

PROVISION OF BUS-BASED PUBLIC TRANSPORT FACILITIES IN DUBLIN CITY

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ABSTRACT:

The Quality Bus Network (QBN) is a low cost solution to provide public transport infrastructure with a high level of priority for public service vehicles on the existing road and street network in Dublin. The QBN is being provided in the short to medium term to enable the city to cope with the transport demand prior to the implementation of a high cost metro and light rail system. There is an annual investment of between €30m and €40m in the QBN infrastructure works.

To date the programme has been very successful with increases in the number of public transport users on the upgraded QBN routes ranging from 40% to 200%. There is also a significant increase in the modal share for buses together with a significant reduction in bus journey times.

The designs for the bus priority measures on the QBN take account of the needs of all road users. There have been significant safety benefits on the routes due to the provision of enhanced cycle, pedestrian and mobility impaired facilities as part of the overall route designs which also provide for accident remedial measures at existing 'black spot' locations.

RÉSUMÉ : Le Réseau d'Autobus de Qualité (RAQ) est une solution bon marché pour fournir à l'infrastructure de transport public un niveau élevé de priorité pour les véhicules de service public sur le réseau de routes et de rues existant à Dublin. Le RAQ est assuré du court au moyen terme pour permettre à la ville de faire face à la demande de transport avant la mise en oeuvre d'un métro coûteux et d'un système de rail léger. L'investissement annuel dans les travaux d'infrastructure du RAQ est de 30 à 40 millions d'euros (€).

Jusqu'à présent le programme a été couronné de succès avec des augmentations du nombre d'utilisateurs de transport public sur les itinéraires améliorés du RAQ allant de 40 % à 200 %. Il y a également une augmentation significative de la part modale pour des bus de même qu'une réduction significative du temps de voyage en autobus.

Les conceptions pour les mesures de priorité des autobus sur le RAQ tiennent compte des besoins de tous les usagers de la route. Il y a eu des bénéfices significatifs de sécurité sur les itinéraires en raison de l'amélioration des équipements détériorés pour les cycles et les piétons tout comme les conceptions globales d'itinéraires qui pourvoient aussi des mesures pour remédier aux accidents aux 'points noirs' existants.

1 INTRODUCTION

Dublin is the capital city of Ireland with a population in its catchments area of 1.5 million people. The population is expected to grow to 1.75 million by 2016. This has major implications for the provision of all types of infrastructure ranging from

water treatment, education, health, etc to transportation.

In 1994 the Irish Government approved a transport strategy for Dublin. The strategy was known as the Dublin Transportation Initiative (DTI). This strategy had 3 critical objectives:

1. the production of a long-term Transportation Strategy to 2011 for the Dublin area.
2. the preparation of a medium term Investment and Implementation Programme up to 1999.
3. the putting in place of a continuous Transportation Planning Process.

The Dublin Transportation Office was set up in 1995 to deliver the continuous Transportation Planning Process and in 2000 it published its strategy for 2000-2016 entitled 'A Platform for Change 2000-2016'

'A Platform for Change' is the blueprint for the future development of transport policies and infrastructure in the Dublin area up to 2016. It is the most comprehensive transportation strategy ever devised for Dublin and it also seeks to provide a strategic solution to current traffic problems. It is an integrated approach to deal with travel needs and land use development.

1.1.1 THE TRANSPORT INFRASTRUCTURE PROPOSALS TO 2016

The Platform for Change strategy was based on a vision for Dublin taking account of what type of city the people wanted. The Vision Statement for Dublin is:

- a city and region embracing the principles of sustainability
- a leading European City, proud of its heritage, and looking forward to the future
- the national capital, seat of government and centres of excellence
- a strong, dynamic and sustainable city
- a living city, on a human scale, accessible to all and providing a good quality of life for all its citizens.

'A Platform for Change' has two main elements which must be implemented for it to be successful:

- the provision of new transport infrastructure
- the implementation of demand management.

The overall objective is to reduce current and predicted levels of congestion to 1991 levels. It is clear that the provision of infrastructure and im-

proved services alone will not accomplish this without the implementation of demand management measures.

The provision of new transport infrastructure and associated service improvements aims to increase the supply of facilities available through a substantial expansion in the public transport network, strategic road construction and traffic management measures.

The demand management initiative aims to reduce the growth in travel demand through the application of land use and other policies and the encouragement of a transfer of trips, especially at peak periods, from the private car to sustainable modes such as public transport, cycling and walking.

The public transport elements of the strategy aim to provide for approximately 300,000 trips in the morning peak hour of 2016 compared with 70,000 in 1999. To achieve this it will be necessary to create an integrated public transport network system with the following components:

- upgraded rapid transit suburban train network
- light rail network
- metro system
- expanded and upgraded bus network
- park and ride facilities
- integrated ticketing and real-time passenger information systems
- quality interchange facilities

Fig. 1 gives an overall view of the extent of the public transport proposals.

figure 1

Public Transport Networks



Figure 5.5

Source: "A Platform for Change 2000-2016"

There are also substantial upgrading and improvements to be carried out on the strategic road network with special emphasis being placed on the orbital routes bypassing the city, access for the port and airport and strategic links to the major growth centres of employment.

The traffic management measures incorporated in the strategy include the provision of:

- cycle routes and cycle facilities
- parking control and enforcement measures
- traffic management control systems with the emphasis on ITS
- pedestrian facilities
- traffic calming and accident reduction measures
- village improvement schemes.

The overall cost of the package of measures is €21 billion up to 2016. An essential part of the strategy is the need to address the short-term transportation needs of the city and region and the emphasis is on bus based public transport improvements particularly in the period up to 2006.

Table 1 shows the breakdown of capital costs of the infrastructure and service improvements elements of the Strategy for the periods 2000-2006 and 2007-2016.

Table 1 Capital Costs

Capital Costs (€ million)	2000-2006	2007-2016	Total
Metro	1,270	5,951	7,221
Light Rail	1,317	808	2,124
Suburban Rail	2,307	3,275	5,582
Quality Bus Network	617	190	808
Integration of Systems	197	197	392
Roads	4,134	1,234	5368
Traffic Management	184	184	367
Total	10,026	11,838	21,862

Source: A Platform for Change 2000-2016

2 The Quality Bus Network

Buses are the most flexible form of public transport. The bus is, consequently, the most extensive form of public transport in the Strategy in terms of route length and geographic coverage. Quality Bus Corridors and bus priority measures can be implemented relatively quickly and cheaply. They therefore provide the best means of dealing with the existing transportation deficit in the short term.

Quality Bus Corridors are constructed so that buses are not delayed in traffic. This involves the use of traffic management measures such as with-flow and contra-flow bus lanes, one-way streets bus only roads, the use of selective bus detection technology and priority at traffic lights, bus gates and queue relocation. They have direct, high frequency services with extended working hours.

The Project Office has developed a Work Breakdown Structure (WBS) as a Project Management tool to ensure that all aspects of the design for the bus priority measures are taken into account.

The main WBS sections are set up as follows:

1. Concept Feasibility

- Topographical surveys
- Traffic surveys
- Bus Information
- Accident Information
- Route Audit
- Option Development & Assessment
- Feasibility Report
- Selection of preferred option at roundtable meeting with all agencies

2. Preliminary Design

- Junction and route design
- Traffic Modelling – TRIPS, SATURN, PARAMICS
- Utility Information
- Safety Audit Stage 1
- Roundtable Meeting of all agencies

3. Statutory/Legal

- Public Consultation process
- Council Approval
- Statutory Approval
- Statutory Orders

4. Detailed Design

- Instructions to Tenderers
- Detailed Design Drawings
- Bill of Quantities
- Specifications and Standard Details
- Preliminary Health & Safety Plan
- Safety Audit Stage 2

5. Procurement

- Tender Process
- Recommend Contractor

6. Construction

- Appoint Contractor
- Appoint Resident Site Supervisory Staff
- Arrange Payments of Certificates
- Health & Safety Plan
- Negotiate Final Contract Account
- Safety Audit Stage 3

7. Commissioning

- Launch Scheme
- Confirm Bus Operators adherence to agreed speed frequency
- Carry out Scheme Evaluation

A large amount of effort is being concentrated by the QBN Office on the design of bus priority measures on the main radial routes from the outer suburbs with special emphasis being placed on the conversion of the hard shoulders to bus lanes during the peak hours. There are major issues to be dealt with as part of these designs including:

- the need for new legislation,
- the reconstruction of the hard shoulders,
- the safety of vulnerable road users,
- meeting design standards for junctions and accesses on the routes
- the overall monitoring and enforcement of the bus priority measures.

It is proposed to provide a high level of Intelligent Transport Systems to operate, monitor and enforce these bus lanes. The ITS systems will include the following:

- Variable message signs to provide information and alter speed limits
- Equipment to monitor congestion
- CCTV to monitor speeds, enforcement, accidents etc
- Speed cameras to enforce speed limits
- Vehicle recognition systems to enforce correct vehicle usage of the bus lane.

Local bus priority measures and services will be provided as part of the QBN with particular reference to access for major residential, retail and employment centres.

The layouts of major residential, retail and employment developments in the future will allow direct and efficient access exclusively for buses with

these facilities incorporated as part of the planning conditions.

3 Scheme Evaluation

The evaluation of schemes forms an essential part of the monitoring of the schemes. This forms an essential part of the public perception of the benefits/disbenefits of the schemes based on improved bus journey times, increased passenger numbers, increased modal share for buses and reduction in travel times.

The evaluation framework is set out in Table 2

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The impacts of the QBC on residential areas can be seen as both positive and negative, as residential parking becomes increasingly difficult with the development of unofficial park and ride sites, yet the resident has immediate access to public transport.

The potential for intensive commercial and residential development along the QBCs is also examined, as charging developers by means of transport levies, as part of the planning conditions for the benefits of easy access to public transport, is becoming common practice.

5 The Role of the Public Transport Providers

The main provider of bus-based public transport in Dublin is Dublin Bus. The Company operates a fleet of 1062 buses serving a population of 1.27 million. They currently operate a total of 150

(a) Table 2 QBC Evaluation Framework : Overview of Costs/Benefits

		QBC Route		Rest of Network	
		Benefit	Cost	Benefit	Cost
1.	Design etc.			•	
2.	Construction			•	
3.	Additional Bus Capital Costs			•	?
4.	Time Savings/Loses			•	•
	Bus				
	General Traffic	•			•
	Goods Vehicles	•			•
	Pedestrians	•			
5.	Vehicle Oper. Costs			•	•
	Bus				
	General Traffic	•			•
	Goods Vehicles	•			•
6.	Road Safety Impacts	?	?	?	?
7.	Environmental Impacts			?	?? ?
	Noise				
	Emissions	?	?	?	?
8.	Land Valuation				
	Residential	?	?	?	?
	Commercial	?	?	?	?
9.	Development potential			?	?

routes with approximately 500,000 customers per day. The company receives a subvention of 25% from the Government.

The QBCs comprise 20% of the Dublin Bus road network and approximately 50% of the total morning peak inbound passengers derive some benefit from travelling on the QBC network. Dublin Bus carries over 90% of bus passengers in the AM peak. Dublin Bus has carried out an analysis of the impact of the QBCs in relation to the number of passengers carried. The analysis set out in Table 3 shows an increase of 62% in the number of people carried on the QBCs routes after the QBCs became operational.

(1) Table 3 Impacts of QBCs

Source: Dublin Bus

	Pre QBC	Post QBC	% Change
Peak Buses	262	411	57
Peak Capacity	22,061	36,867	67
AM Hour Bus Trips	251	406	62
Peak Passengers	27,736	44,825	62

The current Dublin Bus commercial speed across the network is 14.6 kph at peak times. This compares with an European Union average of 17.3 kph. Dublin Bus estimates that this lower operating speed available in Dublin is equivalent to 20% of its operating fleet. They also estimate that congestion is costing the company about €50 million per annum.

As a company Dublin Bus is constantly seeking to improve efficiency and reduce operating costs. Major savings have been made in the reduction of staffing levels. In 1987 Dublin Bus operated a total of 820 buses with a staff ratio of 4.7 per bus. In 2003 the company operates 1062 buses with a staff ratio of 3 per bus.

The other major provider of bus-based public transport is Bus Eireann. This company operates the longer haul inter-urban routes which largely operate on the main radial routes in the city. They carry approximately 6% passengers in the morning peak on the radial routes.

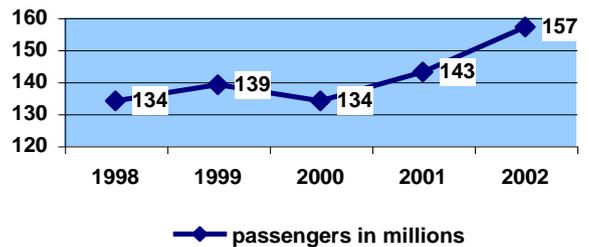
THE BENEFITS OF THE QBCS

To date 9 Quality Bus Corridors have become operational. Major benefits are accruing to the commuters, the bus companies and the city.

Figures received from Dublin Bus show an increase in the annual number of passengers carried from 134 million in 1998 to 157 million in 2002. See Fig. 3 below. However, the majority of these additional passengers are on the QBCs. There is an overall increase of peak customer volumes of 38% on the QBCs with approximately 60% of these customers transferring from cars. Bus journey times have been cut by up to 40%.

5.2 Figure 3 Annual Number of passengers carried

DUBLIN BUS PASSENGER NUMBERS



Source: Dublin Bus

One of the main areas for monitoring the performance of the QBCs is the annual comparison of bus and car journey times. As can be seen from Table 4 below there are major time savings for the passengers using the buses over those using their private cars.

1.2 Table 4

Quality Bus Corridor Monitoring November 2002

1.3 Summary of AM Peak Comparative Bus and Car Journey Times

Quality Bus Corridor	Bus Average 1.4 <i>Journey Time (mins)</i>	Car Average Journey Time (mins)	% Difference
Stillorgan	32:55	65:43	99.64 %
Finglas	13:48	23:45	72.10%
Tallaght	50:07	73:33	46.67%
Swords	29:16	40:42	39.07%
North Clondalkin	8:44	11:57	36.83%
Malahide	27:11	35:35	30.90%
Lucan	32:36	35:35	8.18%
Rathfarnham	34:55	36:22	4.15%
Blanchardstown	26:22	23:10	(12.14%)

Source: Dublin Transportation Office

The Future

The Quality Bus Network provides a low-cost solution for the provision of public transport on the existing street network of Dublin for the immediate future. The experience gained by the staff currently involved in the design and implementation of bus priority measures is essential for the future proposals to ensure a co-ordinated standardised approach for all areas within the Dublin region.

The Government is committed to providing funding of €30-€40 million per annum for the next 3 years in order to put the necessary infrastructure in place to provide for priority for buses across the Dublin region. It is crucial that the Quality Bus Network is implemented to ensure that the bus system can provide the public transport service to meet the demands of the expanding city and region and enable it to maintain its competitiveness