

# APPENDICES



## Appendix A: Glossary of Terms and Definitions

Brownfield site	Development site, usually in an urban area, that is (or has previously been) developed.
Critical Mass	The size and concentration of population that enables a range of services and facilities to be supported and which in turn attracts and supports higher levels of economic activity and improved quality of life.
Dwelling	Set of rooms normally occupied by a household “Dwellings” may include vacancies (see below).
Gateway	A strategic location both nationally and relative to the surrounding area, which provides national scale social, economic infrastructure and support services.
Greenfield site	Development site, usually in a rural area, that is not (or has not previously been) developed.
Household	Group of people sharing a common budget.
Housing completions	The number of new houses completed in any period, together with conversions from non-residential to residential use.
Housing stock	Total number of housing units (or dwellings).
Housing unit	Conventional house or structurally separate apartment.
Hub	A town that supports the national and international role of a Gateway and in turn energises smaller towns and rural areas within its sphere of influence.
Modal Share	The proportion of person trips made by each mode of transport during a specified time period.
Net change in the number of households	The difference between the number of households recorded at two dates.
Obsolescence	Housing unit that is no longer used as such because it has been converted to another use or is uninhabitable or is demolished.
Obsolescence rate	The number of housing units becoming obsolescent in a year, divided by the total number of housing units.
Satellite Towns	Tramore, Carrick-on-Suir, New Ross.
Study Area	The Plan covers Waterford City and its immediate area of influence, so the Study Area (see <b>Figure 1.1</b> ) radiates out from the City to include the satellite towns of Tramore in Co. Waterford, Carrick-on-Suir in Co. Tipperary and New Ross in Co. Wexford and a number of smaller settlements including Dunmore East, Kilmacthomas, Portlaw, Piltown, Mooncoin, Kilmacow and Passage East.
Sustainable Development	Development that meets the needs of this generation without compromising the ability of future generations to meet their needs.
Vacancies	Dwellings that are not occupied by households at a particular point in time.



## **Appendix B: Background Planning Documents**

The following is a list of relevant background planning documentation used in this study:

- National Development Plan 2000-2006 (2000);
- National Spatial Strategy (2002);
- Working papers associated with the NSS including unpublished demographic material (2000);
- Sustainable Development: A Strategy for Ireland (1997);
- Southern and Eastern Region: Development Strategy 2000-2006 (1999);
- Waterford City Development Plan (2002)
- Waterford County Development Plan (1999);
- Waterford Second River Crossing Study;
- Housing Framework Study;
- Housing Density Guidelines - Department of the Environment and Local Government;
- A Study of Waterford County's Economy: Facts, Figures and Analysis (1997);
- Kilkenny County Council: Waterford Environs Plan (2000).



## **Appendix C: Study Approach and Consultation**

### **Introduction**

The study working arrangements and methodology are set out below. Public consultation has been a critical component of the Study process and is also described below in some detail.

### **Working Arrangements**

This is the Final Report of the Waterford Planning Land Use and Transportation Study, which was prepared by Atkins, under the direction of the Steering Group. The report is based on work described in various working papers prepared during the course of the Study.

The Steering Group was appointed by the City Manager and comprises officers from Waterford City Council, Waterford County Council, Kilkenny County Council, the Department of the Environment and Local Government and the Department of Transport. The Steering Group members are listed below.

### **Members of Steering Group**

Mr. Eddie Breen	City Manager, Waterford City Council
Mr. Tom Mackey	City Engineer, Waterford City Council until March 2003
Mr. Lar Power	Senior Engineer and Acting Director of Services (Transport & Infrastructure) from March 2003, Waterford City Council
Mr. Michael Walsh	Director of Services (Planning & Environment), Waterford City Council
Mr. John Andrews	Senior Planner, Waterford City Council
Mr. Pat McCarthy	Senior Engineer (Transport & Infrastructure)
Mr. Liam Quinlan	Senior Executive Officer
Mr. Jim Hickey	Senior Executive Engineer (Transport & Infrastructure)
Mr. Denis Malone	Senior Executive Planner, Kilkenny County Council
Mr. James O' Mahoney	Senior Executive Planner, Waterford County Council
Mr. Niall Cussen	Department of Environment
Mr. Liam Daly	Department of Transport

## **Consultation**

The stakeholder groups contacted as part of the consultation process are as follows:

### **Transport**

Bus Eireann  
Iarnrod Eireann  
Kenneallys  
JJ Kavanagh & Sons  
Irish Taxi Federation  
South East Hackney Association  
National Hackney Drivers Association  
Waterford Port Authority

### **Enterprise**

Waterford Chamber of Commerce  
Industrial Development Agency (IDA)  
Enterprise Ireland  
South East Tourism  
Waterford Crystal

### **Statutory**

Garda Siochana  
Department of Public Enterprise  
National Roads Authority  
South-East Regional Assembly

### **Waterford City Council**

Roads Department  
Planning Department

### **Education**

Waterford Institute of Technology (WIT)

## Appendix D: Detailed Projections for Population, Households and Workforce

### Scenario 1: Present Trends

<b>Population</b>	<b>1996</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2000-2020</b>
City and Environs	44,153	46,216	47,607	53,073	55,742	58,350	61,332	64,198	12,134
Satellites	19,626	21,472	26,059	30,018	33,989	37,935	39,398	39,992	16,462
Rural Inner Area (Remainder of PLUTS Study Area)	47,387	48,002	54,490	59,382	63,714	67,574	68,854	69,318	19,571
Outer Area	88,559	90,693	93,727	96,282	98,255	99,944	101,048	101,585	9,251
<b>TOTAL</b>	<b>199,725</b>	<b>206,384</b>	<b>221,882</b>	<b>238,754</b>	<b>251,700</b>	<b>263,803</b>	<b>270,631</b>	<b>275,093</b>	<b>57,419</b>
<b>Households</b>	<b>1996</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2000-2020</b>
City and Environs	13,322	15,434	17,265	20,410	22,181	23,665	25,477	27,357	8,230
Satellites	6,170	7,887	10,340	13,258	15,651	17,834	18,948	19,874	9,947
Rural Inner Area (Remainder of PLUTS Study Area)	14,454	15,026	18,320	20,962	22,809	24,077	24,587	24,911	9,051
Outer Area	27,322	30,125	33,925	37,864	40,172	41,499	42,647	43,809	11,374
<b>TOTAL</b>	<b>61,268</b>	<b>68,472</b>	<b>79,850</b>	<b>92,494</b>	<b>100,813</b>	<b>107,075</b>	<b>111,659</b>	<b>115,952</b>	<b>38,603</b>
<b>Workforce</b>	<b>1996</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2000-2020</b>
City and Environs	18,926	21,421	22,145	25,013	25,734	26,678	28,092	29,292	5,258
Satellites	7,921	10,550	13,163	15,082	16,762	18,641	19,288	20,027	8,090
Rural Inner Area (Remainder of PLUTS Study Area)	19,354	20,231	24,002	25,763	27,147	28,477	28,878	29,268	8,246
Outer Area	35,771	40,932	44,028	45,244	45,207	45,178	45,699	46,650	4,246
<b>TOTAL</b>	<b>81,973</b>	<b>93,134</b>	<b>103,337</b>	<b>111,102</b>	<b>114,851</b>	<b>118,974</b>	<b>121,957</b>	<b>125,237</b>	<b>25,839</b>

## Scenario 2: City Focus

<b>Population</b>	<b>1996</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2000-2020</b>
City and Environs	44,153	46,216	50,252	59,181	66,256	74,099	78,529	82,478	27,883
Satellites	19,626	21,472	27,794	31,835	34,758	36,686	37,657	37,638	15,214
Rural Inner Area (Remainder of PLUTS Study Area)	47,387	48,002	50,110	51,457	52,431	53,074	53,397	53,391	5,071
Outer Area	88,559	90,693	93,727	96,282	98,255	99,944	101,048	101,585	9,251
<b>TOTAL</b>	<b>199,725</b>	<b>206,384</b>	<b>221,882</b>	<b>238,754</b>	<b>251,700</b>	<b>263,803</b>	<b>270,631</b>	<b>275,093</b>	<b>57,419</b>
<b>Households</b>	<b>1996</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2000-2020</b>
City and Environs	13,322	15,434	18,177	22,688	26,163	29,631	31,958	34,296	14,196
Satellites	6,170	7,887	11,513	14,659	16,561	17,661	18,492	19,087	9,774
Rural Inner Area (Remainder of PLUTS Study Area)	14,454	15,026	16,235	17,284	17,918	18,284	18,562	18,760	3,258
Outer Area	27,322	30,125	33,925	37,864	40,172	41,499	42,647	43,809	11,374
<b>TOTAL</b>	<b>61,268</b>	<b>68,472</b>	<b>79,850</b>	<b>92,494</b>	<b>100,813</b>	<b>107,075</b>	<b>111,659</b>	<b>115,952</b>	<b>38,603</b>
<b>Workforce</b>	<b>1996</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2000-2020</b>
City and Environs	18,926	21,421	23,708	28,463	31,379	34,849	36,455	37,936	13,428
Satellites	7,921	10,550	14,166	15,511	16,163	16,675	17,317	17,952	6,124
Rural Inner Area (Remainder of PLUTS Study Area)	19,354	20,231	21,436	21,884	22,102	22,272	22,486	22,698	2,041
Outer Area	35,771	40,932	44,028	45,244	45,207	45,178	45,699	46,650	4,246
<b>TOTAL</b>	<b>81,973</b>	<b>93,134</b>	<b>103,337</b>	<b>111,102</b>	<b>114,851</b>	<b>118,974</b>	<b>121,957</b>	<b>125,237</b>	<b>25,839</b>

## Scenario 3: City and Satellites

<b>Population</b>	<b>1996</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2000-2020</b>
City and Environs	44,153	46,216	47,607	53,073	55,742	58,350	61,332	64,198	12,134
Satellites	19,626	21,472	29,778	36,416	42,644	48,498	50,555	51,349	27,025
Rural Inner Area (Remainder of PLUTS Study Area)	47,387	48,002	50,771	52,984	55,060	57,011	57,697	57,961	9,008
Outer Area	88,559	90,693	93,727	96,282	98,255	99,944	101,048	101,585	9,251
<b>TOTAL</b>	<b>199,725</b>	<b>206,384</b>	<b>221,882</b>	<b>238,754</b>	<b>251,700</b>	<b>263,803</b>	<b>270,631</b>	<b>275,093</b>	<b>57,419</b>
<b>Households</b>	<b>1996</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2000-2020</b>
City and Environs	13,322	15,434	17,265	20,410	22,181	23,665	25,477	27,357	8,230
Satellites	6,170	7,887	12,197	16,367	19,547	22,135	23,353	24,291	14,249
Rural Inner Area (Remainder of PLUTS Study Area)	14,454	15,026	16,463	17,853	18,913	19,776	20,182	20,495	4,750
Outer Area	27,322	30,125	33,925	37,864	40,172	41,499	42,647	43,809	11,374
<b>TOTAL</b>	<b>61,268</b>	<b>68,472</b>	<b>79,850</b>	<b>92,494</b>	<b>100,813</b>	<b>107,075</b>	<b>111,659</b>	<b>115,952</b>	<b>38,603</b>
<b>Workforce</b>	<b>1996</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2000-2020</b>
City and Environs	18,926	21,421	22,145	25,013	25,734	26,678	28,092	29,292	5,258
Satellites	7,921	10,550	15,338	18,099	20,396	22,803	23,589	24,435	12,252
Rural Inner Area (Remainder of PLUTS Study Area)	19,354	20,231	21,827	22,747	23,513	24,315	24,577	24,859	4,084
Outer Area	35,771	40,932	44,028	45,244	45,207	45,178	45,699	46,650	4,246
<b>TOTAL</b>	<b>81,973</b>	<b>93,134</b>	<b>103,337</b>	<b>111,102</b>	<b>114,851</b>	<b>118,974</b>	<b>121,957</b>	<b>125,237</b>	<b>25,839</b>



## Appendix E: Specific Details of Transport Proposals

### Bus Operations

Various initiatives in terms of bus operations will be developed and implemented in parallel with infrastructure improvements. These measures are best seen within the concept of the 'total trip' starting with the walk to/from the bus stop, the wait for the bus and the journey itself. Most of these initiatives are essentially image based and seek to raise the profile of public transport so that existing users are retained and transference from private to public modes is encouraged.

#### *The Walk to/from the Bus Stop*

Particular care should be taken on bus routes to ensure that footways are regularly maintained. This will avoid unnecessary risk to pedestrians, the elderly and the young in particular.

Bus stops should be located one quarter to one third of a mile from each other (subject to prevailing road conditions). Care should be taken to ensure they are linked to established pedestrian desire lines and situated close to known generators of travel demand such as schools and places of work. They should also be safely located in relation to existing traffic movements thereby avoiding any unnecessary obstruction to the free flow of traffic.

Generally speaking walk times from the bus stop to established destinations should not be more than five minutes or a quarter of a mile.

In areas of new residential development, particular attention should be given to ensuring that footways are arranged to facilitate access to bus stops.

#### *The Wait at the Bus Stop*

Bus stops should aim to have a standardised form throughout the City. As a minimum, they should have the following features:

- Shelters should be provided on the footpath. Where necessary, third party land may have to be acquired to avoid unnecessary obstruction to passing pedestrians;
- Seating should be provided within the shelter;
- Bus shelters should be lit;
- Bus stops should as a general rule provide recessed provision for stationary vehicles. 'Built-outs' should be provided on more heavily traffic routes so as to avoid buses being blocked into a recessed stop by passing traffic;
- Timetables should be customised to a particular stop and give readily intelligible information about the routes available, connecting services and their frequencies;
- Bus stops should be common to both operators within the City;
- Raised kerbing should be provided to facilitate access onto low loading buses – a facility currently made available on Bus Eireann services within the City;

- Care should be taken in the specification of traffic bylaws in the immediate approach to a bus stop to ensure that the bus can actually access the low loading stop. Failure in this respect will negate the benefits to be obtained from the raised kerbing;
- Bus stops should be clearly delineated on the road surface preferably by means of a different colouring.

The above improvements should be implemented in the short term. Instead of incurring the full cost of this programme, use could be made of companies that will cover the costs of provision in return for advertising rights. One limitation affecting this sort of arrangement is that companies of this sort will tend to only install shelters in highly visible locations where advertising can be clearly seen.

In the medium to longer term, it should be the aim of Waterford City Council to provide real time information at bus stops. This necessitates buses being linked to a GPS system. It can also be used to provide route managers with detailed information about the movement of vehicles and can facilitate the identification of areas where delays are being incurred on a regular basis. Other more novel features currently under trial in the UK and implemented in Europe and the Pacific rim involve a dial up facility whereby passengers can receive service information and arrival times at bus stops on their mobile phones.

#### *The Bus Journey*

Bus operators should seek to provide the highest standard of vehicles, which in turn will contribute to high standards of safety and comfort.

### **Bus Fleet Implications of Proposed Strategy**

At present Bus Eireann and Kenneallys operate bus fleets of 11 and 2 vehicles respectively to service existing routes in Waterford. In recent years, Bus Eireann has acquired 11 new 30-seat midi buses while Kenneally's operate double-deckers with a seating capacity of approximately 90.

Service improvements of the sort proposed will involve both an extension of existing services and the provision of new routes. The resulting number of buses required to service these routes has been estimated with reference to the existing route allocations and the estimated travel time required. On this basis, the extension of existing services will require 9-16 more vehicles and new services will require approximately 16 vehicles. This gives an overall increase of 25-32 vehicles over and above the existing bus fleet or an increase in excess of 200%.

The main elements of uncertainty in assessing future fleet size are twofold as follows:

1. The exact routes and travel times through future residential and employment areas (that are currently undeveloped);
2. The effects of congestion on timetabling. This will have most impact on existing services that operate in parts of the City where some further deterioration in levels of service is anticipated.

The uncertainty associated with these effects is reflected in the wider range of vehicle numbers required to service existing services as opposed to new ones.

## Park and Ride

As part of the PLUTS, the potential contribution of Park and Ride was assessed separately prior to its inclusion within the wider transport model. The results summarised here are broadly compatible with those that were subsequently derived from the traffic model and serve to highlight some of the important factors that influence the success of Park and Ride as an instrument of demand management.

In addition to Park and Ride there is also scope to consider Park and Walk as a supplementary instrument of demand management within the City Centre. The aim of such a strategy involves reducing on-street parking provision within the City Centre and providing compensatory provision in one or more off-street facilities situated around the edge of the City Centre.

As part of the current assessment the following topics are addressed:

- The concept of Park and Ride;
- Key features of Park and Ride in Waterford;
- Potential Park and Ride sites within Waterford;
- Potential transference to Park and Ride;
- Views of public transport operators;
- Public transport corridors within Waterford;
- Complementary traffic management and control.

### *The Concept of Park and Ride*

Park and Ride involves people getting out of their cars and completing their trip to a chosen destination by a dedicated public transport service. The bus travels from the Park and Ride site directly to the City Centre, where it makes a series of limited stops to pick up and put down, before returning to the Park and Ride car park.

The aim is to provide a fast efficient alternative means of travelling to the City Centre that will attract motorists out of their cars to travel by bus instead. To provide a credible alternative to the car it is usually essential to augment Park and Ride with one or more of the following features:

- Bus lanes,
- Bus priority at junctions – including Selective Vehicle Detection (SVD),
- Preferential access to City Centre destinations,
- Control and management of City Centre parking.

Some of the more commonly cited benefits from such an arrangement involve the following;

- Reduced vehicular congestion in the City Centre and the connecting radials,
- Reduced environmental impact from vehicular traffic,
- Provision of additional (displaced) car parking space for the City Centre.

Conversely, some of the more commonly identified disadvantages of Park and Ride involve one or more of the following:

- Localised increases in vehicular traffic in the vicinity of the facility – particularly if it attracts traffic from other radial corridors or adjacent parts of the road network;

- The visual impact of the car parking facility itself, which can range from between 400 to 800 spaces, and require areas of between 10,000 to 20,000 square metres;
- The marginal economic benefits associated with Park and Ride in terms of the additional delays it imposes on users relative to the benefits it confers on non users;
- The limited reduction in vehicular traffic within the City Centre due to high levels of residual demand for travel by car.

Consequently, the benefits and disbenefits arising from Park and Ride are often finely balanced. Despite this, there is usually a predisposition to consider it as a viable means of restricting growth in traffic within cities. This is particularly true in the medium to longer term when faced with the prospect of a steady growth in traffic and a corresponding deterioration in levels of service.

The key to the successful implementation of Park and Ride will depend upon three facets. First, the design of the system itself. Second, the design of peripheral features with particular consideration being given to the supply and management of on and off street parking in the City Centre. Third, the use of traffic management features within the City Centre.

#### *Key Features of Park and Ride in Waterford*

Summarised below is a checklist of features that should be incorporated within a Park and Ride facility.

- *Radial Distributor:* As a general rule Park and Ride car parks should be located on a radial distributor. An exception to this is where a Park and Ride facility is situated on an orbital route within easy access to/from one or more radial distributors.
- *Inbound Carriageway:* Park and Ride car parks should wherever possible be located adjacent to the inbound carriageway on a radial distributor so as to avoid the need to cross opposing traffic flows when entering the car park. This is particularly true where access to the facility is from a signalised junction where fully segregated right turning facilities may be restricted due to the configuration of the junction or other site constraints.
- *Car Park Location:* Conventional guidance indicates that provision should be located on the edge of the built-up area beyond the normal limits of traffic congestion. In practice this will be adhered to by most sites in Waterford given the limited number that are available.
- *Charges:* Most Park and Ride car parks are free. The return bus fares should be less than or equal to the price of parking in the City Centre.
- *User Profile:* Some consideration should be given to the type of motorists that may use a Park and Ride facility. Generally speaking shoppers will be prepared to pay higher return fares on account of the higher short term parking charges that they willingly incur when parking in the City Centre. At present, however, this is unlikely to assume significant proportions in Waterford, given the fairly compact nature of the City Centre, and the proximity of large quantities of moderately priced parking on the Quays.

- *Internal Design:* The internal design of the facility should be given a high priority as this is seen as having a significant perceptual effect on potential users. As a minimum the facility should have the following:
  - A surfaced car park with marked spaced and adequate surface drainage;
  - Good quality lighting providing security for vehicles and motorists;
  - Covered pedestrian walkways converging on one or more covered waiting facilities with seating;
  - A minimum number of collection/drop off points within the car park. Depending upon the number and location of stops within the car park, and the distance to the City Centre, as much time can be spent picking up and putting down motorists within a Park and Ride car park as travelling to the City Centre;
  - A turning circle for the bus at or close to the entrance of the car part so as to facilitate access to and egress from the car park for buses.

Other optional features include:

- CCTV;
- Real time information about departure times;
- Assisted means of conveyance for pedestrians within the car park.

#### *Potential Park and Ride Sites within Waterford*

**Figure E.1** shows the locations of 8 potential Park and Ride car parks in Waterford, 6 of which lie to the south of the River and 2 to the north. Each facility is situated on a radial distributor. With the exception of the site on the N25 Cork Road, it is judged feasible to locate the car parks adjacent to the inbound carriageway.

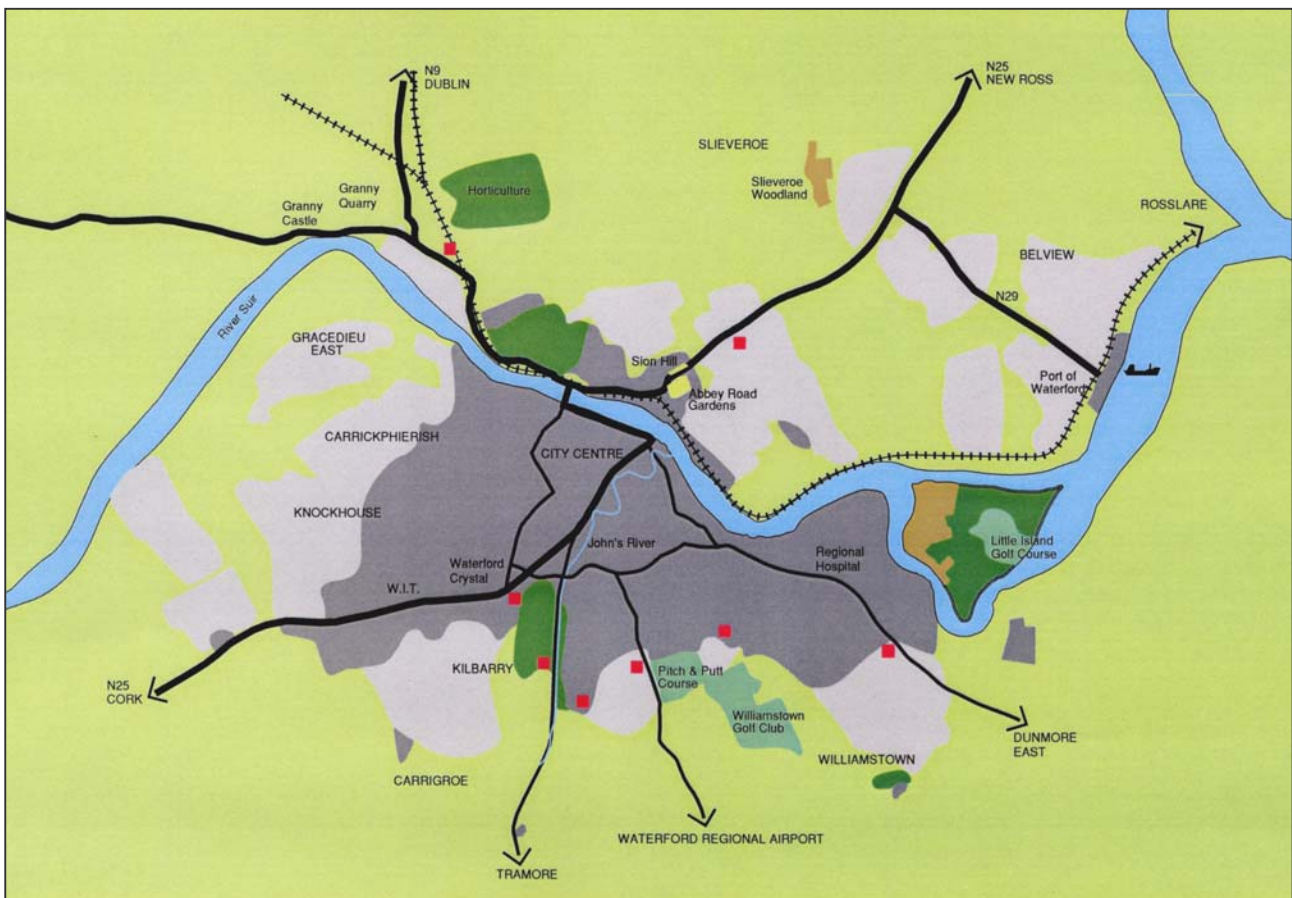
The sites identified represent the last feasible location on the inbound carriageway for Park and Ride. Beyond these points the consultant was unable to locate suitable sites in the built-up areas of Waterford. These locations were selected from information obtained during site visits and aerial photography of the City.

- Dunmore Rd – Granstown,
- Williamstown Rd – Grange Lower,
- Lower Grange Rd – Ballynakill,
- Old Tramore Road – Kilcohan,
- Tramore Rd – south of sports ground,
- N25 Cork Road,
- N9 – Newrath,
- N25 Abbeylands.

Each of the locations identified are judged to be capable of accommodating between 400 to 800 parking spaces.

Generally speaking each of the sites to the south of the City are seen as being compatible with current land allocations contained with the current Development Plan.

Figure E.1 Potential Park and Ride Sites



**Potential Transference to Park and Ride**

A range of factors that reflect the difference in travel cost between users of Park and Ride and private cars governs the utilisation of Park and Ride. These costs seek to reflect the component parts of each trip and usually comprise the following:

**Car Users**

- The perceived cost of travel time and distance to the City Centre destination,
- Parking charges – which should reflect the fact that typically little more than 30% of City Centre trips pay for parking during the (AM) peak period.

**Park and Ride Users**

- The perceived cost of travel time and distance to the Park and Ride facility,
- A notional cost associated with transferring from car to public transport,
- A walk time cost from the car to the bus stop,
- A waiting time cost at the bus stop - usually assumed to be half headway between services,
- The bus fare,



- The travel time cost by public transport,
- The walk time to the final destination.

A logit model was used to assess the likely scale of transference from car to Park and Ride.

**Table E.1** summarises the predicted transference to Park and Ride based on the following assumptions:

- 30% of inbound trips on the main radial corridors of Waterford during the AM peak hour have destinations that would fall within the orbit of a Park and Ride service to the City Centre;
- An average travel distance of 10km for potential Park and Ride users during the AM peak;
- Average travel distances from the Park and Ride car park to the City Centre of 3 km;
- Average vehicle (bus) headways of 10 minutes;
- Daily parking charge for car drivers of 3.20 Euro in the City Centre;
- 30% of vehicle trips pay for parking in the City Centre;
- A flat rate public transport fare of 80 cent.

Information regarding the volume of inbound traffic on each of the main radial distributors has been derived from the automatic traffic and turning movement counts undertaken for the study. In each case, the traffic flows are one way inbound and have been derived from locations at, or as close to the potential Park and Ride sites. The inbound AM peak hour flows summarised in **Table E.1** include Heavy Goods Vehicles (HGVs). The estimated transference has been confined to cars with (assumed) destinations in the City Centre.

The most important variables influencing the utilisation of Park and Ride are parking charges in the City Centre and the proportion of on and off street parking space that the City Council controls in terms of being able to levy charges for its utilisation. Accordingly, two further tests were performed to gauge the sensitivity of these variables in influencing utilisation.

- Test 1 assumed a doubling of parking charges to €6.40 a day;
- Test 2 assumed a doubling of the number of trips that have to pay for parking space with destinations within the City Centre plus the assumption regarding the doubling of parking charges,

Table E.1 Estimated Transference to Park and Ride

Road/Corridor	Inbound AM Peak Hour Flows (Vehs)	Assumed Trips with City Centre Destinations	% Transference AM Peak Hour		
			30%	Test 1 42%	Test 2 55%
Dunmore Rd (West of Knockboy)	310	90	30	40	50
Williamstown Rd	390	110	30	50	60
Lower Grange Road	68	20	5	10	10
Ballytruckle Rd/Lower Grange Rd	660	190	60	80	100
Tramore Rd	510	150	45	60	80
N25 Cork Rd/Kilbarry Rd	933	260	80	110	140
<b>Sub Totals</b> (Dunmore Rd to N25)	<b>2871</b>		<b>250</b> (8%) (1)	<b>350</b> (12%) (1)	<b>440</b> (15%) (1)
Cleaboy Rd	70	20	5	10	10
N24 west of N9 and N9 north N24	679	160	50	70	90
N25 Abbeylands	448	120	40	50	70

(1) Percentage reduction relative to inbound sub total

Of the radial corridors examined the greatest absolute transference occurs on:

- Ballytruckle Rd;
- Tramore Rd;
- N25 Cork Rd/Kilbarry Rd;
- N9 (east of its junction with the N24).

This is on account of the higher inbound traffic flows on these roads. Despite this, the absolute scale of transference at individual sites is fairly modest in each case.

It is only when the transference from Ballytruckle Rd, Tramore Rd and the N25 Cork Rd/Kilbarry Rd are summed that the numbers start to assume greater significance - ranging from between 200 to 350 vehicle trips/hr inbound. Allowing for average vehicle occupancies of 1.2 during the AM peak hour these figures equate to approximately 240-420 person trips/hr.

In practice the actual transference from these three corridors would be appreciably lower on account of the additional distances travelled by vehicles to reach a single Park and Ride facility. Furthermore, the model used does not fully reflect the fairly serious delays incurred by traffic on the N25 during peak periods of the day. Despite these limitations the level of patronage indicates that there may be some potential for Park and Ride in this corridor.

Preliminary results summarised above imply the following:

- First, Park and Ride will only realise its full potential once the Outer Ring Road has been constructed, thereby enabling much freer movement of traffic between the radial distributors south of the City. As such it will assume greater significance in the medium to longer term. Despite this, urgent consideration needs to be given to the reservation of land at appropriate locations around the City;

- Second, as part of any restructuring of car parking space in the City Centre the City Council should aim to progressively control as high a proportion of on and off street parking spaces as possible - in the sense of being able to regulate the price of parking;
- Third, consideration should be given to increasing parking charges within the City Centre as part of any Park and Ride strategy;
- Fourth, Park and Ride would appear to be one of the instruments that could assist in restricting growth in traffic in the City Centre and the radial distributors. Despite this it is unlikely to provide a global solution to all the traffic problems of the City.

*Public Transport Corridors in Waterford*

As part of the current assessment of Park and Ride an inventory of current bus routes within the City Centre has been made. This has been done so as to ascertain the scope for the introduction of 3 metre bus lanes to assist the passage of buses generally, and also as part of a Park and Ride strategy. All significant radial and orbital routes were examined as part of this exercise. The results of the analysis are summarised in **Figure E.2** and **Table E.2**.

The results of this assessment indicate that the scope for introducing bus lanes is largely confined to the N25 and the Quays without recourse to acquisition of third-party land.

Figure E.2 Potential Bus Lanes

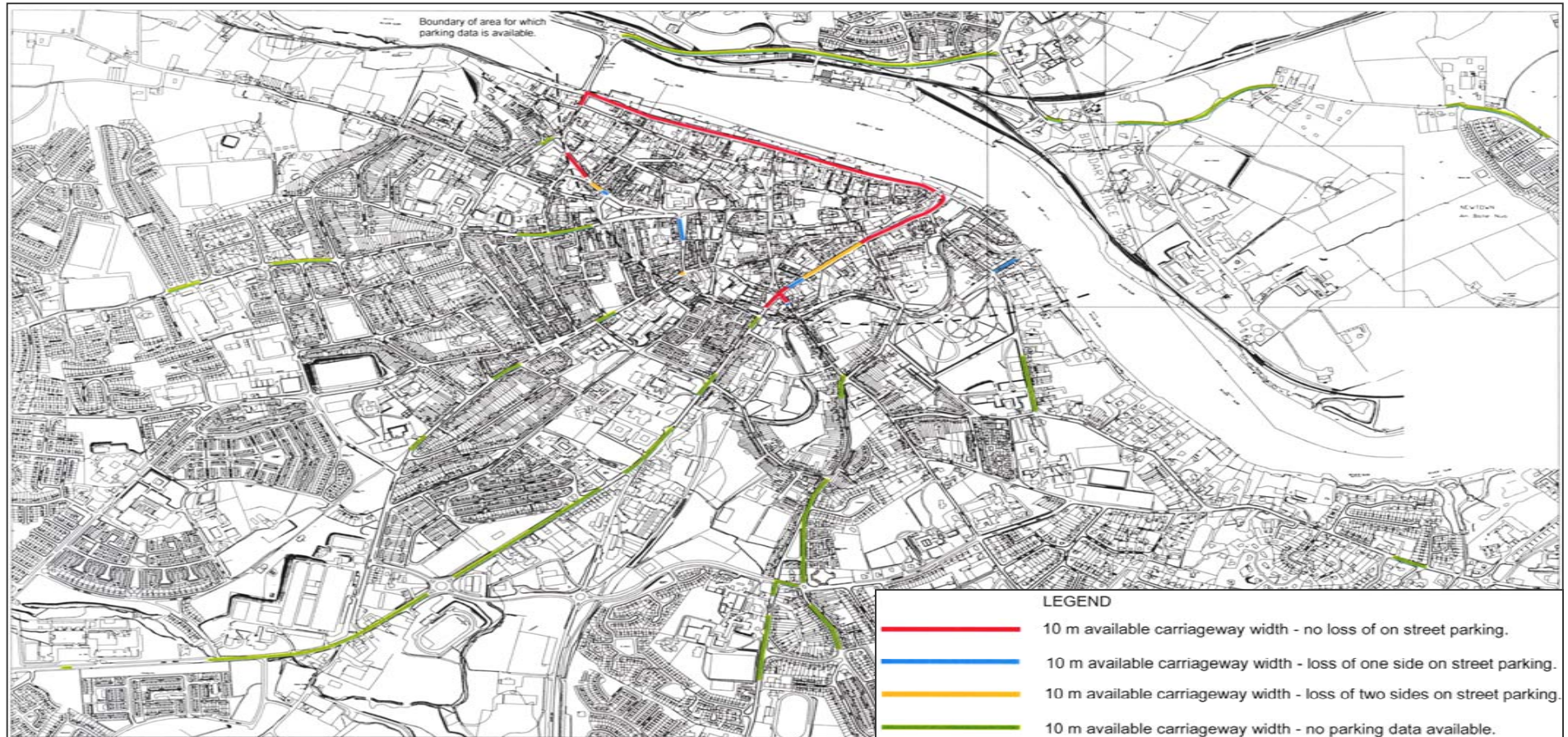


Table E.2: Scope For The Provision Of Bus Lanes

Road	3 Metre Bus Lane	Parking Spaces Affected	Service (Frequency Per Hour) <sup>(1)</sup>	Comments
North Quays	✓	0	1 (30)	Width available
South Quays	✓	0	4 (30,30,40,12)	Width available
The Mall	✓	50	3 (12,30,30)	Width available
Parnell St	✓	33	4 (12,30,30,40)	Width available
Manor St			2 (12,12)	Width restriction precludes bus lane
N25 Cork Rd	✓	50	2 (12,12)	Width available between Tramore Rd and Ashe Rd
Ballytruckle Rd (south of IRR)	✓	10	1 (40)	Road widening required for 3 m bus lane.
Lower Grange Rd (south of IRR)	✓	20	1 (40)	Road widening required for 3 m bus lane.
Ballytruckle Rd (north of IRR)	✓		1 (40)	No bus lane proposed due to limited length of appropriate carriageway
The Glen	✓		2 (12,30)	No bus lane proposed due to limited length of appropriate carriageway
Lower Yellow Rd	✓		2 (12,30)	No bus lane proposed due to limited length of appropriate carriageway
Clearboy Rd	✓		1 (30)	No bus lane proposed due to limited length of appropriate carriageway
Cannon St	✓		1 (12)	No bus lane proposed due to limited length of appropriate carriageway
Newtown Rd	✓		1 (30)	No bus lane proposed due to limited length of appropriate carriageway
Rice Bridge	✓		1 (30)	No bus lane proposed due to limited length of appropriate carriageway

(1) 3 (12,30,30) Represents 3 services with hourly headways of 12, 30, and 30 minutes

## **Mobility Management Plans**

Mobility Management Plans (MMPs) should include measures to promote and improve the attractiveness of using public transport and other sustainable modes of transport such as cycling, walking and car sharing as well as flexible working practices or a combination of these as alternatives to drive-alone journeys.

The MMP should be objective led specifying target changes in mode choice. For example – reducing car travel by 10% in one year as follows: 2% by car sharing, 2% by cycling and walking and 6% by improvements in public transport. To deliver these targets the City Council, should consider employing or resourcing by other means, a Travel Coordinator (TC) with special responsibility for monitoring its implementation and changes in travel patterns.

The remit of the TC needs to be linked to the planning process. In this respect it is recommended that MMPs accompany major planning applications as part of the future development of Waterford.

The range of issues in which the TC is involved can be summarised under the following headings.

- Car Use;
- Public Transport;
- Cycling;
- Walking;
- Alternative working arrangements;
- Promotion;
- Monitoring.

### *Car Use*

The TC should actively encourage the development of car sharing databases that can be used to provide information about employees that are willing to share trips to/from work. To encourage car sharing, preferential parking arrangements should be provided where practical to allow car sharers access to the most desirable parking spaces in the car park. Active support from employers is also required as part of any car sharing scheme. For example, employers must be prepared to provide car sharers free emergency trips home covering the full cost of the return taxi trip. Car parking management in the form of parking charges or paying employees to give up their parking space can also be used to discourage car use.

### *Public Transport*

The TC can seek to encourage the use of public transport in the following ways:

- The provision of public transport information on notice boards and web pages;
- Company discounts to employees for the purchase of public transport tickets;
- Interest free loans for the purchase of season tickets;
- The provision of a shuttle bus to link the site to existing public transport services. The cost of the shuttle bus could be shared by a group of companies on a business park or industrial estate.

### *Cycling*

The TC should actively encourage cycling to work. This requires active support from employers in providing:

- Cycle storage facilities at the place of work;
- Showers, changing and locker facilities;
- Interest free loans for cycle purchase;
- The provision of a mileage rate for bicycle users.

### *Alternative Working Arrangements*

Employers should be encouraged to adopt flexible working patterns. Car use can be reduced and its effects minimised by the adoption of one or more of the following:

- Flexible working hours - reducing the need for travel during peak periods;
- Teleworking – working from home or from a satellite office;
- Teleconferencing – communication by video and/or audio conferencing facilities;
- Staggering the school day to start outside the morning peak period.

### *Promotion*

Promotion is an important part of any MMP. Few MMPs will succeed in having a discernible impact on person trip making unless employees are aware of its objectives. Information can be disseminated through various media. These include:

- Company intranets or websites;
- E-newsletters or group emails;
- Summary leaflets on travel to the site (distributed via employee pay packets);
- Dedicated notice boards.

### *Monitoring*

The TC should monitor the MMP to ensure that the plan is being implemented properly. This can be done by annual surveys aimed at identifying any changes in mode choice.

Meetings should be arranged biannually with employers to discuss the MMP and to identify a need for any corrective actions. This should include consultations with employees to discuss ways in which the MMP can be improved in relation to changing circumstances.

## Traffic Assessment of Alternatives for Proposed River Crossing

Various alignments for a new river crossing were tested in terms of traffic impact. The options tested included the following:

- Vulcan Street;
- The Mall;
- Outer Ring Road;
- Outer Ring Road Little Island Route.

Other alignments were considered but dismissed on the grounds of engineering feasibility.

Of the various alignments assessed, the only options that represented a credible solution are downstream of the City Centre. This is on account of the additional traffic that is drawn into the City Centre as a result of introducing a new river crossing in the vicinity of the Quays.

Of the two proposed downstream crossings, the Outer Ring Road alignment is preferred compared with the alternative crossing on Little Island. The primary consideration in this respect is the minimisation of environmental impact on the River Suir and Little Island, which is seen as being prohibitive. In addition to these considerations, the preferred crossing is sympathetically aligned in relation to the Outer Ring Road and serves to further foster the concentric development of the City - north and south of the river.

**Tables E.3 and E.4** compare the spatial distribution of traffic for each of the crossings and compare this with the forecast distribution of traffic in the absence of a new river crossing. **Figure G.3** shows the sectors used in the traffic assessment.

Figure E.3. **Traffic Assessment Sectors**

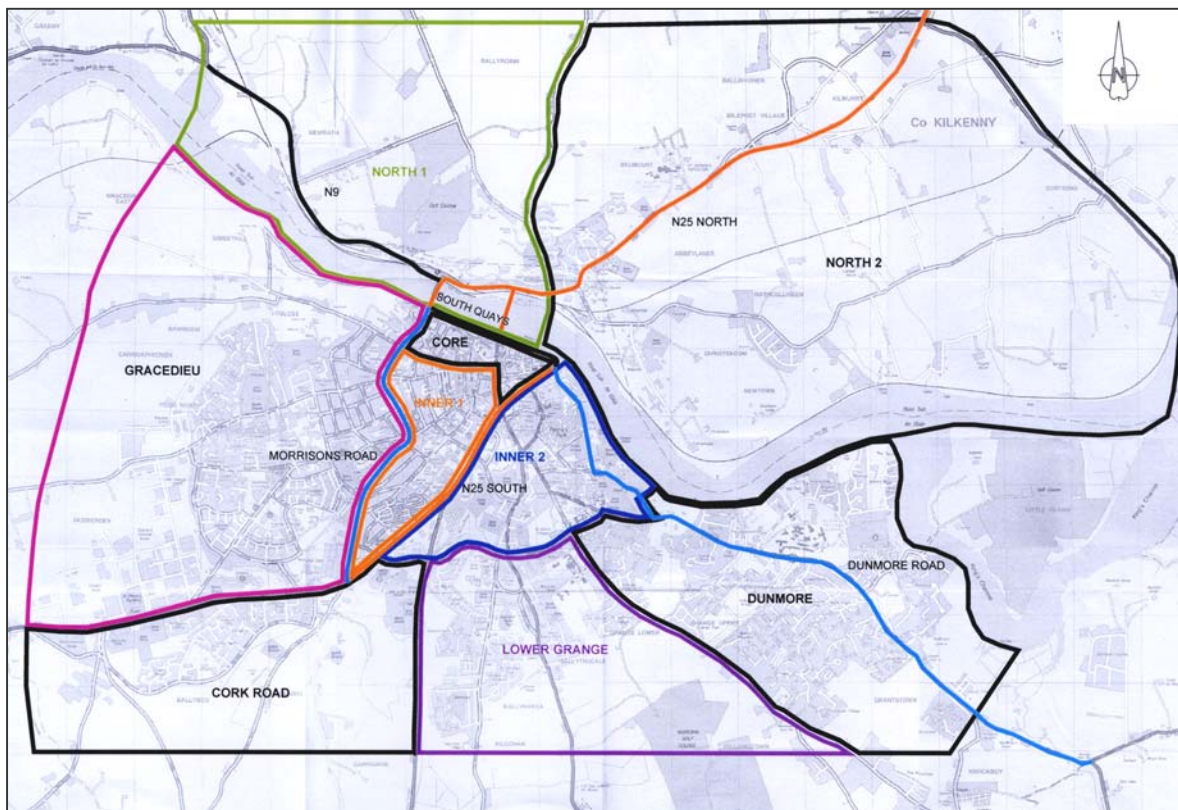


Table E.3: **Transport Sectors - Percentage Growth in Vehicle Kilometres to 2020**

Sectors	No New Crossing	Vulcan St	The Mall	Outer Ring Road	Little Island
Core	141	168	133	72	90
Inner 1	81	94	105	58	65
Inner 2	38	42	46	29	31
<b>Total City Centre</b>	<b>58</b>	<b>66</b>	<b>68</b>	<b>39</b>	<b>44</b>
Dunmore	132	127	740	271	194
Lower Grange	446	430	437	435	530
Cork Rd	409	392	406	346	376
Gracedieu	186	187	180	176	179
North 1	49	86	20	12	29
North 2	843	817	1369	2099	2463

From **Table E.3** above, it can be seen that some of the largest growth in traffic is recorded in the North 2 sector where the combined effect of the proposed new river crossing and the forecast growth in Belview as an employment zone serves to encourage significant growth in traffic and related vehicle kilometers. The Strategy seeks to encourage traffic growth in this type of area where there is much greater scope for its accommodation compared with other more developed parts of the City. It is worth noting that the Outer Ring Road alignment contributes to some of the lowest overall growth by traffic sector.

Table E.4: **Transport Corridors – Percentage Growth in Vehicle Kilometres to 2020**

Corridors	No New Crossing	Vulcan St	The Mall	Outer Ring Road	Little Island
N25 South Quays	55	50	6	32	44
N25 (Rice Bridge to Kilmurry)	58	50	57	80	33
N9 (Rice Bridge to Newrath)	32	89	33	21	11
Dunmore Rd (R683)	73	69	75	80	109
Newton Rd	32	39	52	7	12
Morrissons Rd	72	88	72	55	32
Cork Rd	42	40	42	28	35

Similarly, from **Table E.4** above, it is apparent that in terms of transport corridors, both downstream crossings tend to minimise the impact of future traffic growth in the City Centre compared with the alternative crossings on the Quays. Of the two downstream crossings, the Outer Ring Road alignment serves to minimise traffic impact on the South Quays more effectively. As regards The Mall crossing, it can be seen that resultant traffic flows on the South Quays are reduced due to a local reassignment of traffic onto the North Quays. However, reference should be made to **Table E.3** in which it can be seen that The Mall crossing tends to draw significantly more traffic into the Core Area (+133%) as opposed to the Outer Ring Road alignment (+72%)



## Appendix F: Historic Population, Households and Employment Data

Table F.1: Summary of population data at Regional and Sub-regional level 1991, 1996 and 2002

Area	Population			1991-1996			1996-2002			Share		
	1991	1996	2002	Change	% Change	Ann % Ch	Change	% Change	Ann % Ch	1991	1996	2002
<b>REGIONAL ANALYSIS</b>												
<i>Waterford CB and Env</i>	45,763	49,521	51,917	3,758	8.2	1.6	2,396	4.8	0.8	11.9	12.6	12.3
Carlow and Env	14,027	14,979	18,066	952	6.8	1.3	3,087	20.6	3.2	3.7	3.8	4.3
Kilkenny and Env	17,669	18,696	20,707	1,027	5.8	1.1	2,011	10.8	1.7	4.6	4.8	4.9
Wexford and Env	15,393	15,862	17,709	469	3.0	0.6	1,847	11.6	1.9	4.0	4.1	4.2
Clonmel and Env	15,562	16,182	16,751	620	4.0	0.8	569	3.5	0.6	4.1	4.1	4.0
Gateway	45,763	49,521	51,917	3,758	8.2	1.6	2,396	4.8	0.8	11.9	12.6	12.3
Hubs	62,651	65,719	73,233	3,068	4.9	1.0	7,514	11.4	1.8	16.3	16.8	17.3
Gateway and hubs	108,414	115,240	125,150	6,826	6.3	1.2	9,910	8.6	1.4	28.3	29.4	29.5
Remainder	274,774	276,277	298,390	1,503	0.5	0.1	22,113	8.0	1.3	71.7	70.6	70.5
<b>Region</b>	<b>383,188</b>	<b>391,517</b>	<b>423,540</b>	<b>8,329</b>	<b>2.2</b>	<b>0.4</b>	<b>32,023</b>	<b>8.2</b>	<b>1.3</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>SUB-REGIONAL ANALYSIS</b>												
<i>Waterford CB and Env</i>	45,763	49,521	51,917	3,758	8.2	1.6	2,396	4.8	0.8	42.7	44.5	43.6
Satellites	19,047	19,626	22,290	579	3.0	0.6	2,664	13.6	2.1	17.8	17.7	18.7
Remainder of Study Area	42,386	42,019	44,870	-	-	-	2,851	6.8	1.1	39.5	37.8	37.7
<b>PLUTS Study Area</b>	<b>107,196</b>	<b>111,166</b>	<b>119,077</b>	<b>3,970</b>	<b>3.7</b>	<b>0.7</b>	<b>7,911</b>	<b>7.1</b>	<b>1.2</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
Traffic Planning Area	194,341	199,725	212,678	5,384	2.8	0.5	12,953	6.5	1.1			
Carrick on Suir	5,143	5,172	5,543	29	0.6	0.1	371	7.2	1.2	4.8	4.7	4.7
Tramore	7,001	7,482	9,350	481	6.9	1.3	1,868	25.0	3.8	6.5	6.7	7.9
New Ross	6,903	6,972	7,397	69	1.0	0.2	425	6.1	1.0	6.4	6.3	6.2

Notes: no data available for towns and environs in 2002. Changes in Carlow, Kilkenny, Wexford, Clonmel, Carrick, Tramore and New Ross are based on the change in the town plus the whole DEDs in which environs lie. This change is assumed to apply to the urban area only and is applied to the true 1996 base in the case of the hubs.

Table F.2 Basic Demographic Data for Elements of areas defined for the Study - 1991

1991 Data	County Borough	Remainder Inner	Total Inner (PLUTS Study Area)	Outer	Traffic planning area	County Borough and Environs	Towns and Environs in Planning Area	Towns and Environs in Buffer Area	Rural inner	Rural Outer	Rural Total
Total Population -1991	40,328	66,868	107,196	87,145	194,341	41,828	19,047	24,145	46,321	63,000	109,321
Young dependents (0-14)	10,294	19,110	29,404	24,805	54,209	10,707	5,276	6,737	13,421	18,068	31,489
Working Age (15-64)	26,151	40,077	66,228	51,739	117,967	27,101	11,741	14,740	27,386	36,999	64,385
Retirement Age (65+)	3,883	7,681	11,564	10,601	22,165	4,020	2,030	2,668	5,514	7,933	13,447
At work - agriculture	132	4,782	4,914	7,113	12,027	150	285	322	4,479	6,791	11,270
At work - mining	1	103	104	60	164	1	40	2	63	58	121
At work - manufacturing industry	4,790	4,433	9,223	5,681	14,904	4,947	1,241	2,085	3,035	3,596	6,631
At work - building & const	695	1,724	2,419	2,117	4,536	725	429	584	1,265	1,533	2,798
At work - elect & gas	129	244	373	149	522	132	86	67	155	82	237
At work - commerce	2,426	3,445	5,871	4,320	10,191	2,517	1,293	1,603	2,061	2,717	4,778
At work - transport	802	1,022	1,824	819	2,643	836	288	219	700	600	1,300
At work - public admin	510	729	1,239	1,295	2,534	536	275	560	428	735	1,163
At work – professional services	2,234	2,907	5,141	3,713	8,854	2,310	970	1,386	1,861	2,327	4,188
At work - other	1,080	1,368	2,448	1,689	4,137	1,164	489	607	795	1,082	1,877
At work - total	12,799	20,757	33,556	26,956	60,512	13,318	5,396	7,435	14,842	19,521	34,363
Persons at work	12,799	20,757	33,556	26,956	60,512	13,318	5,396	7,435	14,842	19,521	34,363
Persons first time job seekers	610	657	1,267	860	2,127	620	268	258	379	602	981
Persons unemployed	2,785	3,970	6,755	4,707	11,462	2,884	1,564	1,506	2,307	3,201	5,508
Labour Force	16,194	25,384	41,578	32,523	74,101	16,822	7,228	9,199	17,528	23,324	40,852
Total Private households	11,745	18,904	30,649	24,782	55,431	12,139	5,562	7,084	12,948	17,698	30,646

Table F.3 Basic Demographic Data for Elements of areas defined for the Study - 1996

1996 Data	County Borough	Remainder Inner	Total Inner (PLUTS Study Area)	Outer	Traffic planning area	County Borough and Environs	Towns and Environs in Planning Area	Towns and Environs in Buffer Area	Rural inner	Rural Outer	Rural Total
Total Population -1996	42,540	68,626	111,166	88,559	199,725	44,153	19,626	25,099	47,387	63,460	110,847
Young dependents (0-14)	9,560	16,944	26,504	22,090	48,594	9,973	4,825	6,176	11,706	15,914	27,620
Working Age (15-64)	28,625	43,476	72,101	55,582	127,683	29,705	12,592	15,976	29,804	39,606	69,410
Retirement Age (65+)	4,355	8,206	12,561	10,887	23,448	4,475	2,209	2,947	5,877	7,940	13,817
At work - agriculture	131	4,145	4,276	6,269	10,545	145	242	253	3,889	6,016	9,905
At work - mining	15	57	72	61	133	15	5	5	52	56	108
At work – manufacturing industry	4,964	5,307	10,271	6,943	17,214	5,119	1,594	2,766	3,558	4,177	7,735
At work - building & const	701	2,121	2,822	2,484	5,306	730	538	563	1,554	1,921	3,475
At work - elect & gas	135	240	375	154	529	141	87	51	147	103	250
At work - commerce	2,842	3,784	6,626	4,993	11,619	2,961	1,327	1,682	2,338	3,311	5,649
At work - transport	881	1,162	2,043	1,041	3,084	917	320	275	806	766	1,572
At work - public admin	503	728	1,231	1,209	2,440	533	267	510	431	699	1,130
At work – professional services	2,754	3,617	6,371	4,750	11,121	2,857	1,110	1,680	2,404	3,070	5,474
At work - other	1,792	2,556	4,348	2,874	7,222	1,873	782	1,041	1,693	1,833	3,526
At work - total	14,718	23,717	38,435	30,778	69,213	15,291	6,272	8,826	16,872	21,952	38,824
Persons at work	14,718	23,717	38,435	30,778	69,213	15,291	6,272	8,826	16,872	21,952	38,824
Persons first time job	487	584	1,071	731	1,802	497	212	182	362	549	911
Persons unemployed	2,920	3,736	6,656	4,460	11,116	3,016	1,437	1,421	2,203	3,039	5,242
Labour Force	18,125	28,037	46,162	35,969	82,131	18,804	7,921	10,429	19,437	25,540	44,977
Total Private households	13,579	20,523	34,102	26,687	60,789	14,060	6,170	7,837	13,872	18,850	32,722

Table F.4 Basic Demographic Data for Elements of areas defined for the Study - 1991 to 1996 Changes

1991 to 1996 Change	County Borough	Remainder Inner	Total Inner (PLUTS Study Area)	Outer	Traffic planning area	County Borough and Environs	Towns and Environs in Planning Area	Towns and Environs in Buffer Area	Rural inner	Rural Outer	Rural Total
Population Change	2212	1758	3970	1414	5384	2325	579	954	1066	460	1526
Young dependents (0-14)	-734	-2166	-2900	-2715	-5615	-734	-451	-561	-1715	-2154	-3869
Working Age (15-64)	2474	3399	5873	3843	9716	2604	851	1236	2418	2607	5025
Retirement Age (65+)	472	525	997	286	1283	455	179	279	363	7	370
At work - agriculture	-1	-637	-638	-844	-1482	-5	-43	-69	-590	-775	-1365
At work - mining	14	-46	-32	1	-31	14	-35	3	-11	-2	-13
At work - manufacturing industry	174	874	1048	1262	2310	172	353	681	523	581	1104
At work - building & const	6	397	403	367	770	5	109	-21	289	388	677
At work - elect & gas	6	-4	2	5	7	9	1	-16	-8	21	13
At work - commerce	416	339	755	673	1428	444	34	79	277	594	871
At work - transport	79	140	219	222	441	81	32	56	106	166	272
At work - public admin	-7	-1	-8	-86	-94	-3	-8	-50	3	-36	-33
At work - professional services	520	710	1230	1037	2267	547	140	294	543	743	1286
At work - other	712	1188	1900	1185	3085	709	293	434	898	751	1649
At work - total	1919	2960	4879	3822	8701	1973	876	1391	2030	2431	4461
Persons at work	1919	2960	4879	3822	8701	1973	876	1391	2030	2431	4461
Persons first time job seekers	-123	-73	-196	-129	-325	-123	-56	-76	-17	-53	-70
Persons unemployed	135	-234	-99	-247	-346	132	-127	-85	-104	-162	-266
Labour force	1931	2653	4584	3446	8030	1982	693	1230	1909	2216	4125
Total Private households	1834	1619	3453	1905	5358	1921	608	753	924	1152	2076

Table F.5 Basic Demographic Data for Elements of areas defined for the Study - 1991 Dependency, sectoral work shares and unemployment rates

1991 Data	County Borough	Remainder Inner	Total Inner (PLUTS Study Area)	Outer	Traffic planning area	County Borough and Environs	Towns and Environs in Planning Area	Towns and Environs in Buffer Area	Rural inner	Rural Outer	Rural Total
<b>Shares of Population</b>											
Total Population -1996	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Young dependents (0-14)	25.5%	28.6%	27.4%	28.5%	27.9%	25.6%	27.7%	27.9%	29.0%	28.7%	28.8%
Working Age (15-64)	64.8%	59.9%	61.8%	59.4%	60.7%	64.8%	61.6%	61.0%	59.1%	58.7%	58.9%
Retirement Age (65+)	9.6%	11.5%	10.8%	12.2%	11.4%	9.6%	10.7%	11.0%	11.9%	12.6%	12.3%
<b>Shares at Work</b>											
At work - agriculture	1%	23%	15%	26%	20%	1%	5%	4%	30%	35%	33%
At work - mining	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
At work - manufacturing industry	37%	21%	27%	21%	25%	37%	23%	28%	20%	18%	19%
At work - building & const	5%	8%	7%	8%	7%	5%	8%	8%	9%	8%	8%
At work - elect & gas	1%	1%	1%	1%	1%	1%	2%	1%	1%	0%	1%
At work - commerce	19%	17%	17%	16%	17%	19%	24%	22%	14%	14%	14%
At work - transport	6%	5%	5%	3%	4%	6%	5%	3%	5%	3%	4%
At work - public admin	4%	4%	4%	5%	4%	4%	5%	8%	3%	4%	3%
At work - professional services	17%	14%	15%	14%	15%	17%	18%	19%	13%	12%	12%
At work - other	8%	7%	7%	6%	7%	9%	9%	8%	5%	6%	5%
At work - total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Unemployment rate</b>	21%	18%	19%	17%	18%	21%	25%	19%	15%	16%	16%

Table F.6 Basic Demographic Data for Elements of areas defined for the Study - 1996 Dependency, sectoral work shares and unemployment rates

1996 Data	County Borough	Remainder Inner	Total Inner (PLUTS Study Area)	Outer	Traffic planning area	County Borough and Environs	Towns and Environs in Planning Area	Towns and Environs in Buffer Area	Rural inner	Rural Outer	Rural Total
<b>Shares of Population</b>											
<i>Total Population -1996</i>	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Young dependents (0-14)	22.5%	24.7%	23.8%	24.9%	24.3%	22.6%	24.6%	24.6%	24.7%	25.1%	24.9%
Working Age (15-64)	67.3%	63.4%	64.9%	62.8%	63.9%	67.3%	64.2%	63.7%	62.9%	62.4%	62.6%
Retirement Age (65+)	10.2%	12.0%	11.3%	12.3%	11.7%	10.1%	11.3%	11.7%	12.4%	12.5%	12.5%
<b>Shares at Work</b>											
At work - agriculture	1%	17%	11%	20%	15%	1%	4%	3%	23%	27%	26%
At work - mining	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
At work - manufacturing industry	34%	22%	27%	23%	25%	33%	25%	31%	21%	19%	20%
At work - building & const	5%	9%	7%	8%	8%	5%	9%	6%	9%	9%	9%
At work - elect & gas	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	1%
At work - commerce	19%	16%	17%	16%	17%	19%	21%	19%	14%	15%	15%
At work - transport	6%	5%	5%	3%	4%	6%	5%	3%	5%	3%	4%
At work - public admin	3%	3%	3%	4%	4%	3%	4%	6%	3%	3%	3%
At work - professional services	19%	15%	17%	15%	16%	19%	18%	19%	14%	14%	14%
At work - other	12%	11%	11%	9%	10%	12%	12%	12%	10%	8%	9%
<i>At work - total</i>	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
<b>Unemployment rate</b>	19%	15%	17%	14%	16%	19%	21%	15%	13%	14%	14%

Table F.7 Shares of Population and Households in 1991 and 1996

1991 and 1996 Data	County Borough	Remainder Inner	Total Inner (PLUTS Study Area)	Outer	Traffic planning area	County Borough and Environs	Towns and Environs in Planning Area	Towns and Environs in Buffer Area	Rural inner	Rural Outer	Rural Total
<b>As percent of region</b>											
1991 Population shares	10.5%	17.5%	28.0%	22.7%	50.7%	10.9%	5.0%	6.3%	12.1%	16.4%	28.5%
1996 Population shares	10.9%	17.5%	28.4%	22.6%	51.0%	11.3%	5.0%	6.4%	12.1%	16.2%	28.3%
1991 Household Shares	10.8%	17.3%	28.1%	22.7%	50.8%	11.1%	5.1%	6.5%	11.9%	16.2%	28.1%
1996 Household Shares	11.3%	17.1%	28.3%	22.2%	50.5%	11.7%	5.1%	6.5%	11.5%	15.7%	27.2%
<b>As percent of Traffic Planning Area</b>											
1991 Population shares	20.8%	34.4%	55.2%	44.8%	100.0%	21.5%	9.8%	12.4%	23.8%	32.4%	56.3%
1996 Population shares	21.3%	34.4%	55.7%	44.3%	100.0%	22.1%	9.8%	12.6%	23.7%	31.8%	55.5%
1991 Household Shares	21.2%	34.1%	55.3%	44.7%	100.0%	21.9%	10.0%	12.8%	23.4%	31.9%	55.3%
1996 Household Shares	22.3%	33.8%	56.1%	43.9%	100.0%	23.1%	10.1%	12.9%	22.8%	31.0%	53.8%

Table F.8 Performance of Gateway and Hubs in the South East Region 1991 to 1996

Town or other area	1991	1996	1991 Share (%)	1996 Share (%)	Change in share (% points)	% Growth 1991-1996
Waterford CB and Environs	41,828	44,153	10.9	11.3	0.4	5.6
Carlow and Environs	14,027	14,979	3.7	3.8	0.2	6.8
Kilkenny and Environs	17,669	18,696	4.6	4.8	0.2	5.8
Wexford and Environs	15,393	15,862	4.0	4.1	0.0	3.0
Clonmel and Environs	15,562	16,182	4.1	4.1	0.1	4.0
<i>Gateway</i>	<i>41,828</i>	<i>44,153</i>	<i>10.9</i>	<i>11.3</i>	<i>0.4</i>	<i>5.6</i>
<i>Hubs in Region</i>	<i>62,651</i>	<i>65,719</i>	<i>16.3</i>	<i>16.8</i>	<i>0.4</i>	<i>4.9</i>
<i>Gateway and Hubs</i>	<i>104,479</i>	<i>109,872</i>	<i>27.3</i>	<i>28.1</i>	<i>0.8</i>	<i>5.2</i>
<b>Regional Population</b>	<b>383,188</b>	<b>391,517</b>	<b>100.0</b>	<b>100.0</b>	<b>0.0</b>	<b>2.2</b>

**Table F.9: Populations of Other Towns Over 500 within the Study Area**

	<b>1991 Population</b>	<b>1996 Population</b>
Dunmore East	1,038	1,430
Portlaw	1,151	1,176
Kilmactomas	694	681
Passage East	542	573
Mooncoin	810	855
Piltown	717	716
Kilmacow	596	599
<b>TOTAL</b>	<b>7,544</b>	<b>8,026</b>

**Appendix G: Detailed Transport Data**Table G.1: **Scheduled Bus Services**

<b>Service</b>	<b>Operator</b>	<b>Weekday Frequency</b>
<b>City Services</b>		
Ballybeg / Institute of Technology	Bus Eireann	10 minutes
City Centre Browns Road	Bus Eireann	12 minutes
Avondale / St John's Park /City Centre / Browns Road / Tirconnell Avenue	Bus Eireann	40 minutes
Farronshoneen / Hillview	Bus Eireann	30 minutes
Abbey Park / Ballygunner	Kenneallys	30 minutes
<b>Inter City Services</b>		
Cork via Dungarvan, Youghal	Bus Eireann	60 minutes
Thomastown	Bus Eireann	90 minutes
Limerick via Carrick on Suir , Dungarvan	Bus Eireann	5 services Mon-Thurs 7 Fri
Wexford via New Ross	Bus Eireann	2 services
New Ross	Bus Eireann	5 services
Great Island	Bus Eireann	3 services
Dublin	Bus Eireann	16 services
Dublin Airport	Kenneallys	18 (return service inc)

Table G.2: **Bus Eireann Patronage in Waterford City 1990-1999**

<b>Year</b>	<b>Patronage (all services exc Ballybeg)</b>	<b>Ballybeg Route</b>	<b>Total Patronage</b>
1990	747,493	-	747,493
1991	722,806	-	722,806
1992	707,558	-	707,558
1993	694,220	-	694,220
1994	687,662	-	687,662
1995	488,999	144,848 (23%)	633,847
1996	407,414	333,830 (45%)	741,244
1997	378,945	358,298 (49%)	737,243
1998	349,966	362,132 (51%)	712,098
1999	353,457	350,927 (50%)	704,384

**Table G.3** summarises the current allocation of traffic on some of the key roads in Waterford City. The summary serves to underline the importance of the N25 Cork Road at Skibereen and Kilmurry, the Williamstown Rd and the R683 Dunmore Rd. Other roads carrying significant quantities of traffic are the N9 and N24 north of Grannagh Bridge, the R675 Tramore Rd, the Outer Ring Road and Browns Road reflecting in part it's (unofficial) role as a bypass to the City Centre for cross river traffic.

Table G.3: **Surveyed Daily Traffic Flows (vehs/24 hrs.)**

NB = Northbound  
SB = Southbound  
EB = Eastbound  
WB = Westbound

<b>Abbey Rd</b>	<b>Dunmore Rd.</b>	<b>Williamstown Rd West of X Rds</b>	<b>Williamstown Rd East of X Rds</b>	<b>Dunmore Rd (Grantstown)</b>	<b>Outer Ring Rd. At Ardkeen</b>
EB 913	EB 4671	EB 1359	EB 309	EB 1484	NB 3983
WB 892	WB 4392	WB 1143	WB 307	WB 1668	SB 4964
Σ 1805	Σ 9063	Σ 2502	Σ 616	Σ 3152	Σ 8947 (1)
<b>Williamstown Rd West of ORR</b>	<b>N25 Kilmurry</b>	<b>Ballinvoher</b>	<b>Milepost Village</b>	<b>Lower Grange</b>	<b>Kilbarry Rd</b>
EB5006	NB 5874	EB 644	EB 151	NB 548	NB1035
WB6003	SB 4774	WB 513	WB 120	SB 531	SB 1063
Σ 11009	Σ 10648	Σ 1157	Σ 271	Σ 1079	Σ 2098
<b>N25 Skibereen</b>	<b>Gracedieu Rd</b>	<b>Bilberry Rd</b>	<b>Mount Sion</b>	<b>N9 North of Grannagh Bridge</b>	<b>N24 West of Grannagh Bridge</b>
EB 6619	EB1083	EB 547	SB 1522	NB 3454	EB 4014
WB 5166	WB 1060	WB 557	NB 1316	SB 3338	WB 4225
Σ 11785	Σ 2143	Σ 1104	Σ 2838	Σ 6792	Σ 8239
<b>Maypark Lane</b>	<b>Tramore Rd</b>	<b>N25 at WIT</b>	<b>Browns Rd</b>	<b>Industrial Estate</b>	<b>Cleaboy Rd</b>
NB 1556	NB 4516	EB	EB	NB	EB
SB 1768	SB 4719	WB	WB	SB	WB
Σ 3324	Σ 9235	Σ18690 (2)	Σ12990 (2)	Σ8520 (2)	Σ11630 (2)

(1) Traffic counts in 2002 have recorded flows in the region of 11,000 vehicles.

(2) Totals derived from peak hour counts.

Table G.4: Current Off-Street Parking Provision

Car Park	No Spaces	Charge	%
Bolton Street	60	€1.20/hour	2
Jenkins Lane	109	€1.20/hour	5
New Street	301	€1.10/hour (max 6 hours) €4 overnight	12
City Square	410	1-3 hours €1.30/hour 4-5 hours €1.80/hour 6 hours €11.60 7 hours €14.70 8 hours €18.00	17
Miller's Marsh	186	€1.20 Max €3.60	8
Rose Lane (Tower Hotel)	81	Free for residents and members of leisure centre €2/hour for general public	3
Quay1	101	€3/24 hours	4
Quay2	165	€3/24 hours	7
Keverflow	275	1-4 hours €1.30/hour 5-6 hours €1.40/hour 7-10 hours €1.50/hour Daily Rate €12 Overnight €4	11
Quay 3	194	€1/hour (max 5 hours) €2 overnight	8
<b>Sub Total</b>	<b>1882</b>		<b>77</b>
Tesco	308		13
Morgan Street	234		10
<b>Overall Total</b>	<b>2424</b>		<b>100</b>

Table G.5: **Current On-Street Parking Provision - Waterford Disc Parking Area**

Residential		Non Residential			
		Adjacent to Core Area		Core Area	
Street	Spaces	Street	Spaces	Street	Spaces
Barker St	31	Thomas Hill	36	The Quays	58
Patrick Terr	26	Meeting Ho Lane	7	The Mall	86
Wellington St	20	Anne St	24	O'Connell St	42
Gratton Terr	16	The Glen	43	Greyfriars	15
Thomas St	14	Ballybricken Green	38	Gladstone St	4
Greyfriars	5	Newgate St	17	St Francis Place	5
James St	9	Bachelors Walk	4	Henrietta St	6
Glass Ho Lane	8	Brian's Terr	3	Parnell St	33
Margaret Ave	7	New St	12	Bolton St	11
Carrigan Park	20	Johns Lane	15	Adelphi Quay	6
Mayor's Walk	52	Mayor's Walk	6	Arundel Sq	6
Stephen St	14	Stephen St	8	Olaf St	6
O'Brien St	25	Bath St	7	Lady Lane	6
Parliament St	10	Catherine St	33		
Close Gate	29	Johnstown	11		
Spring Garden Alley	21	Canada St	38		
Bailey,s New St	5				
Waterside	52				
Scotch Quay	8				
<b>Totals</b>	<b>372 (39%)</b>		<b>302 (32%)</b>		<b>284 (29%)</b>

All figures exclude provision for the disabled

### Disabled Parking

Provision for the disabled is fairly widespread throughout the Disc Parking Zone with a total of 34 spaces on the following streets:

- Canada Street (2),
- Bolton Street car Park (2),
- The Mall (3),
- Waterside (1),
- Parnell Street (2),
- Railway Station Square car park (4),
- John Street (1),
- Lady Lane (2),
- Henrietta Street (1),
- Arundel Square (1),
- Mayor's Walk (2),
- Stephen's Street (1),
- Patrick Street (1),
- Ballybricken Green (2),
- Jenkins Lane car park (2),
- Gladstone Street (1),

- O'Connell Street (2),
- The Quays (4).

Other points of importance concerning the provision of car parking within the central area of Waterford are as follows:

- There are a total of 18 designated loading bays within the Disc Parking Zone. Ten are situated on the Quays, two in Arundel Square and John Street, and one in Gladstone Street, Henrietta Street, Mayor's Walk and the Jenkins Lane car park.
- There are nine bus and coach stops on the Quays. The majority (8) are allocated to coaches. This ensures a generally good level of access to the main hotels in the City - all of which are located on the Quays or on the adjoining side roads.
- There are a total of three permanent taxi ranks within the Disc Parking Zone. These are situated on O'Connell Street and Ballybricken Green. These are supplemented by a total of four part time ranks on The Glen, O'Connell Street, The Mall and John Street. In each case, these facilities are situated in close proximity to important shopping centres within the City Centre.

Table G.6: **Waterford City Centre Parking Standards - Development Plan 2002**

Land Use	City Centre Parking Standard	Gross Floor Area (m <sup>2</sup> )	Spaces
Pubs & Restaurants	1 space/20m <sup>2</sup>	5,006	250
Banks and Offices	1 space/100m <sup>2</sup>	67,896	577(1)
Hotels (Inc Tower Hotel)	1 space/2 bedrooms	557 (beds)	279
Shops (Inc Tesco & Morgan St)	1 space/30m <sup>2</sup>	51,550	1,718
Surgeries	2 spaces/consulting room	26	52
Theatres	1 space/10 seats	410 (seats)	41
<b>Total</b>	-	-	<b>2,917</b>

(1) Adjusted to reflect the provision of private non-residential parking linked to some commercial premises.

Table G.7: **Port Tonnages**

<b>Port</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>% Growth 97-99</b>	<b>% Growth 98-99</b>
Bantry	344	478	1,131	229	137
Cork	8,216	8,895	8,509	4	-4
Drogheda	791	958	891	13	-7
Dublin	12,134	13,240	15,243	26	15
Dun Laoighaire	0	240	225	-	-6
Dundalk	218	233	269	23	15
Foynes	1,199	1,037	1,344	12	30
Galway	537	599	657	22	10
Greenore	346	456	540	56	18
New Ross	1,108	1,020	1,111	0	9
Rosslare	1,227	1,693	1,786	46	5
Shannon	8,332	8,832	8,721	5	-1
Waterford	1,181	1,592	1,904	61	20
Other	697	681	597	-14	-12
<b>Total</b>	<b>36,330</b>	<b>39,954</b>	<b>42,928</b>	<b>18</b>	<b>7</b>

All figures are in 000' tonnes  
Source CSO

Table G.8: **Container Units**

<b>Port</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>% Growth 97-99</b>	<b>% Growth 98-99</b>
Cork	54,462	61,694	71,303	31	16
Drogheda	2,199	2,092	2,320	6	11
Dublin	231,028	254,816	265,195	15	4
Waterford	33,956	45,377	55,379	63	22
<b>Total</b>	<b>312,645</b>	<b>363,979</b>	<b>394197</b>	<b>23</b>	<b>8</b>

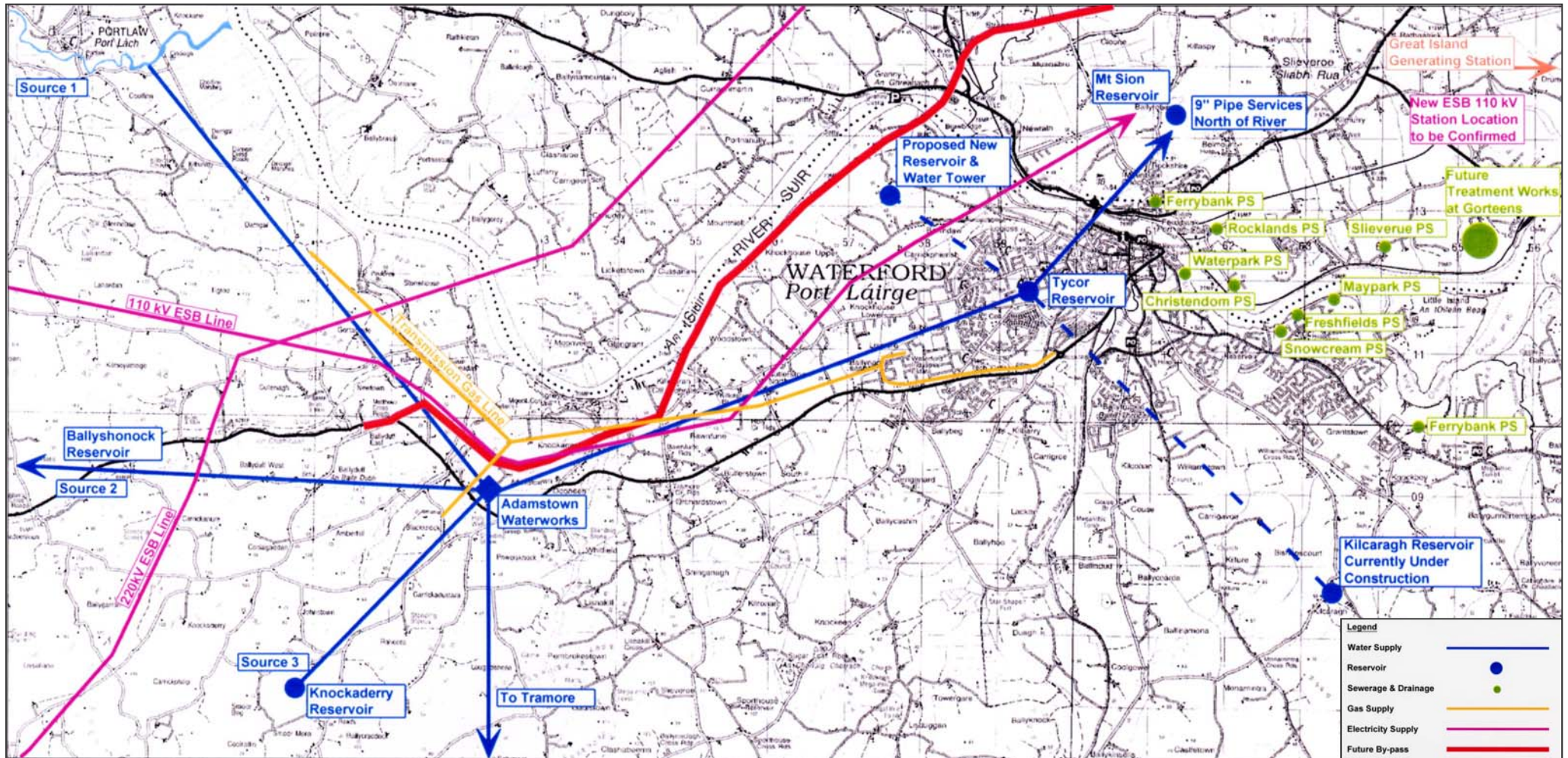
## **SCATS**

SCATS operates at two levels of control simultaneously. These are referred to as Strategic and Tactical. The Strategic control provides an operational overview of groups of traffic signals, which seek to optimise overall performance. Tactical control regulates the individual performance of junctions separately. Both levels of control operate in parallel and are used to regulate the performance of the total system. This enables SCATS to perform additional functions over and above the optimisation of linked sets of traffic signals. For example:

- It can vary the number of pedestrian stages 'called' in any defined period to reduce interference with traffic flows at busy times of day,
- It can record and regulate the volume of traffic passing through a junction in accordance with some predetermined strategic objective,
- It can divide the overall system into a series of sub systems to introduce more localised control of traffic signals.

Appendix H: Utilities

Figure H.1 Current Infrastructure Provision





## Appendix I: Goals Achievement Matrix for Alternative Strategies

### Goal: Economic Development

OBJECTIVES	ACHIEVEMENT
1. To promote and foster an internationally oriented and highly competitive location.	The relatively dispersed nature of existing land use allocations and current high levels of traffic congestion are constraints to the development of both Strategies B and C. The greater emphasis on the North Quays as an employment location in Strategy C may give this option the edge over Strategy B. This difference would become more pronounced in the post 2020 period.
2. To provide for a wide range of development opportunities so as to provide a balanced economic structure.	Strategy options B and C both provide a good range of development sites.
3. To develop the tourist products of the Waterford Region, including the provision of new attractions and facilities.	Tourist and related riverside developments would be key components of both strategy options B and C but C might perform slightly better because of its greater emphasis on the North Quays.
4. To develop Waterford as a centre for higher education with WIT evolving into a new university and as a driving force in the local economy.	Strategies B and C would both facilitate the expansion of higher education in Waterford.
5. To develop the national role of the Port of Waterford & the Belview Industrial Zone.	Both Strategies B and C could equally achieve this objective.
6. To develop the regional role of Waterford Regional Airport	Both Strategies B and C should facilitate the achievement of this objective, although the southern emphasis of Strategy B should mean that it is likely to provide better access to the airport from most residential areas in both the pre and post 2020 periods.

**Goal: Social Cohesion and Community Development**

OBJECTIVES	ACHIEVEMENT
7. To strengthen the retail position of the City and to ensure the maintenance of a healthy City Centre.	Strategy C envisages the expansion of the City Centre into the North Quays and this is most likely to strengthen and enhance the position of the existing Centre. Strategy B would tend to encourage a gradual drift of City Centre functions out of the Centre towards the south.
8. To ensure the availability of sufficient land to accommodate housing needs, including different housing types	Both strategies B and C should be able to meet this objective satisfactorily.
9. To improve access to employment opportunities, community facilities and services, including education, health, community services and utilities	The provision of a Downstream River Crossing and a City Centre bridge for pedestrians and cyclists would improve overall accessibility in each strategy. A crossing aligning as close as possible with the Outer Ring Road would better suit the distribution of land uses proposed in Strategy C rather than Strategy B and would provide access to strategic sites such as Belview and WIT.
10. To ensure ready access to open space and the natural environment	Both spatial options B and C would allow the local planning authorities to provide adequate access to open space and the natural environment.
11. To ensure an adequate range of and access to recreational facilities	The majority of recreational facilities are currently to the south of the River Suir, which suits the distribution of land uses under Strategy B. However, the Outer Ring Road and the Downstream River Crossing would facilitate access to these facilities from the northern suburbs proposed in Strategy C.
12. To ensure the adequate provision of healthcare facilities.	Both strategies B and C will provide for adequate healthcare facilities.
13. To ensure the adequate provision of primary and secondary educational facilities.	Both strategies B and C will provide for primary and secondary educational facilities.

**Goal: Sustainable Land Use and Infrastructure Development**

OBJECTIVES	ACHIEVEMENT
14. To promote the sustainable use of resources and the re-use of 'brownfield' sites	Redevelopment of the North Quays is given more emphasis in Strategy C, so this option is likely to perform best at meeting this objective.
15. To create a balanced spatial strategy	Strategy C would achieve a more balanced city structure than Strategy B by encouraging a far greater proportion of development to the north of the existing City. This would be particularly the case under Strategy C post 2020.
16. To minimise routine commuting and reduce car dependency	Strategy C performs slightly better than Strategy B, the difference becoming far more significant in the 2020+ situation.
17. To encourage a settlement pattern that encourages public transport, cycling and walking	Neither Strategy B nor C performs particularly well in meeting this objective, largely for historical and geographical reasons. The development of new Green Routes would be accelerated by the development required by the adoption of Strategy C.
18. To develop and maintain on an ongoing basis a modern telecommunications network	Equal performance would be expected in both Strategies B and C.
19. To maximise the use of existing infrastructure	Strategy B is likely to make the best use of existing infrastructure in the short term, especially with regard to the provision of water.
20. To minimise the cost of new service provision and operation	In the medium to long term, the location of the new sewage treatment works on the north bank of the river suggests that development envisaged under Strategy C will minimise the future provision of drainage and sewage costs. However, the sources and supply of water is more established in the south of the City, so that the cost of water provision in Strategy B may be lower than under Strategy C.

<p>21. To enhance public transport within the City of Waterford and its environs and between Waterford and other key settlements in the PLUTS Study Area.</p>	<p>Strategy C, with its greater emphasis on the north side of the City, should encourage greater use of the rail network given the location of the station here. The potential for improved bus services should be similar in all strategies, although emphasis on City Centre expansion in Strategy C may also slightly favour this option.</p>
<p>22. To enhance inter-urban transport measures</p>	<p>Links to Dublin, Kilkenny, New Ross and Rosslare are likely to be facilitated more effectively under Strategy C, both post and pre 2020.</p>

**Goal: Heritage and Environmental Improvement**

OBJECTIVES	ACHIEVEMENT
23. To increase awareness of the rich environmental and heritage legacy of Waterford and to promote access to and enjoyment of this amenity by all	All strategies should perform equally in meeting this objective.
24. To maximise the use of the river as a civic amenity while respecting its value as an environmental asset	The successful regeneration of the quays and waterfront are more central to Strategy C 2020 and 2020+, so the growth of the City in this direction should help meet this objective.
25. To improve the physical fabric and public realm of the City to serve the needs of existing and future citizens while contributing to the attractiveness of the City to potential investors and visitors	The successful regeneration of the quays and waterfront are more central to Strategy C 2020 and 2020+, so the growth of the City in this direction should help meet this objective.
26. To minimise negative impacts on the cultural and built heritage, and character of the PLUTS Study Area.	Conservation of the historic setting of the City should be possible under all of the options considered.
27. To minimise the adverse impacts on ecologically sensitive areas	This will have to be managed equally under each scenario.
28. To minimise the negative effects of development on the setting of the City and the attractive landscape of the surrounding countryside.	Strategy C best meets this requirement.

**Goal: Implementation**

<b>OBJECTIVES</b>	<b>ACHIEVEMENT</b>
29. To ensure reliable delivery of study objectives by stakeholders within the study timetable	Implementation of Strategy B is likely to be more straightforward than Strategy C, since it most closely matches existing market trends and local authority boundaries.