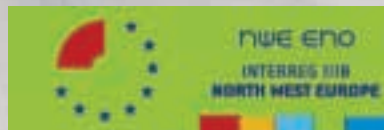


Breaking Barriers in Public Transport ■



This project has received
European Regional
Development Funding
through the INTERREG II B
Community Initiative



LiRa
International network of
Light Rail Cities

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Introduction ■

The improvement of public transport is the topic of many national and international research projects and publications. Throughout Europe, the overall growth of traffic in cities, along with related problems of accessibility, environment and emissions, economic development, as well as various other trends has been prompting new technologies and strategies for decades.

It has become clear that there will never be one single way (be it a technology or a strategy) to solve all problems relating to urban and regional transport. Working in this field will always require broad and multiple approaches that cover several modalities, subjects, strategies, disciplines and methods of co-operation. Secondly, realism is just as important: despite the clear urgency of problems at hand, sources of finance are always limited. Public acceptance is something else: new, innovative and expensive transit systems are complicated schemes to introduce despite the need to enhance the quality of the existing system. Conflicts of interest among essential co-operation partners, including political entanglements on various levels can pose further constraints in the approach of traffic problems on the urban and regional levels.

Against this background, in 1999 the LiRa initiative was set up. LiRa stands for 'the International Network of Light Rail Cities'. Twelve cities and regions from the UK, the Netherlands, Belgium and Germany formed a partnership and jointly set up four study projects to investigate the potential as well as the organisational / technical backgrounds of the public transport technology referred to as Light Rail.

The projects, which were 50% co-financed by the EU, addressed 4 topics:

1. Operation models and public private partnerships.
2. Light Rail on Heavy Rail: technical and operational aspects in four countries.
3. Light Rail, spatial-economic impacts and real estate development.
4. Long term / modal split impacts.

This has led to valuable insights into the potential of quality rapid transit as well as usable and welcomed transfer of knowledge, confirmed at the closure conference of LiRa-1 (Scheveningen, May 16th, 2001). All of the results can be downloaded from the LiRa-2 website¹⁾. Already during the first project, the partners decided not to see Light Rail technology as the solution. Instead, the choice was made to select the concept of 'quality rapid transit on the urban and regional scale'. Every city or region has its specific geographic characteristics and transport attributes. The overall situation results in a specific solution, which will resemble, but hardly ever be the same as its counterparts in other countries. In short, LiRa does not put technology first ■

¹⁾ <http://www.lira-2.com/lira1.php>

> Background

LiRa-2

Despite this clear limitation to exchanging experiences, some of the partners decided to continue the contacts. This led to plans for a new INTERREG project, in the newly formed INTERREG IIIB NorthWest Europe programme¹. Essential to these intentions was that a possible new project would not target copying technological solutions, or studying with only reports as a result. Instead, the partners formulated a number of common challenges: transnational issues relating to the implementation of Quality Rapid Transit solutions. Several common challenges were formulated, which somehow played and still play in all regions. With the INTERREG IIIB project 'LiRa-2: from Vision to Action', this became reality.

A main characteristic of INTERREG is the emphasis on action: implementation-focused, or even tangible projects, while excluding large-scale investments. This has inspired the initiators of the project, leading to the project's subheading 'from Vision to Action'.

In the beginning of 2003 the LiRa-2 project started off with the following partners:

- 1 City Region Haaglanden, *the Netherlands* (lead partner)
- 2 Province of Limburg, *the Netherlands*
- 3 Province of Gelderland, *the Netherlands*
- 4 GMPTE Greater Manchester Passenger Transport Executive, *United Kingdom*
- 5 LEP Lancashire Economic Partnership², *United Kingdom*
- 6 Wolverhampton City Council - Centro, *United Kingdom*
- 7 Province of Vlaams Brabant, *Belgium*
- 8 Ministry of Brussels Capital Region, *Belgium*
- 9 HTM The Hague Tramway Company, *the Netherlands*

The LiRa-2 project has two overall objectives:

First, to support actual implementation of quality rapid transit systems throughout Europe, and to improve existing systems, LiRa-2 wishes to create *concrete methods, procedures and tools*.

Second, LiRa aims in this respect to be the driving force of *active transnational transfer of knowledge* through various channels.

This final report will be delivered at the conference which marks the end of the LiRa-2 project on September 15, 2005.

Structure of the report

After this foreword, there is an introduction to the LiRa-2 theme: *breaking barriers in public transport*. Alongside the main text, real-life experiences are presented (this continues through the report).

This is followed by the project outcomes. Firstly, this consists of the Seamless Journeys initiatives. Partners have tested several implementation-focused approaches, in order to cope with the barriers as described below. This way, the partners have literally gone from vision to action. Subsequently, the other LiRa-2 activities are reviewed.

There have been Planning and Design Expert Sessions involving visits by international expert teams to other partner regions. During these visits the experts could critically judge, and assist in Quality Rapid Transit station and hinterland designs and consider the use of transit as a planning tool.

Last but not least, an innovative software *calculation and assessment* tool was devised. It is meant to assist in the process of deliberations and decisions about the rapid transit technique to be used.

Concluding observations mark the end of the report ■



¹ NWE = North West Europe, the largest programme area of the INTERREG IIIB framework involving transnational co-operation initiatives in parts of the Netherlands, Germany, France and Switzerland and all of Ireland, the UK, Belgium and Luxembourg. For more information, visit <http://www.nweurope.org>.

² In 2005, East Lancashire Partnership (ELP) has begun a merger process with the Lancashire West Partnership (LWP). The new organisations name will be Lancashire Economic Partnership.

> Barriers to seamless journeys

The main topic of the LiRa-2 project has been ‘barriers to seamless journeys’. We would like to explain the background to this below.

To become an alternative for more travellers and more journeys, public transport should be placed in the context of the door-to-door journey: the complete trip from the origin location to the destination place. Only in this way, it can start to be a real alternative to the private car. Strategies, policies and solutions to overcome the main barriers to seamless journeys have been tested as part of the LiRa-2 project.

LiRa has identified four categories of barriers:

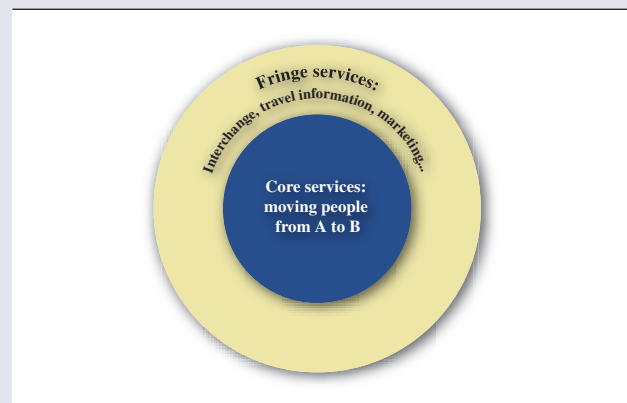
1. *Physical barriers* are actual, ‘touchable’ barriers that exist in the environment. As such, they are highly visible as a hindrance to the travelling individual. Both spatial aspects (arrangements on the fabric of the urban environment, urban planning) as well as material aspects (building engineering, architecture) play a role. Physical barriers hamper the entering and exiting of a single transport system, but also occur in the case of interchanges: when passengers have to change from one transport system or transport carrier to another.
2. With *conceptual barriers*, this is different. This second category exists with users and has to do with lack of accurate travel information, and/or poor image of public transport. Of course, this strongly depends upon the traveller involved. Some people need more or more detailed information than others and one group of travellers will see barriers as more problematic than others. Clearly, travellers will always need information and the right information strongly contributes to a successful journey and journey experience.
3. *Commercial barriers* relate to the observation that most transit operations include commercial activities. While this is no problem in itself, and could well be the only way to operate public transport, commercial considerations can severely hamper door-to-door journeys. This varies from the inconvenience of having to buy several tickets, to severe lack of co-ordination in public transport networks, caused by a lack of consciousness by commercial parties that they are part of the system. It has to be underlined that the significance of commercial barriers strongly varies from country to country.
4. *Institutional barriers* are inherent to the way Quality Rapid Transit is planned, built, organised and regulated. As with the commercial barriers, there is quite some variation among different countries as to how this is perceived and organised. Institutional barriers not only include problems caused by laws and regulations, but also politics, administrative arrangements, or even traditions.

The main part of the LiRa-2 project has been devoted to breaking or overcoming these barriers. While these project contents are described in detail further on, the remainder of this chapter will focus on the way LiRa has taken on these issues.

LiRa-2 versus its project targets

On the preceding pages, the main targets of the project were stated. As explained, LiRa-2 did not focus on large-scale investments, nor carried out extensive studies to justify these. First, it has been the exclusive goal to create transnationally usable methods, procedures and tools regarding current and future quality rapid transit systems. As much as possible, the project has tested them in real-world situations, making them ‘implementation-ready’. Second, the project has worked on active transnational transfer of knowledge, using both project-internal as well in a project-external channels.

How did LiRa-2 address and achieve these targets?



For this, it is interesting to look at the graphic above. The basic functions of Quality Rapid Transit services are performed by transporting people from A to B: the core services of the transit system. However, more is needed to make it ‘quality rapid transit’. This includes items that speak for themselves, such as a bus stop, a platform, a clock or a ticketing system. There are also less obvious items, such as a good website, a signposting system or a common brand name for several transit systems.

These fringe services play an important role in the LiRa-2 project.

The main elements of the fringe services are directly connected to the barriers to seamless journeys, described earlier:

- (Facilitation of) interchange
- Travel information
- Marketing
- Simple ticketing systems

LiRa-2's concrete activities can be grouped in existing and future transit systems.

LiRa-2 activities: existing systems

Regarding the current systems, LiRa-2 has addressed the fringe services. Improvement or optimisation of (elements of) these services potentially give considerable added value to the transport system as a whole. The project has created methods, procedures and tools for this, concentrating on breaking the barriers. Note: The improvement of the transit systems themselves (the core) has not been part of LiRa-2. These have been regarded as given.



As part of LiRa-2, The Province of Gelderland (NL) has introduced a standardised travel information system for all rapid transit modalities. Travel information is the most important ingredient of the fringe services and, supported by LiRa-2, the province has compiled a standard in travel information facilities, both static and dynamic. The system is meant to become mandatory for all operators province-wide.

East Lancashire Partnership and Greater Manchester Public Transit Executive (UK) carried out a broad and integral analysis of which barriers to seamless journeys are most important in the actual case of a large city region and a bordering rural, more small-scale area. This has resulted in an integrated set of concrete, bottom-up and low-cost measures capable of improving the situation that covers all of the Fringe services. Subsequently, this partnership has made a start with LiRa-2-supported implementation of some of these measures.

The City of Wolverhampton has tackled a physical barrier-related problem by the creation of an innovative information system. This way, the walking distance between various modes of transport is 'optically' reduced. With this kind of support the passenger will, in a few years, move seamlessly from Light Rail, to Heavy Rail and bus.

The Province of Limburg (the Netherlands) is, for a large part, surrounded by Belgian and German territory. Transport systems having difficulties with crossing national borders are one thing; connecting the institutional systems with their investment plans is another. Through LiRa-2, the provincial authority has explored the barriers to a truly euroregional transit system. Technically, there are no limits, but organisationally the situation is quite different. The breaking barriers theme has been adapted towards a transnationally integrated Euroregion.

LiRa-2 activities: Future systems

LiRa-2 has created methods, procedures and tools for the development of new transport systems. The project has done this in an integral way, including both core and fringe services. Also in this respect, breaking the barriers remained the central theme.

LiRa-2 has carried out two successful Planning and Design Expert Sessions, one in Stockport (UK) and one in Delft (NL). These transnational and interdisciplinary expert sessions were organised to provide insights into how to integrate Quality Rapid Transit development with urban and regional planning and design and how to use these systems as structural elements in town planning. It was possible for partners to actively take part in the transnational solving of these issues by 'looking into each other's kitchens'.

The Brussels Capital Region and the Province of Vlaams-Brabant have twinned to develop a transport concept that offers seamless journeys, overcoming physical, institutional and conceptual barriers in advance. Two corridors were involved in the analysis, Brussels - Boom and Brussels - Tervuren - Leuven. The result is a useful vision for a very complicated institutional and political setting, combined with an innovative way of devising future interchange hubs in the Brussels urban area. In this way, LiRa-2 has created the right preconditions for overcoming barriers to seamless journeys in the future.

Finally, the partnership has created a widely usable calculation and assessment software tool to assist in the procedure of deliberations and decisions about what rapid transit technique to use. It takes into account the costs of investment and operation (infrastructure, rolling stock), the specific regional situation (number of jobs and inhabitants) and the options regarding available techniques. A particular benefit is that it is used in a very early planning phase. Limited know-how on traffic and transport modelling is required and it is usable in three LiRa countries and Germany. For this, appropriate parameters have been integrated ■

Conceptual barriers

Annika Simons lives in Belgium. She is going to attend a conference in a city that she does not visit very often, and does not know very well. A few days before the conference she decides to travel there by public transport. She owns a car but detests heavy traffic. The conference venue and in fact the whole city are not particularly well-known for accessibility by car.

The day before the event she telephones the venue to ask the best way to travel from the train station to the conference centre. She is told

73S go there. Good. Unfortunately there is no information on where to catch them. From earlier visits to this town she remembers that there are also 'loads of buses and trams' close to the station, so confident that she will find the right one she closes the web browser.

The next morning her train arrives on time and Annika gets off and starts to look for information. Apparently there are bus stops on both sides of the railway station. She has no idea which to choose and starts at the nearest one. Bad luck: it's the wrong bus. On the other side, she finds an information panel. After studying it, she finds the conference centre on

the map and discovers that of the five routes going there she should take tram number 2 or bus number 10. The other ones either do not stop at the railway station, or do not run anymore. Unfortunately, there are no timetables. When she finds the right stop, it turns out that she will have to wait for nearly a quarter of an hour, because the previous one has just left. Annika looks at her watch. Bad luck again: the conference starts in about 15 minutes. After her 15-minute wait and a 15-minute ride, luckily the driver knows where she has to get off. She is late; and not happy.

Annika has met a conceptual barrier. She had prepared, and she knew that the bus trip would take some time, but did not expect that it would take more than half an hour. She took the trouble to find travel information but what she found

was out of date, fragmented, complicated and some of it was incorrect; add to this the unhelpfulness of the conference staff and their website and the lack of co-ordination between train and local services. This was no 'seamless journey'... ■



'you'll have no problem, there are loads of buses and trams' but the lady on the phone has no idea what number to catch, as she drives there herself. She suggests Annika checks their website. Annika does find some information here: tram numbers 2 and 4, and bus numbers 10, 56, and

Institutional barriers

Peter has been asked to be the transport co-ordinator for his employer. Today he is making a list of what his colleagues see as the disadvantages of public transport. Some of his findings are:

- Why are the trains so old? They create Light Rail systems everywhere else, but not in this region. Plans for an upgrade have been in place for fifteen years, but no agreement can be reached on the type of vehicles, as several operating companies are involved. Should they look like low-floor trams as in the city where his office is or like the high-floor metro vehicles of the adjacent region? Meanwhile, the clapped out trains keep going.
- One suburban railway station has a brand-new bus station next to it.

The bus schedule makes buses leave a few minutes before the train arrives. The railway company gets its orders from the government, the bus operator works for the regional authority. Both set their own rules. Why can't they get together over a cup of tea and sort things out?

- Near another station, the railway company built a beautiful Park-and-Ride facility. It is full everyday - with cars belonging to people working in offices nearby. Here, the authority has set strict parking rules. The solution has become a problem.

Peter sighs, so many institutional barriers. He writes a memo to his boss, suggesting the initiation of talks with other companies and the authorities on ways to ameliorate the situation ■

Physical barriers

Dennis Markham is travelling from home to work in the medium-sized UK town where he lives. He makes this journey every weekday. Although he owns a car, taking public transport is not a bad choice as he can do some reading on the train on his way to work. He tends to take a nap on his way back, if he gets a seat. Besides, there are no parking spaces anywhere near his office. The train services are quite reliable; though occasionally things go really wrong with signal failure.

The only down side is something which happens twice daily as part of his trip: it takes 20 minutes to walk from the station to his office. Thus Dennis gets wet when it rains. There are buses he could use, but these terminate at the bus station which is an 8-minute walk from the station: that's nearly half the time his walk takes. Besides, there are only 2 buses per hour...

Dennis meets a physical barrier, twice daily. The bus is not a good alternative to his walk. Even though he likes walking, if there was a parking space near his workplace, he would not hesitate to trade in his old car for a better diesel one. This might even be cheaper.

LiRa has investigated ways in which the authorities in this town could improve Dennis' journey. Working with the bus operators the options for

extending the bus route(s) could be explored, or even moving the bus station nearer to the railway station. This way, more people than just Dennis could use it, especially if the buses could connect with the trains. An initiative could be set up to encourage Dennis to buy a bicycle, and



designated parking spaces could be provided near the office and the station. This would save him time, too. To be short, there are several options available to remove this physical barrier, some low-cost, some more far-reaching ■

Commercial barriers

Sally is a bus driver for a medium-sized regional bus operator. She drives big buses as well as the smaller van-type minibuses on the less busy lines, with the disabled, elderly, and school children for passengers. She likes the work very much, she's on the road nearly every day, meets many people and enjoys being out and about where it all happens. If you are a bus driver, you are providing an essential service and by helping others she feels like she is contributing to society. Although some people treat her like a real social worker, telling her all their secrets and stuff. Sally is very punctual, but she will go that extra mile, wait for that late train, or to pick up that drenched individual halfway between two stops. It's the way she likes to work.

Her firm has recently been taken over by a multinational company, so it is a little bit of an uncertain time for her and her colleagues. Sally hadn't

heard of the company, but it turned out that the company certainly knew all about them and their work; or so they said. The message was, this is a town to make money in. And that is their plan. Things might change in the near future, her boss told her and the others. For her boss, things did change: he was the first to be laid off.

Commercial barriers arise because public transport will always include commercial activities. This might not be a bad thing, to begin with. However, the ultimate goal of making money tends to have a variety of effects on the quality of services, set off against the price to be paid. Commercial operators can be visionaries: good services do need some investment, clients come back when you give them a little extra. They can get involved with the authorities' long-term plans in order to remain in business with them. However, it can also go the other way: to sell is to survive and if you don't sell, you're out of business ■

In search of ideal interchange locations to promote seamless journeys between new Light Rail Lines in the Flemish Region and Brussels ■

The Brussels Capital Region is the smallest region of a federal Belgium. Yet, it fulfils the important role of Capital, both of Belgium and of the European Union. Composed of 19 municipalities, it is surrounded by the Province of Vlaams Brabant (Flemish Region) and is closely linked with the Walloon Region.

The Region has some 1M inhabitants. Even with 650,000 jobs, it has a high unemployment rate, especially amongst its less educated population. More than half the workforce (some 350,000) is made up of incoming commuters, most of whom are highly educated, and work for the different federal and regional administrations, European institutions, headquarters of large business companies, etc. These commuters live in the surrounding Flemish and Walloon Regions. Over 50% travels by car, thereby creating a lot of traffic congestion during morning and evening rush hours, which also affects the performance of those public transport lines that do not have their own infrastructure.



So, one of the biggest challenges on a mobility level is getting the well-to-do commuters out of their cars, into highly performing public transport and getting good public transport connections for the not so well-off urban population so that they can more easily find a job in the industrial or service-oriented businesses located on the outskirts of the region: one solution for two problems.

The Administration of Equipment and Transport is part of the larger Ministry of the Brussels Capital Region. In transport related matters, the administration executes regional policy on the lay-out of the urban public transport systems (apart from the railways, which are still run by central government), the operation of the main roads and motorways and taxi licensing. The Region still has its own public transport company, named STIB or MIVB. It is responsible for the metro and tram services, and bus services (most within the region). The other two bus operators, De Lijn (Flemish) and TEC (Walloon), provide most interregional bus services ■

> Approach

The main scope of the study was to investigate the feasibility of integrating two Quality Rapid Transit axes, leading in from Flanders (from Boom and Leuven), to the high-performance urban public transport network of the Brussels Capital Region. Special attention would be given to design principles in order to make the transfer from regional Quality Rapid Transit to the high performance urban network as smooth and



seamless as possible, in order to attract a maximum number of users. The Province of Vlaams Brabant studied the opportunities for both lines outside of Brussels (see the chapter on Vlaams-Brabant).

Representatives from the public transport operators, and the regional and provincial services responsible

for transport, mobility and urban planning steered the progress of the study, which was conducted by Tritel and Eurostation.

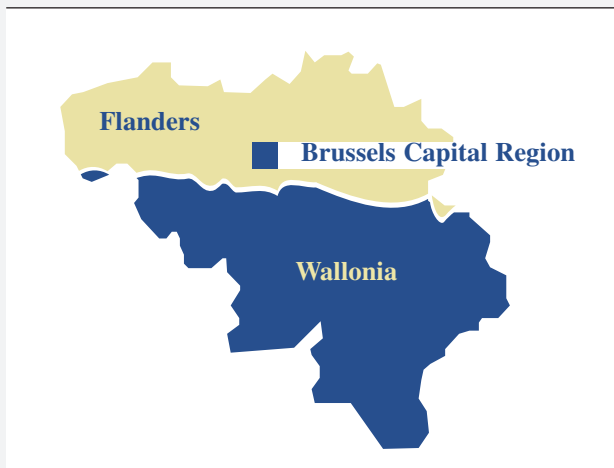
In the first phase of the study, special attention was paid to the expectations of (potential) users regarding the design of interchange locations (all modes of transport included). Existing data and the results of a new inquiry were analysed. Further (statistical) research was also carried out on the different destinations in and around the Brussels Capital Region

and their importance for the potential users of the two new quality rapid transit lines under study. Finally, key people were questioned about the different options for integrating the new quality rapid transit lines into the high performance public transport network of the Brussels Capital Region. This resulted in a list of possible interchange locations.

These different potential interchange locations and the connecting trajectories were further analysed in the second phase. A SWOT-analysis was performed. Then, a multi-criteria analysis (MCA) addressed the points of view and demands of passengers, the public transport operators, the public authorities and the surrounding area. Points considered were:

- for the passengers / public transport operators: offer, capacity, smoothness of travel, accessibility by bike and by car, necessary infrastructural adaptations, technical feasibility and investment cost;
- for the public authorities/surrounding area: smoothness of traffic, parking facilities, possible changes in traffic circulation, quality of life, and environmental impact.

Finally, the accessibility of different areas of activity (work, school, leisure) was compared for the different possible trajectories through the Brussels Capital Region ■



The Brussels capital region: location within the country

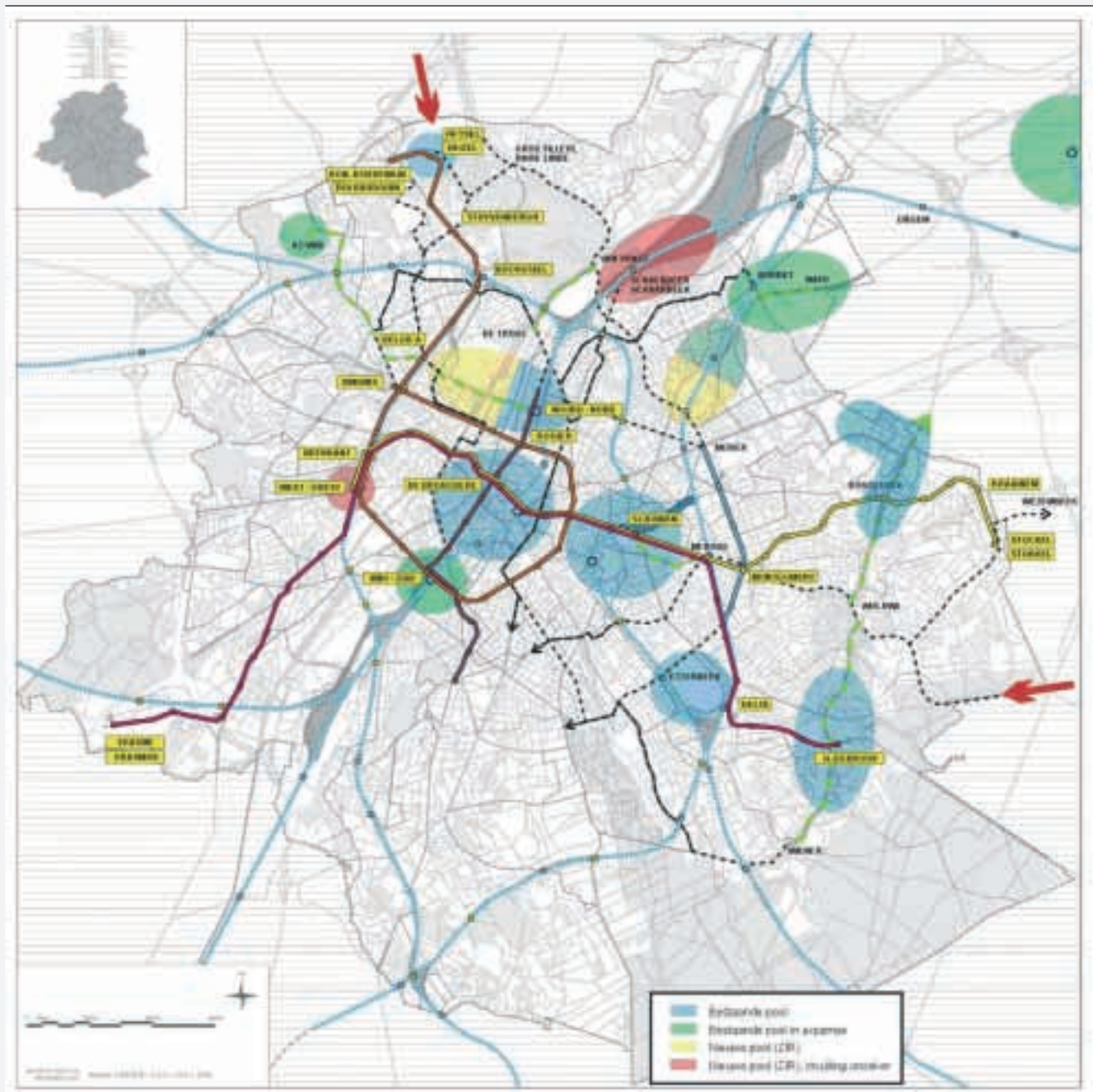
Belgium has three federal regions: Flanders in the north (Vlaanderen; 5 provinces), Wallonia in the south (Wallonie; 5 provinces) and the area around Brussels: the Capital Region. This heavily urbanised region consists of 19 municipalities. It is completely situated within the area of the province of Vlaams (Flemish) Brabant. In Flanders, the main language is Dutch, in Wallonia it is French, the capital region is bi-lingual.

Both the Province of Vlaams-Brabant and the Ministry (authority) of the Brussels Capital Region are partners of the LiRa-2 project ■



Sources:

- [Wikipedia.org](https://en.wikipedia.org)
- project.klascement.net/ge/demulder.romny/aaanederlands.htm



Looking for the best transfer points

On the map, the red arrows indicate the place where the quality rapid transit lines enter the Brussels Capital Region. A part of the project consisted of a puzzle to either:

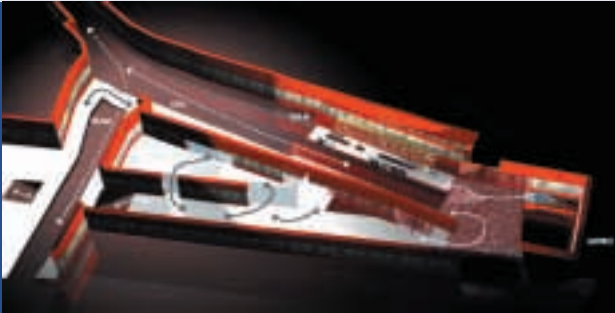
- let the lines terminate at multi-modal transfer points, offering seamless connections in many directions;
- extend the lines into the city, using existing or planned infrastructure.

The light blue lines are Heavy Rail, the coloured solid lines are metro lines and the dotted are tram lines (black existing, green projected). The coloured areas are high-density working areas (the yellow / red ones projected) ■

Sources:
- MBHG/Tritel

> Results and added value of European co-operation

All these analyses led to the final choice of interchange locations and trajectories for the two new lines within the Brussels Capital Region. In the meantime, the potential analyses on the routes outside the region, carried out by the Province of Vlaams Brabant, made it clear that the potential group of quality rapid transit users, is not very large. So, short-term realisation of new lines with their own infrastructure is no longer on the agenda.



Simonis interchange hub

Because of this, the scope of the Brussels study changed: from real(isation) to ideal, with an emphasis on design principles for the interchange locations and the exploration of the different layout requirements of the proposed trajectories. Three of these were chosen: Merode (near the European quarter), Heysel (near the regional border, the great exhibition park with the same name and the Baudouin Football Stadion) and Simonis (a metro, tram and bus stop within the Brussels Capital Region). In the third and last phase of the study, a list of guidelines for the good design of transfer locations was put together with special attention paid to the image and the 'recognisability' of public transport locations within the urban tissue.

The project resulted in the following outputs regarding interchange points vs. their users:

- Perception of time spent: users prefer to sit in a vehicle rather than walking or waiting and in particular to changing from one vehicle to another, so if one wants to create seamless journeys, special attention has to go to the quality of the interchange.
- Perception of vehicle (comfort): users clearly prefer metro, to pre-metro, to tram and buses, so they prefer the fastest forms of public transport. Furthermore, potential users (also known as car users) would like to sit on public transport and they prefer Park & Rides and Kiss & Rides close to the stations/stops.
- Accuracy, frequency, good interchange conditions, safety and through ticketing are demands shared by users and potential users of public transport.
- For potential users travel time is more important than waiting time. For actual users it is the other way round. Potential users, however, do not know the public transport system well enough. Good information about the public transport system is vital, to draw potential users across the line.

Though not different from other available information, these results give a good idea of what the public really expects from a high performance public transport system. Based also on European experience it was clear that combined use of tram infrastructure and Light Rail infrastructure (and even train infrastructure) within the Brussels Capital Region seemed advisable, whereas specific Light Rail infrastructure could be built to connect Boom and Leuven with Brussels.

The list of guidelines for the design of interchange locations has been developed in close co-operation with the services, responsible for the design and building of stops and stations for the public transport network in our region. They have indicated to be willing to use this list of guidelines in the future. So, here, all of the knowledge exchanged during steering committees, local visits and expert sessions, organised through the LiRa-2-project, has been put to full use.

From the design angle, special attention needs to be paid to:

- *Legibility of the spatial structure*
Primary points of entry to the station/stop have to be a point of orientation, a recognizable icon for the neighbourhood. Since recognition comes from repetition, every false connotation has to be avoided. Secondary points of entry should only be visible when the user is in front of them.
- *Concentration and combination*
Different functional elements (dustbins, benches, advertising displays, etc.) have to be integrated through appearance in the design in order to simplify and clarify the surroundings. The combination of functions makes them more sustainable and makes better use of available space.

The main design principles are:

- Legibility leads to comfort: a recognizable and clear design, a coherent and clear signalisation, a repetition and concentration of information, a clear, attractive and short connection between the different modes, a safe and swift transition to other modes and functions.
- Security, and the feeling of it, can be enhanced by good lighting, a feeling of open space, the presence of other people, camera surveillance, measures for disabled and visually and hearing impaired people, etc.
- Vandalism can be avoided by careful selection of materials. Standardisation of equipment does not exclude a location specific design.

With attaining these results, the Ministry of the Brussels Capital region has taken considerable steps towards breaking especially physical and conceptual barriers. An innovative aspect is that the project consisted of an 'ex ante evaluation', strongly concentrating on the interchange nodes of a possible new Quality Rapid Transit system. Carrying out these analyses in such an early stage represents a main step on the road to seamless journeys: with the future system optimally closing in on the existing system ■

Feasibility of quality rapid transit on two new lines: A systematic approach of seamless journeys ■

The province of Vlaams (Vlaams) Brabant is situated in the heart of Belgium and, equally, Europe. It is surrounded by urban regions as the Delta-metropolis (Randstad, the Netherlands), the Rhine-Ruhr area (Germany) and the Lille conurbation (France). The European capital Brussels lies within the province, but the Brussels Capital Region has an autonomous territorial status (the same as Flanders and Wallonia). Brussels has a significant effect with regard to economic and also mobility issues, due to the huge concentration of activities there (see box).

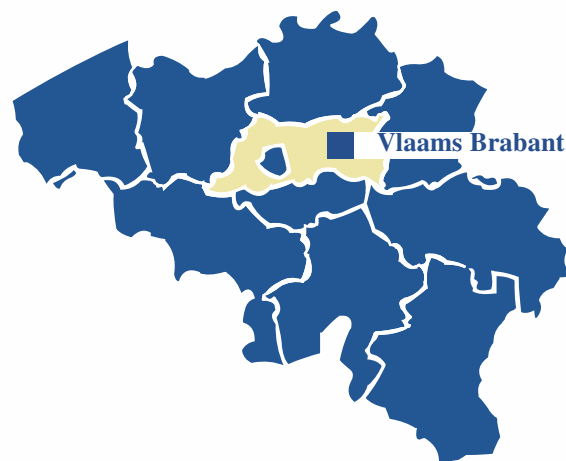
Territorial development and mobility planning is one of the fastest growing policy domains in the Flemish provinces. The provinces are also involved in the domains of water management, environment, tourism, culture and social welfare.

In Vlaams Brabant and Brussels road congestion is constantly getting worse. According to recent studies, 19 of the 25 most congested areas in Flanders are situated in Vlaams Brabant, which leads to tremendous problems of accessibility and for the environment. Public transport has a very low market share for trips in the range of 10 to 40 kilometers.

Together with the Flemish Region and the Flemish public transport operating company 'De Lijn Vlaams-Brabant', the province has produced a strategic plan to introduce an integrated network of rail and (express) bus connections for the region, the so-called RegioNet Brabant-Brussel. It can be considered as an addition to the so-called Regional Express Net (GEN), a proposed public transport structure of mainly Heavy Rail connections, which was originally an initiative in the Brussels Capital Region. RegioNet Brabant-Brussel is characterised by a cobweb structure. Through the development of high-quality interchange stations, the designated growth areas are made more accessible by public transport. The province of Vlaams Brabant is conscious of the importance of a regional quality rapid transit network for its inhabitants and its regional economy.

Therefore, the province has taken the initiative to investigate the feasibility of quality rapid transit on two lines of the RegioNet Brabant-Brussel, in consultation with the Brussels Capital Region and other involved partners. It consists of the Boom-Brussels and Leuven-Tervuren-Brussels lines; currently seen as express bus axes. The most favourable routes need to be determined as to possible passenger numbers and the connection with the public transport system in Brussels and the airport region (Zaventem).

The Brussels Capital Region has carried out a project on the location and design of the interchange stations between the GEN in Brussels and the two lines under investigation ■



> Approach

The process comprised 5 stages.

Stage 1

Orientation phase. This included an overview of important reports and planning processes with impacts on the project. Also, a 'long-list' was made of possible technical solutions outlining the characteristics, opportunities and weaknesses of each option.

Stage 2

Quick scan: routes and activity hubs: a first selection was made of the regional hubs of activity, and the most feasible technologies and routes for the development of quality rapid transit. Questions that have to be answered included: Which activity spots have to be served? Is it better to go through urban centres or to follow roads? Which technologies are the most appropriate for the region?

Stage 3

Feasibility study: calculation of the expected passenger numbers for the two main variants resulting from the quick scan (stage 2) through the so-called journeytime factor (VF) methodology: calculation of the modal split between public transport and private car traffic through comparison of journeytimes.

Stage 4

Action plan and perspective: for each variant resulting, possible location(s), necessary measures and future opportunities are outlined. Of each main variant, calculation of costs and revenues were further worked out.

Stage 5

Final report: integrated summary of the previous stages.

With this project, the concept of 'Light Rail' was introduced for the first time in the region. During the process, this led to a number of institutional barriers being established.

- 'Light Rail' was often seen as a miracle solution for every mobility problem in the region;
- Some activity areas had to be chosen at the expense of others, e.g. Brussels or the airport region. Through this process it became more and more obvious what was feasible;
- Planning policy in Flanders was already determined before the study started; a transit-oriented planning policy (urban and employment development to support the success of quality rapid transit) is not seen as adequate in (for example) the region between Leuven and Tervuren;
- It turns out, there is public resistance against new quality rapid transit routes through urban centres, although most of the time these were the most favourable routes from the point of view of expected passenger profile. Apparently residents see it as intruding;
- In some cases there were conflicting interests between different means of transport so that a frequent and reliable quality rapid transit operation would become very expensive. Examples include the need to cross an important shipping canal and the joint use of a Heavy Rail track near Leuven with international freight trains originating from the port of Antwerp.

These barriers would have to be removed to go on with the realisation of Quality Rapid Transit in the region. However, despite the complicated administrative setting, the institutional authorities involved in Brussels and the province of Vlaams Brabant and the two public transport companies do not create any barriers to the development of improved, more seamless public transport ■

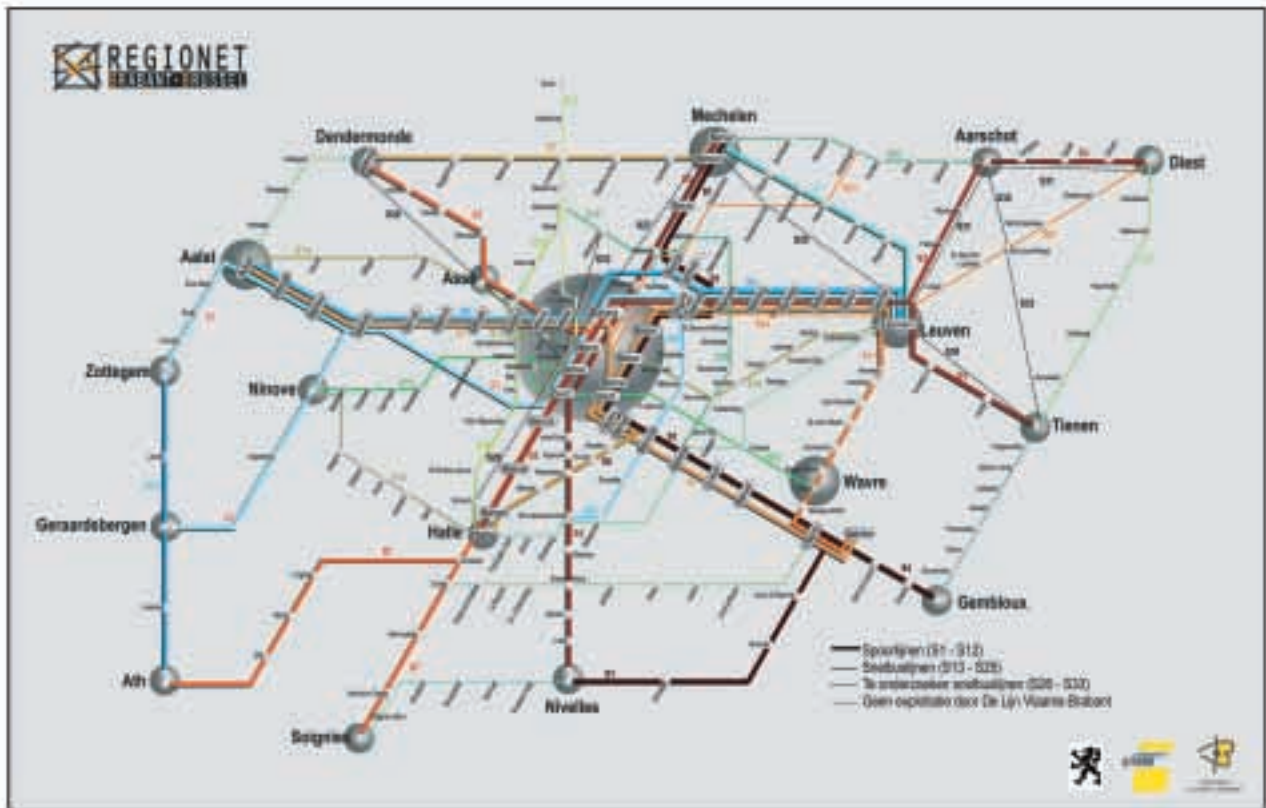


Province of Vlaams-Brabant: location

The province of Vlaams-Brabant is centrally situated in the 'Vlaanderen' (Flanders) region. The enclave which can be seen on the map is the Brussels Capital Region (see separate section) ■

Source:

- [Wikipedia.org](https://en.wikipedia.org)



Regionet Brabant-Brussel



Quality rapid transit corridors between Brussels and Boom and Brussels and Leuven

> Results and added value of European co-operation

The province of Vlaams Brabant has advocated the importance of public transport for the accessibility and viability of the region from its inception a decade ago. Up to now public transport has meant Heavy Rail and bus services.

With the dissemination of the results of the LiRa-1 project, the province of Vlaams Brabant has been introduced to the concept of 'Light Rail' and 'quality rapid transit'. With European support, the province of Vlaams Brabant, together with the Brussels Capital Region, has taken the lead in a feasibility study of Light Rail on two transport lines in the region.



The important conclusions of this process are:

- It has become clear which routes and technologies are the most suitable; the technical and location-specific boundaries have become clear; the joint use of Heavy Rail tracks is no longer under consideration for these lines.
- The routes through the urban centres are the most suitable in terms of expected passenger numbers (despite the slightly higher journey times); for both lines the route towards Brussels scored better than those towards the airport region.
- Within the Brussels Capital Region it would be advisable to continue the routes towards the city centre; some important interchange stations have been selected.
- The study has concluded that the expected passenger numbers for a Light Rail system were rather moderate. This relates to the fact that the national Heavy Rail company plans a huge amelioration of public transport in the region.
- An action plan for the development of a high-quality express bus on the two lines and proposals for a connection with the airport region have been drawn up.
- There is a proposal for reservation zones to facilitate the development of a regional tramway in the future.
- The design of a new industrial park along the Boom-Brussels line in Westrode would coincide with the arrival of a quality rapid transit system. This opportunity should be taken to realise transit-oriented development and use quality rapid transit as a planning tool.

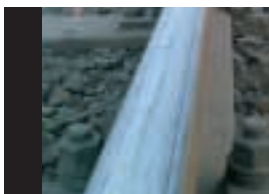
The different partners in our region have contributed to the development of a vision for quality rapid transit in our region. Public opinion within the local communities concerning the rural and urban development issues for Light Rail is an issue that has to be taken into account in the future. These issues also arose at the 'World day of urban development' in October 2004 (organised by the Flemish Association of Urban Planners).

The experiences that have been gained from working with the European partners of the LiRa-2 project, including especially fieldtrips and visits, have been considerable. These experiences will be used for the step-by-step development of quality rapid transit on the Boom-Brussels and Leuven-Tervuren-Brussels lines. Furthermore, the province is researching on possibilities for Light Rail on the Heavy Rail track between Leuven and Tienen. Light Rail has well and truly arrived in the region ■

Removal of barriers to travel by Public Transport between East Lancashire and Greater Manchester ■

Manchester is the regional centre for the northwest of England. The city is the centre of a conurbation of 2.5M people which forms the county of Greater Manchester. East Lancashire lies to the north of Greater Manchester. The East Lancashire Partnership was formed in April 1997 to shape East Lancashire into a cohesive sub-region with a strong local economy and facilities comparable to UK and European cities with similar populations¹

Greater Manchester Passenger Transport Executive (GMPTEx) is responsible for public transport in the county and its responsibilities include: developing public transport infrastructure (including the successful



Metrolink system), procuring socially necessary bus services not provided by the market, subsidising cheap fares for the elderly, children and people with disabilities; and providing travel information. Partners include seven local authorities, including

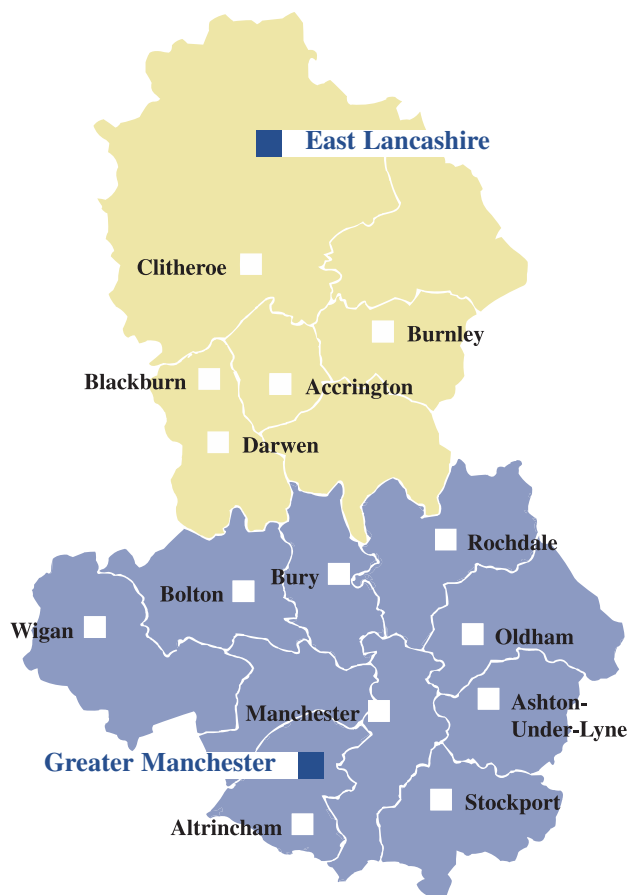
Lancashire County Council and Blackburn - with - Darwen Borough Council, who are responsible for public transport and local roads in the area.

There is a significant demand for travel between East Lancashire and Greater Manchester. As well as being a major employment centre, Greater Manchester has four universities, several major sports stadia and numerous cultural venues. Its hospitals - including Christies, a nationally renowned centre for cancer treatment 4 km south of the city centre - treat patients from beyond the county boundary. Travel occurs in the other direction and the hill country of East Lancashire is a major leisure destination for many people from Greater Manchester.

There are three main public transport routes from East Lancashire to central Manchester: a rail service from Blackburn via Darwen and Bolton; an express bus service from Colne via Burnley; and an express bus service from Clitheroe via Accrington.

The aim of this project was to understand the barriers to movement between East Lancashire and Greater Manchester and to identify measures to encourage greater use of public transport.

After a competitive tendering process, Halcrow consultancy was appointed to undertake the study. The project was carried out in three stages: identification of barriers to public transport use, identification of measures to remove/reduce those barriers and development of a selected number of measures ■



¹ An aim which reflects the ELP's view of East Lancashire as a 'city region' - i.e. an area that has the identity and facilities of a city even though its population is not concentrated in a continuous urban area

> Approach

1. Identification of barriers

Barriers to public transport use include underlying factors affecting the initial decision to make a journey and the decision to use public transport, as well as barriers to making specific trips. In order to understand these barriers, market research was undertaken comprising:

- A Stakeholder Workshop attended by 33 professionals from the region.
- 206 in-depth interviews in the East Lancashire area, typically lasting 40 minutes.
- 8 Focus Groups of differing characteristics.
- 15 accompanied public transport journeys to establish whether perceived barriers were experienced in reality.

Six categories of barriers to public transport use were identified:

Time factors, including long public transport journey times relative to the car, unreliability, lack of direct services and problems over interchange. *Cost* - car owners tended to consider only the marginal cost of a car trip and even then consistently underestimated it; the resulting perception of public transport as expensive was exacerbated by often inflexible ticketing, particularly for group travel.

Personal Safety was of particular importance to females, elderly and school children, especially at night and on journeys involving interchange.

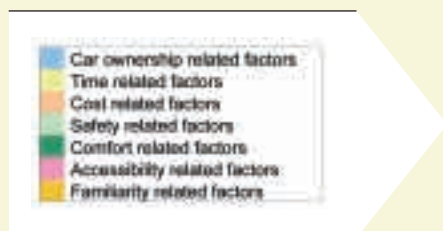
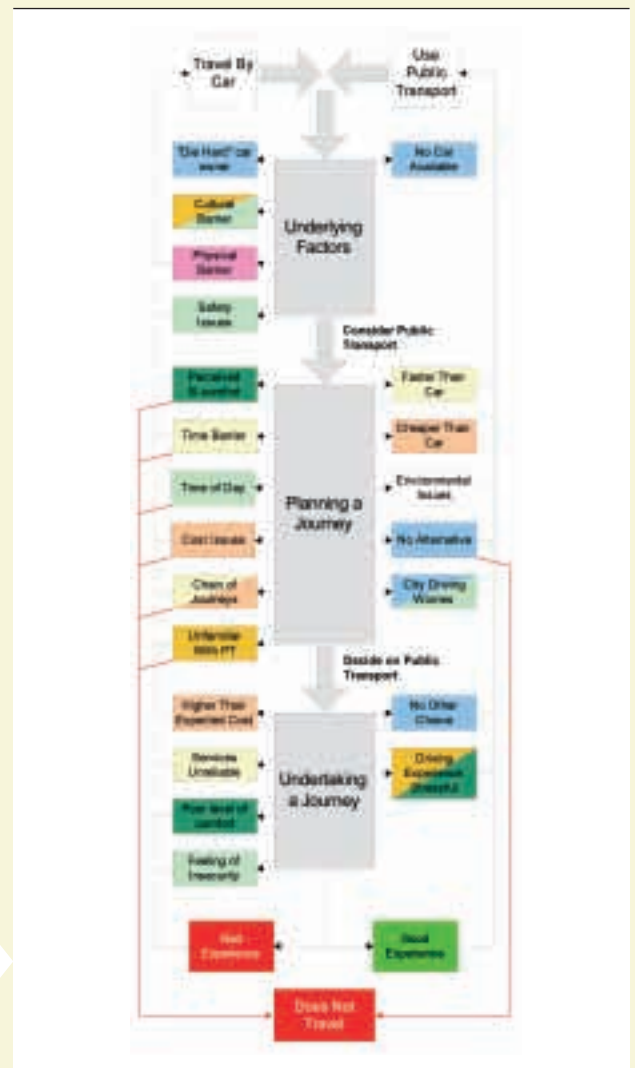
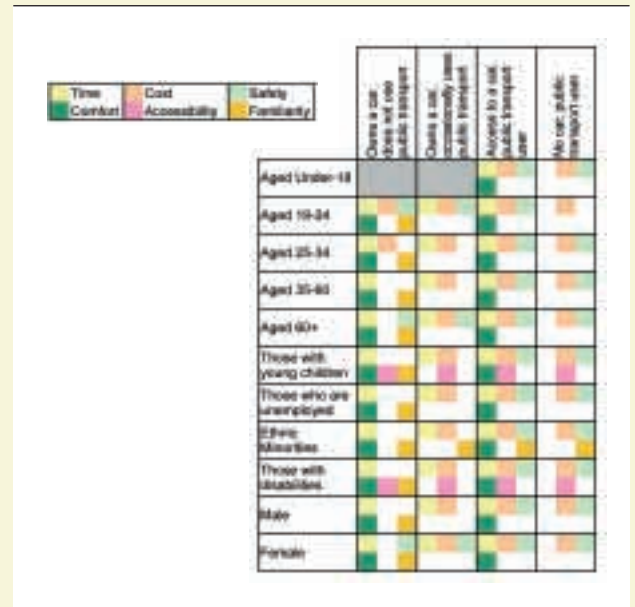
Comfort - Buses (but not rail) were often seen as a second class mode of transport.

Accessibility was of particular relevance to the elderly, mobility impaired and carers with pushchairs and shoppers. Although low floor buses provided improved access, lack of guaranteed availability created a barrier to use.

Lack of *familiarity* was a major barrier for infrequent users and those new to the system (e.g. ethnic minorities or elderly who were suddenly unable to drive).

The first diagram summarises the importance of different barrier types to different types of traveller.

The research identified three key stages in making a journey. At each stage within this process a number of factors affect both the decision to travel and mode choice. The flow chart shows the three-stage decision process and the barriers influencing travel. >>>



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At any point in this process, people can decide to travel by either car, by public transport, or in some instances decide not to make the journey at all. In the flowchart, barriers to the right the three-stage process lead the traveller to use public transport, barriers to the left mean the user travels by car; clearly the odds are weighted in favour of the car.

The first stage of the process represent underlying factors that lead to a predisposition for car or public transport use before a specific journey is even considered. Die-hard car users do not consider public transport and immediately fall out of the process. Other factors, including cultural, physical and safety barriers mean travel by public transport is not an option unless fundamental issues can be addressed.

The next stage of the process is planning a specific journey. Factors such as time, cost and journey purpose are a major influence and at this point a decision not to travel can be made.

The last stage is actually undertaking the journey. A bad experience can influence future travel decisions and public transport providers need to focus on delivering good actual journeys before addressing underlying factors.

2. Identification of measures to remove/reduce barriers to public transport use

- An Action Plan was developed, focusing on five key areas:
- Creation of a core network*, which is easier to understand with bus priority and competitive journey times.
 - Improved ticketing* - with more flexibility and improved value for group travel.
 - Safety and Security* - improved facilities at stops and interchanges.
 - Improved *awareness* through better information and marketing, including public transport guides for new users.
 - Improved *service experience* including improved quality of vehicles and quality corridor improvements.

3. Development of a selected number of measures

The final stage of the study focused on interchange, since it is affected by all six of the above key issues. Additional face to face interviews were undertaken to establish the current level of interchange and expectations of wait times and infrastructure provision. Audits of existing provision at bus stops, bus and rail stations were also undertaken together with a review of walk routes between interchange points in Manchester City Centre.

- The key findings of this additional research were:
- The importance of safety and security, the need to provide information for the onward journey and to minimise distance between interchange points.
 - The maximum acceptable wait time for bus-to-bus interchange varied from 7 to 13 minutes. Longer wait times were acceptable

- in town centres but shorter wait times were required at peripheral interchanges, reflecting safety and security concerns. Wait times of over 15 minutes were acceptable at railway stations.
- Inconsistencies in cross-boundary travel information were a major barrier to travel.



Following this additional research, a number of specific measures were developed.

Firstly, a method of analysing service timings and frequencies at interchanges was developed. After identifying the main corridors radiating from an interchange, key journeys involving interchange are identified (e.g. journeys to hospitals, employment centres, colleges, leisure centres, etc). By analysing existing wait times for these journeys and identifying residential areas generating particular types of trip (using demographic information) it is possible to identify services which could benefit from retiming / frequency increases.

Secondly, infrastructure audits were undertaken at Blackburn and Burnley Bus Stations and Darwen Rail station and a package of measures to improve interchange facilities and on-street information was costed.

Thirdly, improved static information was designed. A leaflet aimed specifically at East Lancashire residents to aid interchange in Manchester City Centre was market tested. The leaflet included a simple chart showing key health, education and leisure destinations (e.g. hospitals, universities, football stadia) and the termini, stand and service required for onward journeys to those destinations. Also included was a street plan showing walk routes between the arrival point of East Lancashire bus services and other bus, rail and Metrolink termini.

In addition, improved static information for interchange within East Lancashire was developed, using Burnley bus station as an example. The improved information shows, in schematic form, key destinations, colour coded routes serving these destinations and approximate travel times, together with clear, colour coded information about how to make the interchange at the bus station.

Finally, frequency and route improvements for local bus services linking with Darwen rail station were costed, although these proved to be expensive ■

> Results and added value of European co-operation

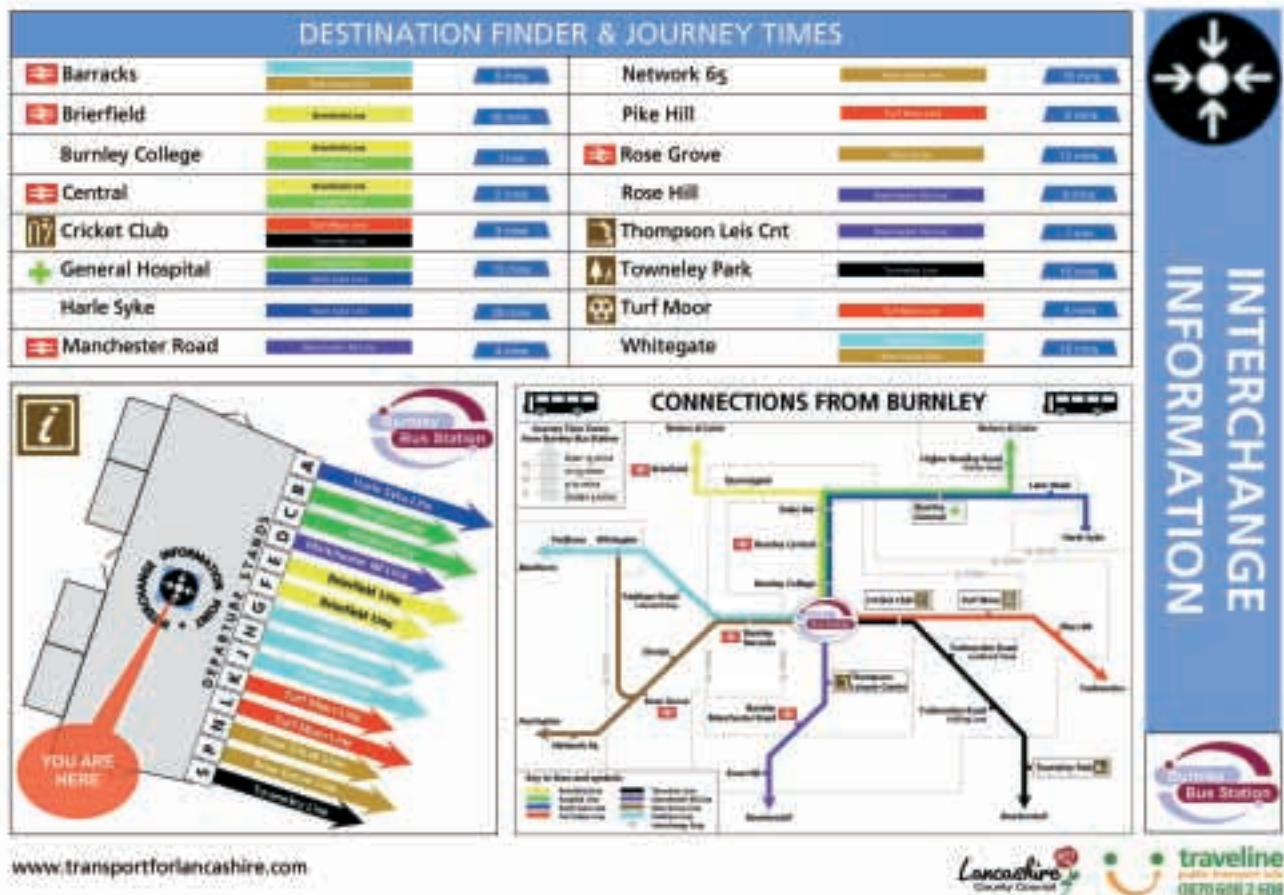
A major output of the project is a prioritised and costed action plan, covering measures to reduce barriers in all six categories. These measures range from those that can be implemented quickly and cheaply to long-term measures requiring major capital investment. This will guide work in the East Lancashire area over a number of years.

More specifically, in the short-term:

- The method of analysing service timings and frequency has been applied to Blackburn and Burnley bus stations and will guide discussions with operators to improve service linkages.
- As finance permits, improvements identified in the audits of Blackburn and Burnley bus stations will be implemented.
- The static information improvements will be implemented (including internet versions).

Carrying out this project within an overarching European project has helped in three ways:

- LiRa-2 has provided a useful conceptual framework for examining barriers.
- It has been helpful to see the approach taken by others within this common framework and to receive comments on our own work.
- There were many examples of good practice which have been an inspiration in addressing barriers to travel in our own area ■



Smartly bridging the gap; Overcoming physical barriers using information tools ■

Wolverhampton City Council and Centro are co-partners in the LiRa-2 Project. Wolverhampton is a city with a population of 240,000 situated in the West Midlands region of the United Kingdom. It lies at the northwestern edge of a largely urban conurbation that also includes the UK's second city, Birmingham and five other towns and cities. The City Council is responsible for managing and developing the road based transportation infrastructure within its boundaries. The City also participates in the formulation of public transport policy as a partner in the West Midlands Local Transport Plan. Whilst the City Council has no operational responsibility for public transport, it has strong links and partnerships with the various public and private sector organisations in the business of public transport provision. Centro is the executive arm of the West Midlands Passenger Transport Authority (WMPTA), which is responsible for public transport across the entire region. The Midland Metro Light Rail system is being promoted by the WMPTA and Centro. At the present time, the system consists of a 20 km line linking Wolverhampton and Birmingham. Extensions to the network are currently being planned.

Wolverhampton's commercial and shopping core is contained within the City's Ring Road. Also within the Ring Road, and in the northeast quarter of the central core, are the Bus Station and the Midland Metro St George's Terminus. The Heavy Rail station lies immediately outside the Ring Road and adjacent to the northeast quarter of the central core (see box). Links between the Heavy Rail, Light Rail and bus nodes are poor, both in terms of distance and journey quality. Public transport users needing to change mode at this location do not have a seamless journey at the present time – there are significant barriers to chain mobility in both the physical and conceptual domains. It is a priority of Wolverhampton City Council and Centro to rectify this situation ■



> Approach

The core elements of the remedial strategy are:

- The Wolverhampton Interchange Project (WIP), which is being promoted by the City Council in partnership with transport authorities and transport operators;
- Centro's plans for expansion of the Midland Metro system, to include the promotion of a link through the proposed Interchange and on through the neighbouring centres to the north and east.

The Wolverhampton Interchange Project (WIP) will incorporate measures to overcome the barriers to chain mobility. Design work is well advanced on the physical measures and work has commenced on the first phase of construction.

Physical measures alone however, are not a guarantee of effective chain mobility. After all, people need to be able to find out how to get to where they want to go. The LiRa-2 Pilot Action Trial undertaken by Wolverhampton City Council and Centro therefore focuses on the information systems needed to support the WIP. These lie in the conceptual domain of chain mobility.

The main aims of this project were to develop a practicable and deliverable 'state of the art' passenger travel information system for the WIP to complement the physical domain measures already committed, and to develop a means of evaluating its effectiveness prior to implementation.

Specific objectives were:

- To research all appropriate sources and prepare detailed, implementation ready proposals for a state of the art public transport information system to complement the physical and commercial measures of the Wolverhampton Interchange Project.
- To incorporate European wide best practice within the proposed system.

It has been determined that the Wolverhampton Interchange Project (WIP) will provide a high quality pedestrian, cycle and public transport link between the bus station and the Heavy Rail station. The WIP will also feature a new rail station passenger terminal, additional car parking facilities for park and ride, and a new segregated all-vehicle access road to the rail station. Bus services will be routed through the WIP, enabling stops outside the rail station as well as in the bus station.

Centro's plans for the Midland Metro Phase 2 Extensions include the promotion of the '5W's Route'. This will link Wolverhampton with the centres of Wednesfield, Walsall, Willenhall and Wednesbury to the north and east. It will be routed through the WIP so as to integrate Light Rail with bus and Heavy Rail. Metro stops will be provided within the WIP at locations convenient to both the bus and Heavy Rail stations.

Wolverhampton City Council and Centro appointed specialist consultant Atkins Transport Systems to undertake the work on their behalf. The project was managed by a Working Group, which was led by the co-partners and which included representatives of stakeholders in the WIP.

These included transport authorities, health authorities, numerous transport operators, developers and promoters of regeneration schemes. The consultant's activities were managed in a proactive manner such that the working group was closely involved in the research and design process, as well as in determining the project's direction.



Site visit in Wolverhampton

The work plan comprised of four discrete stages.

Stage 1

After preparing research, the consultant comprehensively identified the information and marketing requirements of passengers in relation to local, regional, national and international destinations. This would enable the consultant to design a set of measures that conveys this information to passengers in the most effective way possible. This in itself was a two part process; the first was a review of existing systems and research, whilst the second involved the collection and analysis of primary research data involving focus groups and face to face interviews involving both frequent and infrequent passengers (including non users) and people with different needs. Also in this stage, examples of best practice were identified through site visits undertaken by the consultant and members of the Working Group including visits to Amsterdam, The Hague, Arnhem and Maastricht (in the Netherlands), Brussels and Leuven (in Belgium) making use of LiRa-2 meetings and site visits. In addition, there were specific fact finding trips to Gothenburg (in Sweden), Helsinki and Tampere (in Finland), Manchester, Newcastle and Chorley (in the UK). All yielded knowledge that was invaluable in the development of the pilot. >>>

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Stage 2

The system development involved adopting and adapting best practice to meet user and institutional needs within the Interchange. The starting point was the development of a toolkit of ideas in which each was rated for its strengths and weaknesses, ideal and non ideal uses, accessibility/disability considerations, ease of re-siting, outline costs etc. This resulted in the production of a generic document relevant to any such similar situation. In parallel with the toolkit a gazetteer of technology and locations within the Interchange was produced, the objective of which was to minimise the possibility of confusion at the detailed design stage.

A series of options was then developed by the consultant and the stakeholders in 'design workshop' conditions. This involved detailed consideration of potential information handling systems. Other issues considered included the location of a control centre, integration of car park management, control of the CCTV system, and interaction with the emergency services.

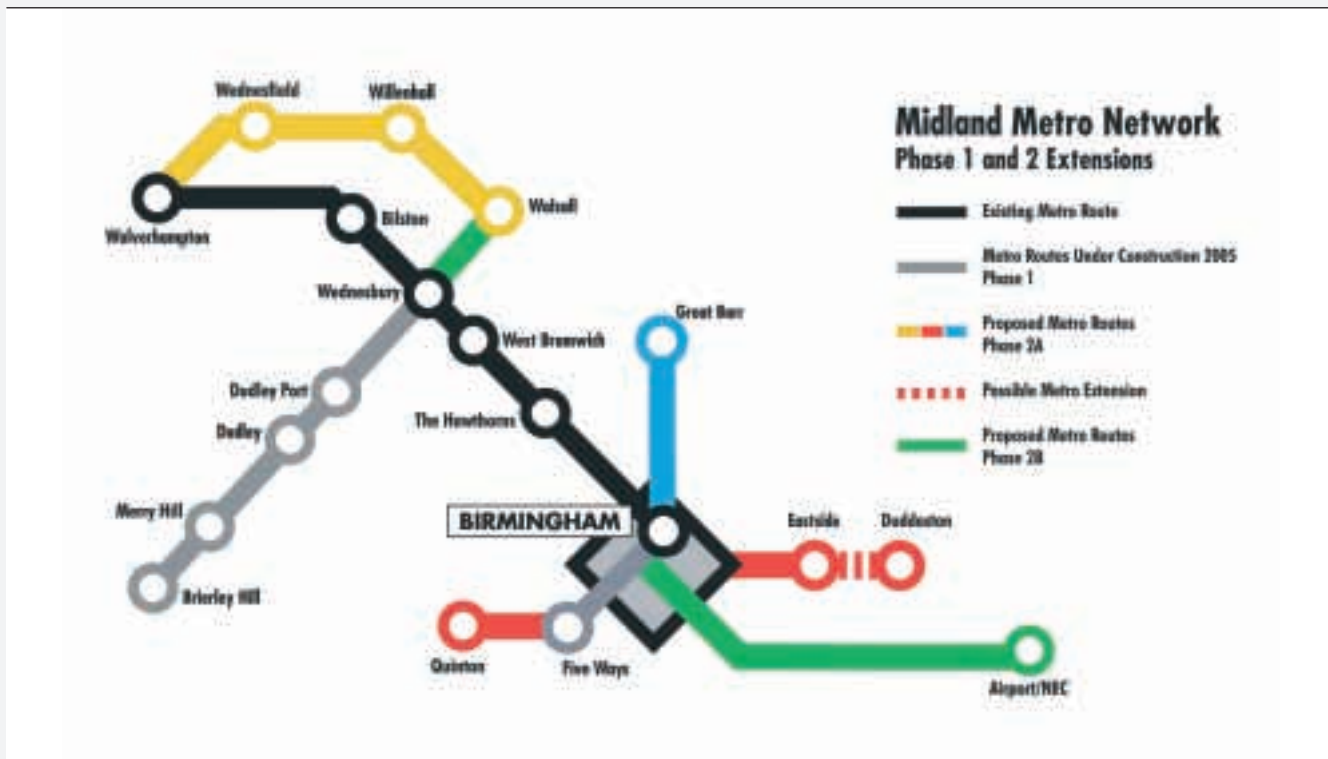
The output from Stage 2 was a draft report identifying options for developing the passenger travel information system. This though could not be finalised until the effectiveness test had been carried out as this would determine if the identified system needed to be amended.

Stage 3

Effectiveness testing was determined to be part of the project from the onset. The consultant was required to propose a test method to the Working Group and suggested that a 3D virtual walkthrough model be developed as a means of testing a number of identified scenarios and optimising system performance. The technology to be employed would enable the test to be used on any terminal incorporating a web browser; this would allow the Working Group to obtain as wide a range of views as possible on the operation and effectiveness of the system. Once a satisfactory operational information system had been achieved, this was fed back into the System Definition Report which was the final output of Stage 2.

Stage 4

Information dissemination enabled the Working Group to request the consultant to assist as necessary with the dissemination of information arising from this pilot ■



Midland Metro extensions

For the successful Midland Metro system, various extensions are being planned or investigated. The Wolverhampton Interchange Project (WIP) will be served by the yellow link ('5W's Route'), possibly in operation by 2012.

Source:
- Wolverhampton City Council

> Results and added value of European co-operation

The main output of the Wolverhampton project was a concept design for a public transport information system for the WIP that is 'state of the art', future ready, adaptable and expandable. This will be the 'foundation stone' for the detailed design and implementation stages and will enable the physical measures to be designed to complement and accommodate the information system.

The concept was presented in the form of a virtual reality model (similar to a computer game, not just a walkthrough movie) that enables the user to go anywhere and in real time (available on CD upon request). The VR model was accompanied by a Design Guide.

With the results, the WIP will be equipped with an information system enabling users to overcome barriers to seamless journeys in the following way:

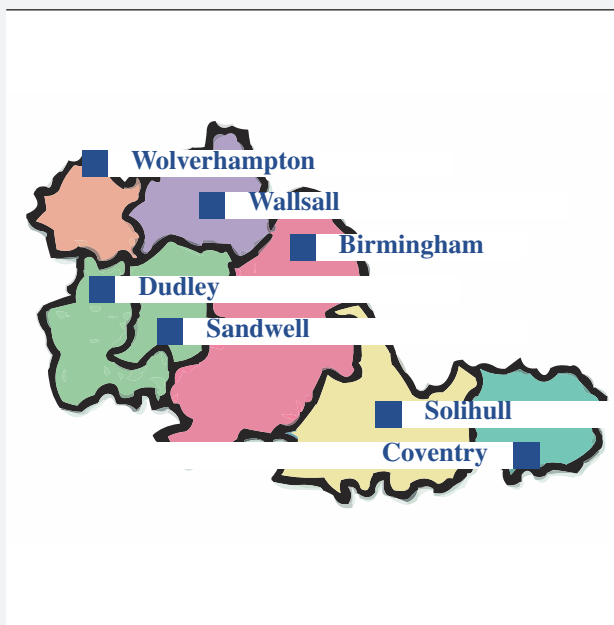
- The information system is designed and compiled in such a way that the burden of an inevitable physical barrier is significantly reduced. This is a unique joint effort solving problems which would otherwise need considerable higher investments.
- Also, clear conceptual barriers are overcome by the new system, which will feature both dynamic and static high-profile travellers' information.

The Wolverhampton Interchange Project and the extensions to Midland Metro will be significantly enhanced by the European co-operation stemming from our involvement in LiRa-2. Examples of this are as follows:

Our involvement in the LiRa-2 project has added value to a major project in Wolverhampton by facilitating the examination of a key design issue much earlier than would otherwise have been the case.

Our project has benefited significantly from the incorporation of examples of Europe wide best practice viewed at first hand during visits directly associated with the LiRa-2 project.

- The LiRa-2 partners have contributed directly to the development of our project through their visit to Wolverhampton in January 2003.
- The LiRa-2 project has served to facilitate an effective Europe wide information and knowledge exchange on a wide range of Light Rail related issues.
- LiRa-2 and the Wolverhampton City Council - Centro LiRa-2 Pilot Action Trial is the subject of a paper to 'Smart Moving 2005'; an International Conference held in Birmingham, UK in April 2005 ■



Wolverhampton - Centro: location in the UK

Wolverhampton City Council and Centro, the West Midlands Public Transport Executive, have jointly taken part in the LiRa-2 project. The West Midlands region consists of 7 seven metropolitan boroughs, including the main city Birmingham which is located in the centre of the region, and Wolverhampton in the north-east ■



Towards Euroregional seamless journeys; Breaking the barriers of national borders ■

The province of Limburg is in the south-east of the Netherlands. The majority of the province (roughly 75%) borders to other countries: Germany (the state of North Rhine-Westphalia) and Belgium (both Flanders and Wallonia). This gives the province a highly international character. This is demonstrated in the INTERREG IIIA-supported Euroregion Meuse-Rhine programme involving many cross-border co-operation initiatives.

The provincial government of Limburg is one of the twelve regional governments in the Netherlands. The provincial governments constitute the middle tier of government, sandwiched between the central government and the local authorities (the municipalities). The provincial executive of Limburg has powers and duties relating to spatial planning, transport, the environment, welfare and care and also formulates policies designed to boost the regional economy and promote tourism and culture in the province.

In the sphere of transport, the provincial government of Limburg is responsible for a network of around 600 kilometres of regional roads. It is also responsible for developing mobility-related policies in the region and for co-ordinating its implementation in association with the municipalities. Since 1996 the provincial government has been responsible for public transport in the region. Up to now, this responsibility for regional public transport has involved issuing licences to operate bus services. The provincial government will shortly also be given responsibility for two regional railway lines (Heavy Rail). In anticipation of the transfer of responsibility for these two railway lines the provincial government of Limburg has spent several years studying the possibility of introducing Light Rail operation on one of these two lines, the Maastricht-Heerlen-Kerkrade line. Although the primary focus of this project has been on the railway line itself, the province has also looked into the possibilities of expanding the system in the future, both within Limburg and across the border to the neighbouring cities of Liège (Belgium) and Aachen (Germany).

With the increasing integration of Europe there has been strong growth in cross-border traffic. This is particularly true in Limburg, given the region's historically close ties with the neighbouring countries. These ties effectuate that the residents of the Euroregion are more likely than others to work, shop and spend their free time across the border. However, cross-border public transport has failed to keep pace with this.

Significant physical, conceptual, commercial and institutional barriers have grown and are still growing. This is reflected in the fact that supply (both in terms of the network and services) is more limited and the quality and image of cross-border public transport is considerably poorer than in similar regional and national situations. The provincial government of Limburg has encountered various problems in its effort to improve this situation. It consequently decided to carry out an in-depth analysis of the barriers that hamper improvement of the cross-border public transport system and how they can be resolved in the context of its participation in the LiRa-2 project. It was decided to concentrate the analysis on two cross-border railway lines, Maastricht-Liège and Heerlen-Aachen ■



> Approach



For the survey and analysis of the obstacles to improvement of cross-border public transport various seminars and meetings with experts were organised in the beginning of the project. The participants included important stakeholders in the region: the transport operating companies (both bus and rail companies), the regional public transport authorities, the relevant cities and independent experts. The Euroregional public transport platform was established at the beginning of 2003 and its meetings provided an opportunity to assess the results of those discussions in a wider context.

Several other projects evolving at about the same time (see box) created an even greater need for closer alignment of the plans and projects of the different authorities. In 2003 this led to the creation of a Euroregional public transport platform in which all the authorities with powers relating to public transport and the public transport companies were represented.

One of the bodies in the Euroregional platform is a co-ordination committee, whose task is to prepare the decisions of the steering group. The first assignment facing the committee is to draw up a vision for public transport in the Euroregion and a plan for its phased implementation.

Following the discussions on the obstacles to improving cross-border public transport, the participants in the Euroregional public transport platform expressed considerable interest in an exploratory study into a second new rail connection between Heerlen and Aachen, which would also provide access to a new cross-border high-tech business park. A feasibility study for this new rail link was therefore carried out as part of Limburg's LiRa-2 project. The study was performed by an external consultant, DHV Ruimte en Mobiliteit BV. The results of the study are published in a separate report ■



Province of Limburg: location

Limburg is the southernmost province of the Netherlands. The southern half is part of the Euro region Meuse-Rhine, also referred to as the MHAL region (after the main cities Maastricht, Heerlen, Hasselt, Aachen and Liège, see map) ■

Sources:

- Wikipedia.org
- www.euregio-mr.org
- 5plusnet.com
- Euregio-ticket.com



Route of the Maastricht - Heerlen - Kerkrade line, scheduled to be converted to Light Rail operation

A complicating factor for the implementation of Limburg’s LiRa-2 project was the fact that fairly soon after it started the cities of Heerlen and Maastricht separately joined two other projects in the INTERREG IIIB programme, the HST-4i project and HST-Connect. As part of the HST-4i project, Heerlen joined forces with Aachen in an investment project to improve the feeding services to the HST station in Aachen. Maastricht meanwhile launched a research and investment project with Liège to improve the Maastricht-Liège rail link as part of HST-Connect. Consequently there was a need for co-ordination to avoid overlap in the different projects. At the same time, it provided an opportunity for the two cities to use the results of their respective projects to help each other.

All things considered, Limburg’s LiRa-2 project therefore took place in a highly dynamic environment of different (inter)national public trans-

port concepts, arising from policy plans drawn up by regional authorities, and different concrete projects:

Plans

- Public transport vision of the Province of Limburg;
- Plan for the public transport network for the Aachen region (Euregiobahn);
- Plan for the public transport network for the Belgian province of Limburg (Spartacus).

Projects

- Light Rail South Limburg;
- HST-4i: improving feeding services to HST station in Aachen;
- HST-Connect: improving Maastricht-Liège rail link ■

> Results and added value of European co-operation

Firstly, the project provided a clear picture of the barriers to improving cross-border public transport in the Meuse-Rhine Euroregion. Four distinct categories of barrier were identified: physical, conceptual, commercial and institutional.

The physical and technical barriers in the Meuse-Rhine Euroregion are:

- differences in the voltage of the electrical systems of the railways;
- differences in the traction used for the existing rolling stock (diesel and electric);
- differences in safety technology and related systems;
- limited capacity on the rail network in some places;
- a lack of modern trains and other rolling stock.

The conceptual barriers are:

- the absence of an integrated Euroregional travel information system and the (transnational) hardware and software to create such a system;
- the poor image of cross-border public transport due to its poor quality and the use of cross-border connections by drug users.

The commercial barriers are:

- differences in national and international tariffs and fares;
- the absence of an integrated system for ticket sales;
- problems with the settlement of costs and revenues between the transport companies.

Finally, the institutional barriers are:

- the absence of a joint and supported action plan for improving cross-border public transport;
- the absence of subsidies for cross-border routes;
- the absence of international agreements on safety systems;
- the absence of international guidelines on co-operation between railway companies on cross-border tracks.

The most important options that were identified for removing or avoiding these barriers are:

- improving the communication and co-ordination among the partners in the Euroregion with respect to planning and projects;
- increasing the involvement of the railway companies in order to improve the operations on cross-border routes;
- securing greater professional, political and financial support for projects.

The first point has to a large extent been taken care of with the creation of the Euroregional public transport platform. Even before the platform was established, there was a working group in which the public transport companies, in particular, made arrangements on the operation of cross-border routes and for joint promotion of them. The effect of these agreements was limited, however, since they related only to everyday operations. The Euroregional public transport platform provides a broader basis, including political support and also extending to policy. It provides a more robust structural basis for co-operation in the Euroregion.



The railway companies have been involved in the Interreg IIIB projects HST-4i and HST-Connect from the outset. Although this is logical since they will have to carry out the projects, all too often in the past the companies have only become involved after the plans for the project had been largely finalised. The speed of execution of the project suffered as a result. The simultaneous involvement of public and (semi-)private parties requires that they are aware of each other's interests and find solutions together.

The closer co-operation and consultation between the parties has, finally, led to the awareness that if we want to bring Europe closer to the citizen, particularly on a regional scale, issues have to be addressed at a cross-border level. This awareness, particularly at political level, has already led to broader support and increased financing (including European!) for projects.

DHV's feasibility study came up with a possible alternative for the problems surrounding the capacity on the track from Heerlen to the German border. This alternative will be considered in the formulation of the vision for public transport in the Meuse-Rhine Euroregion.

The development of the Euroregional public transport scheme will probably yield concrete proposals in 2006. The implementation projects HST-4i and HST-Connect will run until 2008. There is therefore enough time to apply the knowledge gained with the LiRa-2 project in the concrete plans for improving the cross-border connections in the Meuse-Rhine Euroregion ■



Information is everything. Fundamentally reforming travel information systems in the Province of Gelderland ■

Gelderland is one of the larger provinces in the Netherlands. It is situated in the mid-east of the country and borders Germany. The province features several mid-sized towns (such as Arnhem, Apeldoorn and Nijmegen) as well as extended rural and countryside areas with many smaller towns and villages. The transport-related responsibilities and tasks of the provincial authority (based in Arnhem) are the same as those of Limburg regional roads and mobility-related policies. Also the province is the commissioner for regional (and in some cases local) public transport. In this capacity it is responsible for contracting regional bus and rail services in the province. Whereas the Province of Limburg is in the starting phase of this task, the Gelderland authorities now have first experiences on five regional Heavy Rail connections. This includes the multi-modal concessions to Syntus, allowing for the combination with feeding buses to stations (fishbone network).

The Province of Gelderland works with a Network Policy Document regarding public transport. The main strategic targets are:

1. Significant growth of the amount of traveller-kilometres of public transport: calling for a regional express bus network.
2. To maintain sufficient services to provide basic mobility for all: calling for an underlying network in close co-ordination with the express and rail networks.
3. To improve cost coverage by using market mechanisms.

Over the last few years the provincial authority of Gelderland has taken several measures to fulfill these targets. These include faster connections between the major municipalities in the province. It has also taken measures to improve public transport between Gelderland and the rest of the Netherlands. Interchange connections between buses and trains have been improved. Railway stations are meant to become well-equipped hubs, optimally facilitating seamless journeys.

As supporting targets, the province has highlighted the provision of reliable multi-modal travel information and the unhindered flow of (especially) buses. Because of this, the Province of Gelderland has taken up the matter of (static and dynamic) travel information. It was already referred to in the introduction that travel information is a very important part of the 'fringe services' of quality rapid transit. The province has, as a part of the general public transport policy, taken the initiative to reform and standardise the travel information system province-wide, partly supported by the LiRa-2 project. This section will describe the efforts to improve static as well as dynamic travel information ■

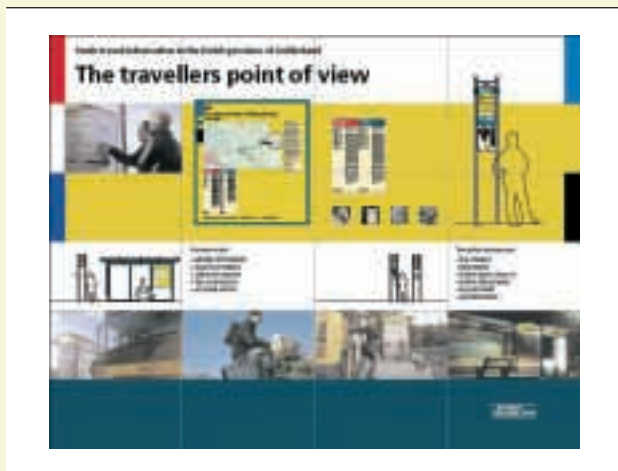


> Approach

Static travel information

The province started the project in 2001. An analysis of the strengths and weaknesses of existing travel information made clear that considerable improvement of the static travel information was required. To this end, various national and international concepts were examined and discussed. Based on their research results, the main themes of a Gelderland Travel Information concept were drawn up with regards to content and the 'look' of all transfer points and bus stops. It was considered essential that the following minimum information should be displayed at bus stops:

- Modality, line number and destination;
- The tariff zone number and boundaries;
- The departure times;
- The route with intermediate stops/place names;
- A map of the line;
- A list of destinations near the bus stop (and if possible a local map or a district/town map);
- The logo of the transport company on the departure time schedule and/or on the information panel including the express bus logo where applicable.



It has to be underlined that the concept involves a shift in the responsibilities regarding travel information, as it used to be the operators that had the task of informing the people of their services in an appropriate way. The province has taken over this responsibility, with the operators bearing responsibility for adequate supply of the input information. The obligation of submitting information is becoming commonplace in the Netherlands, in relation with the national travel information service (phone and e-mail).

As a basic structure for the Gelderland Travel Information concept, a proposal was made to convert the current (typical) Dutch bus stop post into an information column (particularly important for stops without a shelter). Also, it was decided to standardise and improve the information panel in shelters with regard to contents and form. Important aspects were uniformity and readability.

The concept was tested by a panel of commuters and a cross section of the Public Transport User Platform. Their comments and recommendations were noted and further developed by the project group. This led to the Requirements (Travel) Information Gelderland report. These specifications were developed in detail with regards to the user, design and functional requirements. Visuals were produced showing how the information would appear on the information columns (bus stop post) and the information panel in the shelter. As part of these preparations, a distinction was made between the regional situation with a few bus services, and the urban situation with many different bus and sometimes trolleybus services. An 'ex ante' evaluation showed that the overall travel information concept (new shelters, new static travel information) including new bike shelters was good: on average, customers gave an 8 (on a scale of 1 to 10).



Meanwhile, in October 2003 the Province of Gelderland won the UITP¹⁾-Travel Information Award for the concept. At the time, much of the attention was focused upon dynamic travel information. It may have been decisive that Gelderland had placed so much emphasis on the traditional side of the field of travel information as most of the other final nominees had submitted initiatives regarding dynamic information systems.

According to the jury, the quality of the information strongly benefits quality rapid transit as a whole. Not only because of the practical transfer of information, but also as a branding tool.

The roll-out started in 2004, around the time of a visit of the LiRa-2 Steering Committee to the province. In the coming time, the concept will be implemented throughout the entire province, with the exception of the Arnhem - Nijmegen Urban Region²⁾. Before the end of the year 2005, about 400 new bus stops with the improved static travel information panels and about 1100 information columns in the new pillar style will have been installed. Moreover, as some of the transport companies are researching the possibilities of rolling out the concept to other parts of the Netherlands as well, the project already seems to be a success. >>>

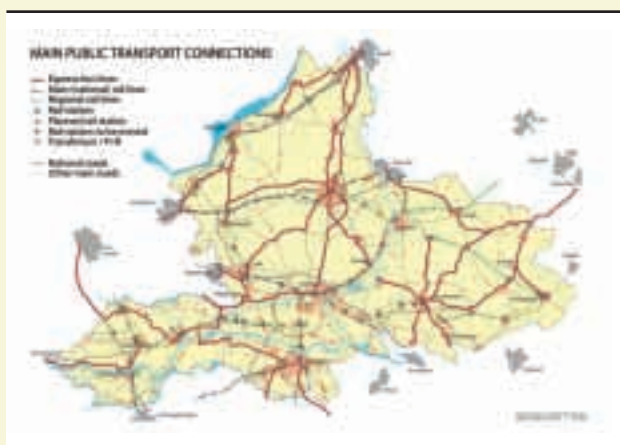
¹⁾ UITP: Union Internationale des transports publics, International Association of Public Transport

²⁾ Here, an independent regional authority is in charge of public transport matters

>>>

Dynamic travel information

Apart from improvement of static travel information, the province has also been working on improvement measures regarding dynamic travel information. With advanced dynamic travel information systems (DRIS), the service to the traveller can be substantially improved. DRISs are based upon innovative ICT technology. To create a reliable and sustainable provision of information, the province has concluded that apart from an orientation regarding technological possibilities, a sound and proven organisational structure of DRIS is just as important, if not more important. This has received full focus with the DRIS project plan which was developed.



Just as with the static information, the province has, as a territorial authority, taken the initiative to develop a multi-modal, territorially-organised DRIS. As basic functionalities of this 'Gelderland provincial DRIS', the province has formulated the following three main points:

- A Offering dynamic multimodal information, on a collective as well as on an individual basis.
- B Using information to promote unhindered flow of public transport, by prioritisation at traffic lights (using short-range radio technology).
- C Drawing management and monitoring information.

The main structural parts of a territorial DRIS are:

- A central database and processing unit, where the various data streams come together;
- This can be a responsibility of the contracted operator or the public transport authority (e.g. the province);
- Board computers in the vehicles, in this case buses and rail vehicles operating in the province;
- This is a responsibility of the vehicle owner (usually the operator). The board computers have GPS (Global Positioning System) or a similar navigation device;
- Short-range radio interface with the traffic lights that are managed with the system;
- Interfaces to the end users of the information (travellers);

- This can be collective dynamic information, displayed on screens at bus stops or bus terminals. Various sorts and sizes of displays are possible, dependent upon the design and function of the bus stop: one or more lines, only bus or also Light Rail, etc;
- It can also be individual travel information, with the traveller requesting specific information. Various channels can be used, e.g. the mobile phone or the internet.

For the configuration of the central database and processing unit, two variants were worked out:

Central management

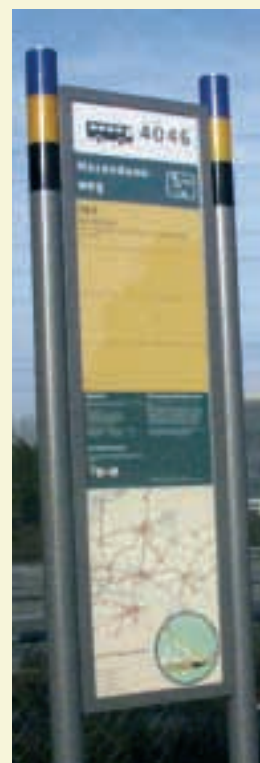
There is one server for the entire region / province; the public transport authority (province) is responsible for the logistics of processing the information; the operators are responsible for the integration of the information in their board computers

Management with concession holder

There are several servers for the various operators, who are responsible for the operation and management. This means the tasks for the operator(s) are more extended and they have to work together with other operators. The task for the province is more limited.

Because of this strategic perspective, the last applications for the traveller as the end user have not yet been the central part of the project. As part of the DRIS programme, no 'flashy' hi-tech devices / concepts have been developed; the province has concentrated on creating the right basis, which can later be used to develop the channels to direct the information to the end user. Together with national and regional partners, the province is currently working on the IRIS concept (Individueel ReisInformatie Systeem, individual travel information system), which is the outline of a future system that channels the information to the user.

The conclusion is drawn that the optimal model is strongly dependent upon the role that the transport authority wants to play. As with the static travel information, a clear role for the authority involves more tasks but does create a better foundation for a well-maintained and sustainable Dynamic Travel Information System. This takes place by central management of the information flows, as well as the authority's function as a co-ordinator in close contact with the many other actors in systems like this ■



> Results and added value of European co-operation



The integration of the Gelderland travel information developments within the LiRa-2 project has generated interesting transfer of knowledge with respect to the significance travel information, and the organisation of its provision. The province has initiated a centralised concept serving all modes of quality rapid transit on a regional scale. This active position of the regional transport authority (in this case the province) potentially yields a uniform, high-quality, well-managed and up-to-date result when it comes to static travel information. Also in the case of dynamic travel information systems, an active role of the transport authority proves to contribute to its success. The active role of the province breaks commercial and institutional barriers ■



The Achterhoek model, combined concession bus - rail

The Dutch rural 'Achterhoek' region, which is situated in the Eastern part of the Province of Gelderland, has had light train services on various diesel lines for some years.



While this has given a considerable boost to rapid transit's achievements, it would not have been such a success without the inter-modal concession. To let the same company (Syntus) operate both bus and rail services creates an important network effect, especially in low-populated regions as this

one. The fishbone model could be used to optimise feeding to the rail stations, with the rail line as a backbone of the regional transport: This way there is no parallel running, rail is used most efficiently with the bus lines connecting at the stations ■



Sources:

- Syntus
- The Province of Gelderland

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Planning and Design Expert Sessions ■

A part of LiRa-2 was an active and implementation-focused transfer of knowledge: planning and design expert sessions. These involved visits of international expert teams to a partner region to critically judge, and assist in Light Rail station and hinterland designs and the use of Quality Rapid Transit as a planning tool.

During the project, two planning and design expert sessions were initiated. The first was in Stockport, near Manchester (UK) in 2004, the second will be in Delft (The Netherlands) in 2005. In both cases the redevelopment of areas near a railway station was at stake. Here a short summary is given of the reports that can be found on the LiRa-2 website.

Stockport

Stockport, situated south of Manchester, is a town with a complex geography in a period of change. Provision of the best possible public transport is vital to the town's future prosperity and quality of life. In order to achieve this, it is essential to create a shared vision amongst different stakeholders of how to better integrate public transport into the fabric of the town centre, especially in view of the Master Planning exercise being undertaken by Stockport Metropolitan Borough Council (MBC). In particular, there is need to identify an east-west alignment, initially for a prioritised bus route, but with the potential for conversion to Light Rail, as an extension of the Metrolink system.

Both transportation and planning issues were presented to and reviewed by the experts from the LiRa-2 partner regions. Several options for solutions were presented and discussed. The recommendations of the session were:

- The location of the bus station and the possibilities to relocate it (partially) to the railway station.
- The possibilities for realignment of the bus services, in combination with the transport corridor foreseen and the location of the bus station.
- The introduction of a frequent circular bus line connecting railway station, upper and lower centre.
- Alternative Metrolink routes through the centre and the consequences with respect to spatial reservations.
- The connection between Metrolink stops and the bus network.
- The link between the lower town centre (Metrolink and/or bus station) and the railway station: investigation of options.

Delft

Delft is a mid-sized town some 10 km south of The Hague, part of the City Region of Haaglanden. The Expert Session concerns the redevelopment of the area around the suburban rail station Delft South. The regional authorities and the railway company have plans to ameliorate the Heavy Rail service from two trains per hour to four, perhaps even six. A part of the scheme would be to invest in new 'light train' rolling stock, instead of the present 40-year-old trains. This creates new opportunities for the area, where there are some derelict industrial complexes. There are also new high-tech industry developments, but there is no real connection with the station. To introduce international expertise and criticism, it has been decided to have a planning and design expert session. A team of experts from Belgium and the United Kingdom will assess the plans and give recommendations on the integration with the upgraded public transport system ■

Rapid Transit Options Assessment Tool ■

One of the projects of Interreg III is LiRa-2. A sub-project within LiRa-2 is the development of a rapid transit options assessment tool: a software tool that supports decisions on the rapid transit techniques. The Rapid Transit Options Assessment Tool has been developed to be used in the early stages of a project to assess the feasibility of a technology to be selected for a new public transport link in a city, region or corridor.

The target was to build an 'easy to use' instrument which gives results in one day. Therefore many default values are available. The user has the opportunity to enter any more accurate information he may have available into the model.

The rapid transit options assessment tool has been developed on the directions of the city region of Haaglanden and HTM by AGV mobility advisors for use in North West Europe. During its development contributions were made by LiRa-2 partners and consultants from Belgium, Germany and the UK.

The tool consists of two parts (figure 1):

1. The calculation of passenger numbers and costs (i.e. the Demand Forecast part).
2. A method for comparing the use of different public transport technologies (i.e. the Technology Comparison part)

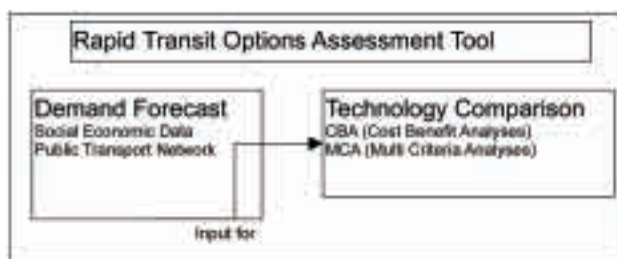


Figure 1, structure of the Rapid Transit Assessment Tool

The calculation method of both components uses default values for each country, which may vary depending on the circumstances. The user may modify any parameters that deviate from the default situation.

Demand Forecast

The Demand Forecast part allows data to be gathered for a particular study area, such as on the residents, jobs and existing public transport, from which the existing transport pattern can be calculated. A new public transport link can subsequently be introduced and the passenger numbers, operating costs and investments are calculated.

Technology Comparison

The Technology Comparison part compares the data on investments, passenger numbers, vehicle utilisation and commercial operation for the various technologies. Qualitative elements such as quality, public transport comfort and the environment also play a role in the comparison. Public transport technologies are ranked by means of weighing up quantitative and qualitative arguments ■

> Demand Forecast

Grid data

In the model all data are stored on a grid, which simplifies the input and management of the data compared with the more traditional models that are based on areas and public transport lines. The most important behavioural characteristics are determined according to degree of urbanisation, which is a measure of the density of residents by area.



The socio-economic model locates the residents and jobs on the grid. Attractions (e.g. museums, beaches, exhibition halls and other places where many visitors gather) and external points (where public transport lines enter and leave the study area) are part of the model.

Nine different types of public transport have been identified, and are referred to as the technology types. This typology is identical to the one used in the Technology Comparison model. The characteristics of each line are entered as type of technology, whether or not it stops in each grid cell, peak periods and daily frequency.

Trip production

The trip production model uses residents, jobs and production factors to calculate the number of departures per grid cell according to the degree of urbanisation. A daily model is assumed in which arrivals are equal to departures. It is assumed that the number of departures in a cell, besides the socio-economic content and trip production factors, is also dependent on public transport availability in the cell concerned. Therefore, a public transport quality is determined for each cell, where the quality of the specific public transport form and the waiting time is taken into account. The feeder transport sub-model consists of two parts. The first to be determined are the direct feeder transports to train stations, in so far as they do not involve public transport. The other departures in the grid cells are then allocated to grid cells with public transport stops.

A gravity model is used to distribute the departures over the arrivals. For the distribution, the model computes a resistance matrix between all public transport stops. The result is the trip matrix between public transport stops. A shortest route algorithm has been implemented, which does take the different feeder and distribution transport options into account. Operational costs are also computed during the assignment, resulting in the total data for the area and per public transport type, and including the number of passengers, passenger kilometres, revenues and costs.

Reporting

The reporting function produces three types of reports:

1. Reports with the data for the Technology Comparison part.
2. Map images and aggregate information belonging to the Demand Forecast model run.
3. Detailed reports for an accurate study of the model results and calibration ■

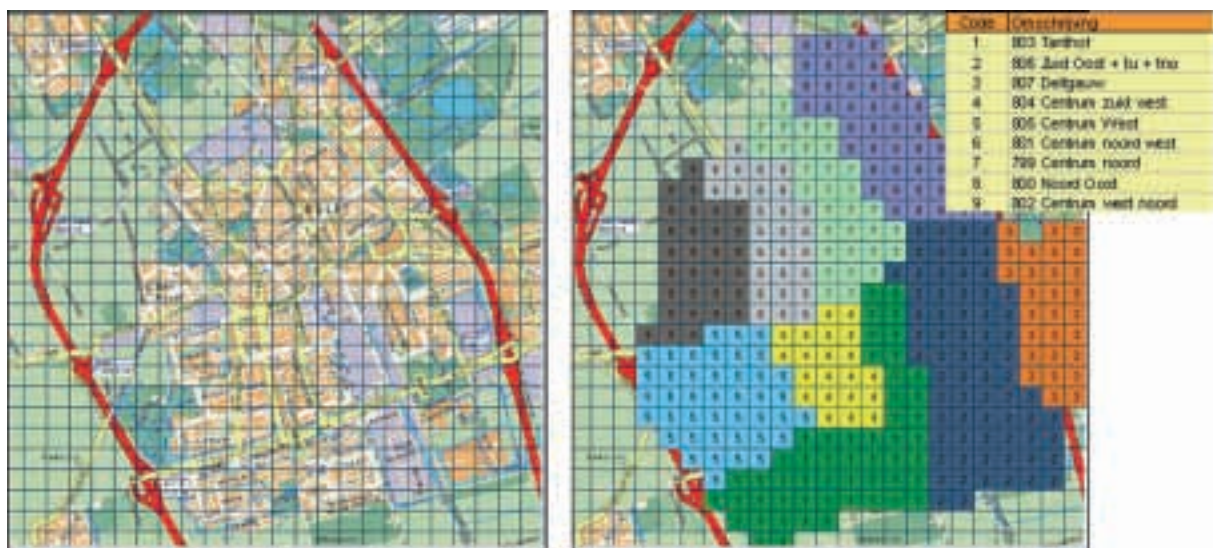


Figure 2, grid structure and socio economic data

> Technology Comparison

For the development of the Technology Comparison model the existing THOM-PIOV model was used. THOM-PIOV is used by the Ministry of Transport, Public Works and Water Management for supporting infrastructure investment decisions. The THOM component enables the various candidate technologies to be compared on both financial and non-financial aspects. This comparison takes into account existing and new public transport passengers, road users and investment costs. The most important intermediate results are the cost coverage ratio and the commercial performance. The intermediate results lead up to a CBA (Cost-Benefit Analysis) and then the NMS (Net Monetary Score), which is the indicator for the social performance of a project and one of the criteria in the MCA (Multi Criteria Analysis) for determining the best technology for the new link.

Cost-Benefit Analysis (CBA)

Various data have to be determined in order to perform a Cost-Benefit Analysis (CBA). These data are determined in the Demand Forecast part or are given as input.

Multi Criteria Analysis (MCA)

The MCA involves scoring the technologies on many criteria. One of the MCA criteria is the result of the CBA. The outcome of the MCA is a value per technology. The scores are between 0 and 1, where a score close to zero indicates the best alternative in social terms. This technology will get the preference. See figure 3 for an output screen with Light Rail as the best alternative ■

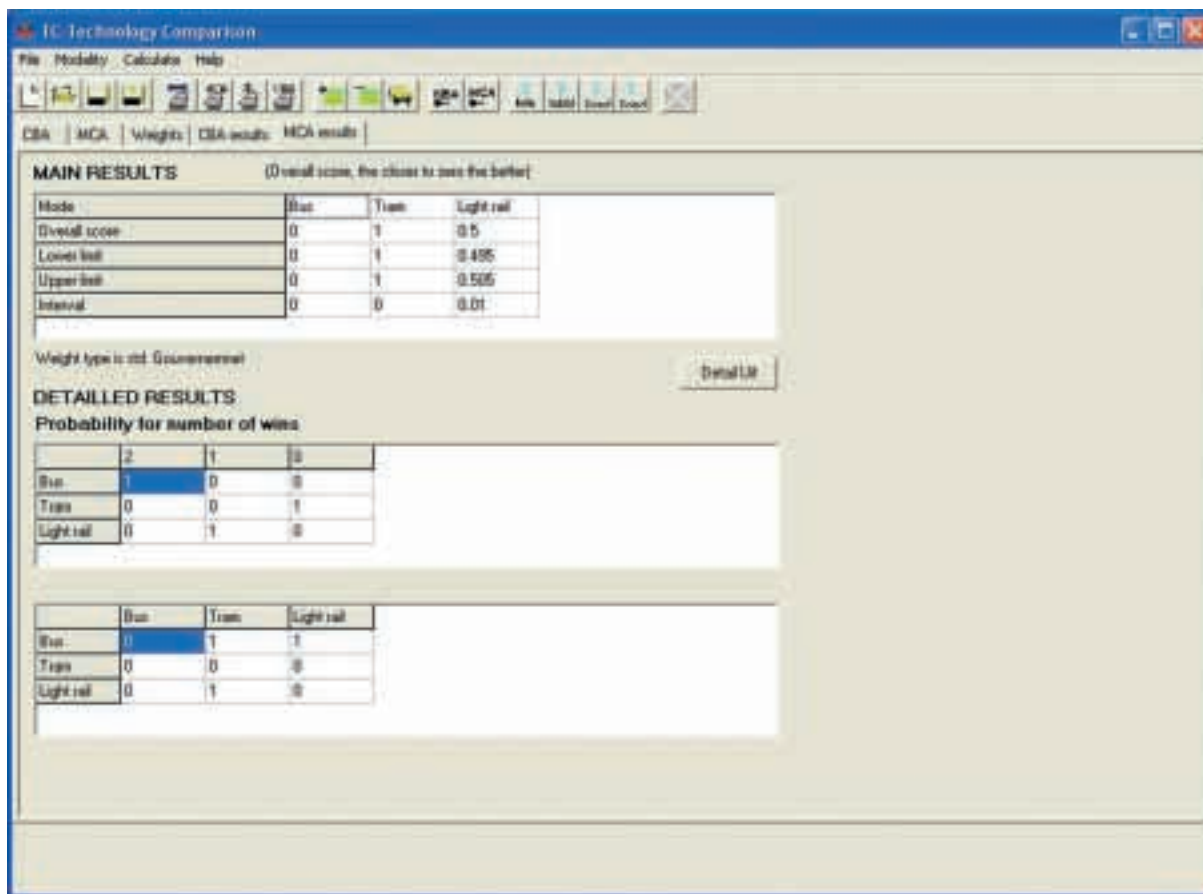


Figure 3, Results of the MCA analysis

Final thoughts LiRa-2: From Vision to Action ■

The LiRa-1 project came up with valuable and innovative know-how on the general conditions for quality rapid transit. The results of its successor LiRa-2 are more related to the way the quality can be obtained, working on other aspects than infrastructure and vehicles, in a 'hands-on manner': focused on implementation.



> Final thoughts

As the main common issue, the 'Seamless Journeys' theme has provided a very useful general background, against which all LiRa-2 actions can be positioned: working on the four barriers to seamless journeys is the approach to get to quality rapid transit. Indeed, the partnership underlines that, while the local and regional settings are hardly ever the same, this may help to solve problems that exist in many cities and regions in and outside Europe.

'Breaking barriers in public transport' has gradually become the project's slogan. Altogether, the partnership has been very creative in discovering ways of overcoming the barriers, whether in existing or developing systems of quality rapid transit. Final target: to get to implementation-ready solutions that work.

Below some particular successes of this are highlighted.

Bridging a considerable physical barrier was central in the project of the City of Wolverhampton, together with Centro. While the 'hardware' needed will be realised anyway, there will still be a considerable walking distance between the rail station, bus station and Light Rail stop. Smart 'software', an integral, state-of-the-art information system will work in the conceptual domain and alleviate the distance to be covered.

It can very well be concluded that travel information is probably the most important fringe service of public transport. This might seem an obvious deduction, and indeed, travelling information has recently been receiving more attention. However, if one takes a good look at the travel information needed when one wants to make seamless journeys, the crucially supportive function becomes clear. Basic, bottom-up, low-tech static travel information is just important as modern, dynamic state-of-the-art services - if not more important. This has come back on several occasions in the project. Apart from the Wolverhampton Interchange Project, the award-winning solutions of the Province of Gelderland, and the measures proposed by East Lancashire & Greater Manchester PTE strongly point into this direction.

Of course, travel information should be supported by marketing of Quality Rapid Transit. This includes the creation and marketing of an easy-to-understand core network, but also the awareness of public transport as a whole, especially if well-co-ordinated by partnerships (e.g. between operators, site owners and local / regional authorities).

The LiRa-2 project has also given attention to the development of new systems. For the Belgian partners 'Light Rail' and 'quality rapid transit' are rather new, in many respects promising concepts. The Province of Vlaams Brabant and the Ministry of the Brussels Capital Region could significantly draw on the experience of other partners. In close observance of the four barriers, they introduced 'seamless journeys-proof' way of planning with solid feasibility audits on two corridors (Brussels - Boom and Brussels - Leuven). This sub-partnership has worked on

optimal design of seamless transfer locations, connecting onto the existing Brussels systems.

In this respect, Haaglanden and HTM have taken the lead in the development of a smart software tool, together with other partners. The result is a transparent, bottom-up easy-to-use software tool which works for the three LiRa-2 countries, plus Germany. The tool is freely distributed on a 'controlled circulation' basis.

Breaking institutional barriers pertaining to national borders was central in the Limburg project. Nowadays, it is a logical move for people, but also socio-economic processes cross the area's borders (Germany, Belgium and the Netherlands). Consequently, there are many border-crossing projects and initiatives. Still, it remains a terrifically complicated problem to get to a Euroregional quality rapid transit system with the partners over the border. The province has mapped what barriers to seamless journeys may exist, and how they can be overcome. It will take time, but perseverance pays.

But how does all of this change the way we build and improve public transport, now and in the future?

First of all, we know Quality Rapid transit cannot get everywhere, no matter how high-profile or good-looking a system and its rolling stock can be. Accessibility, carefully designed interchange nodes, smart and innovative policies in pre- and end-transport are crucial elements of the physical domain.

Secondly, fringe services are just as important as core services: they should be treated that way. This might be just as important as investments in new systems and new infrastructure.

Thirdly, it has become clear that main and universal elements of seamless journeys are quality, reliability, and transparency, using targeted, low-cost and easily implemented measures that put the user first. The customer should be placed central, including the information he or she needs. This also includes professional marketing and branding.

The Seamless Journeys concept is, therefore, truly worth while, to make public transport as a whole more attractive. Therefore, the LiRa-2 partnership advocates that quality rapid transit can make a great deal of progress if constant and consequent work is done on the breaking of the four barriers ■



Colofon ■

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The LiRa-2 project consists of the following partners, who were contributors to this report:

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Province of Limburg	NL	Mobility	Mr. Marc Onnen
Province of Gelderland	NL	Roads, Traffic and Transport	Mr. Gerard Zijlema
Greater Manchester Passenger Transport Executive	UK	Network Strategy	Mr. Nick Hallett
Lancashire Economic Partnership	UK	Business development unit	Mr. Nick Briggs
Wolverhampton City Council - Centro	UK	Regeneration & Transportation Metro Development	Mr. David Orton Mr. Chris Chatfield
Province of Vlaams Brabant	BE	Infrastructure - mobility and roads	Mr. Kris Lambrechts
Ministry of Brussels Capital Region	BE	Equipment and transport – transport policies	Mrs. Christel Straetemans
HTM, The Hague Tramway Company	NL	Development of public transport	Mrs. Esther de Kler Mr. Hans Westerink
<i>Co-ordination and secretariat</i>			
Buck Consultants International	NL	Economic development, spatial planning, transport and infrastructure	Mr. Adriaan Nuijten



All addresses and links to partner websites can be found on www.lira-2.com, please do not hesitate to contact us. The LiRa-2 partners would like to thank all the consulting companies and other organisations that contributed to the project.

