

Department for Transport

Analysis of Cost Factors for Accessibility Planning in Greater Manchester

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Executive Summary

Cost is one of the most important barriers to access and it is important that it is fully considered in accessibility planning. National data restrictions limit the ability to include cost factors within national indicators of accessibility so it is particularly important for local assessments to be made of cost factors. This report has been prepared to illustrate the different approaches, which could be useful for considering cost factors successfully.

The main instruments to reduce the cost of public transport are concessionary fares and transport cost re-imbusement e.g. the hospital travel cost scheme. However these are often not always successfully targeted at the most needy groups, and boundary problems are apparent for many people. A clear analysis of who benefits from existing schemes, and identification of the scope for extension of schemes to cover other people groups or geographical areas is therefore needed.

Research shows that cost constraints are often most critical for work, learning and leisure trips. This analysis of cost factors should consider:

- Boundary issues
- Affordability by people group defining: who is affected by proposed transport and other service delivery changes, how often they are affected taking account of travel patterns and other available choices, and how significant the anticipated changes are for the group in particular in relation to defined local or accepted national affordability thresholds.
- The sensitivity of costs to provision by any particular mode or operator.
- The relative importance of cost compared to other accessibility barriers.

Although not as straightforward as travel time to consider in analytical terms, analysis and mapping of cost using the sort of data generally available within most local authorities can yield useful information which would not be clear purely from qualitative survey work in the area. Overlaying fare stage data on maps of travel time based accessibility can reveal differences in the cost and time surfaces, which have a material effect on the identification of gaps in public transport network coverage.

Although the quantitative accessibility indicators used in the pilots were largely limited to travel time, the actions put in place sought to overcome cost, information, administration, and other barriers. Robust analysis of cost factors using the techniques identified in this report should ensure that such action is targeted as effectively as possible.

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1.0 Introduction

- 1.1 In piloting accessibility planning in Greater Manchester detailed mapping of travel time was used to inform the accessibility audits. However travel time is not the only barrier to accessibility, and many other factors were identified which were not analysed in detail. These included: information, security, physical access, cost and reliability. This report discusses approaches for considering cost factors in greater detail.
- 1.2 The report has been prepared to illustrate the different approaches, which could be useful for considering cost factors. Although cost is analysed in this report in isolation from other factors, this does not mean that combinations of factors are not also important. However to assess these combinations, PT costs need to be related to the journey purposes, person types and travel patterns that are relevant to the local accessibility concerns. This prioritisation needs to be undertaken by accessibility planning partners in the Greater Manchester area.
- 1.3 This report is therefore concentrates on defining a menu of concepts and techniques, which could be used to ensure that cost can be adequately considered in the analysis.

Approach

- 1.4 The approach to this project has been to:
 - Review the literature about cost as a barrier to access.
 - Identify conceptual approaches to consider cost barriers within accessibility planning.
 - Consult with Greater Manchester PTE to identify practical ways to use existing evidence to understand problems and plan improvements.
- 1.5 The report has been prepared by DHC and the Transport Studies Group at the University of Westminster.

Cost within the GMPTE Pilot

- 1.6 Although the accessibility planning pilot was focused on access to learning in Wigan, this research on cost factors is set in the context of the wider GMPTE area. In order to examine cost in more depth, this report takes a broader view of known issues across the area. It should help to identify approaches, which can be used within the Wigan access to learning plans, within GMPTE more generally and provide wider lessons for the roll-out of accessibility planning across England.

- 1.7 Although the quantitative indicators used in the Wigan pilot were largely limited to travel time, the measures put in place through the action plan sought to overcome information, administration, and other barriers. This is symptomatic of the accessibility planning process which seeks to identify the best available qualitative and quantitative evidence to target action.
- 1.8 In the same way, progress in monitoring accessibility changes are likely to focus on travel time, where data are more readily available, but this does not mean that cost will not be at least as significant a barrier as time. Therefore it is very important for the local assessments to include detailed consideration of cost issues to ensure that action is effectively targeted.

2.0 Cost as a Barrier to Accessibility

- 2.1 The SEU interim report¹ identified cost as one of the three most important barriers to access for people experiencing or at risk of social exclusion. It identifies the key cause of this as the steady rise in the cost of bus fares (over 30 per cent) since 1985.² It is interesting to note that a typical public transport trip by any mode in Britain costs 15 per cent more than in Germany, 60 per cent more than in France and nearly three times as much as in the Netherlands.³
- 2.2 Travel costs for some groups are a much more significant barrier than for others. For example access to work for low paid or part time employment will only be practical if fares are low enough to make the employment option attractive. Local surveys are needed to define limits on what people will be prepared to spend on travel but as a general rule of thumb people will not spend more than 10% of their income from employment on accessing the employment^{4 5}.

Concessionary fares

- 2.3 The main instrument used to reduce the cost of public transport for target people groups is concessionary fares. Current arrangements mean that local authorities have a statutory obligation to provide half price fares to people over 65 years and with certain disabilities regardless of their income. In Greater Manchester concessions apply to over 60s but there is a general issue across England that eligibility is restricted to residents, and that boundaries do not always reflect travel needs, particularly where people live near authority boundaries.
- 2.4 However, more importantly other social groups, who are in many cases experiencing far greater financial hardships and travel burdens are not automatically eligible for concessionary fares. Although the legislation now allows for other categories of individuals to be included within concessionary fares, the evidence from the pilot studies suggest that most will not opt to offer these more widely to other 'in need' groups due to the considerable financial burden already placed upon them by the statutory arrangement.
- 2.5 Research has shown (e.g. EPSRC⁶, Lucas et al 2001⁷) that boundary effects place significant limitations on those people who are eligible for

¹ SEU (2002) Making the Connections: transport and social exclusion: Interim report

² Grayling, T et al (2001) *Any More Fares?* IPPR

³ CfIT (2001) European Best Practice in Delivering Integrated Transport Key Findings

⁴ Transport Studies Group *EPSRC Social Accessibility Mapping Project (in progress)*

⁵ ONS (2002) Family Expenditure Survey

⁶ Transport Studies Group *EPSRC Social Accessibility Mapping Project (in progress)*

concessionary fares from accessing a variety of key destinations that are physically closest to them but lie outside the administrative boundaries of the area in which they live, and so outside the scope of their concessionary fares. The effect is either significantly longer and inconvenient journeys to the places that are within the administrative boundary, or an increased financial burden to get to more convenient destinations in the adjacent authority.

- 2.6 The half price concession also offers no guarantee of parity in the cost of access in different parts of the country, since operators can set their own fare levels. Thus in some cases the concession may reduce the fare to 50p where in other instances £1.00 may be charged for a half price fare. The issue of fare disparity (i.e. where the fare to travel the same distance is different in different parts of the country) is a more general problem, which accessibility planning should aim to identify and address.
- 2.7 Equally, the time restrictions placed on concessionary fares mean that job seekers and low paid workers are prevented from accessing employment in the early morning. Many elderly people cannot afford to pay the full fare that is required to access early morning hospital outpatient, dentist and doctor's appointments, which may only be available to them at this time of the day.
- 2.8 For school children, the concessions offered by commercial operators are sometimes not available for the journey to school. This can also prevent some pupils from low income families attending schools outside their areas. This can restrict choice in the availability of educational opportunities for these pupils. The issue is particularly live at the present time with the introduction of the 16-19 curriculum (see under Education below).

Employment

- 2.9 The cost of public transport fares, or motoring costs, particularly affect travel to interviews and work. It is estimated that one in four people is inhibited in their job search by the cost of travel to interviews.⁸ Surveys in Nottinghamshire identified that the cost of public transport was the second most reported difficulty faced by respondents when attempting

⁷ Lucas K, Grosvenor T. and Simpson R. (2001) *Transport, the environment and social exclusion* York Publications Ltd.

⁸ McKay, S et al (1999) *Unemployment and Jobseeking after the Introduction of Jobseeker's Allowance*, Department of Social Security (DSS) research report 99. Almost 40 per cent of job seekers say that their job search has been limited because of the costs involved. For 63 per cent of them, this results from the cost of travelling to interviews.

to access employment (32%)⁹. However, limited willingness/ability to pay was identified as a factor in Tyne and Wear with jobseekers considering that the Metro offered better value for money than bus services. Although willingness to pay is a complex combination of cost and other factors including travel time, it was clear that cost was an important contributory factor affecting job search boundaries to vacancies within the vicinity of Metro stations.

2.10 Other employment issues to consider are that:

- Many concessionary fare schemes are only valid for use in the off-peak so it cannot be assumed that people with disabilities will be able to use public transport to get to work when considering the cost of travel for this group.
- Evaluation of the welfare-to-work programme has shown that 14 per cent of out-of-work lone parents consider that they couldn't afford the cost of transport to work¹⁰.

Education

2.11 Transport costs are the largest expenditure associated with participation in post-16 education.¹¹ In 1999, the average annual (education-related) transport costs for 16 to 18 year olds was £371 (around £10 per week during term time). Nearly half of 16 to 18 year old students say they find their transport costs hard to meet.

2.12 The Education Maintenance Allowance (EMA) evaluation shows that a significant proportion of young people use their allowance to subsidise transport costs. Six per cent of students have missed college at some point in the previous year because they could not afford transport costs.

2.13 The problem of accessing breakfast clubs, after-school activities and work placements has been highlighted in research. In some areas, the problem is simply that students do not have funds available for the cost of the bus fare home.¹²

⁹ The greatest restrictions was the operating times of public transport (37%) and the third was lack of awareness of transport links (32%) were also major barriers. Cost was identified as the greatest issue by women respondents.

¹⁰ Green, A et al (2000) *First Effects of ONE*, DSS research report 126

¹¹ Callender, C (1999) *The Hardship of Learning* South Bank University

¹² SEU (2002) *Making the Connections: transport and social exclusion: Interim report*

Healthcare

- 2.14 There are few instances in the literature where cost emerges as a more important issue than journey time for access to healthcare services. However:
- The SEU report found that twenty-three per cent of people who use mental health services say that financial problems have restricted their ability to access these services.
 - The Hospital Travel Cost Scheme is often not publicised effectively so some people from low income households may not be aware that they can have their costs re-imbursed.
- 2.15 For healthcare, the perceived cost barriers are therefore, in practice more often information barriers.
- 2.16 However, interviews with health workers in rural Lincolnshire, emphasised the importance of taxis in providing transport to surgeries and to hospital, and that older people on benefits were particularly disadvantaged because they did not feel comfortable claiming costs back, as they are entitled to do. Also a group of older people identified that, while Dial-a-Ride and Call Connect have reduced health journey costs compared to taxis, affordability is still an issue.
- 2.17 However healthy living depends on access to a much wider range of activities, which can often be omitted in accessibility planning or incorrectly viewed as unimportant. For example: older people on benefit, particularly those who have multiple health problems such as diabetes, or who need attend to incontinence clinics, or to attend a gym or swim regularly, can face real cost barriers to undertaking these activities from travel costs.

Food shopping

- 2.18 For food shopping there is a trade off to be made between the cost of travel and the cost of the foodstuffs. Some research has suggested that basic foods can cost as much as 24 per cent more in small stores than in big supermarkets.¹³ In the Wiltshire food pilot¹⁴ the following method was used to assess the relative affordability of accessing two different food stores for residents without a car. The total component cost was calculated on the basis of:
- Shopping cost

¹³ Dowler, E et al (2002) *Poverty Bites: Food Health and Poor Families* Child Poverty Action Group

¹⁴ DfT 2004. *Developing and Piloting Accessibility Planning – Final Report*

- Bus Fare
- Value of Time (£4.35 per hour in DfT Transport Economics Note).

2.19 Even if the value of time costs are excluded there are still significant cost impacts of location choice, as illustrated in Table 1.

Table 1 – Comparison of Whole Trip Food Shop Costs

| | Tesco Salisbury | Waitrose Gillingham |
|---------------------------------|------------------------|----------------------------|
| Depart Mere | 09:15 | 10:15 |
| Arrives at Mere | 13:53 | 12:38 |
| Duration | 4:38 | 02:23 |
| Value of Time/Hour | £4.35 | £4.35 |
| Cost of Time | £20.14 | £10.37 |
| Cost of food shop ¹⁵ | £21.29 | £33.58 |
| Cost of fare | £2.25 | £1.25 |
| Total Cost | £43.68 | £45.20 |

¹⁵ Based on the same basket of items at each store

3.0 Methods of Analysing Cost Factors

- 3.1 There are three main factors that need to be considered when analysing cost:
- Boundaries defined by ticket types, administrative factors, or limits of data/knowledge.
 - The cost of travel varies by people group, and eligibility for different ticket types affects accessibility.
 - Costs of travel can be different between two locations depending on the mode or bus operator chosen.

Boundary Issues

- 3.2 There are various ways that boundaries determine travel costs:
- Zone cards and tickets only allow travel within a defined area.
 - Concessionary ticket schemes similarly only allow subsidised travel within a defined area.
 - Administrative criteria may subsidise or pay for travel within defined areas for specified people groups. Examples of this are school travel, and the hospital travel costs scheme.
- 3.3 Some of the most important accessibility barriers arise when these boundaries are not co-incident. For example hospital catchments often do not coincide with concessionary travel schemes based on local authority boundaries.
- 3.4 People who are dependent on opportunities outwith their local administrative areas are often unable to benefit from concessionary travel schemes depending on the local rules applying to the administration of the scheme.
- 3.5 Mapping boundaries under each of the relevant categories above and perhaps overlaying these on time based accessibility maps by trip purpose, particularly for key destinations, should reveal any local anomalies in accessibility assessments. Such mapping can easily be achieved where GIS based data showing zone boundaries is readily available. In most authorities GIS boundaries will have been created for other purposes such as publicity and marketing leaflets and these can be imported to the accessibility models which incorporate GIS techniques e.g. ACCESSION.

People Group

- 3.6 Discounted fares for different groups of people and different discounts by time of day complicate any analysis of travel costs. Someone given a hospital appointment in the off peak period may be able to benefit from discounted fares that would not be available had travel in the peak period been necessary. It is therefore necessary to consider different people groups separately and in some cases to consider whether there are constraints that mean that peak period travel is essential. Mapping travel costs for elderly people, other adults and young people, and for peak and off peak periods will identify the main groupings for most areas, based on general availability of concessionary travel schemes, but other local schemes may also need to be considered e.g. where employers provide assistance with travel to work costs.
- 3.7 People are sometimes described as facing hardship if for any essential household expenditure they need to spend more than the average of households in the lowest three income deciles¹⁶. To assess whether transport costs for any deprived group meet this hardship criterion, data from the Family Expenditure Survey can be used to identify expenditure by the relevant groups and sample sizes for such analysis should be sufficient at a regional level¹⁷.
- 3.8 Although income bandings in the National Travel Survey do not allow people to be classified in quite the same way, an analysis of travel costs for public transport trips, comparing low income groups with the average costs by trip purpose, shows that access to learning incurs the greater hardship than for work, health or food (Table 2), since for this purpose costs per trip higher for low income travellers (£0.89) than for the average traveller (£0.59). These higher costs are likely to be as a result of many education institutions being located in places which are not easily accessible by public transport, particularly from deprived areas.

Table 2 – Average Travel Costs by Trip Purpose

| Trip purpose | Average Travel Cost | |
|--------------|---------------------|--|
| | For All | for individuals with less than £9000 per annum |
| Work | £ 1.91 | £1.12 |
| Learning | £ 0.59 | £0.89 |
| Health | £ 1.14 | £ 0.99 |
| Food | £ 0.71 | £ 0.68 |

Source: National Travel Survey, 2002

¹⁶ Transport Studies Group *EPSRC Social Accessibility Mapping Project (in progress)*

¹⁷ Cain A and Jones P 2004. Could Congestion Charging cause Hardship to Low Income Car Users? University of Westminster (unpublished paper).

3.9 When implementing changes it can be important to assess the affordability for each sector in society. This can be achieved by considering:

- Who is affected by the change
- How often they are affected e.g. need to make an extra journey weekly.
- Do they have other choices or behavioural responses, which would mitigate adverse impacts.
- How significant are the anticipated changes in cost in terms of overall transport expenditure and do transport costs rise above defined local or accepted national affordability thresholds e.g. as estimated from the Family Expenditure Survey as discussed above.

Modes and Operators

3.10 There are significant differences in fares between operators that need to be considered in accessibility planning. These occur as a result of different operators targeting different markets. Some bus operators concentrate on local travel markets and compete with larger companies using lower fares on specific routes to local destinations. One trip purpose may be able to use the cheap local operator for access to local food shops but for access to the health centre there may be no local service and a more expensive fare structure for a trip of a similar length may be needed. There is therefore sometimes a need to look at single modes or services by each transport operator to identify locally specific accessibility opportunities based on cheaper fare options.

3.11 To define the sensitivity of costs to modes and operators, a good starting point is to take the standard multi-operator multi-modal fare or equivalent default ticketing option where this is available and consider what if any savings in travel cost result from:

- Limiting mode use to one mode (e.g. bus only, excluding rail), if this enables a cheaper type of ticket to be purchased.
- Limiting the traveller to one operator only (particularly bus operator). Again, in some urban areas it is cheaper to purchase a return ticket for the same operator, than to buy two singles or a multi-operator return. However, in many areas single operator tickets are all that are available so this will be the starting point.
- Mapping costs which require interchange assuming that separate tickets need to be purchased for each stage of the journey.
- Limiting the traveller to one bus trip only, without interchange. This will restrict the destinations which can be reached.

3.12 In the GMPTE area there is an extensive rail/light rail network that can be unaffordable to anyone on a low wage wishing to travel at peak times. Such analysis would therefore identify locations with a high sensitivity to modes and operators, allowing a disaggregate approach to be taken to needs assessments. These approaches could look at whether specific ticketing or other products are needed to ensure a network coverage which is both practical and affordable for all groups, whilst reflecting the benefits of choice and competition within the transport supply.

The relative importance of cost

3.13 Cost and time are the two factors used in most transport modelling to define the transport options available. For transport demand models, such as those used by DfT and others for the analysis of transport economic efficiency, time and cost are usually combined using average values of time to derive generalised costs or time for use in trip distribution, mode choice and assignment modelling. Although this works reasonably well for demand modelling, this option is not attractive for accessibility planning since:

- It is not a very 'transparent' approach being unsuitable for the high degree of disaggregation by people group and trip purpose needed within accessibility analysis.
- Values of time vary significantly across the people groups being considered, so important barriers can be hidden.
- It does not help to identify the nature of the accessibility problem faced since poor accessibility can be due to high travel times or high fare levels, and it is important to know which, in order to adjust policies accordingly.
- Demand modelling generally uses crude assumptions about fare costs using defaults based on distance (e.g. 20p per mile). Although many fare tables are based on distance factors there is generally little added value to be gained in accessibility planning from the effort involved in mapping distance based costs since the travel time mapping generally gives a better picture of this geography in any case.

3.14 Transport Direct has plans to assemble a database of public transport travel costs, FareXchange, to parallel the travel time database used in Traveline. There is currently no indication when this might be completed but this could allow a more consistent national approach perhaps combining travel cost and time within national indicators. From separate analysis of cost and time it may not always be clear which is acting as the more important barrier so there could be

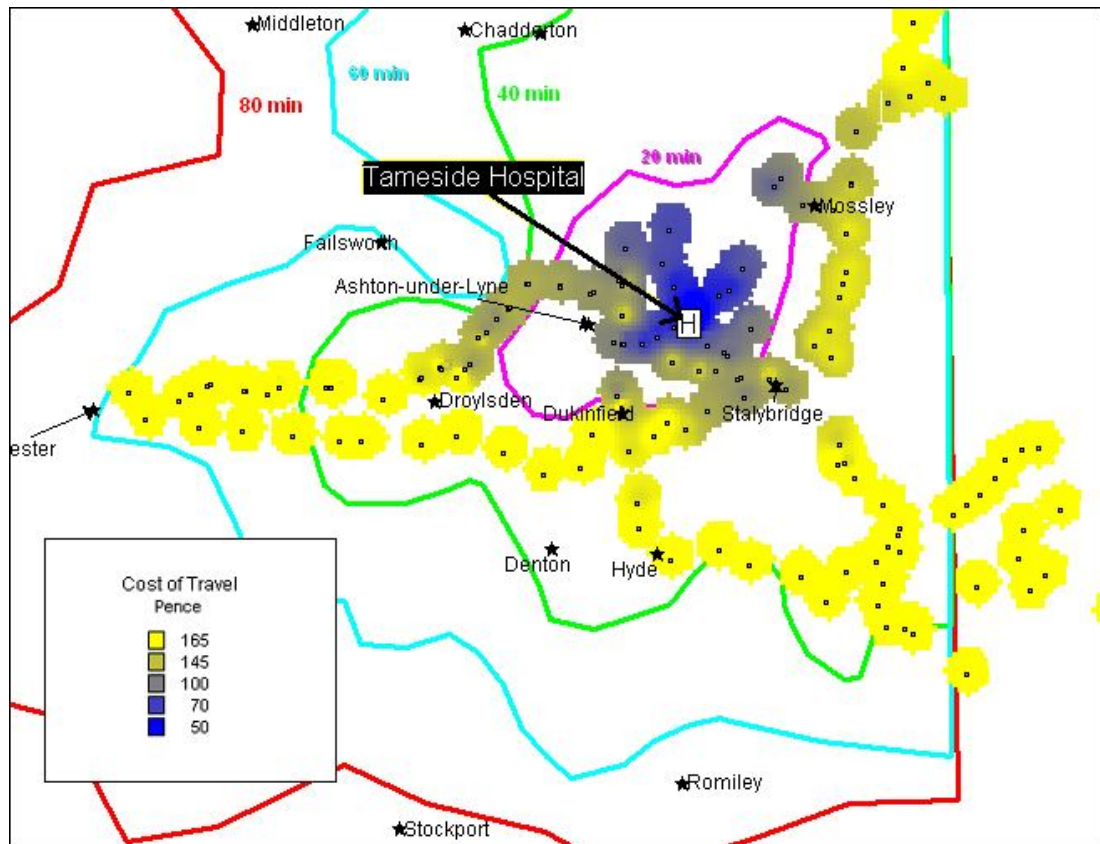
advantages in a combined approach once the FareXchange data is available.

- 3.15 However in most local situations, the complex dependencies between cost and time factors merit detailed local analysis of the way they affect decisions by specific people groups about which destinations are accessible. Local calibration of the relationships between travel time and travel choices will be particularly important.
- 3.16 At present it is important to recognise that travel time alone cannot describe the travel choices, and it is better to map the cost element of deterrence separately from travel time element. This should help to identify whether time or cost places greater restrictions on access for any group of people or location. The mapping should be able to show which is the binding constraint at different points.

4.0 Cost Mapping for Greater Manchester

- 4.1 The lack of readily available cost data meant that a targeted approach was needed to the analysis of cost factors. Rather than analysing costs from all locations to all other locations (as for the time based analysis), the analysis needs to focus on accessibility from selected priority locations so that cost data can be extracted from appropriate fare tables.
- 4.2 For this project, based on local policy concerns Tameside Hospital was chosen by GMPTE as a destination to use in the mapping of accessibility to compare the time and cost of journeys. Data on the fare stages and costs from these stages, for travel to Tameside Hospital were obtained for following bus services: S37, 220, 232, 233, 234, 235, 239, 397, 352.
- 4.3 Costs were calculated on the basis of a single journey to the hospital from each fare stage. As it is likely that the majority of trips made to the hospital are same day returns (i.e. out-patients, visitors, staff) the journey was treated as a 'half return'. For more expensive journeys (more than a 1.65 single) it is more economical for users to purchase an "all operators" day saver ticket (£3.30). Therefore single trip costs were given an upper limit of £1.65 (half of the £3.30 daysaver).
- 4.4 Fare stages were mapped by cost (shown as coloured circles representing 500m radii around fare stage bus stop locations) and overlaid onto a map showing the travel time to Tameside Hospital from all locations in the GMPTE area. These are shown as figure 4.1.

Fig 4.1 Time / Cost to Tameside Hospital



4.5 The geographic spread of cost and time access is different. For example, Stalybridge and in particular Dukinfield perform worse in terms for cost access, relative to other areas of similar travel time (e.g. the areas directly north of the Hospital). It is clear that time access mapping alone will not demonstrate these variations to access so detailed separate consideration of cost is needed.

Concessionary fares

4.6 There is blanket coverage of concessionary fares in the area. Eligible passengers pay either the standard concessionary fare, or half the adult fare whichever is lower, inside the Greater Manchester Boundary. Eligibility for these fares is available for those over 60 and adults with serious walking difficulties. People who are partially sighted or have impaired hearing or learning difficulties travel free.

4.7 The geographical spread of accessibility cost components for concessionary fare travellers is therefore broadly similar to that for other travellers but the relative importance of cost is lower and ceiling costs kick in at a shorter distance. This is likely to be balanced by the fact that concessionary travellers have lower disposable incomes and

lower values of time. It is beyond the scope of this work to look at the relative importance of time and cost for each people group.

5.0 Conclusions

- 5.1 This report demonstrates that cost is a very important factor in accessibility planning and can act as a significant barrier to social inclusion.
- 5.2 Although not as straightforward as travel time to consider in analytical terms, analysis and mapping of cost using readily available data for most local authorities can yield useful information which would not be known purely from qualitative survey work in the area.
- 5.3 Overlaying fare stage data on maps of travel time based accessibility indices reveals differences in the cost and time surfaces, which have a material effect on the identification of gaps in public transport network coverage.
- 5.4 For the purposes of mapping, cost and time are best considered separately since it is difficult to generalise about the relative importance of these factors for different trip purposes, locations and people groups.
- 5.5 Mapping concessionary fares boundaries and travelcard zones could provide further evidence on how to target solutions through ticketing schemes and concessionary fares, and should be straightforward for authorities which have already created zone boundaries within a GIS environment.