habitat, flowering or autumn leaves.

Fruit shrubs
When planted in easy reach from the path and at eye and hand height it can be inviting for tenants to harvest their own fruit. They can be planted

Figure 25
Robinia trees throwing a light shade, Therapy Animal Park Eckenstein, Basel. Image credit: UrbanPioneers

Figure 26
Free growing low hedge, Bingen, Germany. Image credit: UrbanPioneers

in raised beds, on climbing frames (raspberries, blackberries) or high growing species with a clear stem can be used (currants, gooseberries). (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.48)

Ground covers
These are useful for a variety of areas, from shady areas under shrubs and trees or steep embankments (ivy, carpet box). They suppress weed growth and are generally low maintenance.

Perennials
Perennial beds offer a wide variety of colours, forms and textures and can be used as border planting and focal point. Planted in specific colours they can be used for wayfinding within the open space, for example a colour code for specific areas. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.48)

Self-sustainable perennials
These planting systems are based on a well-balanced selection of compatible species to create dynamic plant communities. These plantings provide colour and all year round interest with colour change, texture and structure.

Plant species will complement each other not only aesthetically, but also ecologically, avoiding any competition with each other. Once established they are extremely low in maintenance. Refer to 'Management and maintenance' (p.38).

Herb and vegetable beds
The beds should be south orientated for ideal sun exposure and good soil conditions should be provided. Beds should be arranged for easy access by tenants. If they are used by kitchen staff they should be in close proximity to the kitchen minimising the access route.(Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.48)

Planting pots (temporary) and Window boxes
Planting pots or window boxes allow observation of plants and easy gardening work for tenants who can't access the open space easily. Pots can be planted with perennials or small shrubs and window boxes with temporary plants like herbs or annuals. For maintenance they need to be easy accessible and need to be sturdy and positioned in a way to avoid tenants using them to climb over barriers.

Summer flowers
Annual plants (sun flowers) set focal points within the open spaces, can fill temporary gaps in beds or pots on balconies and terraces. Seeds can be collected by tenants and seeded in the following year.

Climbing plants
For the planting of pergolas or building facades, perennials (roses, honeysuckle) or annuals (beans, nasturtium) can be used. Annuals are fast growing which can cover pergolas or fences in a short period of time. Note that some honeysuckles are poisonous.

Figure 27
Self-sustainable perennial planting, Kinghorn, Fife. Image credit: UrbanPioneers

Figure 28
Herb Garden, Aberdour Old School Sensory Garden. Image credit: UrbanPioneers

Climbing frames can be used for greening facades or walls and can be designed linear or over a surface. They can also be free standing, for example a rose frame and act as a design element creating a gate or tunnel effect.The choice of climbing frame depends on the specie of climbing plant chosen. If using wisteria a root barrier should be used between the plant and adjoining structures to avoid any damage caused by its roots.

Fixings can be attached to walls or into the ground. Additional bearings need to be considered for the construction.

Materials: wood for slats or poles, stainless steel for ropes, grates or netting.

Pond planting
Obvious pond planting like water lilies become the focus point quite easily. Different zones require varied plants and species, for example submerged plants or marginal plants. Access, formation and height of planting along the pond edge needs to be carefully considered.

Greenhouse
A greenhouse allows the beginning of the gardening season in early spring and also allows storage of potted plants over winter. Direct access to the building allows easy use for tenants.

A greenhouse made out of plastic bottles could be built together with tenants.

Lawns and meadows
Lawns and meadows allow open views, can make the space feel bigger and be used as free space for events or for future extension of the building.

Areas can be distinguished according to their use between 'close to the building, intensive used areas, with high maintenance' and 'further away from building, extensive used areas, with low maintenance'. From a maintenance point of view small areas of lawn or meadow (for example between path and planting beds) should be avoided. Access for lawn mower and maintenance should be considered. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.44)

Lawn
The use of lawn with a wheelchair or walking frame is possible when there is no level difference between path and lawn, good drainage, compaction and maintenance provided. Lawns can also be used for therapeutic exercises such as to practice walking on different surfaces or Tai Chi.

Lawns are high maintenance due to regular cuts and fertilising. The cuttings can be used for fertilising but only when the grass has minimal growth between cuts.

During spring, bulbs can be used for attraction (for example crocus, grape hyacinth or early-flowering tulips) as they flower before the first cut of the year.

Figure 29
Greenhouse made of plastic bottles, St. Maries Primary School, Fife. Image credit: UrbanPioneers

Figure 30
Meadow with tulips, Jupiter Art Land, Edinburgh. Image credit: UrbanPioneers

Reinforced grass
Grass reinforcement is suitable for grass or overflow car parks, emergency access routes and storage spaces by stabilising the natural surface. There are different products available from mesh structures to pavers.

Meadow
A colourful and diverse flowering meadow consists of low to high growing flowers and grasses.
The grass and meadow seed mixes should be chosen according to the site and climatic conditions in order to avoid watering of areas as well as to achieve low maintenance. Meadows and grasslands require soil of low nutritional quality and should be seeded on maximum 100mm topsoil.

There are various mixes available:

- For wetlands
- For woodland
- Open meadows

These mixes can be annual/ biannual or perennial. Annual seed mixes require annual cultivation and re-seeding. Perennial mixes need to flower at the right time to ensure desired species have the chance to reproduce while undesired species are removed through mowing. Meadows are low in maintenance but require work to schedule and season. In order to maintain the species diversity, a cut 2–3 times a year is required with the removal of cuttings.

Meadows only have an impact in bigger spaces. Small patches of meadow give the impression of an unkempt landscape and might be counterproductive. They are very valuable for biodiversity and wildlife.

Soil
If existing soft landscaping is to be turned into a planting area or raised beds, the existing soil should be divided between topsoil and subsoil. The existing topsoil should be used for the upper 300mm, the subsoil can be used for the lower layers. If there is not sufficient topsoil additional imported topsoil should be brought in. Depending on the plant selection 50mm compost should be added and mixed in with the first 300mm of topsoil.

Compost is required for:

- Vegetables
- Existing topsoil of poor quality

All soil has to be weed free in order to minimise maintenance and competition to plants.

Local and chemical free materials should be considered.

To keep moisture within the soil grass cuttings, shredded plants or gravel can be used as a temporary cover for planting areas. Reflecting materials such as glass or materials with unusual colour should be avoided or only used in small quantities as they can have irritating effects.

All manufactured topsoil should be in accordance with British Standard 3882:2007 Specification for topsoil.

Furniture

The open space is made usable and livable through furniture. The design should be aesthetically pleasing and the use of the object clearly recognisable. Height, width and depth need to be designed for residents of all mobilities. Fixed elements need to be easy accessible and fitted on hard surfaces with enough space for turning wheelchairs. Elements need to be sturdy (not easily tipped over) and allow support and leaning on. Accessories such as blankets and cushions, placed at exists to the outdoors, make the outdoors inviting, comfortable and attractive to use.

Materials and construction of the elements have to be weather-resistant, temperature neutral, fast drying, easy to maintain and repair or to exchange. Smooth surfaces and chamfered edging avoid injuries.

All timber is suitable especially larch, robinia, oak and pressure treated wood. All timber needs to be FSC certified to guarantee quality from sustainable, environmental friendly managed forests.

For constructive wood preservation contact between wood and ground level/foundations should be avoided, as well as no standing water on wooden surfaces or on connection points.

Benches
To allow autonomous standing up, arm rests are essential. An intermediate support arm increases the number of seating opportunites and provides support on both sides for the individual. The seating area should be smooth and ergonomic formed, as this allows sliding to the front of the seat. A wide, continuous back offers optimal comfort with a high back supporting the head when snoozing.

Material: Timber slats with small gaps in between are seen as comfortable. Metal benches require cushions or similar which results in more work for staff as they need to be removed in bad weather and at night.

Chairs
Non-fixed elements allow flexibility using the open spaces. They should be easily moveable for the elderly. To allow autonomous standing up a smooth and ergonomic formed seating area, which allows sliding to the front of the seat, as well as arm rests are required.

Material: For movable chairs a metal frame with plastic seat and back is suitable.

Handrails
Handrails provide support and can help tenants feel more secure when exploring the open spaces. They need to be fitted to all steps, ramps and slopes with the ends continuing 300mm beyond the end of the steps, ramp or slope. Handrails can be fitted along paths and should run in a curve around corners. The fixings of the handrails need to be constructed as not to effect the sliding of the hand. If several parts are being fitted along each other a smooth transition should be guaranteed. Ends need to be chamfered or protected.

Material: Metal or wood with smooth surface to allow easy gliding of the hand. Wooden handrails need to be regularly inspected for injury sources.

Also refer to: British Standard 8300:2009+A1:2010 Design of buildings and their approaches to meet the needs of disabled. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.53-54)

Figure 31
Dimensions for benches and chairs.
Wulf, H. (2008). Wohnen mit Zukunft. In: Rau, U. (ed.) Barrierefrei - Bauen für die Zukunft. Bauwerk Verlag p301

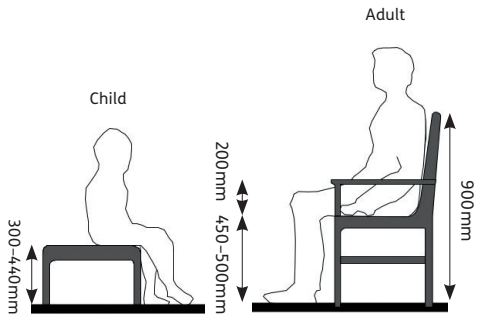


Figure 32
Dimensions for handrails.
Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.54

Tables
Tables need to be constructed to allow moving underneath with a wheelchair. They need to be sturdy to allow leaning onto the table edges.

BBQ
It is worth allocating a space for a BBQ to encourage outdoor eating on warm days and social events.

Raised beds
Raised beds offer the possibility to observe and feel plants close up but also to undertake some gardening. For an optimal plant growth they should be orientated north-south and good quality soil and irrigation have to be provided. They can be dimensioned for working standing or seated. Seating can be provided along the edge of the raised beds. Access should be given to all sites of the bed with enough distance between raised beds. To allow comfortable gardening across the bed they should not be deeper than 1m. (Fauler,H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.57)

Materials: railway sleepers, strong wooden boards or round wood (larch, robinia, pine) with a layer of geotextile between wood and soil. Natural stone, gabions, concrete elements or brick should also include a layer of geotextile between the soil. The soil inside the raised bed should have contact to the natural ground.

Mobile table beds and working tables
Mobile raised beds or tables allow gardeners to start the garden season in early spring.

They should be designed to allow wheelchairs to move underneath and castor rolls need to be fixable. Filled with various materials they can be used as working tables to train the sense of touch.

The planting depth is between 150–200mm which doesn't allow for permanent planting.

Materials: Metal or wood (larch, robinia). Drainage needs to be provided and wooden beds need to be covered with foil.

Bins
In semi-public and intensively used areas bins need to be provided. They need to be easily accessible and stable with a minimum height of 700mm.

Sunshade
Sunshades provide shade in strong sun but can also give shelter in rainy weather.

In order for tenants not to trip over sunshade stands or constructions they need to stand out from their surrounding. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.56)

Figure 33
Dimensions for tables (incl. mobile and working tables) Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.54 and Wulf, H. (2008). Wohnen mit Zukunft. In: Rau, U. (ed.) Barrierefrei - Bauen für die Zukunft. Bauwerk Verlag p301

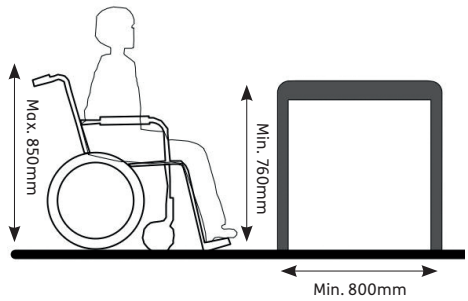


Figure 34
Raised bed with seating area, Therapy Animal Park Eckenstein, Basel. Image credit: UrbanPioneers

Pavilions
Pavilions allow the use of the open space in bad and cold weather. The entrance should have level access and at least 1.3m wide. To allow views into the surroundings, the balustrade or railing should not be higher than 1m.

Pergolas
Pergolas are shelter from sun, view and wind in common areas but also support for climbing plants. They can run linearly along the path or buildings for structure or wayfinding.

Materials: Vertical posts can be made of wood, steel, natural stone, bricks or concrete. Beams and rafters can be made of wood, metal or wire. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.56)

Play, sport and therapeutic equipment

Equipment needs to suit the mobility and safety needs of the tenants with the use easily to understand. Seating opportunities should be offered close by. Access should be clearly visible and a space for parking wheelchairs or walking frames given. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.61)

Sensory paths
Sensory paths should fit into the overall design of the open space. They should be situated close to the building, be clearly visible and offer optical stimuli, for example running through a perennial bed. Ramps or slopes can be incorporated within the path. Surfaces/materials should allow 'shuffling' and too soft materials, which could cause residents to sink into them, should be avoided. The path should have a minimum width of 1.2m and railings should be fitted along one side of it.

Practicing steps
With different step heights, depths and railings on both sites these can be used to practice and re-learn walking steps as well as help training required muscle groups.

Elderly fitness equipment
This specially designed equipment offers incentive to practice and move by oneself as well as helping to maintain activity regimes. Installed in a cluster it allows exchange between tenants when using them together. The area should be sheltered from wind and a roof could provide shelter from rain and sun.

Equipment should meet British Standard: British Standard EN 1176, British Standard EN 1177, British Standard 7188 and British Standard 5696.

Play equipment
Play equipment keeps small children occupied during visits and provide enjoyable entertainment. It also allows inter-generational play and can help maintain activity regimes. The equipment should be usable for tenants with movement restrictions and enough space should be allowed between the equipment to reduce conflict of use.

Equipment should meet British Standard: British Standard EN 1176, British Standard EN 1177, British Standard 7188 and 5696.

Figure 35
Pergola, Aberdour Old School Sensory Garden. Image credit: UrbanPioneers

Figure 36
Sensory path, Fairisle Primary School, Fife. Image credit: UrbanPioneers

Other equipment

Shed
Within the design integrated sheds can function as partition or wind shelter. The size depends on the need of storing garden tools, furniture or accessories such as sun shades or cushions. They should be positioned in close proximity to the area of use. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.63)

Workshop
A workshop allows repair work, maintenance of tools, central storage for tools and equipment and during winter also storage of furniture. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.63)

Bin/recycling areas
External bin areas should be covered and easily accessible for staff and bin men. If possible they should be located minimum 8m away from the building to avoid possible smell (prevailing wind direction should be considered) and noise nuisance.

Compost
Compost bins/areas should be located in half shade and be easily accessible. They are suitable for open spaces with plenty of garden waste and leaves as well as kitchen waste to make cheap and valuable fertilizer.

Flag pole
Flapping in the wind, flags can be a point of interest or a flag changing ceremony can be a highlight at events. Poles should have a clear access. It is generally necessary to obtain planning consent to erect a flag pole.

Birdhouse, bird bath
Observing birds through sight and sound can lift tenants mood for the rest of the day. Birdhouses or bird bath should be installed to be well visible from the internal and external spaces and safe from cats or squirrels. Birds should not be fed during Summer.

Bird and bat boxes, insect hotels
These can attract beneficial birds, bats, insects and other creatures and can increase biodiversity. These animals will offer observation and talking opportunities for the tenants but also act as natural pest management (aphids or mosquitos). The boxes and hotels should be not directly accessible, secure from predators, in sunny to half shady areas and be sheltered from the weather.

Artworks
Artworks can positively enhance the open spaces, create focal points and transform the perception of the space. They can be permanent or temporary and should be site-specific. Accessible artworks have to be weather and vandal proof as well as securely installed.

Animals
Animals will certainly encourage residents to go outdoors. The therapeutic effects of contact to animals has been recognised in some countries like Switzerland. Even if tenants might not be able to look after and care for animals they will communicate on an emotional level, allowing for a special form of communication between human and animal. They give tenants the opportunity to communicate, touch, stroke and observe the animals.Especially people living with dementia seem to perceive their surrounding through touch and contact. Open spaces can be used to keep animals such as chickens, ducks, rabbits, dogs, cats or birds. Management needs to be considered.

Games
Outdoor games like croquet, frisbee or a kite can be left outside or be easily accessible indoors to encourage a range of outdoor activities.

Garden tools
Besides the special equipment and furniture for the open spaces, garden tools require special designs too. Ergonomic requirements can be added easily by extending and/or padding handles, changing the angle of the handle, etc. Diverse measures should be tested and improved over time. Aids such as mats, stools, platforms or steps can contribute to a better working posture and improve comfort while kneeling, sitting or standing.

Tools should be stored close to the area of use. Gardening tools like a brush or rake could be left outside during the day to encourage physical activity.

Water

Water enriches the open space as a habitat for water plants and animals. It can also offer optical, acoustic and haptic stimuli through light reflections and mirroring, movement and touch. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.59)

When considering implementing water elements or features the following need to be considered:

- Wind direction, as water blown across paths can cause algae growth and slippery surfaces
- Blown leaves into water features or ponds causes higher nutrient input into the water, which results in higher maintenance.
- The water quality depends on the temperature of the water. High sun radiation can cause temperature rise of the water, which increases the growth of algae.
- The water needs to be drained appropriately to allow access without getting wet feet.
- Level or water access can be a hazard to visibly impaired people and should either be avoided or secured.

Water features
Water features offer various architectural design possibilities, for example form, material or positioning. In order to be accessible for all tenants walls should be vertical with a minimum height of 700mm to allow for touching of the water. However, the water depth should be not deeper than 100mm. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.60)

Water play
Water play as fountains or spheres activate open spaces, whereas calm water surfaces offer calm and contemplation. Water spheres can offer contact with water when not much space is given. The splashing noise of water can have a calming effect but can be unsettling or disrupt conversation when in close proximity to communal areas.

Water features with moving water should be equipped with a timer or solar panels to save energy and water. The water should run in a cycle and filter and pumps should be easy to maintain.

Ponds
Positioning a pond at the lowest point of the site is the most natural location. Well positioned seating areas and paths allow direct view of the water surface. The pond edges have to be secured by planting, stones or attractive fencing.

To ensure a permanent biological balance within the pond it requires 30 sq.m. and a minimum depth of 1m. Direct sunlight should not exceed more than 5–7 hours during the day and organic matter such as leaves, grass cuttings or surface water have to be avoided entering the pond.

Ponds can be lined with various materials (plastic products or sheets). Sheets need a capillary barrier around their edges and need to be covered with gravel or grid. An overrun needs to be fitted. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.60)

Drinking water
Drinking water should be available within the open space. The access should be low enough for wheelchair users and the use of the tap should be possible from a seated position. A simple self stopping water tap should be fitted and a space for putting cups or jugs down should be provided. (Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) p.60)

Taps
Water is required for watering and cleaning of the open space. Rain water is best for watering plants and is, from an economic and ecological point of view, the best solution. Water buds can be easily connected to pipes. Taps can be fitted onto the building itself (850mm above ground) or below ground level. Higher platforms for watering cans make it easier for tenants for filling them.

Management and maintenance

There is no such thing as "no maintenance". All buildings and spaces intended for use need regular care and attention. However, maintenance can be significantly reduced by considering options and choosing appropriate materials and planting based on the site specific requirements, for example cut grass in close proximity to building(s), maintained meadow areas away from the building(s) and the use of appropriate mulch for planted areas to suppress weeds and retain moisture. Investment in good maintenance will pay off by increased use, tenants, who feel well-cared for

and appreciated, as advertisement to visiting family members and friends and future clients.

Budgets - Less is more if well maintained
It is more effective to focus on improving a few spaces at a time and be able to look after these, rather than creating and installing lots of different elements and running out of budget to keep these in order. The main obstacle is the distribution of funds. Capital money is usually more readily available than revenue funds. To improve the quality and durability of external spaces it is crucial to address the imbalances of available budgets and to ring-fence monies for future maintenance.

Areas to be considered:
Hard surfaces
Surfaces such as pathways, steps and patios need to be kept in a condition that enables a safe use. They need to be brushed, washed and if required treated to keep them algae- and moss-free to ensure slip resistance. Joints in paving might need weeded or refilled.

Seeded finishes:
Grass
Very low installation costs, but needs regular cutting and fertilising. Once a year grassed areas should be spiked or aerated to remove moss and thatch and to allow air, water and nutrients to penetrate the grass roots. It can be difficult to establish grass in shaded areas. Shrub planting might be a more cost effective long-term solution. However a special grass mixture and increased maintenance might help.

Meadow
Grasslands or meadows have become increasingly popular over the last couple of years based on the assumption that they require little or no maintenance. Indeed they only require one annual cut (either spring or autumn depending on the mix of species used). However, meadows only unfold their beauty when used in bigger areas where a pattern of species is recognisable (a field of poppies, rather than the odd poppy at a road verge). Small areas treated with meadow seeding tend to look unkempt, overgrown and derelict. Meadows prefer poor soils, hence all airings should be removed in order to keep nutrients low.

Bedding plants
Bedding plants are the most labour intensive type of planting and need regular weeding, fertilising, watering and seasonal replanting.

Herbaceous planting/Perennials
Depending on the combination of species perennials can be extremely low maintenance. Perennials can be combined to compliment each other not only aesthetically, but also based on their social compatibility. If this is achieved the planted area should be almost self sustaining once established. A designer specialised in low maintenance perennial planting should be consulted to achieve the best results.

Mulch or gravel should be used to conserve soil moisture and suppress weed growth.

Shrubs and trees
Shrubs and trees should receive an annual maintenance cut removing dead or diseased branches. Shrubs can also receive an invigorating cut. However, shrubs should be treated as individuals with different requirements. Cutting all shrubs to the same height won't benefit the plant as it doesn't remove all dead, diseased or aged branches. It will, however, have the opposite effect creating a bland and uninspired environment. There are some exceptions to the rule – hedges or areas in which the same species have been used can cope with the same cut throughout. Mulch or gravel should be used to conserve soil moisture and suppress weed growth.

Fences/walls/boundary elements
The boundary represents the property to the outside world and should always be kept in good and attractive order. Walls should be inspected on an annual basis, missing copes replaces and joints re-pointed where required. Fences should be repainted at least every 5 years. The choice of finish is important for future maintenance works. Metal fences for example can be treated with an extremely durable metallic rather than a polyester based powder-coating system, which does not need treatment upon installation.

Water features
Water can provide a great source of pleasure. Water features require regular maintenance, replacement pumps and filters, inspection and cleaning. Depending on the design, the channel or base of the feature might need cleaning and brushing.

Maintenance schedule
An annual maintenance schedule should be drawn up specifying what needs to be done in each season and implemented with a ring-fenced budget. As indicated above, choosing suitable planting and finishes can have an enormous impact on the time and money required for maintenance. If designed carefully even a variety of different plants such as perennials, grass, meadow and shrubs for different spaces and experiences can be established without increasing maintenance costs. Larger areas with low maintenance requirements, for example a meadow can make small corners of high end planting such as at the entrance affordable and might help to get away from monotone and expensive grassed areas.

Illustrative example of costs per 100sq.m for different planted areas based on information provided by Fife Council (2014):

Grass maintenance (16 occasions per year)	£40 per visit
Meadow (For one cut and rake off at end of season; cut depends on growth)	£75–100
Bedding plants (Prepare/plant and maintain)	£1,250

References 5.0 Design Guidance: External Spaces

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Wulf, H. (2008) 'Wohnen mit Zukunft', In Rau, U. (ed.) Barrierefrei - Bauen für die Zukunft, Bauwerk Verlag.

Figure 37
Image credit: INCH Architecture

Figure 38
Image credit: INCH Architecture

Figure 39
Image credit: INCH Architecture

Design Guidance: Transitional Spaces

In its simplest form, the transitional space has the principal function of facilitating the transition between the inside and outside. However, as an architectonic tool, it also has the important task of acting as a buffer zone, providing shelter and a place to pause before leaving the comforts of the indoors.

The well designed transitional space will provide an opportunity to 'break-out' from the inside world, to observe, to gain confidence or readjust to the change in temperature. It should encourage movement and interaction with the outside world and provide a safe, pleasant and convenient route to the outside. As such, the transitional space plays an important role in ensuring barrier-free access to external space and consideration should be given to the design of transitional spaces in relation to their role, the existing context and the relationship between the inside and outside spaces, which it will connect.

Access

"All buildings should be designed and constructed so as to permit safe, convenient and unassisted access by all occupants and visitors." (mandatory standard 4.1: Access to buildings, BSTH)

Accessible entrance

Each common entrance to a domestic building and at least one entrance to a dwelling should be an accessible entrance. An accessible entrance to a building should:

- have an unobstructed entrance platt of at least 1.2m by 1.2m, with a crossfall of not more than 1 in 50, if required to prevent standing water and
- have a means of automatic illumination above or adjacent to the door and
- have an accessible threshold and
- have a door leaf giving a clear opening width of at least 800mm in accordance with the diagram below and
- if fitted with a door closing device, be operable with an opening force of not more than 30N (for first 30º of opening) and 22.5N (for remainder of swing) when measured at the leading edge of any door leaf and
- if not a powered door, have an unobstructed space to the opening face of the door, next to the leading edge, of at least 300mm.

Figure 40

Image credit: INCH Architecture

Figure 41

Image credit: INCH Architecture

Accessible threshold

All entrance and external doors to a dwelling and all communal entrance and external doors should have an accessible threshold, including doors to balconies and roof terraces.

An accessible threshold should have an overall maximum change in level of 15mm. Slopes on sills supporting the threshold should not exceed 15 deg (running away from the door).

If the internal floor level is more than 15mm from the top of the threshold, an internal transition strip may be used where the angle of the transition strip does not exceed 15deg.

Two effective methods of providing an accessible threshold at an external entrance whilst ensuring effective surface water management are illustrated in figure 43, 44 and 45.

The installation of a linear drainage channel with narrow throat provides an effective surface water drainage system at the junction of the level threshold and external ground levels. The narrow throat of the drainage channel helps prevent items such as leaves and waste getting trapped in the drain.

The installation of a mild-steel grating level with the threshold also provides an effective method of surface water drainage as the external ground level is below the threshold level.

The grating provides a permanent, solid platt at the point of entry.

External level landings

An unobstructed level access platt of 1.5m x 1.5m should be provided to each common entrance.

An unobstructed level access platt of 1.2 x 1.2m should be provided to each individual dwelling. (Figure 42)

A crossfall of not more than 1:50 can be provided to prevent standing water.

Doors

Doors to transitional & garden areas should be designed to maximise light whilst maintaining a degree of privacy to those inside.

When designing an access door, either for a new door opening or replacing an existing, the following should be considered:

- The performance and role of the door in the event of a fire. For example, does the door form part of an escape route and is it required to be fire rated or fitted with fire escape ironmonger?
- The direction of the door swing. This can be determined by many factor such as; the fire evacuation requirements of the room or circulation which the door serves; internal floor area, orientation, exposure & weathering.
- The location of the door relative to its context
- The clear opening width. (For refurbishment projects this is often determined by the existing structural opening width)
- The extent of glazing.
- Performance and specification of the glass.
- Door material & finish
- Ironmongery & automatic opening requirements

Figure 42

Image credit: INCH Architecture

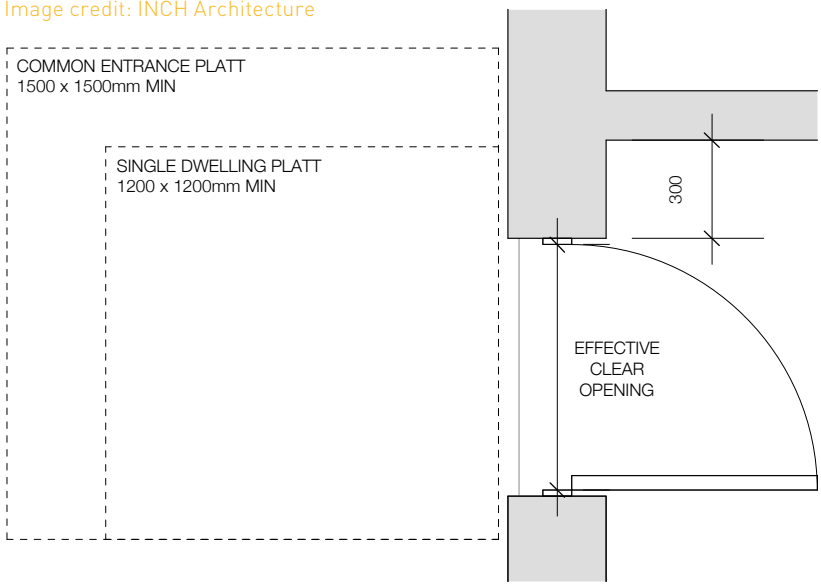


Figure 43

Level access threshold - mild steel grating 1

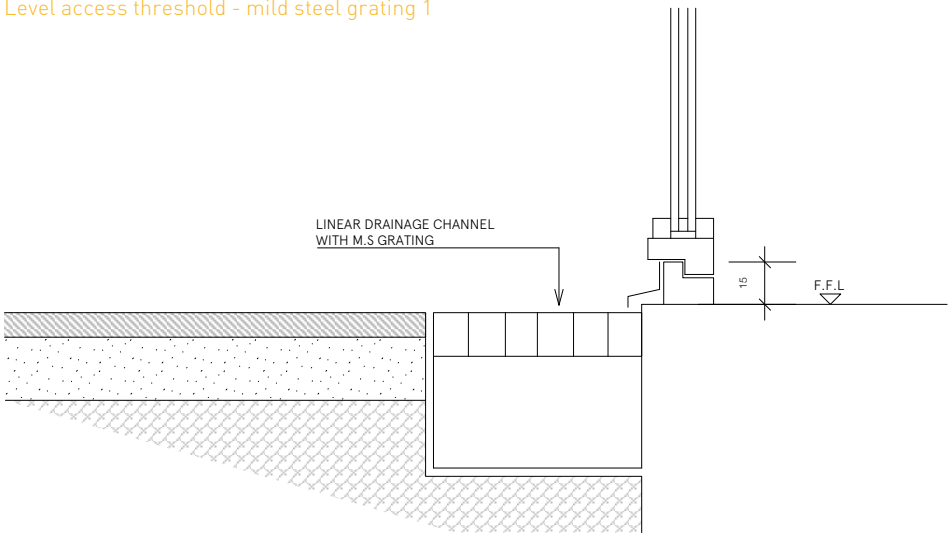


Figure 44

Level access threshold - mild steel grating 2

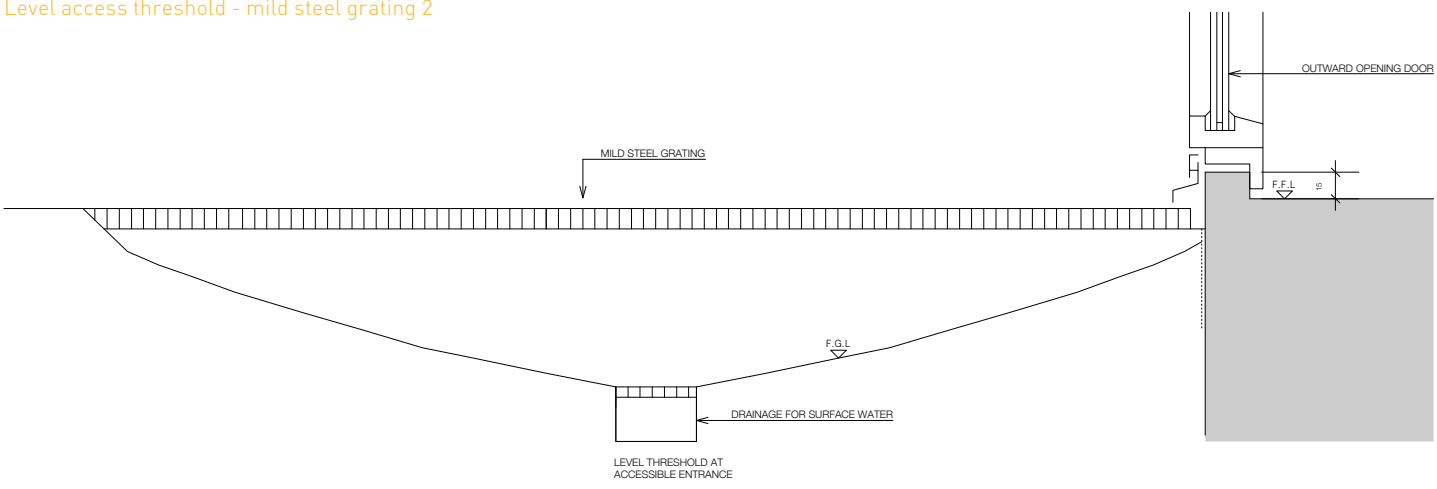
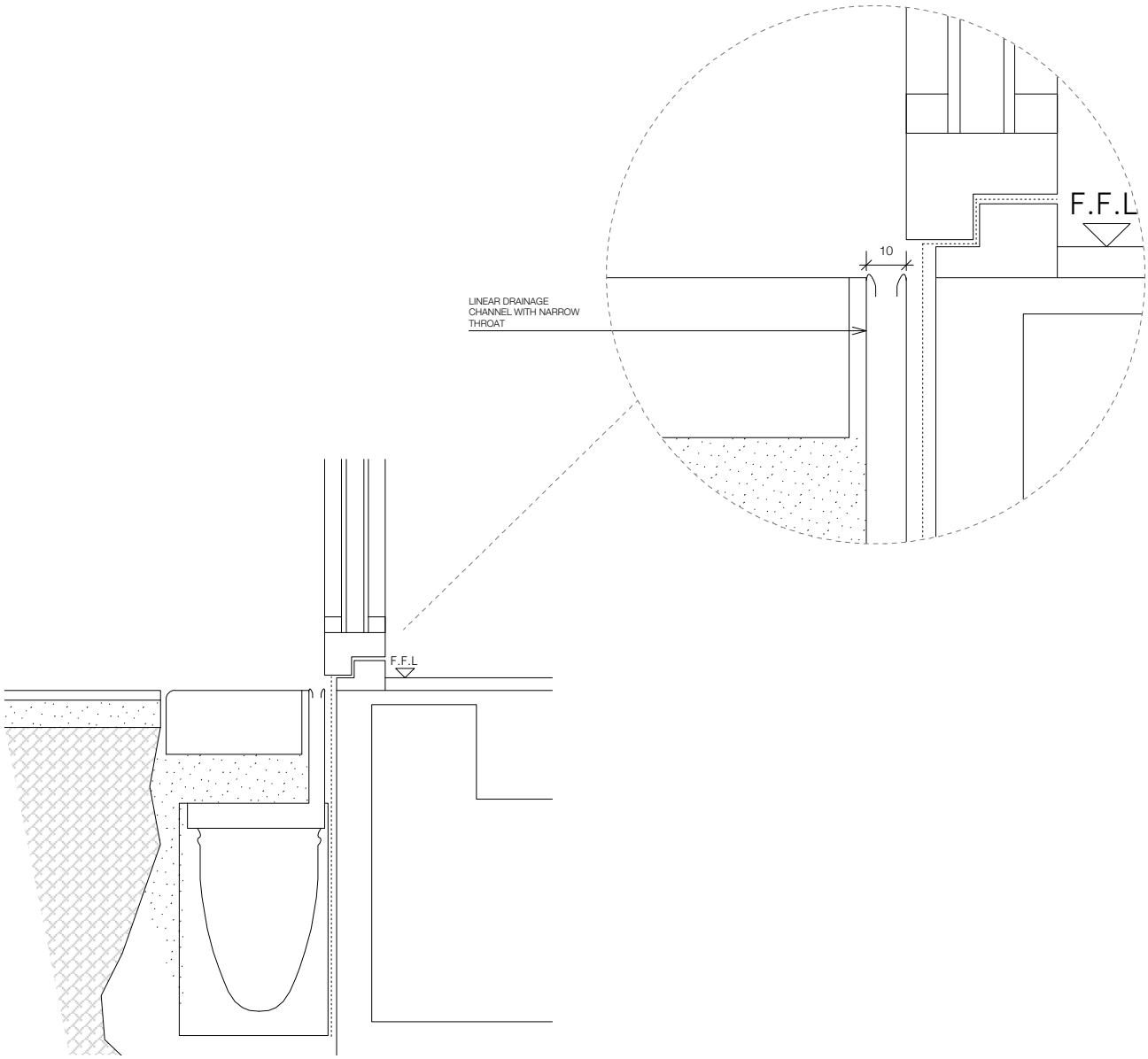


Figure 45

Level access threshold - linear drainage channel



- Integration of existing secured entry/assistance call systems
- Visual contrast of the door, it's frame and ironmongery

An accessible door should have a minimum clear opening width as outlined in figure 47 However, it is considered better practice for all doors to provide a minimum clear opening of 900mm. This will ensure passage of a wheelchair.

For external door applications, care should be given to ensure weather bars or seals do not restrict the clear opening beyond the recommendations.

An unobstructed space of 300mm should be provided next to the leading edge of the door to the opening face of the door on the latch/pull side. However, wheelchair users unable to lean forward will require to manoeuvre their chair alongside the door. Therefore it is considered better practice for an unobstructed space of 550mm to be provided instead.

Where it is not possible to provide an unobstructed space due to the constraints of the existing building, it is recommended that a power assisted door opening mechanism be installed and activation pad located at a suitable distance from the door to permit unobstructed opening of the door leaf.

It is generally recommended for access doors to gardens and amenity spaces such as balconies to be fully glazed. A fully glazed door permits the greatest amount of light to penetrate a room and also offers clear views from a seated or lying position.

Consideration should be given to manifestation, glass performance and specification.

In circumstances where the fire escape strategy requires panic-bar ironmonger to be fitted to the door, a fully glazed door may not be considered appropriate or practical.

In all applications, a door should be designed to visually contrast with it's context.

Visual contrast is defined as a difference of 30 between the Light Reflectance Values (LRV) of two surfaces or finishes.

A door should visually contrast with:

- the wall in which it sits or architrave
- the door ironmongery
- the face of the door and its leading edge

Where the existing structural opening width is larger than a single door it is preferable to install a 'penny-farthing' door arrangement as opposed to a double door with equal door leafs, if the width of one of the single leafs is less than the effective clear opening recommended.

In a penny farthing arrangement the smaller leaf can be opened as needed to permit larger mobility vehicles or wheelchairs to pass.

Figure 46

Image credit: INCH Architecture

Effective clear opening width

All communal entrance doors to and from an external area should have a minimum effective clear opening width of 800mm or 825mm depending on the direction and width of the approach to the door.

All entrances to a dwelling should have a minimum effective width of 800mm.

For older people housing it is recommended that a minimum effective clear opening width of 900mm is achieved to enable unobstructed passage of mobility frames and wheelchairs.

Ramps

Housing developments designed prior to the introduction of the Disability Discrimination Act 1995 were rarely designed to provide accessible entrances. However with the introduction of the Equalities Act 2010 & the inclusion of accessible entrances within the Building Technical Standards for Scotland, it is now mandatory that an accessible entrance is provided to all buildings and every dwelling.

To provide barrier free access to daylight spaces such as gardens, balconies or terraces, it is therefore considered essential that an accessible entrance is also provided to all entrances providing access to the outside.

A ramp by the definition of the technical standards is a surface with a gradient of 1:20 to not more than 1:12. A gradient of less than 1:21 is not considered a ramp.

A surface with a gradient of greater than 1:12 is considered too steep to negotiate safely and is not recommended.

Figure 47

The required minimum clear opening widths are as follows:

Minimum corridor width at door	Minimum clear opening width (mm)[1]
1500	800
1200	825[2]
900[3]	850[2]

1. The projection of any ironmongery that extends across the width of a door leaf should be subtracted when calculating the clear opening width.
2. The clear opening width may be 800mm where a door is approached head-on
3. A corridor width of less than 1.2m is not permitted within new buildings but may be found within some existing buildings.

Figure 48

A pedestrian ramp should be constructed in accordance with the following table:

Minimum gradient of flight	Maximum length of flight	Maximum rise of flight
1 in 20	10 metres	500mm
1 in 15	5 metres	333mm
1 in 12	2 metres	166mm
More than 1 in 12	Not recommended	Not recommended

The maximum flight length can be interpolated as follows:
3m long for a gradient of 1:13, 4m long for a gradient of 1:14 etc.

The effective width of a ramp should be designed relative to the intensity of its use and whether it forms part of an escape route.

However, it is recommended that for people with limited mobility who may use mobility aids or be assisted to walk, the minimum effective widths are as show in figure 50.

A clear, level landing should be provided at the top and bottom of each ramp flight and be constructed to meet the following requirements:

- Permit manoeuvring of a wheelchair without the need to obstructing passage or the need to encroach onto a ramp flight
- Have an effective width not less than the effective width of the ramp
- Have an unobstructed length of no less than 1.5m (1.8m if the entire ramp flight is not visible from either the top or bottom of the ramp
- Be clear of any door swings

Where the overall change in level of the ramp is less than 600mm a handrail need only be provided to one side. However, it is recommended in older people housing, where tenants may have limited mobility, that a handrail is provided to both sides

A handrail to a ramp should be provided at a minimum height of 840mm above the pitch of the flight and should continue 300mm beyond the flight length.

Figure 49

The minimum required effective width (distance between handrails) of a ramp should be in accordance with the following table:

Location of ramp	Minimum effective width (between handrails)
Serving an access to a single dwelling	1 metre
Serving a communal access	1 metre
Serving a communal access which forms part of an escape route	1.2 metres

Figure 50

The minimum required effective width (distance between handrails) of a ramp for people with limited mobility, should be in accordance with the following table:

Location of ramp	Minimum effective width (between handrails)
Serving an access to a single dwelling	1.1 metre
Serving a communal access	1.2 metre
Serving a communal access which forms part of an escape route	1.5 metres
Serving a communal access which permits 2 wheelchair users to pass	1.8 metres

Windows

Windows within the principle living space should have glazing that starts no higher than 800mm above the finished floor to allow seated people a view through the window.

In an existing development, where this is not the case existing window cills can be dropped to increase the daylight opening and provide views from a seated or lying position.

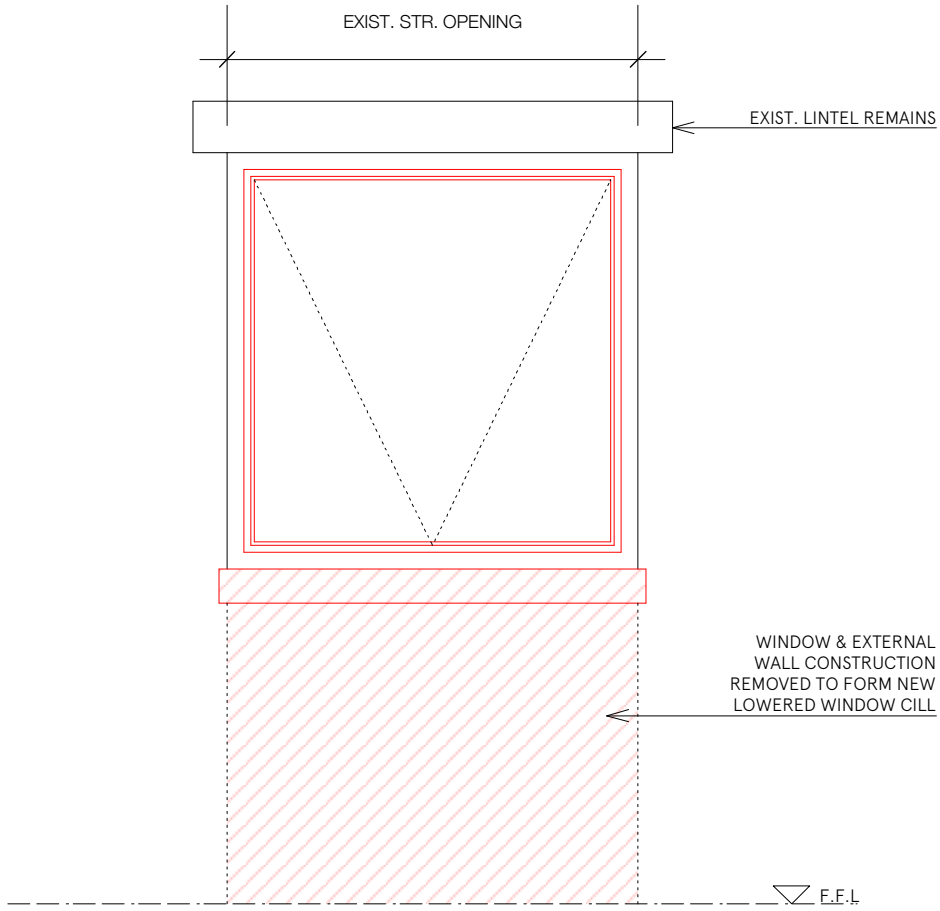
This is beneficial for less mobile tenants who are not able to access outside space but who can participate in the enjoyment of watching those activities outside.

A maximum cill height of 600mm–800mm provides a good view from a seated position.

A cill height of 450mm above the floor level provides a good view from a lying position and for upper level apartments, it will provide a view downwards towards the garden or street level (Figure 65 & 67). A 450mm cill height is also at convenient height to double as a window seat, if detailed to provide depth to the cill.

An unobstructed view should be provided at eye-level. When considering the average eye level while seated (refer anthropometric diagrams in section 1) a clear zone of 1200mm above the finished floor level is desirable. (See figure 67).

Figure 51



Where an unobstructed view cannot be achieved due to transom locations or balcony balustrades, these items should be positioned at least 400mm in height away from any other visual obstruction. (See figure 67).

It can also be desirable to have a full height window which will permit a greater level of daylight to enter a room and provide an unobstructed view out.

Consideration should be given to full-height glazing in terms of manifestation and providing sufficient space for curtain rails and mounting of blinds. (See figure 69).

For all windows, ensure an appropriate level of natural ventilation can be achieved by providing opening-lights. Consideration should be given to the position and effective opening area of an opening light to ensure an unobstructed view can be achieved and to mitigate causing any obstructions to the outside. Examples of window opening light arrangements are provided in figure 67.

In respect of the above recommendations, glazing should be designed to resist human impact where all or part of the window is within 800mm from the finished floor level.[1]

Manifestation is required to glazed screens, partitions and doors and the design of this should be carefully considered to provide both privacy, light and remain clearly visible.

Manifestation should be provided within the zones of 800–1000mm & 1400–1600mm above the finished floor level.

Loggia

A loggia is a gallery at ground level open on one side to the outside and supported on a series of columns.

The loggia as an architectural feature was commonly constructed in Italian renaissance architecture, however recent new-build older people housing developments have reintroduced the loggia as a transitional space between the lounge and outside gardens.

Retrofitting a free-standing loggia to an existing development, along with a terrace above would provide an effective outdoor space that can be used throughout the year.

Lobby

A lobby can provide a buffer zone to shelter from the external elements. It can also help reduce heat loss if one door is permitted to close before the opening of the next.

Any lobby at the entrance to or within the communal areas of a domestic building should allow a person to pass clear of any door swings (See figure 54).

Figure 52

Image credit: INCH Architecture

Figure 53

Image credit: INCH Architecture

1 Additional requirements for glazing which should resist human impact are outlined in BS 6262: Part 4 & should be considered when designing.

Sunspace

A sunspace is an unheated glazed area located out with the insulated fabric of the main building. It is a form of passive solar design. The space naturally heats & cools, depending on outside temperatures, allowing daytime temperatures to rise higher and night time temperatures to fall further than the inside temperature and levels of isolation of adjoining rooms.

The addition of a sunspace to an existing development can realise significant health benefits and gains in energy efficiency, although this is dependent upon location, orientation, latitude, construction and forms of linkages to interior spaces.

Sunspaces function as an intermediate space between the inside & outside of the building. By adding another layer to the building envelope, it acts as a thermal buffer. The sunspace also shelters the building fabric from wind chill and rain, which is beneficial in northern or exposed locations.

When the temperature of the sunspace becomes sufficiently comfortable it provides an additional amenity space/garden room for tenants, offering views and access to daylight/direct sunlight without having to leave the home. This is particularly beneficial for tenants with limited mobility and elderly tenants who's lifestyle is often sedentary.

The length of time when this opportunistic amenity is available can be significantly extended through considered use of thermal mass in construction materials and finishes.

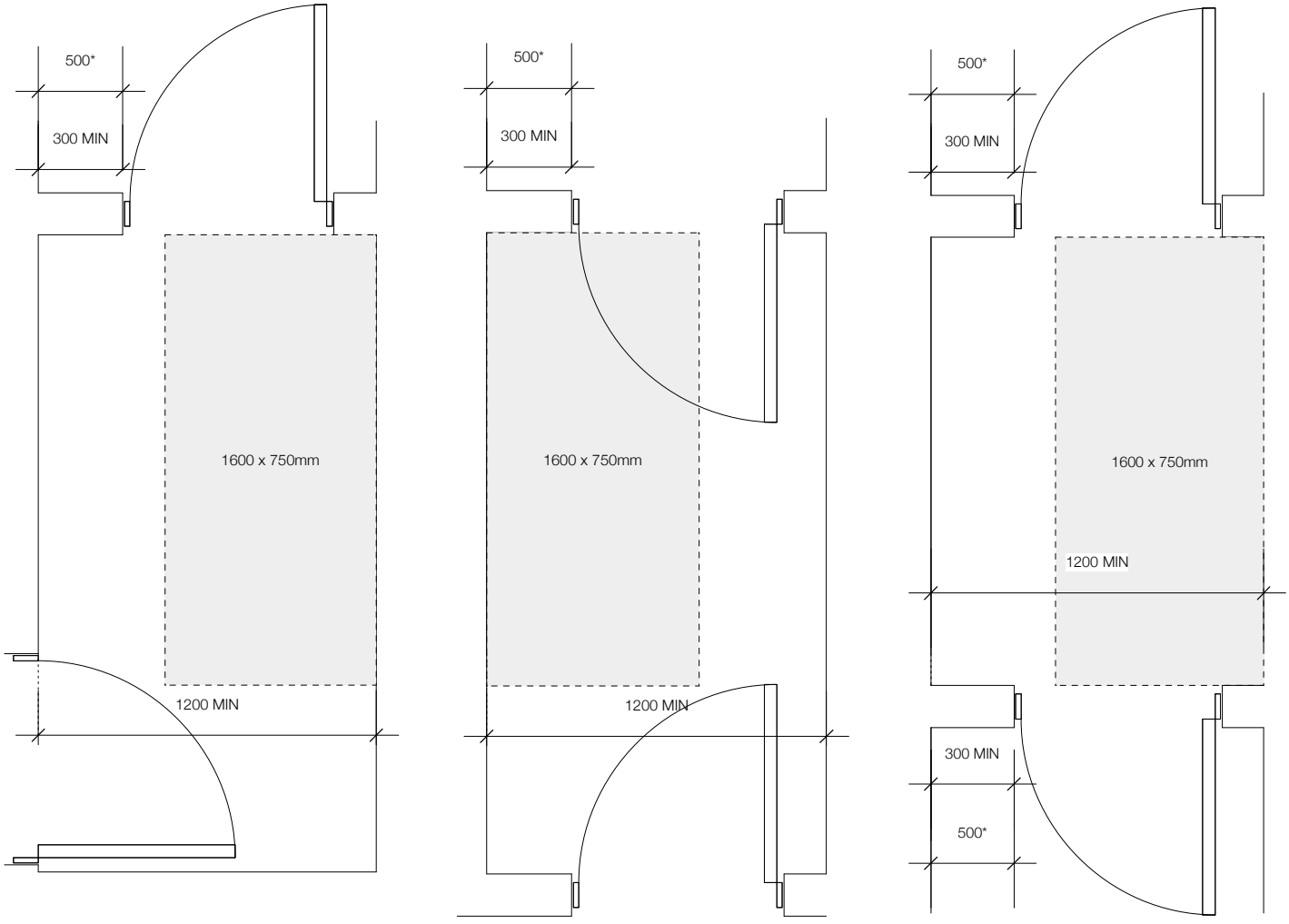
The design and subsequent benefits of a sunspace can vary and these are dependent upon it's application, orientation, integration with the insulated envelope of the building and any additional mechanical or passive design feature.

The design of the sunspace should be considered in relation to site conditions and the overall building design, and this should be discussed with the design team and modelled for it's resultant efficiency early into the design development.

Beyond the empirical assessment of efficiency it is also important to realise that the successful design and integration of sunspaces into residential projects provides health and wellbeing benefits which are less easily quantified but which can have qualitative impacts of equal or greater importance.

The recommended design of accessible lobbies are provided on the next page:

Figure 54
Accessible lobbies



Balconies

An outdoor space near to or directly accessed from a dwelling or communal lounge is especially important for older people and those with restricted mobility.

Although, not commonly used in housing for older people, the introduction of balconies to housing projects throughout Scotland has seen an increase.

A review of European examples of older people housing indicates balconies are considered an integral part of the building fabric and a necessary amenity space for older tenants. In fact, similar to UK accessible adaptations European counterparts are implementing alterations to existing dwellings for the provision of level access thresholds to external balconies.

The balcony or roof terrace is an enabling space. They provide a safe secure place to; enjoy the physical and psychological benefits of being exposed to daylight; to experience the seasons and; to observe life outdoors.

Providers of housing for older people may face opposition or reluctance by family members & care providers with regards to the safety of frail & vulnerable tenants on a balcony or roof terrace. An individual personal needs and risk assessment of each tenant would determine any true risk.

A communal balcony retrofitted to an existing development can provide an additional external amenity space on an upper level. The structure of the balcony will also provide a covered and shaded area beneath, which could benefit communal areas on the lower level.

Retrofitting private balconies to individual dwellings would provide a much sought after amenity space, improving the quality of life of the tenant.

Recent good practice design guidance suggests that a private balcony accessed directly from a tenants apartment can help increase an elderly persons independence.

There are several construction methods for retrofitting balconies to existing buildings and some leading window manufacturers offer a 'bolt-on balcony service'.

Two appropriate methods of retrofitting balconies to existing buildings are noted below:

- A built-on free-standing balcony which is anchored to the existing facade.
- A cantilever balcony which is suitable where foundations are not an option due to site constraints.

Figure 55

Image credit: INCH Architecture

Figure 56

Image credit: INCH Architecture

The design of any balcony should take into consideration the following:

- The size of the balcony will be dependent upon the number of people who will be using the balcony at any one time and the activities that will be possible. A projecting balcony should have a manoeuvring space of at least 1.5m
- The aspect & orientation of the balcony to maximise exposure to sun. A south facing balcony will receive the most direct sunlight and an east facing balcony will benefit from morning sun.
- Shelter from rain & wind
- Views & optimising the outlook with a good balustrade design
- The flooring should be level, non-slip, well drained but does not allow water to pass through the balcony below and be easy to clean and maintain

Juliet balconies

Juliet balconies are flush fitting balustrades with a full height, inward opening door. They provide an opportunity for increased light and ventilation into the room but do not provide any additional amenity space externally.

Juliet balconies are an economic alternative to projecting balconies and with an appropriately designed balustrade, will increase visibility and reinforce the connection to the outside.

Balcony balustrades

The design of a balcony or roof terrace balustrade is key to ensuring the safety whilst also maximising the overall pleasure of enjoying the balcony. A well designed balustrade can provide a place for planting, a clear unobstructed view from sitting and a ledge to lean on and feel supported.

There are a number of balustrade configurations and the final decision on design and material will be dependent upon the overall construction. However a balustrade to a balcony or roof terrace should be constructed to meet the following requirements:

- Be at a minimum height of 1.1m from the finished floor level.
- Provide an unobstructed view from 600–900mm
- Avoid horizontal supports which can provide a foothold

Figure 57

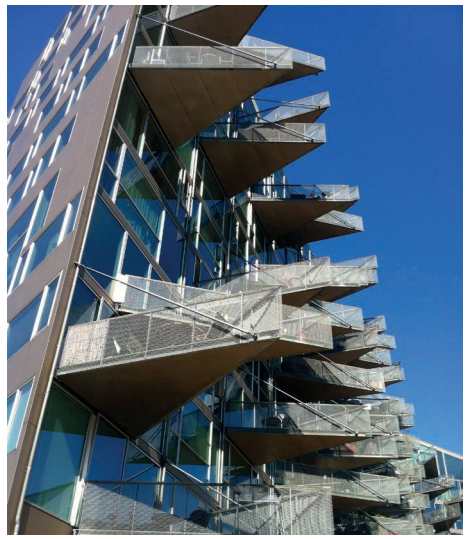
Image credit: INCH Architecture

Figure 58

Image credit: INCH Architecture

Figure 59

Image credit: INCH Architecture



Roof terrace

A roof terrace provides the same benefits of a balcony and it's design in relation to balustrade, finishes and orientation are similar.

Opportunity exists for a roof terrace to be constructed where there is an existing single storey flat roof, with the potential to be accessed from an upper level.

A structural survey should be carried out to ascertain whether the existing structure is suitable to support the additional loads of the roof terrace. If the existing structure is not suitable to take any additional load, an independent steel frame construction could be installed which sits outside of the existing building and therefore minimising the overall disruption.

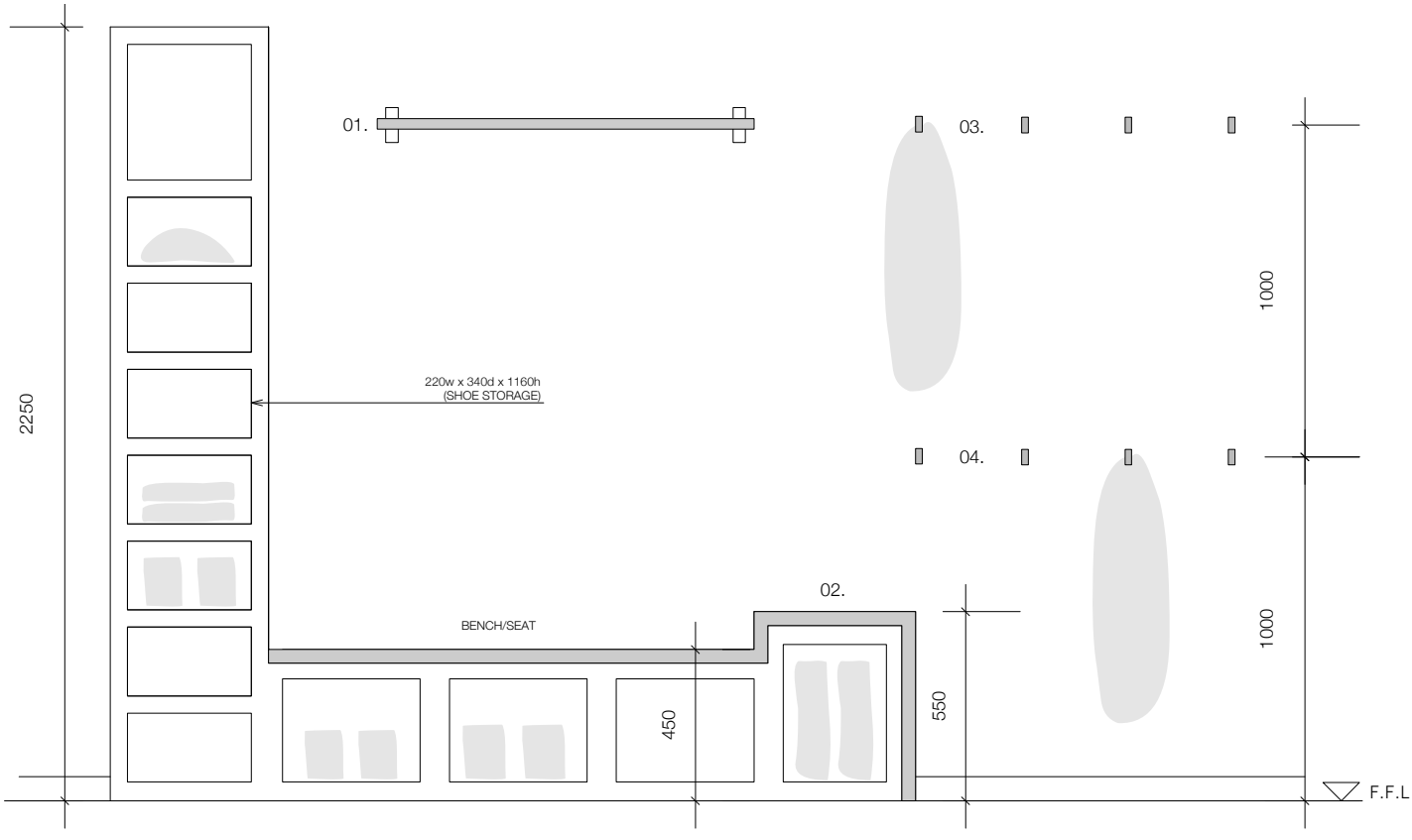
Transitional storage

It is important when designing transitional spaces to include for the design of a storage area adjacent to the entrance or exit for ease of access. This area should allow for sufficient storage of items such as blankets, coats and outdoor shoes. Storage adjacent to transitional spaces could include:

- Coat hooks (at a variety of heights to suit all users)
- Shelving for blankets (for use when sitting outside)
- Shelving for shoes (at a variety of heights to suit all users and prevent excessive bending down
- A seated area for putting on shoes
- An umbrella stand
- A heat source

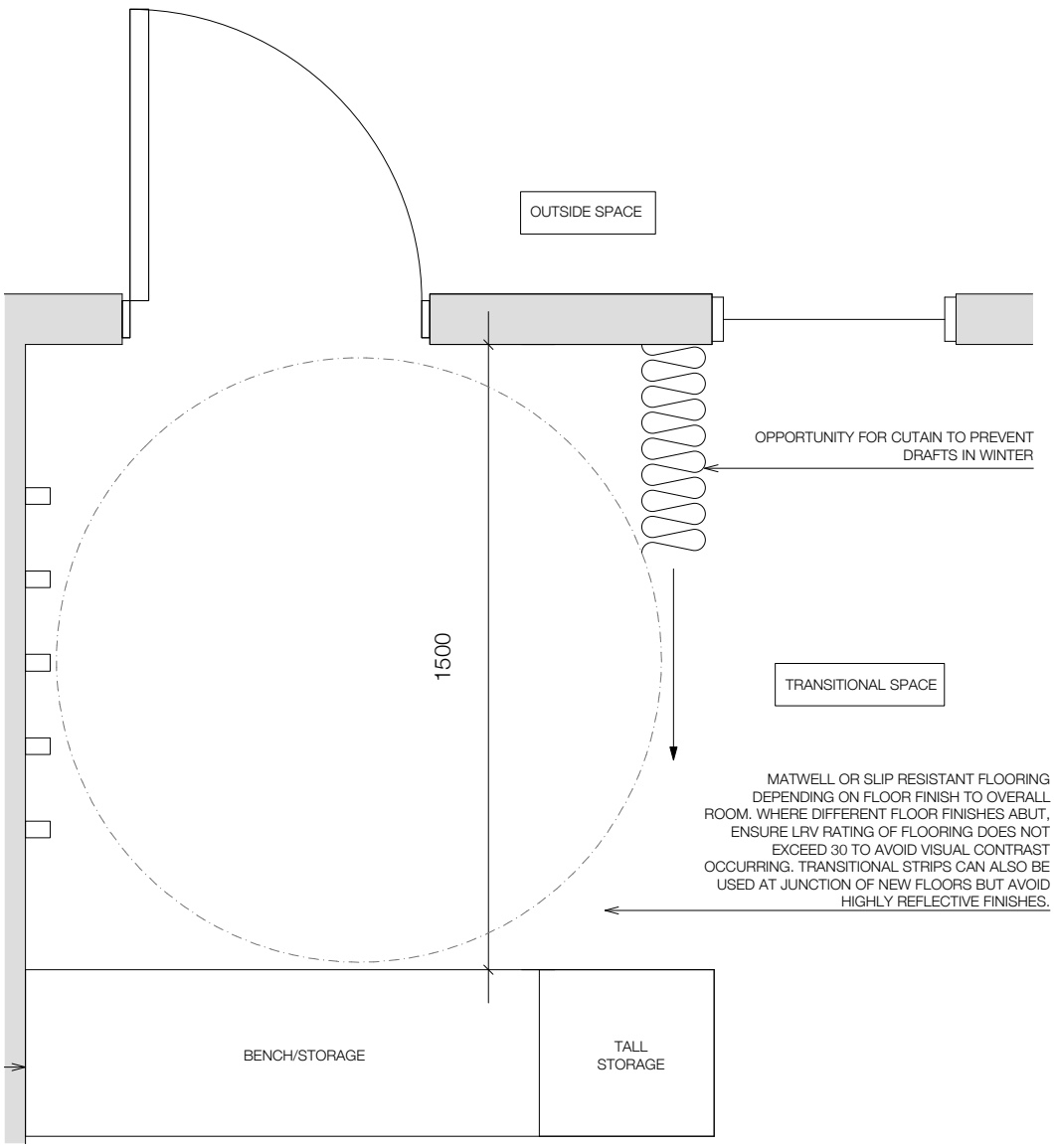
Figure 60

Transitional Storage



1. When providing shelving at high level, ensure easy access can still be achieved.
2. A Raised seat height can be helpful where tenants mobility is restricted.
3. Coathooks provided at heights (1000mm AFFL & 2000mm AFFL) ensure the floor area is kept clear below coathooks to ensure mobility-aid users and wheelchair users can get access

Figure 61


OUTSIDE SPACE
OPPORTUNITY FOR CUTAIN TO PREVENT DRAFTS IN WINTER
1500
TRANSITIONAL SPACE
MATWELL OR SLIP RESISTANT FLOORING DEPENDING ON FLOOR FINISH TO OVERALL ROOM. WHERE DIFFERENT FLOOR FINISHES ABUT, ENSURE LRV RATING OF FLOORING DOES NOT EXCEED 30 TO AVOID VISUAL CONTRAST OCCURRING. TRANSITIONAL STRIPS CAN ALSO BE USED AT JUNCTION OF NEW FLOORS BUT AVOID HIGHLY REFLECTIVE FINISHES.
BENCH/STORAGE
TALL STORAGE

Design Guidance: Internal Spaces

Accommodation based services such as sheltered housing have inextricable links to the support being offered. As such, the communal facilities provided and their space requirements are often as a result of the service model being offered and number of occupants.

Communal rooms

The communal room (lounge or dining room) provides a vital space for tenants to relax, socialise, entertain and to connect (visually, socially or physically) to the world outside.

Often, the communal rooms within sheltered housing are single aspect, deep plan spaces (designed to accommodate large numbers of occupants) with domestic sized windows (facing one orientation). Achieving sufficient & consistent light levels throughout the room can be difficult in these conditions and it is recommended that artificial lighting is provided to a uniform level of 300 Lux. This should be supplemented with task lighting near to activity areas or seating, to support tenants in undertaking tasks such as reading.

However, it is also necessary to increase the provision of daylight to these rooms and where possible, to reinforce the connection between the inside and outside spaces.

This can consist of simple, immediate interventions such as how to 'window dress' or larger interventions such as forming new doorways within existing window openings. Where there is not a door providing direct access from the communal room to the outside, existing window cills can be lowered to form a new access to the communal gardens, deck, balcony or roof terrace.

When forming a new doorway within an existing window opening, consideration should be given to the resultant effective width of the opening as there is no guarantee that the original window opening width will be sufficiently wide to permit the passage of a wheelchair or mobility scooter.

The change in level from the internal finished floor level and external ground levels should also be considered and guidance on level thresholds, steps and ramps is provided earlier in section 6.0.

Further guidance is given in section 6.0 on forming door openings within existing window openings.

Where it is not considered desirable to form a new door opening, increased levels of daylight can be achieved by lowering the existing window cill and increasing the effective daylight opening area.

It is worth noting that a nominal drop of 400mm will increase the daylight opening of a typical 1200mm wide window by 30%.[2]

Figure 62

Image credit: INCH Architecture

Figure 63

Image credit: INCH Architecture

2 Based on a window opening area of 1.56m2

Circulation

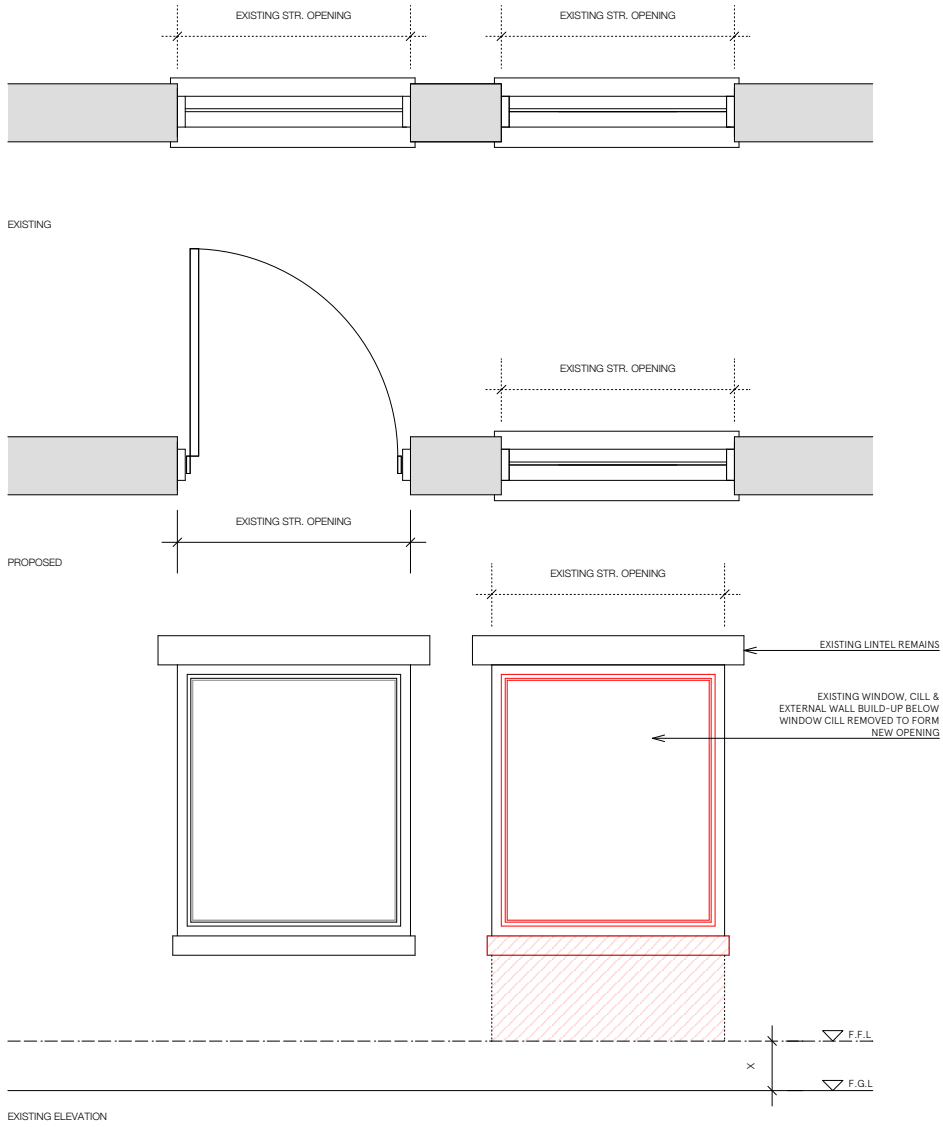
Circulation within multiple-apartment housing developments is often designed to be 'double loaded' ie the apartments are located along both lengths of the corridor. This can be preferable due to the economies of scale and reduction in capital build costs. However, the result is often an internalised circulation route with little or no access to natural light, which can be problematic if artificial light levels are insufficient. Reliance on artificial lighting also requires commitment to maintenance cycle and increased energy costs.

On the upper floor level the installation of a natural daylight system such as a sun-pipe could be utilised to introduce natural light into circulation routes. In addition, some proprietary sun-pipes provide an integrated natural ventilation system, which rely on passive ventilation principles.

Integrating glazed screens into existing partitions provides an effective, alternative methods of bringing borrowed light into internal rooms or corridors. This can also provide a useful method of wayfinding if positioned at a corner junction, thus allowing a view to perpendicular routes.

Figure 64

Forming a new door within an existing opening



Integral blinds can be incorporated into glazed screens to provide privacy as required

Care and attention should be given to ensure the existing fire and smoke integrity of the original partition is maintained and where the partition is full-height, manifestation is required. Integral blinds can also be incorporated into glazed screens to provide privacy as required.

Apartments

For many older tenants their apartment is the place where most of their day will be spent. It is therefore important that every opportunity to increase daylight and increase access to daylight spaces is considered.

It is understandable that a balance should be struck between the disruption of the works to the tenant and the overall benefits which will come as a result.

We have previously discussed the benefits of lowering existing window cills to between 400mm–600mm to increase the overall daylight opening area and subsequent internal light levels.

Where this work is to be carried-out to individual apartments it is recommended that the window cills to both living room and bedroom are lowered to match. This ensures that both principal rooms offer good views from a seated or lying position, should the tenant become confined to bed for any length of time.

In addition this ensures a coherency to the elevation and efficiencies in carrying-out the works at one time.

Opportunity exists for larger structural alterations to be carried-out which will provide increased levels of daylight into an individual apartment. For example, where apartments are altered to provide an open-plan kitchen & living room arrangement as a result of accessible adaptations or to increase activity spaces within the kitchen.

In this scenario the number of windows to overall room area increases. Also, where windows are on opposite walls the room further benefits from becoming dual aspect.

Increasing daylight to ancillary areas such as hallways and bathrooms is also beneficial for improved visibility and reduced reliance on artificial lighting.

Fully glazed doors to principle living rooms and bedrooms will provide borrowed light into hallways. Opaque glass or film should be used for doors to private areas such as bedrooms or bathrooms.

Ancillary accommodation within apartments on the top floor of a development can also be fitted with a natural daylight & ventilation system such as a sunpipe. This will provide increased levels of natural light and ventilation into these areas.

Figure 65
View from lying position

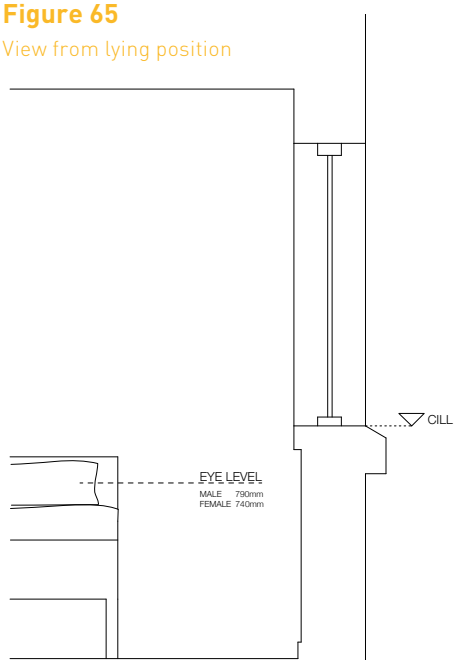
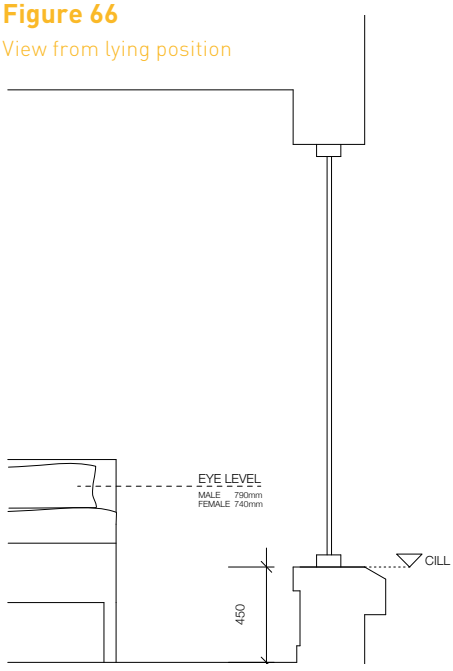


Figure 66
View from lying position



Window dressing

Windows to communal areas are often dressed with curtains or blinds and in some cases pelmets.

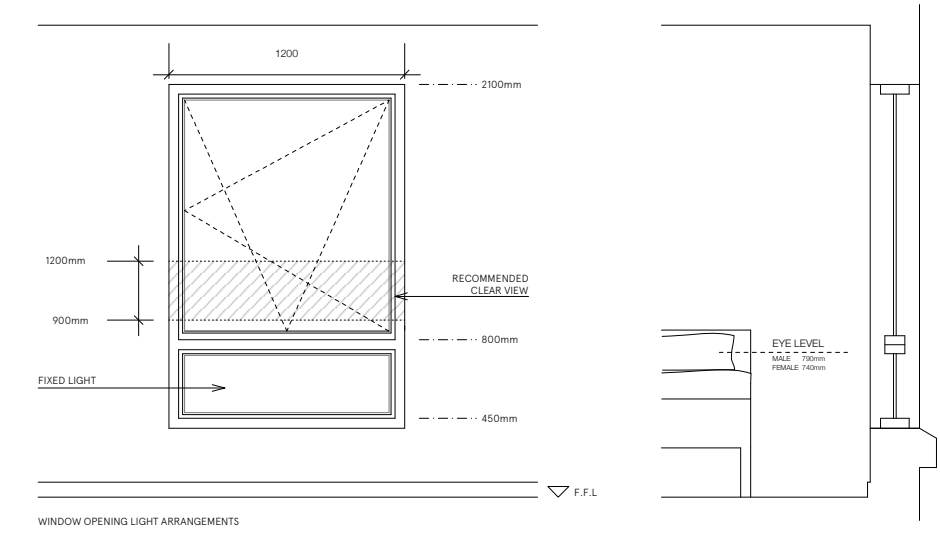
Where curtains are fitted, the curtain track has a tendency to be fitted to match the width of the window and therefore the curtain stack will sit in-front of a portion of the glazed window. The result is a reduction to the overall effective area that light can penetrate through the window, thus restricting the overall light into the room.

To increase the effective daylight opening of any window, it is recommended that curtain tracks are extended beyond the width of the window by the overall stack-back, to enable the curtain to sit fully opened without impeding the glazed area. (See figure 68 & 69).

Pelmets should generally be avoided as these reduce the overall effective daylight area of a window. Where a pelmet is desired, we recommend placing this above the window head to maintain optimum light penetration.

Figure 67

Opening window arrangements to enhance uninterrupted view from seated or lying position



WINDOW OPENING LIGHT ARRANGEMENTS

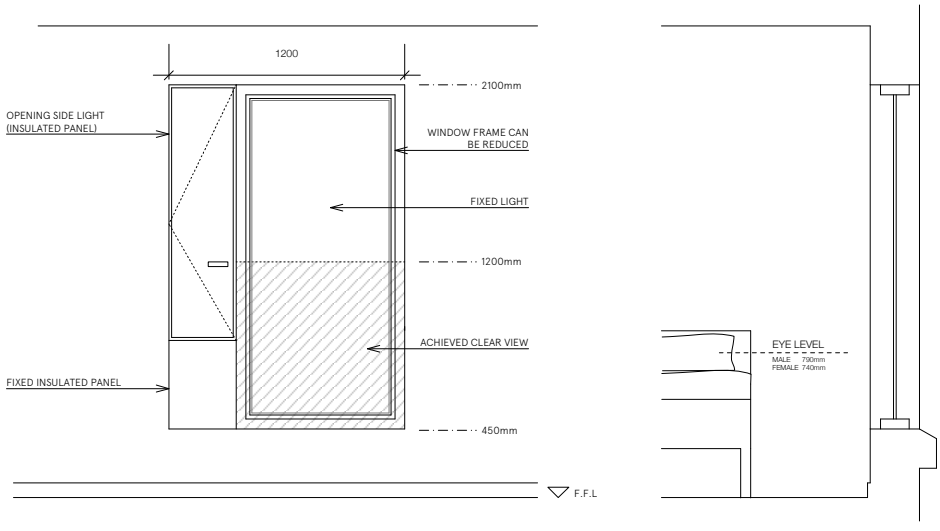


Figure 68

Increasing the effective daylight opening of a window

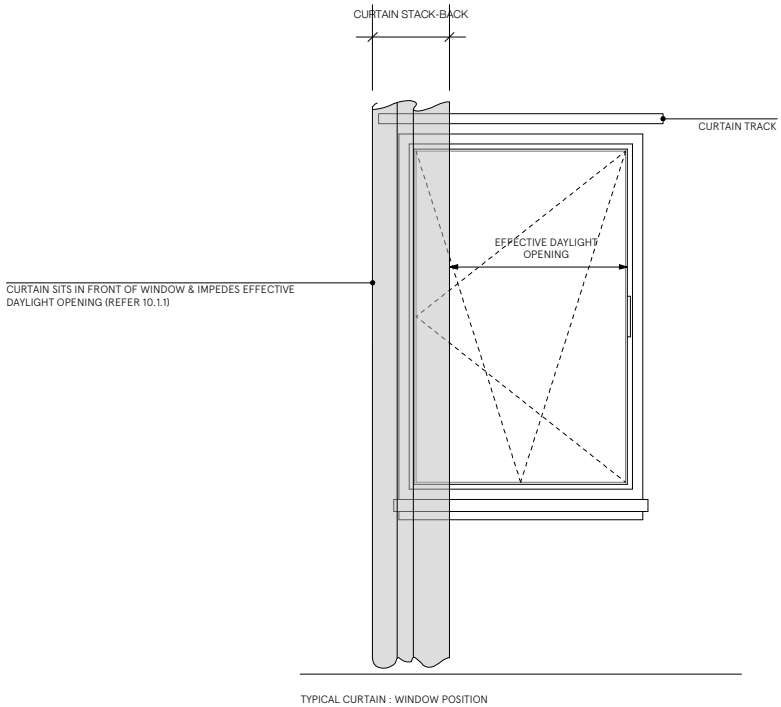
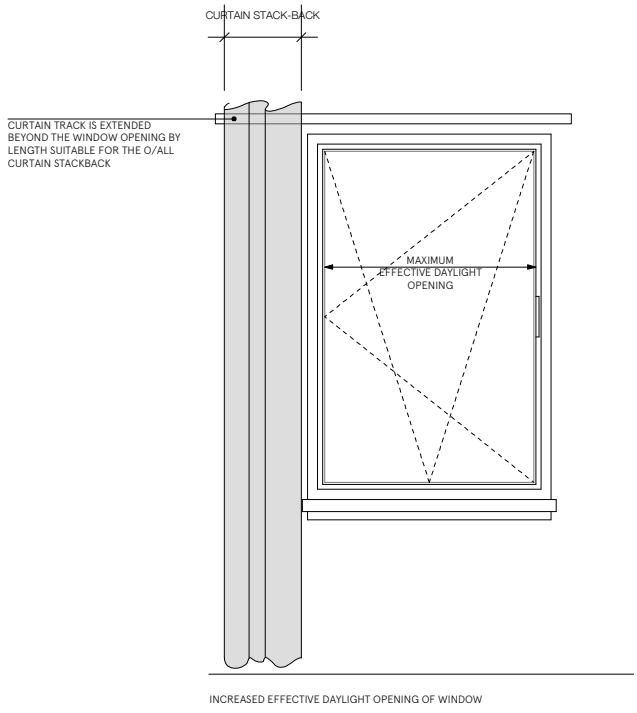


Figure 69

Increasing the effective daylight opening of a window



Toolkit for moving forward

Process for the development of new external spaces

In order to develop an overall design for the external spaces at an existing development this diagram illustrates the process from appraisal, through a vision plan, detailed designs to implementation.

By the end of this stage the following understanding will be gained: the existing layout and features of the external spaces, how they are maintained and whether they are in a good condition, how the grounds are used and viewed by tenants, staff and visitors, and any technical and legal constrains that exists.

Where are we now?

- What do we have?
- How are the external spaces used?
- How do Trust, tenants, staff and non-tenants feel about the external spaces?

Where do we want to be?

- What should the external spaces feel and be like?
- Developing a vision/concept plan for the external spaces.

By the end of this stage a vision plan will be drawn up showing what to achieve, how the external spaces should function and be used and have a budget identified.

How can we get there?

- Solving problems
- Devloping detailed designs

By the end of this stage detailed plans with immediate changes will be developed and the maintenance implications considered. A step-by-step action plan will set out targets and responsibilites to keep the project on track.

Making the changes

- Implementing plans
- Celebrating achievements
- Maintaining the new external spaces
- Using the new facilities

By the end of this stage the external spaces will have been improved.

Reference:

Department for education and skills. (2006) 'designing school grounds', UK: Published by TSO

Appendix A

Statutory Regulations Guidance

British Standards & Guidance

BS 8300:2009+A1:2010 Design of buildings and their approaches to meet the needs of disabled people – Code of practice

This standard provides guidance on good practice in the design of buildings and their approaches so that they are convenient to use by disabled people. The recommendations relate not only to the elements of construction and accommodation which are common to different types of buildings, but also to those that are specific to individual building types.

Housing for Varying Needs, Parts 1 & 2 – Communities Scotland

'Inclusive Mobility' – Department of Transport, 2002

Tree Preservation Order (TPO) Background

Local Planning Authorities (LPAs are required to make appropriate provision for the planning and preservation of trees under The Town and Country Planning Act. Planning Policy Guidance also states that LPAs should seek to protect trees where they have natural heritage value or contribute to the character or amenity of an area.

Legislation UK

- Planning and Compensation Act 2004
- Town and Country Planning (Scotland) Act 1997
- The Town and Country Planning (Trees) Regulations 1999

Purpose

- To prevent the felling, mutilation and harming to the health of a tree or woodland covered by an order unless consent is obtained from the LPA
- Protects selected trees and woodlands if their removal would have a significant impact on the environment and its enjoyment by the public

Types

- Individual
- Groups
- Woodland

Who makes a TPO

- LPA
- Special arrangements exist for National Parks, The Broads, Enterprise Zones and Urban Development Areas (UDAs)

Exemptions to an Order

- Hedges, bushes, shrubs
- Trees in Crown Land (without consent)
- Forestry Authority interest in land (unless consent is obtained)

Exceptions to Obtaining Consent

- Dead, dying or dangerous trees
- Preventing/abating a nuisance
- Trees on airfields/ defence installations
- Ornamental fruit trees and orchards
- Forestry Authority plans of operation
- Trees on/adjacent to Ancient Monuments or churchyards
- Work by a statutory undertaker but nor utility co's (except in certain situations, eg safety)
- Work permitted as part of planning permission

Procedure for Making a TPO

- A TPO must be in the form of the model order contained in the Regulations
- The Order must define the position of the trees, the number, species and location, using an OS map at 1:1250 or 1:2500 for woodlands
- A copy of the Order and map and grounds for it being made is served to the occupiers of the land and also at a place where it can be inspected
- Objections may be made to appropriate authority within 28 days
- Copy of the Order is served to the Conservator of Forest
- LPAs are advised to inform affected neighbours and provide a site notice of the TPO will affect the interest of the neighbourhood

Penalties

- On summary conviction, to a fine up to £20,000 - Magistrates Court
- On conviction, on indictment to an unlimited fine – Crown Court

Source/Copyright:

Vernon, S., Tennant, R., Garmory, N. (2009). Landscape Architect's Pocket Book. Elsevier, UK

Working Checklist

This checklist includes the most common and important elements covering both potentials and challenges. It can be used for analysing existing conditions and potential types of spaces and uses.

Please note that this checklist is not exhaustive and should serve as a sample only.

1.0 Potentials of External Spaces

Item	Description
1.1	Identify which external areas are in the sun/shade (e.g. morning sun, midday sun, afternoon & evening sun, shade all day). According to the sun/shade position which activities are suitable for these areas? (e.g.communal areas or growing spaces in afternoon & evening sun) (refer to '4.0 Design Considerations',
1.2	Identify which external areas are sheltered/exposed to the elements. (this can be through building, fencing, hedges or other planting etc.) Which areas should be sheltered to make them more user-friendly? refer to '4.0 Design Considerations', p.17, within the document)
1.3	Identify viewpoints, landmarks or stimulating views from the external spaces (either within the grounds such as a mature tree or externally such as the steeple of a church). How can these views or landmarks be emphasised e.g for orientation or focus?
1.4	Identify the external spaces that are accessible/ barrier free. Which areas need to be accessible/barrier free? If there are existing steps can they be incorporated f.ex. to encourage light exercise? (refer to '4.0 Design Considerations', p.17, within the document)
1.5	Identify the equipment/furniture that is being provided in close proximity to usable spaces such as chairs, pillows, blankets, cups, games, storage space, tools etc. What else could be provided to make it more comfortable to use the external spaces?
1.6	Identify the suitability and quality of the existing furniture. Is the furniture age and user-friendly? Could it be modified e.g. with trays for cups or books to make it more user-friendly? (refer to section 'Furniture', p.34, within the document)
1.7	Identify areas that stimulate the different senses (sound, sight, touch, smell and taste). Which areas could offer quiet, tactile, scented etc. experiences? (refer to '4.0 Design Considerations', p.17, within the document)
1.8	Identify planting areas which already offer an all year interest and high biodiversity. Which areas could be improved with more attractive, all year interest and higher biodiversity planting?
1.9	Identify spaces that encourage relatives/friends to visit more often such as play equipment, animals, café etc. What could be provided to create a more interesting experience for visiting relatives/friends? (refer '3.0 Types of Daylight Spaces', p.15, within the document)

2.0 Types of External Spaces

Item	Description
2.1	Identify existing different types of external spaces that are offered. (e.g. central communal area, paths, open areas, spaces for observing; refer to '5.0 Types of External Spaces' within the document)
2.2	If none or few different types are offered, which other ones would tenants be interested in having provided?
2.3	The following points identify the quality of the existing types of spaces and give suggestions on how to improve them: (refer to '5.0 Types of External Spaces' of the document for more detailed information)
2.3.1	**Entrance space** Identify what makes this area welcoming and inviting. Is the planting attractive with all year interest and high biodiversity? Is sheltered seating being provided? Is bike parking being provided? Which of these elements need to be improved?
2.3.2	**Central communal area** Identify the current use of this area. Does this area provide sufficient and flexible space for events and bigger groups? Is the seating sheltered and user-friendly? Is the planting attractive with all year interest and high biodiversity? Which of these elements need to be improved?
2.3.3	**Small communal area(s)** Identify which small areas are currently offered and their current use. Does the area offer retreat with screening? Is the planting attractive with all year interest and high biodiversity? Is the seating user-friendly? Which of these elements need to be improved? Which other small communal areas should be offered?
2.3.4	**Path(s)** Identify all existing paths. Where do they lead to/what do they link? Are the existing paths of appropriate gradient, width and have a user-friendly surface? Do they require hand or trip rails? Is seating and/or different areas along path(s) provided? Are additional path links or provision of access to other areas required?
2.3.5	**Open area(s)** Identify all existing open area(s). Can they be used for multi-functional purposes? Is good access provided? Is the planting attractive with all year interest and high biodiversity? Which of these elements need to be improved?
2.3.6	**Gardens/allotments** Are existing growing areas barrier free & accessible? Is seating and equipment user-friendly? What else should be provided to make food growing more attractive for tenants?
2.3.7	**Boundaries** Is the planting attractive with all year interest and high biodiversity? Is the fencing secure and attractive without feeling 'imprisoned' (e.g. no barbed wire). What else can be provided to make the boundary and gates more attractive?
2.3.8	**Separate area(s) for staff** Identify separate area(s) for staff. If none is provided, should there be separate area(s)? How should they be furnished?
2.3.9	**Parking spaces** Identify existing parking spaces (disabled, visitors, staff, drop-off, bike parking). Are parking spaces of appropriate distance to entrances? Are parking spaces located away from bedroom windows? How could cycling to the property be supported? Is there space for vans (e.g. baker, fishmonger, library) to park temporarily to service the property as well as the surrounding neighbourhood?
2.3.10	**Areas for smoking** Identify all existing smoking areas.Are these areas away from entrances and windows in order not to disturb non-smokers? Where should smoking be allowed? Should these area(s) be sheltered and furnished?

3.0 Ramps

Item	Description	Yes	No
3.1	The effective width (between handrails) of a ramp service a single dwelling is 1.1metre or greater		
3.2	The effective width (between handrails) of a ramp serving a main entrance, which forms part of an escape route is 1.5m		
3.3	A clear level landing is provided at the top and bottom of each ramp flight with an unobstructed length of 1.5m and clear of any door swings		
3.4	A handrail is provided to the ramp where the overall change in level of the ramp is greater than 600mm		
3.5	The height of a handrail to the ramp is a minimum of 840mm above the pitch of the flight		
3.6	The handrail projects 300mm beyond the flight length		

4.0 Entrances

Item	Description	Yes	No
4.1	An unobstructed entrance platt of at least 1.2m x 1.2m is provided at the entrance to the dwelling and 1.5m x 1.5m to the main development entrance		
4.2	An external light is provided above or adjacent to the entrance door		
4.3	The entrance door has an accessible threshold i.e. maximum 15mm in height		
4.4	An effective clear width of 800mm is achieved at the entrance door		
4.5	The entrance door is either powered by an automatic door opener or has an unobstructed space to the opening face of the door of at least 300mm		
4.6	Access doors to gardens and amenity spaces are fully glazed		
4.7	The door face visually contrasts with the surrounding wall or frame and ironmongery		
4.8	A lobby at the entrance to or within common ares allows for a person to pass clear of any door swings		
4.9	Sufficient storage is provided at the entrance/exits between the communal lounge, dining etc. for coats, shoes, blankets etc. (not applicable to main entrances to developments)		

5.0 Balconies

Item	Description	Yes	No
5.1	The size of the balcony is sufficient to accomodate the number of people who will be using the balcony (minimum of occupancy of dwelling)		
5.2	A projecting balcony should have a maneouvering space of at least 1.5m		
5.3	The aspect and orientation of the balcony maximises exposure to sun/daylight		
5.4	The balcony provides shelter from rain and wind		
5.5	The flooring of the balcony is level, non-slip and well drained		
5.6	The balcony balustrade is at a minimum height of 1.1m from the finished floor level		
5.7	The balcony balustrade provides an unobstructed view from 600–900mm from the finished floor level		
5.8	Horizontal supports to the balcony are avoided		

6.0 Windows

Item	Description	Yes	No
6.1	Windows within the principle living space and bedroom have glazing which starts no higher than 800mm above the finished floor (preferably 450mm)		
6.2	An appropriate level of natural ventilation can be achieved through the window		
6.3	An appropriate level of natural daylight can be achieved through the window		
6.4	Manifestation is provided to windows and glazed screens where there is a risk of persons moving around the building not being aware of the presence of glazing i.e. where there are large areas of uninterupted glazing		
6.5	Where manifestation is provided, it is located within the zones of 800–1000mm and 1400–1600mm above the finished floor levels		
6.6	Where curtains are fitted, the curtain track extends beyond the width of the window by the overall width of the curtain stack		
6.7	Pelmets are avoided		

Appendix B

Recommended Reading

Mönnikes, J. and Ufer, P. (2006) Garten und öffentlicher Freiraum im Leben alter Menschen, Dresden.

Garten und öffentlicher Freiraum im Leben alter Menschen (Garden and public open spaces in the life of elderly people) is a historical review of the integration open of seniors in public spaces as well as an essay about open spaces for elderly housing over the centuries covering Germany, Switzerland and UK.

It illustrates the change from 'calm and quiet' spaces for seclusion to barrier-free spaces offering diversified activities and opportunities for communication.

Key Issues:

- History of open spaces for elderly people
- Illustration of change to variety of outdoor spaces

Kamp, D. (2011) Design Considerations in the Design of Outdoor Spaces for Elder Populations, (Online), Available: http://uvadesignhealth.org/resources/031411-Design%20Considerations%20by%20David%20Kamp.pdf (27 June 2013).

These design consideration cover how to understand and analyse the site, its users and concerns related to elder people. It identifies design considerations and describes how to refine the design considerations with examples of illustrations and photographs.

Key Issues:

- Involvement of competent and collaborative design team from beginning
- Importance of a variety of outdoor spaces
- Design principles for outdoor spaces
- Design principles for elements within the outdoor spaces

Shackell, A. and Walter, R. (2012) Greenspace design for health and well-being, Edinburgh: Forestry Commission.

This booklet sets out best practice for designing accessible outdoor healing environments which has relevance to outdoor spaces for elderly people.

It uses case studies to understand the importance of the outdoors as healing spaces and explores what sort of spaces should be designed as well as design principles for these.

Key Issues:

- Design principles for outdoor healing environments

Goodman, C. (2011) Lifetime Homes Design Guide, IHS BRE.

This design guide covers technical specifications and guidance for accessible homes including some outdoor spaces: parking, routes between parking and dwelling and other approach routes.

Key Issues:

- Principle design guidelines for some elements within the outdoor spaces; parking, access to the buidling, weather protection at entrances,
- Detailed design guidelines for access, approach, circulation to and within a building
- Detailed design guidlines for window cill height to enable views out & achieve greater levels of daylight penetration

Bern, K. and Bern, S. (2006) Gestaltung von Aussenanlagen für Demenzkranke, Stadt Bern: AVA.

This design guide 'Design for open space for people with dementia' offers practical guidance to elements within the outdoor spaces which are relevant to all open spaces for elderly people such as access, paths, boundaries, planting, furniture and water.

Review of Policy & Practice

Fauler, H., Hemmelmeier-Händel, B. and Schauer, K. (2010) Freiräume für Pflegeheime, Land NÖ, Gruppe Raumordnung, Umwelt und Verkehr, Abteilung Umweltschutz und Raumordnungsförderung und Gruppe Gesundheit und Soziales, St. Pölten: Abteilung.

Freiräume für Pflegeheime (Open spaces for care homes) provides a guideline for designing open spaces for care homes in Austria. It was written by the local government in order to improve their own care homes.

It covers the involvement of a competent design team and the process of developing suitable and attractive open spaces. It highlights the relationship to the immediate neighbourhood and gives an overview of various spaces within the outdoors as well as details of outdoor elements ranging from planting, furniture, water, boundaries to play or sport equipment.

Key Issues:

- Involvement of competent and collaborative design team from beginning
- Importance of immediate neighbourhood for care/ residential home
- Importance of semi-public facilities within the care/ residential home
- Importance of link between building and outdoor spaces
- Overview and importance of a variety of outdoor spaces
- Design principles for outdoor spaces
- Design principles for elements within the outdoor spaces

Wulf, H. (2008) 'Wohnen mit Zukunft', In Rau, U. (ed.) Barrierefrei – Bauen für die Zukunft, Bauwerk Verlag.

Within Wohnen mit Zukunft (Living for the future) the chapter 'Open Spaces' provides a guideline for basic concepts and detailed outdoor elements such as paths, planting, water, furniture, lighting as well as appropriate design for people with dementia.

Key Issues:

- Principle design guidelines for elements within the outdoor spaces

Landschaftsarchitekten, H. (no date) Gärten für Senioren, (Online), Nullbariere.de. Available: www.nullbariere.de/senioren-garten.htm (28 March 2013).

This article 'gardens for seniors' stresses that not the size of an open space is crucial but the variety of the experiences offered. This can be achieved by enabling different activities, links to the neighbourhood as well as a connection of the open spaces. Opens spaces should also reactivate the senses and should be flexible to future changes.

Key Issues:

- Importance of immediate neighbourhood for care/ residential home
- Importance of a variety of outdoor spaces

Rodiek, S. and Schwarz, B. (ed.) (2005) The Role of the Outdoors in Residential Environments for Aging, New York: Haworth Press.

This book presents studies and case studies showing the positive impacts of the outdoors on the lives of elderly people, examines how to make the most of outdoor spaces, explores attitudes and patterns of its use and offers design recommendations.

Key Issues:

- Importance of greenspaces for health and well-being
- Principle design guidelines for designing outdoor spaces (by using case studies)
- Principle design guidelines for elements within the outdoor spaces

Pollock, A. and Marshall, M. (ed.) (2012) Designing outdoor spaces for people with dementia, Greenwich: Hammond Press.

Designing outdoor spaces for people with dementia focuses on designing for people with dementia but covers nevertheless why the outdoor is important for elderly people and design principles which apply to all outdoor spaces.

It stresses the importance of different activities within the outdoors and how they can be facilitated. Further it display a wide range of case studies from round the world including USA, Japan, Australia, Norway and UK.

Key Issues:

- Importance of immediate neighbourhood for care/ residential home
- Importance of link between building and outdoor spaces
- Importance of offering a variety of activities
- Importance of a variety of outdoor spaces which can provide various activities
- Design principles for outdoor spaces
- Design principles for elements within the outdoor spaces

Marshall, M. (ed.) (2010) Designing balconies, roof terraces and roof gardens for people with dementia, Stirling: DSDC.

This design guide focuses on 'enabling design for people with dementia' specifically in relation to increasing access to daylight through design and implementation of balconies, roof terraces and roof gardens.

It outlines the implications on tenants health & wellbeing where suitable access and choice to engage with external spaces is not provided. In addition this publication outlines the pro's and con's of design principles through case study analysis.

Key Issues:

- Enabling access to a variety of external & semi-external spaces (both communal & private) which offer access to daylight throughout the year, regardless of season
- Enabling choice by the tenant to access ,independently, daylight
- Understanding actual & perceived risks and managing assessment with tenants, their families and care providers to ensure access to daylight is achievable.
- Design guidelines on appropriate dementia design principles for provision of safe balconies and roof terraces

NAPA Living Life. (2010) Activity at the heart of care – A guide for managers, London: Bondway Commercial Centre.

This is guide is part of a Activity Toolkit series and focuses on positive activity-orientated culture in care homes but relevant to a wide set of care settings. It covers mainly how to manage and provide activities but also gives an overview and examples on building links to the neighbourhood and community.

Key Issues:

- Importance of immediate neighbourhood for care/ residential home
- Examples of creating links to the immediate neighbourhood and community

Sustrans. (2013) Inactive lifestyles kill an estimated 36,815 people in England each year, (Online), Available: http://www.sustrans.org.uk/press-releases/inactive-lifestyles-kill-estimated-36815-people-england-each-year [28 March 2013].

A study published by Lancet in March 2013 this article suggest that physical inactivity is a top risk actor for death and disability in the UK and could be prevented by building physical activity into peoples daily lives.

Key Issues:

- Importance of physical activity for elderly people

National Institute on Aging. (2005) Exercise & Physical Activity , (Online), Available: http://www.nia.nih.gov/health/publication/exercise-physical-activity-your-everyday-guide-national-institute-aging-1 [23 March 2013].

This guide describes the benefits of exercise and physical activity for elderly people. It gives an overview of the main four categories of exercises with examples of activities and how they can be incorporated within everyday life.

Key Issues:

- Importance of physical activity for elderly people
- Examples of activities for outdoor spaces

CARE UK, (no date). As easy as ABC, Colchester: CARE UK.

CARE UK produced this booklet with top 100 hints and tips for activity based care. For CARE UK 'activity based care plays a key role in how (they) care for residents and goes a long way towards CARE UK's vision of ensuring people are living fullfilling lives.' This helps elderly people to maintain their independence, health and wellbeing.

Key Issues:

- Importance of physical activity for elderly people
- Examples of activities for outdoor spaces

Heiss, O (2010) Barrier-Free Design: Principles, Planning, Examples, Birkhauser Architecture.

A publication prepared by DETAIL. de which provides practical basic information and implementation options on the theme of building without barriers.

"Both the social and the subjective perception and the associated will to integrate have changed. A disability is no longer merely an individual, comparatively severe and long-term physical or mental constraint, but rather, a social and socio-cultural one".

Key Issues:

- Barrier-free design and construction therefore means creating an environment that can be used, preferably independently, by as many members of society as possible, irrespective of their age or physical constitution.
- Design guidance on all aspects of barrier-free design in the built environment
- Case studies from throughout Europe

Fedderson, L. (2009) Living for the Elderly: A design manual, Germany: Birkhauser.

"there will be 1.2 billion by 2025 and 2 billion by 2050. By 2050, the number of older persons in the world will exceed the number of young for the first time in history."
This publication considers the socio-economic changes in an ageing population in parallel to the varying housing models which exist and should be considered in future years. In addition the principles of 'universal design' are discussed and examples of current best practice given through case study analysis.

Key issues:

- The United Nations Principles for Older Persons which include ability to enjoy human rights and fundamental freedoms when residing in any shelter, care or treatment facility; ability to reside at home for as long as possible; abile to live in environments which are safe and adaptable to personal preference and changing capacities.
- The potential and limitations of building models.
- Lifecycle cost analysis of building developments and energy consumption

Schittich, C. (ed.) (2012) Housing for Seniors, Germany: Detail.de.

"an awareness of the rapidly growing need for suitable housing for elderly citizens is nothing really new. Determining the appropriate form of accommodation, however, becomes increasingly difficult, for as a group, the older generation is remarkably heterogenous."

A publication dedicated to the sole topic of determing the appropraite future form of housing for older people. This publication considers severl building typologies and assesses their suitability for a diverse client group – 'seniors' through case study analysis of existing developments throughout Europe. A summary interview is given by the Foundation for Housing for the Elderly of the City of Zurich on the topic of 'Living Autonomously in Old Age', which picks-up on the key theme of communal facilities within eldery persons housing.

Levitt, D. (2010) The Housing Design Handbook: A guide to good practice, London: Routledge

David Levitt, co-founder of Levitt Bernstein Architects and Circle 33 Housing Trust reflects presents a series of case studies of work by many architects throughout the UK. Drawing on over 40 years of experience in the social housing sector. Levitt examines:

- The importance of 'place' in housing design and community development
- why some social groups are more resistant to design innovation than others
- sustainability and the need for adaptability in new housing stock.

Review of existing housing models:

During the initial stages of our policy and best practice review, we visited several existing elderly housing developments. These include:

Trust Housing Association, Scotland

We visited several Trust Housing Association properties as well as studied plans to gain an overview of some of the existing daylight spaces. We gained an insight on the variation of outdoor space in sizes, orientation, access and the offered opportunities for use and links (if any) between external and internal daylight spaces. The following Trust Housing Association developments were visited:

- Corson Court, Bellshill, Lanarkshire
- Mission Place, Motherwell, Lanarkshire
- Millar Park, Hamilton, Lanarkshire
- Shawholm Crescent, Pollokshaws, Glasgow
- Lochar Crescent, Pollol, Glasgow
- Ashcroft Drive, Croftfoot, Glasgow
- Ravens Court, Motherwell, Lanarkshire
- Deanhaugh Street, Edinburgh
- Murray Cottages, Edinburgh

Key Issues:

- Existing properties feature a wide range of sizes and settings of outdoor spaces
- Poor visual & physical links between external and internal spaces
- Limited internal spaces which offer good daylight
- Restrictive access to external spaces such as change in level, locked or alarmed doors

Cairdean House, Edinburgh, Care UK

This building and its outdoor spaces have been design by architects and landscape architects associated with the Dementia Centre in Stirling.

We visited the recent established care home which features a semi-public facility within the building (a cafe) and a variety of external spaces including an enclosed garden for each wing, a courtyard and terraces.

Key Issues:

- Offering a variety of activities
- Offering a variety of outdoor spaces
- Offering a semi-public facility within the care/residential home

Dementia Services Design Centre, Iris Murdoch Building, University of Stirling

This building includes an outdoor area which is designed using design principles for people with dementia. Within this small courtyard space it demonstrates wayfinding/access to and from the building, the creation of different subspaces and a planting with different heights, textures and an all-year-interest.

Key Issues:

- The link between the building and the outdoors
- Design examples of elements within the outdoor spaces

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