

DESIGN CONSIDERATIONS APPLICABLE TO EXISTING OWNER OCCUPIED DWELLINGS TO MEET NEEDS OF THE AGEING IRISH POPULATION AS REQUIRED BY IRISH LAW AND GOOD PRACTICE

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*"The length of life ain't important to me – the quality is".
Ralph Nelson 84; Almost Home film*

Abstract

The main purpose of this publication is to address design considerations applicable when remodelling existing owner occupied dwellings in the Republic of Ireland to meet the needs of the ageing Irish population. The paper begins with statistics illustrating increasing need for the issue to be seriously addressed. It subsequently moves on to analyse physical and mental aspects of ageing and typical housing conditions in which the Irish older population live. All of these aspects are then taken into account in a presentation of general and detailed design considerations. A case study, which demonstrates the application of most of them in a real life scenario, follows. The policy and legislation applicable in the Republic of Ireland are discussed, and finally the paper arrives at conclusions.

Streszczenie

Celem tej publikacji jest zwrócenie uwagi na rozwiązania projektowe mające zastosowanie przy przeprojektowywaniu zamieszkałych przez właścicieli istniejących domów mieszkalnych w Republice Irlandii na potrzeby starzejącej się populacji irlandzkiej. Na początek podano dane statystyczne ilustrujące wzrastającą potrzebę poważnego wzięcia pod uwagę tej kwestii. Następnie zanalizowano fizyczne i psychiczne aspekty starzenia się oraz typowe warunki mieszkaniowe, w których żyje większość starszych Irlandczyków. Po wzięciu powyższych pod uwagę zaprezentowano ogólne i szczegółowe rozwiązania projektowe, poparte przykładem pokazującym zastosowanie większości z nich w realnej sytuacji. Po przyjrzeniu się sposobom postępowania i prawodawstwu w Irlandii nastąpiło przejście do konkluzji końcowych.

Keywords: Design for older people; Design for disabled; Universal design; Ageing of the world.

1. INTRODUCTION

It is estimated that there were 429 100 persons aged 65 years and over living in the Republic of Ireland in 2001. This figure represents 11.2% of the total estimated population of 3 838 900. [1]

In European terms Ireland has a relatively small population of older people. [2] In 1996, 15.2% of Ireland's population were aged 60 years or over. For the same year figures in other European countries are: Italy and Greece 22.3%, The Netherlands 17.8% and Belgium 21.5%.

For comparison figures from outside the European Union in 1996 are: US 16.5%, the Russian Federation 16.7%, China 9.5% and South Africa, 6.7%. [3]

All recent demographic projections anticipate significant growth in the numbers of older people in Ireland over the next ten years, a period in which the overall population of the state is expected to remain stable. [4] Projections indicate that the population aged 65 years and over will grow to 14.1% of the general population by year 2011, and to 18% in year 2031. [5]

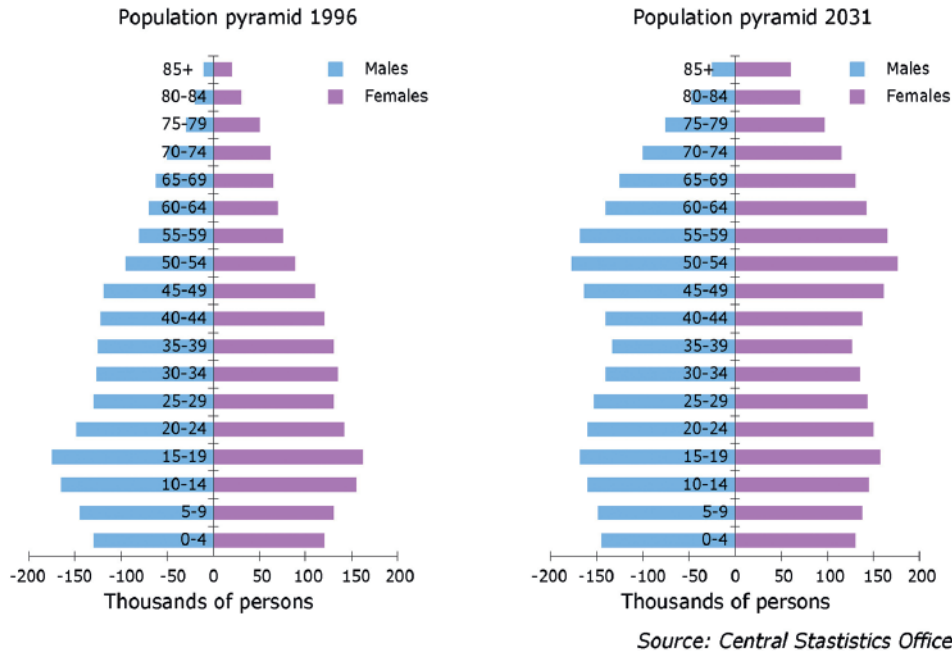


Figure 1.
CSO Irish population projections

Figure 1 illustrates how proportions of people at different ages is expected to change between 1996 and 2031.

At present, over 21% of older people are aged 80 years or more. It is estimated that this number will grow to 24.9% by year 2011. There are more older females than males, reflecting women's longer life expectancy. [1] [5] Life expectancy has improved from 57.4 years in 1926 to 73 years in 1996 for Irish males, and from 57.9 years to 78.5 years for Irish females respectively. [4]

It is clear that ageing and disability issues will have a major impact on the future of Ireland and its ageing population.

2. ASPECTS OF AGEING

Changing physical and psychological needs are features of old age. Age-related disabilities such as impaired vision, hearing and mobility, osteoporosis, arthritis, rheumatism and reduced resistance to poison and food-borne infections make older people more prone to accidents.

Surveys show that people aged over 80 are more likely to have problems with mobility and everyday activities including bathing, dressing, moving around and eating. [6] A lot of older people are not able to walk independently and require help of either another person or a walking aid. The number of older people,

especially those aged over 80, is expected to increase markedly by the year 2011.

People's range of movement becomes limited with age. Their ability to reach and bend becomes restricted, and their sense of balance can deteriorate. It is important to ensure that things are designed within easy reach and bending down or reaching up and across is avoided. This is not only to make things comfortable for older people with limited ability to reach, it is also to lessen the risk of falling over.

Senses become affected and fail with age. The sense of touch is the one most people retain without deterioration into very old age. Its role is dominant in negotiating the environment. Selecting the right materials to re-decorate interiors can make a building feel good for an older person.

Although the sense of touch remains, simultaneously loss of visual performance and hearing are commonly observed among older people. Old people need three times as much light as people aged 20 to carry out visual tasks. Also hearing loss is very common, particularly in the high frequencies. Good levels of lighting assist older people in seeing lip movement and gestures in situations, where they find it difficult to understand what people are saying. [7]

On top of physical frailty many older people suffer from dementia. Dementia affects cognitive capabilities such as language (e.g. not finishing sentences), memory – especially recent memory, spatial aware-

Table 1.
The number of people with dementia in Ireland in 2005 [8]

Age group	Eurodem			Ferri et al.
	Men with dementia	Women with dementia	Total number of people with dementia	Total number of people with dementia
30-59	1 321	738	2 059	
60-64	1 357	399	1 756	1 537
65-69	1 493	789	2 282	2 108
70-74	2 544	2 368	4 912	4 195
75-79	1 947	3 483	5 430	5 451
80-84	2 893	5 320	8 214	7 720
85-89	1 952	4,838	6 790	10 928
90-94	1 087	2 851	3 938	
Total	14 593	20 787	35 381	31 940

ness, movement execution (e.g. problems getting dressed), planning and problem solving, reasoning, behaviour and judgement.

Alzheimer Europe estimates the number of people with dementia in Ireland in 2005 as being between 31,940 (Ferri et al.) and 35,381 (Eurodem). This represents 0.78% (Ferri et al.) to 0.86% (Eurodem) of the total population of 4 109 173. The number of people with dementia in Ireland as a percentage of the total population is much lower than the EU average of 1.14% to 1.27% (Ferri et al. and Eurodem, respectively). [8] One third of people over 95 have dementia [9]

The Alzheimer Europe figures shown in Table 1 above underestimate the number of people with dementia in Ireland owing to the difficulty of obtaining sufficiently detailed population statistics of the number of people in Ireland over the age of 94. [8]

3. HOUSING

Figures show that most older Irish people live in owner occupied housing, with 86.2% in 1991. This is the highest rate of owner occupation in the European Union. [10] 87% of respondents in the HeSSOP Study declared that their preference would be to stay in their current home. [11]

Housing is a key aspect of health in old age. The high rate of owner occupation among older Irish people means that they tend to live in the oldest houses. These are most affected by dampness and structural problems. Older dwellings are more conducive to accidents or unsuitable for those affected by disability. Substandard and poorly designed housing can lead to accidental falls, fire, vulnerability to crime

and the health problems that arise from living in a cold and damp dwelling. Some of the issues to deal with in old dwellings are lack of adequate heating, damp walls and floors, rot in windows or floors, leaking roofs.

As people age they are more likely to live alone, mainly because of bereavement. It is estimated that almost one third of people aged 75 years or more live alone. It is expected that by 2011 this number will rise. [4] As a result they often struggle not only with the physical challenges of living at home, but also with loneliness and isolation.

Accidents and falls are a common cause of death and injury among older people. They often result in serious long-term difficulties and even premature death. The reduction of accidents in the older population is considered to be an important factor in promoting the general well-being of older people.

Falls account for almost one third of deaths from all accidents. Almost two thirds of all fatal falls occur among older people aged over 75. [12] Falls in old age are not simply unpleasant events, they are commonly precursors to major deterioration in health and confidence. Figures show that significant numbers of older people die within two years of a serious fall. [7]

Most falls occur in living spaces rather than in more obviously dangerous bathrooms and stairs. This is partly because living spaces are not generally equipped with handrails and there tend to be a number of low-lying obstacles, particularly small items of furniture or cables. [7]

Older people are at particular risk from injury or death from domestic fires. In 1999 more than 45% of all people killed in fires were aged over 65. [13]

4. DESIGN CONSIDERATIONS

In this section the author analyses design considerations applicable to a situation where an existing owner occupied dwelling is required to be remodelled for an older owner who wants to continue living in it.

The extent of refurbishment works and choice of materials will be influenced by two main factors: existing building constraints and cost considerations.

This section is divided in five parts.

Part 4.1. takes a look at the critical elements for the evaluation of an existing dwelling to ensure that the main priorities are addressed first.

Lists follow which presents general and detailed design considerations for the building's external and internal environment in Part 4.2. and Part 4.3. respectively. It is not intended that the lists was exhaustive. They are based on information available from publications [7], [14] and [15], which the author read, analysed and assembled in this document to include issues most relevant.

In Part 4.4. a case study is presented, which demonstrates application of most of the listed design considerations in a real life scenario. The case study is based on a project the author prepared for the purpose of this paper. The presentation is inspired by a similar one in a book used widely in Ireland, [15].

Assistive Technology options available to assist architectural design are presented in Part 4.5.

There are characteristics that successful places share. For a dwelling to be a successful and accessible home for everyone it has to be [16]:

- Inclusive: so everyone can use it safely, easily and with dignity.
- Responsive: taking account of what the inhabitants say they need and want.
- Flexible: so different people can use it in different ways.
- Convenient: so everyone can use it without too much effort or separation.
- Accommodating: for all people, regardless of their age, gender, mobility, ethnicity or circumstances.
- Welcoming: with no disability barriers that might exclude some people.
- Realistic: offering more than one solution to help balance everyone's needs and recognising that one solution may not work for all.
- Understandable: everyone knows where they are and can locate their destination.

It would be ideal if most of the buildings met those

criteria. However, even most of the newly built domestic buildings fail to meet them. As a result a significant number of reasonably new dwellings would have to be re-designed at some time in the future if the ageing family members decide to stay there for life. In addition, almost all of the existing building stock currently occupied by older people would need to be re-designed in order to meet their basic needs.

Ageing has many aspects, as described in point 2, and it is important to take the physical and psychological needs of older people into account in the design process. As many older people require the assistance of either another person or a walking aid, while others use wheelchairs, their varying needs have to be taken into account. Ideally, every project would be individually tailored to a person(s) it is intended for, however, in some cases it may not be practicable to implement all of the proposed design solutions.

4.1. Building performance evaluation

There are some critical elements for the evaluation of the existing dwelling to determine what priorities are in order to achieve the minimum standard and comfort required by an older person. These are [7]:

- Structural integrity: is it sufficient or should it be reviewed and addressed?
- Energy consumption: can improvements be made to make it more sustainable?
- Building systems and services: are they in line with external benchmarks?
- Building fabric: are there problems that need to be addressed?

4.2. External environment

4.2.1. Access to a building

- Access generally: considered from the public footpath to the principal entrance.
- Pedestrian gate from public footpath – clearly indicated / minimum clear opening 800 mm.
- Car parking: easy access to parking space.
- Approach to entrance(s): level if possible or gently sloping / minimum 900 mm unobstructed width / can be combined with a driveway, provided driveway is minimum 3.0 m wide / firm surface suitable for wheelchair use.
- Wheelchair access: provided if possible.
- External steps and ramps: handrails as required / contrasting-coloured nosings to steps.
- Lighting: adequate levels / avoid glare.

4.2.2. Entrance(s)

- Entrance(s): minimum clear opening width 800 mm / to open to 90° angle / 300-500 mm clear leading edge / illuminated and with level access over the threshold / door furniture easy to see and to operate / minimum 1200 mm deep canopy.
- Door bells, letterboxes etc. at a height of 900-1200 mm above ground level / amplified or visual door bell to be provided as appropriate to the user's hearing and/ or vision.

4.3. Internal Environment

4.3.1. General considerations

- Spaces and layout: easy to move between / flexible for different users.
- Purpose: should be clear, most helpful for persons with dementia.
- Fire safety: to required and accepted standards.
- Sitting (family) room: locate at the entrance level.
- Living room: two or more storey houses: accommodate a convenient bed on the ground floor.
- Internal doors generally: minimum clear opening width 800 mm / to open to 90° angle / 300-500 mm clear leading edge / level threshold / door furniture which is easy to see and to operate / do not swing into circulation areas.
- Large areas of glazing: if present, to be marked permanently within the 1200-1500 mm zone above floor level / area up to 400 mm high from the finished floor level (FFL) to be constructed of a solid material.
- Light: levels higher than normal / avoid glare.
- Handholds / robustly fixed objects to hold onto: generous quantities.
- Handrails and grab rails: as required / contrasting colours to the background décor.
- Fittings: to be anchor-fixed to the structure / to be robust / avoid protruding fittings such as heaters or low level obstruction.
- Moving parts: users to be able to move without effort.
- Supportive furniture: space to accommodate.
- Surfaces: slip-resistant floor finishes / not shiny / rich tactile surfaces to be used.
- Colour: different colour schemes in different house zones / floor covering colour to be consistent in order to minimise confusion.
- Edges: to be smooth, corners and edges rounded off.
- Switches, socket outlets, TV and telephone points and controls: fitted at height between 900 mm and 1200 mm above floor level and 300-500 mm clear of internal corners.

Table 2.
Examples of Assistive Technologies used by and for older people

Health	Medication delivery Health monitoring
Safety	Activity monitoring Alarm call Fire detection, also to include as appropriate Vibrating fire alarm placed under pillow when asleep Flood detection Cooking safety controls; boiling-dry and gas detection Bath and shower overflow detection Heating monitoring Water temperature monitoring Air quality monitoring
Security	Intruder alarm CCTV Security lighting Anti-theft devices
Control	Temperature Ventilation Curtains Entry Door opening Appliance switching
Therapeutic support	Loop system (portable and fixed) Way-finding lighting Reminder devices
Communication	Telephone Radio aids Telecommunications device for the deaf Door bell lighting system Television Call stations Computer network
Seating products Standing products	Seating products Standing products Walking products Advanced technology walking products Wheeled mobility products Robot-aided rehabilitation

- Pull cords: as required / reachable from the floor.
- Reach: design features that necessitate the body to move from a vertical position should be avoided.
- Cleaning: easy to clean.
- Heating, ventilation: easy to control / location of radiators to be carefully considered.
- Noise: adequate insulation against external noise.

4.3.2. Internal circulation

- Clear of obstructions.
- Two-way traffic: minimum 1.8 m wide.
- One-way traffic: minimum 1.2 m wide.
- Turning circle: as required, minimum 1500 mm for three point turn, 1800 mm to allow full

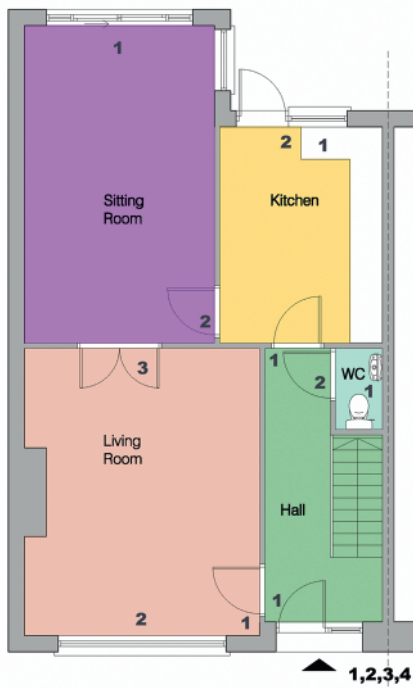


Figure 2.
Existing ground floor plan

Outside

1. no entrance canopy for protection from rain
2. doorbell out of reach
3. no level access at door threshold
4. letterbox too low

Hall

1. no leading edge at door (door handle too close to the inside corner of the room to allow access), door threshold saddle impedes easy access

Living Room

1. no leading edge at door, door threshold saddle impedes easy access
2. height of transom interferes with sightlines from seated position
3. clear opening of one door leaf less than 800 mm

Sitting Room

1. raised track for sliding door impedes movement
2. no leading edge at door (door handle too close to the inside corner of the room to allow access), door threshold saddle impedes easy access

Kitchen

1. window over bench is difficult to access for closing and opening
2. no leading edge at door (door handle too close to the inside corner of the room to allow access), door threshold saddle impedes easy access

WC

1. room too small to allow unimpeded access
2. clear opening of doorway less than 800 mm

360 degrees turn in a single motion.

- Wheelchair accessibility: as required.
- Internal stairs/ ramps: handrails as required / nosing in a contrasting colour and not projecting / two short flights of stairs instead of one long if possible, with 900 mm long landing / clear unobstructed width of 800 mm / maximum rise of 175 mm and a minimum going of 280 mm.
- Internal lobbies: avoid if possible.
- Stair lift or through-floor lift: as required.
- Objects fitted to walls: protruding no more than 100mm if 700-2200 mm over FFL and not protruding at all if lower than 700 mm.
- Internal fire doors: fitted with electromagnetic hold-open devices linked to the fire alarm system / strength of door closers to be adjustable.
- Change of level: avoid within a storey.

4.3.3. Bathroom and toilet

- Wheelchair accessible toilet + rinse basin– located on the ground floor / provisional space, drainage and services for the future on the ground floor.
- Space and layout: sufficient to accommodate the carer (optimum 700 mm/minimum 600 mm adjacent to the toilet, bath or other bathroom fitting) / wheelchair accessible as required.
- Door: on the short wall.
- Walls: structurally capable of adaptations such as the addition of future handrails.
- Bathroom ceiling: structurally capable of adaptation to support a future hoist.
- Turning circle: provided if possible.
- Ambulant accessible toilet: provided as required, 800 mm wide x 1500 mm deep with an outward-opening door, or 1800 mm deep with an inward-opening door + fitted handrails.



Figure 3.
Proposed ground floor plan

a indicates a clear 300 mm at leading edge of door for access to door handle

Outside

1. door entry, number, name etc. clearly visible from the street
2. porch light
3. level entry
4. doorbell and letterbox relocated at 900-1200 mm above FFL
5. ramp
6. entrance canopy to project 1200 mm

Hall

1. handrail to project 300 mm beyond last step
2. 1500mm turning circle
3. possible future extra handrail and stair lift (optional)

Living Room

1. no transom between 1000 mm and 1400 mm above FFL if possible
2. location of future installation of a through floor lift (trim timber floor above), size 1200 mm x 800 mm (optional)

Sitting Room

1. head built into partition to enable later wall removal to improve circulation
2. door without saddleboard

Kitchen

1. sockets on side walls to facilitate easy reach
2. swan-neck tap for easy operation
3. carousel unit - better access to corners
4. unrestricted access to window

WC

1. 750 mm x 1200 mm zone for side transfer
2. grab rails as required

- Handrails: vertical grab rails beside baths and wash basins / horizontal grab rails tailored to the individual.
- WC pan: should finish at 395-410 mm above floor level / flush handles that are easy to operate.
- Showering facilities: level-floor showers in lieu of conventional step-in baths.
- Sanitary fittings: free of sharp edges / colour to contrast with background colour.
- Taps: easy to operate.

4.3.4. Kitchen

- Space and layout: sufficient for easy movement / locate critical items in the zone 450-1300 mm over FFL.

- Counter: continuous / height generally 850 mm, possibly with a low section at 750 mm / toe recess of 250 mm high x 150 mm deep.
- Units: carousel units under worktops in corners.
- Sink: shallow bowl / located convenient to cooker / taps easy to operate.
- Split oven and flush fitted ceramic hob if possible.
- Wheelchair accessibility/ turning circle: provided as required.
- Light: good task lighting / light source glare free.
- Contrast: use tonal contrast to highlight such things as cupboard door handles and sockets.
- Dining area: located nearby cooking area / preferably open plan relationship with kitchen.

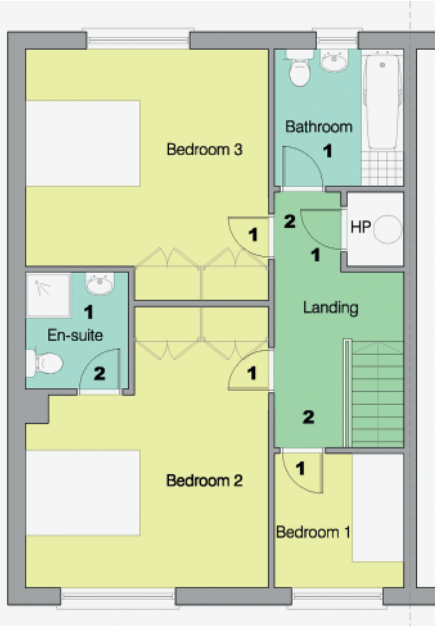


Figure 4.
Existing first floor plan

Landing

1. hot press (HP) difficult to access
2. less than 1500 mm restricts turning

Bathrooms

1. room too small to allow unimpeded access
2. clear opening of doorway less than 800 mm

Bedrooms

1. no leading edge (door handle too close to adjacent wall to allow access), saddleboard impedes easy access

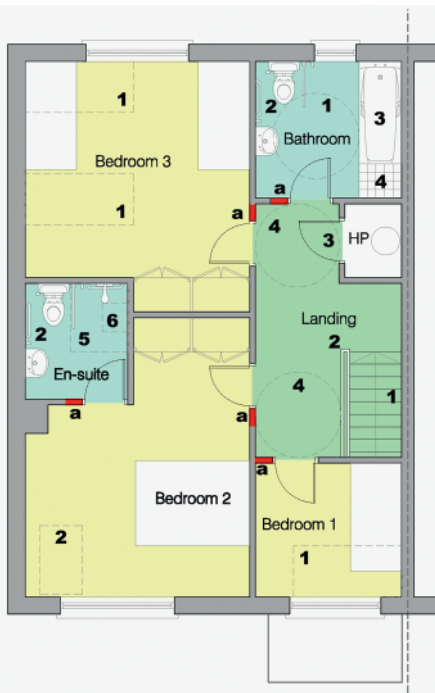


Figure 5.
Proposed first floor plan

a indicates a clear 300 mm at leading edge of door for access to door handle

Landing

1. allow for future extra handrail and stair lift (optional)
2. handrail to project 300 mm beyond last step
3. hot press (HP) base flush with floor
4. 1500 mm turning circle

Bathrooms

1. 1500 mm turning circle
2. grab rails as required
3. slip resistant bath, lever taps
4. 400 mm minimum deep ledge
5. either entire floor to fall, or a proprietary flush finish shower tray surrounded by fabric shower curtain
6. flip-up seat, 450-500 mm wide

Bedrooms

1. alternative bed positions shown dashed
2. location of future installation of a through floor lift (trim timber floor) (optional)

4.3.5. Main bedroom

- Ceiling: structurally capable of adaptation to support a future hoist.
- Wheelchair accessibility/ turning circle: provided as required.

- 800 mm clear zone around beds to facilitate circulation and access.

4.4. Case study

Typical example of a semi-detached two-storey house.

4.5. Assistive Technologies (AT)

Older people have been found to be much less technology resistant than might have been expected, and there are potential benefits in supporting frailty with Assistive Technologies. Assistive Technologies appropriate to older people can be loosely categorised as those that monitor safety and health, those that provide security, and those that improve quality of life (Table 2). [7]

5. POLICY AND LEGISLATION

There is no legislation dealing specifically with the design requirement for residential dwelling occupied by older people. However, many of the design issues applicable are covered under “Universal Design” and ‘Access for People with Disabilities’ headings.

There is significant legislation and public policy relevant to Universal Design in Ireland. Many European Union Member States, including Ireland, have estimated that approximately half of their legislation is derived from European Union membership, therefore policy and legislation at both international and national level is relevant. Key policy areas include Human Rights and Equality, Disability Rights, Social Inclusion, and Sustainable Development. [18]

Ireland is a member state of the United Nations, the European Union and the Council of Europe (including the Partial Agreement in the Social and Public Health Field). Irish legislation is therefore directly influenced by recommendations and legislation at the international level. [18]

Some of the documents, which directly or indirectly refer to accessibility requirements for residential dwelling are: Disability Act 2005; Building Control Act 2007; Building Regulations 1997 – 2008 – in particular *Part M: Access for People with Disabilities*; Equal Status Act, 2000 & 2004 and Planning and Development Act 2000.

6. CONCLUSIONS

Traditionally, legislation in Ireland has rarely acted to impose change to existing buildings. Although current legislation requires duties of care from building owners and employers they appear not to affect domestic dwellings as much as public buildings and places of employment. Also the requirement to provide access for people with disabilities applies to new buildings, extensions, material alterations and changes of use of buildings only. Therefore there is no direct requirement to provide accessible environment in existing domestic dwellings.

As a consequence it is entirely up to the individual owners and their consultants (architects, engineers, designers etc.) to decide to what extent to make the existing domestic dwelling accessible to older inhabitants.

Adapting existing residential buildings to meet the needs of older and disabled people in many cases is challenging and it is often very difficult, if not impossible, to render them fully accessible. The main issue designers must deal with is the lack of space.

In the ideal world a new house should have features that help the occupants to “age in place”, care for themselves and live as independently as possible, as well as to facilitate the delivery of support and care, ideally to be available 24/7.

It is essential that architects are aware of the issues and best practice solutions available, and that they apply these in their design.

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