

BIRMINGHAM MOBILITY ACTION PLAN

TECHNICAL WORK PACKAGE 5 ACCESS STRATEGY FOR PEOPLE WITH DISABILITIES NOVEMBER 2014









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BIRMINGHAM MOBILITY ACTION PLAN – TECHNICAL STUDY GROUP REPORT

Access Strategy for People with Disabilities

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Client

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Executive Summary

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This guidance has been prepared as part of the development of the Birmingham Connected White Paper and meets the equity objective to create a more accessible, inclusive and fairer transport system. It is not intended to be a stand-alone document, but instead, the principles set out within this document permeate through and are embedded within all sections of the Birmingham Connected White Paper and all resultant transport schemes that are developed under the Birmingham Connected umbrella.

The Equality Act 2010 sets out characteristics which, by law cannot be discriminated against. In transport terms most of these protected groups have the same transport needs and requirements. People with disabilities may have different requirements and hence transport schemes must meet the needs of all users, including those people with disabilities.

The Equality Act defines disability as a physical or mental impairment that has a 'substantial' and 'long-term' negative effect on your ability to do normal daily activities. Census data indicates that 18% of the population of Birmingham identified themselves as having a "Limiting Long-Term Illnesses" (defined within the census as any long-term illness, health problem or disability which limits someone's daily activities or the work they can do). This large section of our population have the same right to access transport as the rest of the population.

The guiding principles of this access strategy have been formed through sourcing approved information from a number of groups that represent people with disabilities to ensure the issues faced by disabled people are included from the perspective of a person with disabilities and not just assumed by people without disabilities.

The guidance is intended to provide an easy reference **for anyone involved in developing and designing any transport schemes within Birmingham**. At the heart of the guidance are two user friendly reference tables. The first, 'The Table of Considerations' provides a simple checklist of key considerations set out clearly, by transport mode and by disability. The second table 'The Design Reference Guide' links to the first and provides more detailed information on each consideration and provides further links to the full background source papers if the reader or designer wishes to focus on a specific area of interest in depth.

We are seeking adherence to a simple statement of intent:

"For any transport scheme proposed in Birmingham the needs of people with disabilities will be fully taken into consideration."





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Introduction

Background

When you have a disability the very first transport choice you make is whether to even leave the house. Thousands of people decide not to, which impacts on their physical health as well as their mental wellbeing. The aim of this access strategy is to ensure, as much as is possible, that people with disabilities have equal access to services and the same choices as everyone else, so that they can move freely about the city.

There is a growing awareness of disability rights. In the past, emphasis was on adapting the person to fit the environment but now the social model is more common. Rather than seeing people as having disabilities they are seen as being disabled by the environments and products provided for them. This social model aims to design environments and products to minimise disability. It is seen to be important to design to meet the needs of everyone, or as many people as possible, rather than those of the 'average' fit¹, recognising that some specific group needs conflict with others. For example, wheelchair users prefer flat, kerb free surfaces, whilst those with visual impairments prefer kerbs to orientate themselves and to distinguish between areas for cars and those for pedestrians.

With the social model in mind, this access strategy will inform the content of the Birmingham Connected White Paper, to ensure services and places are designed to minimise negative impacts on people with disabilities.

People with disabilities are often excluded from mainstream life, and this is replicated in planning and guidance documents, where often there is separate guidance for people with disabilities which is distinct from other guidelines. The aim of this access strategy therefore is not to replicate existing guidance for people with disabilities (of which there is a plethora already), but to ensure that the principles are embedded throughout all sections of the Birmingham Connected White Paper and resultant transport schemes, via succinct and simple to use checklists and reference guides.

The guiding principles of the access strategy have been formed through sourcing approved information from a number of reference groups that represent people with disabilities to ensure the issues faced by disabled people wanting to travel are considered thoroughly.

The access strategy culminates in a **Table of Considerations** which has subsequently informed all other sections of the Birmingham Connected White Paper.

The Equality Act

Since 2010 The Equality Act² has been at the heart of policy and legislation for people with disabilities. It confirms that the following are protected characteristics in law: age; disability; gender reassignment; marriage and civil partnership; pregnancy and maternity; race; religion or belief; sex; and sexual orientation. Therefore transport schemes developed in Birmingham as part of Birmingham Connected must meet the needs of all users, irrespective of the presence or otherwise of any of the above characteristics.

Clearly though, some of the characteristics mentioned above do not implicitly require specific measures to ensure inclusivity in transport schemes. For example, whilst women and children potentially could be considered as vulnerable users and therefore require suitable security, lighting and so on, these are measures that equally are required by all other users. Similarly, some of the needs of people using baby buggies or prams

¹ Inclusive Urban Design – Streets for Life, Burton & Mitchell, 2006

² The Equality Act 2010, HMSO





are the same as wheelchair users. As such, those characteristics do not need specific intervention to ensure inclusivity in a transport context.

With that in mind, whilst transport schemes will ensure no individual is discriminated against for any of the above characteristics, this Access Strategy will focus on those that do need specific consideration to ensure that transport schemes are fully inclusive. As such, this access strategy will focus on people with disabilities, including people who have age related disabilities which means they have difficulty travelling around.

Context

Demographics

The total population of Birmingham in 2014 is $1,102,000^{-3}$ and is considered 'young' by comparison with the demographics of the UK, with the average age in Birmingham being 36, compared with 38.6 across England as a whole.⁴

Birmingham's population age profile in 2014 is as follows:



When considering the proportion of the population that are considered to have a disability we need to understand what we mean by 'disability'. The Equality Act 2010 defines disability as a physical or mental impairment that has a 'substantial' and 'long-term' negative effect on your ability to do normal daily activities.

The 2011 Census "Health and Care" Topic Report for Birmingham shows the percentage of Birmingham residents by age group that identified themselves as having a "Limiting Long-Term Illnesses" (defined as any long-term illness, health problem or disability which limits someone's daily activities or the work they can do). These percentages are shown in Table x.x below:

Percentage of population with limiting long-term illness by age group

³ Office of National Statistics, 2012

⁴ Comparison of Birmingham and England Age Structure, 2005

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Age Group	% of Population Identifying as Having Limiting Long-Term Illness (based on 2011 Census)
0 – 14 Years	4.46%
15 – 29 Years	5.78%
30 – 44 Years	11.88%
45 – 59 Years	24.38%
60 – 64 Years	36.27%
65 – 74 Years	47.16%
75 Year and Over	68.60%

-WSP

Mott MacDonald



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Percentage Per Age Group

If these proportions are applied to the population and demographics information from the Office of National Statistics, this suggests that there are currently around 197,000 people in Birmingham with a disability, or 18% of the total population.

Ageing can result in a range of related disabilities including visual impairment, mobility difficulties and dementia, but age itself is not a disability. Clearly, if 47% of 65 – 74 year olds have a disability, then 53% do not. As such,



whilst this access strategy includes the requirements of those over the state pensionable age in its considerations and recommendations, we look at the needs of people with disabilities, whether agerelated or not, and how they can be catered for, rather than assuming all older people have a 'disability'.

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With the population predicted to increase, the overall numbers of people with disabilities will rise in Birmingham, and importantly, with demographics changing globally to include an increasingly aging population, the proportion of people with a disability, including dementia, will also rise as the proportion of people over state pensionable age increases.

The Office of National Statistics data (2012) indicates that in 20 years' time (2034) the population of Birmingham will have increased to around 1,250,000 and the proportion of people over state pensionable age will have increased from 13% to 16.09%. Based on these 2034 predicted demographics and population the number of people with disabilities is likely to have risen to around 242,000 people in Birmingham. This is based on the assumption that the percentage of people with disabilities in all age groups remains constant with 2011 levels as shown in the 2011 census. When comparing the profiles from the 1991 and 2001 census the percentage of people with disabilities increased in every age group, but when comparing 2001 to 2011 census data the percentage of people with disabilities DECREASED in every age group except the '75 or older' age group which increased from 65.5% to 68.8%. It is likely that some reduction in people with disabilities due to medical improvements may be offset against an increase in older people, with life expectancy increasing.

The population breakdown and predictions are summarised in the tables below.





	2014					
Age	Population (000's)	Number of People in Each Age Group	Percentage of Total Population Identifying as Having a Disability (based on 2011 Census Figures)	Number of People Identifying as Having a Disability (000's)	Percentage of Total Population of Birmingham Living with a Disability	
0-4	85					
5-9	80	236	4.46%	11	0.95%	
10-14	71					
15-19	79					
20-24	101	268	5.78%	15	1.41%	
25-29	88					
30-34	82					
35-39	71	223	11.88%	27	2.41%	
40-44	70					
45-49	69					
50-54	63	185	24.38%	45	4.09%	
55-59	53					
60-64	46	46	36.27%	17	1.51%	
65-59	41	74	47.16%	35	3.15%	
70-74	33	14				
75-79	28					
80-84	22	70	68.6%	48	4.37%	
85-89	13					
90+	7					
All Ages	1,102		1	197	18%	

Population in Birmingham - 2014







	2034				
Age	Population (000's)	Number of People in Each Age Group	Percentage of Total Population Identifying as Having a Disability (based on 2011 Census Figures)	Number of People Identifying as Having a Disability (000's)	Percentage of Total Population of Birmingham Living with a Disability
0-4	88				
5-9	85	279	4.46%	11	0.92%
10-15	106				
16-19	66				
20-24	108	271	5.78%	16	1.35%
25-29	96				
30-34	83	245	11.88%	29	2.33%
35-39	82				
40-44	80				
45-49	72		24.38%	48	3.84%
50-54	67	197			
55-59	58				
60-64	57	57	36.27%	21	1.66%
65-59	54	102	47.16%	48	3.83%
70-74	47	102			
75-79	36	100		68	5.46%
80-84	28		68.6%		
85-89	20				
90+	15				
All Ages	1,250			242	19%

Predicted population in Birmingham – 2034





Total Residents & Identified as Disabled (2014 & 2034)



Residents Identifying as Disabled by Age Group (2014 & 2034)



It can be seen that people with disabilities make up almost a fifth of the population of Birmingham and this is set to increase. The range of disabilities is wide and encompasses persons of limited mobility, hearing and vision. It includes the elderly, infirm and wheelchair users. The infrastructure, facilities and technology provided by transport networks should therefore go further than just providing wheelchair access and should include aural

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and visual information systems, including induction loops, appropriate warning surfaces at the top and bottom of stairs and at platform edges and alternative access arrangements where physical barriers make it impossible or difficult to use the service.⁵ We need to ensure this large proportion of our population is not excluded from using our transport system.

Accessible Birmingham

The demographics define the population in terms of need, but we also must consider the current accessibility of Birmingham. Each section of the Birmingham Connected White Paper reviews specific mode strengths and weaknesses, in terms of capacity, quality and future requirements, to give an overall view of accessibility in the city.

For people with disabilities this analysis highlights both the benefits and disbenefits of living in a major urban centre:

- a public transport network that is generally more accessible than in many other UK cities;
 - o 85% low floor buses;
 - o level access to Midland Metro trams and level, ramped or lift access to platforms;
 - good level access to stations, such as the upgraded New Street, although more can be done in local stations, as local trains require a ramp to provide wheelchair access;
 - o however network overcrowding presents specific challenges for travellers with disabilities
- a well-developed voluntary transport sector meeting individual needs with Ring & Ride door to door services;
- good levels of accessible taxi availability and capacity, providing a realistic alternative to local bus or rail;
- many pedestrianised city centre streets, yet sometimes within an overall streetscape designed for and dominated by cars;
- severance caused by busy ring roads and radial routes, leading to dependence on poor street level crossings or subways/footbridges;
- some application of shared space designs, but difficult to meet all user's needs;
- improved signing and directions for all users, but need to consider further needs of people with disabilities;
- high levels of disabled parking spaces, although not always in optimal locations.

While the image of a city dominated by the car (and therefore less friendly to non-motorised people with disabilities) has receded in the last 10 years, with real steps forward by the Council, Centro and transport operators, meeting travel needs must always be achieved within the context of existing infrastructure and operational constraints. This report will aid decision making to ensure that investment in the future fully recognises the travel needs of people with disabilities.

⁵ <u>http://mosenltd.com/wp-content/uploads/2011/01/Improving-Disabled-Access-in-Transport-Infrastructure.pdf</u>





Reference Groups

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It is vitally important to understand the problems that people with disabilities face from their perspective. An able bodied person is often no substitute, however empathetic, as there are always issues that get missed unless you have a disability and regularly use transport systems. A series of consultations were held with a range of stakeholders during the Green Paper stage, albeit that the interaction with people with disabilities was not extensive. Given the timeframe for production of the White Paper this access strategy has drawn on existing policy and guidance, as well as previously approved design guidelines and recommendations from a number of groups with disabilities to develop a definitive overarching approach ensuring ALL disabilities are considered when developing transport strategies.

Where there are conflicts in the needs of different groups these have been drawn out and solutions proposed.

We have aimed to source approved transport considerations from the following groups:

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- NHS England, Birmingham Cross City Clinical Commissioning Group, Birmingham & Solihull Mental Health NHS Foundation Trust
- Public Health team, Birmingham City Council
- Department for Transport;
- World Health Organisation
- EqIA/DDA officers, BCC
- Disability Advocates:
 - RNIB
 - o Guide Dogs for the Blind
 - o Action on Hearing Loss
 - The International Transport Forum on Cognitive Impairment, Mental Health and Transport;
 - o Scope;
 - o MIND;
 - Help the Aged and other older people's action groups
- The Access Association
- Centro & public transport operators

Considerations

Introduction

When a street scene design concept or transport operational plan is developed, there are certain key components that are critical to the provision of an inclusive, accessible street environment and transport systems that will cater for all people including those with disabilities. We are seeking adherence to a simple statement of intent:

"For any transport scheme proposed in Birmingham the needs of people with disabilities will be fully taken into consideration."

We have developed a Table of Considerations which aims to underpin all other aspects of the White Paper. The table itself provides a quick reference of key considerations. This is underpinned by a Design Reference Guide with a greater level of detail of each consideration, which in turn provides references to relevant documents approved by groups representing disabled users, should the designer need more detail. In this way, when new guidance, technology and practices are introduced in the future these links can be updated.



What is the Table of Considerations?

The Table of Considerations is designed to be a user-friendly simple checklist of design considerations for designers and/or developers who wish to cater for various user-groups that identify as disabled.

Along the horizontal axis of the table are the user groups. The vertical axis of the table is formed of the transport modes to be catered for in transport schemes. The Table lists key words and phrases to prompt the designer into ensuring they have considered their scheme from a range of user perspectives, ensuring it is useable and appropriate for all user-groups.

What can the Table of Considerations be used for

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The Table of Considerations is flexible in its use – it can be used to reference guidance for specific modes only as well as for specific user-groups, e.g. a developer providing a public transport interchange can check for design considerations for all user groups; similarly, a designer wishing to cater for people with visual impairments (for example) can check for design considerations for all modes of transport. It can even be used for specific mode/user-group combinations, i.e. designing for cyclists with hearing impairments. At the other end of the scale, the Table of Considerations can also be used as an overall framework checklist to cater for as many users with various needs as possible, providing a city-wide transport access strategy to cater for all disabilities.

How has the Table of Consideration been created?

The first stage in creating the Table of Considerations was to define the user groups that identify as disabled. Whilst it is recognised that people can have a wide and varied range of often over-lapping disabilities, and that one size does not fit all, in order to produce a framework that caters for as many people as possible, it has been necessary for us to create a fixed set of categories into which people with disabilities will sit. We have broken down disabilities into the following categories:

- Locomotion impairments (i.e. people who use wheelchairs)
- Visual impairments (i.e. people who have total or partial blindness or difficulties with their vision)
- Hearing impairments (i.e. people who have total or partial deafness or difficulties with their hearing)
- Mobility, reaching, stretching and dexterity impairments (i.e. people who have difficulties walking or moving, including those with arthritis, poor stamina, breathing or heart problems but who do not use a wheelchair)
- Cognitive impairments (i.e. people with learning difficulties, people with mental health issues and people with dementia).

We have discussed that as the population ages, the percentage of people who identify as disabled increases, but we have not specifically included "age impairment" as a category in our Table of Considerations, as disabilities associated with old age fall within the other categories set out above and we have ensured that as we consider each disability category we have reviewed guidelines and recommendations from age-related action groups.

The second stage was to define the transport modes which would be need to be catered for in the access strategy. Our modal design considerations include:

- Walking horizontal and vertical alignments;
- Cycling horizontal and vertical alignments;
- Public Transport at boarding and alighting places, and on board public transport vehicles (including buses, trains, trams etc.);



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- Car at the start and end of car trips (provision within the vehicle for a disabled user is up to individual discretion);
- Non-Mode Specific cross-mode considerations; and

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• Technology and Information Provision – Other elements that should be considered aside from infrastructure; technological advances and the ability to provide more efficient and accurate information needs to be considered for all user groups.

Once users and modal considerations had been identified a spreadsheet grid was populated with all relevant design considerations by mode for each user group. In order to do this, approved guidelines and recommendations set out by a number of groups representing people with disabilities (as well as other transport and health bodies) have been reviewed. These design considerations either come directly from the approved design guidelines and recommendations issued by the groups identified previously under the Reference Groups or are inspired by overarching principles set out by these groups. The documents that have been reviewed to collate the design considerations are:

- Access to public transport for people with hearing loss Policy statement ~ Action on Hearing Loss
- Access for road users with hearing loss Policy statement ~ Action on Hearing Loss
- Birmingham City Council Car Parking Guidelines SPD ~ Birmingham City Council
- Centro Our Equality Commitment ~ Centro Webpage
- Cognitive Impairment, Mental Health and Transport ~ International Transport Forum (as recommended for use by Scope and MIND)
- Effective Kerb Heights for Blind and Partially Sighted People ~ Research Commissioned by The Guide Dogs for the Blind Association (Guide Dogs)
- Getting Around Access Guide A guide to accessible public transport in the West Midlands ~ Network West Midlands
- Global Age-friendly Cities: A Guide ~ World Health Organisation
- Neighbourhoods for life ~ A checklist of recommendations for designing dementia friendly outdoor environments
- Inclusion by Design Equality, Diversity and the Built Environment ~ CABE
- Inclusive Mobility ~ Department for Transport
- Inclusive Streets: Design Principles for Blind and Partially Sighted People ~ Guide Dogs
- Mobility scooters and powered wheelchairs on the road Appendix B "Voluntary Code of Best Practice - Confederation of Passenger Transport" ~ DfT
- Road Safety Research Report No. 37 Older Pedestrians: A Critical Review of the Literature ~ DfT
- Shared Space, Safe Space ~ Prepared by Ramboll Nyvig for Guide Dogs for the Blind Association

(See Bibliography for full reference details)

The aim of Birmingham's Table of Considerations for people with disabilities is to be an easy-to-use checklist to aid developers and designers, so it is essential it be kept as simple as possible, with key words and phrases to prompt the designer to ensure they are doing all they can to cater for all users. The detail and full explanations of the design considerations are contained in a more detailed spreadsheet, the **Design Reference Guide**. The Table of Considerations condenses the contents of the Design Reference Guide into the user-friendly checklist. It is recommended that the Table of Considerations always be used in conjunction with the Design Reference Guide.

The aim of the Table of Considerations and the Design Reference Guide is not to re-write or replicate existing policy or approved guidance, but rather to be a single go-to point of reference for designers and developers.



Each full design consideration within the Design Reference Guide lists the relevant source documents which should be referred to for further design policy, standards, full recommendations and overarching principles.

Monitoring

As part of the strategy we need to develop a picture of what 'success' looks like and how that can be measured and monitored, ensuring that we focus on positive impacts on *people*, rather than simply 'counting' infrastructure and services introduced which cater for people with disabilities as a purely quantitative measure of success.

In "Fulfilling Potential: making it happen for disabled people" the Government has identified a number of indicators for the success of policies, services and care for people with disabilities. It includes a specific indicator for transport:

• Transport Headline Indicator: Access to Transport - The proportion of disabled people who do not experience difficulties using transport.

The technical report notes⁶ "In 2011 78 per cent of the disabled population stated that they had not experienced difficulties in using public transport. This figure has improved over the years, increasing by 5 percentage points since 2005." The indicator uses data from the ONS Opinions and Lifestyle Survey, which is updated annually, however, this may not include people who do not even try to use public transport.

For qualitative and quantitative measures we have a wide range of indicators which can be utilised, including:

- Use of concessionary bus passes by people with disabilities;
- Disabled parking spaces utilisation;
- Blue Badge applications and use;
- Ring & Ride passenger trends;
- Percentage of streets and pavements meeting key accessibility standards;
- Public health key indicators on wellbeing, mobility, etc. for the target groups.

Working with groups representing people with disabilities we could establish a set of key performance indicators that relate to Birmingham and its communities to assess how the council, transport providers and others are delivering on the promise of accessibility for all.

⁶ Fulfilling Potential – Making it Happen: Technical Annex Fulfilling Potential – Disability Outcome and Indicator Framework, July 2013, DWP







Birmingham City Council

Bibliography

Action on Hearing Loss (2011) Access to public transport for people with hearing loss

Action on Hearing Loss (2011) Access for road users with hearing loss

Applying Inclusive Design Principles to Eco-town Development (2009) Town and Country Planning Association

Birmingham City Council (2006) Access for People with Disabilities supplementary planning document, BCC

Birmingham City Council (2012) Car Parking Guidelines SPD, Birmingham City Council

Birmingham City Council (2006) Disability Equality Scheme 2007 - 2010, Birmingham City Council

Burton E & Mitchell L (2006) Inclusive Urban Design, Elsevier

CABE. (2008) Inclusion by design Equality, Diversity and the Built Environment, Seacourt Ltd

Centro (2014) Getting Around Access Guide, Network West Midlands

Centro (2014) - Our Equality Commitment, [Online] <u>https://www.centro.org.uk/about-us/equality/</u> [Accessed September 2014]

Chartered Institution of Highways & Transportation (2010) Manual for Streets 2, Chartered Institution of Highways & Transportation

Cheshire County Council. (2005) Pedestrian Access & Mobility – A Code of Practice

Childs CR, Boampong DK, Rostron H, Morgan K, Eccleshall T, Tyler N. (2009) Effective Kerb Heights for Blind and Partially Sighted People, Guide Dogs

Department of Environment, Transport and the Regions (1998) Guidance on the use of Tactile Paving Surfaces, DETR

Department for Transport (2005) Inclusive Mobility, HMSO

Department for Transport (2007) Manual for Streets, HMSO

Department for Transport (2011) Mobility scooters and powered wheelchairs on the road Annex B "Voluntary Code of Best Practice - Confederation of Passenger Transport", Department for Transport

Design of buildings and their approaches to meet the needs of disabled people – Code of practice (2010), British Standards

Dunbar G, Holland CA, Maylor EA, (2004) Older Pedestrians: A Critical Review of the Literature, Department for Transport

Equality Act (2010), HMSO

Fleck J. (2006) Designing An Accessible City, City of London

Guide Dogs (2010) Inclusive Streets: Design Principles for Blind and Partially Sighted People, Guide Dogs

Inclusive Streets: Design Principles for blind and partially sighted people, (2010) Guide DogsJMU Access Partnership (2007) Designing for Disabled People in Home Zones, JMU

International Transport Forum (2009) Cognitive Impairment, Mental Health and Transport, OECD

Mitchell L, Burton E, Raman S (2004) Neighbourhoods for Life, OCSD Cities

Network West Midlands (2012) Getting Around Access Guide - A guide to accessible public transport in the West Midlands, Network West Midlands

Ramboll Nyvig. (2006) Shared Space >>> Safe Space, Guide Dogs

Shared Surfaces in town centres (2007) Guide Dogs





World Health Organisation (2007) Global Age-friendly Cities: A Guide, WHO







Appendices

This Report Has Been Prepared by the Birmingham Connected Technical Study Group





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