HousingExecutive

Response to:
FOI_22-23_202
January 2023

Disabled Facilities Grant & Social Housing

1. The current allocation [meaning budget] to the Disabled Facilities Grant scheme for the financial year of 2022/23?

For Disabled Facilities Grants the role of the Housing Executive is to administer grant funding on behalf of the Department for Communities. It makes grant funding available for private home owners in relation to eligible works.

The allocation of budget for 2022-23 is:

Year	Budget
	£k
2022/23	11,750

2. The allocation [meaning budget] for the Disabled Facilities Grant scheme for each financial year since 2015/16?

For Disabled Facilities Grants the role of the Housing Executive is to administer grant funding on behalf of the Department for Communities. It makes grant funding available for private home owners in relation to eligible works.

The allocation of budget for the years request was:

Year	Budget
	£k
2015/16	9,951
2016/17	8,895
2017/18	9,575
2018/19	9,950
2019/20	11,756
2020/21	10,305
2021/22	10,000
2022/23	11,750

3. The number of successful and unsuccessful applications to the Disabled Facilities Grant since 2015/16.

For Disabled Facilities Grants the role of the Housing Executive is to administer grant funding on behalf of the Department for Communities. It makes grant funding available for private home owners in relation to eligible works.

A Disabled Facilities Grant is initiated by a recommendation received by the Housing Executive from an Occupational Therapist within a Health Trust.

For the period 1 April 2015 – 31 December 2022 the Housing Executive received 16,170 recommendations from Occupational Therapists. Some of these recommendations are still being processed through stages 2-4 (see *response 4 for details of stages)* but at the 31 December 2022:

Successful Disabled Facilities Grant Applications (beginning of stage 5 – see below)
Disabled Facilities Grants Approved: 7,157
Disabled Facilities Grants Works Completed*: 6,189 *(end of phase 6)*

Unsuccessful Disabled Facilities Grant Applications
1,382 applications were considered unsuccessful.
These are applications cancelled after a Test of Resources shows that the contribution which an applicant will be expected to make is greater than the grant-aid required.

Please note, other applications have been withdrawn by the applicant throughout the assessment and approval process.

*Completion figure will include Disabled Facilities Grants given formal approval to start works before 31 March 2015.

4. How many people are currently on the waiting list for adaptions to their homes under the Disabled Facilities Grant, including a breakdown on the length of their wait?

For Disabled Facilities Grants the role of the Housing Executive is to administer grant funding on behalf of the Department for Communities. It makes grant funding available for private home owners in relation to eligible works.

The Housing Executive does not operate a 'waiting list' for Disabled Facilities Grants which are completed in privately owned properties.

The process begins with a recommendation from an Occupational Therapist within a Health Trust. Such referrals are received on a daily basis and processed in date order.

It might be helpful to illustrate the private sector grants process in respect of a Disabled Facilities Grant:

Stage 1	OT recommendation received **to** Housing Executive Technical Officer inspection
Stage 2	Inspection **to** issue List of Grant-Aid Works
Stage 3	List of Grant-Aid Works issued **to** receipt of all required plans and documents from the grant applicant
Stage 4	Receipt of completed documents **to** issue of Approval to Start Work
Stage 5	Issue of Approval **to** receipt of Satisfactory Completion of Works notice

Stage 6	Completion of works **to** Final Inspection (Housing Executive and OT) and Payment of grant-aid monies.

It is important to note:

- Stage 1: a full Test of Resources, where applicable, must be completed before the initial inspection takes place. The Housing Executive relies on an applicant providing the requested information to complete a Test of Resources in a timely manner.
- Stage 3 and Stage 5: both are generally outside of the Housing Executive's control. These two stages rely on an applicant and / or their agent supplying the required information to complete.

As at 31 December 22	No of Cases	Average working days
Stage 1	497	64
Stage 2	96	98
Stage 3	1,206	215
Stage 4	72	52
Stage 5	517	177

5. The total number of people on the social housing waiting list?

Social Housing Waiting List and allocations data held by the Housing Executive, forms part of the **Northern Ireland Housing Bulletin**, which is published quarterly as a **National Statistic** by the Department for Communities (DfC). The most recently published Waiting List statistics in the Northern Ireland Housing Bulletin are as at 30 September 2022.
Section 13(1) of the Statistics and Registration Services Act 2007 states that the person producing any official statistics which are designated under Section 12 as National Statistics must ensure that the Code of Practice for Statistics under Section 10 continues to be complied with in relation to those statistics. Provision of any statistics more recent than September 2022 would be a failure to comply with the Code in respect of Parts T3.3 and T3.4, as the National Statistic to which this information relates has not yet been published.

The table below provides the number of applicants on the Waiting List as at 30 September 2022. Any more recent figures are exempt from disclosure at this time under the Freedom of Information Act Section 44- disclosure is prohibited by other legislation (the Statistics and Registration Services Act 2007).

Sept 2022	All Applicants in NI
Grand Total	44,532

The next DfC Northern Ireland Housing Bulletin is anticipated to be published in February 2023, after which Waiting List statistics as at 31 December 2022 will be available.

6. **The total number of people currently on the social housing waiting list, due to their accommodation not being appropriate or accessible due to a physical health or disability?**

Social Housing Waiting List and allocations data held by the Housing Executive, forms part of the **Northern Ireland Housing Bulletin**, which is published quarterly as a **National Statistic** by the Department for Communities (DfC). The most recently published Waiting List statistics in the Northern Ireland Housing Bulletin are as at 30 September 2022. Section 13(1) of the Statistics and Registration Services Act 2007 states that the person producing any official statistics which are designated under Section 12 as National Statistics must ensure that the Code of Practice for Statistics under Section 10 continues to be complied with in relation to those statistics. Provision of any statistics more recent than September 2022 would be a failure to comply with the Code in respect of Parts T3.3 and T3.4, as the National Statistic to which this information relates has not yet been published.

As of the 30th September 2022 there were 4,058 applicants/transfer applicants on the common waiting list who have been found homeless (FDA) on the grounds of 'accommodation not reasonable – physical health'. Please note that the sub-category 'physical health' on which this dataset is based went into operation in 2018/19. This dataset will not capture any cases prior to this date.

Any more recent figures are exempt from disclosure at this time under the Freedom of Information Act Section 44- disclosure is prohibited by other legislation (the Statistics and Registration Services Act 2007). The next DfC Northern Ireland Housing Bulletin is anticipated to be published in February 2023, after which Waiting List statistics as at 31 December 2022 will be available.

7. **The number of contractors approved to carry out works under the Disabled Facilities Grant scheme, broken down by area if applicable.**

For Disabled Facilities Grants the role of the Housing Executive is to administer grant funding on behalf of the Department for Communities. It makes grant funding available for private home owners in relation to eligible works and is not responsible for arranging for work to be carried out to privately owned properties nor does it carry out work to such properties.

Contractors are not approved by the Housing Executive to carry out works under the Disabled Facilities Grant. Where the 'formal approval' cost for works is more than £5,000 the Housing Executive asks that the applicant uses a builder or contractor registered with one of the following warranted builders schemes:

- Contractors Insurance Guarantee Services (NI) Ltd
- The Federation of Master Builders (FMB)

These schemes may help protect if there is a dispute.

8. A copy of the (i) Northern Ireland Housing Executive (2006) Wheelchair user housing study, and (ii) Northern Ireland Housing Executive (2014) Adaptations design communications toolkit.

(i) A copy of the Northern Ireland Housing Executive (2006) Wheelchair user housing study is attached as *'2006_10 - Wheelchair User Housing Study Report'*

(ii) A copy of the Northern Ireland Housing Executive (2014) Adaptations design communications toolkit is attached as *'2016_Adaptations-design-communications-toolkit'*

The toolkit requested is the "Inter-Departmental Review of Housing Adaptation Services – Adaptations Design and communications toolkit". The toolkit was produced with involvement from:

- The Northern Ireland Housing Executive;
- HSC Trust Occupational Therapy Services;
- Housing Associations; and
- People with disabilities through the support of Disability Action.

The Interdepartmental Housing Adaptations Design Toolkit was reviewed and the most recent edition (2022) can be downloaded at:
https://www.nihe.gov.uk/getattachment/b0653b86-7bd0-4dd8-b983-7c5215e4eca7/Housing-Adaptations-Design-Toolkit.pdf

9. When clarifying the request the following additional information was requested: Figures for adaptations (minor) carried out to Housing Executive properties since 2015/16.

The Housing Executive practically completed 37,387 repair jobs with an expense code of 'minor adaptation' in its properties from 1st April 2015 to 20th January 2023.

Wheelchair User - Housing Study -

An evaluation of users experience and the evolution of design standards

Housing Executive

The Regional Strategic Housing Authority -

Contents

Acknowledgements

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Glossary of Terms

Assistive Technology Device - any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customised, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities. "Smart" technologies such as home automation, help lines and other forms of communication are considered as such devices.

Access - access to and use of facilities and egress except in case of emergencies.

COW - clear opening width. Should be measured from the face of the door when opened to the opposite frame or doorstop.

Effective Clear Width - available width measured at 90^0 to the plane of the doorway for passage through a door opening, clear of all obstructions, such as handles and weather boards on the face of a hinged door, when such a door is opened through 90^0 or more, or when a sliding or folding door is opened to its fullest extent.

EPIOC - electrically powered indoor outdoor wheelchair.

Handrail - component of stairs, steps or ramps that provides guidance and support at hand level.

In-Curtilage - a term used to describe a space within the house boundaries normally used for car parking. It can also be referred to as a hardstand.

Landing - platform or part of a floor structure at the end of a flight or ramp, or to give access to a lift.

Nosing - projecting front edge of a tread or landing that may be rounded, chamfered or otherwise shaped.

Platform Lift - lift with a platform and low walls which travels vertically between two levels and is intended for use standing up or seated on a chair or wheelchair.

Ramp - construction, in the form of an inclined plane 1:20 or steeper from the horizontal or a series of such planes and an intermediate landing or intermediate landings that make it possible to pass from one level to another.

Rise - vertical distance between the upper horizontal surfaces of two consecutive treads, or of a landing and the next tread above or below it, or of a flight between two consecutive landings.

Riser - vertical component of a step between tread or landing or the tread or landing above or below it.

Summary Report

This summary attempts to draw out the key features of a very comprehensive, multi-faceted piece of research. However it is also designed to be read as a stand alone document for a wide ranging audience. The reader should be aware that on occasions more detailed explanations should be sought in the main text of the report.

Background

This study was jointly commissioned by the Department for Social Development (DSD) and the Northern Ireland Housing Executive (NIHE) following a comprehensive literature search which identified the need for focused customer satisfaction feedback from wheelchair users on the design of their homes. The study focused on wheelchair users living in domestic settings rather than residential facilities. Statistics from Regional Disablement Services suggest there are approximately 28,000 people in Northern Ireland in receipt of wheelchair services.

Legislation

The concept of wheelchair standard housing only emerged in the 1970s following the introduction of The Chronically Sick and Disabled Persons Act 1970 Section 3, (enacted in Northern Ireland in 1978), which for the first time placed a duty on local authorities to consider the housing needs of physically disabled people. This legislation provided the impetus for the development of wheelchair standard housing in the United Kingdom.

Further legislation followed, in particular The Community Care Act 1990 (People First policy in Northern Ireland), and The Manual Handling Operations Regulations 1992 and Guidance to Carers Assessments (NI) 1996, which have impacted on housing design requirements.

As a result of the Manual Handling Operations Regulations 1992, Occupational Therapists and other health care staff were required to undertake formal ergonomic assessments, leading to the installation of appropriate moving and handling equipment supplied by Health and Personal Social Services Trusts (HPSSTs). This legislation in particular highlighted the need to develop supplementary design guidance for assisted wheelchair users and carers.

Evolving design standards

The first blueprint for wheelchair standard housing (HDOPP/2/75 Wheelchair Housing) was developed by Goldsmith and Morton, primarily for independent self-propelling wheelchair users. This blueprint formed the baseline standards for the NIHE's new build wheelchair housing from the 1970s to the 1990s and for Habinteg Housing Association's first wheelchair standard homes built in Northern Ireland in 1980.

In general, the standards set down by Goldsmith and Morton in the first blueprint, for the most part, meets the needs of independent wheelchair users. However, wheelchair users are not a homogenous group. This survey has identified varying patterns of wheelchair use and wheelchair type that can change over the life cycle of the wheelchair user.

In 1996 The Habinteg Design Guide (1st edition) incorporated a number of features to reflect good practice in the provision of wheelchair standard housing. These included:

- covered hard standing,
- wider paths,
- wider internal and external door openings,
- wider corridors (1500 mm),
- enhanced bath/shower room space standards with the potential to create an en suite facility in a bedroom, and
- an emergency call system in each room.

This was followed in 1997 by NATWHAGs Wheelchair Housing Design Guide, based on in depth research with 20 wheelchair users and included;

- design guidance on external elements, such as moving around outside and using outdoor spaces,
- consideration of additional space to accommodate

wheelchair access to rear entry vehicles,
- a more generous turning circle allowance (1, 800 mm x 1, 400 mm) applied to kitchens, bathrooms and shower rooms,
- partial guidance on space standards for living rooms,
- an extra bedroom or extra space for visitors, carers and equipment is considered,
- guidance for the provision of facilities to support the installation of communications equipment in the home, and
- additional spatial planning guidance regarding use of furniture.

In 2001 the BSI published BS: 8300 Design of building and their approaches to meet the needs of disabled people. This is underpinned by a substantial ergonomic study of the spatial needs of 91 wheelchair users. This particular study is considered to contain the best ergonomic data currently available.

Although BS 8300 is a comprehensive document, as with the other sources of design guidance selected, it does not appear to address a comprehensive design strategy for egress from domestic dwellings in the event of a fire. Furthermore, minimum standards for storage have not been identified to reflect the range of assistive technologies currently deployed in people's homes, and there is an apparent contradiction in the standards set for 180° wheelchair turns.

Although there is evidence to show that wheelchair housing design has evolved over time and has become more inclusive for a wider range of wheelchair users, there remains some tension between emerging good practice in design guidance for wheelchair users and the actual funding mechanisms for new build wheelchair dwellings in Northern Ireland.

As more inclusive design standards have emerged there has also been a gradual increase in some of the space recommendations for specific elements of wheelchair standard housing. Although these increases in space allowances are relatively small, they can be highly significant for wheelchair users and their carers.

However, recommended increases in space allowances are not necessarily reflected in the overall footprint for new build wheelchair standard housing and funding is largely determined by a banded classification of the overall area of the home.

A critical issue for debate is whether new build schemes are customised to the specific needs of known wheelchair users, or there is an attempt to find more universal design solutions for all new build wheelchair standard housing. The baseline spatial blueprint for wheelchair standard housing is largely based on the space requirements of independent wheelchair users, using 8L type wheelchairs that have been described as 'standard' wheelchairs (Goldsmith, 1976). Self propelling manual wheelchairs have the smallest space requirement. Current wheelchair housing design guidance, defaults to the minimum space standard, not an average or inclusive standard.

The needs of wheelchair users can change over time due to the progression of underlying medical conditions and the ageing process and some people who had been independent wheelchair users required powered wheelchairs later in life.

A more inclusive design approach to new build wheelchair standard housing therefore, has the potential to reduce the need for expensive, time-consuming and disruptive adaptations.

Research Objectives

1. To outline the functional, social and financial circumstances of people in wheelchair standard housing,
2. to identify the nature of the informal and formal care provided in the home,
3. to identify the levels of satisfaction with general aspects of the home and surrounding environment,
4. to identify specific consumer satisfaction with key design elements in wheelchair standard housing and offer an analysis of the findings,
5. to establish if current wheelchair standard housing provision meets the needs of today's wheelchairs users, given the social, legislative and technological changes that have taken place over the past 30 years,

6. to find out if good practice design principles for wheelchair users and their carers can be taken from adaptation of housing and transferred into the design of new build wheelchair standard schemes and vice versa,
7. to promote the development of products, fixtures and fittings that will effectively meet the needs of wheelchair users and carers, and
8. to identify further areas of research into wheelchair standard housing.

Methodology

The methodology incorporated a number of elements;

- An extensive literature review relating to wheelchair standard housing was undertaken and utilised to identify trends and areas for future design development and to formulate key aims for the study.
- An analysis of wheelchair provision was carried out to identify and quantify the number and type of wheelchairs in use, as different wheelchair types have variable performance characteristics and spatial requirements.
- Semi-structured interviews were completed with key managerial and technical personnel within the Regional Disablement Services to identify data that may assist with the future planning of new build wheelchair housing in Northern Ireland.
- In depth interviews with a broad spectrum of wheelchair users from different age groups, in varying household tenures, were facilitated from a variety of operational sources. In total 31 participants were interviewed, 16 from the North-West and 15 from the greater Belfast area. Eight people also participated in the pilot study.

Semi-structured interviews were carried out with all 31 participants. The survey was in two parts.

1. *Satisfaction survey of wheelchair users.*
   Face to face semi-structured interviews were carried out with participants, providing a quantitative analysis of participant's satisfaction levels with the design of their homes.
2. *User centred design survey.*
   This part of the survey provided qualitative analysis of activities undertaken in the home by participants and their carers, and highlights the impact that housing design can have in facilitating or hindering such activities.

Narratives from four participants illustrates the diversity of needs experienced by wheelchair users and their carers and demonstrates the integration of design elements in people's homes in meeting human need.

Key Findings

Findings from social survey of 31 wheelchair users
Profile of respondents

- 20 participants were male and 11 were female.
- The diversity in age of wheelchair users is reflected in the fact that the youngest participant was 5 years old and the oldest was 87 years old.
- The majority of participants (17) were Housing Executive tenants.
- Almost all participants (27) had lived at their present address for more than four years.
- Two-thirds of dwellings (20) had been adapted to meet the needs of the wheelchair user and eight had been purpose built to wheelchair standard. The remaining three dwellings had either not yet been adapted or were in the process of adaptation at the time of interview.
- 26 participants had difficulty with personal care,
- 25 reported some degree of sensation loss,
- 25 had difficulty in reaching cupboards, washing line and bending down, and
- 22 had continence problems.

Participants used a variety of wheelchairs, (all participants had more than one wheelchair)

- 17 participants used a wheelchair pushed by another person.
- 13 used a self propelling wheelchair.
- 8 used a powered outdoor/indoor wheelchair.
- 3 used a powered outdoor wheelchair.

- 13 participants were assisted wheelchair users; seven were independent wheelchair users who needed assistance with transfers to bed and five described themselves as independent wheelchairs users. The remaining participants were either assisted wheelchair users who could walk with the help of a carer or walking aid (3), occasional wheelchair users, primarily outdoors (2) and an independent wheelchair user who could walk with aids or with the help of a carer (1).

Although participants received care from a variety of sources, the majority (24) received care from family living with them in the home.

Twenty-three participants received help with household tasks, of these help with household tasks was provided for 18 participants by family. The remaining 5 participants received help from statutory carers or friends. Twenty-four participants received help with personal care, of these 13 received care from a combination of family and carers and 11 received help from carers alone. The combination of care provided by family and statutory carers underpins the need for wheelchair standard housing to provide a homely atmosphere for families and a safe workplace for carers.

Satisfaction with design and layout of home

- Almost all participants (28) were very satisfied/satisfied with the number of bedrooms in their home.
- 20 participants stated that the design of their home met the needs of family and friends staying over. However one third (10) stated this was not the case, stating there was too much equipment and not enough space to store it and rooms were not large enough or there were not enough bedrooms to accommodate family and friends staying over.
- Almost two-thirds of participants (20) were very satisfied/satisfied with the design and layout of their home, eleven were dissatisfied. Space restrictions, lack of storage and problems with exterior surroundings were given as reasons for dissatisfaction.
- Of the 20 participants who were satisfied with the design and layout of their home 12 stated that having good neighbours, living near family and friends and amenities was more important than design and layout.
- Almost all participants (28) said their home met their needs better now than before moving or having their home adapted. The majority (24) said that having facilities on the ground floor met their needs better.

Findings from User Centre Design Survey

The technical survey was based on a user centred design approach, which recognises the importance of human activity analysis as an effective research tool. This approach explores the interplay between the activities undertaken in various parts of the home and the impact of assistive technologies and environmental design in facilitating or acting as a barrier to activity.

The findings are explored under three sections

1. external design features,
2. internal design features and
3. services and controls.

The review of literature identified twenty-six design elements that are considered good practice in wheelchair standard housing. This study has shown that a full range of these design elements was not always present: much of the housing surveyed (two-thirds) was adapted older stock, while newer housing had been built to varying wheelchair standards.

There was a desire among participants, whether living in older or new build housing, to retain a homely atmosphere for the wheelchair user and other family members.

External design features

Location

Convenience of location, being near shops and amenities, being close to and having access to family and friends, integration into the local community, and the absence of anti-social behaviour, are key features influencing the quality of a wheelchair user's life.

Transport

Few of the participants surveyed used buses or trains, citing environmental barriers and inaccessible transport

as reasons. The majority of participants (21) had a car; the remainder used accessible taxis, community transport with tail lifts, powered wheelchairs for short journeys or a powered scooter. Since this study was completed there has been substantial investment in new accessible buses and trains. This investment is a direct result of the Disability Discrimination Act 1995. The impact this investment will have on the lives of wheelchair users will require further research in the future.

Gardens
For some participants gardens were too large and difficult to maintain, a small low maintenance garden area with raised beds accessible to wheelchair users was preferred.

Car ports
A small number of participants had covered car ports that provided privacy and protection from the weather when transferring form car to wheelchair. This area also provided additional storage space or a place to keep household pets. Additional space is required for adapted vehicles with rear entry access.

Ramps
Nineteen dwellings in the survey had a ramped approach to the dwelling and 12 had a level or gently slopping approach. A level approach was preferred as participants felt it was less stigmatising, was less strenuous to negotiate and did not signal vulnerability.

Entrance
Some participants were concerned about escape routes in the event of a fire. In some homes escape was only possible via one entrance. There was also some difficulty with paramedics accessing homes where the front entrance was designed to accommodate a wheelchair. Traditional corridor and door allowances could be quite restrictive, especially if a stretcher needed to be brought into the home. Where people required frequent paramedic assistance, linear access to the disabled persons bedroom via patio doors, provided easy access in some instances.

More than half of all participants (16) had a canopy and lighting at the front entrance to their home. Lighting gave a sense of security, whilst a canopy provided weather protection.

Internal design features

Doorways and corridors
The design of doorways and corridors are important factors in wheelchair standard housing and must be considered together, as consumer satisfaction is dependent on both. For example, the narrower the corridor the wider the door needs to be. When corridors are too narrow access to areas such as siblings/children's bedrooms can be compromised. Epioc (electrically powered indoor outdoor chair) wheelchair users in particular need more turning space due to the larger dimensions of the wheelchair.

An effective clear opening width of doors and corridors was often compromised by design features such as large front door handles, radiators, door stops, fuse and meter boxes and health service equipment such as hoists and wheelchairs. Health service equipment was sometimes stored and charged in corridors because of lack of appropriate storage space in other rooms, including bedrooms.

Flooring
Laminate flooring when used in homes offered less rolling resistance for wheelchair users than carpet. Participants found this type of flooring easy to clean and it reduced the accumulation of dust.

By contrast dissatisfaction was reported with non-slip ceramic tiles in bath and shower rooms. The general appearance and difficulty in cleaning this type of tile were cited as reasons for dissatisfaction.

Showers
There was a high level of satisfaction among participants (23) with shower rooms. However design improvements are required in specific areas, for example;

- flooring can be uneven resulting in equipment becoming unsteady,
- poor water containment - resulting in carers and floors getting wet,
- difficulty in using half height shower doors resulting in wear and tear.
- inadequate space in shower rooms for equipment and carers.

Living rooms

Seven participants reported that living room space was inadequate to accommodate the wheelchair user and to provide sufficient space for wheelchair manoeuvring. Comprehensive minimum standards for living rooms in wheelchair standard housing have not been established.

Kitchens

A significant number of kitchens had not been adapted for wheelchair users. In these instances the wheelchair user depended on family members for preparing and cooking meals. It was noted that minor modifications to the kitchen area, such as a snack preparation area at wheelchair height, would promote independence for some wheelchair users and reduce the work load for carers. The majority of participants (22) had problems with continence. In most homes surveyed there was an absence of a separate utility room, therefore clothes were washed in a washing machine in the kitchen, where odours and condensation can build up.

Dining area

There were high levels of satisfaction with dining facilities. However in three instances the dining area was used to store equipment or the dining area was too small to accommodate the disabled person while in a wheelchair. In these instances participants ate from a tray or trolley in the living room on their own.

Bedrooms

Most participants were satisfied with the number of bedrooms (28) in their home. In many cases the bedroom design had been customised through adaptations.

Due to the complexity of care required by some wheelchair users, consideration needs to be given to both nursing and other essential independent living equipment used in the bedroom, and the requirement for additional electric power outlets.

Through floor lift

Where a through-floor lift had been installed, it was found that participants were able to access rooms on the first floor. This was particularly useful were the participant had child care responsibilities, as children could be supervised.

Services and controls

There is a large degree of compatibility between design principles incorporated in 'secured by design' and accessibility guidance.

Nevertheless, further research and development is required in the evaluation and selection of door and window locking systems that are secure and accessible to wheelchair users, and meet fire egress requirements.

Sensory loss

In 2003 Royal National Institute for the Blind (RNIB) Cymru published Housing Sight. This publication recommends a range of design standards for people with sight loss, an area in which there has been a relative deficit of design guidance applied to housing. Many people who are wheelchair users may also have some degree of sight loss or disturbance (seven were identified in this survey) and, as many of these recommendations are low to medium cost if incorporated into new build housing, it is recommended that they be given further consideration in new build schemes.

Communication technology

A wide variety of communication technologies were used in participants homes. These technologies were highly valued in terms of both personal security and to overcome social isolation. Nevertheless there was some evidence of under use of 'life line' type technologies, because of fear of accidental activation or the wheelchair user feeling self-conscious about wearing certain body worn controls. Further product development in this area is needed.

Storage

Internal storage was the single biggest source of dissatisfaction amongst participants (13). A survey of equipment showed that wheelchair users have greater storage requirements (in addition to every day needs) than non-wheelchair users.

Consequently consideration should be given to storage areas that are convenient, visually non-intrusive and comply with health and safety standards. There is a need not only to take into account storage areas in rooms, but also to examine the internal design of wardrobes and

cupboards to make optimal use of storage space that can be easily accessed and used by wheelchair users.

Equipment

The relationship between the provision of wheelchair standard housing and the need for assistive technologies requires a higher level of joint planning between HPSS, housing providers and service users. The survey found that all wheelchair users had more than one wheelchair; this was in addition to other essential equipment used for everyday living and nursing care.

Conclusions

The provision of wheelchair standard housing was enshrined in legislation passed in the 1970s. In the intervening years wheelchair standard housing design guidance has gradually evolved to meet the varying needs of wheelchair users. However, the diverse and changing needs of wheelchair users and the multiplicity of disabilities that some wheelchair users experience, for example, communication difficulties, hearing and sight loss, have not always been incorporated into design guidance and new design strategies are required to meet these needs.

There was evidence that some participants had been subjected to anti-social behaviour, aimed specifically at their disability. In some instances, participants relocated to less accessible housing, where they experienced a higher level of community support. Environmental design has a positive role to play in addressing some of these concerns. For many wheelchair users, location can be as important as housing design in determining satisfaction and well being.

Wheelchair users received care from a variety of sources, including family and statutory carers. While a house is the wheelchair user's home, it may also be the workplace for statutory carers. Therefore support and care must be provided in a comfortable and safe environment that adequately meets the needs of all involved. Providing support with household tasks can impact on design requirements in kitchens, while support with personal care can impact on the design of bedrooms, bathrooms/ shower rooms, WCs and living rooms.

In this study good practice in wheelchair standard housing effectively addressed a complex range of human needs including:

- personal security and safety,
- reduction of pain,
- maintaining thermal comfort,
- sensory stimulation,
- dignity and privacy,
- independence,
- autonomy,
- communication within the family and with the "outside world,"
- enhancing family relationships,
- maintenance of intimate relationships,
- child care and development,
- relieving physical and emotional stress for carers and
- social inclusion and reduction of social isolation.

Wheelchair housing design guidance and implementation varies. This triggers a debate as to what constitutes best practice. Good practice was identified in both new build and adapted property. Best practice could be achieved by integrating these elements into a revised wheelchair housing blueprint. In developing new build wheelchair standard housing for the future, accessibility design guidance needs to be considered alongside secured by design and "Eco homes" policy and guidance.

While most participants surveyed, were generally satisfied with their homes, some fundamental flaws have been identified in the spatial planning principles applied to wheelchair standard housing. Dissatisfaction also arose with design detail in the following areas; gardens, space for wheelchair manoeuvring, water containment in shower areas, flooring, in particular ceramic non-slip tiles, accessible pathways to key neighbourhood facilities and storage for equipment and clothes.

There was a desire by participants to maintain a homely atmosphere, where equipment could be kept out of sight and where the exterior of the home was not conspicuous, for example having a graduated entrance rather than a ramp where feasible and having more choice regarding fixtures.

It is acknowledged that while significant advances have been made in the design of wheelchair standard housing and that enormous health and social benefits are delivered through housing adaptations and new build programmes, there is still scope to create a more inclusive blueprint for the next generation of wheelchair standard homes.

Recommendations

- Invest in accurate computerised housing databases that can identify the need for and availability of wheelchair standard housing.
- Develop interagency collaboration between the NIHE and the Regional Disablement Services/ Occupational Therapy services that provide wheelchair services in Northern Ireland. The transfer of data from one agency to another (subject to data protection protocols), would give the earliest possible indication of the emerging need for new wheelchair standard housing.
- An inclusive design process should be further developed for future reviews of housing design standards which involves disabled people, their families and occupational therapists in the evaluation and development of design standards in collaboration with designers, housing providers and planners. This will help combine expertise and experience of disability with technical expertise to form an effective quality improvement cycle.
- The health and social benefits of wheelchair standard housing need to be given a higher profile and disseminated to housing planners, housing providers and the general public.
- Training should be provided for people involved in the housing allocation process, regarding the limitations of adapting lifetime homes for wheelchair users.
- Good design practice from the housing adaptations programme and new build schemes should be brought together.
- 'Secured by Design' principles should be promoted and combined with wheelchair standard access guidelines for new schemes with careful selection of door and window locks.
- There is a need to develop interagency planning (DSD, NIHE, DHSSPS and HPSS), regarding the deployment of certain types of assistive technologies which impact on housing standards, for example, communications technology, home security, lifts /ceiling mounted hoists and environmental controls.
- Best practice in relation to slip resistant flooring for wet floor areas should be established.
- Best practice in achieving access with effective water containment in level access shower design needs to be established
- Consideration should be given to radiator free heating systems within the context of renewable energy policies.

Recommendations for further research

- There is a need to invest in further anthropometric research to identify the spatial needs of assisted wheelchair users and carers in a variety of home settings.
- A technical and user evaluation of prefabricated building technologies should be undertaken with a view to considering these technologies for housing in Northern Ireland.
- An investment appraisal of a more inclusive and larger blueprint for wheelchair standard housing should be carried out incorporating current good practice established for design elements in new build and adapted property.

Introduction

Introduction

i. The 'Dwellings for Wheelchair Users' research was jointly commissioned by the Department for Social Development (DSD) and the Northern Ireland Housing Executive (NIHE), following a review of current literature that identified a requirement for focused feedback from wheelchair users on the design of wheelchair standard property.

Purpose of the study

1. To systematically evaluate core design features present in both new build and adapted wheelchair standard dwellings from both user and provider perspectives.
2. Identify evidence of good practice and areas which require further development.
3. Data will help to inform the development of new build wheelchair housing standards and identify areas for product development and assist with future reviews of design elements within new build or adaptation design guides.

ii. This study will not produce a comprehensive wheelchair housing design guide, a guide will be published by Habinteg - England later this year. Readers are also referred to the NIHE publication 'Inclusive Design Through Home Adaptations' which reflects current good practice when adapting housing to wheelchair standard in Northern Ireland

iii. At the time this research was taking place:

28,000 people were in receipt of wheelchair services from the regional disablement services at Musgrave Park Hospital, Belfast.

3,808 requests for wheelchairs, were logged with the regional wheelchair services in 2002-2003 (not all will be first time wheelchair users).

In addition, many people have also purchased wheelchairs and scooters from private suppliers.

iv. In practice the wheelchair using population is living in a variety of settings, from their own homes in various tenures to residential, nursing homes and continuing care settings. Where people live in housing designed to wheelchair standard it may be achieved through a mixture of adaptations to their existing home or transferring to purpose built wheelchair standard housing.

Background to study

v. It may come as a surprise to many people that the concept of wheelchair standard housing only emerged in the 1970s. The Chronically Sick and Disabled Persons Act 1970 Section 3 placed a duty with local authorities to consider the needs of disabled people. This development acted as the catalyst for the development of wheelchair standard housing in the UK. Since the 1970s further design guidance has led to variations in the interpretation and design of wheelchair standard housing (see Table 2, chapter 2 for a comprehensive overview of evolving trends).

vi. With the implementation of The Community Care Act in 1990s, (People First policy in Northern Ireland), people were increasingly supported in their choices to return to, or remain in their own homes. People with higher levels of dependency, whose needs would previously have been met in hospital or continuing care environments, received this care in their own homes.

vii. A greater emphasis was also placed on safety for both the person with a disability and their carers as a result of the Manual Handling Operations Regulations 1992. In cases where people needed assistance to move or required personal care, occupational therapists and other health care staff undertook formal ergonomic assessments which resulted in the provision of equipment, supplied by Health and Personal Social Services Trusts (HPSST)

to assist with safe moving and handling (National Back Pain Association, 1997). This analysis also resulted in recommendations for environmental adaptations to promote a safe care environment for all concerned.

Musculoskeletal Injury

viii. The cost of musculoskeletal injury to society as a whole was £5.7 billion in 1996/1996 (Health and Safety Executive, 2004). A proportion of this injury is directly related to environmental design. The health and safety of care workers and family who offer personal care in the homes of disabled people merit particular attention as wheelchair standard accommodation can resemble the environment found in residential care homes where there is a high level of reportable non fatal injury, much of which is associated with moving and handling

Practice versus Design Theory

ix. When occupational therapists applied design guidance (Goldsmith: 1976) which was considered best practice at that time (1990s) to situations where wheelchair users needed personal assistance to transfer from a wheelchair, there was often insufficient space to allow for carers and equipment. These practice issues highlighted the need for supplementary research in this area.

Review of Housing Design

x. A review of the adequacy of housing design guidance for assisted wheelchair users and carers was undertaken (O'Brien, 1999) and a number of methodological limitations were identified in the anthropometric and ergonomic evidence underpinning Goldsmith's design standards. It was also clear that space allowances and other design considerations relating to new assistive technologies (e.g. hoists and mobility aids) used in the homes of assisted wheelchair users did not fully reflect community care requirements.

Review Findings

xi. The review concluded that, although Goldsmith's design standards are largely reliable for independent wheelchair users (people who can independently propel and transfer from a wheelchair), they did not fully consider the needs of assisted wheelchair users (people who need assistance to move from a wheelchair) and carers and that further research was required to supplement existing design guidance.

xii. Further evidence of the need for revision of wheelchair housing design standards came with the publication of BS8300: Design of Buildings and Their Approaches to Meet the Needs of Disabled People (2001). This British Standard was underpinned by extensive study of the ergonomics of wheelchair usage and addressed a number of the methodological limitations of earlier work.

xiii. During the revision of design standards for housing adaptations in Northern Ireland (Housing Executive, 2003) BS 8300 was used alongside evidence of good practice gleaned from case studies, to create more inclusive design standards which better reflect current community care needs. Nevertheless, further research to calculate activity space requirements for people with complex disabilities and those who care for them is still required.

xiv. In 2002 an international conference on the anthropometrics of disability (the science of measuring body size, strength and the space in which the body functions) convened in Buffalo USA to determine how US access standards and product design could be strengthened for disabled people and carers by the development of improved anthropometric data collection methods. It was concluded that more research is required on the anthropometry of disability to fully inform US access codes and environmental and product design in general.

One of the recommendations of this conference was to develop human computer modelling to

enhance the understanding of the environmental design needs of disabled people and carers (Steinfeld et al. 2002)

New Build Standards

xv. There is now a situation where elements of our new build standards for wheelchair housing may lag behind design standards for housing adaptations in Northern Ireland (Housing Executive, 2003). Elements of good practice from the Housing Executive/Health and Personal Social Services Trust adaptations activity may be transferable to new build wheelchair housing situations and vice versa.

Lifetime homes versus wheelchair standard housing

xvi. The advent of Universal Design approaches (Preiser, 2001) has also had a major impact on the planning for accessible housing. There is a 'quest' to design a mainstream house type, which will meet the needs of all users. This quest has proved to be elusive. The advent of Lifetime Homes has been heralded as a move in this strategic direction, in that the 17 design features either reduce the need for, or ensure more cost effective adaptations when needed. However, recent research to evaluate Lifetime Homes in Northern Ireland (Blythe et al, 2002), showed that lifetime homes cannot always be adapted cost effectively for assisted wheelchair users. Lifetime homes have the potential to meet the needs of short-term wheelchair users or people who use wheelchairs for outdoor mobility only. However, Lifetime Homes have real limitations in meeting the needs of everyday wheelchair users particularly those who require personal care and equipment.

Research into Lifetime Homes

xvii. The research into Lifetime Homes in Northern Ireland has influenced the development of the London Plan (GLA, 2004) which now requires all new build housing, regardless of tenure, to provide a mix of lifetime homes and a 10% quota of wheelchair standard housing or housing that is easily adaptable for wheelchair users.

Planning Considerations

xviii. Housing planners need to determine the respective design standards for lifetime homes and wheelchair standard housing and an appropriate ratio for new schemes. The optimum ratio of lifetime homes to wheelchair standard housing requires a separate study considering allocations policy in addition to strategic and operational needs assessment techniques. This study has explored one method of predicting future wheelchair housing need by examining regional wheelchair trends in provision.

Key aims and objectives

- To outline the functional, social and financial circumstances of people in wheelchair standard housing;
- to identify the nature of the informal and formal care provided in the home;
- to identify the levels of satisfaction with general aspects of the home and surrounding environment;
- to identify specific consumer satisfaction with key design elements in wheelchair standard housing and offer an analysis of the findings;
- to establish if current wheelchair standard housing provision meets the needs of today's wheelchairs users, given the social, legislative and technological changes that have taken place over the past 30 years;
- to find out if good practice design principles for wheelchair users and their carers can be taken from adaptation of housing and transferred into the design of new build wheelchair standard schemes and vice versa;
- to promote the development of products, fixtures and fittings that will effectively meet the needs of wheelchair users and carers; and
- to identify further areas of research into wheelchair standard housing .

The preparatory work and pilot study commenced in 2004 and the main study commenced spring 2005. The study was completed in November 2005.

Sample

Sample Frames

ixx. - It was proposed that a random sample of the wheelchair user population would be extracted from The Northern Ireland House Condition Survey (2001, Housing Executive) database and from various other databases, including the Housing Executive Prawl and housing association housing lists. The sample would concentrate on dwellings that had been adapted or purpose built to wheelchair standard and cover a spectrum of tenures, age groups and types of wheelchair users.

Pilot Study

xx. A pilot study of eight participants commenced in spring 2004. Due to a number of operational difficulties, the pilot study was postponed and was concluded in April 2005. During this stage of the survey, difficulties with the extracted sample became apparent. It was found that, although some of the participants in the pilot sample had a disability and some adaptations had been carried out on their property, most participants did not use, or never had used, a wheelchair.

Sampling Sources

xxi. With these difficulties in mind, it was concluded that a sample representing a broad spectrum of household tenures, age groups and types of wheelchair users, would be taken from other sources. These included:

- Housing Executive Welfare Officers and Architects,
- Disability Action and other community and voluntary sector bodies,
- occupational therapist client lists in HPSS Trusts, and
- other wheelchair users. -

In total, 31 wheelchair users were identified, 16 from the North-West area and 15 from the greater Belfast area.

Diversity of Sample

xxii. To ensure the sample included a broad spectrum of the wheelchair using population in a variety of tenures, the following criteria were used.

Housing Tenure

- New build wheelchair standard housing
- Housing which had been adapted to wheelchair standard -
- Housing Executive dwellings
- Housing Association dwellings
- Owner occupiers who had received Housing Executive grant aid to adapt their home -
- Owner occupiers who have used personal resources to build their own home without statutory assistance.

Wheelchair users

- Children
- Adults
- Older people
- People living alone (or with the support of statutory carers)
- People living with families

Wheelchair types

- Manual self–propelling
- Attendant propelled manual wheelchairs
- Indoor powered wheelchairs
- Electrically powered indoor/outdoor wheelchairs
- Electrically powered scooter

Methodology

Literature Review

xxiii. Electronic and manual searches of literature relating to wheelchair standard housing have been compiled and utilised to identify key strategic trends and areas for future design development. This data was then used to formulate key aims for the study. In addition an associated literature review of other 'non design' issues impacting on wheelchair housing was also undertaken to provide the reader with an overview of inter-related issues.

Wheelchair provision trends in Northern Ireland

xxiv. A statistical analysis of wheelchair provision trends was undertaken to identify the volume and type of wheelchair provision. Data on volumes is useful to assist with the prediction of the requirements for new build wheelchair housing each year.

Data on wheelchair type was utilised to predict the impact on spatial design requirements in people's homes, as different wheelchair types have variable performance characteristics.

To gather this data semi - structured interviews were undertaken with key informants both technical and managerial in the wheelchair service to identify information which may assist with the forward planning of new build wheelchair standard housing in Northern Ireland

A comparative chart of wheelchair housing standards 1974-2004

xxv. Comparative charts of four selected design standards applying to wheelchair standard housing in Northern Ireland have been compiled.

- HDDOP 2/75 Wheelchair Standard Housing (1975)
- Habinteg Design Guide- Ulster (1996)
- NATWHAG Wheelchair Housing Design Guide (1997)
- BS: 8300 Design of Buildings and their approaches to meet the needs of disabled people – Code of practice (2001) (Applied to adaptations only at this time)

These charts facilitate direct comparison of design elements and allow the reader to track the evolution of these standards over time. These standards are then critically appraised against the needs of wheelchair users and future design issues highlighted.

Survey of Wheelchair users

xxvi. Face to face semi-structured interviews were carried out with participants, providing a quantitative analysis of respondent's satisfaction levels with the design of their homes.

User Centred Design Survey

xxvii. The user centred design survey is a qualitative analysis of activities undertaken in the home by participants and carers. This part of the survey highlights the impact that housing design can have in facilitating or hindering such activities.

Participatory research approaches

xxviii. The principle that users of services should be involved in decisions that affect them is now generally supported (Joseph Rowntree Foundation, 2005). Participatory research principles (Kelmshall and Littlechild, 2000, The Joseph Rowntree Foundation, 2005) have been considered and implemented in the following ways:

- Disability Action and a wheelchair user/ architect, with direct experience of the housing adaptations process were invited to participate in the reference group to guide the general direction of the study.
- Wheelchair users helped to shape the format of

the pilot questionnaire

- "Narrative" has been used alongside quantitative data compiled from the surveys so that the "voices" of wheelchair users can be heard in addition to statistical data gleaned on consumer satisfaction relating to design.
- Of the 31 participants who took part in the survey, four gave consent for their individual stories to be shared in order to highlight the diversity of needs arising and the impact of housing design on quality of life.
- A copy of the draft report was shared with the four participants for further comment and approval.
- The structure of the report has a user centred structure, identifying and systematically responding to the design needs of disabled people.

Interviewee

xxix. Where the wheelchair user was a minor or was unable (due to the extent of disability) to take part in the interview process, the interview was conducted with the parent/guardian or primary carer

Interviewee	*Number*
Wheelchair User	17
Parent/Guardian	10
Primary Carer	4
Total	**31**

Through Our Eyes (Participants Personal Stories)

xxx. These narratives illustrate the diversity of needs experienced by wheelchair users/carers and demonstrate the integration of design elements in people's homes in meeting human need.

The studies present good practice and suggest solutions to problems encountered in wheelchair housing, illustrating with photographs, drawings and scaled plans.

Methodological issues arising from the pilot study

xxxi. Two of the most significant issues arising from the pilot study when using current computer generated housing lists was the difficulty in identifying homes that were designed to wheelchair standard and whether wheelchair users actually lived in these dwellings. This was particularly evident in adapted properties. While such data were available in manual files based on OT recommendations, it was not possible to identify addresses accurately from electronic data bases. This problem was less evident in new build wheelchair standard housing association property where housing standards are known at the outset.

Because of the inevitable environmental variability which occurs in adapted property, it is easier to measure the effectiveness of wheelchair housing design standards against a range of wheelchair user's needs in new build wheelchair standard dwellings. However, by evaluating the design solutions which have emerged from customised adaptations and comparing these against base line standards for new build housing, one can identify areas of good practice which have emerged from the housing adaptations programme and consider utilising some of these elements as standard practice in new build housing.

Recommendations

xxxii. The difficulty in identifying both wheelchair standard adaptations and wheelchair users, highlights the need for further investment in the development of accurate housing registers of disabled persons in Northern Ireland, so that housing planners/providers can accurately match the needs of wheelchair users to the features available in either adapted or new build dwellings. The Greater London Authority (GLA, 2004) and other local authorities in the UK are currently undertaking significant work in developing

methods of identifying accessible housing. Good practice from these projects should be considered in Northern Ireland.

Ethical Considerations

xxxiii. The methods used in this study have been non-invasive and, the research has been participatory (Barnes et al, 2002) which can be empowering for service users, the following ethical issues have been considered:

Health and Safety Issues

xxxiv. Where health and safety issues were identified by the study, researchers would seek consent to discuss these issues with housing providers/ occupational therapy services.

Confidentiality

xxxv. While some participants were happy to be identified so that the 'voice of the user' could be heard by service planners, others wished to remain anonymous and the researchers complied with their wishes.

Consent

xxxvi. Where the study used data, photographs or narrative (see 'Through Our Eyes'), which might identify the wheelchair user, the researchers obtained full written consent. Participants also had the opportunity to read copies of the text, comment on the material and to give approval for its use in the final publication.

Participants were advised that they could withdraw from the project at any stage.

Standards

This research was undertaken in accordance with the Market Research Societies code of conduct 2005.

Literature Review

1. Dwellings for Wheelchair Users

This research was jointly commissioned by the Department for Social Development (DSD) and the Housing Executive (HE). It will look at the experiences of wheelchair users in dwellings specifically built or adapted for their needs. The project examined dwellings built by the Housing Executive, housing associations, owner occupiers who have utilised Housing Executive grant aid to adapt their homes and owner-occupiers who had used personal resources to build their home without statutory assistance. The research has identified levels of customer satisfaction with various aspects of design, with a view to modifying future design specification. The first aim for the 'Dwellings for Wheelchair Users' project was to compile a literature review within this sphere and to ascertain methodologies used. The following is a brief description of publications reviewed, findings and a brief evaluation of each report in terms of their use, as a foundation for this specific research.

2. Awang D (2004), Building in Evidence: Reviewing Housing and Occupational Therapy. London: College of Occupational Therapists

This comprehensive review was commissioned by the College of Occupational Therapists Specialist Section in Housing (COTSSIH) and undertaken between June 2002 and May 2004. The review involved the examination of over 130 publications and grey literature items, including unpublished works, of these 35 items have been selected for presentation within the review. This includes 20 published works and 15 items of grey literature.

The aims of the review were to:

- identify and appraise the quality of selected published and grey literature on occupational therapy and housing;
- examine and critique the research methods utilised in this area of research;

- provide an overview of the current evidence base that could assist OTs working in the field of housing and adaptation work;
- identify where work has occurred and where gaps in knowledge exist; and
- identify research priorities in housing and OT and provide recommendations to assist the development of the COTSSIH Research and Development Strategy. -

Although most of the articles reviewed relate to the process of delivering housing adaptations, a number of the studies have direct relevance to the design of wheelchair standard dwellings.

3. Blythe A, McDaid S, O'Brien P (2002), Lifetime homes in Northern Ireland: evolution or revolution. Belfast: Chartered Institute of Housing (NI) and Joseph Rowntree Foundation.

   This report evaluates the benefits of Lifetime Homes for disabled and non-disabled people. It undertakes an economic analysis of up lifting the existing building regulations and defines the parameters of adapting Lifetime Homes for wheelchair users.

4. Centre of Accessible Environments and Lacey (2002), Planning your home for safety and convenience. London: Centre for Accessible Environments.

   This publication includes a chapter which provides useful suggestions for future proofing homes, making them safer and more convenient for residents and visitors. Checklists were also provided to help individuals assess the potential of a new property under key rooms/ areas, and practical suggestions were offered with regard to layout, basic equipment and fittings.

5. Heywood (2001), Money Well Spent: The Effectiveness and Value of Housing Adaptations, York: Joseph Rowntree Foundation/The Policy Press

   This comprehensive publication focuses on the benefits of housing adaptations for service users. Within this analysis Chapter 4 examines the reasons why housing adaptations may not have been effective. Problems with consultation and communications, inadequate specifications and poor quality implementation are highlighted. The issue of inadequate space is a significant theme.

6. Grisbrooke, J (2003), Living with Lifts: A study of users experiences. British Journal of Therapy and Rehabilitation, 10(2) 76-81.

   This study examined both the advantages and disadvantages of providing interfloor lifts from the service user and carers perspective, and is one of the few client centred studies on interfloor lifts available.

7. Payne A (1998), Report: Evaluation of bathing and showering adaptations for children with disabilities living in a greater London Borough. Brunel University. (Unpublished MSc)

   The benefits of various bathing and showering solutions for children and parents were acknowledged, and some areas of difficulty highlighted particularly, after-care and maintenance of facilities.

   Design related findings in this study included the difficulties parents encountered when using shower screens.

8. Atkinson B, Dodd T (2002), The Greenwich Wheelchair Site Brief, London: Greenwich Council.

   This guide was devised to achieve wheelchair user standards with footprints exceeding lifetime homes. Standards applied have conformed with Part M of the Building Regulations, British Standard 8300 and the NATWHAG Wheelchair Housing Design Guide. This guide offers a concise and informative area by area checklist of wheelchair standard design features.

9. Northern Ireland Housing Executive (2003), Inclusive Design through Home Adaptations, Belfast.

   This comprehensive guide to the processes and design standards relating to housing adaptations, considers existing statutory standards, emerging design

guidance and examples of good practice of housing adaptations in Northern Ireland. Comprehensive good practice guidance for wheelchair standard adaptations are outlined.

10. The Housing Corporation (1991), Housing For People with Disabilities: The Needs of Wheelchair Users.

This study examined the extent and level of housing needs of people with disabilities, in particular wheelchair users, in England, recommended how these needs might be best met within the Housing Corporation and how registered housing associations might best help in meeting these needs.

- The main part of the DoE's research aimed to provide reliable national and regional estimates of the need of subsidised housing provision for elderly people, including disabled elderly people in England.

Findings: Housing Needs Data

- Prevalence of disability was much higher than was previously thought.
- If people with disabilities are unable to travel, they are restricted to their local community, in turn restricting their access to employment and housing.
- The disposable income of people with disabilities was significantly less than that of the general population.

Findings: Housing provision

- Housing Associations accounted for 22 percent of all wheelchair dwellings, whilst accounting for only three percent of all dwellings. About one percent of all housing association stock was built to wheelchair standard, roughly equalling the proportion of wheelchair users in the population.
- There is a notable shortfall in the number of specialised dwellings for wheelchair users. -

Findings: Co-ordination of services

- Some local authorities have set up liaison groups involving different agencies with a view to improving the identification of housing needs and co-ordinating housing solutions.
- Voluntary agencies provide another way for people with disabilities to access services. They have a range of functions and may hold useful statistics, which are difficult to use for assessing overall housing needs.
- Most OT's would like to have more contact with housing associations. This would foster mutual understanding and improve service co-ordination.
- Simple questionnaires can be used to collect data on the housing needs of people with disabilities.
- It would benefit housing associations and local authorities to work closely with agencies and to formalise data collection systems.

Recommendations

- Local housing authorities were encouraged to assess the local housing needs of people with disabilities.
- Meet jointly with the Housing Corporation and social services departments to help assess local needs and determine local policies
- Note the apparent occupation of existing wheelchair units by non-wheelchair users.
- Seek to improve the monitoring of occupancy of existing wheelchair dwellings through the Continuous Recording of Lettings (CORE) system
- Examine with HOMES (the social housing mobility organisation) and others, how people with disabilities can be referred more efficiently to housing associations and other social housing providers which have vacant wheelchair and mobility units.
- Note the shortage of wheelchair dwellings and examine the case for incorporation of further wheelchair dwellings in their development programme.
- Consider value for money of wheelchair schemes.
- Assess the potential of existing stock to provide for the needs of disabled people through adaptation.

The report would be useful in terms of giving guidance on how records should be kept and maintained pertaining to wheelchair housing but not directly relevant to this specific research.

11. The Housing Corporation, Habinteg Housing Association and Papworth Trust (2001), 'Pathways to Accessible Housing' A guide to assessing the housing and support needs of wheelchair users.'

Policy Context

'Pathways to Accessible Housing' has been developed with the Supporting People agenda in mind. It will give local authorities the opportunity to reveal the extent of hidden need for alternative accommodation for wheelchair users (for example, among young adults living with their parents or middle-aged people in residential care homes) and for the support required to establish and sustain independent living. The implementation of 'Pathways to Accessible Housing' will facilitate the local authorities' strategic role as outlined in the Housing Green Paper. It will also enable the better assessment of the housing needs of vulnerable people as indicated by Planning Policy Guidance No. 3.

The 'Pathways' method makes explicit links between housing, support and care services. It will inform the Housing Investment Programme, joint investment plains and health strategies. It will also help housing providers consider their obligations in relation to the Disability Discrimination Act 1995.

The 'Pathways to Accessible Housing' Guide comes in two parts: Part 1 presents the policy context and research findings; Part 2 provides a hands-on toolkit for planners in local authorities to map supply and demand for wheelchair-accessible housing and adaptations. It also identifies additional care and support required for people to remain living independently in their own homes. The planning toolkit includes an interactive CD with a software analysis package and resources.

Set within this context, 'Pathways to Accessible Housing' provides a vital planning tool for local authorities, allowing them to assess the housing adaptation and support requirements of disabled people far more effectively than before.

Key Findings

In the process of developing and testing the model in the case study areas, the following key findings were identified. These findings highlight the importance of carrying out a 'Pathways' assessment:

- Existing information relating to the supply and ownership of accessible housing was fragmented and incomplete in most local authorities.
- There were no standard definitions for accessible housing evident across the study areas.
- When asked about the accessibility of their home, the largest proportion of participants said their home had no adaptations at all for wheelchair use.
- Findings in one case study area show that participants from ethnic minorities were more likely to live in housing with no adaptations.
- 40% of wheelchair users aged 18-34 lived with their parents or relatives.
- Only two districts were able to say how many of their accessible properties were actually occupied by wheelchair users or people with mobility difficulties. Wheelchair designed properties were often re-let to non-wheelchair users.
- Background national statistics researched by Pathways revealed that 33% of wheelchair users aged 65 + lived on their own.
- Approximately 40% of participants were not satisfied with their current housing. The most common reason cited for needing to move was that the design of their present home was not suitable.

The Planning Model

The planning model used surveys of wheelchair users and local housing providers to assess the local supply and demand related to:

- wheelchair accessible housing,
- voids, and unsuitable lets,
- adaptations,
- sheltered and supported housing, and
- care support

Outcomes

The Pathways to Accessible Housing model provides information on:

- people that need to move to alternative accommodation,
- the need for adaptations,
- the need for additional care and support,
- the total unmet need for wheelchair accessible housing.

This is a useful model particularly in the selection and allocation of wheelchair standard housing.

12. Goldsmith, S, Universal Design: A manual of practice guidance for architects

This book was written on the basis of the need for an authoritative design guidance manual on Universal Design. Broadly Universal Design means that the products designed, are universally accommodating, that they cater conveniently for all users.

The book is aimed specifically at practising architects and focuses mainly on the design of public and employment buildings and the component features of them. However, chapter nine refers specifically to social housing commissioned by housing associations with construction costs being funded by SHG (Social Housing Grant). The book highlights that when looking to apply the principles of universal design, the architects who plan and design low cost housing of this kind have a more challenging task than when designing more spacious and costly properties for individual private clients. The book states that, whether a house is large or small, the aim (as in other universal design arenas) is to expand accommodation parameters.

The standards to which SHG funded housing has to be designed are set out in the Housing Corporations 'Scheme Development Standards.' No overall standards are prescribed, but a requirement is that housing environments should be accessible. In this regard the standards for accessibility distinguish between general needs housing and wheelchair housing; the prevailing rule is that when social housing schemes are planned a proportion of them, for example five to 10 percent, should be wheelchair units for which access to the dwelling and rooms within it should allow for wheelchair circulation and manoeuvre. For the provision of wheelchair units the cost allowances applicable to general needs units increased.

The book outlines the plans for all social housing, i.e. ground floor flats, Lifetime Homes and two storey wheelchair houses.

The guide takes into consideration all mobility equipment: self propelled wheelchairs, attendant pushed wheelchairs, powered wheelchairs, shower chairs, electric scooters and child pushchairs. This book gives a good indication of where to start in terms of questionnaire design, either technical or social, to the needs of the client/respondent.

13. Thorpe, S, National Wheelchair Housing Association Group, Home Housing Trust (1997), Wheelchair housing design guide

This guide explains how to design and detail a home for wheelchair users.

The guide places emphasis on usability and the fact that no one who uses a wheelchair should

(as a result of the way their home is designed) be restricted in their independent use of it, nor should they experience indignity, unreasonable discomfort or inconvenience in carrying out essential activities.

The primary aim of the guide is to ensure that housing developers and builders provide homes which are fully accessible to wheelchair users. It is also invaluable in the design of:

- the one-off house designed around individual wheelchair users who may have significantly more demanding needs and the necessary financial resources;
- new housing where some degree of wheelchair usability is to be incorporated; and
- alterations to existing housing to achieve a wheelchair usability standard. This may be for rehabilitative purposes or for a specific adaptation to suit a known user.

The Leeman considerations, on which the guide is based, include:

- independence in managing domestic activities particularly personal ones are highly prized;
- there is no standard wheelchair user and that those who need to use a wheelchair in their own homes represent a cross section of the population;
- individuals tend to use more than one wheelchair, manual or electric and some people use larger outdoor vehicles such as scooters.
- wheelchairs vary in size and type, as do their users' abilities to control and manoeuvre them independently;
- the reasons why someone needs to use a wheelchair may have a bearing on their other physical and sensory capabilities: they may be able to reach only a short distance up, down and across. Even then they may not be able to reach backwards to a door handle or light switch. They may have difficulty managing controls and fittings. Needs also change through ageing and other factors;
- a person's perception or expectations of their home or desire to enhance it is not diminished because they need to use a wheelchair within it. Good design should seek to avoid such potentially negative aspects such as;
- damage to walls and doors;
- slip resistant floor surfaces that are difficult to clean;
- exposed pipe work under sinks; and
- sanitary fittings directly viewable from entrances.

Adaptations

Housing intended to suit a range of wheelchair users may need to be adapted:

- to allow for a persons changing needs or capabilities within their present home;
- to allow reasonable compromise to be achieved between wheelchair users and other household members;
- to suit successive occupants of a house, some of whom may have quite specific need; and
- to incorporate improved standards of communication, security and safety.

The guide states that built in adaptability which may increase initial costs significantly may not be appropriate but some provision to allow fine tuning or adaptation should be considered.

The guide also states that in terms of adaptations past experiences or research into future needs and developments will indicate what is likely to be commonly required.

If provision is carefully incorporated at the outset it may involve little extra cost. It may also avoid or limit expensive or disruptive subsequent work.

The guide is based on the findings of a group of people interviewed who represented a reasonable cross-section of abilities in family or individual home context, with varying equipment

and accommodation, who provided detailed information on key aspects of their home based activities. In most cases the people interviewed also engaged in constructive discussions on design requirements beyond their immediate surroundings.

The guide highlights a summary of requirements to check that a scheme or adaptation complies as follows:

- moving around outside,
- using outdoor spaces,
- approaching the entrance,
- negotiating the entrance door.
- entering and leaving, dealing with callers,
- negotiating the secondary door
- moving around inside, storing things
- moving between levels
- using living spaces
- using the kitchen
- using the bathroom
- using bedrooms -
- operating doors -
- operating windows -
- controlling services

This is a valuable document in terms of taking guidance in relation to the research about to commence.

14. **Statham R; Korczak, J; Monaghan, P (1988), DoE House Adaptations for people with physical disabilities: A guidance manual for Practitioners**

This is a case study report on people who are severely disabled and as a result of their problems and needs have special housing needs. The book is based on the pretext that there will rarely be a need for specialist housing that has been purpose designed and built but more likely suitable adaptations/modifications to the existing family home.

The manual was aimed primarily at OTs, architects, building surveyors, technicians, environmental health officers and housing and social services administrators. It was hoped it would also be of use to contractors engaged in house adaptation work for disabled people, and for disabled people considering adaptations to their home.

The manual reports on a wide range of typical house adaptation features such as ramped entrances, thresholds, kitchen modifications, roll-in showers, stair lift and through floor lifts. The principal sources of information in each case study were the client and household members. The manual, aside from the technical provision, has considered a range of other variables relating to the characteristics of the disabled clients and their dwelling.

In each case study the manual highlighted the problem that was presented and the therapeutic intervention given. The manual highlights the measures of success. Notwithstanding, in all the cases reported the disabled clients and their families were pleased with the eventual outcome despite the irritations, misunderstandings, delays and shortcomings that invariably accompany any major house adaptations.

As well as events that cannot be controlled e.g. the client dies or becomes permanently hospitalised, there is a family relationship breakdown, or despite much preliminary work being done, the client may decide they do not want the work to continue

There may also be other obstacles whereby a client's prognosis may be unreliable or unpredictable and adaptation work has not given due consideration to future needs.

The manual is based on the lessons learned from the case studies but acknowledges that they are not typical of all major house adaptations. The manual gives guidelines for assessment of need, for management and for designers. Consideration in each case was given to the individual, their property and adaptations required, on the basis of

mobility, personal care, w.c. requirements, dressing, bed, bathing, eating and drinking, domestic tasks, hobbies and interests.

This manual gives a good indication of where to start in terms of questionnaire design, either technical or social, to the needs of the client/respondent.

15. Ounsted, D (1987), Wheelchairs no handicap in housing: National Federation of Housing Associations

This publication is intended to help those who have little specialist experience - whether associations, co-operatives, local authorities, developers or architects - to accommodate the needs of wheelchair users in their housing programmes. It suggests principles to adopt and proposes ways of putting them into practice. It raises housing management issues which need as much careful thought as the design. Although the emphasis is on new build, the planning and management principles apply equally to the rehabilitation of older housing and to any major repair work which associations may carry out on their existing housing stock.

The publication is not designed to be a technical development brief. Rather, it is intended as easy reading which will generate ideas among committees of management and staff and encourage them to think about the diverse needs of physically disabled people in all their housing schemes, whether self-contained or shared for young or old people, for single people or for families.

The report has a checklist of questions for housing managers; consideration is given to development issues and design ideas which could be useful in terms of the research requested by the DSD.

Conclusions

All reports highlighted that wheelchair users are as varied in their needs and aspirations as able bodied-people.

When examining the literature on adaptations there was relatively few focused publications on the design needs of older and disabled people in relation to wheelchair standard housing. The research provided an ample supply of design guides and recommendations dating back to the 1970s, however, the approach taken does not seem to have changed greatly, but the nature of adaptations necessitates that they be reviewed more often and policy in this area be updated. Research demonstrated that there is no longer the demand for traditional or ordinary sheltered housing that has existed previously, as there is an increasing desire for elderly and disabled people to remain in their own homes, which can be facilitated by means of adaptations. The research available on DFGs etc. is wide ranging; however there is no information in terms of literature on the whole area of aftercare or suitability of adaptations. However, some research published by disability groups, has expressed the desire for a more hands-on service where each case is individually assessed as individual needs differ from person to person.

There was no research (there are more recent studies which this initial literature search did not identify - see list) on how adaptations met the needs of the disabled person or other family/household members and if in fact the adaptation had caused any problems for either the disabled person or their family/household members. There is a wealth of research on the functionality of design elements but no relevant information on the importance of family dynamics. There is a definite need to consider the housing requirements of the whole family, as well as social and community links within an area, in addition to the specific housing needs of the applicant. Research concluded that, whilst most local authorities carried out some form of post-completion inspection, in most cases it examined the quality of building work rather than the appropriateness of the adaptation. In a very small minority of cases local authorities carry out a review at a later stage to ensure the adaptation was appropriate and meeting the needs of the disabled person.

There is also a desire for more meaningful consultation: research conducted by Radar, the disability network, stated that over half of local authorities have no consultation with service users or feedback mechanisms and these authorities will have no real idea of whether their adaptations system is meeting the needs of older

or disabled people. These findings are backed up by research conducted by Pieda, who stated that authorities should ensure clients are kept informed of progress in processing their enquiry and ensure that they are aware of the next stage in the grants administration process and what action, if any, they need to take. Pieda also outlined the need for authorities to encourage the establishment of forums representing disabled people and, where such a forum exists, to seek feedback from them on the operation of the DFG system. Pieda stated authorities should also establish procedures for seeking feedback from those who receive DFGs. A few reports have been highlighted as useful documents on which to take guidance, in terms of moving the Dwellings for Wheelchair Users research forward:

- The Housing Corporation (October 1991), Housing for People with Disabilities: The Needs of Wheelchair Users.
- The Housing Corporation, Habinteg Housing Association and Papworth Trust (February 2001), Pathways to Accessible Housing' - A guide to assessing the housing and support needs of wheelchair users.
- Goldsmith, S, Universal Design: A manual of practice guidance for architects.
- Thorpe, S, National Wheelchair Housing Association Group, Home Housing Trust (1997), Wheelchair housing design guide.
- Statham, R. Korczak, J. Monaghan, P (1988), DoE House Adaptations for people with physical disabilities: A guidance manual for Practitioners.
- Ounsted, D (1987), Wheelchairs no handicap in housing: National Federation of Housing Associations.
- Heywood (2001), Money Well Spent: The Effectiveness and Value of Housing Adaptations. Bristol: The Policy Press/Joseph Rowntree Foundation.
- Awang, D (2004), Building in Evidence: Reviewing Housing and Occupational Therapy. London: College of Occupational Therapists.
- Goldsmith, S (1976), Designing for the Disabled. London: RIBA.

Chapter 1

Social Survey

Chapter 1
Social Survey

1.1 **A member of the Research Unit (Housing Executive) and two consultants, one an architect the other with a background in disability design research, carried out face-to-face semi-structured interviews with participants in their homes. The questionnaire was dichotomised into social and user centred design surveys and utilised both qualitative and quantitative research methods.**

Where a sample comprises less than 50 participants, it is the policy of the research unit Housing Executive to present the findings in numbers only.

- demographic profile of participants
- mobility classification
- provision of care
- levels of satisfaction with general aspects of the home and surrounding environment

1.2 **The Social Survey Highlights**

- More than half (17) of the 31 interviews were carried out with the wheelchair user.
- 17 wheelchair users rented their homes from the Housing Executive.
- The majority of participants (27) had lived in their home for more than four years.
- Almost two-thirds of dwellings surveyed (20) had been adapted to meet the needs of the wheelchair user.
- Most wheelchair users received regular help with household tasks (23) and personal care (24).
- Almost two-thirds of participants (20) were very satisfied/satisfied with the design and layout of their property; 11 were dissatisfied/ very dissatisfied. Reasons for dissatisfaction included: space restrictions, no access to other rooms, doors too narrow, front access inadequate, fire risk, house not designed for wheelchair, and front elevation making access to footpaths difficult
- The majority of participants (28) stated that the design and layout of their home met their needs better now than had been the case before they moved into their present address or before the adaptation work had been carried out.

Results of the Social Survey

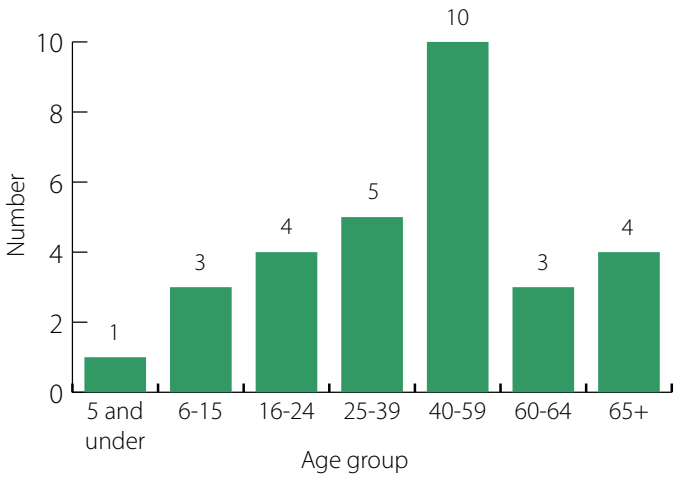
1.3 **Profile of Wheelchair Users (Gender)**

Almost two-thirds (20) of wheelchair users were male and the remaining 11 were female (Table 1, Appendix, 1).

1.4 **Age of Wheelchair Users**

The diversity in age of wheelchair users is reflected in the range, which is 82 years (i.e. the difference in age between the youngest and oldest wheelchair user), the mean age being 43 (Figure 2; Table 2).

Figure 2. -
Age Group of Wheelchair Users -



Difficulties Encountered by Wheelchair Users

1.5 **All participants (31) had problems with locomotion. However, participants stated that their disability resulted in other problems, including:**

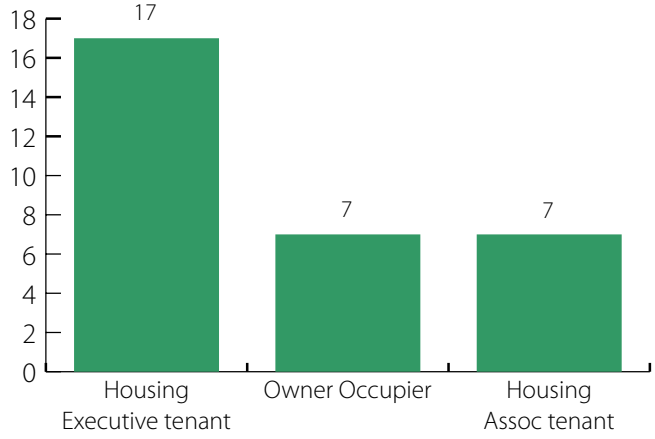
- difficulty with personal care, washing dressing, eating and getting in and out of bed (26);
- varying degrees of sensation loss (25);
- difficulty in reaching cupboards, washing line and bending down (25);
- incontinence problems (22);
- picking up objects or turning knobs (20);
- communication problems - some participants felt their needs were not clearly understood (17);
- cognitive problems (12);
- sight problems (7) e.g. reading a news paper while wearing glasses;
- hearing impairment (3); and
- breathing difficulties, requiring a ventilator (2) (Table 3).

Tenure and Type of Property

1.6 Housing Tenure

The majority of participants (17) were Housing Executive tenants. Seven participants were owner occupiers and seven rented from housing associations (Figure 3; Table 4).

Figure 3
Housing Tenure



1.7 Time at Present Address

Almost all participants (27) had lived at their present address for more than four years. Three participants had lived at their present address for more than one year but less than two years and one respondent for less than six months (Table 5).

1.8 Type of Dwelling

One-third of all participants (11) lived in semi-detached bungalows, six lived in end terrace houses, equal proportions (five in each case) lived in mid-terrace and semi-detached houses; two lived in detached bungalows and the remainder (2) lived in a detached house (1) and ground floor flat (1) (Table 6).

1.9 Adaptations

Two-thirds of dwellings (20) had been adapted to meet the needs of the wheelchair user and eight had been purpose-built to wheelchair standard. The remaining three dwellings had either not yet been adapted or were in the process of adaptation at the time of interview. End and mid-terrace properties were more likely than any other property types to have been adapted to the needs of the wheelchair user (Tables 7 and 8).

Satisfaction with Design and Layout of Home

1.10 Number of Bedrooms

Participants were asked how many bedrooms and sleeping spaces were in their home and how satisfied they were with the number of bedrooms.

1.11 **The majority of homes (14) had four or more bedrooms, 10 had three bedrooms and seven had two bedrooms.**

1.12 Number of Sleeping Spaces

Sleeping spaces ranged from seven to two. Eight homes had five sleeping spaces, seven homes had seven sleeping spaces, five homes had six, six

homes had three, two homes had four and two homes had two sleeping spaces.

1.13 Satisfaction/Dissatisfaction with Number of Bedrooms

Almost all participants (28) were very satisfied/ satisfied with the number of bedrooms and three participants were dissatisfied/very dissatisfied. Reasons for dissatisfaction included: caring for an elderly relative requiring extra bedroom, not enough space and partner has to sleep on the couch as there is not enough room in bedroom due to equipment (Tables; 9, 10 and 11).

1.14 Meeting Needs of Family and Friends

Participants were asked if the design of their home met the needs of family and friends staying over. Although the majority of participants (20) stated that the design of their home met the needs of family and friends staying over, one-third (10) felt this was not the case. Reasons included: bathroom was too small, house was overcrowded with equipment, big family takes up most of the space and bedrooms either were too small or there were not enough of them (Table 12).

1.15 Reduced Need for Care or Assistance

Two-thirds of participants (20) stated that the design features provided in their home had reduced their need for care and assistance. Eleven participants stated this had not been the case (Table 13)

1.16 Design features that had reduced the need for care or assistance were as follows:

shower room/shower chair	8
automatic heating/lower control and light switches	7
bath lift	1
car port/wider doors	1
ramped access	1
bungalow/everything on level	1
environmental controls	1
See Table 14	

1.17 Children and Child care

To assess how the design of the home impacted upon child-care, the survey asked participants if they had any children under the age of 18, living or visiting their household and if any design feature had made child care easier.

1.18 Almost half of participants (15) said they had children under the age of 18 living in or visiting their household, the remaining 16 stated this was not the case (Table 15).

1.19 Had Child Care Been Made Easier?

Of the 15 participants who had children living in or visiting their home, eight thought the design features in their home made child care easier, and seven thought they made no difference. Reasons why child care was made easier for some participants included: extension is good as equipment can be kept in one room, giving more of a family feel to home; walled garden and patio doors allow observation of children while at play; bedroom downstairs frees upstairs bedroom that now acts as a playroom; big house accommodates family living and visiting; and a lift from ground floor to first floor enables observation of children when they are in bed (Tables 16 and 17).

1.20 Design and Layout of Property

Participants were asked how satisfied/dissatisfied they were with the design and layout of their property. Two-thirds of participants (20) were very satisfied/satisfied and 11 participants were dissatisfied/very dissatisfied with the design and layout of their property (Table 18). Reasons for dissatisfaction included:

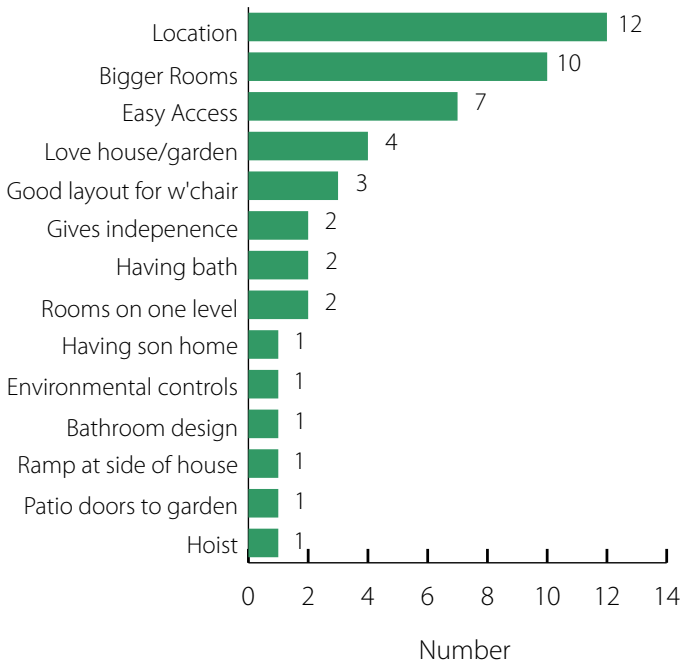
space restrictions, not enough storage in bathroom, living room, bedroom	6
living in kitchen as no access to other rooms	1
need covered access from car to house	1
doors too narrow, front access inadequate	1
fire risk, house not designed for wheelchair	1
steep hillside locations creating difficulty getting a wheelchair from road to footpath.	1
See Table 19	

1.21 What Participants Liked about Their Home

The 20 participants who were very satisfied/ satisfied with the design and layout of their property were asked what they particularly liked about their home, having lived there for a while (participants could give more than one response).

Twelve participants put location, good neighbours and being near family, friends and amenities above design features. Ten participants liked having a big bathroom, living room and kitchen, seven participants stated their home was easy to access, four stated they loved their house/garden and three thought the layout of their home was good for wheelchair use. Equal proportions of participants (two in each case) valued the independence their home gave them, liked all rooms on one level and liked the choice of being able to take a bath rather than a shower. The remaining participants (6), gave other reasons for liking their home including: having their son home from hospital was only possible because of adaptations that had been made to their property, improved bathroom design, ramp at side of house, patio doors leading to garden, having environmental controls and having a hoist (Figure 4; Table 20).

Figure 4:
What Participants Liked About Their Home -



1.22 Meeting Needs

Participants were asked if the design/layout of their home met their needs better now than before either moving or having the adaptations carried out (participants could give more than one response).

1.23 Twenty-eight participants said their home met their needs better now; and three participants stated this was not the case (Table 21). Several reasons were given by participants as to why their home met their needs better now, including the following:

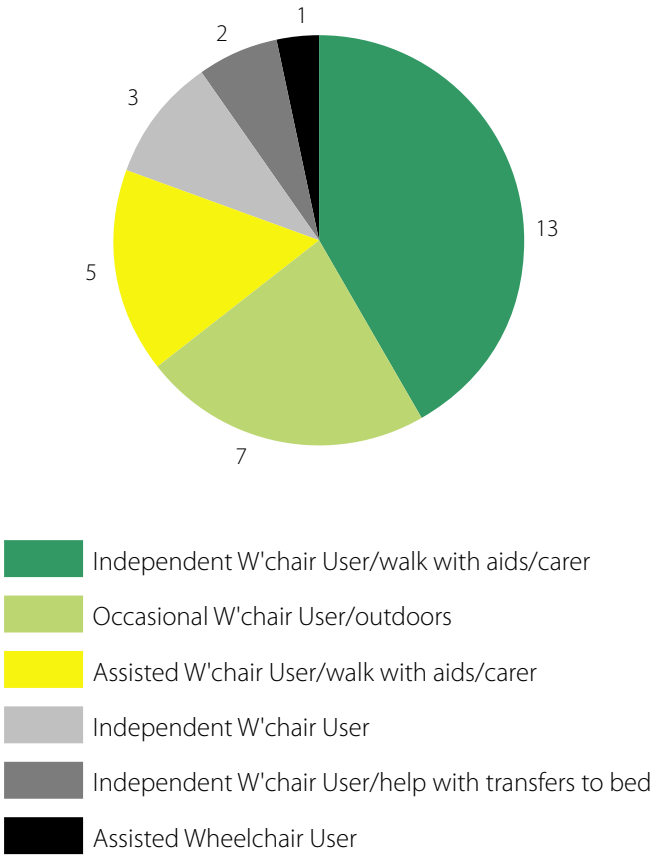
having downstairs bedroom/bathroom/ shower and toilet	24
having wider doors/ramps/lower work surfaces and light switches	8
hoist/lift	7
independence	6
good space	5
accessible to family/friends/shops/garden	4
good neighbours/neighbourhood	3
bathroom adapted to meet needs	2
large bedroom to store equipment	2
was living in temporary accommodation	2
bathroom and separate toilet	1
can do own decorating	1
extension gives privacy	1
oil heating	1
environmental controls	1
larger house	1
See Table 22	

Mobility Classification of Wheelchair Users

1.24 Mobility Classification

Participants were given a list of mobility classifications and asked to select the one that best described their circumstances. Thirteen of the 31 participants described themselves as assisted wheelchair users; seven participants were independent wheelchair users who needed assistance with transfers to bed and five described themselves as independent wheelchair users. The remaining participants described themselves as either assisted wheelchair users who could walk with the help of a carer or use an aid (3), occasional wheelchair user primarily outdoors (2) and an independent wheelchair user who could walk with aids or with the help of a carer (1) (Figure 5; Table 23.)

Figure 5
Mobility Classification



Mobility Aids

1.25 Equipment

Equipment used by wheelchair users can be many and varied, depending on the severity and nature of the disability. Participants were asked what equipment they used, either inside or outside the home; aids included:

wheelchair pushed by another person	17
self propelled wheelchair	13
powered outdoor/indoor chair	8
walking frame	6
adapted vehicle	5
stick	4
powered outdoor use only chair	3
crutches	2
battery operated scooter	1
confined to bed	1
other (bath-lift, hoist, commode shower chair, changing bench, standing frame, hospital bed, oxygen monitor)	14
See Table 24	

1.26 Types of Mobility Aids

Participants were asked if they had used different types of mobility aids since moving or adapting their home.

The majority of participants (18) said they had not used different types of mobility aids since moving or adapting their home and 13 participants said they had done so (Table 25 and 26). Mobility aids used by wheelchair users since moving or adapting their home included:

- hoist
- bath chair
- riser/recliner chair
- shower chair
- stick
- walking frame
- lift
- battery operated scooter
- indoor/outdoor powered wheelchair (See Table 26)

Provision of Care

1.27 Providers of Care

Participants were asked to choose from a list the people who were most likely to provide them with either informal or private care. It was found that the care provided emanated from a number of different sources. Nevertheless, the majority of participants (24) stated that most care was provided by family living in the home.

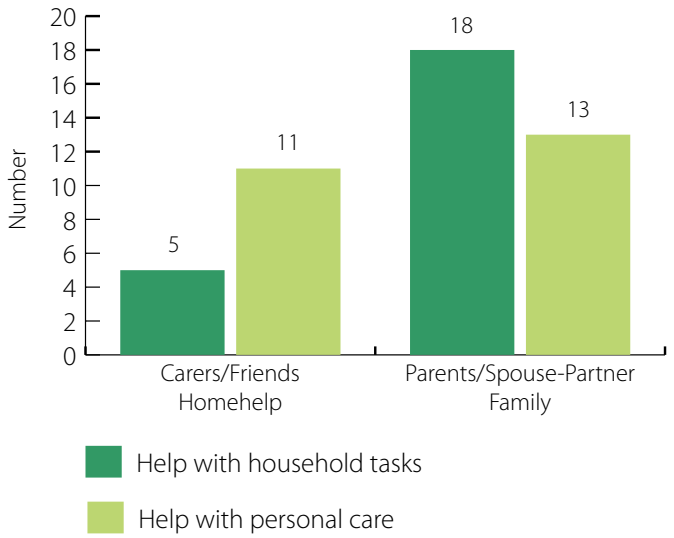
1.28 Household Tasks

Most participants (23 out of 31) received regular help with household tasks, e.g. provision of meals, help with domestic tasks, cooking, cleaning, shopping etc. For almost three-fifths of participants (18) this help was provided by parent/parents, spouse/partner or other family members; the remaining five participants received help from carers, friends or home help.

1.29 Personal Care

Twenty-four participants received help with personal care, e.g. getting up, bathing, eating meals and going to bed. In the majority of cases (13) care was provided by parent/parents, spouse/partner or a combination of parents, family and carers. The remaining 11 participants received care from nurses or carers who called regularly to the home (Figure 6; Tables 28, 29 and 30).

Figure 6. -
Providers of Help and Care -



1.30 Household Types

From information collected through the household grid, each household was classified into specific household types. This was based on the total number of household members within each unit and their age. Definitions of household types are presented in Table 31.

1.31 Large Adult Households

Large adult households were the most predominant household type (12), six were lone adult households, five were two adult, three were two older, two were large family and the remaining three were lone parent, lone older and small family household types (Table 31).

1.32 Household Religion

The majority of participants (15) stated that the religion of the household was Catholic, 13 were Protestant, two described the household religion as mixed (Protestant/Catholic) and one stated they had no religious affiliation (Table 32).

1.33 Ethnic Origin of Wheelchair User

All of the participants surveyed described their ethnic origin as white.

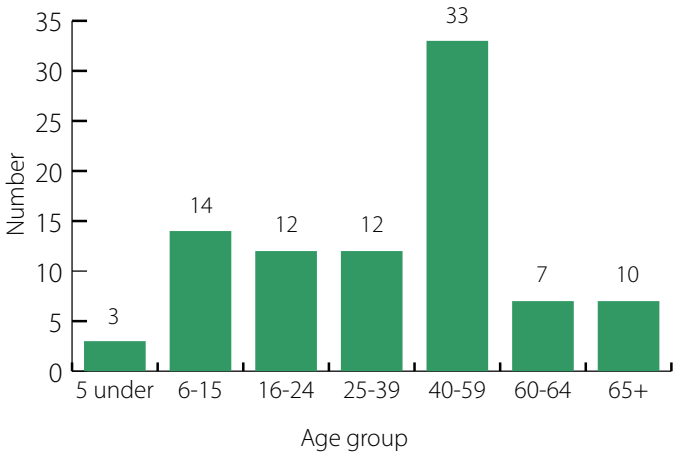
1.34 Number of people per Household

Eight households comprised two persons, six households had four persons, six had one person, five had three persons, four had five persons and one had seven persons (Table 33).

1.35 Age of Household Members

Participants were asked how many people lived in their household and the age of each member. In total, information on age was given for 88 household members. More than one-third of household members (33) were aged between 40 and 59, 14 were aged between six and 15, 12 were aged between 16 and 24 and a further 12 were aged between 25 and 39. Seven participants were aged between 60 and 64, seven were aged 65 or over and three were aged 5 or under (Figure 7; Table 34).

Figure 7. -
Age of Household Members -



Additional Comments

1.36 On completion of the questionnaire, all participants were given the opportunity to make general comments about the survey. Comments are listed in Table 35.

Chapter 2

The Evolution of Wheelchair Standard Housing

Chapter 2
The Evolution of Wheelchair Standard Housing

Table 2a: -
Evolution of Wheelchair Standard Housing 1974 -2004 -

Housing Design Element	1975 Wheelchair Standard Housing HDDOP2/75	1996 Habinteg Design Guide	1997 NATWHAG Wheelchair Housing Design Guide	2001 BS: 8300 Design of buildings and their approaches to meet the needs of disabled people-code of practice
Access to Dwelling	Gardens should be small	Useful guidance under external works and landscaping	Useful new guidance on external elements	Extensive new guidance - see code of practice
Car Parking	Where there is parking within curtilage (3,400mm wide) Provide undercover access to the house	Covered Hard standing	Covered hard standing No spatial guidance identified Rear car door entry identified	Firm level ground 3.600mm x 6,000mm markings for off street parking spaces 4,200mm x 5,700mm for enclosed parking space
Path widths	Not less than 1,000mm	1,200mm	1,200mm	1,800mm for buildings 1,200mm less busy routes 900mm paths within curtilage of a single dwelling
Approach/ Ramp Gradient Ramp details	1:20	1:20	1:20 1:12 up to 5,000mm length. level landing 1,500mm x 1,500mm	1:20 any steeper should conform to ramp specification 10m - Max 1:20 5m - Max 1:15 <2m - Max 1:12 ramp width 1,200 landing platform 1,200mm min
Main entrance/ Threshold	Flush or near flush 15mm upstand max	Level Flush or 15 mm upstand	Covered entrance Upstand not to exceed 15mm Additional weatherproofing details included.	Canopy or recessed entrance Level or 15mm upstand. Chamfer upstand if more than 5mm
Lifts where applicable	Ground floor provision preferred	No Guidance	BS5900 (1991) 1,425mm x 965mm – 1,190mm x 785mm	BS EN 81-1 BS EN 81-2 1,000mm x 1,250mm Wide (one user of manual or electric chair). 1,500mm deep car will accommodate most scooters. 1,000mm wide x 1,400mm deep one wheelchair user and companion. 2,000mm wide x 1,400mm deep - a wheelchair user plus several other passengers in communal situations. 1,500mm x 1,500mm manoeuvring space at approach

Housing Design Element	1975 Wheelchair Standard Housing HDDOP2/75	1996 Habinteg Design Guide	1997 NATWHAG Wheelchair Housing Design Guide	2001 BS: 8300 Design of buildings and their approaches to meet the needs of disabled people-code of practice
External doors Doorset Clear opening width (cow)	900mm-1,000mm 750mm minimum	1000mm	800mm 300mm-550mm clearance at lock edge on approach side.	800mm preferred. 750 mm straight on access. 850mm if at right angles from a 900mm access route. 300mm clearance between leading edge of door and return wall.
Internal Doors Doorset Clear opening width (cow)	900mm Assumes 775mm clearance.	1,000mm	750mm – 775mm preferred	750mm minimum straight on approach, 800mm preferred up to 800mm - 850mm preferred for 90º turn off 900mm corridor.
Corridors	1,200mm	1,200mm-1,500mm (preferred)	900mm for straight passage. 1,200mm to allow 90º Turn 1,500mm 180º turn	Minimum clear width 900mm for single family dwelling – 1200mm preferred 1,800mm where there are two or more wheelchair users.
Wheelchair Turning Space (T.C.)	1,500mm	1,500mm	1,800mm x 1,400mm	Wheelchair turning space Variable 1,500mm x 1500mm upwards
Living Room	No minimum space standards	No minimum space standards	Rooms not narrower than 3,000mm wide Reference to space for furniture and approach spaces.	No minimum space standards. This area was not commented on.
Kitchen Work-surfaces	Wheelchair TC 1,500mm – if there is any obstruction. 1,400mm between parallel surfaces if no obstructions.	Wheelchair TC 1,500mm and clear space in front of appliances –1200mm	Wheelchair manoeuvring space 1,800mm x 1,400mm Between worktops. 600mm deep Provide space for 3 appliances in addition to hob/oven	Unobstructed Wheelchair Manoeuvring 1,500mm x 1,500mm between facing floor units. knee recesses - 800 mm wide. 600mm deep
Dining space	Space for 2 or 3 to sit down and eat in kitchen	No minimum space standard. Must function to meet DSD standards.	No minimum space standards 1,000mm for approach space to dining table.	No minimum standards – 1,050mm for access to table
Toilet	1,700x1,400mm or 1,600x1,500mm 2 wc's in five person dwelling	1,400mm x 1,700mm 2 w.c's in five person dwelling	No minimum dimension identified 2 w.c's preferred	1,500mm x 2,200mm independent user. 2,200mm x 2,400mm assisted wheelchair user -peninsular design.
Bedroom	No minimum standards Examples given in design guide	No minimum space standards All rooms wheelchair accessible	No minimum space standards See guidance on layout of rooms p.16 Second bedroom desirable for visitors, carers and equipment	A sliding scale applies depending on bed and transfer space requirements. Ranges from a single bedroom for an independent user. 3,900mm x 3000mm to a twin bed arrangement for an assisted wheelchair user with mobile hoist 3,900mm x 4,850 mm

Housing Design Element	1975 Wheelchair Standard Housing HDDOP2/75	1996 Habinteg Design Guide	1997 NATWHAG Wheelchair Housing Design Guide	2001 BS: 8300 Design of buildings and their approaches to meet the needs of disabled people-code of practice
Additional Storage	Storage guidance for kitchen 1,200x700mm No location identified	No minimum guidance – see guide for kitchen storage.	See NHF Standards and Quality in development: A good practice guide. The value of having a spare bedroom identified for storage, as is additional provision for specific equipment for wheelchair users.	Total allowances in domestic dwellings not identified. General guidance to approach and layout of storage offered. See also storage guidance for kitchen
Heating	22º In living/dining area 17º in other. Solid fuel not recommended.	Full central heating throughout. Accessible controls 22º recommended throughout home	No specific temperature recommendations. Even room temperatures recommended. Low radiator surface temperature Radiators Controls within reach and usable.	No specific guidance on air temperature. Guidance on location of controls 750mm - 1000mm height location for heating controls requiring precise hand movement. 41º C max temperature of heat emitters.
Egress in the event of fire	No guidance	No guidance	No specific guidance. Failsafe lighting and fire alarm recommended.	Fire alarms should have both visual and audible signals. (public buildings)
Commun-ications	Telephone recommended	Emergency call systems. Pull cord in each room.	Multiple telephone sockets. Can have emergency/ alarm facilities. Provide power supply for entry-phone / door openers	Guidance on a range of communications equipment e.g. entry phones, communications equipment for people with sensory impairment. Mostly applied to public buildings.
Position of controls	Align with door handles	Between 600mm and 1,050mm from finished floor level	700-1000mm 800mm both sockets and switches. Variances exist.	Zones defined depending on nature of usage. 750mm-1,000mm for controls requiring precise hand movements. All outlets, switches and controls at least 350mm from room corners.
Additional spatial planning recommend-ations. Clear passage between furniture Clear space for side approach or use of facilities Space to approach furniture and reverse to pull out drawers			 800mm 1000mm 1,350mm	A range of charts outlining specific space requirements for a range of wheelchair users is outlined. 1,050 mm min.

Evolution of Wheelchair Standard Housing

2.1 Before undertaking an evaluation of the design elements of wheelchair standard housing, this chapter offers a strategic overview of how aspects of wheelchair housing design guidance have been evolving since the 1970s and highlights some of the key issues for debate in relation to design standards.

When attempting to define new build wheelchair standard housing, it is clear that a number of variables have evolved, influenced by new design guidance over time. In practice this can result in accommodation with differing space standards and facilities. The guidance outlined in HDDOP/2/75 Wheelchair Housing in the 1970s forms a base line standard.

In adapted property, defining wheelchair standards becomes more complex as structural and site constraints may result in properties which are not fully wheelchair accessible but offer access to key facilities in the home.

For this reason this study will focus on the evaluation of housing design elements found in wheelchair accommodation.

2.2 Design Guidance

With reference to the chart of wheelchair standard housing from 1975 to 2004 one can track how wheelchair housing design guidance is evolving to gradually become more inclusive over time. The guidance outlined applies primarily to new build housing, although elements of this guidance have also been utilised for housing adaptations. Four sets of design guidance have been selected as the more influential standards for wheelchair standard housing in Northern Ireland and because they illustrate an evolutionary process which is occurring.

2.3 Blueprint for Wheelchair Standard Housing

The first blueprint for wheelchair standard housing HDOPP 2/75 Wheelchair Housing was developed by Goldsmith and Morton in response to Section:3 Chronically Sick and Disabled Persons Act 1970, which required Local Authorities to consider the housing needs of physically disabled people for the first time. The Chronically Sick and Disabled Persons Act was not enacted in Northern Ireland until 1978. This blueprint formed the baseline standards for the Northern Ireland Housing Executive's new build wheelchair housing from the 1970s to the 1990s. The NIHE built the first wheelchair standard homes in 1978 on the basis of identified need. These homes complemented mobility standard dwellings.

The primary group of wheelchair users considered when developing these standards comprised of independent self-propelling wheelchair users, who could often transfer independently. Goldsmith stated "the majority of design specifications are based on the performance and space requirements of the DHSS model 8L wheelchair" (Goldsmith 1976 p.134).

These standards continue to largely meet the needs of independent wheelchair users, but as this survey demonstrates, patterns of wheelchair usage can often change during the lifecycle of the user.

It is increasingly recognised that wheelchair users have widely varying needs. There is now a much wider variety of wheelchairs on the market (Disabled Living Foundation, 2005) with greatly varying manoeuvring and performance characteristics.

2.4 New Legislation

With the emergence of new legislation and policy to promote the well being of carers (Manual Handling Regulations Operations Regulations 1992 and Guidance to Carers Assessments (NI) 1996) the needs of people who assist wheelchair users must also be

given serious consideration. This includes the space required to safely offer personal assistance.

2.5 Habinteg Design Guide

In 1996 The Habinteg Design Guide (1st Ed) incorporated a number of features to reflect good practice in the provision of wheelchair standard housing, including the following:

- covered hard standing
- wider paths
- wider external and internal door openings
- wider corridors 1500 mm
- enhanced bath/shower room space standards with potential to create an en suite relationship to a bedroom
- emergency call system in each room.

Habinteg (Ulster) built their first wheelchair standard homes in Northern Ireland in 1980. Initially their designs were mainly based on HDOPP 2/75 and experience of Habinteg in England, but through user consultation and review, e.g. sharing good practice with Habinteg (England), new design guidance evolved.

2.6 National Wheelchair Housing Association Group

In 1997 the National Wheelchair Housing Association Group (NATWHAG) provided advice on standards in their publication NATWHAG Wheelchair Housing Design Guide.

This publication was based on in-depth research with 20 wheelchair users (occupational therapists were jointly involved with the architect in ten of the studies). Design developments included:

- design guidance on external elements, such as moving around outside and using outdoor spaces;
- consideration of additional parking space to accommodate wheelchair access to rear entry vehicles;
- a more generous turning circle allowance (1, 800 x 1, 400mm) applied to kitchen and bathrooms/shower rooms;
- a minimum space standard for living rooms;
- the desirability of an extra bedroom or extra space for visitors, carers and equipment is considered;
- guidance for the provision of facilities to support the installation of communications equipment in the home; and
- additional spatial planning guidance regarding use of furniture.

The design guidance from these studies was incorporated into the Housing Corporation's Scheme Design Standards, which set standards for the funding of new build social housing in England. In Northern Ireland, comparable design standards are set down in the Housing Association Guide (1998).

2.7 British Standards Institute

In 2001 the British Standards Institute published BS: 8300 Design of buildings and their approaches to meet the needs of disabled people. The recommendation for this study originated from the Department for the Environment and the Regions studies in 1997 and 2001 respectively. PD 6523 (1989) concluded "that the guidance with respect to the access needs of disabled people was incomplete, in some instances contradictory and on the whole not based on validated research" (BSI, 2001 P. v).

This code of practice has received much attention as it was underpinned by a substantial ergonomic study of the spatial needs of 91 wheelchair users and is generally considered to be the standard for best practice. Indeed, there has been discussion as to whether it should form the "deemed to satisfy" benchmark for the Disability Discrimination Act 1995 in public buildings.

Although BS: 8300 offers guidance on good practice in the design of domestic and non-domestic buildings and their approaches, the application of design elements from this guidance to domestic dwellings is complex. The British Standards researchers recognised that there may be a requirement for future dwelling specific guidance. To date these standards have not been generally applied to domestic new build wheelchair standard housing, although elements have been considered in the review of design guidance for housing adaptations (NIHE, 2003) and The Greenwich Wheelchair Site Brief (2002).

In an attempt to get some sense of how the application of BS: 8300 may impact on the design of future wheelchair standard housing, we have extracted some of the key design elements to allow comparison with previous guidance.

The central developments are:

- considerably strengthened guidance on the approaches to buildings;
- increased space standards for car parking and valuable spatial guidance on a range of vehicle approach and entry scenarios;
- enhanced guidance on the design of entrance door thresholds;
- comprehensive guidance on a variety of inter-floor lift options;
- flexible guidance on door/corridor width relationships;
- flexible options for utilizing varying door types;
- considerably increased space standards for assisted wheelchair users in bathroom/shower rooms and toilets;
- enhanced design guidance on the design of bedrooms particularly for assisted wheelchair users;
- more specific ergonomic guidance on the location of controls relating to functional requirements; and
- comprehensive data from ergonomic research trials led by Robert Feeney Associates, commissioned by the Department of the Environment, Transport and the Regions to inform reach ranges and general space requirements. These valuable data are in Annexes D and E.

This source of design guidance helps to address the deficit of design guidance in earlier publications for assisted wheelchair users and carers, in the locations where carers offer personal assistance, i.e. bathrooms, toilets and bedrooms (living rooms have not been included).

Guidance on space for carers to assist and use mobile hoists is outlined, although the space saving achieved through the use of fixed track ceiling hoists was not examined.

Although BS 8300 is a comprehensive document, as with the other sources of design guidance selected, it does not appear to address a comprehensive design strategy for egress from domestic dwellings in the event of a fire. Furthermore minimum standards for storage have not been identified to reflect the range of assistive technologies currently deployed in people's homes.

A highly significant issue in BS 8300 is the apparent space differences identified for 180º wheelchair turns. In the main text a 1,500 mm x 1,500 mm turning space is indicated, but when one examines the appendices in details it is apparent that the actual space requirements identified from ergonomic studies are much larger, in many cases exceeding 2 m in length. (Note that these turning spaces have been calculated on 180º rather than 360˚ turns which designers generally apply in living rooms, bedrooms, kitchens and bathrooms).

If we are to respond to the actual needs of wheelchair users, this finding from Feeney's study has considerable significance for spatial planning in wheelchair standard dwellings. In this study a number of wheelchair users, particularly Electric Powered Indoor/Outdoor Wheelchair users (EPIOC)

were observed to require over two meters to turn through 180˚

2.8 Housing Sight

In 2003 the Royal National Institute for the Blind (RNIB) Cymru published Housing Sight. This publication recommends a range of design standards for people with sight loss, an area in which there has been a relative deficit of design guidance applied to housing. Many people who are wheelchair users may also have some degree of sight loss (seven were identified in this survey) and, as many of these recommendations are low to medium cost if incorporated into new build housing, it is recommended that they are given further consideration in new build schemes.

2.9 Building Regulations

At the time of writing this report Part M of the Building Regulations is under review in England and Wales. The current review will consider whether to uplift the standards for domestic dwellings to Lifetime Homes standards.

Consultation over revision of Part R of the Building Regulations in Northern Ireland took place in July 2005. Unfortunately, the current review in Northern Ireland does not extend to domestic dwellings. While the access standards embodied in Part R 2000 promote wheelchair visitability to domestic dwellings they fall short of the needs of wheelchair users who live in the home.

2.10 Emerging good practice in design v funding mechanisms for new build wheelchair standard housing

There would appear to be some tension between emerging good practice in design guidance for wheelchair users and the actual funding mechanisms for new build wheelchair dwellings in Northern Ireland.

As more inclusive design standards have emerged there has also been a gradual increase in some of the space recommendations for specific elements of wheelchair standard housing (See chart). Although these increases in space allowances are relatively small they can be highly significant for wheelchair user and carers.

The recommended increases in space allowances are not necessarily reflected in the overall footprint for new build wheelchair standard housing which has been largely determined by funding mechanisms determined by area bands.

On examination of Table 2b below, one can note variations in the funding of new build wheelchair housing over time.

Space allowances (Table 2b) are based on a three person, two bed wheelchair standard bungalow.

Table 2b: Space Allowance

Year	Funding mechanism	Typical Footprint
1970s	HDDOP standard plus tolerance of the standard.	67 m^2 HDDOP standard.
Late eighties	Cost band 70-75 (total indicative costs)	70.30 m^2
1993	Mixed funding cost band 70 – 75 (total cost indicators)	73 m^2
1998 onwards	Mixed funding cost band 65 – 70m + tolerance.	65-70m^2 tolerance gradually tightening. Higher space allowances funded on specific assessment of need.

If wheelchair housing is funded by inadequate bandings, the real activity space requirements of disabled people in key areas of the home may not be met. One of the outcomes of applying this method is that, when trying to accommodate the increasing number of key wheelchair design elements within a predetermined footprint, storage, the size of additional bedrooms and the

accessibility of second WCs are often compromised. As is evident from the survey, wheelchair users have additional storage needs to non-wheelchair users.

2.11 Building to Known Need v Universal Provision

A critical issue for debate is whether new build schemes are customised to the specific needs of known wheelchair users, or whether there should be an attempt to find more universal design solutions for all new build wheelchair standard housing.

If we wait until we know the needs of specific users, this may result in a time delay of two years or more between identification of needs and the availability of suitable housing.

While in some instances the future requirement for wheelchair standard housing can be predicted and planned for some years in advance, e.g. where children have Duchene muscular dystrophy, more frequently the need for wheelchair standard accommodation can result from sudden traumatic injury, e.g. spinal injury or as the result of a fall in an older person, resulting in a fracture which does not heal. In such instances wheelchair standard housing can be required urgently and if not available, can in some instance delay discharge from hospital.

Where this situation arises, people may choose to adapt their existing home. Adapting an existing dwelling tends to be more expensive, will often take a year and a half or more, is disruptive and can be more structurally constrained than new build options.

Consideration of the life cycle of the participants in this study showed that mobility needs were changing over time due to the progression of underlying conditions and the ageing process. Some people who had been independent wheelchair users required powered wheelchair provision later in their lives, as a result of progressive deterioration of health.

With regard to the life cycle of dwellings particularly in social housing, it is likely that a number of wheelchair users with varying spatial needs may occupy the home over time. If a dwelling is designed to a minimum standard for one user, future, and sometimes substantial adaptations may be required. There was evidence in this study that some wheelchair standard new build homes required major adaptations to meet the specific needs of occupants.

2.12 Conclusions

There is evidence that as wheelchair housing design guidance has evolved, it has gradually become more inclusive for a wider range of wheelchair users. The original blueprint gave greatest emphasis to the needs of independent manual wheelchair users, but as time has progressed the needs of people with more complex needs are being addressed. Since 2001 assisted wheelchair users and carers are formally considered in BS8300 and we are now poised to factor in design guidance for people who may also have sight loss. In practice the funding mechanisms to implement these design improvements have not always followed suit. Some design improvements are cost neutral, e.g. the vertical location of controls/fixtures, others such as additional circulation space will have a cost.

Some minor adaptations to kitchens and bathrooms are still anticipated to meet the specific needs of individuals, as are further developments in environmental control systems in the homes of wheelchair users.

A more inclusive design approach to new build wheelchair standard housing particularly in the public rented sector, has the potential to reduce the need for expensive, disruptive and time-consuming adaptations and to maximise the potential for re-lets.

The determination of the optimal ratio of lifetime homes to wheelchair standard dwellings is beyond the scope of this study, although the recommendations on how to better forecast future wheelchair standard housing needs, based on new wheelchair provision trends, should assist future planning.

2.13 Recommendations

Best practice in design guidance for wheelchair users has now been formally incorporated in the housing adaptations programme in Northern Ireland (NIHE, 2003). There is a case for transference of specific elements of best practice to new build wheelchair standard housing to reflect modern community care requirements.

Funding mechanisms for new build wheelchair standard housing should not result, in the reduction of existing space standards.

There is a case for modest, targeted increases in space allowances in key activity areas in the home to create a more inclusive wheelchair housing stock for all wheelchair users.

A follow-up study is required to quantify and cost such targeted space increments.

A specific funding stream for highly customised schemes based on exceptional needs, e.g. where there is multiple disability in a family unit, is justified to complement 'mainstream' provision.

Chapter 3

Discussion of Findings (User Centred Design Survey)

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3.1 User Centred Design Survey

The technical survey was based on a user centred design approach (Pheasant, 1998), which recognises the importance of human activity analysis as an effective research tool. This approach explores the interplay between the activities undertaken in various parts of the home and the impact of environmental design in facilitating or acting as a barrier to activity. The purpose of the questionnaire is to:

- identify the presence or absence of key wheelchair standard design elements in the homes visited;
- record satisfaction/dissatisfaction with these design elements;
- capture the qualitative experiences of wheelchair users through direct quotations when describing the impact of the design of their housing on their lives; and
- record key environmental data which influenced either satisfaction or dissatisfaction by means of digital photography and housing measurements.

3.2 The findings from the study will be explored under three sections:

- external design features
- internal design features
- services and controls

In each section the presence or absence of design features and the reasons for both satisfaction and dissatisfaction will be explored in response to the experiences of wheelchair users. Good practice is identified, design solutions offered and the need for further research highlighted.

3.3 The presence of wheelchair standard design elements

From the survey of the 26 core design elements which might be considered good practice in wheelchair standard housing it is clear that a full range of access features were not always present. One of the primary reasons for this was that much of the housing (two-thirds) was adapted older stock. It was also clear that new build housing had been built to varying wheelchair standards over time. One of the homes was a mobility standard dwelling which is now being adapted to wheelchair standard to meet changing needs.

3.4 Improvements in quality of life

All participants reported significant benefits to their quality of life as a result of adaptations to the home or by moving into wheelchair standard housing. Comments included the following:

"My lifestyle has totally changed. I can come and go… not stuck to the house."

"We needed to get out of the hospital…just to get him home." (Mother of a child in hospital for 4 years)

"It's definitely a great job... It was deadly trying to get upstairs."

"Can visit friends in their homes 'cause they're all accessible round here."

3.5 Satisfaction with location of the home

It was significant that overall satisfaction with a person's home was not only influenced by housing design standards, but other factors such as:

- proximity to family, friends and neighbours;
- a sense of integration in the local community;
- absence of anti social behaviour; and
- accessibility of local community facilities including hospitals, schools, churches and shops.

In some cases these factors actually outweighed the suitability of the design of the home. A number of participants stated that they had experienced behaviours such as stones thrown at windows or pets, tampering with oil tanks and verbally abusive behaviour.

"What's the point of accessibility if you're isolated?"

"Those kids throw stones, I can't run away … I feel under siege from people outside."

There was evidence that anti-social behaviour could motivate people to move home even to slightly less accessible housing. Other people had a number of moves before they finally felt comfortable in the neighbourhood or had a home which could be suitably adapted.

"Was a pity about that bungalow but I wanted out … I miss the sheltered cover and the car port."

"Had to move several times to get the right site."

In many other cases people felt secure and comfortable in the community where they lived. These factors influenced people to remain in their own homes and have them adapted, this may result in some limitations as to what could be achieved in design terms.

"Must have a place you are happy living in."

Several wheelchair users felt vulnerable due to anti-social behaviour, some of which was specific to their disability. The reality of anti-social behaviour for participants highlights the importance of environmental design features which help to enhance a sense of personal security. It is acknowledged that improved housing design on its own cannot address all these issues but it can contribute as part of a community safety strategy.

3.6 Recommendations

A number of features were identified which helped to enhance a sense of personal security. These included:

- adequate high level fencing to the rear of dwellings or gable ends of houses;
- use of sensor lights particularly to the rear of dwellings (to illuminate oil tanks and intruders);
- in-curtilage car parking facilities where technically feasible and necessary;
- effective and accessible door locks;
- door entry systems;
- secure window restrictors; and
- appropriate means of communication in the event of a crisis which may include:
  - telephone,
  - mobile phone
  - help line
  - intercom to wardens; and
  - environmental control system.

3.7 Access to local facilities

Satisfaction with location was enhanced, in neighbourhoods where new facilities conformed to building regulations and permitted easy access to disabled people, particularly when the facilities were in close proximity to the home.

"Can't visit friends or family … anywhere we go we have to come home to get a toilet facility."

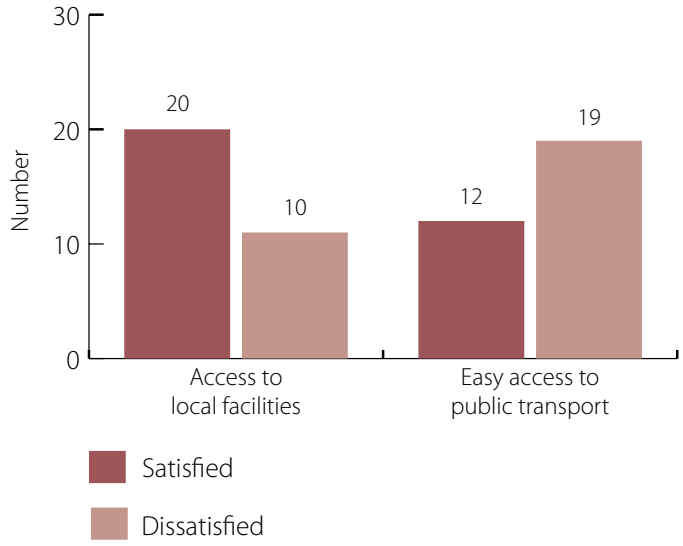
3.8 Easy access to public transportation

Few of the people surveyed used buses or trains. The time and environmental barriers faced by disabled people getting to bus stops and railway stations often acted as a barrier (Figure; 8)

"No chance with public transport"

A number of participants successfully used accessible taxis or accessible community transport with tail lifts. These services were most often used to supplement some form of personal transport.

Figure: 8
Location and transport



Most participants used some form of personal transport as they offered advantages in terms of door to door transport, flexibility, accessibility and convenience.

3.9 Family cars

Twenty-one of the 31 participants had a car; 13 could park inside the boundary of their dwelling, seven parked on the street near the dwelling and one participant kept their car at a relative's address due to a lack of parking facilities nearby.

Of the 10 participants who did not have a car, one used a powered scooter, six used manual chairs in combination with taxis, and three used powered chairs for short range journeys and community transport with tail lifts for medium range journeys. Participants in rural areas had particular difficulties accessing suitable community transport.

"She spent a year in the house on her own before we got the adapted vehicle."

The design implications of evolving forms of personal transport need to be considered in relation to housing design standards. For example, the extra length of rear entry vehicles needs to be factored into car parking bays (see car parking). The charging, storage and egress requirements of battery operated outdoor wheelchairs and scooters will require further consideration in the future as the number of electrically powered indoor outdoor powered wheelchairs (EPIOC) is increasing. The use of privately purchased scooters is also likely to increase.

3.10 External Design Features (Gardens)

"What a waste of space, I can't maintain it."

In relation to garden design, there was an overwhelming desire among some participants for small, defensible but accessible, low maintenance gardens with some privatised space to sit outside.

"Dogs come in and I get dog's dirt on my hands from the wheels."

Garden gates would assist with security and to keep dogs out, although possible difficulties in the ease of opening and closing gates needs to be considered.

"It's very frustrating not being able to maintain the garden…. you need to pay people to cut the grass."

Maintaining lawns was a major issue for many participants, who greatly missed community employment schemes such as ACE.

Garden maintenance constituted a real additional expense for wheelchair users particularly when living alone.

Where people had a specific interest in gardening, the availability of raised planters or pots enhanced life satisfaction.

Figure 9

External Facilities Present

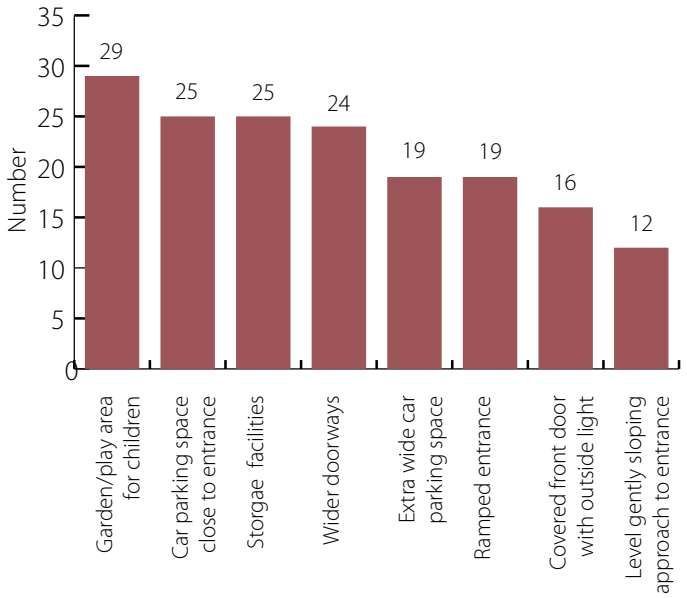


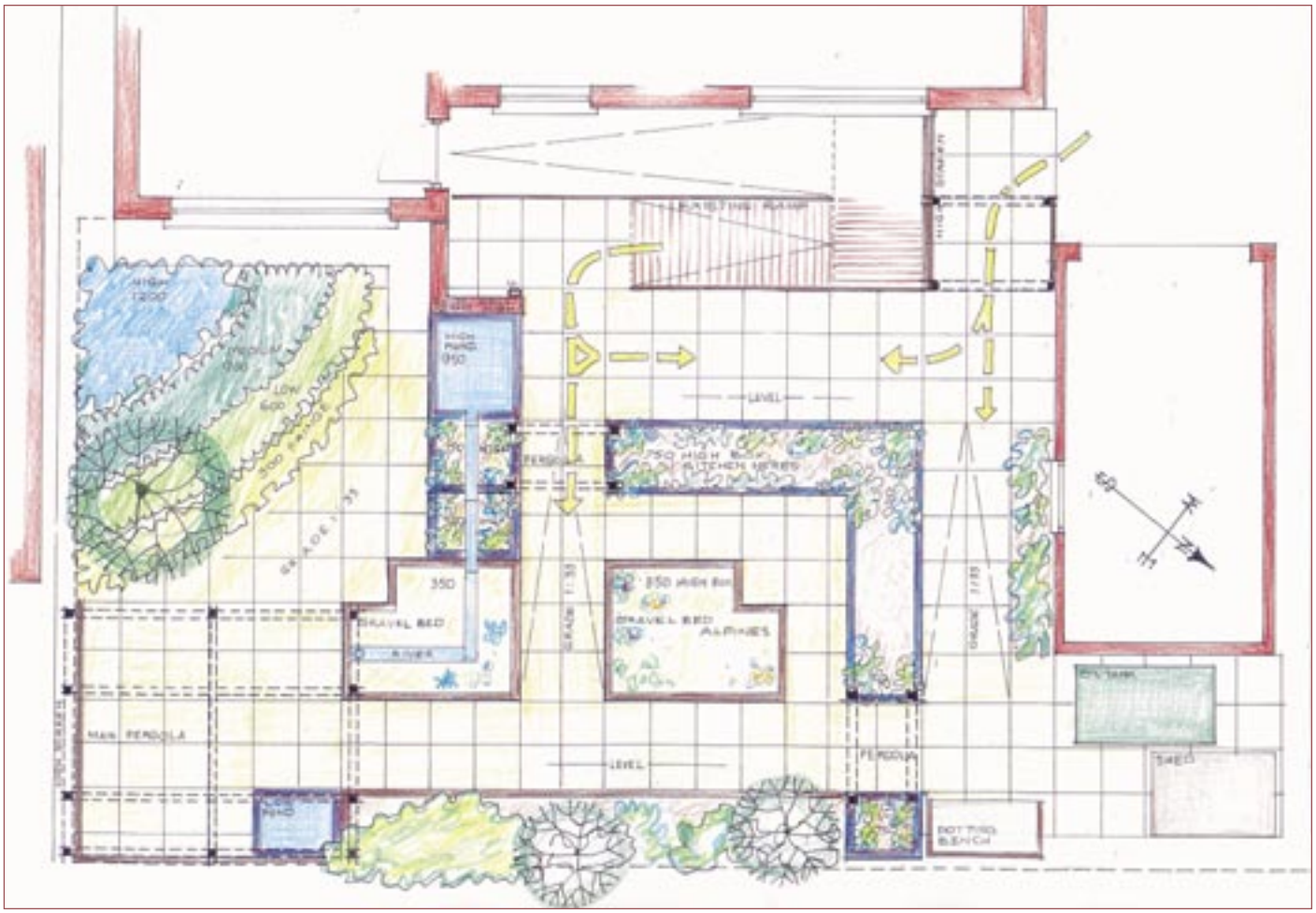
Table 3a

Satisfaction with External Facilities

External Facilities	Satisfied	Dissatisfied	Total
Car parking space close to entrance	24	1	25
Wider doorways for wheel-chair/baby buggy access	24	-	24
Storage facilities (external)	23	2	25
Extra wide car parking space (in cartilage)	19	-	19
Garden/Play area for children	22	7	29
Covered front door with outside light	16	-	16
Ramped entrance	13	6	19
Level/gently sloping approach to entrance	11	1	12
NB. Not all facilities were present in participants' homes			

Figure 10

Wheelchair Accessible Garden



3.11 Car parking

The provision of a maintenance-free, level and accessible driveway in close proximity to an accessible entrance was highly valued, as it:

- reduces garden maintenance;
- promotes convenient transfers and mobility to the car; and
- facilitates monitoring of car security.

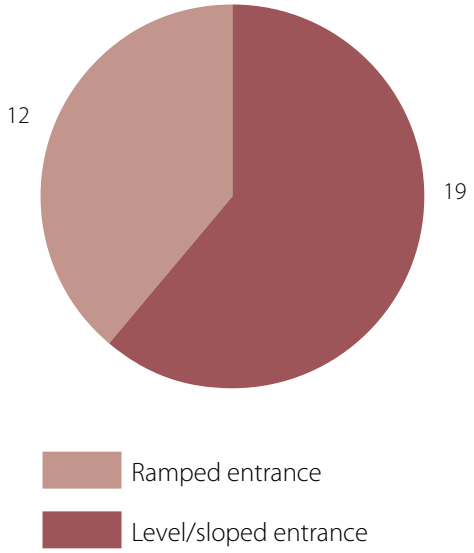
In some cases wheelchair users expressed a desire to be able to transfer to their car with more privacy, as car transfers could be difficult and embarrassing for some.

In the relatively small number of instances where covered car ports were provided this facility was highly valued. Not only did it enhance privacy and provide shelter from the elements while getting in and out of the car, it also served a number of additional functions, such as: an area to keep pets with appropriate enclosures, drying clothes, and secondary storage.

When planning car parking space it is important to recognise that there are an increasing number of adapted vehicles with rear entry access. As a result, the length of the hardstand, and where provided, car port need to be increased accordingly. The additional width of the parking area for driver or passenger side transfers will still be needed for circulation around the car. For example, a hardstand up to 7,505 mm x 3,600 mm may be required. This specification has been utilised in Habinteg dwellings and appears to meet the space requirements of a range of wheelchair users and a variety of vehicle types.

In the survey, 19 dwellings had a ramped approach to the dwelling and 12 had a level or gently graduated approach-less than a 1:20 gradient (Figure 11). Where site topography allowed, a level approach was preferred as it had a number of advantages:

Figure 11
Approaches to dwellings



- requires less exertion to negotiate;
- fewer constraints to the approach space to the front door;
- does not require railings;
- is less stigmatising for wheelchair users; and
- does not signal vulnerability.

"(The ramp) … looks a bit institutional."

From a housing provider's perspective, a level approach is a more flexible entrance for varying tenancies.

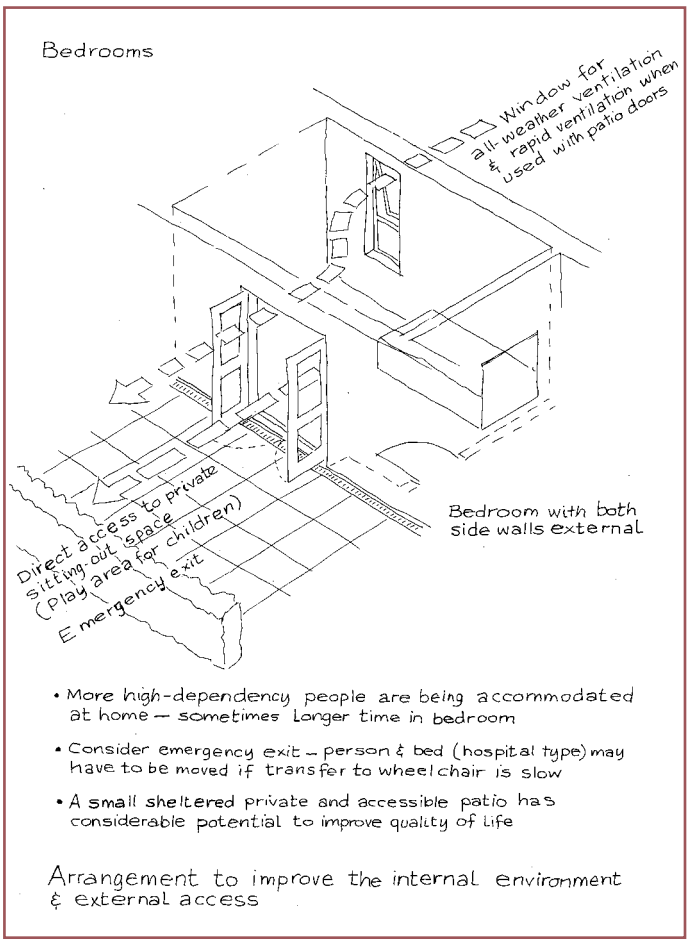
In one property it was not possible to create a wheelchair accessible entrance as there was a large site drop at the rear of the dwelling and insufficient space at the front of the dwelling to achieve a satisfactory gradient. This resulted in carers trying to manually lift the wheelchair user down steps.

3.12 Egress in the event of a fire

Several people expressed concern about egress in the event of a fire. In some cases a second accessible entrance was not available or possible to provide. Where the egress from a bedroom was via high risk rooms such as a kitchen or living room,

some housing adaptations had incorporated patio doors. These worked well, although in such cases careful attention needs to be given to the direction in which patio doors will open to ensure adequate approach space.

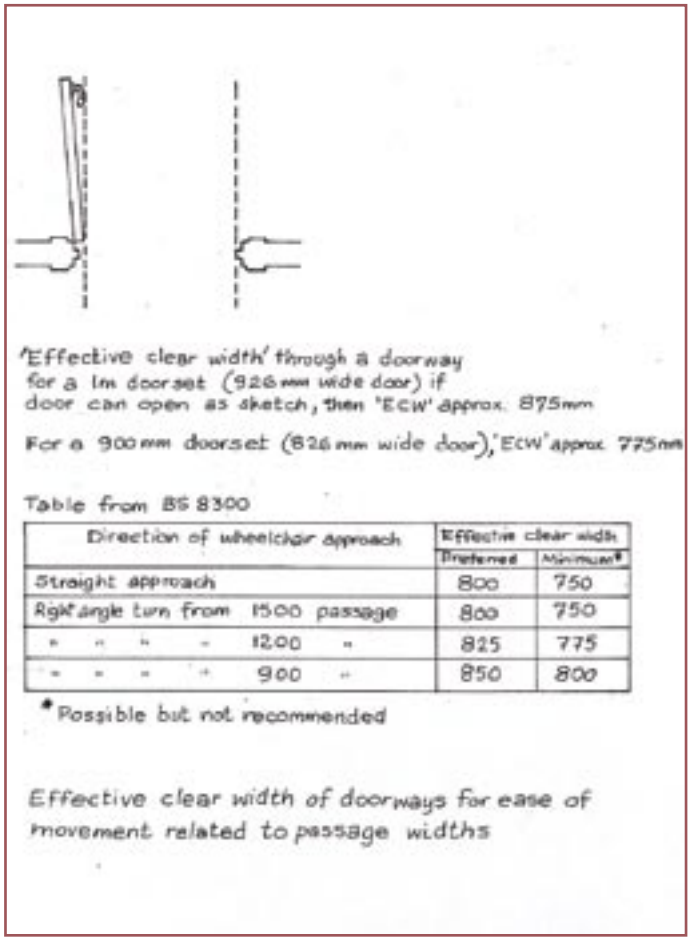
Figure 12
Access to Bedroom Via Patio Doors



3.13 Access for Ambulance Service

In three situations in the main study and one in the pilot, families were looking after children with very severe disabilities to an extent that paramedics would need to visit the home to attend the child or take them to hospital on a regular basis. In these cases two paramedics were trying to access the home, with a stretcher that was longer than the average wheelchair. At times like these paramedics encountered some difficulty negotiating doors and corridors designed primarily for wheelchair access.

Figure 13
Door Widths



3.14 Recommendations

1. Careful integrated planning of road, footpath and house levels is essential in new build situations to ensure that the site plot will ensure a gentle 1:20 gradient or better to the entrance(s) of the home.

2. Planning of housing plots needs to be given the same priority as roads in new developments.

3. Investigate the access and egress needs of emergency services (Both ambulance and fire fighting services) when accessing the homes of people with disabilities.

3.15 Covered Entrance with lighting

Less than half of participants, had both a canopy and lighting at the front entrance. Lighting was valued to illuminate the approach to the dwelling, making it easier to open the door after nightfall and to enhance a sense of security.

"I could do with more light at the front, my wheelchair castors drop into a gully."

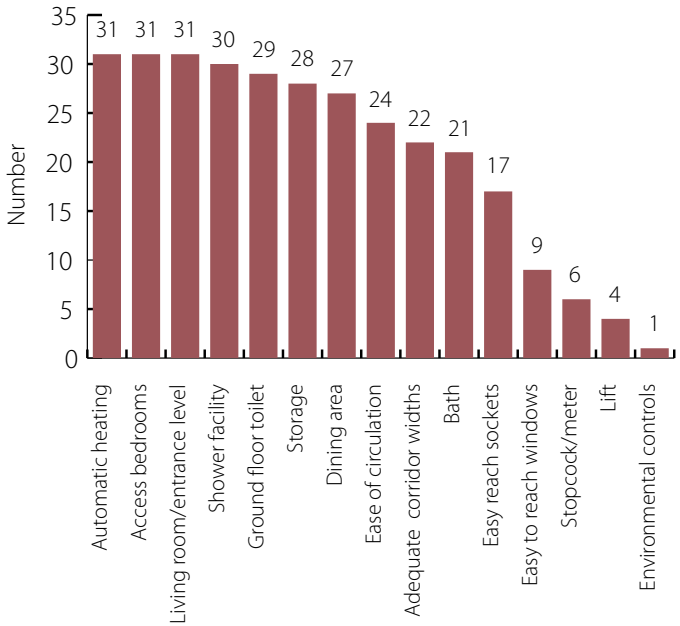
The canopy helped to keep people dry when entering the home and offered weather protection to the front entrance. This is particularly useful when there are level front door thresholds as it helps to reduce the impact of wind blown rain.

Three participants felt the door canopy could extend further to cover the full length of the wheelchair approximately 1,200 mm

"Just OK, greater depth would be better."

3.16 Internal Design Features

Figure 14
Internal Facilities Present



3.17 Doorways and corridors

Doorways and corridors need to be considered together as consumer satisfaction was dependent on the interrelationship of both. The narrower the corridor, the wider the door needs to be to compensate.

"I took the push-rims off the wheelchair because of the lack of space."

In the most extreme example, access to a bedroom was created from an 800 mm corridor by using a double door 1,100mm wide. This occurred in a home that had been adapted, where the desire to remain in the existing home was balanced against unacceptable space standards and where structural constraints did not allow the widening of the corridor.

Circulation constraints were more prevalent in adapted properties where there was a greater likelihood of fixed structural constraints to the widening of doors and corridors. Widening of doors and corridors where possible during adaptations, was also described as particularly disruptive.

"Door widening was the worst."

"I can't get to my brother's bedroom." -

Where corridors were too narrow, this had a major impact on satisfaction resulting in limited access to areas such as siblings'/children's bedrooms.

Optimal corridor (1,500 mm) and door width (up to 870 mm C.O.W) standards were more likely to be found in new build properties although in practice corridor and door widths were not always consistently applied throughout the home and could result in differential levels of access.

The effective clear opening width of doors/ corridors was often further compromised in practice by design features such as:

- large front door knobs
- radiators
- door stops
- fuse and meter boxes
- health service equipment stored in general circulation areas as there was insufficient dedicated storage for it. e.g. powered wheelchairs and hoists; and
- hall tables and furniture

"I charge my hoist in the living room and my wheelchair in the hall."

'Epioc' wheelchair users in particular had more difficulty negotiating door openings (the Greenwich wheelchair site brief recommends a c.o.w. of 900mm). Therefore extra wide doors (> 825 mm) may be required in some instances. There was also evidence of damage to doors from wheelchair footplates, as kick plates were often not provided as standard.

3.18 Recommendations

- In general terms doors which allow an effective clear opening width of 825 mm opening off a 1,200 mm corridor or 800 mm from a 1,500 mm corridor meet most people's needs: this is recommended in BS 8300.
- Implement consistent corridor/door widths in new build property.
- 1,500 mm corridors are preferable in new build social housing as this accommodates 180˚ turns for a greater number of wheelchair users, e.g. when turning around to close a front door.
- Where two wheelchair users live in the same dwelling 1,800 mm corridors may be required so that people can pass each other.
- Ensure dedicated storage for essential health care equipment out of general circulation space.
- Consider alternatives to radiators for home heating.
- Consider installing double doors where corridor widths are restricted in adaptations scenarios.
- Kick plates on doors should be provided as standard.

Figure 15
Double doors allowing easier access to corridor

3.19 Flooring

Although entrances are often floored with the same material as general circulation spaces, i.e. laminate floors or vinyl they could be classified as a wet area as wind blown rain and water carried in on wheelchair wheels or carers' shoes can create a wet zone just inside the door. A method of cleaning dirt off wheelchair wheels is also required which is effective but does not impede ease of movement.

3.20 General flooring

"I didn't want wooden flooring but now it is very useful."

There was widespread use of laminate or wooden flooring in general circulation areas and high levels of consumer satisfaction with this floor type as it offers low rolling resistance for wheelchairs or other equipment on castors, it is easy to clean and reduces house dust and odours.

"My wheels ate the carpet."

Table 3b: Summary of participants' feedback on flooring used in homes[1]

Type of Flooring	Advantages	Disadvantages
Laminate	Ease of wheelchair/hoist movement Easy to clean Less dust Attractive appearance Less problems with expansion/contraction	Cold under foot Easy chairs can slip during transfer from wheelchair to easy chair
Timber	Attractive Less rolling resistance for wheelchair/hoist Easy to clean Less dust	Expansion/gaps in floorboards
Vinyl (slip resistant)	Slip resistant when wet Choice of colours Attractive	Hard to keep clean Doesn't always join well with ceramic tiles Not always well laid
Ceramic Tiles (slip resistant)	Slip resistant when wet	Hard to keep clean Cold underfoot (can trigger spasm) Uncomfortable for sensitive feet Limited choice
Carpet	Warm underfoot Large choice of colours Dense fine nylon carpet had low rolling resistance/durable/slip resistant	Impedes wheelchair/hoist movement Traps dirt from wheels of wheelchairs Retains odours Needs to be changed frequently due to wear
PVC Tiles	Easy to clean	Cold underfoot Slippery when wet

Laminate floors were sometimes reported as slippery resulting in some movement of lighter furniture during transfers in certain instances. e.g. wheelchair to easy chair transfers.

3.21 Wet areas

Bathrooms and toilets

"The tiles .. I wish they were never made like this.. Can't get the marks off them…we have been down on our knees."

There was consistent dissatisfaction reported with non-slip ceramic tiles in bathrooms. Dissatisfaction centred specifically on the general appearance of tiles and difficulties encountered with cleaning them. One reason for this may be that people often have expectations that bathroom floor tiles should be attractive, smooth and shiny.

Slip-resistant vinyl flooring was reported as warmer, more aesthetically pleasing and offered more choice in colour, although the slip resistant properties mean that the surface is more difficult to clean than conventional vinyl.

3.22 Recommendations

- Further research into the performance characteristics of flooring is urgently required. Joint research commissioned by NIHE and BRE, (Building Research Establishment), will seek to offer clarification and guidance on the use of slip resistant flooring. In particular, best practice for flooring in wet areas, considering slip resistance, ease of cleaning, water containment and ease of installation requires further development.
- It should be emphasised that when ceramic tiles are used, a mat finish ceramic tile is essential for wet floor safety and until products are

1. These notes represent what consumers stated about the various floor surfaces of their homes. They do not represent independent technical evaluation. In practice the quality of workmanship in laying and managing moisture in timber may influence outcomes.

developed which can at least match their wet floor performance it would be inadvisable to relax standards in the interests of other aspects of performance.
- Consider methods of removing dirt from wheelchair wheels at entrances.

3.23 Easy circulation in ground floor rooms for wheelchair usage

"Everything is too small." (EPIOC user)

This issue of having the right space in the right place was a recurring theme in this study. It highlights the importance of using activity-based methods of developing design standards, rather than working back from set footprints for house size.

This section considered global satisfaction before the rooms were examined in detail. There were a number of variables which affected satisfaction in this area:

- the particular manoeuvring characteristics of the wheelchair and abilities of the wheelchair user (which can vary considerably in practice),
- use of moving and handling equipment in key areas such as living rooms, bedrooms and bathrooms/shower rooms;
- choice of furniture;
- base line space standards applied in the rooms - this varied depending on tenure; and
- size of family unit.

3.24 Toilet Facilities

In most cases the WC was integrated with shower/bathing facilities; this integration of facilities was valued. Where there were other family members and the disabled person needed extra time in the WC for personal care, the presence of a second WC facility for other family members was found to be particularly important. Where practicable and essential the provision of an en-suite shower and WC had a number of advantages, in that it helped to promote privacy, particularly where there was a larger family unit and minimised strained relationships with other family members. This was particularly important where a high level of intimate care was required.

"I can't wait … The en-suite will make a big difference, he hasn't any privacy."

3.25 WC pans

There were concerns regarding the height (often too low) and stability of WC pans. Recurring problems occurred with loosening or breakage of WC pan seats, due to lateral or uncontrolled descent on to the WC seat.

3.26 Recommendations

- WC pan seats need to be of extra strength with stainless steel hinges and flanges to minimise lateral movement of seats.
- Give consideration to the need for automatic flush, washing and drying WCs for wheelchair users with reduced hand function.
- Ensure pans are secured with extra strength evenly bedded fixing screws and that the floor surface under the pan is durable and secure.
- For independent wheelchair users ensure compatibility with the height of the top of the WC seat and the wheelchair seat height (with pressure cushion). BS 8300 recommends a WC pan height of 480 mm which is higher than most standard WC pans with a seat, which have a height of approximately 420 mm.
- Where there are both wheelchair users and non-wheelchair users in the home (other family members e.g. children), optimal WC heights need to be considered. Where there is a second toilet facility in the home, this conflict of need can be avoided.
- WC pan heights may need to be customised on occasion and may involve the wheelchair user, occupational therapist and designer.

Assisted wheelchair users are often moved using shower/ commode chairs which are designed to move over a standard WC pan. Easy circulation requires unobstructed space to the sides and rear of the pan. Ensure that radiators, sinks and toilet cisterns allow optimal location of the commode seat over the toilet aperture.

"It's hard … don't bath every week, it is so big an ordeal."

3.27 Shower facility

A properly designed shower facility can often address such concerns.

The results of this study have been compared with a much larger study (involving 366 participants - not necessarily wheelchair users), Showers fitted for people with physical impairments, which was conducted in 2002 by the Medical Devices Agency (MDA). It is significant that the findings of this study are consistent with the MDA findings, in that there was a high level of satisfaction with showers generally, but that design development is required in quite specific areas.

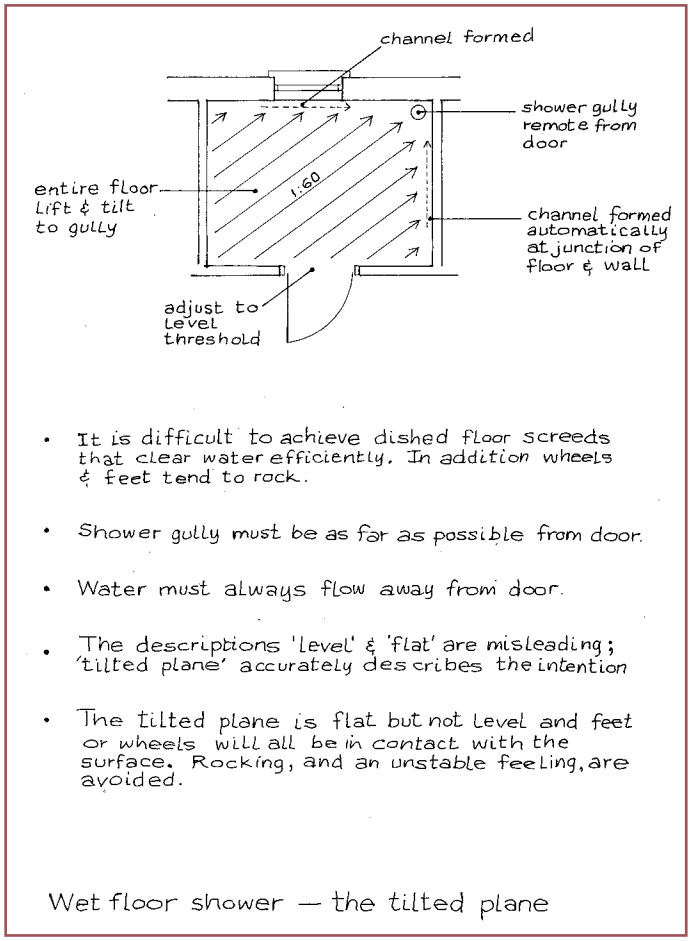
This study identified one major additional area of concern, which was the ease of cleaning slip-resistant flooring.

The majority of participants (23) were satisfied with shower design and few issues were raised about shower controls. Location and design of controls is carefully specified by the occupational therapists to housing providers.

There were a number of recurring complaints about design details relating to the shower base, flooring and forms of water containment, including:

- flooring – see earlier discussion;
- uneven floor surfaces resulting in equipment feeling unsteady when used on it;
- poor water containment – resulting in additional work mopping floors;
- wear and tear on half height shower doors;
- difficulty using half height doors; and
- inadequate sizes of showering areas - too small for the specific equipment used or the needs of the individual (this was less likely to occur in housing adaptations where an individualised brief had been developed by the occupational therapist in collaboration with client, architect and housing provider).

Figure 15
Comparison of Wet Floor to Trays



3.28 Recommendations

- See recommendation under flooring section.
- Where possible locate the shower area away from the shower room door.
- Include a 2,000mm shower hose to facilitate independent or carer assisted use.
- Undertake a specific evaluation of water containment methods in showers.

- Consider the use of tilting plane floors which have been developed within the NIHE adaptations programme in Belfast.

3.29 Bath

The presence of both a bath and level access shower was valued by non-disabled family members. While most wheelchair users in the study preferred a barrier free level access shower facility, some wheelchair users had a strong preference for a bath.

A range of perceived benefits was presented for this, including reduction of spasm, improving joint range of movement, pain relief, more effective cleansing of the lower half of the body and more effective raising of body temperature when cold. One active wheelchair user was able to transfer into the bath independently while others required a bath lift or hoist to use the facility.

"You can't wash inaccessible parts sitting in a shower."

This area is subject to a high level of personal preference and it would be inadvisable to make generalised provision of level access showers in all new build situations. Where certain housing associations have purposely made dual provision this has been highly valued and would appear to maximise choice for both disabled and non disabled tenants and optimise the future use of social housing.

3.30 Living room at entrance level

While many people were generally satisfied with their living room a number of people (7) found space restrictive in living rooms. One wheelchair standard dwelling was being actively adapted to enhance living room space while in another the living room furniture was removed to make space for essential wheelchair manoeuvring.

"It is too small if another wheelchair user comes to visit."

Living room space can be compromised for a number of reasons, e.g. additional space needed for essential health service seating systems, particularly riser recliner chairs, in addition to conventional three piece suites for use by other family members. Adequate space is also needed for not only wheelchair manoeuvre and sitting to view TV, but also space for hoist assisted transfers from wheelchair to easy chair in this room (See Through our eyes Stephen Donnelly). Minimum standards for living rooms in wheelchair housing have not been established, considering the full range of activities undertaken in this room. The NATWHAG guidance cautions against having living rooms which are long and narrow (less than 3,000 mm).

The location of sockets in living rooms requires further consideration not only in terms of number but also where they are located. Sockets should not be placed in corner locations for wheelchair users. When other factors are considered, such as wall space for radiators, specialised seating and seating for non-disabled family members (all of which can make sockets inaccessible), it is clear that the options for locating the increasing number of powered sockets in accessible locations are quite restricted. An inability to independently reach and switch off powered appliances has implications for both fire safety and energy consumption.

31.31 Recommendations

A review of space requirements for living rooms should consider:

- family size;
- space for wheelchair manoeuvre and transfer space from wheelchair to easy chair - whether independent or assisted wheelchair user (mobile hoists have a turning circle of 2,300 mm BS 8300; 2001);
- adequate space to view TV, whether from a wheelchair, easy chair or specialist seating system provided by HPSS Trusts.

3.32 Controls and services; Considerations

- provision of additional accessible sockets ,
- location and control of entertainment systems, lighting and door intercoms,
- the feasibility of wireless methods of powering/ activating appliances. Advances in assistive technology may offer new solutions.

3.33 Wheelchair accessible kitchens

The survey found that a significant number of kitchens had not been adapted for wheelchair users. However there was little evidence of dissatisfaction with kitchen design, as the disabled person usually had a family member to do the cooking and washing up, or statutory services provided help in this area. It was noted that minor modifications, e.g. the creation of a snack preparation area within the kitchen (designed to wheelchair standard), alongside facilities designed for non disabled people, would promote independence for some disabled people and reduce the workload for carers.

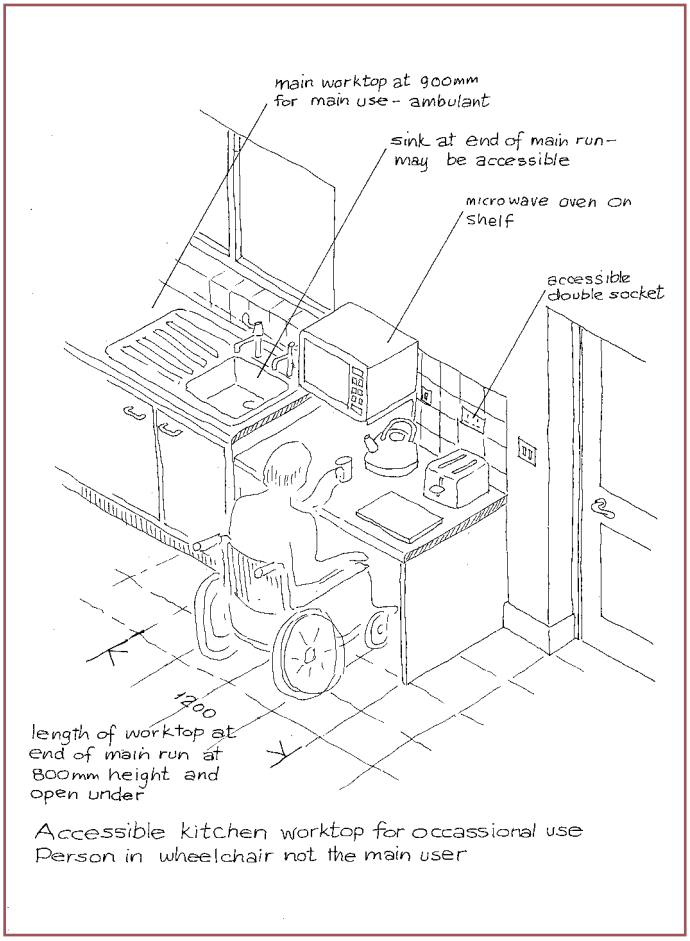
"She would like to do more in the kitchen … can't get into corners to reach the toaster."

3.33 Recommendations

- Even where family or other statutory services have the primary responsibility for food preparation, it is worth considering a snack preparation area (involving minor modifications to kitchen design), were there is the motivation to use these facilities.

- In wheelchair standard housing in the social sector it is prudent to ensure overall wheelchair standard space standards, but ensure height adjustability in work surfaces/high level storage. Adjustable height work surfaces should allow sections to be set at different heights for mixed usage (i.e. wheelchair and non-disabled usage)

Figure 17
Snack Preparation Area in Kitchen



3.34 Clothes washing and drying facilities

The social survey showed that the majority of participants had continence issues, making the availability of adequate washing and drying facilities essential. While in most of the homes surveyed, carers/family undertook these tasks, some active wheelchair users also undertook these tasks independently.

The presence of utility equipment in the kitchen was often problematic in that:

- background noise could impede communications particularly where there was associated hearing loss;
- condensation and odours could build up in the kitchen; and

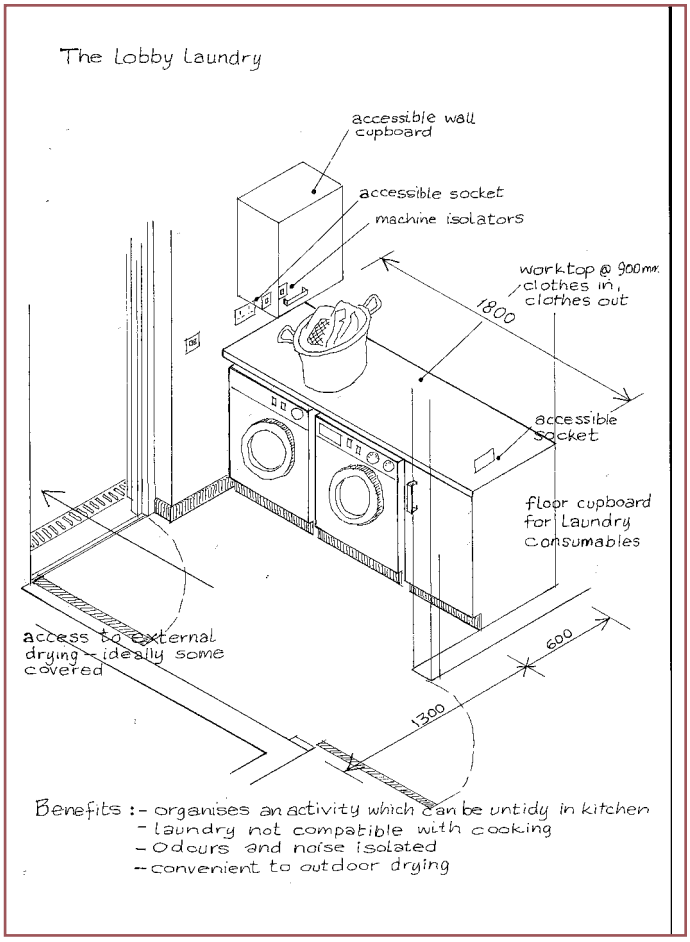
- usable work surfaces are reduced because there is no knee clearance under the surface and the height of the average washing machine/tumble drier at 850 mm results in a work surface height of 900 mm- too high for many wheelchair users.

The feasibility of using the same space for laundry, food preparation and dining needs to be given further consideration.

3.35 Recommendations

- Separation of utility from kitchen facilities may be worth considering in new build schemes where practicable, as it offers a number of advantages.
- Approach space to use washing machines/ tumble driers needs to be carefully considered in utility rooms, allowing for the opening of appliance doors.

Figure 18
Separate Laundry Area



3.36 Dining areas

A high proportion of the participants surveyed had satisfactory access to a communal family dining area, generally in the kitchen area. Such access is important in terms of social inclusion within families or for friends visiting. In three instances a specific dining area had been compromised either because it was used to store an electrically powered scooter or where there was insufficient space in the dining area. In these instances people ate from a trolley/wheelchair tray in the living room on their own.

.37 Bedrooms

There was a high level of satisfaction with bedroom design. In many cases the bedroom design had been customised through adaptations (often extensions to the existing home), following individual assessment and consultation between the disabled person/family, occupational therapist, architect and housing provider.

"It was an absolute godsend."

"We don't want the bedroom to look like a sick room."

Levels of satisfaction were largely determined by individual circumstances - assisted wheelchair users needed considerably more space for transfers than independent self propelling users, with additional space needed for carers to help a person into bed and offer personal care while in bed. Additional space was also needed for storing, using, moving and handling equipment in the room and to store consumables. Several of the participants also required space for essential healthcare equipment used in bed, which included items such as ventilators, oxygen, nebulisers, drips, pressure relieving mattresses, disposables, profiling/ height adjustable beds - (which are longer than commercially available beds) bedside tables and lighting.

As much of this equipment requires a power supply, additional sockets conveniently positioned around the bed are often needed. In one situation 20 power sockets were being used for essential equipment in the bedroom. Powered wheelchairs and hoists are often stored and charged beside the bed for convenience.

Storage space for clothing was sometimes compromised in bedrooms.

"I store my husband's clothes in the bedroom and mine upstairs."

3.38 Sleeping arrangements

A requirement for specialised beds for postural support and pressure relief has potential to separate the sleeping arrangements of couples. Some couples had to sleep in different rooms, or apart in the same room. When planning bedroom specifications the need for intimacy and companionship should be considered sensitively, allowing for changing dynamics within relationships. Bedroom space standards should allow for double bed use or where it is the wish of a couple, two single beds in the same room.

In another situation, a disabled adolescent slept in a ground floor bedroom, while his parents slept upstairs, which resulted in occasional anxiety. This is indicative of the often unspoken vulnerability that people may feel when sleeping apart.

It was also evident that parents would sleep with their children during times of illness and other times when children were distressed.

3.39 Spare bedrooms

The presence of a spare bedroom was valued by all participants for friends to visit, which was particularly important for people living alone

"No one wants to live alone - don't put a person in anything less than two bedrooms."

Having sleepover capacity for a friend or statutory carer, particularly during times of illness, was considered vital. Some participants also valued having capacity for grandchildren to stay over. Spare bedrooms were also used to store equipment and disposables.

3.40 The Through Floor Lift

The 'through-floor' lift has been developed as a safe means of transferring person and wheelchair between ground and first floor. When positioned in the lift the enclosure is at shoulder height and with a slow speed and quiet operation, many people find the facility acceptable. Some people are unable to use this lift and the Occupational Therapist's recommendation is necessary.

The lift is normally 'sent upstairs' after use and the floor becomes part of the ceiling. The obstacle is therefore removed giving the benefit of extra floor space as the area taken up is approximately a square metre.

A lift installation is usually carried out over two days and can be removed if no longer required. The standard design assists maintenance and refurbishment. This contributes to a quick response to a maintenance request.

The great benefit of the lift is an accessible first floor. This often avoids the disruption of moving house or building an extension. Some parents find they can supervise children more easily. With older people the house is sometimes under-occupied. Many houses have light-weight partitions on the first floor with roof trusses which pan across the external walls. This construction permits easy re-planning of the first floor. Once again this can easily be altered or reversed if conditions change.

The lift may be part of a project which includes an extension because the existing dwelling is not large enough to provide the recommended facilities.

The lift would not be suitable in all cases as noted, but it is a very useful element with the added benefit of rapid response.

3.41 Recommendations

- A review of existing bedroom space standards for new build property is warranted, as assisted wheelchair users have additional requirements to independent wheelchair users. The existing space standards for bedrooms are based primarily on the needs of independent wheelchair users.
- Where feasible try to keep parents' and children's bedrooms in close proximity.
- In certain circumstances an inter-floor lift may provide easier access between bedrooms or facilitate parental supervision of children.
- Where family members are sleeping on different levels, consider a means of night-time communication.
- Two-way intercoms between bedrooms were valued by many participants.

Table 3c
Internal facilities

Satisfaction With Internal Facilities	Satisfied	Dissatisfied	Total
Automatic heating	30	1	31
Accessible Bedrooms	28	3	31
Living room at entrance level	24	7	31
Shower facility	20	11	31
Ground floor toilet	23	6	29
Storage facilities	15	13	28
Dining area	27	-	27
Ease of circulation in down stairs rooms	24	-	24
Corridor widths	22		22
Bath	21	-	21
Easy to reach electric sockets and switches	17	-	17
Low level easy to reach windows	9	-	9
Wheelchair accessible kitchen units	6	-	6
Stopcock/meter and mains switches	6	-	6
Lifts	4	-	4
Environmental controls	1	-	1
Not all participants had all facilities			

3.42 Services and controls

There was general satisfaction with the move from solid fuel to automatic forms of heating.

"I couldn't carry out ashes, light or maintain the fire."

All the homes surveyed had automatic push button forms of heating in situ, providing a significant improvement in the provision of convenient heating systems in recent years.

Heating programmers were described as difficult to see and set by some participants, and a number of people expressed a need to have more control of heating in specific rooms to allow for different thermal comfort levels between disabled and non-disabled family members. The ability to maintain consistent heat was also highlighted.

There was some evidence of concerns relating to oil fired heating systems i.e. tampering with oil tanks, rising oil prices, difficulties monitoring fuel levels and coping with air locks if fuel ran out.

"They set fire to the grass … the fire came right up and could have caught the oil tanks."

3.43 Recommendations

- Consider heating controls which allow greater control of specific zones within the dwelling
- Heating controls which are easy to see and programme is required.
- Consider sensor lights to the rear of the dwelling to illuminate oil tanks, particularly where people live alone.
- Consider fuel sensor monitors where people are living alone and cannot access their oil gauge.
- Consider alternatives to radiators for home heating.

3.44 Sensory loss - design issues

A significant number of wheelchair users or their carers had also some form of sensory loss, i.e. hearing, sight or sensation. While there was evidence that mobility needs had been considered, still more could be done to address sensory loss through good environmental design i.e. colour contrast, activity lighting, improved communications and door entry systems for people with hearing loss.

3.45 Window controls and security

In the homes surveyed less than a third had low level, easy to open windows. The dissatisfaction ratings, however, were relatively low. This is because carers/family often opened windows for the disabled person although there may well be occasions when people are unable to regulate room temperature and ventilation independently. Some people also preferred to keep windows closed for security reasons. Window opening restrictors were felt to be generally useful for security but the design of certain restrictors would make them relatively easy for intruders to disengage.

"A lock only keeps an honest man out"

Some people found press button window locks, commonly found in UPVC window handles, difficult to manipulate. The issue of window security needs to be considered alongside fire escape requirements, where egress may need to be considered via a window.

The most difficult windows to open were in the kitchen, where works surfaces limit reach. Radiators under living room windows can also make access to openings more difficult. Some wheelchair users successfully used 'helping hands' or a stick with a hook to extend their reach to manage window openings. One person who lived alone had an environmental control system to open/close his living room window and curtains. This facility was valued as it helped him to achieve control over room temperature and to promote privacy after nightfall.

"It's great to have control of ventilation."

Bottom opening windows with cam openers (where installed) worked well for most people, as they can be opened with one hand and fine finger movements are not required. However, one user wondered if bottom opening windows reduced the clearance of condensation in bathrooms.

3.46 Recommendations

- Provide bottom opening windows with cam openers in new build dwellings. The height of window openers should be between 800-1,000mm above floor level.
- In the planning of adaptations to existing property, consideration should be given to control of essential windows, particularly for disabled people living alone or who spend a considerable part of the day alone.
- Provide window opening restrictors as standard to enhance security, ensuring that the restrictors are secure but conform to fire escape requirements.
- Consider the impact on ease of reaching window controls when positioning radiators under windows.
- For wheelchair users with limited hand function who either live alone or are alone for considerable periods of the day, automatic window and curtain opening control systems may help with room temperature regulation, enhance a sense of personal security and promote privacy.

3.47 Easy to reach electric sockets and switches

Just over half the homes visited had easy to reach sockets and switches throughout the home conforming to building regulations 450 mm to 1,200 mm above floor level). Some homes partially met these standards in the adapted sections. Due

to the disruption of re-siting sockets and switches, there may often be resistance to this work unless it is felt to be absolutely necessary. Where switches and sockets were in accessible locations, this was valued by wheelchair users.

"Perfect - better than before."

The high number of homes without accessible electrical switches and sockets can be explained by the presence of older housing stock (pre 2000) which was now being adapted.

As with window controls, dissatisfaction was relatively low (just over one third). Again, carers and family are often the main users of sockets and switches.

Where wheelchair users are living alone, safety issues need to be considered carefully, as the inability to turn off sockets/pull out plugs or switch on lighting independently has safety and energy conservation implications.

3.48 Stopcock, meters and fuse/mains switch

Although the need for access to these services is often quite infrequent, inability to access and operate these controls in such situations can be problematic

"Can't get at it… I blew switches and had to get the warden out."

"If the lights go out I am totally disabled."

The controls for these services were generally quite inaccessible: only six out of 31 users (mainly living in adapted properties) described these services as accessible.

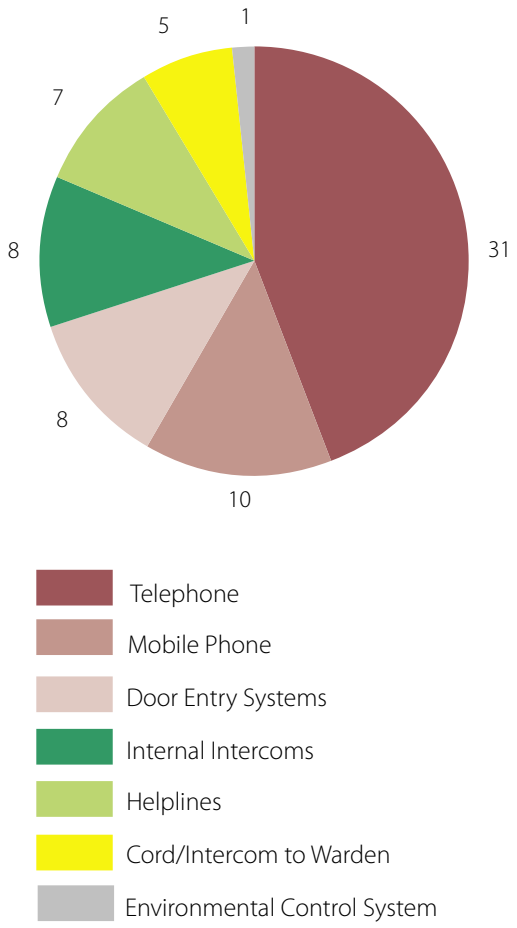
In social housing the controls for services were often located in the hall beside the front door. In new housing, meters are increasingly being located outside so that service providers can monitor without having to gain access to the home. Where this is the case, accessible locations for meters need to be considered.

3.49 Recommendations

- service controls should be located in accessible locations,
- height location between 665 mm and 1,000 mm above floor/ground level,
- the doors and closures on these units need to be accessible.

3.50 Communications technology

Figure 19
Communication Technology Available



A variety of communications technologies were used in people's homes. All participants had a home telephone. Mobile phones are increasingly being used and were identified as being particularly valuable when out and about and where people

needed assistance because of unexpected events, e.g. not being able to get into a friend's house or to access services, e.g. at filing stations or when a wheelchair battery was running flat.

Just less than one quarter of participants had door entry phones and internal intercoms to wardens. These were valued because of the enhanced sense of security they promoted, although the locations of the handsets for door entry systems were not always appropriate to ensure easy usage. Most people require access to the intercom/door release system while sitting in the living room, kitchen/ dining area and when lying in bed. The location of the intercom door release handset is often determined before the home is furnished, and as a result may not always be within easy reach of a person in bed or sitting in the living/dining area due to the location of furniture.

Intercom control from the toilet/shower room and garden has not generally been a consideration.

Wheelchair users who have hearing loss may need modifications to door entry systems. See 'Through our eyes' - Charlie Mills

Seven homes had a help line. Although the presence of a helpline enhanced a sense of personal security, some participants expressed a resistance to body worn controls and fear of accidentally activating the device.

"It's like having a grenade around my neck."

"Not always where you might need them."

3.51 Recommendations

- Consider portable intercom door release systems to cover any part of the home.
- Control of door entry may be required from the living room, bedroom, kitchen and, in specific circumstances, bathroom.
- Consider additional door entry requirements for people with sight and hearing loss.
- Consider further development of aesthetically appealing helpline controls.

3.52 Storage

"They never thought about storage when they built these houses."

"There is not enough storage - we want to keep medical equipment out of living space."

One of the most common causes of dissatisfaction among wheelchair users was the lack of internal storage, with 13 participants reporting difficulties with storage. With preset funding bands determining the overall foot print of the home, planners and designers may have to limit storage when trying to achieve the provision of other facilities in wheelchair standard housing. Evidence emerging from this study suggests that wheelchair users have significantly greater storage needs than non-wheelchair users, due to the significant amount of essential health service or privately purchased equipment, to assist daily living and nursing care, present in their homes (see Figure 19). An inability to store items in close proximity to where related activity takes place is inconvenient and results in wasted time moving equipment from room to room. Many of the wheelchair users have time limited provision of personal care each day from statutory services. It is important that this time is used productively.

Inadequate storage also gives rise to health and safety issues. If equipment has to be stored in general circulation routes it can block fire escape routes or create trip hazards.

Inadequate space in rooms where personal care is provided can also result in carers compromising posture, with resulting musculoskeletal injury.

3.53 Internal Storage

There were examples of people not having adequate clothes storage in bedrooms as space

was needed to store other items. Radiators and electrical socket locations can also reduce options for storage locations.

"They must think pensioners have no clothes."

Many of the wardrobes surveyed had few fixtures and minimal shelving to maximise storage solutions. Cupboards with roll in capacity and shelving to the back and sides of the cupboard worked well. Wardrobes with sliding doors rather than pull out doors are easier to approach and access.

3.54 External Storage

See earlier comments (section 3.11) on the advantages of car ports

Many people supplemented external storage by purchasing garden sheds, although they are generally not accessible for wheelchair users, especially where people wish to independently tend their own garden.

3.55 Recommendations

General

- The importance of additional storage space when planning adaptations and new build wheelchair housing should not be underestimated.
- The key locations where storage needs to be considered are bedrooms, bathrooms, kitchens and outdoor.
- Adequate and accessible power points should be located in storage areas to charge equipment.

3.56 Cupboards and wardrobes

- Further design guidance on good practice when planning wardrobes and cupboards is required.
- Where possible, wardrobes and storage rooms should have open fronted access with the omission of shelving or drawers at low level.
- Where a wheelchair user is accessing storage from front shelving, it is best positioned no higher than 1000 mm and no lower than 655 mm from floor level.
- The height of shelves should be no higher than 1,060mm and no lower than 665mm to facilitate safe access from the side.
- The approach space to access cupboards and wardrobes needs to be factored into spatial planning in bedrooms and kitchens. A clear approach space of 1,100 mm is suggested in BS 8300 (p.131).

3.57 Outdoors

With recent developments in government policy on waste management, most dwellings now have two or three bins. Space to store additional bins and access high sided bins for waste disposal requires further consideration.

The lip of a conventional wheelie bin is 1,000 mm and handles are 1,050 mm above ground, a level which is at the outer reach limit for many wheelchair users. To effectively open the lid to 90° requires a reach of 1,500 mm which is outside the reach range of many wheelchair users.

3.58 Equipment

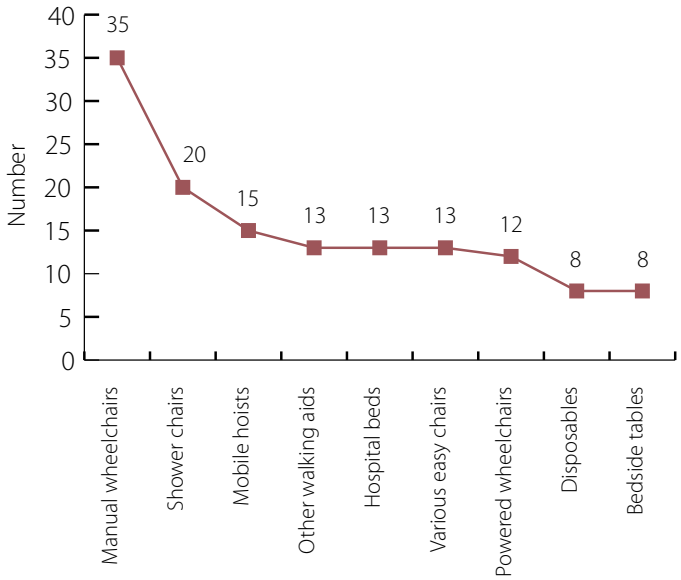
To achieve good practice in housing design standards for wheelchair users, it is essential that the space to store and use essential mobility, daily living and nursing equipment safely and conveniently is properly considered in the design process. An understanding of the performance characteristics of equipment used is a vital part of the product-environment interface which influences design standards.

When asked if the equipment supplied by Health and Social Services occupational therapy, physiotherapy and nursing services was essential, wheelchair users and family members stressed the value of this equipment in coping with daily life. -

"We would be lost without it."

It is significant that all wheelchair users surveyed had more than one wheelchair. Many wheelchair users had a second wheelchair for back up in the event of breakdown. As it can be difficult to transport a powered chair in a car that has not been converted, a number of people also used a manual wheelchair when travelling by car as it was lightweight and could fold for compact storage.

Figure 20
Commonly Prescribed Equipment



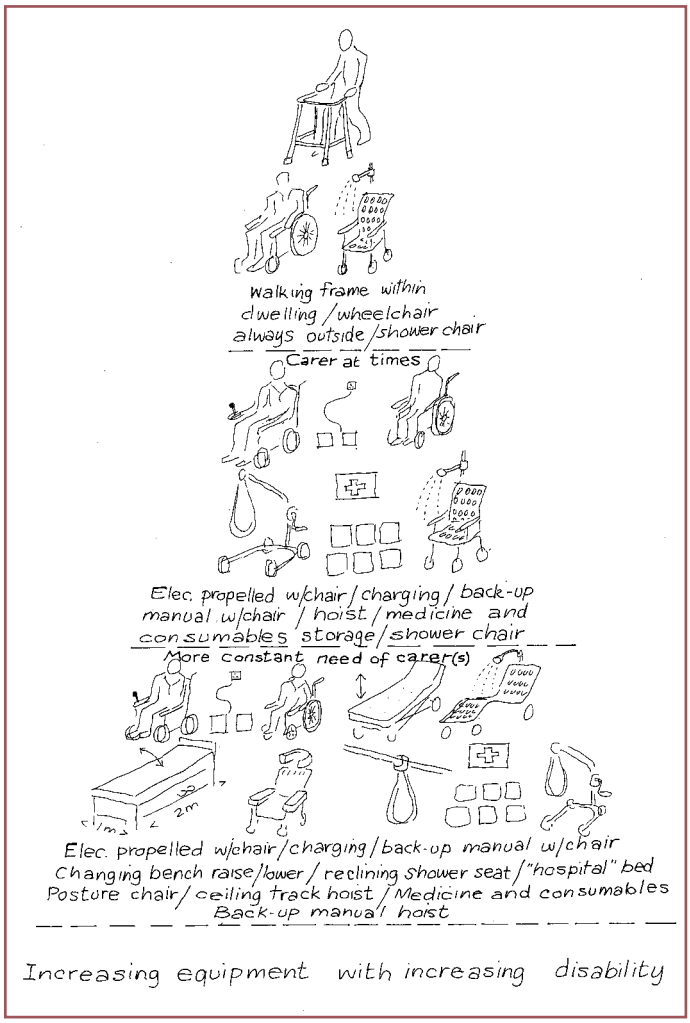
3.59 Changing needs over time

Although all participants were wheelchair users, 13 had various types of walking aids in the home, e.g. walking frames and rollators. In some cases households do not advise the HPSS Trusts when items are no longer required. However, mobility aids also present in the homes of people who had conditions were mobility could fluctuate, e.g. remission from multiple sclerosis. In these instances, equipment was used to assist weight bearing in the lower limbs.

The patterns of wheelchair usage were also subject to change during the life cycle of the people who participated. Some people who had been independent self propelling wheelchair users earlier in their life found they needed to use powered wheelchairs later in life due to the ageing process or where musculoskeletal problems emerged. Some people felt these musculoskeletal problems could be linked to long-term wear and tear on the upper limbs from self propulsion. Recent studies have confirmed that manual wheelchair users can experience upper limb pain and injury, particularly of the shoulder and wrist, which can be influenced by the method of propulsion, weight gain and the design of the wheelchair used (Bonniger et al, 2005).

"Self propelling takes more out of her."

Figure 21 -
Changes in Equipment Needed Over Time



Changing mobility needs over time are significant for wheelchair housing design standards. As each type of mobility aid requires differing space standards it would be prudent therefore to embrace more universal design standards both to meet the changing needs of individuals over

their lifetime and to allow for changing tenancies of wheelchair users in social housing during the lifecycle of the house.

Within the study a cross-section of wheelchair users, using a wide variety of wheelchairs, have been interviewed. The results illustrate the diversity of wheelchair usage that exists. The manoeuvring characteristics of the wheelchairs surveyed varied considerably and manoeuvrability was also influenced by the specific abilities of wheelchair users. This has a direct impact on the spatial design standards required (see also regional wheelchair provision trends chapter 5).

Independent wheelchair users who used high performance self-propelling wheelchairs could generally manage within the traditional space standards applied. Nevertheless, others using powered chairs, particularly indoor/outdoor powered chairs, needed more space, as did people who required longer wheelchairs because of a specific need for enhanced postural support.

3.60 Hoists

The presence of mobile hoists has the potential to impact on space standards in the bedroom, bathroom and living room where assisted transfers may be required. There has been a trend towards the provision of electrically operated hoists which require frequent charging. In some homes a second manual hoist was kept as a backup.

Reactions to the use of a hoist varied from:

"The days were hell getting in and out of bed without the hoist."

"Looked like a hospital … no room for a portable hoist."

3.61 Ceiling tracking hoists (4)

These are often used in the bedroom and bath/shower room. When used for transfers in the bedroom instead of a mobile hoist, they can make significant savings in space. For example BS 8300, p.126 recommends a transfer space of 2,250 mm (width) x 2,100 mm depth (the length of a hospital bed) beside the bed when using a mobile hoist. Two carers can assist a wheelchair user into bed using a ceiling tracking hoist in a 1,850 mm wide space. This method of transfer does not appear to have been considered by BS 8300 and would represent a saving of 400 mm in bedroom space for assisted wheelchair users. There may be occasions when a mobile hoist is required instead of a tracking hoist.

3.62 Shower chairs

A range of shower chairs were in use, including static chairs, various mobile chairs, attendant and self propelled tilting postural support shower chairs. As each of these chair types has different dimensions and manoeuvring characteristics, there are implications for shower room design, both in terms of the size of shower bases and approach space. This is particularly true when shower trolleys are used.

3.63 Hospital beds

Sophisticated hospital beds offering height adjustment, pressure relief and postural management are increasingly being deployed for people with more complex needs. These beds can help to reduce musculoskeletal injury for carers and enhance comfort, posture and ease of bed transfers for wheelchair users. Increasingly these beds are powered and are a little longer than conventional beds. Where bed hoists are used the length of the bed is further increased. Allowances need to be made for this equipment in bedroom planning.

3.64 Easy chairs

Located in living rooms and occasionally bedrooms (some are on castors and can be moved from room to room), these chairs can be operated either

manually or electrically, offering specialist postural support and ease of transfer. Deployment of riser/recliner chairs has particular implications for living room design. When in the full recline position they can measure up to 2,000 mm in length. They often require a power supply from a nearby power socket and need to be located out from walls so the backrest is not damaged by striking the wall during recline. The use of a 'wall hugger' reclining chair can help to address the problem of limited space.

3.65 Disposables

This covers a range of products including home dialysis bags, catheters, colostomy bags, incontinence pads and protective sheets. People often need to keep some reserve supplies of such items, as any delay with new supplies can cause considerable distress for the person affected and their carers. People tend to depend on these products on a daily basis and some disposables can be quite bulky.

As these products are associated with intimate personal care, discreet storage in appropriate locations to ensure privacy, i.e. bedrooms and bathrooms is recommended.

3.66 Bedside tables

Bedside or over-bed tables are needed for items such as medication, books, remote controls, drinks, snacks and tissues. Space is needed to one side of the bed to bring these items into easy reach for the wheelchair user, while avoiding obstruction of space needed for bed transfers. These tables can be placed in the non-transfer side of the bed, and can be used for personal care and bed making.

A convenient location to ensure bedside lighting is easy to reach is essential, particularly where people need to transfer from the bed during night time hours.

3.67 Other health care equipment

Other equipment identified in the study which was often used at the bed included: nebulisers, oxygen, drips and peg tubes. These items will often need a power supply.

Chapter 4

Through Our Eyes (Personal Stories)

Chapter 4
Through Our Eyes (personal stories)

Charlie's story

4.1 About me

"My name is Charlie Mills, I live in a two bed Habinteg housing association bungalow, and I have a dog called Vicky who is both company, as I get lonely at times and a good guard dog too. I was born with paraplegia and hearing loss and I have been using a wheelchair since I was 8 years of age. I have always led an extremely active and independent life. I do everything myself from cutting the lawn with a light electric mower to painting the house, ceilings and all. I also like painting, cooking and making up jigsaws which I mount on cardboard and hang on the bedroom walls.

Figure 22

4.2 Location

"I moved to my present address because the bungalow suits a wheelchair user. The doorframes are extra wide and electric sockets are higher so I don't have to bend down. Also a warden lives on site. I used to live with my mother until she passed away in June 1996. Although I got the bungalow in December 1995, I could not leave my mother on her own too often. I was the first occupier of the bungalow and I've lived here for 10 years.

I drive a car that has been adapted for my needs. I enjoy driving around to visit my friends and family. I especially enjoy going to the local shopping centres.

4.3 Equipment

"As a child I was pushed around in a large NHS pram. But in the home I crawled around as I am paralysed from the waist down. I remember coming down stairs headfirst and doing headstands. This also helped my upper body to become really strong. Around 8 years old I got my first NHS wheelchair. The NHS wheelchairs were very heavy and usually the colour grey. When I started driving a car I realised I needed a lighter wheelchair so I could lift it myself in and out of the car. So my mother bought me my first lightweight blue wheelchair which was made especially for my requirements.

I am now on my third model. It is very light weight, which helps. I would hate to be housebound.

4.4 Design

"I have needed very few adaptations to meet my needs, as the basic design of the home is very good.

As my back garden is next to fields I would prefer the fence to be higher and stronger so young people won't damage it. Other than that I am very happy and secure in my home.

4.5 Things that I like about my home:

"I can move around easily and use all the facilities in the home. There is plenty of space as I live alone and don't need much equipment. I want a small house as it is easier to keep. I have both a level access shower and a bath in the home. Personally I prefer a bath as it warms up my legs, it is good to have that choice.

Figure 23

The covered car port is not only handy for parking in poor weather but I have a sheltered protected area for my dog there and can dry clothes in wet weather.

4.6 Minor adaptations which I have needed:

- The height of my kitchen work surfaces are a little bit high for convenience, but they are on brackets and have now been adjusted to suit me.
- A sensor light at the back was installed at the back of the house, as I mentioned I am not happy with the back and this has helped
- There is an intercom door release in the home but as I cannot hear it I rely on my dog barking to let me know someone is at the door.

Figure 24 -

4.7 My ideal home

"This home is well designed to meet my needs. Some small adaptations to make it suitable for my needs have been needed. I enjoy living on my own. I am very independent from taking care of myself to taking care of my home, decorating, hoovering, washing floors, etc. This bungalow is cosy and easy to keep and it is my ideal home."

4.8 Issues for housing planners

The current design standards for new build wheelchair standard housing are generally suitable for active independent self propelling wheelchair users often only requiring minimal internal adaptations to meet specific needs.

Frequently wheelchair users may have other disabilities as well, such as hearing or sight loss and these need to be considered in the design of the home. Some low cost features can be included in new build schemes for people with sight problems which will benefit everyone (Rees and Lewis 2003).

A sense of personal security can be promoted by features such as sensor lights/fencing at the back of the home.

Stephen's Story

4.9 About me

"My name is Stephen Donnelly; I live alone in a two bedroom new build wheelchair standard housing association bungalow (Habinteg) which has needed a number of customised adaptations to meet my particular needs over time. I have lived here for over four years now. I experienced a spinal injury 12 years ago and already had ankylosing spondylitis; the two conditions exacerbate each other. The availability of wheelchair standard housing, housing fitness and a place where I can feel safe have influenced my choice of home.

I have got limited movement and sensation everywhere, but not enough to carry out normal functions. I am not strong enough to hold myself up and balance. I cannot feel hot or cold and don't have proprioception (the awareness of where my body is in space when my eyes are closed). When the lights go out I would fall over. I need to counter sensory deprivation with sensory stimulation; music I rate highly so far as to say it has healing qualities. I enjoy the visual stimulation provided by wall hangings and wood sculpture and need the sensory stimulation of touching natural materials such as wood. Plastic is cold, generates static electricity and is uncomfortable for me to touch.

I can't tell when I am too hot or too cold and I need an outside source to tell me what the temperature is. I need to carefully choose clothing which will keep me warm but can be easily opened so that I can cool down. I use my clothing in conjunction with environmental controls to regulate my body temperature.

My dependency is total. The only control I have over my environment is by mechanical/electronic means. I am totally dependent on all my environmental systems working and a power cut can be really critical. For those things I can't control mechanically every other requirement needs to be carried out by another person from lifting a pencil from A to B, lifting a book from the bookshelf or picking up something I have dropped. You need a high degree of order to position things so that they can be retrieved by strangers.

The effect of ankylosing spondylitis leaves me a solid mass in the morning, as I will not have moved between 10.00 pm at night and 7.00 am the following morning. I use the bath to defrost myself as I carry out exercises in the water which I couldn't do in the atmosphere. The use of water is a fantastic pain reliever, particularly where a bath has a Jacuzzi effect.

It is essential to maintain my mobility as lack of movement could lead to shrinkage of muscle and seizure of joints. If I don't carry out daily exercise I would get a complete curvature of the spine and lose the limited movement I have. If you don't use what you have you will lose it.

4.10 A typical day

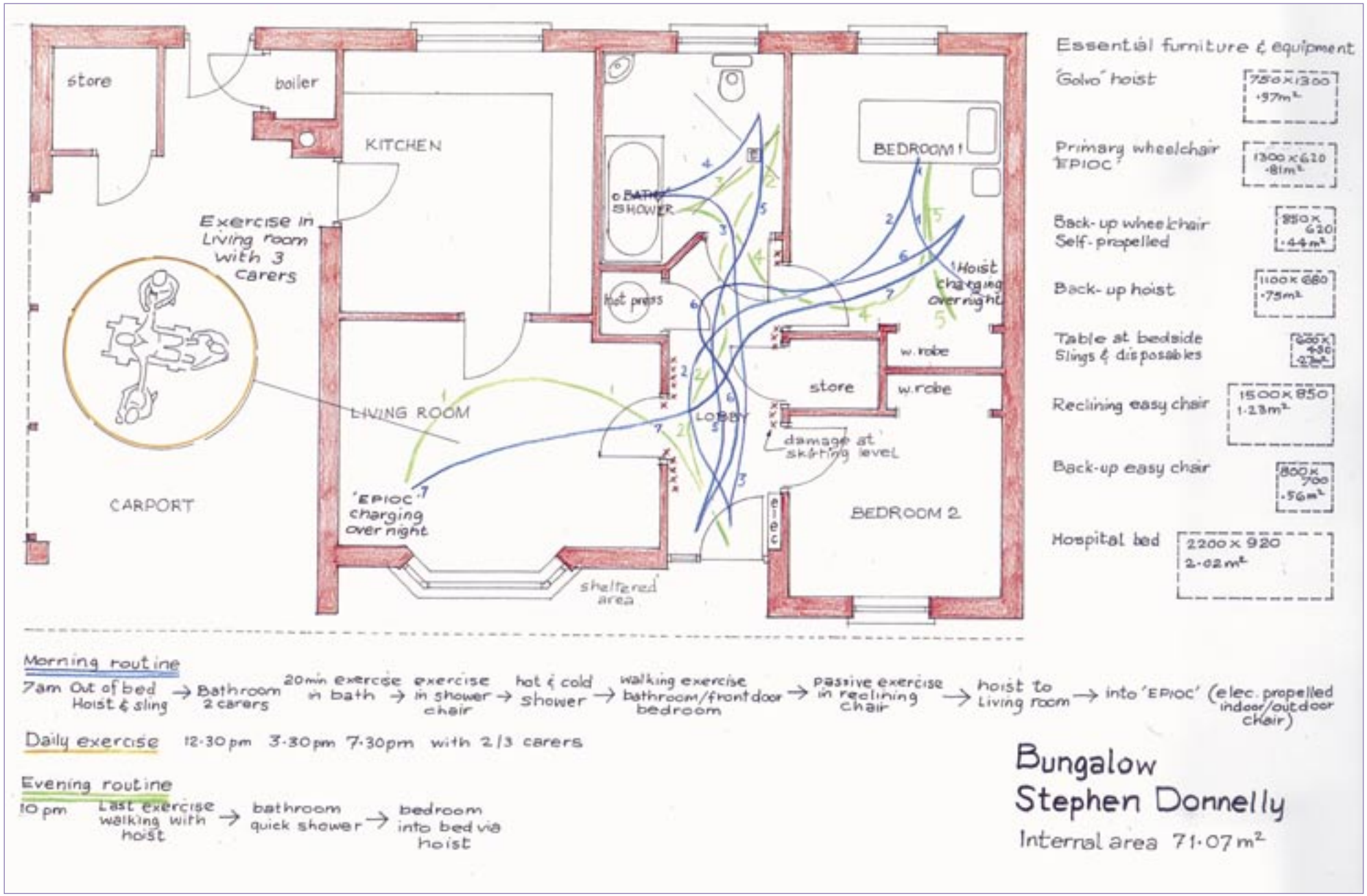
"My day starts at 7.00 am when still in bed. Two carers come in the back door, one runs the bath and empties urine and the other gets ½ pint of water and gives me drugs.

I am then turned sideways to put on a sling, hoisted off the bed and taken to the bathroom one carer pushing the hoist, the other holding my knees.

"I spend 20 minutes in the bath and I am then hoisted to a shower chair where I go through a series of exercises moving all my joints stretching and straightening my spine. While one carer cleans my teeth, the other carer washes creams applied the night before off me. I then get both a hot and a cold shower and am dressed. After this (using a specialised hoist which allows me to take some weight through my legs) I am walked from the bathroom to the front door and back to the bedroom where I am placed in a riser-recliner chair where I get half an hour's passive exercise.

Figure 25

Plans showing Stephens daily routine and manoeuvring of equipment between rooms



Then using the hoist I am walked into the sitting room and am put into my electric wheelchair. This all takes about two hours. The hoist will constantly crash into door frames and is quite difficult to manoeuvre even with the extra space in the hall but it is essential for my mobility.

Figure 26
Moving equipment can cause damage to doorframes

At 12.30 I get ½ hour of passive exercise in the wheelchair including standing and walking in the hoist and the same at 3.30 and 7.30.

At night time I get ½ hour exercise in the sitting room walking with the hoist into the bathroom to have a quick shower and am then hoisted into bed.

The longest period of time on my own in the day is 3 ½ hours. In between times I have other carers in to cook, clean and do other things. It is like an assembly line at times. In total I have 150 scheduled visits in the week from my carers; if one person is late everyone piles up!

4.11 Location

"I use my powered wheelchair to access facilities close by and a combination of accessible taxis and community transport with a tail lift for longer journeys. I can't use public buses partly because there are not enough dropped kerbs between here and the nearest bus stop, there is a difficult cross fall on the footpath and I would get too cold waiting.

The homes around me are lifetime homes. On a warm summer day I could get in to visit a friend in five minutes with some scratches to woodwork but on a cold day I might not get in at all.

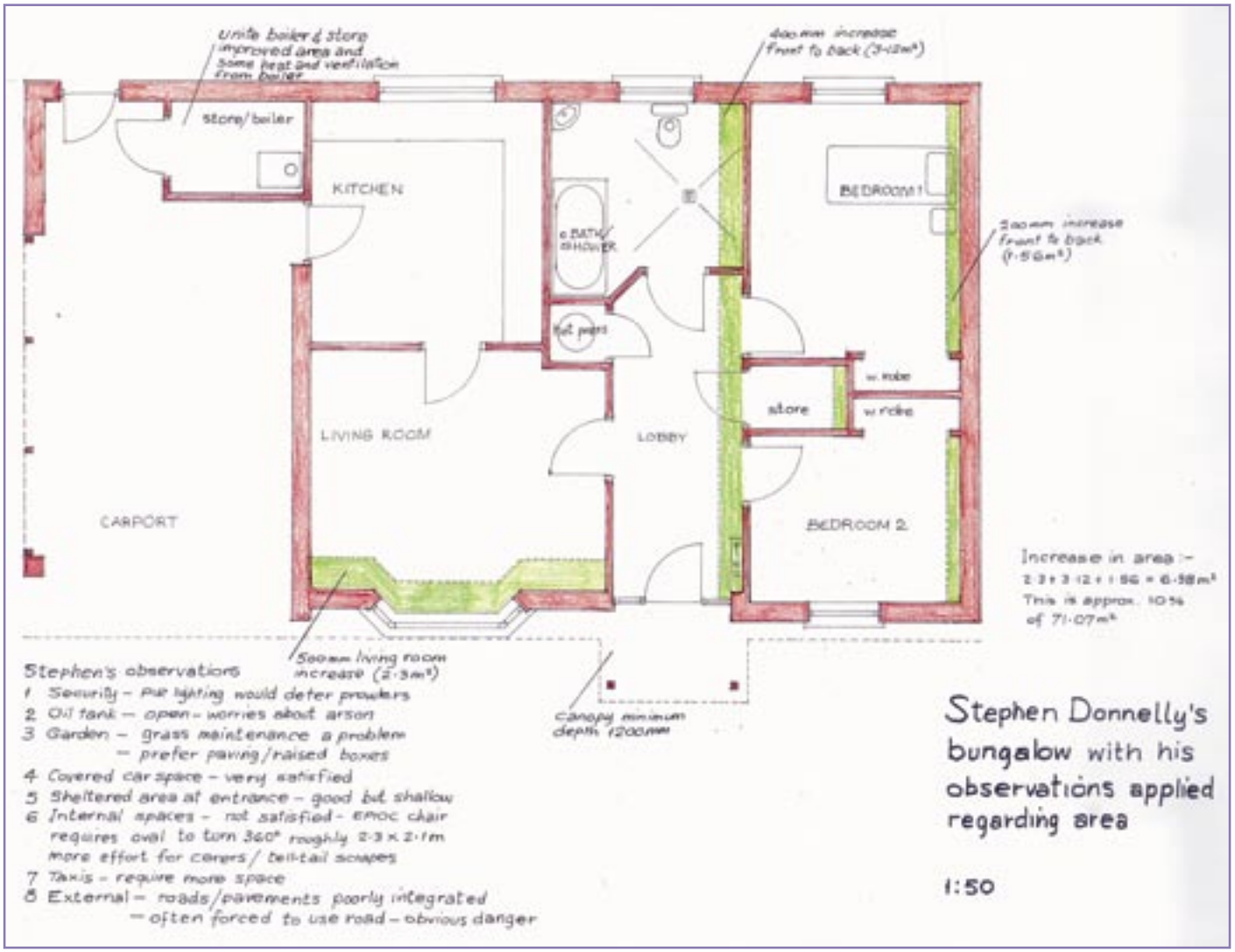
There can be times when I feel insecure in this location. Kids sometimes burn grass on the waste ground and I am worried that the fuel tank could be set alight. I like having grassy area around the home but keeping the grass cut is a real problem and an extra expense. The loss of ACE schemes for garden maintenance and home DIY projects is acutely felt.

4.12 My equipment

"I need quite a lot of equipment for my independence - this is absolutely essential. I have had a number of different wheelchairs over time for mobility and postural support, starting with an indoor electric wheelchair and more recently an indoor outdoor powered wheelchair (Epioc) with postural support features and automatic control of footplate elevation. I still need to keep a backup manual wheelchair in case the powered chair needs repairs or for easy transportation. The different wheelchairs I have used all have differing manoeuvring requirements and it can take up to six months to get used to a new wheelchair.

"My environmental control system which was supplied by the health and social services trust is attached to the wheelchair and can be used with light touch; it gives me control over door entry, lights, curtains, telephone and living room window opening/closing. I am cautious about becoming dependent on any aspect of the environmental control system that would cause me to use my own body movements less. I also use an adjustable

Figure 27
Plan of Stephen's Home



height table beside by my bed or in the living room to place other controls or items within close reach.

I have a riser-recliner chair to help stretch me and for comfort, two hoists, one large electric hoist which is used for walking and getting me into bed and chairs and a manual backup. Five times per day I will need space for me, two carers, a hoist and related equipment for personal care and exercise in places such as the bedroom, living room and bathroom. When my adjustable height table is set up in the living room to operate my equipment only ¾ of the living room space is available and in the bedroom when I am being transferred to the riser recliner chair the back of the chair touches the bed and the back of the hoist is jammed in the bedroom door. It is like a jigsaw trying to get things and people to fit in the room. Space is also needed for convenient storage of disposables and medicines in the bedroom and bathroom.

Figure 28 -

4.13 Design

"Design can be a win/lose process, compromising on some things to gain others. I am generally impressed by Habintegs' approach to housing design but there is still room for improvement. To get the design right there needs to be careful communication between the occupational therapist, housing provider, specialist equipment providers and myself. Attention to detail is critical for the design solution to work.

"The design features which I particularly value in my home are:

- Covered car port - the covered car port has a number of uses - as well as giving me a dry area to get into a car which takes more time, it is also used for household bins, storage of backup equipment and a trailer which can be used to transport essential equipment when I go away for a few days. It is also used to dry clothes in poor weather.
- The 1,500 mm corridor makes movement in, out and around the home easier
- Dual bath and shower facilities.
- A clos-o- mat toilet which promotes independence and dignity
- Environmental controls
- Adjustable height kitchen work surfaces

Figure 29

4.14 Areas for design improvement:

- Deeper canopy at front door
- Overall space in living room, bedroom and bathroom.
- There is a serious shortage of dedicated storage options for both occasional and frequent use items. I have partially addressed this by installing a range of shelves at wheelchair height, in the living room, bedroom and bathroom.
- Securing the home, particularly window design."

Comments for planners designers

4.15 Control of the environment

Stephen's story highlights fundamental human needs which people may take for granted - the ability to keep warm, cool down, breathe easily, move freely, control lighting/noise and communicate with others.

A significant number of people with neurological conditions have difficulty regulating body temperature. Careful design of heating systems and controls are required in these circumstances, particularly where the person is alone for a period of time in the day.

4.16 Personal security

Where people are on their own for periods of time, there is a real need to feel in control of who enters the home, have simple measures to deter intruders and have the ability to communicate quickly and easily if there are concerns.

4.17 Assistive technology

Customised environmental controls have a valuable role to play when people are living alone and do not have control over essential aspects of the home environment.

Attention to design detail is vital to ensure that controls can be reached and used easily. Back-up systems should be considered in the event of power failure.

4.18 Sensory Stimulation

There is a need for sensory stimulation in the environment where people experience sensory loss. This can include careful choice of materials and sufficient sockets to power home entertainment equipment. The well established healing powers of water and music can contribute to pain relief and well-being.

4.19 Carers Working in The Home

Home design should consider the needs of carers who may be in the home on a daily basis, in terms of appropriate space to provide personal and domestic care without strain while using necessary health care equipment, and having convenient storage. Further consideration of how home design can promote privacy and dignity for intimate personal care is required, for example the positioning of a toilet in relation to the front door where the bathroom door may be temporarily open as carers move in and out of the room.

4.20 Space

Linked to space for carers is the space for a wheelchair user to move comfortably when using powered wheelchairs without hitting walls and doors, and space to transfer conveniently to easy chairs in the living room, bed and toilet/shower facilities.

4.21 Homeliness

Choice of flooring, colour schemes for walls and ceilings, use of wall hangings, art, aroma and music contribute to sensory stimulation, personal identity and a sense of home.

Donovan's Story

4.22 About us

"We have three children, Donovan (19), Ruth (15) and Jack (6). Donovan has Duchenne Muscular Dystrophy and has been permanently in a wheelchair since he was eight. We live in a private two storey town house, having moved three times to find what we now call our home.

"Over the years Donovan's needs have changed as he progressed from a manual wheelchair, to an electric one, whereas now he uses both (space and storage can be a problem) as each type of wheelchair has its own demands. The electric one is ideal for the hilly surroundings, while the manual one is convenient when going out. However, as we must push Donovan in the manual one, this entails a lot more thought about space considerations around the home.

4.23 Location

"An accessible house sometimes may not be a home, primarily because of location. At one stage we built a beautiful totally accessible bungalow, but because it was located out of town, away from amenities (e.g. school, church, shopping centres, family and friends), we never felt it was a home. Also, because many of the features were reminders of Donovan's disability, we felt very uncomfortable.

"We now live near the town, (not too far from where we originally lived before Donovan was diagnosed). Just around the corner we have close relatives living (knowing they are there is supportive in itself, even if we do not need them all the time) and we are very close to schools, church, shops and entertainment. Although on a hill, with limited on-street parking, we do have a driveway which can accommodate two cars easily, and when we close the gates at night there is a great sense of security. We love the house, the area and we feel we are at home, and have been here for over ten years. Donovan also has friends he made in the street.

4.24 Equipment

"We have two wheelchairs and a shower chair in the home. A ventilator for night time use and an adjustable height table beside the hospital bed which has an electrically propelled air mattress. All this equipment (except shower chair) is used and stored in the bedroom. Donovan also has a computer, TV, play station and midi system in his bedroom which is his base for recreation as well as rest.

Figure 30
Extension Under Construction

Figure 31
Completed Extension

Figure 32
Ventilator used by Donovan at night

4.25 Design

" Donovan can get in and out of the house easily, as we have a ramp at the back and a gently sloping driveway that is attractive and not intrusive, as our downstairs doors were widened, Donovan can get about the house. His bedroom, with en suite shower and toilet, is spacious with enough room for an additional fold away bed, if this is needed. We recently removed the hoist, as we did not use it (Donovan is quite light) and we always felt it intruded into our lives.

"We have put decking down at the back, with ramps, so Donovan has easy access to all areas, front and back, outside the house. We have had to experiment with different floorings, as wear and tear from wheelchair use was very damaging, and finally opted for laminated. By adding coloured tiles, replacing grey standard non-slip tiles with more attractive silver ones, and by subtly choosing gold taps instead of standard ones, Donovan's bathroom is not a clinical functional area; rather it is a homely place to have a shower in, for all the family. Also we have the option of a bath upstairs, for family members who prefer this.

"My wife Teresa has a great sense of colour and design, and by careful use of colour and design elements, gradually our house has became a home. Features such as wooden pine doors, instead of standard ones, have made a great difference and an enhanced concrete driveway, incorporating colour, is a very positive feature, admired by many, who do not even notice the integrated ramp to the front door, it is so subtle.

Figure 33
Front ramped entrance before improvement work

Figure 34
Front ramped entrance after improvement work has been completed

"Sometimes the location of Donovan's room, near the front door, can be problematic as he feels his privacy is being compromised as anyone coming into the house has to pass his room. Also there was a phase when he felt very isolated at night, being the only person downstairs. However, overall he is very content with his room and all the features that subtly make our home accessible.

4.26 What planners need to know

"Planners need to really listen to families - parents, disabled children and siblings and appreciate that people come before buildings.

4.27 Homeliness

"A house is more than bricks and mortar, it is about people and their individual needs, not a one fix solution for everyone. It is about individual taste, subtle preferences and moving away from clinical environments. It is about colour, relevant design and interpreting standards that actually meet the needs of those who live in houses, it is about adapting adaptations. It is about seeing the person, not the disability and understanding the impact of disability. It is about responding and about flexibility.

4.28 Space

"Space is more than storage, more than access, more than turning spaces; it is about growth and development, particularly for children. It is about dignity and privacy. As children change and grow into teenagers, space is at a premium.

4.29 Choice

"The impact of disability is dis-empowering. Parents should have information that helps them to have choice, to have control over their own home. It is important that all family members are included in the design process so that their knowledge and expertise can be shared with the occupational therapist and housing official, who also bring their own experience, professionalism and knowledge to the situation. At each stage choice should be available; even if the family have to pay extra to get what they want, they should have this choice.

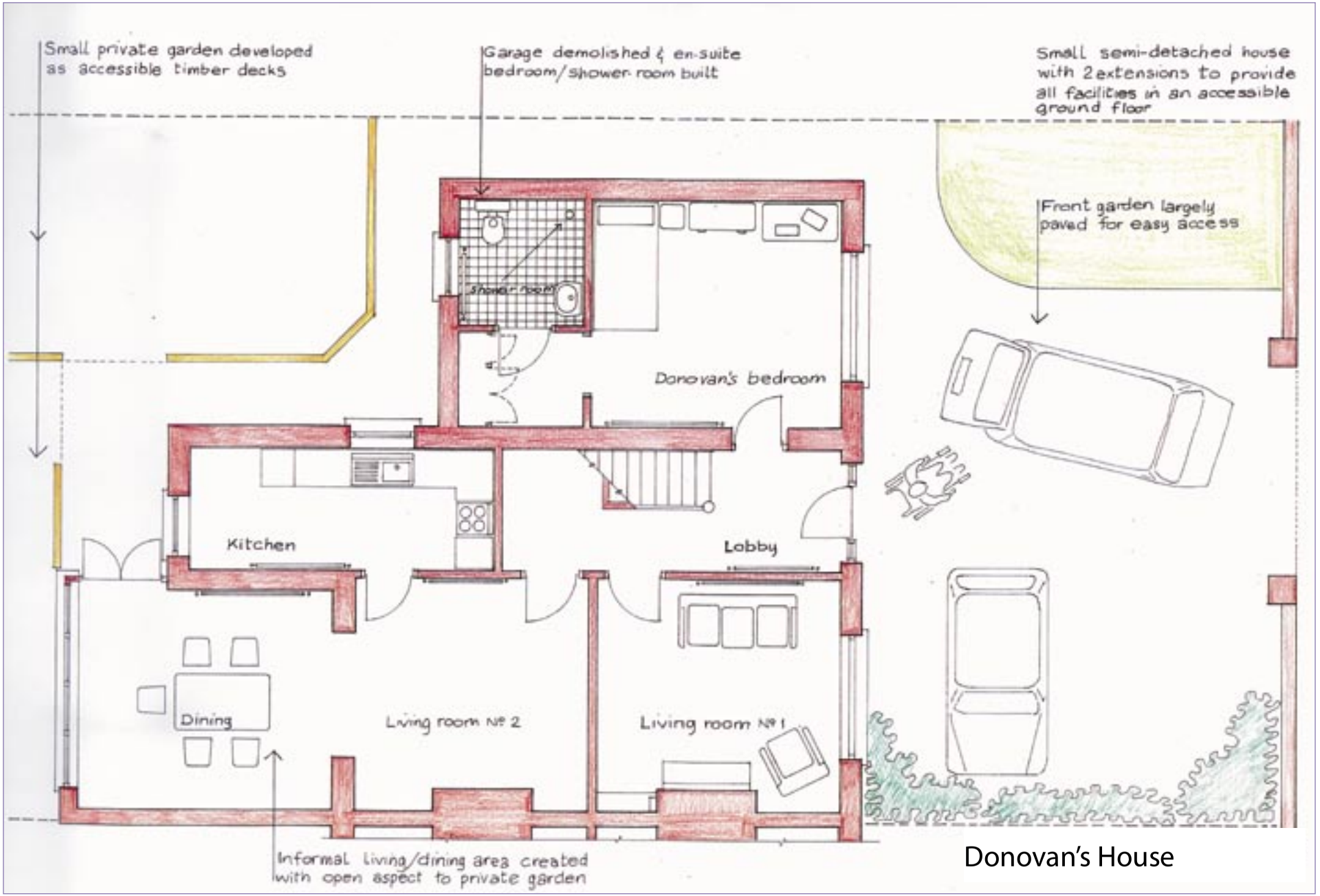
4.30 Ideal Home

"The impact of disability means nothing can ever be perfect or ideal again. But we can honestly say we now have a home and not an adapted house, that we love the house we live in and where it is located. To say all that and to acknowledge with more resources, we could do more, but this is as ideal as it gets and we are very proud of ourselves and those who worked closest with us to get here, to make our house a home."

Figure 36
Front entrance with ample car parking space

Figure 37
Wheelchair accessible garden with decked area

Figure 35
Plans of Donovan's home



The Hendras' Story

4.31 About us

"We are a married couple nearing retirement and have been active wheelchair users for over 40 years. Early onset of non-traumatic paraplegia in our teens meant that following basic rehabilitation and further education it was necessary to seek financial security through salaried employment. We live in North Down and travel separately to work in Belfast where we are employed in government and public services.

"Following our marriage 29 years ago we settled in the North Down area and lived initially in minimally adapted ground floor cottage style accommodation. During that time we pursued a number of housing opportunities in the Greater Belfast area which were convenient for travel to work, provided access to good health services and a mixed community environment. Eventually 20 years ago, we settled on and bought a 1,800 sq. ft. new build bungalow in North Down that gave us sufficient space and was capable of adaptation to our requirements. It had the potential for extension in case of changing needs. Since then we have added additional living space and an ensuite wheel-in shower to the spare bedroom.

4.32 Changing Circumstances

"Our circumstances have changed significantly in recent years because of our own age and health related reduced mobility and the need to assist and support our elderly parents. We now have an elderly parent living with us and have had to adjust our lives to this caring role. Fortuitously our choice of home and the improvements we have carried out have made this possible. The fundamentally important features of level access, generous circulation space, adequate storage, sufficient parking for several vehicles, privacy and quiet rural aspect on the edge of town combine to provide the optimum housing solution and home for us.

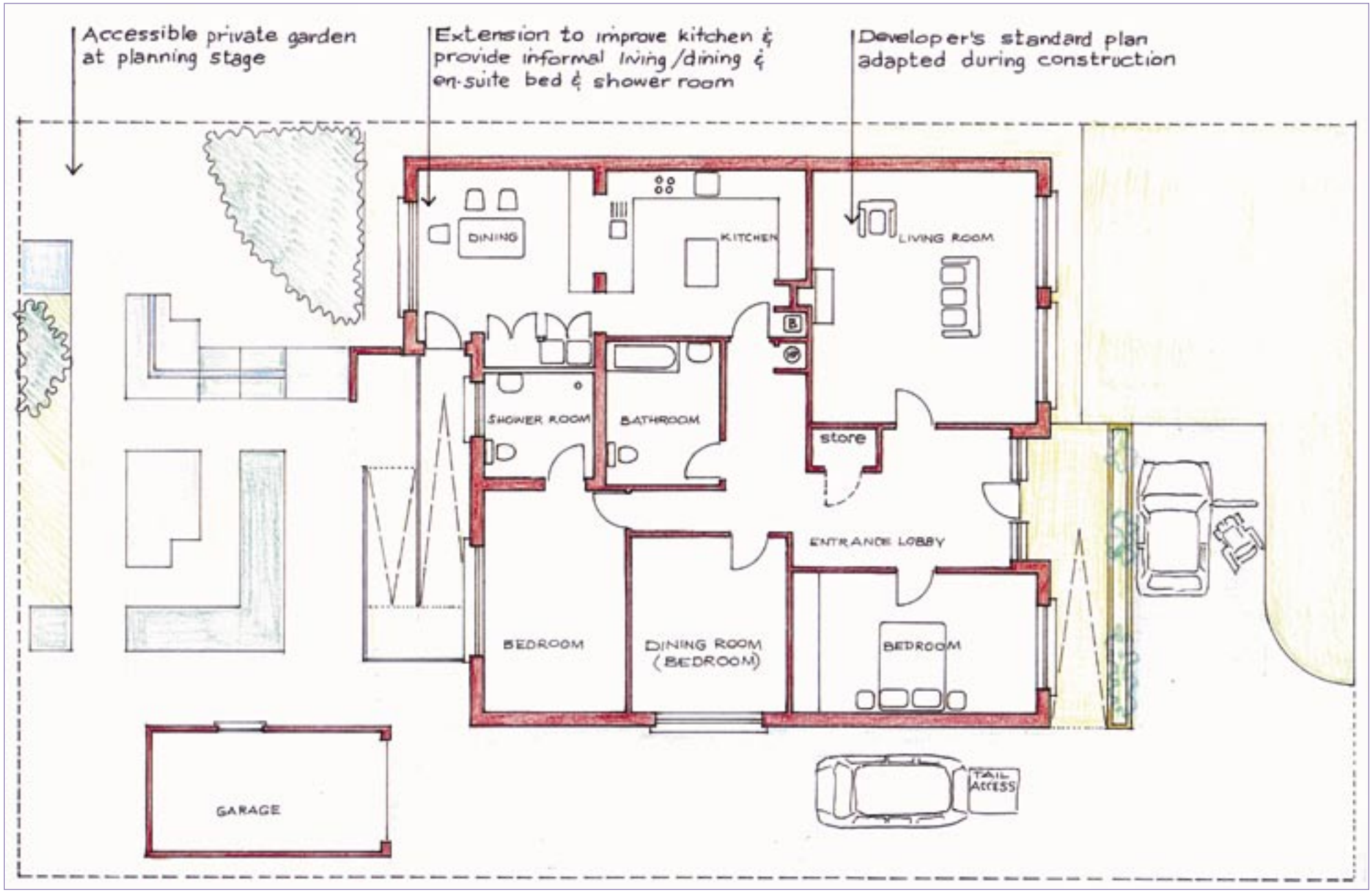
Internally the accommodation opens from a large central lobby into one reception and three bedrooms accessed through 830 mm doorways. The accommodation also comprises an accessible bathroom, ensuite shower and WC to third bedroom, kitchen with spacious dining extension and integral utility space. There is an oil fired central heating unit with accessible controls located in the kitchen. All switches and power points are placed at wheelchair user heights and the kitchen layout of work surfaces, cupboards, hob, oven, dishwasher and fridge plus freezer have been given similar careful consideration. The large roof space has not been converted but is also used for storage.

"Access to the front is by way of an easy gradient ramp from the driveway, which is concealed by a red brick planter in keeping with the general appearance of the dwelling. A back door opens on to a north-east facing small garden. The higher levels at the rear necessitated the erection of a two stage wooden ramp of slatted construction to give optimum gradient in the limited space. The small garden of lawn and borders has settled over time and is no longer easily accessible. We now plan to landscape this area to make a sheltered low maintenance accessible garden with raised planters, paving, pergola and water feature surrounding a level seating area.

"We have constructed an additional parking space at the front to give us unobstructed parking for our two vehicles, a two door saloon and customised van with tail-lift.

"An important design consideration has to be versatility to accommodate changing and increasing needs over time. Good disability centred design should be founded on the principles of simplicity, flexibility and space. Attention to detail will enhance independence and cater for personal requirements. Our increasing dependence on a wide range of mobility and personal care aids and equipment to help in our caring role, and also personally, has

Figure 38
Plans of the Hendra Home



meant that our once tidy and uncluttered home has become the repository of some large pieces of equipment, including hoist, shower chair, WC surround, bath master chair, walking aids and power chair. These are conspicuously parked in their various locations which detract from the ordinary domestic feel of our home, as well as further restricting access and movement in these areas. We now need even more storage space for this equipment when it is not in use."

Chapter 5

Regional Disablement Services

Chapter 5
Regional Disablement Services

5.1 The Potential for Interagency Collaboration

The Regional Wheelchair Service based at Musgrave Park Hospital in Belfast is the primary provider of wheelchairs in Northern Ireland. At present approximately 28,000 people are registered on the Regional Wheelchair Services database. This figure is most likely an overestimate of the number of live wheelchair users, as automatic notification of deaths from the register of births deaths and marriages is not available. In addition to wheelchairs provided through the Regional Disablement Service (RDS) there are a considerable number of wheelchairs provided by a range of voluntary organisations or sold privately. In many instances these wheelchairs are second wheelchairs, provided for specialist activities such as employment, leisure or transportation. In other instances wheelchairs from these sources constitute the primary wheelchair for a disabled person. It is not possible to calculate the total number of wheelchairs provided from voluntary or private sources within this study, due to the diverse range of providers. However, it is known that one of the larger providers, the British Red Cross medical loans service, issued 1,500 wheelchairs during 2003/2004 in Northern Ireland for short term use, e.g. people with fractures or other short-term medical needs.

Currently there are no formal arrangements for data sharing between the regional wheelchair service and housing providers. Such arrangements may be beneficial for the future strategic planning of wheelchair standard housing in Northern Ireland in the following areas.

- Identification of the overall numbers, distribution, and provision trends relating to new wheelchair users. At present the tenure of wheelchair users cannot be identified from the database.

- Technical advice on the performance characteristics, including manoeuvrability, of current wheelchair provision, to assist with the formulation of responsive design standards for wheelchair standard housing.

It should be noted that such information transfer would require skilled clinical and technical interpretation to properly advise housing planners.

This strategic information transfer could complement the advice of occupational therapy services within the HPSS Trusts regarding the specific wheelchair housing needs of individuals and families at a local level.

5.2 Needs and Numbers

The regional wheelchair service has experienced marked growth in demand for wheelchairs in recent years. There was a 14% increase in referral orders to the wheelchair service between March 2002 and March 2004 (522 people) this could indicate a marked growth in the need for wheelchair standard accommodation. This growing demand reflects the increasing number of elderly people in our population and improved needs assessment. The trend towards rising complexity and cost of wheelchair provision reflects rapid technology improvement and rising consumer expectations in this area.

5.3 What do wheelchair provision trends tell us about housing needs?

Emerging need for new wheelchair standard accommodation.
In 2003/2004 3,808 wheelchairs were ordered by the RDS. This gives us some indication of the scale of emerging need for new wheelchair standard

accommodation each year. As a number of these referrals are for replacement wheelchairs, this figure will be somewhat in excess of the need for new wheelchair standard accommodation. At present it is not possible to identify first time wheelchair users. In addition there are an unknown number of wheelchair users obtaining wheelchairs from other sources.

As the tenure of these clients is not currently known, the housing resources required in each sector cannot be forecast with accuracy. The overall breakdown of people living in communal settings versus people living in their own homes is also unquantifiable at present.

Further analysis of the exact type of wheelchair provision gives an indication of the housing design standards required for various user groups.

Figure 33
Regional Wheelchair Services:
Types of wheelchair provided 2003/2004

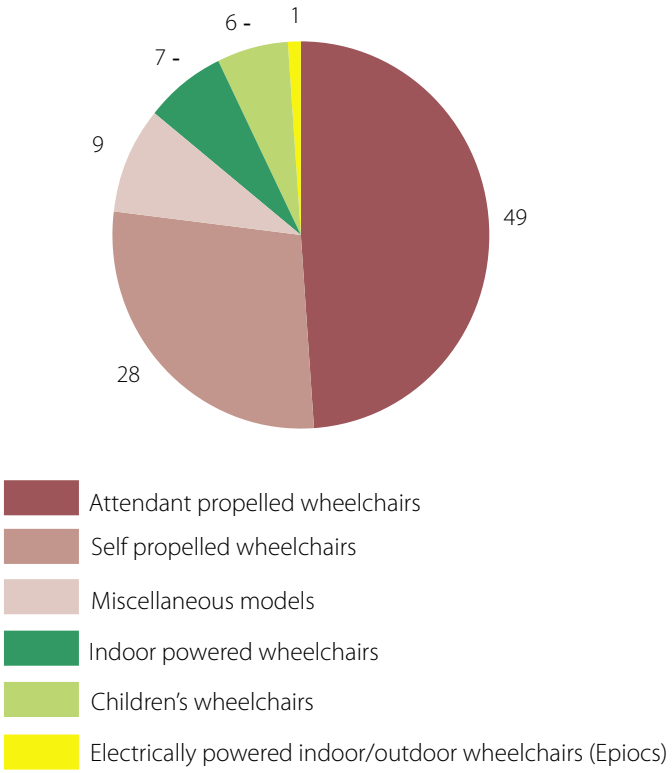


Table 5a: Wheelchair Provision and House Design

Type of wheelchair usage	Housing Design Implications
Occasional (mainly outdoor use) wheelchairs	Accommodation needs can be met by lifetime homes. Some occasional users may eventually require indoor wheelchairs on a daily basis.
Active self propelling users with high performance wheelchairs	Needs should be met by: a) Major adaptations to existing housing b) Major adaptations to a Lifetime Home - £12,000 + c) Minor adaptations to existing new build wheelchair standard housing e.g. kitchen adaptations. (See Joseph Rowntree Foundation, Chartered Institute of Housing, 2002)
Larger self-propelling wheelchair	More extensive adaptations to traditional wheelchair standard housing.
Attendant assisted wheelchair use (indoors and outdoors)	Assisted wheelchair users by definition will need assistance with wheelchair propulsion and most people will need the assistance of one or two carers, often using hoists or other moving equipment to assist with transfers in the bedroom, bathroom/toilet and living room. Lifetime homes, even with major adaptations, offer a compromised solution for wheelchair users who require assistance.
Indoor powered wheelchair	Although these wheelchairs can be quite manoeuvrable, reduced upper limb strength and stamina will mean that human assistance and assistive technologies will generally be required in the transfer locations above. Additional space for carers and moving handling equipment is required 'which is greater than traditional wheelchair standard housing space allowances.'
EPIOC Indoor/outdoor powered wheelchairs	See the additional spatial requirements above under indoor powered wheelchairs. Flooring needs to be more durable due to increased wheel traction and some of these wheelchairs will have a longer wheelbase – particularly if fitted with postural support systems, and therefore may have greater turning space requirements (2m +). Traditional wheelchair standard housing will need some enhancement of space to accommodate needs.
Children's wheelchairs	Specific housing design features may need to allow for growth, but long term planning should be based on adult space standards.
Miscellaneous	Wheelchair users may belong to any of the categories above but many will be assisted wheelchair users. The needs of this large group of wheelchair users require further analysis.

5.4 Discussion of Results

It is clear from these results that just over one-quarter of wheelchair users (28%) may have their needs met by applying traditional design guidance for wheelchair standard housing, although some independent wheelchair users may require assistance over time, due to the ageing process or the progression of an underlying medical condition. Many attendant propelled wheelchair users (49%) will need some additional space for carer assisted propulsion and space to assist with transfers in the bedroom, bathroom/toilet and living room (BS8300, 2001). Many of the people using either indoor or outdoor powered wheelchairs will also need extra turning space in excess of the 1,500 mm (turning circle) and 1,200 mm (corridor width) in addition to enhanced space allowances in transfer locations within the home. Further analysis of the miscellaneous group of wheelchair users (9%) is required to predict housing design implications. In planning for children who are wheelchair users (6%), adult space standards are ultimately required but minor adaptations which respond to the needs of a growing child may also be needed, e.g. providing height adjustable fittings or resiting some fixtures over time.

5.5 Design Challenges: Does the solution lie in improved wheelchair design?

In considering the variance between the performance characteristics of many wheelchairs and the spatial design standards in wheelchair standard housing, it is reasonable to ask whether wheelchair manoeuvrability could be improved to an extent that people could manage within the existing space standards established for wheelchair standard housing.

While some smaller wheelchair users, using high performance chairs, can manage within existing space allowances and many manufacturers continually strive to improve wheelchair performance, a number of factors may constrain the potential for significant improvements in this area:

- The overall postural needs of the disabled person - this often makes it essential for therapists to recommend specialised integral seating systems and accessories, which can lengthen the wheelchair.
- Upper limb dexterity: A significant number of wheelchair users, using powered wheelchairs, may experience difficulty fine-tuning the precise movement of the wheelchair with the controls available. Therefore, the potential turning space performance indicated by wheelchair manufacturers may not always be achieved in practice.
- Bariatrics - A significant number of wheelchair users may require larger wheelchairs due to weight gain, which can accompany reduced mobility.
- Health and Safety: There is ongoing concern about injuries and fatalities relating to the safety of wheelchairs which, within the group of products described as wheeled mobility and seating monitored by the Medicines and Healthcare Products Regulatory Agency (MHRA) cause one of the highest numbers of reported adverse incidents each year (MHRA, 2004a). There are several reasons for safety concerns, but wheelchair stability has been identified as one (MHRA, 2004 b). Some measures designed to enhance manoeuvrability, such as adjustable rear wheel positioning, can potentially have an adverse effect on stability. A careful balance needs to be achieved by wheelchair designers to maximise manoeuvrability but not compromise stability.

Improvements in the person/environment fit might be achieved by compiling standardised wheelchair manufacturers' charts to include data on performance areas such as 90º and 180º turning requirements and gradient climbing capability. Presently manufacturers do not always use the same methods of calculating turning space

which makes comparison difficult. If these data were standardised it would be easier to consider manoeuvrability alongside the numerous other factors, which ultimately determine wheelchair suitability.

Recommendations

5.6 Interagency collaboration

Consideration should be given to periodic information exchanges between the regional wheelchair service and appropriate housing providers to advise on the projected wheelchair housing needs of disabled people and the design implications of new wheelchair technologies.

5.7 Information to enhance strategic housing planning

- Consider the addition of the following data fields to the regional wheelchair database:
- housing tenure
- first time wheelchair user
- wheelchair required for indoor use
- is present accommodation designed to wheelchair standard?
- car ownership

This data would considerably assist forward planning of regional housing needs.

- Undertake a further breakdown of the miscellaneous wheelchair user group to identify the implications for housing design standards.
- Develop capacity for Geographical Information System (GIS) mapping of the location of wheelchair users by postcode to advise on the geographical distribution and prevalence of wheelchair usage.

5.8 Wheelchair housing design standards

- Consider targeted space allowances which actually respond to the performance characteristics of wheelchairs currently being provided in Northern Ireland.

5.9 Wheelchair design

- Maintain ongoing liaison with wheelchair manufacturers to promote further innovations in wheelchair manoeuvrability within the constraints of stability and explore standardised methods of calculating the turning space requirements of various wheelchairs.
- Compile standardised charts on the various performance characteristics of wheelchairs to include data on dimensions, manoeuvrability and gradient climbing capacity, to facilitate informed comparison and decision-making regarding wheelchair selection.
- Consider the deployment of automated backrest and footrest adjusters where appropriate for the client's needs and where space is restricted.

Chapter 6

Conclusions

Chapter 6
Conclusions

Objective 1:
To outline the functional, social and financial circumstances of people in wheelchair standard housing

Wheelchair users in Northern Ireland represent approximately 1.6% of the total population (based on RDS statistics, for wheelchairs used in Northern Ireland). The underlying demand for statutory provision of wheelchairs has increased (14% increase between 2002/2004). There is also demand for wheelchairs from voluntary agencies, for example the British Red Cross issued 1,500 wheelchairs during 2003/2004.

At present the identification of wheelchair users and wheelchair standard housing from computerised housing databases, is not always reliable, as evidenced in the difficulties this project encountered in attempting to obtain a random sample of the wheelchair using population.

The social, financial and functional circumstances of wheelchair users vary widely.

This research found that the everyday financial costs of running a home increased with disability. Additional costs included; garden and general household maintenance, decorating, transport, heating, laundry, and holidays. Employment opportunities for both the disabled person and other family members (particularly where a spouse, partner or parent are the primary carer) can be compromised, resulting in additional financial hardship.

There was evidence that some wheelchair users experienced antisocial behaviour, some of which was specifically related to their disability.

The need for a sense of personal security, family and community support is a major influence in determining satisfaction with the home and can influence the decision either to remain in the home or to move.

The participants were highly dependent on various forms of personal transport complimented by accessible taxis and community transport. Confidence in accessible transportation by bus or train was low, mainly due to the perceived difficulties getting to bus or railway stations/ stops.

Participants often had various combinations of mobility, reach, continence, communications and sensory needs requiring a variety of design responses. The traditional focus of wheelchair housing has been primarily on mobility needs.

A wide variety of wheelchairs, hoists and other assistive technologies were used in respondent's homes. These assistive technologies have varying performance characteristics which impact on housing design requirements.

Existing design guidance on wheelchair housing generally met the needs of independent wheelchair users. Where wheelchair users needed personal assistance or hoists to move, supplementary space was required.

Anthropometric research (the science of measurement and analysis of body characteristics, including stature, size of body parts and the space in which the body carries out activities) to define the spatial needs of assisted wheelchair users and their carers is incomplete. There is a particular deficit in relation to disabled children and their parents.

There was evidence that the mobility needs of wheelchair users can vary considerably during their lifetime. This may involve changes in the types of mobility aids and wheelchairs used, which in turn impacts on spatial planning.

Objective 2:
To identify the nature of the informal and formal care provided in the home.

Most of the participants required support with domestic and personal care activities. This assistance most often came from informal carers. There was also significant input from statutory services.

Some of the people interviewed felt they would not be able to live independent lives without the continuing support of formal or informal carers.

Objective 3:
To identify the levels of satisfaction with general aspects of the home and surrounding environment.

All of the participants experienced varying levels of health and social benefits from their adaptations or by moving to new build wheelchair standard housing.

The primary benefits were enhanced independence, easier care, enhanced safety and comfort and family integration.

Several of the participants expressed a strong desire to have a homely, non-clinical environment (see Donovan's story).

The need for a sense of personal security, family and community support is a major influence in determining satisfaction with the home and can influence the decision to either remain in the home or to move to a new location.

This survey found that the play and educational needs of disabled children and adolescents in the home had been considered in addition to essential mobility needs.

There was evidence of improved social integration resulting from the creation of accessible neighbourhoods. This was facilitated by building a mixture of lifetime homes and wheelchair housing and through the implementation of building regulations applying to access in domestic and public dwelling.

Objective 4
To identify specific consumer satisfaction with key design elements in wheelchair standard housing and offer an analysis of findings.

Disabled people, their families and carers, have considerable expertise in evaluating the impact of housing design on quality of life, and can offer innovative design solutions to meet their needs, supported by design specialists where appropriate.

Most participants were satisfied with the design of their home and immediate environment; however lack of space was a recurring problem. Dissatisfaction tended to focus on elements of design detail.

The most common sources of dissatisfaction were:

- lack of space in specific areas such as bedrooms, shower rooms, living rooms - this depended on a persons functional ability, the level of personal assistance required, the type of equipment used and family size.
- lack of internal/purpose designed storage for clothing and equipment.
- poor water containment in some level access showers
- difficulty cleaning slip resistant ceramic tiles
- difficulty maintaining gardens particularly when large
- high road kerbs and insufficient dropped kerbs.

Objective 5:
To determine whether good practice design principles for wheelchair users and their carers' can be taken from adaptation of housing and transferred into the design of new build wheelchair standard schemes.

Customised adaptations involving consultation between the wheelchair user, occupational therapist, welfare officer and designer were often highly successful in meeting specific needs. The consultation process was valued by clients and contributed to the design of bedrooms, toilets, bathrooms and shower rooms. The use of patio doors in bedrooms, offered solutions where there was complex access and egress requirements in the event of an emergency situation.

Participants valued the following features found in some housing association new build schemes, these included; graduated rather than ramped access, covered car ports, covered front entrances, dual washing facilities and slightly wider corridors and door widths

Objective 6:
To promote the development of products, fixtures and fittings that effectively meet the requirements of wheelchair users and their carers.

The assistive technologies used by wheelchair users were generally highly valued, making a major contribution to helping people remain in their own homes by promoting independent living and facilitating care.

At the time of writing, wheelchair manufacturers do not have a standardised method of calculating wheelchair turning space. Accurate comparisons of wheelchair manoeuvrability are not achievable from existing literature.

The scope for improving manoeuvrability of wheelchairs is constrained by the need to ensure wheelchair stability and the essential provision of postural support systems.

There is evidence from the review of literature (Audit Commission 2004) and from interviews conducted during the course of this research, to suggest there is scope for the further development and deployment of various types of environmental controls that promote security and independent living.

Varying levels of communications technology were present in respondent's homes and enhanced both independence and personal security. Nevertheless, some participants expressed concern about the appearance of helpline controls, worn around the neck or on the body.

There were high levels of satisfaction among participants, with automatic forms of central heating. However, running costs, oil theft and the reduction of circulation space, caused by inadequate placement of radiators, resulting in out of reach window handles and lack of storage space in bedrooms, were a source of concern for some participants. There was also a desire for zoned heating, which provides better control of heating on a room to room basis.

See under recommendations, for specific areas of product and environmental design development in Chapter 3, 'Discussion of Findings, User Centred Design Survey.'

Objective 7:
To establish if wheelchair standard design guidance meets the needs of today's wheelchair users, given the social, legislative and technological changes that have taken place over the past 30 years.

Design standards
It is anticipated that there will be an ongoing need for housing adaptations delivered in parallel with new build wheelchair standard housing programmes to meet the needs of wheelchair users. The vast majority of existing privately owned stock was built before Part R of the Building Regulations was introduced in April 2001.

Part R of the Building Regulations provides minimal accessibility standards for wheelchair users. However further adaptations may be substantially reduced as minimum standards are improved. In adapted property, structural constraints can sometimes make it difficult to achieve full wheelchair accessibility, to all rooms on the ground floor.

New build housing
Varying wheelchair housing design standards apply to new build housing in Northern Ireland depending on tenure and age of property and also on the way specific housing associations interpret the Housing Association Guide.

While there was satisfaction with many elements of wheelchair standard housing, there is compelling evidence that we need to consider the development of a more inclusive and somewhat larger design blueprint for new build wheelchair standard housing to create a more universal house type.

Recurring space restrictions where identified by this survey in three specific areas of the home, these included:

- general circulation space in corridors and primary rooms
- space for carers to provide personal care in bedrooms, bathrooms and living rooms,
- space for essential storage and use of essential health care equipment

Space restrictions were less common in parts of the home that had undergone customised adaptations; however in some cases potential benefits were compromised due to structural constraints.

There was a need for occasional major adaptations to existing wheelchair standard housing, to better meet the need of wheelchair users and their families.

The baseline spatial blueprint for wheelchair standard housing is largely based on the space requirements of independent self-propelling wheelchair users, using 8L type wheelchair (Goldsmith, 1976) which were described as 'standard' wheelchair (of the usual, regularised or accepted kind).

Analysis of wheelchair provision trends in Northern Ireland, suggests that self propelled wheelchairs (28%) are not the most common type used. Attendant propelled (small wheeled) wheelchairs are used by 49% of the wheelchair population, 9% are miscellaneous models, 8% are electrically propelled chairs, 6% are children's wheelchairs and 1% are electrically powered indoor-outdoor wheelchairs. Each of these wheelchair types has varying space requirements for convenient use.

The comprehensive ergonomic data contained in the appendices of BS 8300 details the space requirements needed by wheelchair users. This data represents the best source of ergonomic data available on wheelchair users in the world at this time. The data also supports an increase in the space required for 90° and 180° wheelchair turns.

Some space uplift is recommended for independent manual wheelchair users, e.g. 90° turns (in corridors) requires 1,450 mm and up to 1,950 mm for 180° turns in primary rooms (90% of users accommodated).

Attendant propelled wheelchair users require between 1,500 and 1,800 mm for 90° turns and up to 2,000 mm for 180° turns (full range accommodated).

Powered wheelchair users require 1,550 mm to 1,625 mm for 90° turns (90% accommodated) and up to 2,275 mm for 180° turns (90% accommodated).

Self propelling manual wheelchairs have the smallest space requirements. Present space allowances in wheelchair standard housing default to a minimum space standard not an average standard or an inclusive standard.

Wheelchair users have significant additional needs, particularly in relation to the storage, charging and use of essential health care equipment in a convenient and safe environment within the home. The survey of assistive technology present in the homes of participants, are indicative of a significant range and volume of assistive equipment. In one instance the dimensions of the equipment was equal to 7% of the total floor area of the home. This figure excludes the additional space to move and use the equipment in various locations.

There are a high numbers of carers (both formal and informal), giving assistance with domestic tasks and personal care. The spatial design needs of carers to safely and conveniently assist with specific personal care tasks in the bedroom, bathroom/WC and living room have not been formally considered in new build housing programmes. BS: 8300 recommends an activity space of 700 mm beside the non transfer side of a bed to allow carers to provide personal care in bed. Similar space may often be required to the non transfer side of a WC.

The complexity of 'nursing care' needed by people with multiple disabilities, e.g. the use of suction machines, ventilators, peg tube feeding and intravenous infusions, are now carried out in the home setting, and subsequently impact on bedroom design.

The presence of multiple impairments, including sight

and hearing loss evident in this survey have not been formally considered in the development of wheelchair housing design standards, where the main focus has been to address difficulties with locomotion.

This survey also highlighted the changing mobility needs of wheelchair users during their lifetime, often resulting in the use of different types of wheelchairs, with varying performance and space requirements.

There is evidence that with changing tenancies in social housing, wheelchair users with quite different needs may occupy the same home or house type.

Chapter 7

Final Recommendations

Chapter 7
Final Recommendations

7.1 Identifying wheelchair standard housing need

Valuable data to assist with the forward planning of wheelchair standard housing in Northern Ireland may be achieved through collaboration with the Regional Wheelchair Service at Musgrave Park Hospital and occupational therapist services, providing wheelchairs.

The insertion of specific fields on the regional wheelchair database to capture tenure, whether the person is a new wheelchair user and whether the home is already designed to wheelchair standard, would assist with the determination of emerging wheelchair housing needs.

Geographical Information System mapping of new wheelchair users by postcode would help to identify the geographical distribution of wheelchair users.

These data need to be complemented with specific assessments of known need from HPSS Trusts and housing providers.

Investment in a disabled persons housing database across tenure would assist accurate matching of need to housing stock. This database should be established through interagency collaboration with housing providers and HPSS.

7.2 Assessment Methods

The need for personal security and the influence of location, transport and care networks on well-being should form an integral part of HPSS trust assessment process.

Interagency training is required for both HPSS staff and housing providers, on the limitations of allocating or adapting lifetime homes for wheelchair users.

Liaise with the Equality Commission regarding outworking the sections of the Disability Discrimination Act 1995 which relate to the creation of accessible transport. The perceived and actual barriers to the use of buses and trains need to be considered.

7.3 Design Process

Good practice in the design of wheelchair standard housing needs to be disseminated to all designers and consistently applied.

Much of the minor dissatisfaction expressed in the study could have been addressed by the consistent application of established good practice.

Service users need to be more systematically involved in the planning and evaluation of both individual housing projects and the development of regional and national standards in wheelchair standard housing.

The design process should consider not only functionality, but also features that transform a house into a home for all family members. Consideration should be given to the play and educational needs of disabled children and adolescents.

Key stakeholders in the health and social services, (e.g. occupational therapists and social workers for people with sensory impairment), can assist housing planners and designers in the development and evaluation of housing standards.

The activity space requirements of carers providing assistance can impact on kitchen design, particularly where both standing and seated users are using the kitchen. Where wheelchair users require personal assistance and space for moving and handling (with or without hoists) this needs to

be considered in the design of bedrooms, shower rooms, toilets, living rooms and car parking areas.

The dimensions and performance characteristics of assistive technologies used in the homes of wheelchair users need to be considered as an integral part of the housing design process, to ensure adequate space for movement, use, charging and storage of equipment.

The longer term and often changing needs of wheelchair users during their lifetime need to be considered in the planning of adaptations and in new build wheelchair housing.

In wheelchair standard social housing the varying needs (during the lifecycle of the home) of different tenants who may use wheelchairs needs to be considered.

7.4 Design standards

The many benefits of wheelchair standard housing need to be highlighted and disseminated so that the value of these facilities is fully appreciated by the wider public and housing planners.

The implementation of the design principles outlined in Secured by Design, Department for Social Development 2005, should be used in conjunction with wheelchair standard design guidance. However further work is required to evaluate and develop specific fixtures, particularly window and door locks to promote both independence and security.

There are numerous minor recommendations in the chapter on user centred design findings which address the concerns of participants.

While new and valuable wheelchair housing design guidance exists in the form of design elements (DSD, 2004; BS:8300, 2001, Thorpe and Habinteg Housing Association, 2006), this data needs to be integrated with data from this study to develop new full house plans for wheelchair standard housing incorporating all the elements of best practice. Having established a new foot print, funding mechanisms should be adjusted accordingly to facilitate the delivery of best practice.

A number of general benchmarks can be recommended (as set out below) for spatial planning in wheelchair standard social housing at this stage, however further recommendations will require focused anthropometric research:

Corridor widths
A 1,500mm width corridor clear of all obstructions along its full length is justifiable. Otherwise corridors should be avoided, where fire regulations permit.

Turning spaces in primary rooms
Up to 2,000mm clear space would provide a more inclusive standard (this can include footplate clearance space under fixtures and furniture where appropriate).

Space for carers
Allow 700mm on the non transfer side of the bed.

Bedrooms
A minimum of 4,100mm x 4,000mm will accommodate an assisted wheelchair user (assuming double bed usage and space for a tracking hoist). Additional allowances may need to be made, depending on the door entry position.

7.5 Recommendations for specific areas of further research

1. Further research into the anthropometry (the measurement and analysis of body characteristics, including stature, sizes of body parts and the space in which the body functions), of people with disabilities, particularly assisted wheelchair users and carers, is required to advise the formulation of user centred design standards in housing. Investment to further develop

the work of specialists such as Robert Feeney Associates in Loughborough which underpin BS 8300 is highly recommended.

2. Examine the methods used to test the properties of flooring and evaluate the performance of various floor types in the homes of disabled people. Performance areas such as slip-resistance, ease of cleaning, ease of installation, durability and maintenance should be investigated and best practice established.

3. Research is needed to consider the access and egress requirements of disabled people their carers and emergency services in the event of a fire in domestic settings.

4. An infrastructure needs to be further developed for an ongoing interagency research programme between DSD, DHSSPS, NIHE and HPSS trusts, into the benefits and cost effectiveness of 'smart' technologies in domestic buildings. The crime prevention potential of these technologies should also be considered.

5. The need to establish good practice in the design of level access showers has been highlighted both in this study and the Medical Devices Agency study on showers fitted for people with physical impairments in 2002. In particular, development of means of water containment which are safe, convenient and easy to use for both disabled people and carers is required.

   The tilted plane shower floor, developed through NIHE/HPSST collaboration in Belfast, should be formally evaluated to establish if it represents best practice for certain circumstances.

6. Evaluate the application of prefabricated building technologies in relation to wheelchair standard housing adaptations. The NIHE and DHSSPS in Northern Ireland, in collaboration with BRE have recently commissioned the evaluation of prefabricated building technologies developed in Salford. Such technology has potential for application throughout the UK.

7. Undertake a cost benefit assessment of under-floor heating systems in new build properties and explore the potential benefits of maximising circulation and storage space and promoting safer and more effective maintenance of body temperature. The potential benefits for wheelchair users should be explored within the policy context for renewable energy sources.

8. Undertake an investment appraisal to calculate the benefits and cost of developing a more inclusive blueprint for new build wheelchair standard housing, to include the following:

   - More flexible customisation of internal space: the bungalow is an ideal structure to facilitate the flexible use of internal space as it has overspanning roof trusses which allow internal rearrangement of partitions without endangering the structural integrity of the home. Advances in timber framed building technologies should also be included in this evaluation.
   - A cost benefit analysis if incorporating the 'housing sight' standards for people with sight loss in new wheelchair standard housing.
   - Design features and spatial planning principles (see BS 8300) which were considered good practice in this study.
   - A focused evaluation of the design requirements for storage. This should include the development of design guidance for storage of clothing, disposables, bedding, equipment and consumables.
   - An examination of external space to maximise access, car parking, security, shelter and reduce maintenance. This should include a safe play area for children.
   - Inclusion of data emerging from the other studies identified in this section.

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Appendices

Appendix 1

Tabular Report

Table 1
Gender of Wheelchair Users

	Number
Male	20
Female	11
Total	31

Table 2
Age Group of Wheelchair Users

	Number
5 and Under	1
6-15	3
16-24	4
25-39	5
40-59	10
60-64	3
65+	4
Total	30
Base 30 (participants who gave a response to the question)	

Table 3
Do you have problems with any of the following?

	Yes	No
Moving around, climbing stairs, walking long distances	31	-
Personal care, washing, dressing, eating, getting in/out of bed	26	5
Physical sensory difficulties	25	6
Reaching cupboards, washing line, bending down	25	6
Continence	22	9
Cognitive-using facilities in the home	20	19
Picking up objects, turning knobs	17	11
Communication: do you feel your needs are clearly understood	12	14
Seeing; reading newspaper with glasses on	7	24
Hearing difficulties	3	28
Other (breathing on ventilator)	2	29

Table 4
Housing Tenure

	Number
Housing Executive	17
Owner Occupier	7
Housing Association	7
Total	31

Table 5
Length of time at present address

	Number
More than 4 years	27
More than 1 year less than year	3
Less than 6 months	1
Total	31

Table 6
What type of dwelling do you live in?

	Number
Semi-detached bungalow	11
End terrace house	6
Mid-terrace house	5
Semi-detached house	5
Detached bungalow	2
Detached house	1
Ground floor flat	1
Total	31

Table 7
Is your home adapted/purpose built?

	Number
Adapted	20
Purpose built	8
Not adapted	2
In process of being adapted	1
Total	31

Table 8
Type of dwelling (adapted/purpose built)

	Adapted	Purpose built	Not adapted	In Process	Total
End Terrace	6				6
Mid-terrace	5				5
Semi-det house	4	1			5
Semi-det bungalow	3	6	1	1	11
Detached bungalow	-	1	1	-	2
Detached house	1				1
Ground floor flat	1				1
Total:	20	8	2	1	31

Table 9
How many bedrooms are in your home?

	Number
Four or more	14
Three	10
Two	7
Total:	31

Table 10
How many sleeping spaces are there?

Sleeping Spaces	Number
Five	8
Seven	7
Six	5
Three	6
Four	2
Two	2
Total:	30
Base 30 (participants who gave a response to the question)	

Table 11
How satisfied are you with the number of bedrooms?

	Number
Very satisfied	21
Satisfied	7
Dissatisfied	2
Very dissatisfied	1
Total:	31

Table 12
Does the design of your home meet the needs of family and friends staying over?

	Number
Yes	20
No	10
Total	30

Table 13
Has any design feature that has been provided in your home reduced your need for care and assistance?

	Number
Yes	20
No	11
Total	31

Table 14
What design features provided in your home has reduced your need for care?

	Number
Shower room/shower chair	8
Oil/gas heating/lower controls/light switches	7
Bath lift	1
Car port/wider doors	1
Ramped access	1
Bungalow/everything on one level	1
Environmental controls	1
Total:	20
Base 20 (participants who said a design feature had reduced their need for care)	

Table 15
Do you have children under the age of 18 living in or visiting your household?

	Number
Yes	15
No	16
Total	31

Table 16
Do the design features in and around your home make child care easier?

	Number
Yes	8
No	7
Total	15
Base 15 (participants who have children living/visiting their home)	

Table 17:
How do the design features make child care easier?

Design Features	Number
Extension good/equipment in one room/ family home	2
Garden is walled/patio doors allow observation of children	2
Bedroom downstairs frees upstairs room as playroom	1
House is big/accommodates visiting family	1
Everything needed is on the ground floor	1
Lift/can get to first floor to check on children	1
Total	8
Base 8: (participants who said design made child care easier)	

Table 18
How satisified are you with the design and layout of your property?

	Number
Very satisfied	14
Satisfied	7
Dissatisfied	9
Very dissatisfied	2
Total:	31

Table 19
Why are you dissatisfied with the design and layout of your property?

	Number
Space restrictions (bathroom/living room, bedrooms, no storage)	6
Living in kitchen (no access to other rooms)	1
Need covered access from car to house	1
Doors too narrow/front access inadequate	1
Fire risk/house not designed for wheelchair	1
Front is elevated, difficult to get wheelchair on to footpath	1
Total	11
Base 11: (participants who are dissatisfied with design and layout of property)	

Table 20
Having lived here for a while what do you particularly like about your home?

	Number
Location/near family/friends/amenities	12
Big bathroom/living room/kitchen/more family orientated	10
Easy access	7
Love house/garden	4
Good layout for wheelchair	3
Gives independence	2
Having bath rather than shower	2
All rooms on one level	2
Having son home is main thing	1
Environmental controls	1
Improved bathroom design	1
Ramp at side of house	1
Patio doors leading to garden	1
Hoist	1
Base 20: (participants who are satisfied with design and layout of property; participants could give more than one response)	

Table 21
Does the design and layout of your home meet your needs better now than before moving or adapting it?

	Number
Yes	28
No	3
Total	31

Table 22
Why does your home meet your needs better now?

	Number
Downstairs bedroom/bathroom/ shower/toilet	24
Wider doors/ramps/lower work surfaces and switches	8
Hoist/lift	7
Independence	6
Good space	5
Accessible family/friends/shops/garden	4
Good neighbours/neighbourhood	3
Bathroom adapted to my needs	2
Large bedroom can store equipment	2
Was living in temporary accommodation	2
Bathroom and separate toilet	1
Can do own decorating	1
Extension gives privacy	1
Oil heating	1
Environmental controls	1
Larger house	1
Base 28 (participants who are satisfied with design and layout of property; participants could give more than one response)	

Table 23
Which of the following best describes your mobility class: are you?

Mobility Classification	Yes	No	Total
An assisted wheelchair user	13	18	31
An independent wheelchair user/ need help with transfers to bed	7	24	31
An independent wheelchair user	5	26	31
An assisted wheelchair user/walk with aids/carer	3	28	31
An occasional wheelchair user- primarily outdoors	2	29	31
An independent wheelchair user/ walk with aids/carers	1	30	31

Table 24
Does anyone in the household use the following aids indoors or outdoors?

Mobility Aids	Yes	No	Total
Wheelchair pushed by another person	17	14	31
Self propelled wheelchair	13	18	31
Powered outdoor/indoor wheelchair	8	23	31
Zimmer frame	6	25	31
Adapted vehicle	5	26	31
Stick	4	27	31
Powered outdoor wheelchair	3	28	31
Crutches	2	29	31
Battery operated scooter	1	30	31
Confined to bed	1	30	31
Other (bath lift, mobility car, hoist, commode, shower chair, changing bench. 02 monitor, hospital bed, standing frame)	14	17	31

Table 25
Have you used different types of mobility aids since moving or adapting your home?

	Number
Yes	13
No	18
Total	31

Table 26
What kind of mobility aids have you used since moving or adapting your home?

Mobility Aids	Number
Lift/hoist	3
Hoist in living room & bathroom	2
Hoist/shower chair/rise & tilt chair/bed tables	2
Bath lift	1
Battery powered scooter	1
Indoor/outdoor powered wheelchair	1
Power chair/hoist/bath chair	1
Shower chair	1
Stick/zimmer/wheelchair/lift/hoist	1
Total	13
Base 13 (participants who have used mobility aids since moving or adapting property)	

Table 27
Do you receive any help from any of the following? (informal or private care)

	Yes	No	Total
Family living in	24	7	31
Carers	11	20	31
Family visiting regularly	7	24	31
Family visiting occasionally	4	27	31
Nurse to change dressing	2	29	31
Home help + carers	2	29	31
Home help	1	30	31
Friend	1	30	31
Auxiliary nurse	1	30	31

Table 28
Do you or the person who uses the wheelchair receive any regular help with household tasks/personal care?

	Household tasks	Personal care services
Yes	23	24
No	8	7
Total	31	31

Table 29
Who provides this regular help with household tasks?

Help with Household Tasks	Number
Parent/Parents	10
Spouse/partner	6
Family	2
Home help	2
Carers do some housework	1
Trust	1
Friends	1
Total	23
Base 23 (participants receiving regular help)	

Table 30
Who provides this regular personal care?

Providers Personal Care	Numbers
Carers	11
Parent/Parents	7
Spouse/Partner	3
Parents/Family/Carers	3
Total	24
Base 24 (participants receiving regular personal care)	

Table 31
Household Type

Family Type	Definition	Number
Large adult	Three or more adults, related or unrelated, with or without 1 dependent child under 16 years of age	12
Lone adult	One person below pensionable age -65 for men, 60 for women	6
Two adult	Two people, related or unrelated, below pensionable age	5
Two older	Two people, related or unrelated at least one of whom is of pensionable age	3
Large family	Any two adults related or unrelated, living with 3 or more dependent children under 16 years of age OR three or more adults, related or unrelated living with two or more dependent children under 16 years of age	2
Lone Parent	Sole adult living with dependent (children) under 16 years of age	1
Lone older	Lone person of pensionable age, 65 years for men , 60 years for women	1
Small family	Any two adults related or unrelated living with 1 or 2 dependent children under 16 years of age	1
Total		31

Table 32
Household Religion

	Number
Catholic	15
Protestant	13
Mixed Religion (Protestant/Catholic)	2
No Religion	1
Total	31

Table 33
Number of People per Household

	Number
Two persons	8
Four persons	6
One person	7
Three persons	5
Five persons	4
Seven persons	1
Total	31

Table 34
Age of Household Members

	Number
5 or under	3
6-15	14
16-24	12
25-39	12
40-59	33
60-64	7
65+	7
Total	88

Table 35
Additional comments

	Number
Hope people get something out of survey	4
More central information needed	3
Extra wide driveway good	3
Need much more storage for equipment	3
Ramp at front of house too narrow	2
Garden is less accessible/built up high	2
Happy enough have good neighbours	1
It will be useful to find what should be considered regarding design	2
Would like cistern fixed	1
External environment very hilly	1
Able to voice opinion as to design would work	1
Concerns about personal safety/fires started at oil tank	1

Base 13 (participants who made further comments could make more than one comment)

Table 36
External Facilities Present

External Facilities Present	Yes	No	Total
Garden/Play area for children	29	2	31
Car parking space close to entrance	25	6	31
Storage facilities (external)	25	6	31
Wider doorways for wheelchair/ baby buggy access	24	7	31
Extra wide car parking space (in cartilage)	19	12	31
Ramped entrance	19	12	31
Covered front door with outside light	16	15	31
Level/gently sloping approach to entrance	12	19	31

Table 37
Satisfaction with External Facilities

External Facilities	Satisfied	Dissatisfied	Total
Car parking space close to entrance	24	1	25
Wider doorways for wheelchair/ baby buggy access	24	-	24
Storage facilities (external)	23	2	25
Extra wide car parking space (in cartilage)	19	-	19
Garden/Play area for children	22	7	29
Covered front door with outside light	16	-	16
Ramped entrance	13	6	19
Level/gently sloping approach to entrance	11	1	12

Table 38
Internal Facilities Present

Internal Facilities Present	Yes	No	Total
Automatic heating	31	-	31
Accessible Bedrooms	31	-	31
Living room at entrance level	31	-	31
Shower facility	30	1	31
Ground floor toilet	29	2	31
Storage facilities	28	3	31
Dining area	27	4	31
Ease of circulation in down stairs rooms	24	7	31
Corridor widths	22	9	31
Bath	21	10	31
Easy to reach electric sockets and switches	17	14	31
Low level easy to reach windows	9	22	31
Wheelchair accessible kitchen units	6	25	31
Stopcock/meter and mains switches	6	25	31
Lifts	4	27	31
Internal environmental	1	30	31

Table 39
Satisfaction with Internal Facilities

Satisfaction With Internal Facilities	Satisfied	Dissatisfied	Total
Automatic heating	30	1	31
Accessible Bedrooms	28	3	31
Living room at entrance level	24	7	31
Shower facility	20	10	30
Ground floor toilet	23	6	29
Storage facilities	15	13	28
Dining area	27	-	27
Ease of circulation in down stairs rooms	24	-	24
Corridor widths	22	-	22
Bath	21	-	21
Easy to reach electric sockets and switches	17	-	17
Low level easy to reach windows	9	-	9
Wheelchair accessible kitchen units	6	-	6
Stopcock/meter and mains switches	6	-	6
Lifts	4	-	4
Environmental controls	1	-	1

Appendix 2

Activity Space Requirements in Bedrooms - OT Workshop Data (2005)

Activity	Space requirements	Notes
Space for the single hospital bed. Single domestic bed Space for a double bed	1,000mm x 2,300 fairly average for hospital bed allowing for mattress pumps. 2,000mm x 900mm 2,000mm x 1,500mm	*Actual Hospital bed used. Bed sizes can vary in both width and length. Varying numbers/types of beds will need to be planned for in the bedroom depending on relationships, supervisory responsibilities, continence and pressure relieving equipment.
Space for a carer to move around the bed for bed making and personal assistance	700mm – 800mm	Maximum space needed for low level bending. A small locker 600mm wide can also be placed in this space as could an over-bed table.
Space to get around the bottom of the bed in a wheelchair	1,200mm	Same as wheelchair standard corridor width. Although some of the movement is in a linear direction where 900mm would suffice the 90º turn require 1,200mm
Space for an independent wheelchair user to approach and transfer to the bed.	1,500mm Could be 1,800mm or even 2,000mm depending on type of wheelchair and method of transfer.	The wheelchair tested was a 16" compact self propelling manual wheelchair. 620mm x 1,060mm The client must be able to turn the wheelchair through 180º to "face in the right direction particularly if non weight bearing (Lateral transfer) If partially weight bearing oblique or frontal pivoting transfers may be used this will require between 1,200mm and 1,500mm Some clients may use alternative transfer methods. Clients with larger than average wheelchairs will need additional space particularly if using powered chairs and there is reduced hand coordination.
Space for one carer to assist with hoist transfer. Space for 2 carers assisting transfer to bed using a mobile/tracking or bed lift hoist	1,500 However one person will take longer and health and safety /client support could be compromised. 1,800mm	Planning should allow for two carers for health and safety reasons/changing needs. The maximum space requirement occurs when the carers are either side of the wheelchair user bending down to remove footplates or to fit thigh straps
Space for using a bed lifter (Doherty)	This adds 150mm to the length of the bed.	The pole is located behind the head of the bed.
Space to move a commode/ shower chair into transfer space around hoist with legs splayed.	Width of hoist with splayed legs 900mm An additional 750mm is required to propel a mobile commode/shower chair past = 1,650mm	This may vary depending on equipment used.

Activity	Space requirements	Notes
Storage space Space for a wardrobe Space to approach/open doors/drawers. Space for the storage and use of essential health care equipment	600mm deep min. x widths of wardrobes (variable. 600-1200mm) 1,200mm Measure up.	 Width of doors/depth of drawers + approach space. Other essential items may be stored/used in bedrooms and need to be considered in addition where appropriate: • Wheelchair • Battery chargers • Nebuliser • Oxygen cylinders • Disposables • Standing frames • Mobile hoist • Commode • Television/if bed bound (Can be wall mounted)
Study space for children (Where there is no other suitable space identifiable)	1,500mm x 1,000mm min.	Space to approach and use a computer/workstation/chair
Space to reach and open windows	1,200mm	Often there is a need to be able to move alongside the window to extend reach. Could be automated by environmental control.

Item	Width	Item	Length
Bed single (hospital) Bed double	900mm-1,000mm 1,500mm	Bed Single	2,300mm (2, 600 with bed hoist/mattress motors)
Space for carers on other non transfer side of overlaps with bedside locker/table	700mm	Circulation space around bed/ approach space for wardrobe/ drawers/access to window.	1,200mm
Transfer space /turning circle for an independent wheelchair user Transfer space for fixed tracking hoist/larger wheelchairs	1,500mm 1,800mm	Wardrobe/drawers	600mm - deep
Total a) Independent user with single bed b) Assisted user double bed	3,200 4,000mm		 4,100mm 4,100mm

Appendix 3

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Appendix 4

Social Survey

SCHEDULE NO.			WHEELCHAIR HOUSING/USER SURVEY APRIL 2005

Good morning/afternoon/evening. My name is _____ **SHOW IDENTITY PASS** I am working on behalf of the Northern Ireland Housing Executive Research Unit and we are carrying out some research as a pilot on Wheelchair Housing standards. We would like to ask you a few questions to ascertain how these homes currently meet the needs of the users. If possible, I would like to speak to the person who uses the wheelchair or their primary carer, to ask them some questions. The survey is completely confidential and your help would be much appreciated, any information you provide will be used for research purposes only. Could I just check does the person who uses the wheelchair still live at this address?

YES	1	CONTINUE
NO	2	THANK RESPONDENT AND TERMINATE INTERVIEW

And are you:	1st Call	2nd Call	3rd Call
The Wheelchair User			
The Parent/Guardian of the wheelchair user			
The Carer of the wheelchair user			
Non Contact			
Other (please specify)			

Interviewer Note:
If suitable person available, ask if they could spare approximately 30 minutes to take part in the survey. If they agree, proceed with the interview, otherwise, terminate interview, thank respondent and record reason for refusal.

Anti government/Housing Executive	1
Invasion of privacy	2
Dislike survey subject	3
Can't be bothered	4
Genuinely too busy	5
Too old/sick	6
Personal reasons	7
Other (please specify)	8

If suitable person not available or suitable person unable to take part at that time, arrange to call at a more convenient time.

Q1. Do you (or your family) own this property or do you rent it?

Owner occupier	1
Rent from private landlord	2
Rent from Housing Executive	3
Rent from Housing Association	
Please specify	4
Co-ownership	5
Other (please specify)	6

Q2. How long have you lived at this address?

Less than 6 months	1
6 months- 1 year	2
More than 1 but less than 2 years	3
More than 2 but less than 4 years	4
More than 4 years	5
Don't Know	8

Q2b. Before talking about your home in more detail, I need to identify the type of dwelling you live in

CODE AS MANY AS APPLY			
Type	Code	Purpose Built	Adaptation
Ground floor flat	1		
Upstairs flat	2		
Maisonette	3		
Mid-Terrace house	4		
End-terrace house	5		
Semi-detached House	6		
Detached House	7		
Detached Bungalow	8		
Semi-detached bungalow	9		
End terrace bungalow	10		
Mid-terrace bungalow	11		
Other (please specify)			

Q2c. How many bedrooms are there in this property? Tick as appropriate

One	Two	Three	Four or more
1	2	3	4

Q2d. How many sleeping spaces are there in the property? Tick as appropriate
(NB Double bedrooms = 2 spaces. Single bedroms = 1 space)

1	2	3	4	5	6	7
8	9	10				

Q2e. How satisfied are you with the number of bedrooms?

Very satisfied	1	Go to Q2g
Satisfied	2	Go to Q2g
Neither	3	Go to Q2g
Dissatisfied	4	Go to Q2f
Very dissatisfied	5	Go to Q2f

Q2f. Why are you dissatisfied/very dissatisfied with the number of bedrooms?

_____
_____
_____

Q2g. Does the design of your home meet the needs of family or friends staying over?

Yes	1	Go to Q3
No	2	Go to Q2h

Q2h. If no, why not?

_____
_____
_____

Q3. Do you or the person who uses the wheelchair currently receive help from any of the following?
Informal or private care.

	Yes	No	How Many Carers would be in your home at any one time
Family (living in)	1	2	
Family Visit (Regular)	1	2	
Family Visit (Occasional)	1	2	
Private Help (paid for by yourself)	1	2	
Other (please specify)	1	2	

Q4a. Do you or the person who uses the wheelchair receive any regular help with household tasks (provision of meals, help with domestic tasks, cooking, cleaning, shopping etc)?

Yes	1	Go to Q4b
No	2	Go to Q4c

Q4b. Who provides this regular assistance with household tasks?

_____
_____
_____

Q4c. Do you or the person who uses the wheelchair receive any regular personal care services (help with getting up, bathing, eating meals, going to bed)?

Yes	1	Go to Q4d
No	2	Go to Q5a

Q4d. Who provides this regular personal care service/s?

_____
_____
_____

Q5a. Has any design feature that has been provided in your home reduced your need for care or assistance? E.g. automatic heating? / i.e. has this made caring easier?

Yes	1	Go to Q5b
No	2	Go to Q6a

Q5b. If yes, what design feature has been provided in your home that has reduced your need for care?

_____
_____
_____

Q6a. Do you have any children or young people under the age of 18 living in or visiting your household?

Yes	1	Go to Q6b
No	2	Go to Q7

Q6b. Does the design features in your home and around your home made childcare easier or made it harder?

_____
_____
_____
_____

Q7. There are a number of things that can affect the way in which people use or move around their home. Do you have problems with any of these? Which code or codes best describe your situation? (circle all that apply)

Yes	No	
1	2	**Problems with moving around** such as: getting breathless climbing a flight of stairs, difficulty climbing stairs, difficulty walking long distances
1	2	**Difficulty reaching or stretching** reaching up to kitchen cupboards or washing on the line Difficulty bending down to pull out a plug or to pick up the post
1	2	**Dexterity** - difficulty with picking things up, Turning taps or knobs
1	2	**Personal Care** - washing, dressing, eating, Getting in and out of bed or getting in and out of the bath
1	2	**Continence** - difficulties in access to toilet or waiting time
1	2	**Hearing** - difficulty hearing
1	2	**Seeing** difficulty reading the newspaper with your
1	2	**Communication** - Do you feel your needs are understood clearly?
1	2	**Cognitive** - Do you have difficult in using facilities in the home?
1	2	**None** - No physical/sensory difficulties
1	2	**Other** - please specify below

Q8. Which of the following mobility classifications best describes your circumstances or any visitor who may come to your home?

	Mobility Classification	User	Visitor
1	Assisted wheelchair user	Yes	Yes
2a	Independent wheelchair user	Yes	Yes
2b	Independent wheelchair user but needs some assistance with transfers to bed, wc etc.	Yes	Yes
3	Occasional wheelchair user – primarily outdoor use	Yes	Yes
4	Walk with walking aid(s)	Yes	Yes
5	Walk without aid	Yes	Yes
6	Walk with carer	Yes	Yes
7	Other please specify	Yes	Yes

Q9a. How satisfied/dissatisfied are you with the design and layout of this property? (One response only)

Very satisfied	1	Go to Q10.
Satisfied	2	
Neither	3	
Dissatisfied	4	Go to Q9b.
Very dissatisfied	5	

Q9b. Why are you dissatisfied/very dissatisfied with the design and layout of this property?
(Please rank in order of importance)

_____
_____
_____

Q11a. Does the design of your home meet your needs better than before moving or adapting it?

Yes	1	Go to Q11b
No	2	Go to Q11c

Q11b. If yes, In what way(s) does your home meet your needs better? PROBE IN DETAIL (Please rank in order of importance)

_____
_____
_____

Q11c. If no, why? PROBE IN DETAIL (Please rank in order of importance)

_____
_____
_____

HOUSEHOLD INFORMATION

Q13 Could you please tell me who lives here, how they are related to you and whether or not they are working? (I do not require names). (A family unit cannot span more than 2 consecutive generations (eg. mother with child (family unit 2) living with parents (family unit 1)).

Person		HOH	2	3	4	5	6	7	8	9	10	11	12
Age													
Sex	Male	1	1	1	1	1	1	1	1	1	1	1	1
	Female	2	2	2	2	2	2	2	2	2	2	2	2
Relation to	HOH	1											
HOH	**Partner (married)**		2	2	2	2	2	2	2	2	2	2	2
	Partner (cohabiting)		3	3	3	3	3	3	3	3	3	3	3
	Child		4	4	4	4	4	4	4	4	4	4	4
	Parent		5	5	5	5	5	5	5	5	5	5	5
	Other Relative		6	6	6	6	6	6	6	6	6	6	6
	Lodger		7	7	7	7	7	7	7	7	7	7	7
	Other non-relative		8	8	8	8	8	8	8	8	8	8	8
Family Unit (see above)													
Employment Status													
Self employed		01	01	01	01	01	01	01	01	01	01	01	01
Employed Full Time		02	02	02	02	02	02	02	02	02	02	02	02
Employed Part Time		03	03	03	03	03	03	03	03	03	03	03	03
Not working - short term (< 1 yr)		04	04	04	04	04	04	04	04	04	04	04	04
Not working -long term > 1yr)		05	05	05	05	05	05	05	05	05	05	05	05
Retired from work - excludes looking after family/home		06	06	06	06	06	06	06	06	06	06	06	06
Student (Further /Higher Education)		07	07	07	07	07	07	07	07	07	07	07	07
Perm Sick/Disabled		08	08	08	08	08	08	08	08	08	08	08	08
Looking after family/home		09	09	09	09	09	09	09	09	09	09	09	09
Other (including schoolchild)		10	10	10	10	10	10	10	10	10	10	10	10
Marital Status													
Single (never married)		1	1	1	1	1	1	1	1	1	1	1	1
Married (first marriage)		2	2	2	2	2	2	2	2	2	2	2	2
Re- Married		3	3	3	3	3	3	3	3	3	3	3	3
Separated (but still legally married)		4	4	4	4	4	4	4	4	4	4	4	4
Divorced (but not legally remarried)		5	5	5	5	5	5	5	5	5	5	5	5
Widowed (but not legally remarried)		6	6	6	6	6	6	6	6	6	6	6	6
Ethnic Groups													
White		1	1	1	1	1	1	1	1	1	1	1	1
Chinese		2	2	2	2	2	2	2	2	2	2	2	2
Irish Traveller		3	3	3	3	3	3	3	3	3	3	3	3
Indian		4	4	4	4	4	4	4	4	4	4	4	4
Pakistani		5	5	5	5	5	5	5	5	5	5	5	5
Bangladeshi		6	6	6	6	6	6	6	6	6	6	6	6
Black Caribbean		7	7	7	7	7	7	7	7	7	7	7	7
Black African		8	8	8	8	8	8	8	8	8	8	8	8
Mixed Ethnic (please specify)		9	9	9	9	9	9	9	9	9	9	9	9
Black Other (Please Specify)		10	10	10	10	10	10	10	10	10	10	10	10
Any other ethnic group (Please Specify)		11	11	11	11	11	11	11	11	11	11	11	11

Person Code of respondent			Numbers of persons in household		
Concealed households			Person number of anyone else present at the interview		
Number of children in household					

Q13a Does anyone in the household use the following aids indoors or outdoors? (Please use reference from Household grid as the reference number)

	Yes	No	Household reference number/s
1 No aids	1	2	
2 Stick	1	2	
3 Crutches	1	2	
4 Zimmer Frame	1	2	
5 Self-propelled wheel chair	1	2	
6 Wheelchair pushed by another person	1	2	
7 Powered outdoor use only wheelchair	1	2	
8 Powered outdoor/indoor wheelchair			
9 Battery powered scooter	1	2	
10 Adapted vehicle	1	2	
11 Confined to bed	1	2	
12 Other please specify	1	2	

Q13b Have you used different types of mobility aids since moving or adapting your home?

Yes	1	Go to Q13b
No	2	Go to Q14a

Q13c If yes, which type

_____

_____

Q14a. Now I would like to ask you some questions about your income. Answers of individual respondents will not be disclosed to anyone outside the Executive's Research Unit.

What is the total income before tax and other deductions of yourself and your partner (if you have one)? Please include all income from employment, benefits, or other sources. (Ring one only)

INTERVIEWER INSTRUCTION: PLEASE USE SHOWCARD WITH WEEKLY, MONTHLY & ANNUAL INCOME BANDS

Weekly	Monthly	Annual	
Less than £60	Less than £260	Less than £3,120	1
£61-£80	£261 - £346	£3,121 -£4,160	2
£81-£100	£347 -£433	£4,161 -£5,200	3
£101-£120	£434 - £520	£5,201 -£6,240	4
£121-£140	£521 - £606	£6,241 -£7,280	5
£141-£200	£607 - £866	£7,281 -£10,400	6
£201-£300	£867 - £1300	£10,401 -£15,600	7
£301+	£1301+	£15,601+	8
Refused			99
Don't Know			88

INTERVIEWER INSTRUCTION IF IN EMPLOYMENT

Q14b. Does the Head of Household or partner (if applicable) receive Working Families Tax Credit (previously Family Credit)? (Ring one only)

Yes	1
No	2

Q15. Does the Head of Household or partner (if applicable) receive any of the following benefits? (If no partner code N/A) (Ring all that apply)

BENEFIT	Head of Household				Partner				
	Yes	No	Ref	D/K	Yes	No	Ref	N/A	D/K
Income Support/Jobseeker's Allowance (income based)	1	2	99	8	1	2	99	0	8
Jobseeker's Allowance (contribution based)	1	2	99	8	1	2	99	0	8
Housing Benefit	1	2	99	8	1	2	99	0	8
Child Benefit	1	2	99	8	1	2	99	0	8
State Retirement Pension	1	2	99	8	1	2	99	0	8
Widow's Pension	1	2	99	8	1	2	99	0	8
Occupational/Works Pension	1	2	99	8	1	2	99	0	8
Disability Living Allowance	1	2	99	8	1	2	99	0	8
Attendance Allowance	1	2	99	8	1	2	99	0	8
Incapacity Benefit	1	2	99	8	1	2	99	0	8

Q16. The Housing Executive is committed to the principles of equality of opportunity in the provision of housing and related services. In pursuit of this policy the Executive aims to ensure complete fairness in the treatment of households and individuals. To assist in achieving this it is necessary to collect key information on the religious and ethnic composition of households.

a) How would you describe the religious tradition of this household? (Ring one only)

Protestant	Roman Catholic	Mixed Religion Protestant/ Catholic	Other (please specify)	No Religion	Refused
1	2	3	4	5	7

Q17. Do you have any further comments you wish to make?

_____

_____

_____

Thank respondent for taking the time to complete the survey.

Appendix 5

User Centred Design Questionnaire

SCHEDULE NO.			WHEELCHAIR HOUSING/USER SURVEY APRIL 2005

	Facility Present Y-yes N -no	Additional information e.g. design details which work well or work poorly (check any environmental hazards)	
Location And Setting	Satisfaction Rating S – Satisfied D- Dissatisfied		
ACCESS TO LOCAL FACILITIES shops, health centres etc.			
EASY ACCESS TO PUBLIC TRANSPORTATION bus, train, taxi routes			
External Environment			
GARDEN AREA/ SAFE GARDEN AREA/ PLAY AREA FOR CHILDREN			
EXTRA WIDE CAR PARKING SPACE 3.3m or 3.6m? (Identify no of incurtilage car/van parking spaces)			
CAR PARKING SPACE CLOSE TO ENTRANCE		In Curtilage:	On Street:
LEVEL OR GENTLY SLOPING APPROACH TO YOUR ENTRANCE (Front & Rear) (No steep slopes or steps)			
RAMPED ENTRANCE (Identify no of ramps)		No Of Ramps/accessible Entrances:	
COVERED FRONT DOOR WITH AN OUTSIDE LIGHT			
WIDER DOORWAYS for wheelchair or baby buggy access		Clear opening door width:	
Internal Environment			
CORRIDOR Widths		Width:	
FLOORING		Type/comments	
OPEN SPACE IN DOWNSTAIRS ROOMS to turn wheelchairs or baby buggies (1500mm minimum turning circles)			
GROUND FLOOR TOILET			
SHOWER FACILITY (Classify type)		Type of shower:	
BATH		In addition to shower yes/no	
LIVING ROOM AT ENTRANCE LEVEL			
WHEELCHAIR ACCESSIBLE KITCHEN UNITS (Identify user(s)		Who uses kitchen:	
DINING AREA			
BEDROOMS			

	Facility Present Y-yes N -no	Additional information e.g. design details which work well or work poorly (check any environmental hazards)
Location And Setting	Satisfaction Rating S – Satisfied D- Dissatisfied	
INTERNAL ENVIRONMENTAL CONTROLS helplines/carelines other assistive/smart technology (Identify Type)		Security Safety Communications Environmental control
Home Heating		
MANUAL		
AUTOMATIC		
SENSORY ENVIRONMENTAL ISSUES visual, tactile, auditory (Identify provision by room)		
LIFTS: Type and internal space dimensions.		
EASY TO REACH ELECTRIC SOCKETS, SWITCHES,		
STOPCOCK, METERS & MAINS SWITCH. (Identify any issues)		
Storage Facilities		
Internal Environment		
Internal		
External		

Type	Size	Where do you use the equipment?	Where do you store the equipment?
a.			
b.			
c.			
d.			
e.			
f.			
g.			
h.			

Thank respondent for taking the time to complete the survey.

This document is available in alternative formats. Please contact:

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Housing Executive

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