1. INTRODUCTION

1.1 The Role of Public Transport

Improvements to local public transport are increasingly seen as a catalyst to achieving the development objectives of regional, national and European-level strategic policy. The provision of an integrated and accessible public transport network is considered an essential requirement to cater for the growth of our city regions, to tackle the increasing pressures of traffic congestion and to promote a more dynamic and socially inclusive society. A combination of different elements is necessary for the constraints that continue to hinder the development of attractive and efficient urban and regional public transport networks to be overcome (SEU, 2003).

A series of actual and perceived barriers to the use of public transport have been identified, which affect different user profiles to varying degrees of significance. Understanding the role and interaction of these barriers is fundamental to ensuring the optimum design and implementation standards of public transport schemes on the ground.

1.2 Interchange

Journeys which involve interchange represent the area of travel by public transport where the greatest number of barriers exist that prohibit service contemplation and use. Public transport users perceive interchange in terms of how they make choices and trade-offs in travel cost and time, and the influence particular interchange attributes may have over these travel choices (SECRU, 2001). The significance of a high quality interchange environment in achieving an integrated public transport system conducive to the development of ‘seamless’ public transport journeys is therefore paramount.

Whilst improvements to the standard of infrastructure and quality of service are seen as prerequisites to enhanced travel, ‘softer’ elements of the journey are often overlooked. This paper examines the additional value of enhanced provision, together with the requirements needed to make the convenience and understanding of public transport use more comparable to that of the car. In this way, the more negative perceptions and behaviour towards public transport may start to be overcome.
1.3 Study Area Characteristics

The East Lancashire area to the north of Greater Manchester in North West England is typical of a European sub-region. Its location on the periphery of a major regional centre makes it comparable to similar city regions throughout the UK and Europe.

In many ways, the area may be considered to benefit from the relative proximity to the jobs and opportunities available within Greater Manchester, as one of the largest conurbation in the UK outside of London. However, its geographic and political division from Greater Manchester means that it fails to benefit from the more integrated approach to public transport that is presented in the UK’s major urban centres, whilst users often suffer penalties associated with cross-boundary travel. The 2,500,000 residents of Greater Manchester’s ten metropolitan districts, for example, are able to benefit from multi-operator ticketing across bus, rail and tram services provided within the authority. However, no similar scheme currently exists for the residents of the East Lancashire sub-region to the north.

Figure 1 The East Lancashire sub-region
East Lancashire comprises a population of 517,000, distributed across five districts or boroughs which fall within the wider county of Lancashire, in addition to the separate unitary authority of Blackburn with Darwen. Both Lancashire County Council and Blackburn with Darwen Borough Council provide financial support for public transport services to complement the commercial public transport network. They also coordinate, develop and promote public transport across the area, maintain bus stations and stop infrastructure, and finance concessionary fare schemes for eligible residents across the region.

The area’s traditional manufacturing centres suffer from deprivation, poor health and housing and lower than average levels of educational qualifications. The more affluent northern, rural districts have much higher levels of good health, income and car ownership. The existing public transport network is centred along the main transport corridors between the principal urban areas, with key interchange locations located at Blackburn, Accrington and Burnley. Connections are also available from these centres for bus and rail travel into Greater Manchester.

Figure 2  East Lancashire principal centres and road network
The role of an integrated transit system for East Lancashire is comprehensively recognised in regional and local policy documents as an essential element for securing the region’s future prosperity and development.

2. UNDERSTANDING THE PROBLEM

2.1 Consultation Programme

The initial stage of the study required extensive market research to investigate all areas of consideration linked to travel, including not only the journey itself, but also the decision making process involved prior to making the journey and even deeper rooted decision making fundamentals such as cultural and political grounding.

This market research included some 200 in-depth household interviews with a broad ranging demographic of individuals from both urban and rural communities across the study area.

In addition, a series of focus groups were held with various discrete user groups exhibiting specific attitudes, perceptions and behaviour towards the use of public transport as a means of accessing their needs. Each group comprised both car drivers and regular public transport users in order to gauge a full appreciation of the differences between such individuals. Eight different groups were held in total, specifically including:

- elderly travellers;
- those who are unemployed;
- those in full time education (aged 15-16);
- those in further education (aged 17-19);
- representatives from a rural community;
- those in full time employment;
- women with young children; and
- representatives from ethnic minorities.

The final element of market research involved a series of mystery traveller surveys, whereby a member of the public recruited from the earlier stages of the consultation was asked to undertake a journey by public transport that they would normally undertake by another means. Their experiences and attitudes both on the journey itself and in researching the journey prior to carrying it out were noted, allowing a comparison between the perceptions of non-users with actual service experience.

2.2 Consultation Findings

The consultation process identified a number of factors which may contribute towards both actual and perceived barriers to public transport use. These factors were found to be underpinned by a series of common themes, namely:
• time;
• cost;
• personal safety;
• accessibility; and
• familiarity.

Barriers derived from these common themes occur as part of three distinct phases during the journey process, as demonstrated in Figure 3.

**Figure 3  Understanding the journey process**

A number of underlying factors were identified that often deter people from using public transport even prior to assessing its merit. Beyond such underlying core issues are more specific barriers that become apparent when planning a journey. These barriers may equally prevent travel by public transport, assuming a viable, attractive alternative is available. Thirdly, further barriers can become apparent even if the journey in question is undertaken. These can be derived from unsatisfactory experience during the course of the journey and may feed back into underlying factors which may then prevent public transport consideration in the future.

The relevance and limitations these barriers may have towards individuals is found to be highly dependant on the profile of the traveller and the journey which is required to be undertaken. Whilst all are likely to recognise the principal underlying factors in some way or another, their overall impact and influence through more specific barriers in planning and undertaking journeys may vary. Key issues for each group are highlighted in Table 1.
2.3 Significance of Interchange

The barriers identified in Figure 3 become more prevalent when interchange between services is necessary. Interchange not only takes more time, but often adds additional costs, raises questions regarding personal security, influences degrees of accessibility and compounds problems associated with a lack of familiarity.

Further market research conducted in Blackburn and Burnley found regular public transport users to interchange between services at least 2.5 times per week. Furthermore, since the development of an extensive public transport network where all destinations may be accessed without the need for interchange is unfeasible, the barriers which deter travel through making interchange less attractive need to be addressed.
2.4 Common Themes

As Local Authorities and public transport operators invest in new, high quality vehicles and supporting infrastructure, the public transport experience is gradually becoming more amenable to those travellers who choose to use it. However, many car drivers or those with alternative travel choices available to them continue to overlook the potential for using public transport due to a lack of familiarity and poor information provision that continues to exist, even amongst some of the more cutting edge public transport initiatives and environments that have already been developed.

Whilst the deregulated structure of public transport administration and regulation in the UK (outside London) can often complicate the public authority-led partnerships that are found to underpin the integrated systems operating elsewhere in Europe, progress can still be achieved under the appropriate leadership. Moreover, the needs of the passenger remain unchanged whether using a deregulated, franchised or public operated system, and as such a unilateral approach to marketing the use of public transport is appropriate whatever a region’s legislative background.

3. INTERCHANGE CHARACTERISTICS

3.1 Network Identity

Many examples of good practice in interchange design and perception exist, from which lessons may be learnt in applying similar characteristics to interchange environments elsewhere. Interchanging between services on the underground metro systems that exist in many European cities, for example, is often not perceived as unattractive or as a hindrance. An element of this may be attributed to the ‘closed’ nature of a metro system and the high frequency of services provided. However, it may also be attributed to the presentation of the network as an integrated whole using easy to interpret maps and lines, eliminating the need to plan journeys in advance and physically integrating different stages of the journey together.

Such practices result in the need to present the public transport network under a common brand or identity. Such a requirement presents particular problems in the UK’s deregulated bus market. However, privatised systems operating throughout Europe have sought to tackle such problems and examples exist of how corporate identities of individual operators may be amalgamated into a common cross-network brand which the public may identify as their integrated public transport service provider.

A key recommendation from this initial stage of research was to establish a ‘core network’ across the study area to connect all the principal urban centres through a series of inter-urban bus and rail connections. This ‘core network’ may then be marketed appropriately such that inter-urban travel is easily planned and undertaken by individuals travelling throughout the region. How this ‘core network’ then interacts with local services at key interchange...
locations requires special consideration in terms of integrating the inter-urban and local elements of the journey together, and is the subject of the subsequent elements of this paper.

3.2 Classifying Interchange Locations

The sheer range of different types and categories of interchange environment makes the formulation of good practice promotion and design more challenging. Through examining the different journeys individuals from across the study area were making, three different interchange locations were identified that were felt to be most representative of the varying interchange environments and situations that exist. These include:

- Burnley Bus Station, representative of a central bus-bus interchange;
- Darwen Rail Station, representing a peripheral bus-rail interchange; and
- Manchester Piccadilly, illustrating a multi-modal network hub of the regional public transport system.

The high quality infrastructure that currently exists at the interchange locations selected facilitates the isolation of the more informative barriers to interchange that are still required to be overcome.

4. PROMOTING SEAMLESS JOURNEYS AT LOCAL INTERCHANGES

4.1 Burnley as a Local Interchange

Burnley and its immediate surrounding area has a population of approximately 90,000. The bus station in the town is centrally located and was completely rebuilt in 2002, setting a benchmark standard in local interchange design. Whilst the new facility successfully seeks to eliminate the interchange barriers associated with cost, personal safety and poor quality infrastructure, a series of informative barriers is noted to exist that continue to inhibit interchange through the disjointed perception of interchange journeys and poor levels of integration, both through the informative approach adopted and associated measures observed on the ground.

4.2 Informing the Interchange Traveller

Passengers undertaking an interchange journey rely on information from a variety of different sources to generate the awareness and confidence required for a particular journey to be carried out. The interchange journey as perceived by the passenger is a means of getting from a particular origin to a specific destination. This incorporates not only the in-vehicle time and period of connection, but also includes access to the initial departure point, egress to the final destination, the interchange environment itself and, most significantly, the physical and psychological connections that unify the different elements of the journey.
Whilst the existing timetable information and associated public transport literature found at Burnley and comparable interchange locations may permit the traveller to acquire the relevant information that is needed, its extraction and interpretation results in low confidence and uncertainty due to the necessary active decision making required by the passenger.

Adopting a passive approach to information requirements involves the recognition and presentation of interchange as an entire and tangible journey, thereby eliminating this decision making uncertainty. Through identifying probable journeys in their entirety, tailoring information provision to the specific requirements of the journey stage being carried out, and adopting a consistent and easily interpretable presentation format, the provision of seamless journeys can be realised.

4.3 Understanding the Interchange Journey

In order to identify the range of probable journeys carried out through such local interchange facilities, the individual journey stages that are found to occur through Burnley Bus Station were first identified. Journey stages that are found to occur in such facilities are demonstrated in Figure 4, and include:

- single outbound journeys made from the interchange (indicated from left to right along the upper bar of the diagram);
- single inbound journeys made to the interchange (indicated from right to left along the lower bar of the diagram); and
- two-stage journeys were interchange between buses is required at the facility (combining the inbound and outbound elements of the two journeys via the central hub).

The presentation of information should not only extract and highlight the key needs of the traveller at the appropriate stage in their journey, but should also compliment the development of a network brand identity portrayed as a means of travel between discrete and identifiable destinations. This requires consistency across the range of different media employed, ranging from literature and poster information to bus stop branding and route identity. Ideally consistent branding may be applied to vehicles themselves, although this is often prevented in the UK’s deregulated market, operated by varied private operators. More innovative ways to maintain a unified identity and livery across both marketing and infrastructure which incorporates elements of individual operators’ branding should be considered.
4.4 Promoting the ‘Local Network’

Whilst knowledge of the inter-urban network across a particular region may be relatively well developed through the promotion of a ‘core network’ and individual route marketing, awareness of accessibility opportunities to more localised attractors tends to be more restricted. With the majority of localised services in provincial towns such as Burnley being focused on a single interchange hub, it is felt possible to develop a standardised information strategy that unifies and integrates the ‘local network’ and its extent.

A ‘local network’ of key trip attractors and corridors radiating from the central interchange hub was first identified. Whilst much of this network is itself accessed using inter-urban services that serve local attractors on-route to destinations further a field, it remains necessary to psychologically separate this ‘local network’ from longer distance inter-urban destinations in order to ensure a comprehensive understanding of accessibility opportunities to specific local destinations is achieved. High frequencies also comprise a key requirement of the ‘local network’ and should therefore set such services aside from less frequent routes. In this way, the information strategy developed in one particular town such as Burnley may be adopted in similar local centres across a particular region. These standardised local networks may then be consulted by passengers from across that region attempting to reach destinations within specific local areas, with the trans-regional ‘core network’ connecting these mini-hubs via inter-urban bus and rail connections.
4.5 Developing ‘Seamless’ Interchange

The presentational style of information relating to the ‘local network’ is required to be both consistent and easy to interpret. Information is best taken in by the public when supplied in small ‘bites’.

The presentational style of information provision developed drew heavily from the good practice examples evident across metro and light rail systems operating elsewhere. This style involved assigning each corridor with a unique line name and colour so that its route and the destinations it serves may be easily followed on maps and signs throughout the public transport system. Simplified mapping, as shown in Figure 5, indicates the connectivity of the various lines and the location of attractors in the local area.

Figure 5  Presentational mapping approach to Burnley’s local network

This style of presentation may be repeated across the network and through all media outlets, incorporating journey times and distances as well as line connectivity and attractor locations. Where possible, easily recognisable symbols comparable to those used in road signing have been applied in order for swift recognition and maximum understanding, particularly amongst minority groups. Sources of further information should also be highlighted, including appropriate journey planning websites and telephone information lines.

When undertaking a particular journey, information provided on vehicles themselves is required to provide two key informative elements, namely:
• information regarding onward services from the bus station to facilitate seamless interchange from the inbound service to the outbound departure point; and
• information for the outbound traveller advising of the appropriate disembarking stop and journey time to their ultimate destination.

Through adapting this simplified ‘line-based’ style for individual corridors, whilst supplementing information regarding where onward services are available from within the central interchange facility itself, as shown in Figure 6, the on-bus requirements for both inbound and outbound passengers may be successfully satisfied.

**Figure 6**  Example of on-bus information for typical radial corridor

Whilst interchange information provided during the earlier stages of the interchange journey should provide all the necessary information required when interchanging, it remains necessary to provide additional information at the facility itself to reaffirm understanding and improve confidence amongst interchange travellers; and to inform those undertaking single outbound journeys from the bus station.

Information at the interchange is required to be concentrated at a central location within the likely footfall of passengers using the facility. This central ‘hub’ may thus automatically draw passengers arriving by bus at arrival stands.
and on foot from pedestrian entrances, and seamlessly signpost them to the appropriate departure stands for reaching their onward destination. The use of chevron floor markings may further increase the prominence of this central hub by physically connecting it to the arrival stands and pedestrian entrances throughout the facility.

Information at the departure stands themselves may provide more service-specific information, detailing appropriate routings, journey times and approximate costings to key destinations served.

**Figure 7** Interchange information poster produced for Burnley bus station for display at central interchange hub

To compliment this unified approach to information provision and branding, bus stop infrastructure along radial corridors is required to be branded according to line identity. Stop flags should be of a design consistent with branding used as part of the ‘local network’, whilst also incorporating other information regarding any inter-urban destinations for which they serve.

In addition to the information provided whilst undertaking their journey, the earlier stages of consultation revealed passengers to require pre-trip information prior to leaving their respective origin. This information allows trips to be planned in advance and provides a point of reference for undertaking new journeys with which the passenger may not be familiar.

This new approach to informing the traveller should be adopted comprehensively throughout the area. It is not uncommon for attractors in London or other cities served by an extensive metro system, for example, to

©Association for European Transport and contributors 2006
quote their nearest station and the lines served for passengers wishing to access that location by public transport. Similarly, ‘how to get to…’ guides for hospitals and other key local attractors in Burnley and comparable local centres should refer to the appropriate line and corresponding departure stand in the bus station for ease of recognition by the public. Personal travel planning that may be employed to reach employment or leisure destinations should also adopt a similar approach using this revised information strategy and ‘local network’ concept.

Knowledge of the ‘local network’ and the way public transport is considered and referred to should change over time to reflect a more comprehensive understanding of network familiarity and extent, increasing confidence in local bus services and further minimising the barriers associated with the interchange process that currently exist.

5. PROMOTING SEAMLESS JOURNEYS BETWEEN BUS AND RAIL

5.1 Interchange Limitations

Darwen Rail Station was chosen as a peripheral interchange location synonymous with the barriers that are evident when interchanging between bus and rail modes. As such, the findings that are noted may be considered appropriate to similar peripheral bus-rail interchange locations across the UK and Europe.

Bus-rail interchanges often represent locations where accountability for management, maintenance and service coordination may fall under the responsibility of several organisations. This may be further exacerbated in instances where additional interchange facilities, as in the case of Darwen Bus Station, are located a short distance away.

Aside from the inadequate provision of any infrastructure that may be apparent, research undertaken as part of this study revealed many such interchanges to suffer a range of further barriers and constraints to interchange, including:

- insufficient integration of bus and rail services into a combined network;
- poor synergy with bus and rail departure profiles;
- poor on-street signing and integration between departure points; and
- insufficient information provision integrating bus and rail modes.

The danger of poor coordination between different managing organisations and insufficient integration of information provision and service operation may result in the creation of physical, organisational and perceptual obstructions to the creation of ‘seamless’ journeys between different modes. As a result, perceptions of the journey may appear unappealing, complex and disjointed.
5.2 Bus-Rail Reciprocity

Darwen is a small town on the outskirts of the local centre of Blackburn, the two having a combined population of 138,000. Across Europe, many peripheral towns such as Darwen operate a series of complex local services which have developed historically to serve key local employer shift patterns, school start and finish times, and traditional livestock and produce market days. In the UK, since bus deregulation, routes are often operated by a plethora of small, local operators. The often non-commercial nature of these routes results in a requirement for public subsidy of services.

The advantage of such services being tendered allows much greater control by the Local Authority in how they should be operated. However, in many cases, as in Darwen, such control has yet to be exercised.

The requirements of travellers in towns such as Darwen have changed over time and are often no longer met by the services that are provided. Whilst the rail station provides regular, frequent services into Manchester for daily commuters accessing the broader employment opportunities that exist within the city, local bus connections to the rail station from outlying residential areas are poor and do not coincide with rail timetables.

By reducing the number of operators and amalgamating these complex local routes into two-way circular town services, a series of ‘rail feeder’ shuttles may be created that both cater for anticipated rail demand, whilst ensuring the historical accessibility needs revolving around local employment, education and trading requirements are more comprehensively fulfilled. Through harmonising bus and rail timetables, maximum accessibility to the station from outlying residential areas may be achieved, facilitating enhanced connectivity between bus and rail modes.

Similarly, the tendered nature of such non-commercial services allows for the opportunity to purchase new, high quality vehicles through available European and national level funding streams, with the vehicles being leased to individual operators for service operation. In this way, a unified brand may be established and imposed on all shuttle routes, incorporating specific shuttle numbering and colouring of individual services. This ‘brand family’ may then be used to emphasise connectivity and interchange opportunities and to increase familiarity of network routing and extent.

Marketing of these shuttle routes locally as a means of accessing the rail network would comprise a key focus to ensure the development and sustainability of an instantly recognisable brand that is synonymous with quality, punctuality and ease of access.

5.3 Information Provision

The provision of up-to-date service information between different modes at interchange locations is noted to greatly increase customer satisfaction and awareness of possible public transport connections that are available. This
may be achieved to maximum effect where the information provided is rolled out consistently through a variety of different media formats targeting different stages of the journey making process.

Standardised presentation through various formats not only provides initial information requirements but may serve to affirm and reassure the traveller as the journey is carried out in addition to integrating the different stages of the journey through an overarching consistent information approach.

Presenting bus information accurately and simply is essential for rail passengers to perceive their onward journey as achievable and attractive. The combination of spider diagram ‘lines’ into a localised geographic map combines the strengths of both media formats and increases familiarity of network coverage and extent in the immediate local area.

Bespoke bus information posters, as developed for Darwen in Figure 8, should be encouraged, for display both at the interchange itself and throughout the local area, mapping local bus routes and indicating their appropriate departure points, with routes being colour coded to match shuttle branding. Accompanying literature in the form of an interchange leaflet should also be made available for such peripheral interchange locations, available at interchange points, on-board bus services and from the usual literature outlets, to ensure maximum exposure and availability to potential interchange passengers.

Accompanying measures on the ground may be necessary at such locations to enhance integration between different bus and rail departure points in the area, maximising interchange opportunities and inter-service connectivity. This may be achieved through improved on-street signing and physical demarcation of walk routes to increase levels of confidence when interchanging.

Many of the costs for such improvements may be borne from a number of non-public sources, including contributions from operators, leasing of infrastructure, revenue generated from advertising space, the sale of existing assets and contributions from private developers who may benefit from such initiatives.
Figure 8 Example of bespoke bus information poster designed for a peripheral interchange location
6. PROMOTING SEAMLESS JOURNEYS AT REGIONAL HUBS

6.1 Regional Network Hubs

Interchange in cities such as Manchester, as the key central hub of a whole region’s public transport network, provides residents from a broad area, including East Lancashire, with the greatest number of opportunities for onward travel to a variety of regional, national and international destinations.

The market research undertaken in the earlier stages of this study indicated that the number of different interchange locations within such large city centres results in confusion for non-residents when interchanging to reach onward destinations. Little or no integration of information provision exists that presents the concept of a ‘seamless journey’ across different modes, services and departure locations. The lack of such integration results in uncertainties and a lack of confidence when interchanging within such central hub environments.

6.2 Development of Literature

To combat this issue, specific literature was developed to aid travel between East Lancashire and onward attractors within Greater Manchester. This literature took the form of an easy to use leaflet, whereby travellers are able to identify the particular destination they wish to reach rather than having to identify specific services and interchange hubs separately.

Information was then provided regarding the appropriate onward interchange location within Manchester city centre together with directions, by way of colour coded walk routes identified on a city centre map, demonstrating how to reach these interchange points. Connecting service numbers and expected journey times were also incorporated, as shown in Figure 9. With onward services assumed to operate at intervals of 15 minutes or less throughout the day, the information provided by the leaflet aimed to satisfy all the necessary information requirements for the passenger prior to carrying out a particular journey.

6.3 Testing the Literature

The leaflet was then tested on a number of volunteers, with journeys being undertaken by different individuals with and without the leaflet’s provision. The leaflet was felt to reduce the necessary journey planning time through only having to plan the initial inbound section of a particular trip. Many felt that it would be the only necessary information they would require for making their onward journey once they had arrived in Manchester. Levels of confidence in information sourced elsewhere were also found to be increased. With the leaflet seeking to compliment rather than replace existing advance and on-route information sources, it may be considered an appropriate tool for seamlessly integrating the different elements of the interchange journey that previously seemed disaggregated and complex.
Accompanying measures on-street may further enhance passenger confidence and recognition. Colour coded finger post signing to onward interchange points may be used to correspond to routes identified within the leaflet, whilst the potential to use metallic markers inlaid into the pavement may be considered to further de-mark walk routes and physically integrate different interchanges sites together.

7. MARKETING PUBLIC TRANSPORT TO THE NON-USER

The promotion of public transport to occasional and infrequent users is essential in order to prevent the decline in current levels of patronage and to potentially attract new or occasional users to consider the use of public transport in favour of the car.

In many areas of the UK, the perception of public transport is as a ‘last resort’ and actively marketing its use as a consumable good is overlooked. Only in London and a number of other isolated locations across the country has patronage increased significantly in recent years. Where this is the case, investment has been accompanied by measures beyond purely infrastructure improvements. For real impacts to be noticed, the whole informative and marketing approach to public transport often needs to be reconsidered.

The potential passenger often does not see an interchange journey as a composite whole, with different services and modes perceived as disaggregated. This perceived segregation needs to be tackled for truly ‘seamless’ journeys to be marketed to the traveller and for public transport to stand a chance of competing with the private car. Whilst this has been achieved in the more car-unfriendly environments of our biggest cities, the use of innovative methods of information presentation at peripheral locations, such
as those highlighted here, should be considered for the more widespread uptake of public transport to be realised.

Bibliography


