

Cork Airport Surface Access Plan
Final Report

Cork County Council
December 10th, 2008



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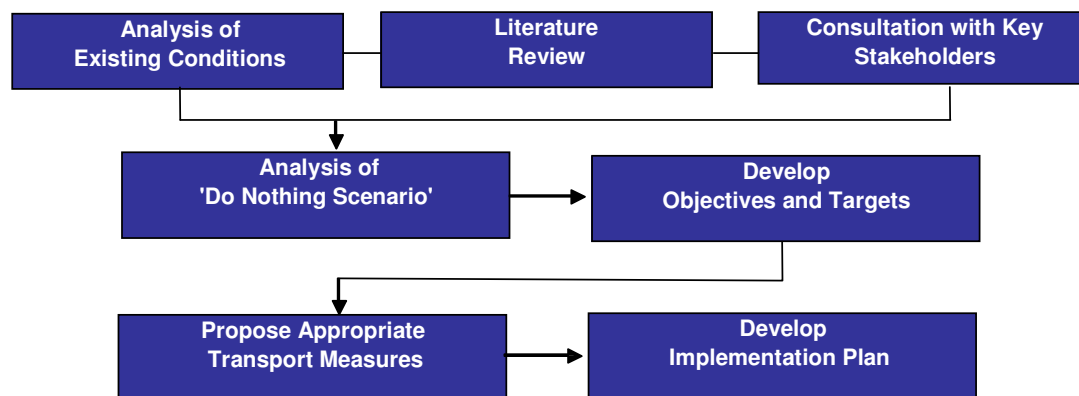
1 Introduction

1.1 Introduction

Cork County Council has commissioned Faber Maunsell to undertake a Surface Access Plan for Cork Airport. The objective of the Plan is to outline a strategy for future development of transport links to the airport. The Strategy has been developed based on projections for passenger and employee growth provided by Cork Airport Authority.

The key steps involved in developing the Plan are highlighted in Figure 1-1 below.

Figure 1-1: Methodology for development of Plan



Projections for future passenger growth are set out in the Cork Airport Future Needs Study. In parallel with this study, the Surface Access Plan has been developed around two phases as follows:

- Phase One: 2008-2012; and
- Phase Two: 2012-2020.

If passenger growth numbers proposed are not realised within this period, it is likely that some of the measures proposed will extend into Phase 3, 2020-2040.

A number of policy documents and reports have been vital in preparing the study, including:

- Cork Area Strategic Plan Update; and
- Cork Airport Future Needs Study.

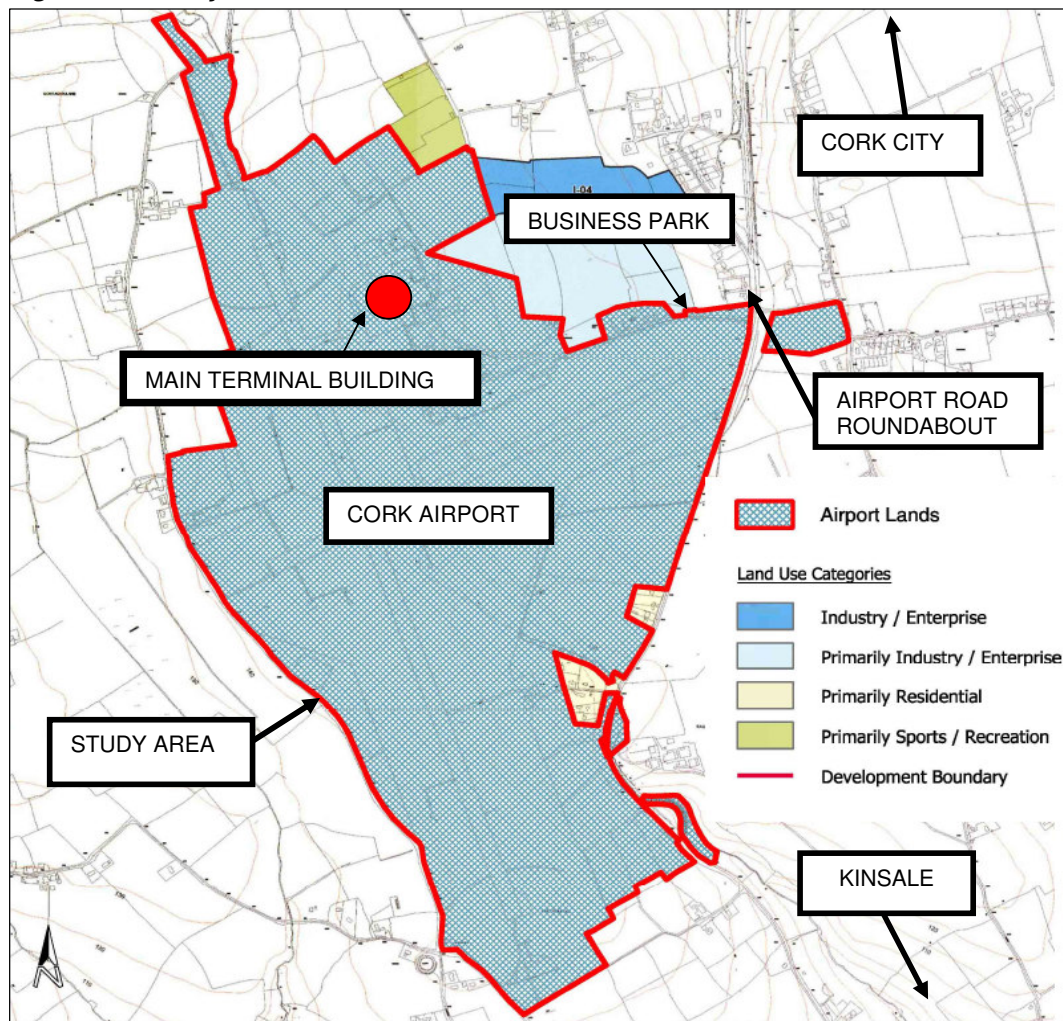
In addition, the Cork Area Transit System (CATS) study which is currently being undertaken, will provide some valuable information regarding the feasibility of long range public transport measures.

It should be noted that the study looks at the direct consequences of passenger growth on national roads and internal airport access roads. Resolving issues relating to consequential growth in traffic on local roads is not within the scope of the project and will be considered through other planning processes.

1.2 The Study Area

The Study Area comprises Cork Airport and, due in particular to the extent of traffic it generates, the adjacent Airport Business Park as shown in Figure 1-2.

Figure 1-2: Study Area



1.2.1 **Cork Airport**

Cork Airport is one of Ireland’s three principal airports and has experienced significant growth in services and passenger numbers in recent years. The opening of a new terminal to satisfy demand has reflected this growth and the airport now caters for almost 3.3 million passengers per year. The Airport is set to experience further growth in the coming years and securing ease of access for both passengers and employees is a key priority.

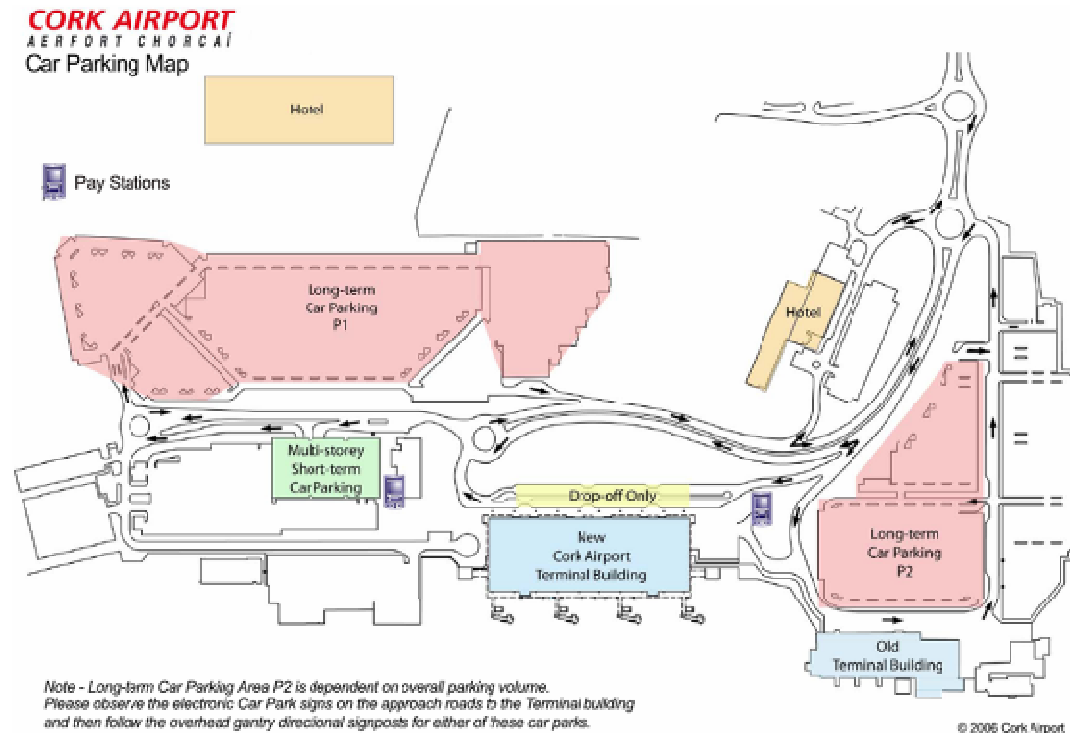


At present there are approximately 250 full time airport staff with an additional 200 staff working on a part time basis.

Passenger numbers through the airport have grown from 2.1million in 2003 to 3.3 million in 2008. This figure is expected to grow to over 4 million by 2012, according to Cork Airport Authority projections. By 2020, passenger numbers are due to reach just short of 6 million.

In addition to passenger traffic, Cork Airport also deals with cargo transport. However, these cargo facilities are severely limited due to the capacity available. There are three cargo sheds at the airport which are considered insufficient for future projected cargo operations. As a result, growth of cargo traffic through the airport has been relatively static for the past number of years due to saturation of cargo facilities.

The existing Airport layout is highlighted in Figure 1-3.

Figure 1-3: Cork Airport Layout Plan

1.2.2 Cork Airport Business Park

The Airport Business Park is conveniently located adjacent to the airport and utilises the same access arrangements as the airport. Good location and transport links have been instrumental in attracting high profile international employers to the Business Park which currently employs 2,750 people.



The Business Park currently has an area of 70,000m², approximately 10% of this commercial space is currently vacant and there are plans to increase the commercial area footprint by a further 10% in the coming years.

1.2.3 Structure of the Surface Access Plan

The report is structured as follows:

- Section 2: Future Directions, sets the scene for future growth of the airport and sets out the local and national policy framework for this growth as well as supporting transport infrastructure;
- Section 3: Literature Review, explores the transport planning objectives and action plans of airports with similar transport connections as Cork Airport. This provides an understanding of how similar issues have been tackled and their achievements or otherwise;
- Section 4: Existing Conditions, is a summary of the key findings of the Existing Conditions Report. This outlines the existing road network and public transport conditions, any issues and opportunities;
- Section 5: Consultation, summarises the outcomes of stakeholder consultation carried out;
- Section 6: The 'Do Nothing' Scenario, presents the results of a modelling exercise to investigate the impact of no future investment on the transport network;

- Section 7: Strategy Development, outlines the strategy objectives and targets to shape the development of measures and actions for the plan;
- Section 8: Transport Measures, specifies the particular measures which could be implemented to avert outcomes of the Do Nothing Scenario and achieve modal split targets; and
- Section 9: Implementation Strategy, outlines an indicative implementation programme to be developed in further detail in consultation with Cork County Council and key stakeholders.

2 Cork Airport Future Directions

The strategic importance of the airport to Cork City and County has been well documented in local and regional planning documents. It is important therefore that the key direction of future growth of the airport adopted in planning policy is taken into account. In addition, the Cork Airport Future Needs Study has an important role to play in development of the Surface Access Plan. This section summarises the key recommendations from these documents.

2.1 Cork Airport Future Needs Study

The Cork Airport Future Needs Study outlines passenger growth figures for Cork Airport and the resulting implications on existing infrastructure. The Report provides a fundamental steer for this study in relation to passenger growth numbers and proposed car parking provision.

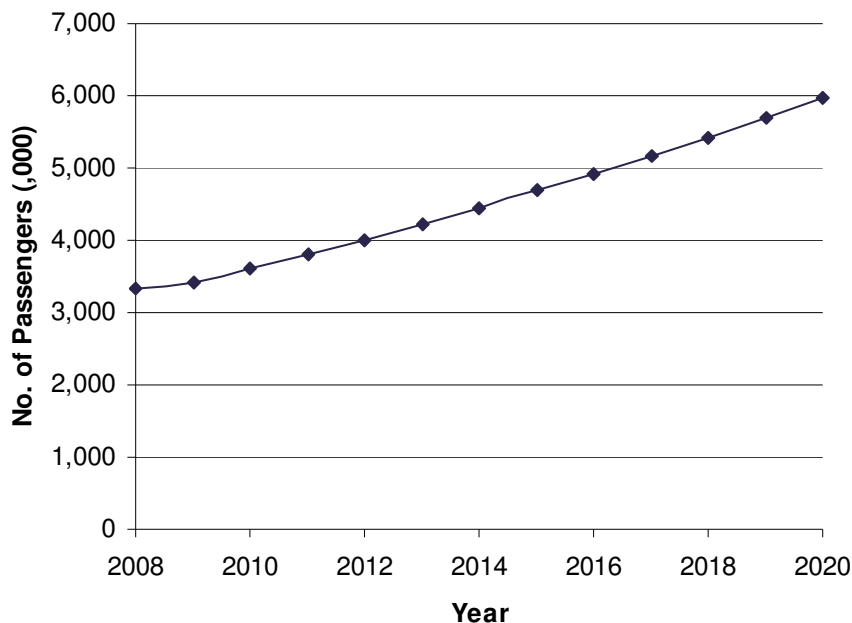
The Study has been developed around three future phases of development as follows:

- Phase 1: 2008-2012;
- Phase 2: 2012-2020; and
- Phase 3: 2020-2040.

This Transport Strategy has been prepared predominantly to reflect the two former phases of development.

Passenger numbers through Cork Airport are expected to increase by 5% per annum from 3.3 million per year in 2008 to 15.9 million by 2040. Within the timeframe of the Surface Access Plan, passenger numbers will have increased to just over 4 million in 2012 and 5.9 million in 2020. Passenger growth to 2020 is highlighted below.

Figure 2-1: Projected Passenger Growth at Cork Airport



Projected passenger growth presents major consequences for airport parking and access. Requirements for the former have been outlined in the Future Needs Study and result in plans for significant expansion of both short and long term parking as well as car hire and staff parking. Planned growth in provision of car parking is summarised below.

Table 2-1 Existing and Projected Airport Car Parking Needs

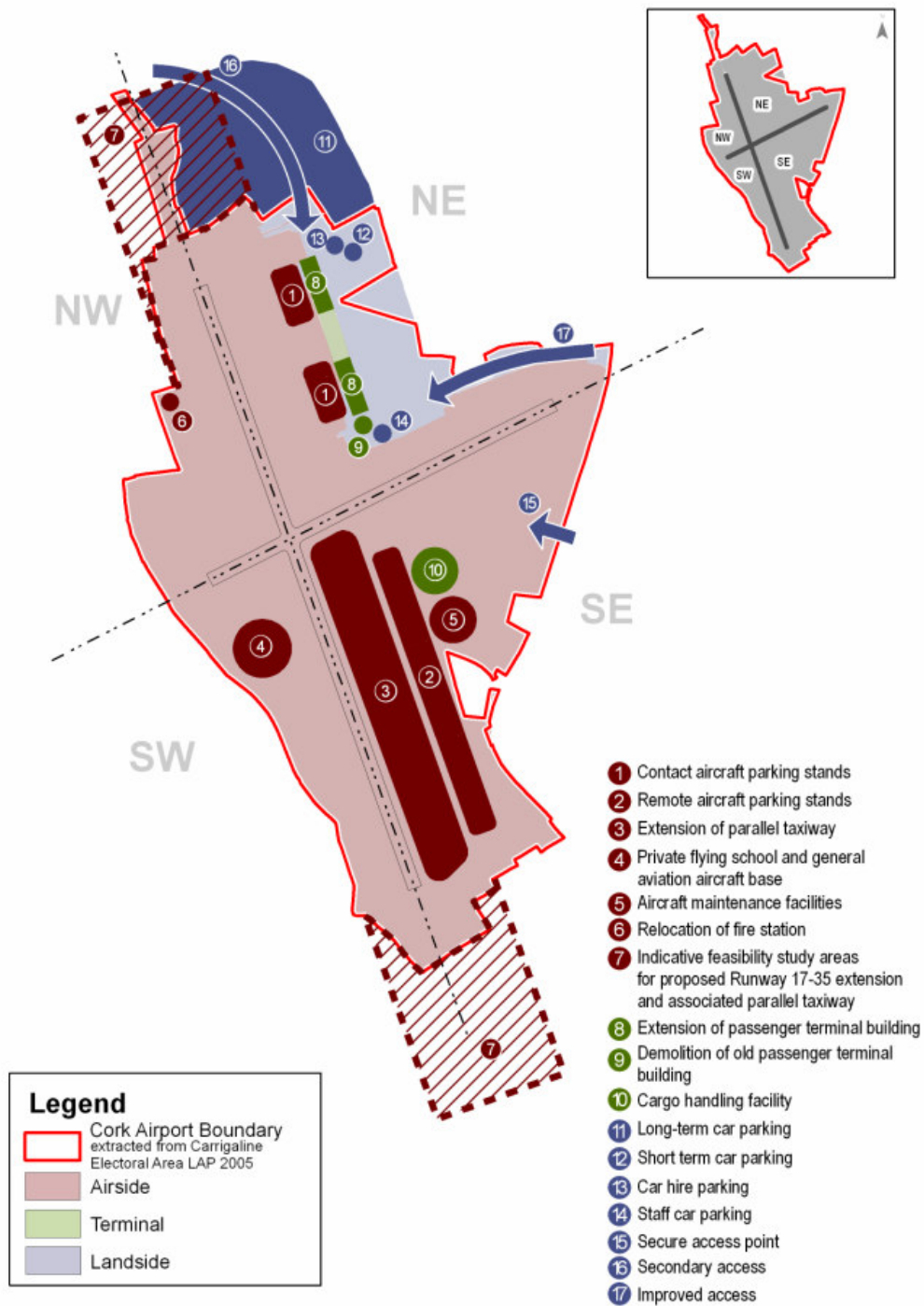
Year	Short Term Parking	Long Term Parking	Car Hire Parking	Staff Car Parking
2008	632	3,780	240	450
2012	632	4,800	280	500
2020	900	7,400	420	700

Expansion of car parks is proposed on a phased basis, with the current high utilisation of long term parking requiring this car park to be extended in 2010. In the long term, a significant amount of land will need to be acquired for parking provision. For long term parking alone, an additional 10ha will be required by 2020 without reflecting any mode shift to other transport modes during this period.

The Needs Study highlights the need for improved public transport links to the airport as well as the introduction of a secondary access point to relieve congestion on existing routes in the peak hour.

Figure 2-2 below illustrates the proposed expansion plan for the airport including car parking growth and improved access.

Figure 2-2: Cork Airport Expansion Plan



2.2 Cork Area Strategic Plan (CASP)

Cork Area Strategic Plan 2001 – 2020 (CASP) establishes a 20 year strategic planning framework for Cork City and its suburbs, the surrounding satellite towns and the harbour area. It presents a shared vision for the Cork Area and was adopted by the City and County Council in 2001. CASP 2001-2020 recognised the importance of Cork Airport to the City and County and supported proposals to develop the Airport's new terminal.

The draft CASP Update (2008) also reiterates the importance of the airport in terms of local and regional development but raises the issue of airport access and the need to upgrade both road and public transport access. The airport currently only has one access route, the N27, which regularly suffers from congestion delays. Congestion at the Kinsale Road Interchange causes delays for traffic travelling to and from the airport although grade separation there has brought some relief to traffic at this busy area of the National Network. In addition, two signalised junctions on the N27 south of the Kinsale Road Interchange contribute to delays.

The introduction of limited sections of bus priority has improved the level of public transport access to the airport; however further upgrades to public transport infrastructure are required if public transport is to become a preferred transport mode to the airport for passengers and employees.

Reflecting these concerns, the CASP Update 2008 outlines the following projects to improve access to the airport:

- A high frequency quality bus corridor from the airport to the City Centre and Kent Station is proposed. Swift journey times and reliability would be ensured by the introduction of priority measures at the Kinsale Road Interchange and the South City Link;
- The prioritisation of national road improvement schemes, in particular, the Cork Northern Ring Road (East and West) and the upgrades to the Cork South Ring Road interchanges at Bandon and Sarsfield Road; and
- The potential of a rapid transit corridor linking the airport to the City Centre and Ballyvolane with an interchange in the City Centre was also proposed (see figure 2-3 below).

Target for public transport mode shift have been outlined in the CASP as follows:

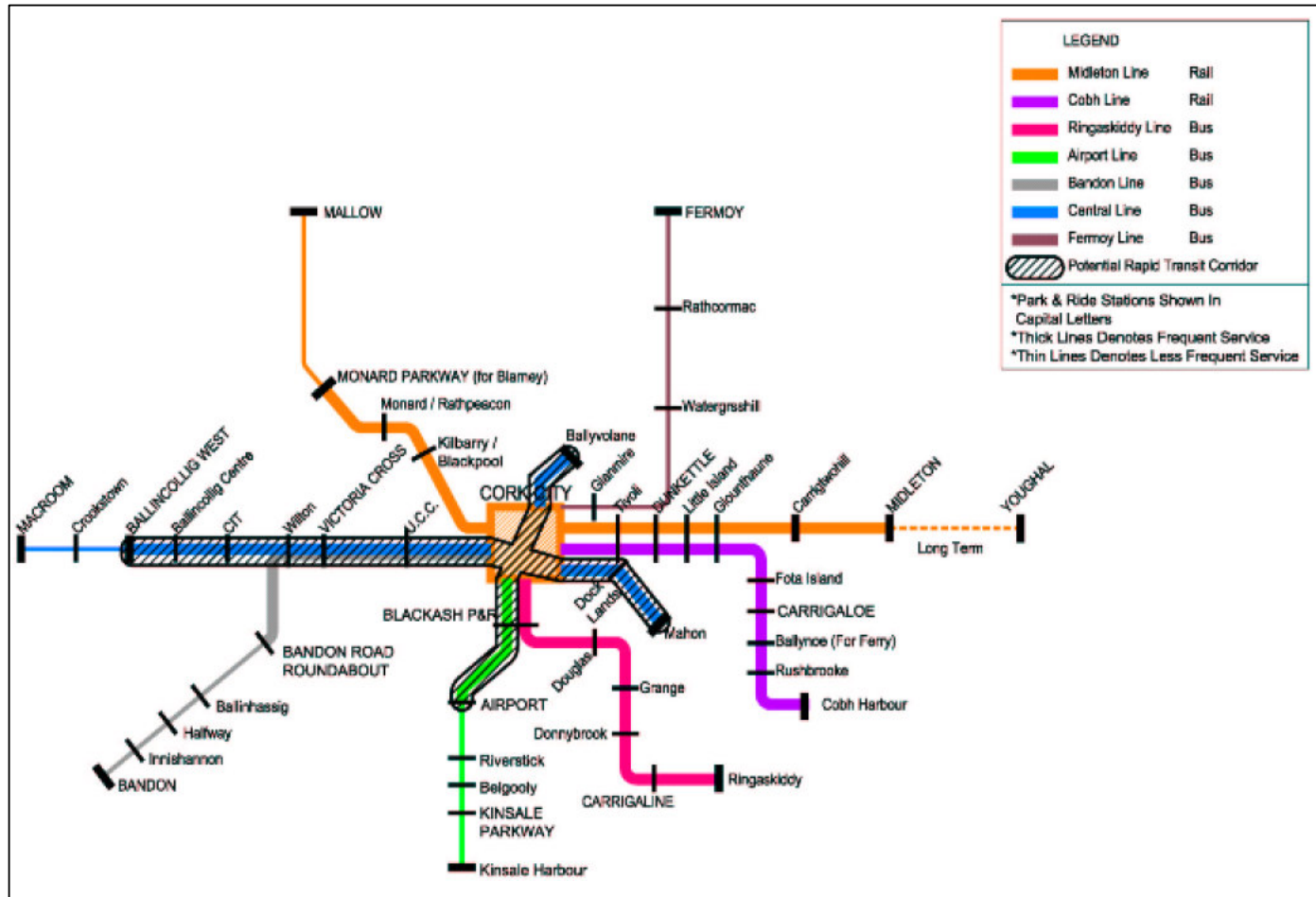
Table 2-2: Public Transport Mode Shift Targets

Mode	2000	2020 target
Rail	450 (0.5%)	7,600 (5%)
Bus	19,300 (22.3%)	31,150 (20.5%)
Car	66,850 (77.2%)	113,500 (74.5%)

These targets illustrate the projected improvement in rail infrastructure, in particular, the reopening of the Midleton-Cork Railway. These targets do not incorporate the impact of the proposed rapid transit infrastructure illustrated in Figure 2-3 below.

Although it is unlikely that there is sufficient residential catchment to support light rail on the north-south route which would serve the airport, these public transport options will be investigated in further detail through the Cork Area Transit System (CATS) study. The study is ongoing and as such, no findings are yet available. The study will consider a range of public transport options including Quality Bus Corridors (QBC's), Bus Rapid Transit (BRT) and Light Rail Transit (LRT).

Figure 2-3 Proposed Rapid Transit Scheme for Cork City (CASP Update 2008)



2.3 Cork County Development Plan 2003

The Cork County Development Plan recognises Cork Airport as one of the most important Gateways in the South of Ireland and supports its further growth. In addition to 'generally supporting Aer Rianta's programme for the operation and development of Cork Airport', Policy INF 1-23 states that the County Council '**support the provision of improved access to and from the Airport and to ensure that the pattern of land uses within the vicinity does not compromise the strategic importance of the Airport through traffic congestion**'.

The following objectives for transport also support the objectives of the Airport Transportation Access Plan:

- **Policy INF 1-1 Integrated Transport System:** It is a general objective to promote a high quality, sustainable and integrated transport system for people and goods within County Cork and to recognise the complementary roles played by the road, rail, air and sea transport sectors;
- **Policy INF 1-3 Access to Transport Choice:** It is an objective to increase the level of access, among the population of County Cork, to a choice of transport modes and, in particular, to promote forms of development that reduce levels of dependence on private car transport;
- **Policy INF 1-4 Co-ordination of Transport Policy:** It is an objective to encourage co-ordination between all agencies involved, directly or indirectly, in the provision of transport services (Bus Eireann, Aer Rianta, Iarnrod Eireann, The National Roads Authority, local authorities and private transport companies);
- **Policy INF 1-5 Supporting the Provision of Public Transport:** It is an objective to support the improvement of public transport services generally by reserving land in suitable locations for infrastructural and other requirements of the public transport sector (where such needs have been identified);
- **Policy INF 1-12 National Roads Programme:** It is an objective to support the National Roads Authority and the Department of the Environment and Local Government in achieving targets set for the national road network. It is an objective to facilitate programmed improvements to the national road network and the provision of bypasses;
- **Policy INF 1-15 Regional and Local Roads:** It is an objective to manage the regional and local roads serving the network of settlements in an economic and efficient manner with a particular emphasis on safety;
- **Policy INF 1-16 Regional Road Improvements:** It is an objective to promote the improvement of strategic regional roads throughout the county in accordance with the recommendations of the North and West Cork Strategic Plan and the Cork Area Strategic Plan;
- **Policy INF 1-17 Local Road Improvements:** It is an objective, in conjunction with the preparation of Local Area Plans to identify key local priorities for road improvements;
- **Policy INF 1-18 Traffic and Road Safety:** It is an objective to seek the improvement of road and traffic safety throughout the county through the provision of appropriate signage and the promotion of driver safety education programmes;
- **Policy INF 1-19 Cycling and Walking:** It is an objective to take into account the needs of pedestrians and cyclists when considering proposals for development, particularly for residential, educational, employment, recreational and other uses. It is an objective to promote designs and layouts for development schemes that encourage efficient and safe use by pedestrian and cyclists and to discourage development schemes that focus solely or primarily on access by private car; and
- **Policy ZON 3-16: Car Parking, Site Design & Access: Industrial and Enterprise areas:** It is an objective to ensure that the likely demand for car-parking and delivery vehicle facilities are fully met within the site, to apply the highest standards design, hard and soft landscaping and to ensure that pedestrian and public transport access is provided.

It should be noted that these policies are subject to review under the development plan review process currently underway.

2.4 South West Regional Planning Guidelines, May 2004

The Regional Guidelines support the National Spatial Strategy and CASP objectives including the development of the Gateways and Hubs, an integrated transport system, education, health, recreational and cultural facilities. They promote the objective of integrated land use and infrastructure provision and the development of selected towns and villages outside the Gateways and Hubs to achieve a critical mass in population, employment and services so that they can act as service centres for the rural hinterland.

With regard to the development of Cork Airport the guidelines highlight the need to generally safeguard the vicinity of the Airport from inappropriate uses that could compromise the long-term development and economic potential of the Airport. The guidelines also emphasise the need for improved access to the Airport and indicate that a *'quality, high-speed access to and from the Airport to the City and the Region is critical to the efficient functioning of the Airport'*.

The strategy indicates that *'a quality bus corridor, with junction priority en route, is required'* and that a *'specific land reservation should be made from the intersection of the Kinsale Road and South Ring Road to the Airport, to facilitate improved public transport provision between the Airport and City'*.

2.5 Department of Transport – Sustainable Travel and Transport

The Department of Transport consultation document *"2020 Vision – Sustainable Travel and Transport"* outlines key objectives for future road infrastructure, public transport and road safety among other elements at a national level. The Strategy provides valuable transport planning guidelines for the development of Cork Airport, as follows:

- **A shift to public transport, cycling and walking** needs to be encouraged through all future development;
- **Ease of access to public transport** and other sustainable forms of travel should be improved for all, irrespective of location and mobility needs;
- **Reduction in congestion and transport emissions** needs to be a priority;
- Land use planning and the provision of transport infrastructure need to be **integrated** more coherently;
- **Improve travel awareness** among the community so that, where feasible, the car becomes the travel mode of last resort.

These objectives will provide an important steer in developing the Surface Access Plan.

3 Literature Review

Although local and national transport policy objectives provide a definitive steer in developing the Airport Surface Access Plan, it is important, and useful, to also look at the experience of other airports with similar public transport connections as Cork Airport to explore their experience and success (or otherwise) in affecting modal shift.

Experience of mode shift at Edinburgh, Bristol and Dublin Airports are used as case studies to investigate the measures which have been taken to encourage public transport use among passengers and staff. These airports all have conventional bus connections which have developed over time in response to increased passenger growth. In addition to infrastructure measures, it is important to consider the weight that has been given at these airports to mobility management and parking policy.

3.1 Edinburgh Airport

Edinburgh Airport is Scotland's busiest airport, over 40 airlines serve over 100 destinations and some nine million passengers pass through the airport a year - figures which are set to grow as Scotland's international connections develop. Passenger numbers have increased from 6.91m in 2002 to 9.1m in 2007.

The Edinburgh Airport Masterplan sets a bold ambition to be the most successful regional airport in Europe. The role that surface access plays in realising this ambition was emphasised in the 2002 Edinburgh Airport Surface Access Strategy (ASAS). Through this plan, priority was given to improving public transport links and aiming to reduce single occupancy vehicle trips.

Table 5-1 below summarises the main objectives and targets of the 2002 Access Strategy and progress made.

Table 5-1 Edinburgh Airport Surface Access Strategy Progress

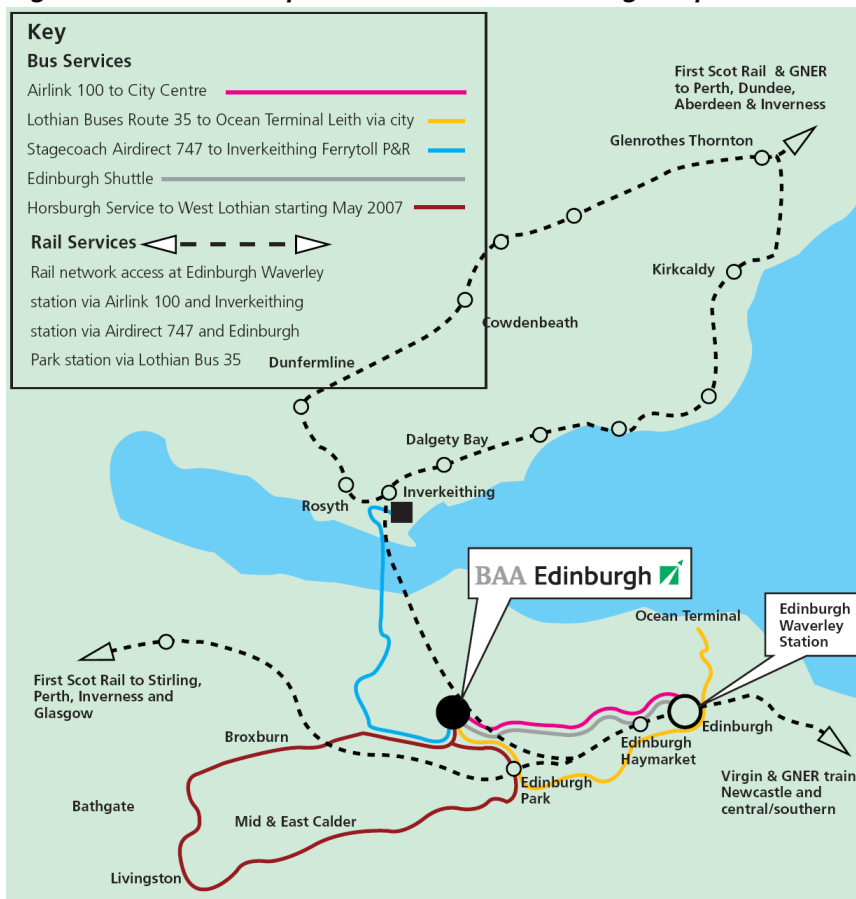
Objective	2002	2007
To increase the percentage of passengers using public transport from 16% to 25%, by 2007.	16%	22.2%
To reduce single occupancy car journeys by staff from 88% to 78%, by 2007.	88%	80%*
To develop an integrated transport strategy.	Completed.	

**reported in 2004*

Considering the short time frame of the Strategy, this progress is immense. The following measures are seen as major contributing factors to achieving this progress:

- Improvements to the public transport network:** Improvements to the public transport network were seen as pivotal in aiming to achieve the targets set. An extensive programme of new bus routes was delivered as well as an increase in frequencies of existing services. In addition to this integrated ticketing was introduced which means Scottish Rail tickets can be used on Airlink services. A marketing campaign and improved branding of public transport services were also completed. Existing bus connections to the airport are highlighted below;

Figure 5-1: Public transport connections to Edinburgh Airport



Source: Edinburgh Airport Surface Access Strategy 2006

- **Bus Priority:** Giving priority to public transport over general traffic is an imperative component in promoting public transport use. In Edinburgh, this has been achieved by giving priority to buses at the cities main junctions. The introduction of TIRIS Radio Frequency Identification (RFID) technology ensures public transport is given priority at over 60 junctions in the city. This has reduced journey times immensely and encouraged a shift to public transport;
- **New airport forecourt:** In 2006 the airport forecourt was remodelled and now allows priority to be given to bus services at the terminal frontage, with bus stances located on the north side of an inner controlled access forecourt. This has raised passenger awareness of public transport options, as well as improving forecourt safety. Improved facilities include covered bus shelters, information display points and signage;
- **Introduction of a levy on car parking to fund public transport schemes:** A Public Transport Levy (PTL) was introduced in 2003 on short-stay airport parking, with an average contribution of 20 pence per car. The monies raised are used to improve and promote use of public transport. The total amount raised each year is approximately £200,000. A significant proportion of the money raised to date has been used to fund preparatory work for the Edinburgh Airport Rail Link;
- **Parking management:** Parking for airport passengers and staff is managed tightly. For passengers, there are approximately 3,200 short stay parking spaces and 2,800 long stay spaces. In comparison to Cork this is not superfluous by any means. However, demand for any additional car parking is met by private operators close to the airport who also provide shuttle buses to the airport. Staff parking at the airport has been reduced to 1 space for every three employees to provide incentives to use public transport and avail of car pooling services; and
- **Development of an airport car share scheme in 2002:** A staff car share scheme was initiated at the airport in 2002. The scheme offers benefits to participating staff such as access to preferred parking areas, discounts on motoring supplies etc and is part of a

scheme operated across the seven BAA airports in the UK. Those registering are put in touch with another driver or group of drivers in the same area, and in order to retain benefits need to actually share a car for at least one day per week.

The Edinburgh Airport Transport Forum (ATF) was pivotal in implementing and monitoring the Access Strategy. The Forum was established in 1999, meets twice yearly and is comprised of transport providers, local authorities and other stakeholders, and BAA Edinburgh. Through agreeing and setting challenging short and long term targets for increasing public transport mode share the ATF seeks to influence airport access journeys and to raise awareness of public transport options. The ATF also monitors progress on an ongoing basis towards achievement of ASAS targets, and oversees preparation of the new ASAS.

Transport connections to Edinburgh Airport are set to improve immensely in the coming years with the development of the Edinburgh Tram (due to open in 2010) and the Edinburgh Airport Rail Link (due to open in 2012).

3.2 Bristol

Bristol Airport is the UK's ninth largest airport with approximately 5.4 million passengers per annum. In line with global growth in aviation, the airport has experienced considerable growth in recent years and as a consequence required the completion of a Surface Access Strategy. The Strategy was developed in 2000 and has been reviewed on an annual basis since then.

As part of the strategy, investment in public transport infrastructure has increased significantly to introduce bus priority, new vehicles and a public awareness campaign. As a result, patronage on the Flyer bus service connecting the airport to Bristol City has increased by 90,000 in 2000 to 267,000 in 2005. Service frequencies have been increased and integrated ticketing has been introduced. The latter has proved a great success with sales of through tickets reflecting the high level of interchange from national rail services to the airport bus link.

Mobility management has been an important element of the Bristol Airport Surface Access Strategy. Car sharing and public transport incentives have formed the basis of the strategy. Car sharing has proved a big success with over 20% of staff indicating they use the service on a regular basis. Free public transport for staff is provided on the Airport Flyer bus service. Although this has boosted the mode share for public transport among staff, there are limitations to the potential of this incentive due to the limited coverage of the service and dispersed population.

3.3 Dublin

The Report *Short Term Measures to Improve Public Transport Access to Dublin Airport* was completed in 2002 by the Public Transport Partnership Forum. The Plan was prepared to take into account the access and transport implications of a 30% growth in passengers from 2001 to 2008. In particular, the aim of the strategy was to ensure that the 2001 public transport mode share of passenger trips to the airport of 21% would not decline. The proposed action plan included the following measures:

- Intensification of use of the existing bus network and services;
- Development of bus services and enhanced integration of services with trains and taxis;
- Priority for buses and taxis on roads within and outside the airport zone so that faster and more reliable services can be provided;
- Provision of airport interchanges at key locations; and
- A programme dedicated to the promotion and encouragement of public transport services for air passengers and employees.

A reduction in the projected need of passenger parking at the airport was recommended to support public transport measures. Recommendations to cap staff parking were also made which would be supported by increased incentives for public transport use. As the Strategy was not monitored annually it is unclear how much progress has been made towards these original objectives.

4 Existing Access and Mobility

The Airport and Business Park generate significant and diverse trips ranging from very local employee trips to long distance passenger trips to the airport. This section provides an overview of the existing transport network and the type and extent of travel to and from the airport to provide some contextual background from which the Surface Access Plan can be developed.

4.1 Road Network

The external road network surrounding Cork Airport varies from local minor roads to national primary roads, the majority of which is high quality infrastructure catering for high volumes of daily traffic. The key external roads are as follows:

- **National Roads:** N27 – Cork City to Airport, N71 – Bandon Road, N25 – South Ring Road;
- **Regional Roads:** R600- Kinsale Road; and
- **Local Roads:** L2462 - Rathmacullig Road.

Existing capacity and speeds on these routes are summarised below.

Table 4-1 Traffic Data Obtained From Cork County Council Traffic Counts 2008

Road	Location and Direction	AADT veh/day	85 th % Speed Km/h	Speed Limit Km/h
R600	Northbound to Airport Roundabout from Kinsale	10,194	84	80
N27	Southbound to Airport Roundabout from Cork City	11,410	72	60
N27	Northbound to Cork City from Airport Roundabout	11,054	66	100
	Total AADT (Two-way)	22,464	69	-
L-2462	Westbound to Airport on Rathmacullig Road	5,725	57	80

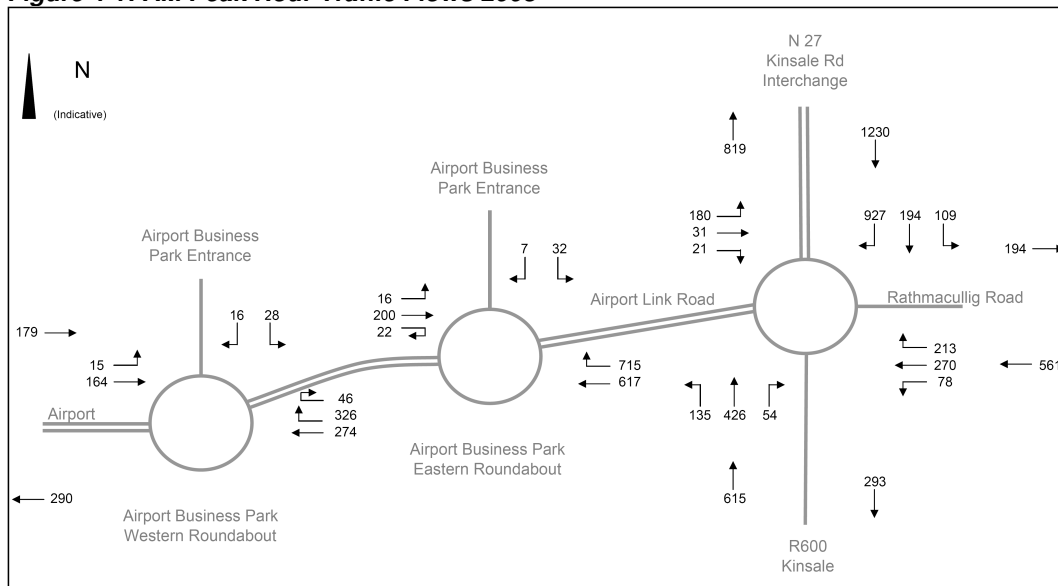
The existing internal road network between the airport terminal and N27 / R600 junction is designed to a dual carriageway standard, with the roads into the Cork Airport Business Park, and one-way systems nearer the main terminal building being single carriageways. This road system is entirely under the control of Cork Airport with a 50 km/h assigned speed limit along the main Airport Road thoroughfare. There are a total of five roundabouts spaced at varying intervals along 1.5km of the internal road network, of which two provide access to the Business Park and the remaining three provide access to the Radisson Hotel, Long Term Car Parks and access from the 'Drop-off' area.

The 2008 baseline traffic data has been based on the following:

- counts carried out by Faber Maunsell on 23rd September 2008, November 2006;
- counts conducted by Arup as part of a development submission by Brooklyn Developers, owners of the Business Park, and
- ATC counts carried out by Cork County Council on the N27 between 29th August and 4th September 2008.

The 2008 baseline study area traffic flow figures for the AM and PM peak are thus shown below.

Figure 4-1: AM Peak Hour Traffic Flows 2008

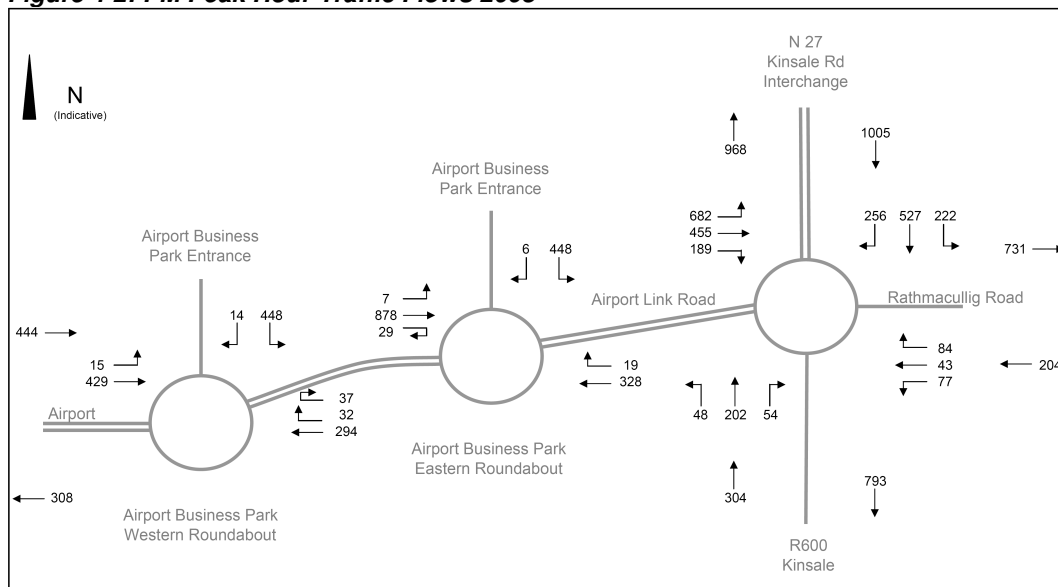


Key results from the above AM peak traffic data can be summarised as follows:

- 71% of the southbound traffic on the N27 accesses the Airport in the AM peak;
- 47% of the westbound traffic on the Rathmacullig Rd. accesses the Airport in the AM peak; and
- 21% of the northbound traffic on the R600 accesses the Airport in the AM peak.

It should be noted that these percentages were taken on a single day and are dependent on local conditions on the survey day. These figures represent approximate daily values of turning traffic and average annual values may vary.

Figure 4-2: PM Peak Hour Traffic Flows 2008



Key results from the above PM peak traffic data can be summarised as follows:

- 51% of traffic exiting the airport in the PM peak is northbound on the N27;
- 34% of traffic exiting the airport in the PM peak is eastbound on Rathmacullig Road;
- 25% of southbound traffic in the PM peak accesses the airport; and
- 15% of souththbound traffic on the N27 in the PM peak accesses the airport.

From the above survey results it is evident that the Airport and the Business Park especially generate significant traffic volumes during the AM and PM peak periods.

During the morning peak approximately 75% of the traffic entering the Airport Link Road from the roundabout is accessing the Business Park and the remaining traffic accessing the Airport itself. In the PM peak the trend is similar for departing traffic with 72% from the Business Park and 28% from the Airport.

4.1.1 Road Network Issues

The following issues in relation to the road network within the study area have been observed and documented:

1. The Airport Road Roundabout was observed to operate over capacity during peak hours on a daily basis. This was primarily due to large volumes of traffic accessing and egressing the Business Park.
2. The Kinsale Road Interchange was similarly observed to operate over capacity during peak hours, causing congestion primarily for vehicles travelling in a northerly direction away from the airport towards Cork City. The proximity of the Frankfield Road signals to the signalled roundabout exacerbates this problem.
3. At present only one main access road to the airport exists. This lack of alternative access to the airport results in significant queuing and delay at times of peak traffic activity, especially at both the Airport Road Roundabout and the Kinsale Road Interchange.
4. Buses queuing on N27 northbound at peak times due to lack of bus lane provision.
5. High levels of northbound and eastbound traffic use Rathmacullig Road. This is higher still in the PM peak as traffic bypasses the Forge Hill junction.

Observations of the internal road network were as follows:

1. Some vehicles were observed approaching the internal roundabouts at inappropriate speeds and also in the incorrect lane;
2. Due to inadequate advanced signage for drivers, vehicles were observed crossing the diverging hatching where the inbound road splits giving access to the 'Drop-off' area. Road marking could complement the existing signage to give advanced clear direction to motorists;
3. Due to the lack of road marking, vehicles were observed using incorrect entry lanes to the roundabout junctions resulting in lane crossing. Road markings and text could be used to inform motorists of the correct lane utilisation;
4. It was noted that some eye-level signs are located ineffectively for drivers on the roundabout junctions. They are not directed at approaching vehicles and therefore do not offer sufficient advance warning to drivers; and
5. It was also noted that the width of the circulatory carriageway on the internal roundabouts was less than the width of the carriageway on interconnecting link roads. This resulted in a restriction at the junction and vehicles were observed impeding on adjacent lanes. This issue was exacerbated by the lack of road markings on the circulatory carriageway.

4.2 Parking

Parking at Cork Airport is provided for a range of purposes including passengers (long and short term), staff and car hire. There are currently three public car parks at the airport, two long term car parks with a combined capacity of 3,780 and one short term car park with a capacity of 632. There is also a staff car park of 450 spaces and a car hire car park of 240 spaces. Existing parking provision at Cork Airport is summarised in Table 4.2 below.

Table 4-2 Existing Car Parking Provision 2008

Car Park	Spaces Available
Short Term Car Park	632
Long Term Car Park	3,780
Sub Total Public Car Parks	4,412
Staff Car Park	450
Car Hire Car Park	240
Sub Total Private Car Parks	690
Total Car Parks	5,102

According to Cork Airport Authority, the short term car park is 63% utilised during the July peak period while the long term car park is 97% utilised. During this time, additional land is reserved adjacent to the long term car parks for overspill. This high utilisation of long term parking suggests the car park is under severe strain in the peak period, making it difficult for passengers to find car parking. This situation also highlights the under-utilisation of short term parking and raises an issue as to why available spaces in the short term car park are not being utilised. Possible explanations for this include poor signage, pricing structures which favour long term parking more and also that the long term car park east of the terminal is as conveniently located to the terminal as the short term car park. In addition, it is important to note that in general drivers would rather park at-grade than in multi-storey car parks.

Other parking issues observed at the airport include:

- Although it is prohibited to leave your vehicle unattended in the existing 'drop off' area, this was not adhered to or enforced in any way;
- Directional signage to car parks causes confusion for drivers on the approach to the terminal.

4.3 Public Transport

At present Cork Airport is served by Bus Eireann and Sky Link Bus services. Sections of bus priority are provided along the N27 between the Airport, Kinsale Road Interchange and the City Centre to support these services.

In recent years, Bus Eireann has improved airport services to meet demand by increasing the number of airport-bound departures from 16 in 1999 to 39 in 2006. This has seen passenger numbers to the airport increase dramatically. The overpass at the Kinsale Road Interchange has also been a significant advantage in improving reliability and journey times.

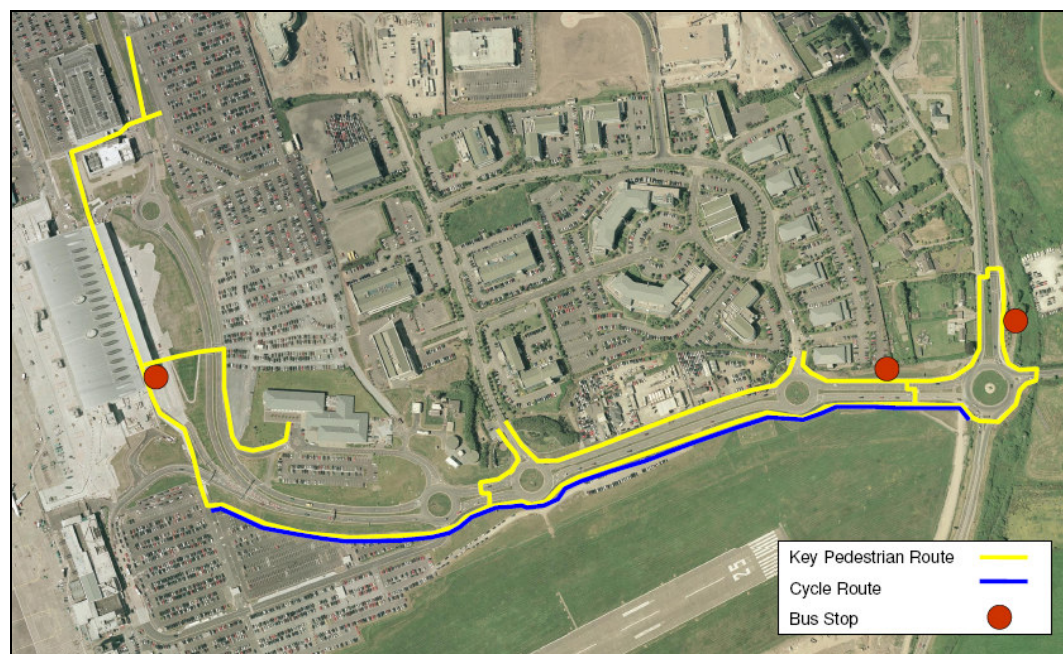
Two Bus Eireann routes serve the airport:

- **No.226 Cork-Airport** is a dedicated bus service which serves the Airport Business Park and the main Airport terminal building. This service runs via the Old Kinsale Road and operates approximately every 30 minutes between 09:00-18:30 and every 45 – 60 minutes between 07:30-09:00 and 18:30-21:30. Twenty five services operate on the route every day; and

- **No.249 Cork-Kinsale** also serves the Airport. This service operates approximately every 45-90 minutes from 07:00-22:00. There are 14 departures every day serving the airport on this route.

Travel time to the airport is on average 20 minutes outside the peak hours and 40 minutes in the peak. Bus stops are located outside the departures entrance of the main terminal building, within the Business Park and at the Airport Road Roundabout. These locations are shown in Figure 4-3.

Figure 4-3 Key Bus Stop Locations



Skylink, a private bus operator, is based in the Airport Business Park and operate services between the Airport and popular City Centre hotels, B&B's, hostels and landmarks. This service departs the airport for the City Centre every thirty minutes between the hours of 04:20 and 00:15. The service runs two routes via McCurtain St and Western Rd.

At present, the following public transport issues are obvious:

- The lack of public transport priority from the city to the airport means journey times are long in the peak and do not, therefore, present a feasible alternative to private car travel;
- Current bus frequencies and network coverage are poor; and
- There is poor awareness of public transport options available, especially for journeys to the airport.

4.4 Taxis

Cork Airport is well served by a regular flow of taxis. The taxi waiting area is outside the main terminal in the 'drop-off' zone and can accommodate on average twenty taxis. There is also an additional waiting area adjacent to the Radisson SAS hotel where taxis can wait until space becomes available in the 'drop-off' area. On average, sixty taxis serve the airport continuously on a daily basis. The majority of taxi services operating from the airport are freelance.

4.5 Pedestrians

The existing pedestrian network within the Study Area is of a relatively high standard with wide footpath provision and crossing points throughout the area allowing for easy manoeuvring of wheelchairs, trolleys and luggage. In addition, car parks are all conveniently located a short distance from the terminal.

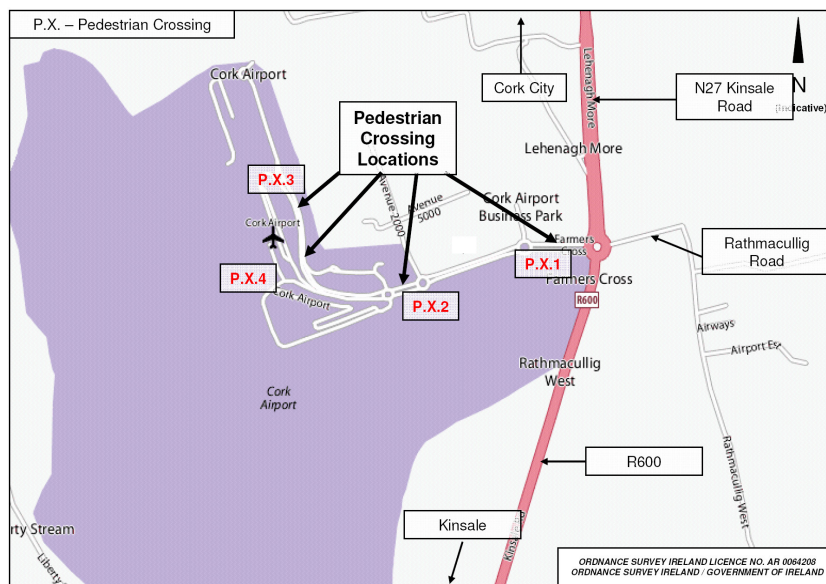
Facilities for the mobility impaired are good and include ramps, dropped kerbs and tactile paving. Wheelchair ramps are provided wherever steps are encountered, and a lift service is available in the multi-storey car park.

There are four signalised pedestrian crossings on site, as shown in Figure 4-4. The layout is that of a staggered crossing with a separate light sequence for each carriageway of the road. However, when the pedestrian cycle is called, both sets of lights are triggered for the pedestrian cycle.

Issues noted in relation to the pedestrian environment include:

- Although pedestrian signage from the short term car park is plentiful, signage from long term car parks could be improved as most signing is aimed at drivers rather than pedestrians;
- It was observed that for the majority of crossings there is insufficient 'green time' given to pedestrians to walk the entire crossing safely, especially if they have a mobility impairment (i.e. carrying luggage);
- The wheelchair accessible ramp at the long term car park No.1 is excessively long and offers a poor alternative for the mobility impaired; and
- Bollards are inconveniently located in the middle of the wheelchair accessible ramp connecting the airport to the Radisson Hotel.

Figure 4-4 Existing Pedestrian Crossing Locations



4.6

Cyclists

Although it is unlikely that passengers to the airport are likely to cycle, there are nevertheless feasible opportunities for increasing the mode share of cycling among employees. It is important therefore that safe and convenient networks are available to boost cycling numbers.

Cycle facilities within the study area consist of cycle lanes on both sides of the road from the Kinsale Road Interchange to the Airport Road Roundabout, with internal facilities continuing into the airport as part of a combined footpath/cycle lane adjacent to and to the south of the main avenue.

Although infrastructure for cyclists has been incorporated on routes to and within the Airport and Business Park, overall the approach appears to have been inconsistent with obvious gaps in network connectivity and infrastructure provision.

Some minor issues in relation to the cycle network with the study area include:

- The internal cycle lane ends abruptly in long term car park No. 2 and does not meaningfully bring cyclists to their destination;

- The bike parking area in the long term car park No.2 is badly located and not signed; and
- Cyclists are obstructed at a point along the cycle route near the corner of long term car park No.2, by a railing presents cyclists with a navigational hazard that is difficult to negotiate without dismounting or veering off the lane.

Figure 4-5 Existing Cycle Parking Stand **Figure 4-6 Obstruction on existing cycle lane**



4.7 Existing Travel Patterns

4.7.1 Airport Employees

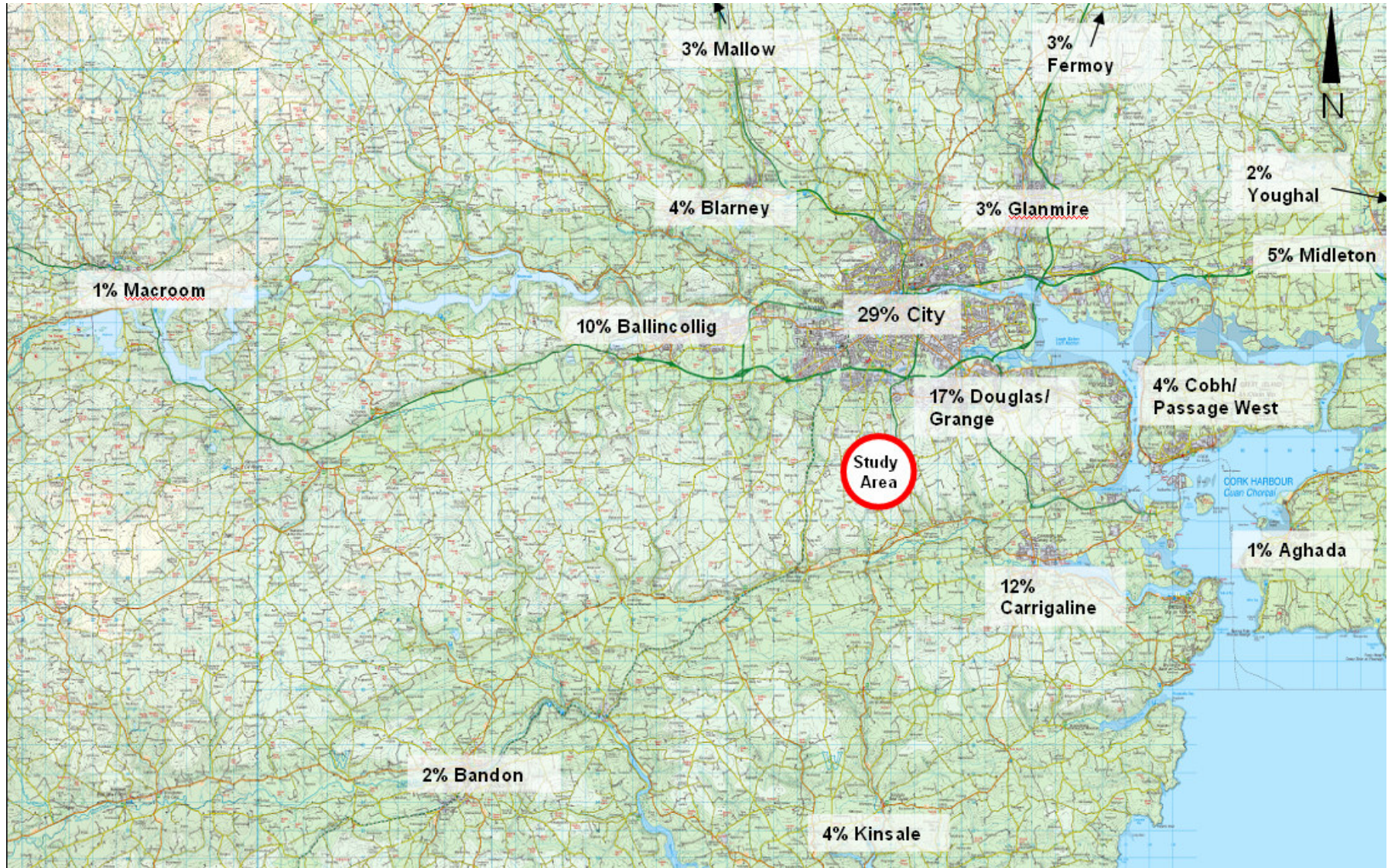
Based on the CSO Census of Population 2006, detailed information regarding Airport staff travel patterns was extracted using POWCAR (Place of Work Census of Anonymised Results). In 2006, there were a total of 2,312 persons employed in the Airport and Business Park. Of these, 80 persons travel to work from outside Cork County leaving a total of 2,232 persons travelling to the airport from within the County. The origins of airport employees are shown below in Table 4-3. This table shows where employees start their journey to work and provides important information relating to existing employee travel patterns.

Table 4-3 Origin Zones of Trips to Airport by Employees

Origin of Employees	Number of Employees	Percentage
Cork City	604	26%
Metropolitan Cork	1,163	50%
CASP Ring	371	16%
North SPA	41	2%
West SPA	53	3%
Out of County	80	3%
TOTAL	2,312	100%

These origins are summarised and highlighted in Figure 4-7 below.

Figure 4-7: Employee catchment area



The mode of travel of the 2,232 persons travelling from County Cork is, naturally, varied however there is a heavy bias towards the private motor vehicle, with 85% of commuters driving to work. The existing modal split for journey to work for employees within the study area is shown below.

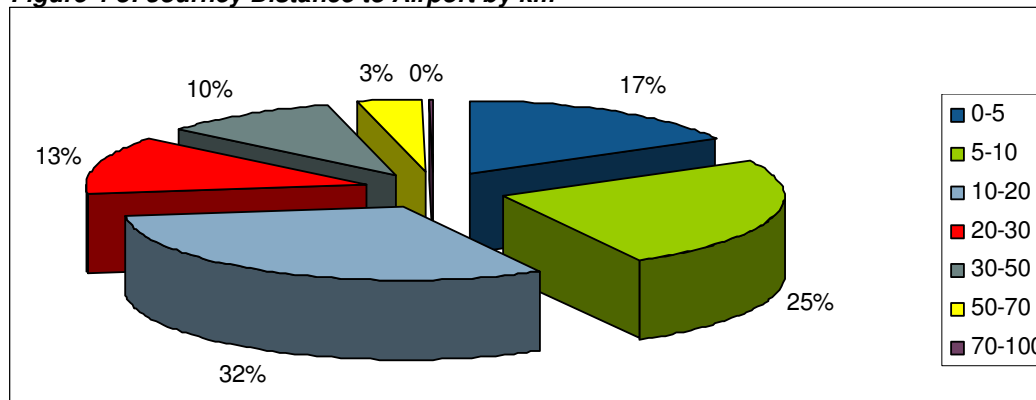
Table 4-4: Mode Split for Employees

Means of Travel	Number of Employees	Percentage
On Foot	24	1%
Bicycle	13	1%
Bus, Minibus	142	6%
Train	0	0%
Motorcycle	18	1%
Driving a Car	1,892	85%
Passenger in a Car	108	5%
Lorry or Van	20	1%
Other Means	5	0%
Work Mainly at or from Home	1	0%
Not Applicable	5	0%
Not Stated	4	0%
Total	2,232	100%

The current mode split highlights the shortcomings of existing public transport system with private vehicle transport clearly dominating the journey to work. It also highlights the ever-present issue of single occupancy vehicles during work travel with an average occupancy rate of just 1.06 persons per car.

The POWCAR information also showed that 73% of workers travel from a distance of less than 20km away. Major feeder/origin zones include Cork City (604 employees), Douglas & South City environs (357 employees), Ballincollig and its hinterland (209 employees), and Carrigaline & Ringaskiddy (132 employees). Journey distances to the airport are summarised below.

Figure 4-8: Journey Distance to Airport by km



4.7.2

Airport Passengers

Faber Maunsell carried out a passenger travel pattern survey at Cork Airport to ascertain the current transport mode split for passengers arriving to and departing from the airport. The survey was carried out on Wednesday October 15th from 5.30am to 8pm. These surveys hours ensured that both leisure and business travellers were captured. The brief survey aimed to capture the following information:

- whether the passenger is inbound/outbound;
- the purpose of travel, leisure or business;
- where in Cork (or wider area) the passenger was coming from/going to;
- how the passenger completed this journey;
- number of vehicles which parked (including vehicle occupancy) and dropped off passengers only; and
- awareness of public transport alternatives for the airport journey.

Overall, 553 passengers were interviewed. Due to the difficulty in capturing passengers on inbound flights, 67% of those surveyed were departing passengers and 33% were arriving passengers.

Mode split among surveyed passengers is highlighted below.

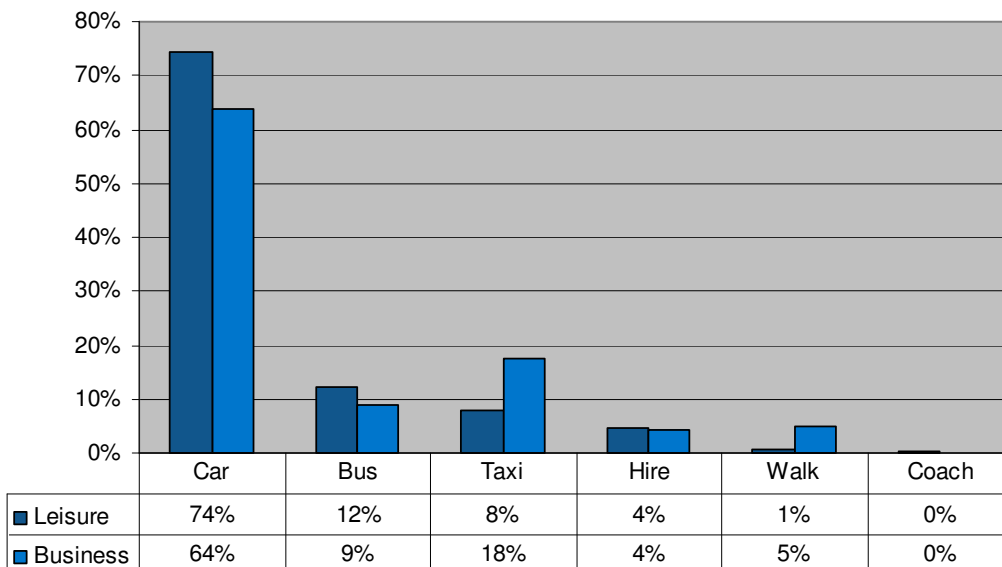
Table 4-5: Current 2008 Mode of Transport for Airport Passengers (Modal Split)

Mode of Passenger Transport	Modal Split %
Private Vehicle Transport <i>(includes driver/passenger 30%, drop off/picked up 33% and car hire 7%)</i>	76%
Bus	11 %
Taxi	11 %
Walk <i>(from Airport Business Park)</i>	2%
Cycle	-
Total	100%

Other key findings from the survey include:

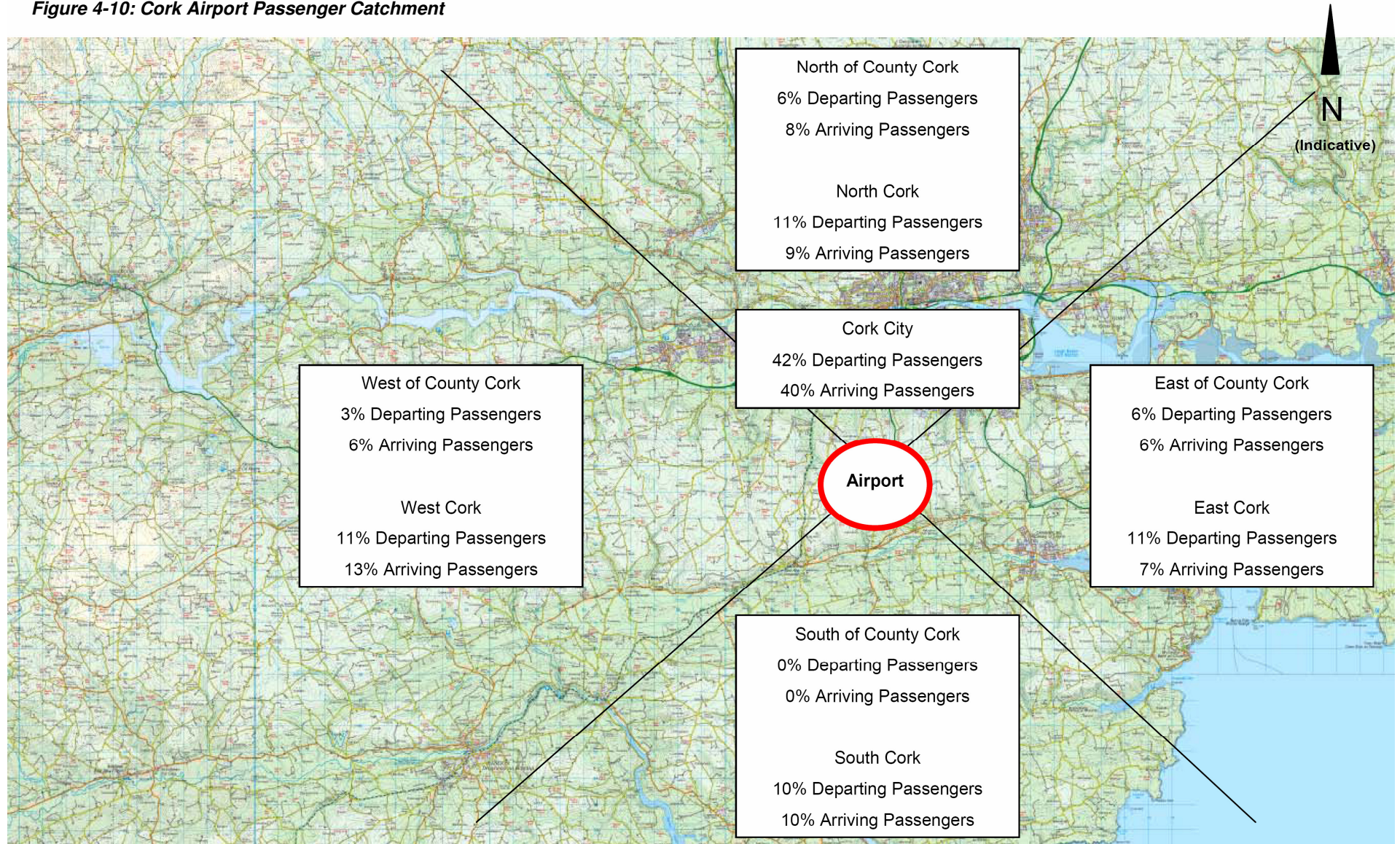
- Of the 76% who used private transport, 30% parked at the airport, 33% were dropped off/picked up and 7% used a hire car;
- 61% of respondents said leisure was the main purpose of their trip, 37% said business and 2% were travelling for both leisure and business;
- There were some differences in the choice of transport mode between leisure and business travellers;

Figure 4-9: Comparison of transport mode for leisure and business travellers



- 18% of respondents travelling on business arrived/departed by taxi as opposed to 8% travelling for leisure;
- Leisure travellers were more likely to use the bus (12%) than business travellers (9%);
- On average 41% of all passengers are from Cork City, as highlighted in Figure 4-10 below;

Figure 4-10: Cork Airport Passenger Catchment



- As expected, the origin/destination of remaining passengers is widely dispersed;
- Of the 11% of respondents who used public transport (bus) to get to the airport, 12% transferred from another bus on their journey and 7% transferred from a train;
- 53% of respondents who drove to the airport said they were aware of public transport services to the airport; and
- 28% of passengers were arriving to the airport from the City Centre while overall 83% were arriving from/departing to County Cork.

Data gathered from the passenger survey will be used to set targets for the strategy in Section 7.

4.8 Summary

The existing conditions investigation and research into existing mode split to the airport has provided an excellent basis from which to begin developing the Surface Access Plan. In summary, the following key facts will need to be addressed through the Plan:

- Existing roads and junctions within the study area are currently running close to capacity and will experience considerable additional pressure in light of proposed plans for airport expansion. Section 6 looks at the consequences of unmitigated growth in the network and highlights the need for improvements to the local network;
- Travel to the airport by both passengers and employees is dominated by single occupancy private vehicle journeys;
- Existing public transport service to the airport does not adequately serve the needs of employees and passengers;
- Car parking is currently plentiful at the airport and Business Park and does not provide any disincentive to private vehicle trips at present. Airport parking is conveniently located near the terminal and is reasonably priced while parking at the Business Park is free;
- Signage at the airport needs to be improved; and
- With a few minor exceptions there is a good cycle network to the airport. Opportunities to maximise the value of this asset should be investigated.

5 Consultation

5.1 Overview

Stakeholder consultation formed an important part of developing the Surface Access Plan. The primary aims of the consultations carried out were to:

- Obtain the experience and views of the key stakeholders about existing conditions, existing issues and future development in the study area;
- Engage with relevant local authorities and transport providers; and
- Evoke a sense of ownership of the ensuing plan.

This section of the report describes the consultation process. The key issues contributed by stakeholders to date are summarised below. It is noted that consultation was achieved through individual correspondence and meetings where appropriate with stakeholders.

A number of key stakeholders were identified at an early stage of the study, and comprised a number of organisations or representative groups which would provide valuable input to the study. Initial consultation with Stakeholders was by means of a letter of invitation, describing the project and inviting submissions either written or through a meeting with the project team. The following Stakeholders were approached in this manner:

Table 5-1: Consulted Project Stakeholders

Name	Title	Organisation
John Forde	Senior Executive Engineer	Cork County Council
Dan Looney	CASP Coordinator	Cork County Council
Denis Deasy	County Architect	Cork County Council
Tom Coughlan	Senior Engineer, South Cork	Cork County Council
Noel O'Keeffe	Acting County Engineer	Cork County Council
Tony Mullane	Projects Manager	NRDO/ Cork County Council
John McAleer	Director	South Western Regional Authority
Pat Keohane	Chief Executive Officer	Cork Airport Authority
John F. McPolin	Superintendent	Garda Siochana Togher Station
Joe Fitzgerald	Regional Manager	Bus Eireann
Joe Gantly	Director	Cork Chamber of Commerce
Conor Healy	CEO	Cork Chamber of Commerce
Neil Hogan	General Manager	SkyLink Airport Shuttle
Tara Spain	Senior Policy Advisor	National Roads Authority
Pat Casey	Senior Engineer	Cork City Council
Dan Buggy	Assistant City Manager	Cork City Council
Dr. William Hynes	Director of Strategic Planning	Keith Simpson & Associates
Ciaran McKeon	Principal Consultant	MVA Consultancy
Richard Bowen	Engineering Inspector	NRA

5.2 Summary of Key Issues Submitted To Date

The various submissions from Stakeholders outlined a broad schedule of issues which highlighted current and future transportation problems in study area. All submissions were categorised into a number of distinct points of information, which could then be grouped under a number of headings in order to provide a clear picture of relevant issues. These are summarised below:

Road and Traffic Issues:

- The need for a second road access point to alleviate traffic pressure at the existing airport access roundabout. This study should establish the optimum route and location of a second access point into the airport complex;
- The prioritisation of the Sarsfield Road and Bandon Road flyover projects cannot be taken in isolation from the future transport needs of the airport. This study should include these critical projects as integral parts of the future transport needs of the airport;
- Improved vehicular access to the South Eastern Quadrant is considered necessary to fulfil the growth potential of these lands;
- It would be essential to upgrade the local road network to alleviate existing congestion.
- Access improvements and general transport consideration of the Business Park as a major element of the study;
- Consideration should be given to the provision of an under pass road at the Pouladuff/Ballycurreren intersection with the Airport Hill to alleviate congestion at this critical junction;
- The synchronisation of traffic lights at Bull McCabes junction where excessive green time appears to be given to traffic travelling from Forge Hill; and
- Lights at the junction with the road from Grange where priority seems to be given to the traffic from Grange in that green time coincides with the green on the Kinsale Road Interchange allowing very little flow of traffic from the Airport Hill.

Public Transport Issues:

- The provision of a Quality Bus Corridor from the City Centre, Bus Station & Railway Station to the Airport, thus providing an integrated transportation service;
- Additional bus services to other key destinations, thus creating a public transport interchange;
- A rapid transit corridor should be developed between the Airport and Ballyvolane via Tramore Road and the City Centre. This rapid transit corridor should utilise either Light Rail (LRT) or Bus Rapid Transit (BRT). A planning reservation should be protected for a (longer term) future light rail service to the airport, including a planning reservation for a railway terminal at the airport;
- Current public transport links from the airport at night time are insufficient to meet the demands of airport users;
- Bus priority measures at key junctions from the City including the Kinsale Road Interchange; and
- Separate stops to be established for Bus Eireann & SkyLink buses at the terminal.

Parking Issues:

- Parking provision needs to be developed further as the Airport grows, in particular, any additional land requirements for future parking and/or improved access.

Road Safety:

- Concerns of Farmers Cross community regarding the "Rat Running" from the Douglas/Donnybrook area via the back roads to the airport;
- The current lack of an additional access point (approach road) to the airport in the event of an accident is of serious concern;

- A review of speed limits on the approach to the airport should be reviewed; and
- A review of street lighting provision both on the external approach roads and the internal road network, in particular, adjacent to footpaths and crossings.

Issues Raised Outside the Study Area:

- Some traffic lights are inefficiently synchronised in the City Centre, including the junctions of: Camden Quay and North Link Road; Brian Boro Bridge and Penrose Quay; and Brian Boro Bridge and Andersons Quay;
- The existing Bus Lane along McCurtain St is rarely free of traffic with little or no enforcement observed;
- Cars queuing for car parks cause severe congestion, particularly at the entrances to Grande Parade and Merchants Quay car parks;
- Loading bays frequently get blocked by vehicles, forcing trucks to unload from traffic lanes;
- Car parking in the City Centre should be taxed while parking in suburban Park & Ride facilities should be subsidised. More Park & Ride facilities should be developed over the coming years;
- The relationship between this study and those for Douglas and Carrigaline; and
- The “Bus Gate” on South Link Road does not operate as planned.

6 The Do Nothing Scenario

Within this section a future Do Nothing Scenario for growth of the transport network is analysed which assumes that no modifications to the existing road and transport network will be made. The outcome of this future scenario provides a context to allow the development of objectives, targets and measures to provide mitigation and intervention against transport issues identified in this section and highlighted during the consultation stage.

6.1 The Do Nothing Scenario

Traffic within the Study Area and wider road network has been projected to the years 2012 (Phase 1) and 2020 (Phase 2) assuming that no mitigating measures, such as road improvements or public transport improvements, have been introduced and the proposed passenger growth numbers materialise. ARCADY analysis of the Airport Road Roundabout on the N27 was carried out for the present and future years to highlight the traffic impact of unmitigated growth. An estimated distribution of airport generated traffic on the local road network in the present and future years was also carried out in order to assess various strategies.

The following assumptions have been incorporated within the future Do Nothing Scenario:

- **Business Park:** The Business Park has undergone an extension since 2006, however not all of the commercial units are occupied. Future traffic generation at the Business Park assumes full uptake of units. It has been estimated that the current level of occupation of the Business Park is approximately 90%. The Business Park is assumed to generate traffic at the same rate as at present. Full occupation of the units plus an additional 10% future increase in floor area has been assumed. This equates to an overall floor area increase of 20% (see Table 6-1).
- **Airport Passengers:** Future airport-generated traffic is assumed to increase by the predicted growth rate in air passenger numbers contained in the Cork Airport Future Needs Study (see Table 6-1). The percentage of air passengers travelling by car (current modal split) is assumed to remain at the level of the 2008 data.
- **Airport Employees:** Airport employee numbers will increase in line with passenger numbers. Although the ratio of employees to passengers is not likely to remain at the same level due to for example economies of scale and increased automation, in the absence of data on this we have assumed that the ratio will increase in proportion to passenger numbers.
- **Cargo:** With expansion of cargo handling facilities, the yearly increase in air freight is projected at 2% p.a., which is lower than that for passengers. The existing HGV percentage during the peak hours is 5% on the Airport Access Road. No plans are in place at present to increase the capacity for cargo handling at the airport. The HGV percentage in the future years is assumed to remain the same.
- **Distribution:** The distribution of vehicles on the network is based on the origin/ destination of employees as contained in the 2006 Central Statistics Office (CSO) census POWCAR data. The passenger element of peak hour traffic accessing the airport is in the order of 20%. In the absence of detailed passenger origin/destination information, the current employee distribution was applied to the passenger element of peak hour traffic.
- **Traffic Growth on Network:** Traffic which has not been generated by the airport is assumed to grow by standard National Roads Authority (NRA) traffic growth rates. A typical growth rate for National Secondary Roads has been used to estimate traffic growth between 2008, 2012 and 2020 on the N27. This rate was used due to the N27's status as a national primary route dependent on its role as the primary access road to Cork Airport. Without the airport this road would have the same status as the R600, i.e. a regional road. However, the R600 is the main link between Cork and south, including Kinsale. It has been assumed therefore that traffic growth will increase at the rate of a National Secondary Route (see Table 6-1).

Future passenger and traffic growth discussed above are presented below in Table 6-1. These rates will be used to project future traffic levels on the local road network to create the required Do Nothing Scenario.

Table 6-1: Future 'Do Nothing Scenario' Growth Rates

Source	Type	Growth Rates	
		2008-2012	2013-2020
Future Needs Study	Passenger Figures	1.197	1.492
NRA Traffic Growth	National Secondary	1.097	1.147
Business Park	Business Park	1.2 (20%)	-

Infrastructure improvements which may come online during the study period 2008-2020 but have not been included within the analysis include:

- Upgrade of Sarsfield Road Roundabout (N25) to a grade separated roundabout junction;
- Upgrade of Bandon Road Roundabout (N25) to a grade separated roundabout junction;
- Construction of the North Ring Road, completing the dual carriageway ring road system around the city; and
- East/West and North/South rapid transit corridors to the City Centre with interchange facilities.

These projects will generally mitigate congestion and provide for future road traffic flows and improve airport access from within the city and to the west. Specific mitigation effects include:

- The opening of the North Ring Road would make the South Ring Road a more attractive option for North City and suburbs-originated traffic. Traffic using the N20 may be re-distributed from the City Centre and the N27 to the N25 via the North Ring Road; and
- The rapid transit corridor and interchange would improve attractiveness of public transport in general and provide a viable link from the North city suburbs.

Based on the predicted growth (Table 3.3), existing traffic distribution and other assumptions, the following future traffic flows on the network were estimated.

Figure 6-1: AM Peak Traffic Flows 2012 (Phase 1)

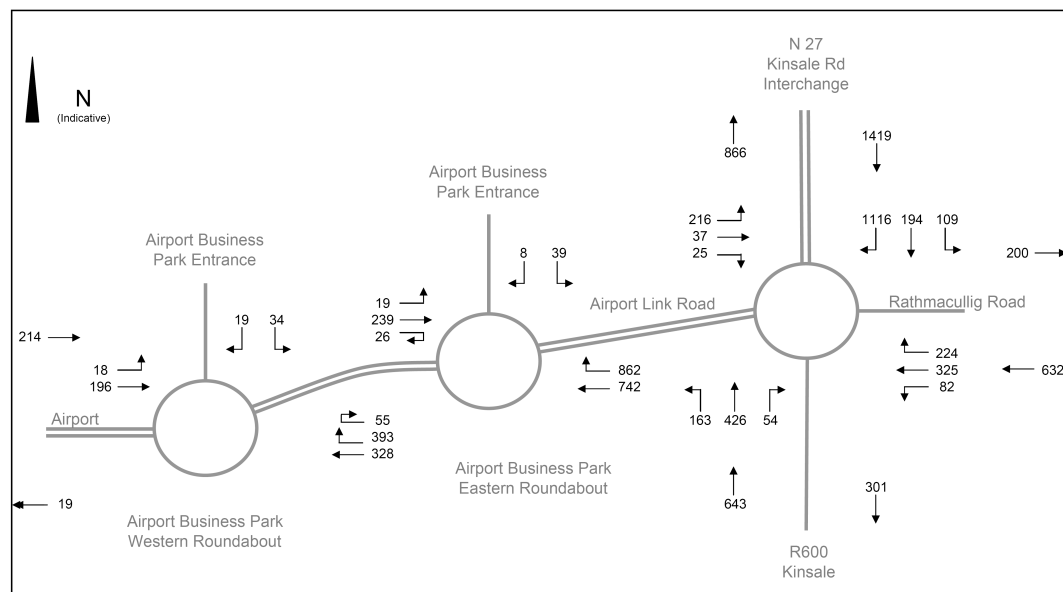


Figure 6-2 PM Peak Traffic Flows 2012 (Phase 1)

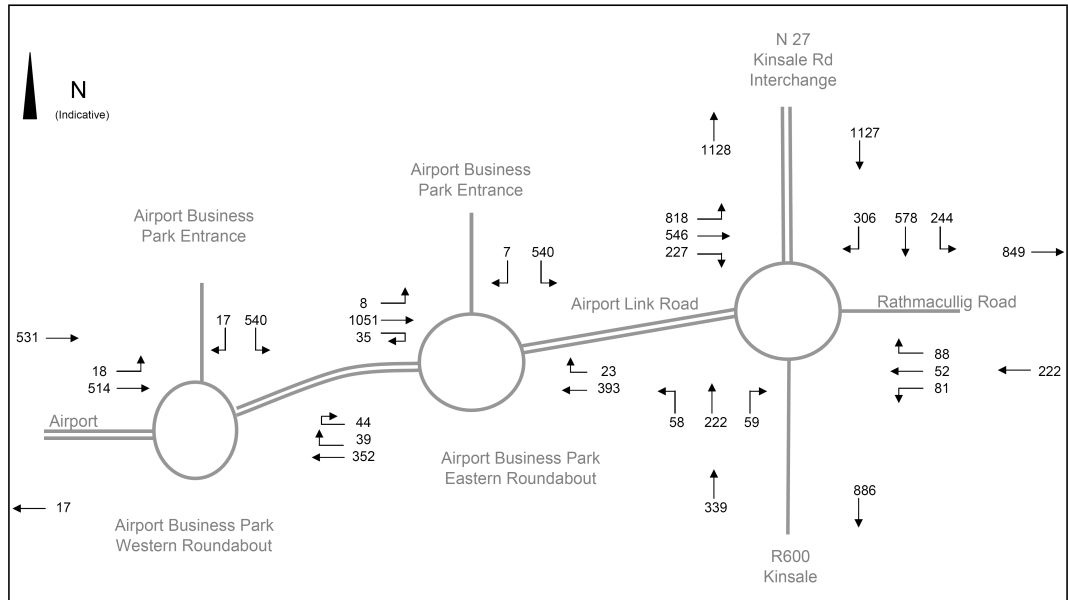


Figure 6-3: AM Peak Traffic Flows 2020 (Phase 2)

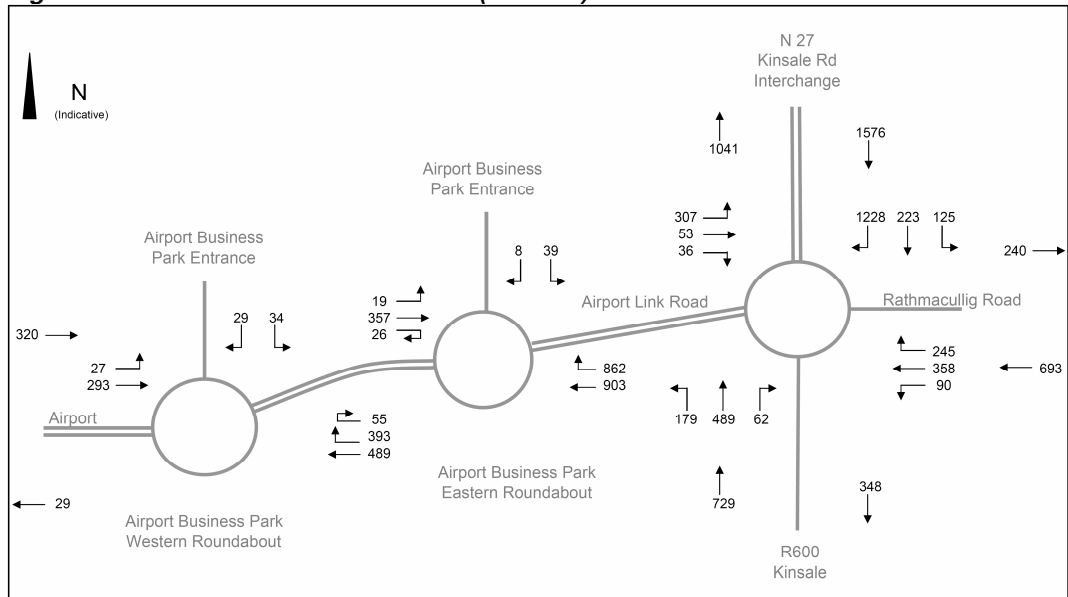
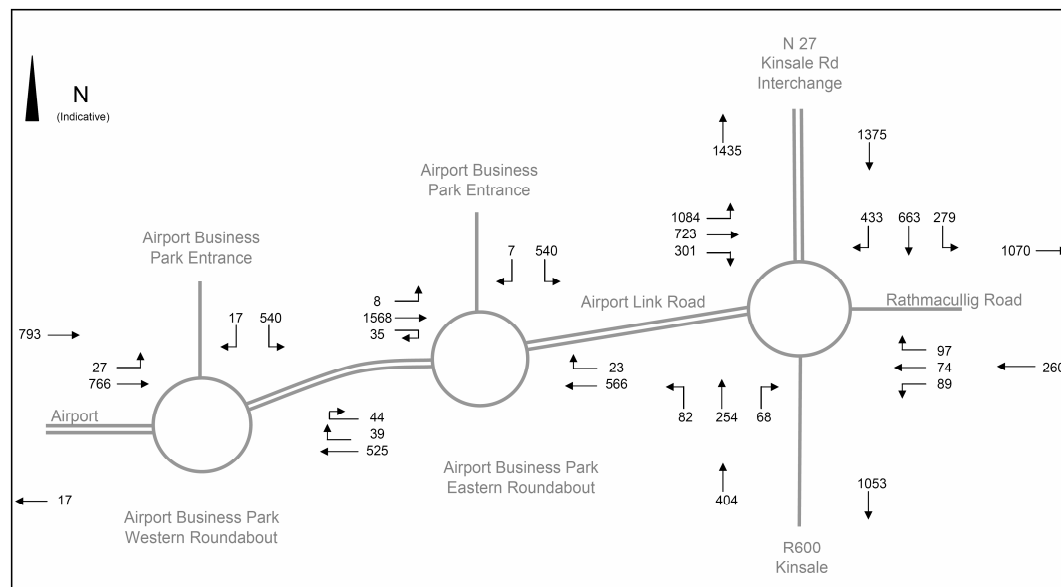


Figure 6-4: PM Peak Traffic Flows 2020 (Phase 2)

6.1.1 Future 'Do Nothing Scenario' - Estimated Traffic Impacts and Issues

The following traffic issues may occur on the internal road network in 2020 based on the above estimation of future traffic flow scenarios:

- At the Airport Road Roundabout, delays would occur during the following periods:
 - During the AM peak: Northbound traffic on the R600 is delayed (queues) by traffic accessing the airport from Rathmacullig Road and N27; and
 - During the PM peak: Traffic leaving the airport is delayed by northbound traffic on the R600 from Kinsale.
- ARCADY analysis of the Airport Road Roundabout on the N27/ R600 shows that the junction will exceed capacity by 2012 if passenger numbers increase as estimated in the Cork Airport Future Needs Study. The junction will be significantly over-capacity in 2020 with extensive queuing and delay on all junction arms, where minor delays are experienced at present. ARCADY analysis results are tabulated in Appendix A;
- It is estimated that the internal Business Park access roundabouts will experience high volumes of traffic during future years, although this will be absorbed into existing capacity reserves. Nevertheless, minor delays which occur at the Business Park exits in the PM peak at present will be marginally exacerbated; and
- The internal Airport roundabouts are high capacity junctions with minimal delays experienced at present. It is estimated that future traffic flows would have minimal impact on the capacity of these internal junctions.

The following issues are likely to occur on the external road network in the 'Do Nothing Scenario' with no mitigation measures in place:

- The current congestion problems experienced at the Kinsale Road Interchange and Forge Hill junction are expected to exacerbate in line with the predicted general increase in traffic;
- Analysis of the 2008 baseline counts and employee origin destination data reveal significant volumes of traffic re-directing to local roads to avoid congestion on main routes:
 - Rathmacullig Road is currently used to avoid queuing on the N27 northbound at Forge Hill junction particularly in the PM peak;
 - Rathmacullig Road is also used as a route connecting the Douglas and Carrigaline areas to the airport;
 - It is estimated that the R600 Kinsale Road is currently being used by a significant proportion of Carrigaline-based employees; and

- These utilised local roads are unsuitable to cater for the expected level of traffic in the future years. The predicted queuing on the R600 in the 2012 and 2020 will have a serious impact on commuters from Kinsale towards the City.

6.1.2 Future 'Do Nothing Scenario' - Estimated Future Parking Demand

Based on estimated passenger growth, the Cork Airport Future Needs Study estimated future parking requirements. Table 4.1 below outlines the existing parking provision/utilisation and the additional public and private parking spaces required in the horizon years.

This section outlines the current estimated car parking utilisation and future parking demand for the Do Nothing Scenario where no change in modal split is predicted.

Table 6-2: Existing and Future Airport Car Parking Provision and Demand

Car Park Type	2008		2012	2020
	Parking Spaces	% Utilisation	Parking Spaces	Parking Spaces
Passenger Numbers	3.3 million		4 million	5.9 million
Short Term	632	63	632	900
Long Term	3780	97	5,534	8,200
Public Sub Total	4,412	80%	6,166	9,100
Staff	450	91	500	700
Car hire	240	96	280	420
Private Sub Total	690	92%	870	1,120
Total	5,102		7,036	10,220

Based on the predicted passenger growth and parking needs contained in the Cork Airport Future Needs Study, it is estimated the existing short-term car park may reach 90% utilisation by 2015 and the long-term by 2010. Parking capacity in the staff, car hire, and cargo sections are likely to exceed capacity before 2012.

The above future parking requirements are based on existing travel patterns and modal split where the use of public transport and other alternative modes of transport are low. With regard to public transport, the above table assumes that no amendments to the network are made. In this instance and in light of projected traffic flow increases, it is unlikely that public transport patronage will increase above its current mode share due to delays public transport would experience on the network.

Mode share for walking and cycling is also unlikely to increase significantly due to distances involved, the travel mobility issues associated with flying (baggage, etc) and also the perceived lack of safety on Irish road networks.

6.1.3 Public Transport – Bus Journey Times

The existing 2008 bus journey times from the City Centre to the airport is 20 minutes in the peak but approximately 40 minutes in the opposite direction. Based on the predicted future increases in traffic volumes on the local road network and the associated junction capacity analysis undertaken these journey times are unlikely to decrease in the future if growth is unmitigated. In order to propose accurate journey time impacts on public transport, detailed analysis of time delays at all key junctions on route to the airport would need to be carried out.

6.2 Conclusion

This future 'Do Nothing Scenario' demonstrates how the local road network and airport could develop does not reflect the overall objectives for the future development of Cork Airport and its' associated transport network as discussed in Section 2. It is therefore important to clearly

define objectives and transport targets for the future development and access to the airport; these are outlined in the next chapter.

7 Strategy Development

7.1 Strategy Objectives and Targets

It is clear that the Do Nothing Scenario does not present a feasible option for future development of the transport network supporting Cork Airport. In developing an alternative strategy, the definition of robust objectives and targets will provide an important steer in shaping appropriate measures to avoid the ‘Do Nothing’ Scenario.

The development of objectives and targets has evolved throughout the study through the analysis of future passenger growth, review of national and local policy and a review of transport operations at other airports.



The following strategy objectives are proposed:

- Increase the mode share of sustainable transport trips to the airport by employees and passengers;
- Ensure road access to the airport is not adversely affected by traffic congestion;
- Maximise the value of existing infrastructure;
- Ensure future development of the transport network is managed and monitored jointly by the key project stakeholders.

Consultation with key stakeholders through the Strategic Local Area Plan process will confirm these objectives.

Achieving modal shift for trips to the airport by both passengers and staff is one of the key objectives of this strategy. To measure the success of the strategy in achieving this objective, mode shift targets have been set. One of the key indicators of success in delivering the above objectives is the transport mode split for both passengers and employees. Targets for the strategy have therefore been set using the latest mode split information discussed in Section 4, these are highlighted below.

Figure 7-1: Mode Split Targets

Mode	Passengers			Employees		
	Existing	Phase 1 (2012) Target	Phase 2 (2020) Target	Existing	Phase 1 (2012) Target	Phase 2 (2020) Target
Drive	76%	73%	62%	92%	82%	72%
Bus	11 %	15%	25%	6%	15%	25%
Taxi	11 %	10%	10%	-	-	-
Cycle	-	-	-	1%	1%	1.5%
Walk	2%	2%	3%	1%	1%	1.5%

Targets for both passengers and employees to 2012 have been set based on what can reasonably be achieved in this short time frame. Although the planning and design of some major infrastructure measures may take place during this period, it is unlikely that for example, major infrastructure measures can be effective in this period. As a result, the 10% decrease in private vehicle trips for both passengers and employees in 2020 will be due to the impact of more robust infrastructure measures.

In the interim, 'soft measures' such as public transport improvements and mobility management could have a considerable impact on mode split. Due to the range of measures available in the short term, employee travel patterns are most likely to change.

To secure potential in achieving this modal shift, a target for the improvement of public transport operations is also proposed. As highlighted previously, current public transport journey times to the airport are approximately 20 minutes southbound (to the airport) and 40 minutes northbound in the peak hour. It is vital that these journey times are reduced to improve the attractiveness of public transport over private vehicle trips to the airport. Public transport trips to the airport need to be reliable with guaranteed journey times.

8 Access Plan Measures

Having established an understanding of how the network could develop without any intervention and developed targets for mode split for journeys to the airport a package of appropriate measures have been developed to achieve these targets and divert potential issues in the transport network. The following categories of measures have been identified and are outlined in further detail below:

- A. Public Transport;
- B. Parking;
- C. Mobility Management; and
- D. Road Network.

8.1 Public Transport Measures

A number of measures are set out below which seek to improve facilities for buses between Cork Airport, Cork City and other centres of population. These measures aim to both encourage the use of public transport whilst also making it a more attractive method of travel than the private car. Current travel patterns and modal split (see Section 4) suggest that the use of public transport is high considering that the existing bus priority infrastructure is negligible, the frequency/capacity is relatively low and routing of bus services does not cater for specific centres of population or direct access to the airport.

Measure A.1	Improvements to the Existing Public Transport Network
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Description	<p>Prior to investigating potential for investment in new public transport infrastructure it is imperative to consider the existing network, its potential and possibilities for improvements. At present, 11% of passengers use public transport while 6% of employees use public transport to the airport. This low proportion of overall trips raises concerns in terms of future airport growth, especially in light of the impact of the Do Nothing Scenario highlighted in Section 6.</p>
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Although work is ongoing in planning a future public transport system for Cork City, it is important that in the interim public transport services are continually improved. This is important because it gets increasingly difficult to influence travel patterns if services have suffered a decline. Where possible, short term measures should be designed to work towards the overall 2020 vision for the network.

Possible short term measures of improvement include:

- **Increased service coverage and frequencies:** As highlighted in Section 4, the catchment area for passengers to the airport is very dispersed with people travelling from all over Munster to use the Airport. The employee catchment area however is much more defined with 73% of people living within a 15 km radius from the airport. In addition, it was observed that existing services to the airport are limited to, in general, routes from the City Centre. There is considerable scope for upgrade of the existing services including at a minimum service frequencies and the introduction of new routes to serve employee catchment areas. The possibility of introducing a shuttle bus for employees is looked at in Measure A.2. The CATS study currently being undertaken should outline a programme of public transport improvements which will serve the airport in the short term before the long term strategy for public transport services is implemented.

- **Marketing and awareness:** It is proposed that public transport travel awareness be improved for airport passengers and both airport and Business Park employees/staff. Awareness should be improved using the following:

- Transport information desk(s) located in prominent position(s) in the airport terminal, the desk should inform passengers about all modes of transport, in particular bus routes (maps), key destinations, cost and frequency.
- Public Transport information should be improved in the City Centre, the bus and train station and tourist accommodation
- Online public transport information or website links should be automatically provided to passengers who book to arrive to, or depart from Cork Airport. This measure should be implemented through Cork Airport Authority, airline websites and public transport providers.

Airport and Business Park staff should be made aware of available public transport services and incentives (discounts) for their use should be provided. Information could be provided with pay slips and discounts be discussed and agreed with public transport operators due to the potential patronage (over 3,000 staff travelling daily at present, 2008).

Increased travel awareness could significantly increase public transport use by passengers and in particular by staff, through the availability of quality public transport information and incentives.

Further marketing incentives are proposed through measures C.1, Mobility Management.

- **Integration with rail/bus services:** In recent years, the development of Cork City has generated diverse travel patterns. This has meant people travel further, more often and at different times of day. This presents a challenge in ensuring the public transport network modes are effectively integrated, for example, the co-ordination of bus and rail services timetables to enable a 'seamless' journey. To secure seamless public transport trips to the airport, a dedicated bus route from the airport to the bus and rail stations is proposed. This can be achieved through co-ordinated planning by public transport providers. This would result in a safer, quicker and more comfortable transfer between modes and services, thus enhancing the experience of existing users and also attracting new users to public transport.
- **Bus set down area:** Bus set down areas adjacent to the terminal should be upgraded to increase awareness of public transport and to meet the needs of future public transport use. Opportunities to incorporate real time information at the stop should be encouraged to increase patronage and reliability. The existing bus set down/parking area at the airport main terminal is currently limited to effectively one space for two operators, namely Bus Eireann and Skylink, due to parking length and especially parked private vehicles. The provision of adequate bus set down facilities will allow the efficient use of the space and enable poor private parking activity to be more easily regulated and monitored.

In spite of these measures, it is important to note that delays to public transport on the current road network remains a major disincentive to public transport trips to the Airport, especially in the peak hour. More expensive

infrastructure measures would therefore be necessary to achieve the upper limit of targets for public transport mode share.

Key Benefits Each of the public transport improvements proposed have enormous potential to boost public transport patronage to the airport in the short term at a relatively low cost.

Key Impacts It is acknowledged that unless priority is given to public transport on the key corridors to the airport, there are limitations on the extent of modal shift which can be achieved. Bottlenecks on the road network should therefore be tackled simultaneously.

Measure A.2 Private Shuttle Buses – Employees of Airport and Business Park

Description As part of the sustainable travel and mobility management objectives of the study, it is proposed to provide private shuttle/bus services for employees of both the airport and Business Park.

The location (origin/destination) and route of these services would be determined from the 2006 Census CSO POWCAR data which details where employees live and the quantity from each location (centre of population). This data showed that the highest concentrations of employees were in the City Centre (33%), Douglas/Grange (17%), Carrigaline (12%) and Ballincollig (10%). These survey results could be updated to provide more detailed information in developing shuttle bus routes.

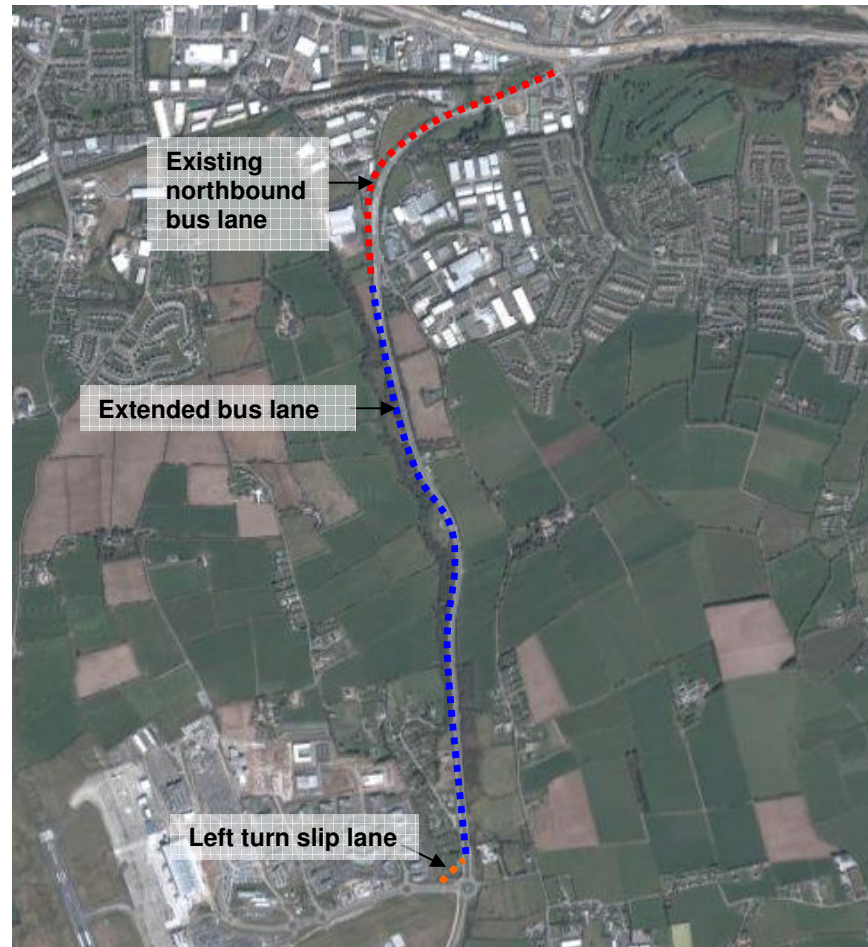
It is proposed that private staff bus services would be owned/operated by either the Cork Airport Authority, Cork Airport Business Park or both through the adoption of Travel Plans for each entity which would be monitored by Cork County Council. It is also recommended that a minimal staff car parking fee be investigated as a form of subsidy for these bus services (see Measures B.1 and B.2).

Key Benefits The provision of shuttle buses from centre of staff population could significantly reduce the reliance on the private car by employees.

Key Impacts The provision and use of these services would ideally be supported by bus priority on the N27 otherwise it is unlikely that sufficient journey time savings would be made to attract employees.

Measure A.3 Bus Lane northbound on N27 to Cork City

Description Public transport journey time to the airport can only be reduced by giving greater priority to buses over local traffic on the N27. The reliability of public transport is currently severely affected by delays along this route. At present there is approximately 350m of dedicated bus lane operating northbound up to the Kinsale Roundabout junction. It is proposed that this facility can be extended south to the Airport Roundabout, complimenting other proposed infrastructural measures along the route such as rationalisation of key junctions along the route (see measure D.1). Based on the existing road cross section, the northbound bus lane could be delivered with relative ease, utilising the existing carriageway including the cycle lane, available road reserve and narrowing of the existing northbound running traffic lane. Embankments on the western side of the N27 could present some difficulties for widening at a number of limited locations (approximately 200m in total). In the short term, this problem could be overcome through a temporary merging of the bus lane with the general traffic lane. A more robust infrastructure solution for widening of the route could be investigated in the medium to longer term (see Measure D.4).

Figure 8-1: Northbound N27 Bus Lane

Key Benefits The provision of this northbound bus lane to Kinsale Road Interchange allows for increased accessibility and ease of movement for all bus commuters to and from the Airport. Overall journey time would be reduced making public transport more attractive as buses would avoid the existing queues at key junctions.

Key Impacts More detailed planning and design of this measure will indicate the specific land requirements and required junction restrictions and rationalisation on the N27.

8.2 Car Parking

Parking policy has a fundamental role to play in managing trips by private vehicle to the airport. At present, the availability and pricing of parking, especially at the Business Park does not act as an incentive to encourage sustainable transport use. Measures developed as part of this plan aim to ensure the existing utilisation of parking at the airport is maximised and to ensure that future provision of car parking at the airport does not adversely impact on the mode share of more sustainable transport modes. It is recommended that a policy for future growth of parking at the airport is agreed by Cork Airport Authority and Cork County Council so that a clear vision for future provision is developed. The measures below should form the basis of this policy.

Measure B.1 Improve Existing Utilisation and Access

Description As highlighted previously, there is currently a discrepancy between the utilisation of long and short term parking at the Airport. Long term car parks experience extremely high utilisation levels in the peak (97%) while even during the peak 33% of short term parking spaces are available. This spare capacity should be optimised, especially during the peak period. This should be the first step prior to investigating the need for additional parking infrastructure.

Better utilisation of parking availability can be achieved by:

- Readjusting parking costs to ensure that short term parking is more attractive. At present long term parking costs €9 per day while the short term parking is €16 per day. This means that for stays over three hours, the long term car park is more economical and attracts more passengers. A review of parking costs is recommended to ensure better utilisation of the short term car park.
- Long term parking could be introduced on one floor of the multi-storey.
- Improved signage to the short term car park is recommended.

Key Benefits Reduced utilisation and land requirements for long term parking in Phase 1.

Key Impacts Pricing structure would have to be monitored to inform further development of parking infrastructure as required.

Measure B.2 Parking Management Policy

Description In the medium to long term, parking policy should be used as a tool in managing vehicular trips to the airport and more specifically to encourage a shift to public transport. As a result, mode split targets for public transport use to the airport for passengers and staff should be accounted for in future parking provision. This measure has been successfully introduced at similar airports where public transport service improvements have been made.

Mode shift targets for trips to the airport are for a 14% decrease in passenger vehicle trips and a 20% decrease in staff single occupancy vehicle trips. This is to reflect a shift to other modes, specifically public transport and assumes that all the public transport measures specified in Section 4 will be fully implemented in line with passenger growth.

Reflecting this modal shift, projections for car parking provision as previously issued by the Cork Airport Authority (see Section 6, table 6-2) have been revised and agreed to reflect the targeted mode shift. Overall, by 2020 passenger parking provision is reduced by 14% and employee parking by 20%. Table 8-1 below presents the revised parking projections and potential land savings due to reduced parking provision.

Table 8-1: Recommended Airport Parking Provision

Type	2008	2020 Projected Need	2020 Revised Projections	No. of Reduced Spaces	Land Area (m ²) Saving
Short Term	632	900	774	126	3,150
Long Term	3,780	8,200	6,364	1,836	45,900
Staff Parking	450	700	560	140	3,500

Land area savings above are based on at grade parking provision at a rate of 25m² per parking space. This accounts for circulation aisles throughout the car park, pavements and sufficient turning movements. This represents typical area used for parking in similar areas. As highlighted, there are significant land savings both in terms of area and potential costs to acquire and develop.

In terms of employee parking at the Business Park, it is recommended that as investment in mobility management and public transport increases, employee car parking is capped as has been implemented in other airports presented in Section 3. Parking for employees at similar sized business parks, specifically Edinburgh City is capped at one space per 40m². This is in contrast to the current 'Draft' Cork County Development Plan Parking Standards for 'Offices' which require one space for every 12.5m² or 8 spaces per 100m². The use of this standard would equate to an unsustainable 2 spaces per employee at the Cork Airport Business Park.

Employee car parking could therefore be capped at a maximum rate per employee which reflects the mode split targets. For example, by 2020, if 72% of staff drive to work and assuming 15% of these either car share or are dropped off then parking would be required for 57% of the workforce. However, due to the need to duplicate use of spaces, for example, between shifts and operational efficiency, there is a need to provide additional parking. The parking cap could therefore be set at 65% of the workforce or 0.65 spaces for every employee.

Measure A2 raises the possibility of introducing Employee Shuttle Buses to the Airport Business Park. As part of this measure, the possibilities for introducing a small parking levy in the Business Park should be investigated to help fund public transport improvements. Similarly, this has been successfully implemented at other airports.

Key Benefits Increased incentives for public transport use.

Key Impacts Reduced land requirements for parking.

8.3 Mobility Management

In setting a strategy to achieve the mode split targets for trips to the Airport and Business Park it is necessary to look at a wider range of options than infrastructure and service improvements. 'Soft measures' such as travel plans and car pooling can have a significant impact on travel behaviour, can be introduced easily in the short term and are cost effective. These options are most frequently introduced in work places as part of compulsory Mobility Management Plans accompanying planning permission for development. As this was not a condition of planning permission for the Airport Business Park, alternative mechanisms to introduce 'soft options' to affect modal shift will need to be investigated.

The introduction of Mobility Management Plans (MMPs) has historically been perceived as a 'stick' measure on large developments to reduce private vehicle trips. Instead, it is argued that the MMP should be presented in terms of the benefits it can deliver to large employers. Adoption of the MMP needs to be presented as an opportunity as opposed to a burden. Without shared responsibility in recognising and resolving traffic and transport issues it is unlikely that objectives and targets can successfully be met.

In the UK, Mobility Management Plans are delivered to major employers by local authorities through the Local Transport Planning process which has defined targets for congestion and emissions reduction. Mobility Management is seen as having a major role to play in achieving these targets. Local Authority Travel Plan officers run city wide campaigns which include the introduction of travel plans as well as a wider programme of travel awareness to encourage public transport use. Participation by employers is voluntary and employee involvement is strongly encouraged. Recorded impacts of mobility management is marketed by the company overall to improve the sustainable image of the company as well as to further encourage

employee participation. Other benefits of participation which can be marketed to employers to encourage involvement are highlighted below.

It is envisaged that a Cork County wide campaign with large employers be developed to introduce and implement mobility management plans. Some of the biggest employers in the County would be approached to get involved in the campaign with the benefits of involvement clearly indicated. Incentives to participation could be offered such as reductions in public transport costs, savings on bikes etc. It is important that the campaign is well monitored to report impacts.

Each of the measures presented below form an important part of Mobility Management and offer significant opportunities to impact modal shift. These could be implemented through co-ordinated efforts between the County Council and Airport Management (including the Business Park).

Measure C.1	Mobility Management Plan
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Measure C.1.1	Workplace Travel Plan
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Description	<p>A workplace travel plan, also known as a staff travel plan, or a green transport plan is a package of measures aimed at widening travel choices by all modes of transport and cutting unnecessary car use. Travel plans take into consideration the travel needs of staff, customers, visitors, business travel, fleet management and deliveries. The plans encourage employers to recognise and take responsibility for the social and environmental impacts that their organisation has on its surroundings. Travel plans are intended to encourage businesses and employees to think about the best way of making a journey, taking into consideration its purpose, environmental impact, local conditions and whether any alternative options were available.</p>
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Characteristics of the Airport Business Park which indicate its suitability for introduction of a travel plan and high potential of success include the following:

- There are approximately 2,750 people currently employed in the Business Park. This is significantly high in consideration of the area of the site. This high density nature of employment at the site means a travel plan here is more likely to be a success. In addition, there are a number of high profile businesses within the Park who are likely to appreciate the company benefits of a travel plan;
- Operating hours for businesses within the Business Park are generally 9-5 office hours. This means the impact on peak hour traffic is at a maximum but also means that opportunities for many travel plan tools such as staggered working hours and car pooling are more likely to be a success;
- As demonstrated in Section 4, 80% of all employees of the Business Park and Airport live within a 20km radius of the airport, this maximises opportunities for modal shift through car sharing and public transport improvements;
- A number of frequent bus services already serve the airport and, as outlined in Section 2 there are plans through the CASP to expand public transport services to the airport; and
- Opportunities to explore employee parking restrictions within the airport and Business Park should be investigated.

Costs for introduction of travel plans would largely be borne by the private sector rather than being a direct cost to the County Council. However, ideally implementation of the plan would be managed and monitored by Council to ensure the plan is successfully delivered and targets achieved.

Research undertaken by the UK Department for Transport of 20 organisations which exemplify travel plans showed that the median average

gross annual running cost of running a travel plan is €60p.a. per employee (full-time-equivalent).

Key Benefits

Workplace travel plans need to be marketed to the Airport and Business Park managements based on the following benefits:

- Assist in resolving problems caused by traffic congestion on and around your site;
- Help meet shareholder demand for corporate social responsibility improvements, including meeting environmental targets such as the ISO14001 standard or global warming emissions targets;
- Enable a planning application for a new site or for new accommodation on the current site – local authorities are increasingly stipulating implementation of a travel plan as a legal condition of giving planning permission;
- Save money on the cost of providing and maintaining parking spaces;
- Secure greater productivity due to reduction in delays caused by congestion;
- Release land under car parks for more productive use;
- Enable higher occupancy of existing buildings;
- Cut mileage claims and other business travel costs;
- Provide a better experience for customers travelling to your site;
- Improve your image with both customers and neighbours;
- Ease delays to deliveries and movements of goods off site;
- Improve staff health and reduce absenteeism;
- Assist with recruitment and retention by making staff journeys to work easier and cheaper; and
- Improve staff punctuality by reducing congestion delays and supporting more reliable means of transport.

Key Impacts

Travel plans have been a major success in large Business Parks similar to the Airport Business Park and present an excellent opportunity to reduce car trips by airport employees to work. Based on a review of the effectiveness of travels plans in similar locations, reductions in car use by 15-20% can be achieved, with perhaps higher reductions of 20-25% from plans incorporating measures such as parking management and bus subsidy, and perhaps lower reductions of 5-15% for plans that do not incorporate such measures.

**Measure C.1.2
Description**

Personalised Travel Planning

Personal Travel Planning (PTP) is an approach to delivering targeted information directly to travellers, to help them make sustainable travel choices. It seeks to overcome habitual use of the car, enabling more journeys to be made on foot, bike, bus, train or in shared cars. It can also seek to discourage unnecessary travel, through the provision of local or site-specific information.

Key Benefits

Benefits of personalised travel planning are similar to those of workplace travel plans, indicated above.

Key Impacts

The impact of personalised travel planning on travel behaviour is slightly higher than workplace travel plans with up to 30% of participants switching from car use to more sustainable travel modes. Assuming that these alternatives provide offer feasible options for employees at the Airport Business Park, considerable modal shift could be experienced.

**Measure C.1.3
Description**

Car Pooling

Carpooling (also known as ride-sharing, lift-sharing), is the shared use of a car by the driver and one or more passengers, usually for commuting. Carpooling arrangements and schemes involve varying degrees of formality and regularity. Carpoolers use pool member's private cars, or a jointly hired vehicle, for private shared journeys. In reducing the number of cars on the

road, carpooling increases vehicle occupancy, decreases pollution and the need for parking space, and in a global perspective, reduces greenhouse gas emissions.

Carpooling reduces the costs involved in repetitive or long distance driving by sharing cars, sharing rental charges, or paying the main car owner. Some countries have introduced high-occupancy vehicle (HOV) lanes to encourage carpooling and use of public transport, to combat rising traffic congestion. The potential for introduction of these lanes in Cork could be incorporated into investigations for introduction of bus lanes on the N27.

Within the study area there is significant potential for car pooling. This could be initiated by Cork Airport Authority, companies within the Business Park or Cork County Council by providing a central listing facility with defined pick-up points, preferential parking and general advice. This can be done locally on staff notice boards or on the Internet.

Key Benefits

The following benefits to employers should be highlighted:

- Greater interaction amongst employees as carpooling participants;
- Increased staff retention and reduced lost business time due to an improved accessibility to the workplace;
- Reduced costs associated with the provision of parking;
- Reduced travel time for some participants; and
- Enhanced employer image.

Key Impacts

Research has shown that car pooling schemes work effectively where there are few public transport options and there are at least 1,500 employees. Although public transport to the Airport from the City is currently adequate, a large proportion of employees at the Business Park travel from outside the City area. Employees at the Business Park should therefore be encouraged to initiate car pooling facilities.

8.4

Infrastructure Measures

A number of key road and junction improvement measures are proposed to accommodate the increase in future traffic demand that will result from the anticipated growth of the airport, which includes passenger and cargo growth in addition to the development of lands in the study area.

The potential for major road and junction capacity issues as a result of this growth have been outlined in Section 3. With these issues in mind, a number of potential infrastructure measures are proposed which will address issues in the short, medium and long term. These measures range from minor improvement measures to major infrastructural measures which will serve both the airports future needs in addition to the strategic transportation needs of the area.

It should be noted that the measures proposed relate to the national roads serving the airport and internal access roads only. It is acknowledged that although local roads in the area, such as Rathmacullig Road, will experience a growth in traffic during the study timeframe, airport development is not the main cause of this growth. Therefore measures to improve access on the local network will be the subject of other investigations and planning processes.

The key infrastructure measures are set out below.

Measure D.1 Improve Existing Local Road Network

Measure D.1 Geometric Improvements to the Airport Roundabout on the N27

The Airport Roundabout is currently at capacity in the peak periods and is set to experience considerable additional strain in light of proposed passenger growth. Three important amendments to the junction have been proposed to increase capacity and reduce delays.

Measure D.1.1 Improved signage and layout at the roundabout

Description

It is proposed to improve the capacity of the main Airport Roundabout in the N27 by improving roundabout geometry including an increased diameter, increased number of approach and circulation lanes and other improvements. In addition, quality road markings and signage indicating proper lane usage are recommended. This would allow 2 dedicated lanes to be provided for access to the airport. As the roundabout currently experiences capacity issues in the peak periods, this measure could be implemented immediately, and should be delivered by 2012 at the latest if passenger numbers increase as expected.

This measure is shown schematically in Figure 8-2 below.

Figure 8-2: Geometric Junction Improvements – Airport Road Roundabout



Measure D.1.2 Left Slip Lane – Exiting Airport

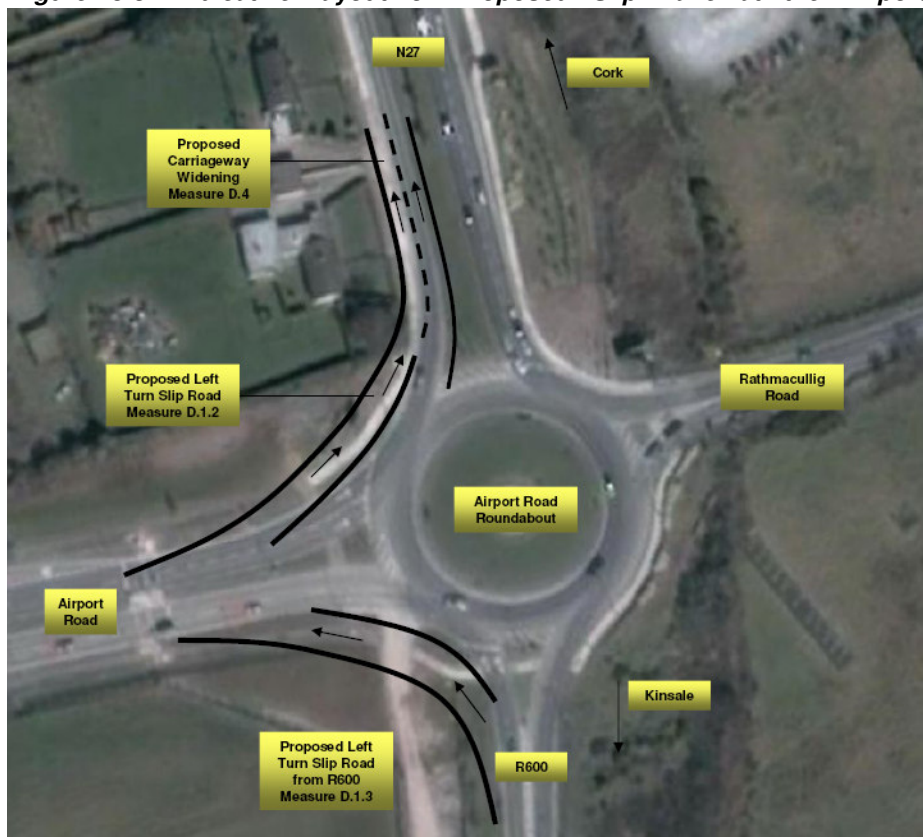
It is also proposed to create a segregated left turn slip road from the airport to the N27 northbound thus avoiding the Airport Road Roundabout and freeing up much needed capacity at the junction. Like the previous recommendations for improvements in roundabout geometry, this measure could be implemented immediately, pending land acquisition needs and design processes. A schematic indicative drawing showing the proposed slip lane is shown below in Figure 8-3.

Key Benefits

These measures would significantly improve both the capacity and operation of the junction thus reducing vehicle queues and delay. It should also improve overall road safety with effective road markings. During the AM peak it would provide for significantly improved junction capacity, in particular accessing the airport. Refer to Capacity Analysis in Appendix A.

Key Impacts The land take impacts of such measures warrant consideration, but given the location of the junction and the undeveloped lands surrounding it, these measures would potentially be straightforward to implement at minimal cost for significant capacity gain.

Figure 8-3: Indicative layout of Proposed Slip Lane at the Airport



Measure D.1.3 Left Turn Lane – Entering Airport

Description Northbound traffic entering the airport regularly experiences delays due to the extent of southbound right turning traffic into the airport. The introduction of a left slip lane into the airport will give priority to airport traffic but will also reduce delays for city-bound traffic at the airport roundabout. This measure is highlighted in Figure 8-3 above.

Key Benefit Reduced delays for northbound traffic at the airport roundabout including airport traffic due to increased junction capacity. Reduced delays to public transport services, the Kinsale-Airport-Cork service for example, is also a key benefit.

Key Impact To maximise benefits of this measure, the slip road should extend for a minimum of 75 metres down the R600 to minimise northbound traffic delays. This is also to ensure that it is not advantageous for city-bound traffic to enter the airport and return back to the N27 via the Airport Roundabout to reduce delays waiting to enter the roundabout otherwise.

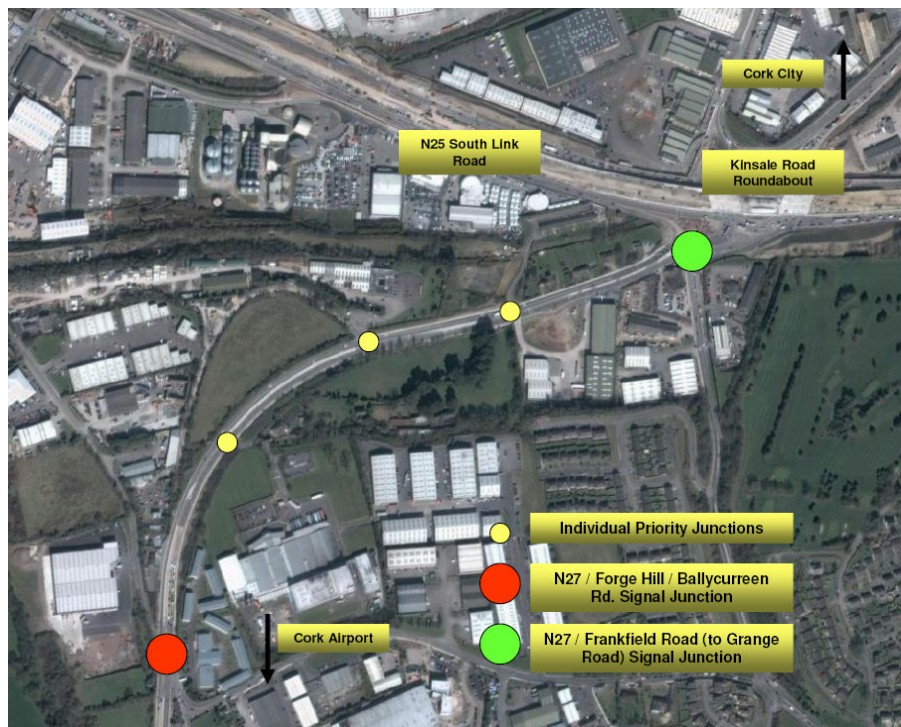
Measure D.1.4 Rationalisation of Junctions on the N27

Description It is proposed to rationalise the number of existing junctions on the N27 between the Kinsale Road Interchange and the Airport Roundabout. At present the existing major signal junctions at Frankfield Road (to Grange Road) and Ballycurreen Road (Grange Road) / Forge Hill cause significant congestion issues, the location of which are shown below in Figure 8-5. It is therefore proposed that in conjunction with local land owners, business owners and residents that Cork County Council investigate the amalgamation, rationalisation and possible closure of junctions and/or junction movements in the area.

Key Benefits The rationalisation of junctions on the N27 would have significant benefits for all N27 traffic. Notwithstanding the improved network capacity which would be achieved, the removal of right turn lanes among other elements would free up existing carriageway for the provision of possible bus lanes, cycle lanes and additional traffic lanes.

Key Impacts The rationalisation of junctions on the N27 would significantly improve junction capacity, allow more traffic through each junction and reduce queuing. However, this release of N27 traffic may impact on the Kinsale Road Interchange which at present uses the existing congestion at these junctions as a form of traffic feeder system allowing only a limited number of vehicles to the roundabout at any one time.

Figure 8-5: Location of key Junction Rationalisation on N27



Measure D.1.5 Pedestrian, Cyclist and Mobility Impaired Improvements

Description It is proposed that all future development within the Airport and Business Park take into account the needs of pedestrians, cyclists and the mobility impaired. It should be noted that the mobility impaired includes the disabled, wheelchair users, parents with prams, the vision impaired but in particular pedestrians carrying luggage, which will account for the majority of mobility impaired users within the study area. The future development of the Airport and Business Park should take into account desire lines and infrastructural needs of all users, specifically improving, upgrading and maintenance of

existing infrastructure and facilities taking into account the issues highlighted in Section 4.

Key Benefits Improving the existing conditions should help increase cycling and walking as a sustainable mode of transport and reduce the reliance on the private car. Improving the pedestrian environment should also provide a more pleasurable experience for airport passengers who are required to walk from their parked vehicle to the Airport terminal.

Key Impacts The provision of additional or improved infrastructure for pedestrians, cyclists and the mobility impaired often requires land and sometimes road space in order to provide quality facilities. This however, should not be perceived as a negative impact but a positive move towards providing for all modes of transport.

Measure D.1.6 **Signage Strategy**

Description As discussed in Section 4 the existing traffic and pedestrian signage is of high standard but in certain circumstances the signage positioning cause both driver and/or pedestrian confusion. It is proposed that a review of existing signage be undertaken as part of the future airport development concentrating primarily on the following:

- Driver directional signage to the drop-off area and car parks which currently causes some driver confusion when arriving at the airport by car. Included in this would also be a review of existing road markings.
- Pedestrian directional signage through the airport, in particular signage to/from the car parks. Particular attention should be given to signage directing pedestrians to available modes of transport including buses and taxis and within the terminal to tickets kiosks for both public transport and parking tickets.

Key Benefits Improving existing driver and pedestrian signage will improve the overall airport experience, creating an efficient internal transport system and improving overall road safety within the site.

Key Impacts The provision of additional or improved signage would have minimal impacts as it should only involve the relocation of existing signage and provision of minimal additional signage.

Measure D.2 SE Quadrant Access

Measure D.2.1 Additional Airport Access on R600 serving Future Development Lands

Description The future development needs of the airport have identified the south eastern quadrant of the airport lands as suitable for expansion of airport facilities such as cargo handling. It is proposed to create an additional access junction to the Airport on the R600 to the south of the existing Airport Road Roundabout to serve future development lands only. Due to the existing capacity issues at the Airport Road Roundabout it is recommended to create an additional access to the airport on the R600 to serve these lands.

This junction will be designed during development planning stage to cater for the predicted traffic flows. An indicative layout showing the possible access location is shown in Figure 8-6 below.

Figure 8-6: Possible Location of Additional Access on R600



It should be noted that the need to upgrade the R600 to the SE Quadrant site should be monitored in Phase 2, especially in the event of further intensification of land use.

Key Benefits A direct access to these development lands would reduce the traffic impact on the Airport Road Roundabout and allow the predicted airport growth to occur with minimal traffic impact.

Key Impacts Although, an additional access to the SE Quadrant off the R600 for cargo handling facilities would have a minimal impact on the R600 traffic flow, internal access to the site would be preferable. This would ensure the site could easily be integrated with airport operations through pedestrian and vehicular links. In addition, the site could be more conveniently accessed by public transport.

Measure D.3 Northern (Secondary) Access Road to Airport

Description It is proposed to provide a secondary access to the main airport terminal to the north of the airport lands thus providing a northern relief road from the Airport to the N25 South Link Road via the Sarsfield Road Roundabout. This proposed relief road may be a partial new-build and partial upgrade of local roads. The road would provide an important secondary access to the airport, reducing pressure on the N27 but also providing an alternative airport access which could prove critical in the event of an airport emergency.

Local topography may lead to design challenges and the project would require land acquisition for some distance beyond the immediate boundary of the road due to the requirement for cuttings and embankments. Detail of this route would be identified through a rigorous route selection and design process.

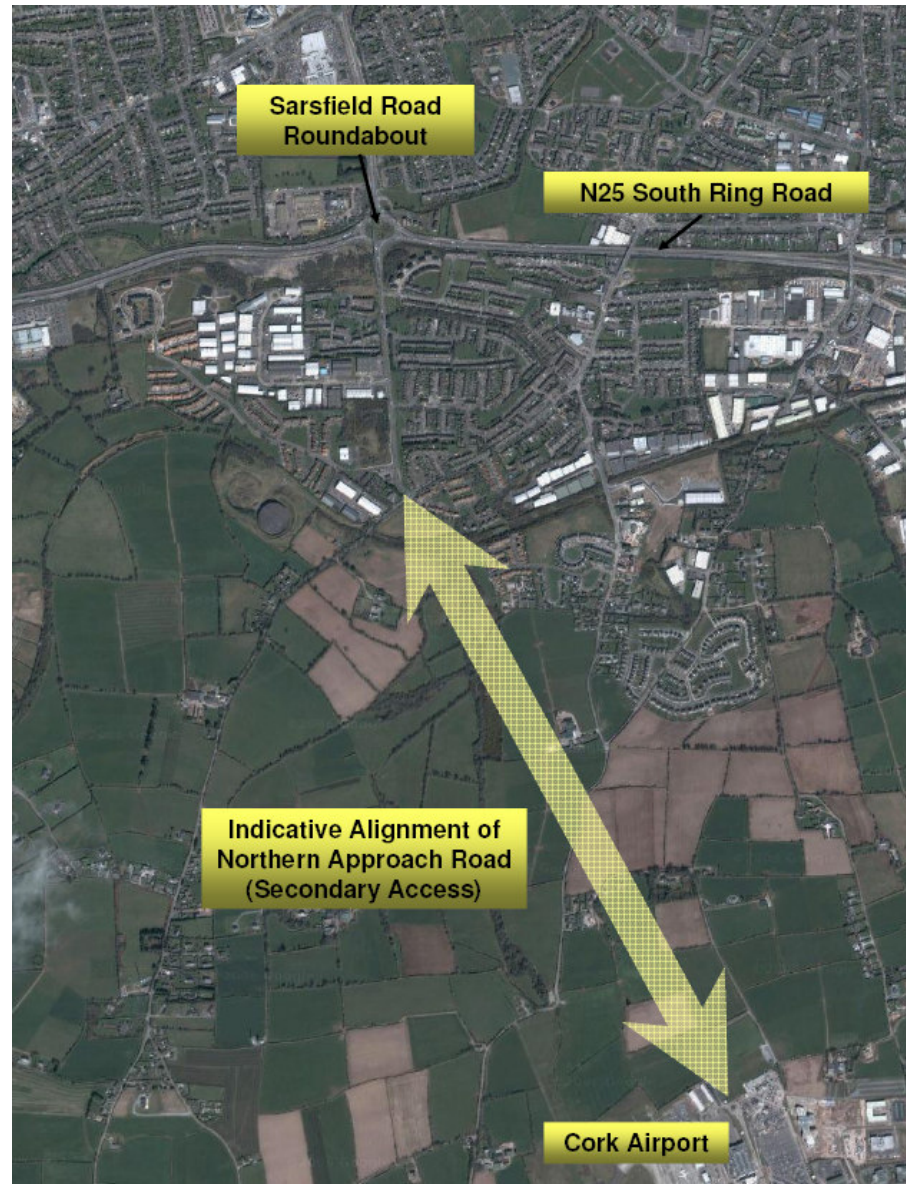
Although preliminary investigations on the potential of this measure could commence immediately, it is likely that, if appropriate, delivery of this measure is a longer term objective.

Key Benefits Based on the origin/destination information the Northern Relief Road may remove a significant portion of both employee and passenger trips (up to 30%) from the N25 South Ring Road, Kinsale Road Interchange and other key junctions on the N27. It would also provide an additional route for possible public transport routes.

Based on a redistribution of both Airport and Business Park traffic, estimated traffic forecasting suggests that there may be a reassignment of up to some

400 vehicles (2-way) onto the Northern Relief Road (Secondary Airport Access) in the AM and PM peak hour travelling between the west of the city and the Airport. It is forecast that 400 vehicles would be removed from the N27 and N25 (Kinsale Road Interchange) thus increasing available capacity at key junctions noted above. This measure would also have a significant positive traffic impact and free up capacity on the national road network. The estimated traffic flows for this measure are contained in Appendix B.

Figure 8-7: Northern (Secondary) Access Road to Airport



Key Impacts

The Northern Relief Road would be a significant road scheme over difficult terrain. Local topography and land uses lead to design challenges which may require land acquisition for some distance beyond the immediate boundary of the road due to the requirement for cuttings, embankments and structures. Such would be identified through a more rigorous route selection, environmental and economic study of the proposed road.

Measure D.4 Upgrade N27 to Multi-Lane Carriageway Northbound

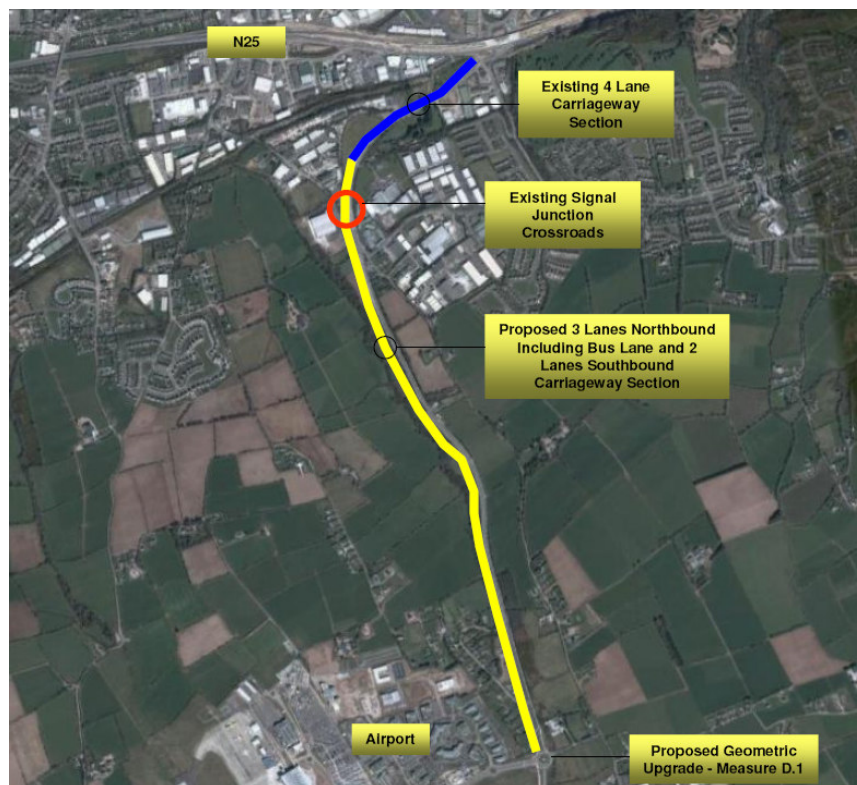
Description

It is proposed to upgrade the N27 carriageway from the Airport Roundabout to the Kinsale Road Interchange (South Ring Road N25) to two traffic lanes plus a Bus Lane (3 Lanes Northbound) in a northbound direction. The existing northbound cycle lane should be combined with the proposed bus lane to reduce the required carriageway width. It is expected that although planning and design for this measure should commence in Phase 2, it is unlikely the works would be completely delivered in Phase 2.

The work would comprise widening of the northbound carriageway into adjacent lands, central islands or minor realignment of the southbound carriageway to gain road width for the northbound section. To achieve this measure it may also be required to rationalise a number of junctions off the N27 thus increasing available road width by the removal of right turn lanes, etc. A schematic drawing showing the location of proposed road widening to 2no. traffic lanes plus Bus Lane northbound is shown below in Figure 8-8.

Detailed planning and design of this measure may suggest that it may be sufficient to widen only limited sections of the carriageway.

Figure 8-8: Proposed Road Widening of N27 Carriageway



Key Benefits

The provision of a multi lane carriageway would provide for a significant capacity increase at key junctions but could also serve to provide bus priority measures where appropriate at these signal junctions. This measure would have to be complemented with improvements at these key junctions to fulfil its potential.

Based on a redistribution of both Airport and Business Park traffic, estimated traffic forecasting suggests that this measure in conjunction with measure D.1 (rationalisation of junction on the N27) may reassign approximately 400 vehicles (2-way) onto the N27 in the PM peak hour travelling between the

Airport and the City Centre / Douglas / Grange / Frankfield. It is forecast that approximately 400 vehicles would be removed from the Rathmacullig Road and other Local Roads (back roads). This measure would have a significant positive traffic impact on residential / rural areas adjacent to the airport. The estimated traffic flows for this measure are contained in Appendix A.

Key Impacts

The existing topography adjacent to the northbound carriageway may be difficult in certain locations (embankments), but given that much of the infrastructure is already present, the majority of the road widening would potentially be straightforward to implement at minimal cost considering the potential benefits. The road widening impacts of such a measure warrants serious consideration due to the requirement of possible junction restrictions and rationalisation on the N27. A land reservation of 10.0m adjacent to both the north and south bound carriageway of the existing N27 carriageway (10.0m site setback for future development) should be applied to allow the implementation of these key infrastructural measures and also prevent future development on these lands.

9 Implementation Plan

The previous chapter of the report set out a range of measures for consideration as part of the Cork Airport Surface Access Plan. This chapter will evaluate those measures against the Plan's objectives, cost and impact on mode split targets. In addition an assessment of the impact of the combined measures on future traffic conditions will be presented.

It should be noted that the measures proposed for each phase of delivery is dependent on future passenger growth numbers as presented in the Cork Airport Future Needs Study being realised. Phasing of some measures, particularly the major infrastructure measures, would be brought forward to Phase 3 (2020-2040) if the required critical mass of passengers and employees is not realised.

9.1 Evaluation of Measures

The evaluation of measures for inclusion in the Plan has been completed against the following variables:

- Project objectives;
- Cost;
- Ease of implementation; and
- Impact on targets.

An evaluation matrix has been developed which assesses each individual measure in how it addresses the particular objectives, using the following scoring system:

- √√√ Strongly supports this objective
- √√ Provides moderate support to this objective
- √ Offers some support to this objective
- 0 Does not impact on this objective
- x Slight conflict with this objective
- xx Moderate conflict with this objective
- xxx Strong conflict with this objective

Table 9-1 overleaf lists all objectives and evaluates each of the proposed measures. Costs and difficulty of implementation are defined from low through the very high such that the potential benefits can be assessed against the cost of implementing the measure.

The table sets out recommended phases for implementation of each measure based on compatibility with objectives, cost and timescale needed to deliver the project. In addition, the tables indicatively highlights the key stakeholders required to action each measure.

Costs for Phase 1 measures only are indicatively proposed.

Table 9-1: Cork Airport Surface Access Plan: Implementation Plan

Measure		Overall Study Objectives				Implementation			Phase	Responsibility
		Joint Working*	Encourage Sustainable Transport	Reduce Congestion	Maximise Existing Infrastructure	Cost	Difficulty in Implementation	Impact on Mode Split Targets		
A. Public Transport (PT)										
A.1	Improve existing network	√√√	√√	√√	√√√	Low to medium cost depending on level of public transport improvements, for example, awareness measures would have low costs relative to service improvements.	Low	Med	1	Bus Eireann/Council/Airport
A.2	Private Shuttle Buses	√√√	√√	√√	√	Low	Low	Med-High	1	Airport/Business Park/Council
A.3	Northbound bus lane	√√√	√√	√√	√√√	Med		High	2	Council/NRA
B. Parking										
B.1	Improve existing utilisation	√√√	√	√	√√√	0	Low	Low	1	Airport
B.2	Parking Management	√√√	√√	√√	√√	0	Low	Low-Med	1+2	Airport
C. Mobility Management										
C.1.	Mobility Management Plan	√√√	√√	√√	√√√	€50 per employee per year	Low	Low-Med	1+2	Airport and Council
D. Infrastructure										
D.1	Local network upgrades**	√√√	√	√	√√√	€1-1.5 million	Low	Med	1	Airport/Business Park/Council
	D.1.1 Airport roundabout improvements									
	D.1.2 Left turn slip lane exiting airport									
	D.1.3 Left-turn slip lane entering airport from south									
	D.1.4 Rationalisation of N27 junctions.									
	D.1.5 Pedestrian, Cyclist and Mobility Impaired Improvements									
D.1.6 Signage Strategy										
D.2.	SE Quadrant Access	√√√	√	√	√√√	To be determined during planning and design of SE Quadrant lands.	Low	Low	1	Airport/Council/NRA
D.3	Northern (Secondary) Access Road to Airport	√√√	√√	√√	√√	High	Med	Med	2	Airport/Council/NRA
D.4	Widening of N27 Northbound	√√√	√√	√√	√√	High	Med	Med	3	Council/NRA

* This assumes that delivery and monitoring is implemented through a joint working framework with Cork Airport Authority, Cork City Council and the NRA

** Costings do not include land acquisition costs

9.2

Phase One: 2008-2012

Phase One measures have been proposed on the basis that they meet the overall Strategy objectives and can be implemented in the short term at a relatively low cost. The measures are as follows:

- Improve existing public transport network;
- Employee Shuttle Buses;
- Improve existing parking utilisation;
- Improved Parking Management;
- Mobility Management Plan;
- Local road network upgrades; and
- South East Quadrant access.

The objective of Phase One is to maximise the value of existing infrastructure through upgrading some of the key elements of the network, including the public transport network, parking facilities and the local road network. In addition, Phase One will incorporate an assessment of the feasibility of the major infrastructure measures proposed in Phase Two. This may include the preliminary planning and design tasks.

Overall it is expected that the Phase One measures, if fully embraced and implemented could achieve the 2012 targets indicated in Section 7, namely:

- A 3% reduction in private passenger vehicle trips and 10% employee trips; and
- A 4% increase in passenger public transport trips and 9% in employee trips.

Each of the proposed measures will have a varying impact on the targets, this is highlighted in Table 9-1 above.

In Phase One the majority of measures have a relatively low impact which are generally soft measures aimed to impact travel behaviour such as mobility management and parking management. Improvements in the public transport network could have a medium impact on travel behaviour. Although the detail of the potential for increased services and frequencies can only be ascertained through a more detailed public transport study, there is considerable scope for improvements in the network. As a result, it is envisaged that the package of public transport measures has the potential to have a significant impact on existing mode share.

Access to the SE Quadrant will only be required when cargo handling facilities are developed.

The Do Nothing Scenario highlighted that passenger and employee trips to the airport by car will increase by 20% by 2012, if the proposed Phase 1 measures are fully delivered, this would be reduced to approximately 15%.

These measures will prevent congestion in the immediate road network becoming critical and will ensure traffic remains close to current levels in the immediate future.

If all proposed Phase One measures are implemented, the following traffic scenarios, highlighted for the AM and PM peaks below, could develop by 2012.

Figure 9-1: 2012 AM Peak traffic flows post Phase 1 Implementation

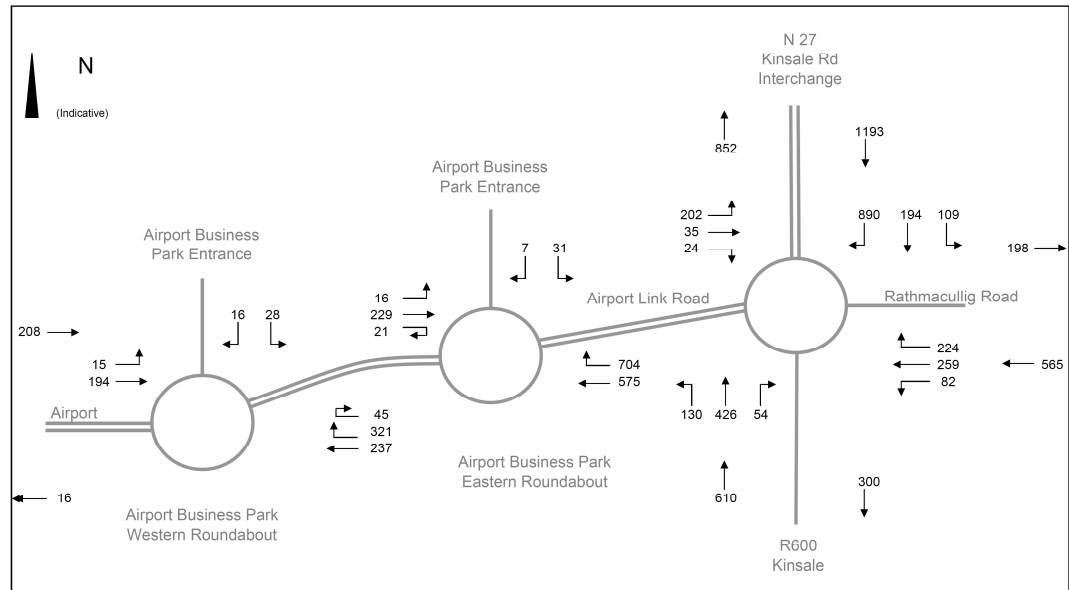
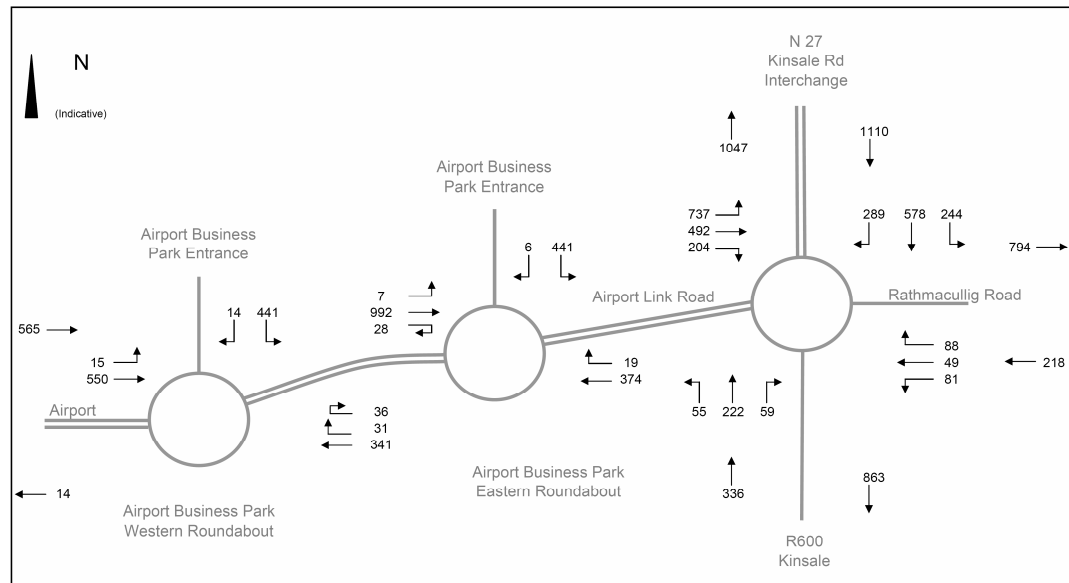


Figure 9-2: 2012 PM Peak traffic flows post Phase 1 Implementation



9.3

Phase Two: 2012-2020

Measures defined for Phase Two are proposed in response to the upper limit of passenger growth to 2020 and to provide access to developments that are likely to materialise in this period. The Phase Two measures are summarised as follows:

- Northbound bus lane on the N27; and
- Northern (Secondary) Access Road to Airport.

In addition, mobility and parking management measures would extend into Phase Two from Phase One.

Ultimately, if the proposed Phase Two measures were introduced, the defined targets for this time period could possibly be achieved, namely:

- An 11% reduction in private passenger vehicle trips and 10% employee trips; and
- A 10% increase in passenger public transport trips and 10% in employee trips.

If the proposed Phase Two measures are implemented, the following traffic scenarios are expected to develop in the 2020 AM and PM peaks:

Figure 9-3: 2020 AM Peak Traffic Flows

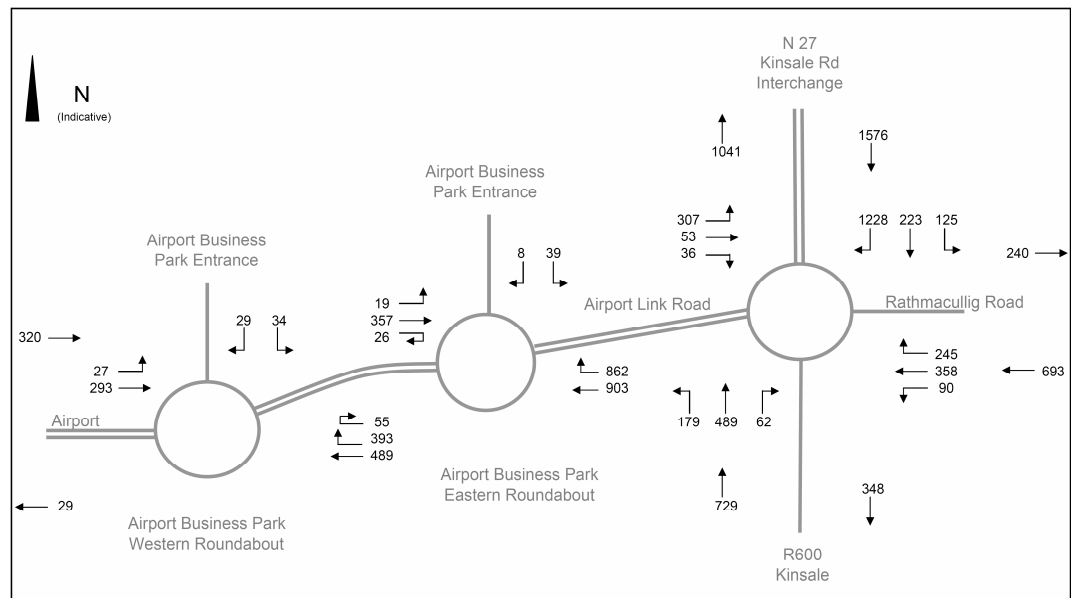
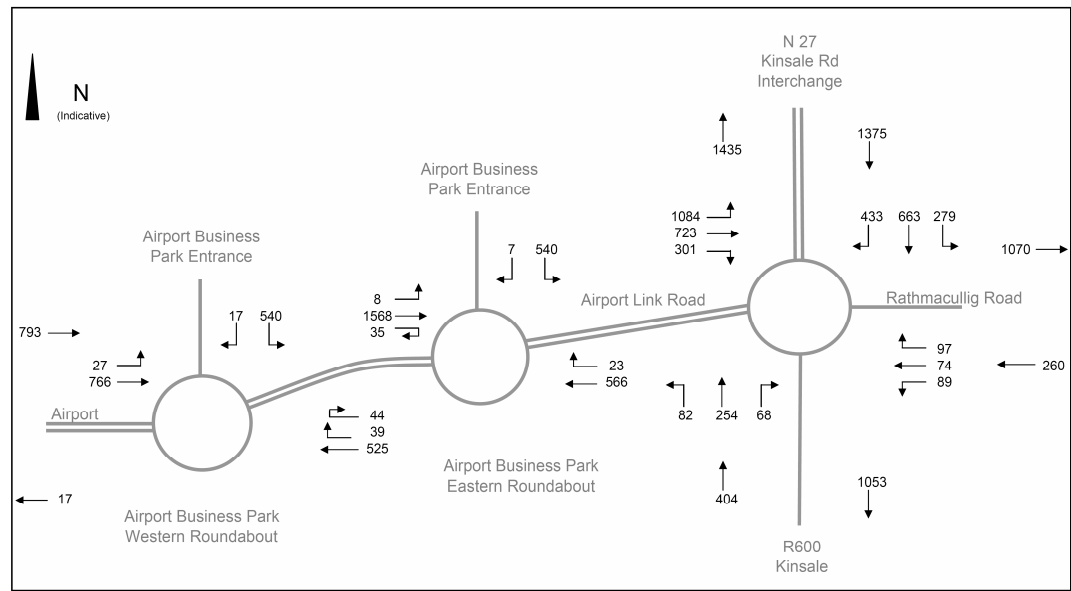


Figure 9-4: 2020 PM Peak Traffic Flows



The redistribution of trips between the N27 and proposed secondary access road were developed based on existing origin/destination travel patterns for both employees and passengers as previously presented in Section 4. More detailed analysis of the likely redistribution of trips to the proposed road would be carried out as part of a preliminary assessment for the route.

The Do Nothing Scenario highlighted that passenger and employee trips to the airport by car will increase by 50% by 2020, if the proposed Phase 2 measures are fully delivered, this would be reduced to approximately 27% for passengers and 31% for employees.

9.4**Phase 3: 2020-2040**

Although Phase 3 was not a specific focus of this Plan, widening of the N27 to incorporate an additional northbound lane has been proposed as a longer term objective. This does not include the northbound bus lane which would form part of Phase 2 as previously discussed.

In addition, it is likely that the public transport recommendation for Cork City, as presented in the final CATS Study, would be delivered during this phase.

No further analysis of mode shift patterns in Phase 3 has been carried out.

9.5**Implementation and Monitoring**

It is recommended that the implementation and monitoring of the impacts of measures is managed jointly by the Cork County Council and Cork Airport Authority. This could be co-ordinated through a forum which should also include the NRA and Cork City Council. The Cork Airport Access Forum would focus on surface access to the airport and work to ensure the mutually agreed objectives and targets for this Strategy will be delivered.

A.2 Estimated Traffic Impact of Measures

Quantifiable effects of some of the Do Nothing Scenario are illustrated in Figures A.1 and A.2 below. The impact of N27 widening is illustrated in Figure A3. These scenarios are based on the redistribution or reduction of 2020 peak hour flows on the network. Estimates of redistribution are made based on the location of study area employees and attractiveness of new routes and further modelling would be required to fully assess the impact of these scenarios. These assessments are undertaken in isolation of each other and should be used as a guide to the effects of these measures if no other factors are taken into consideration.

A.3 Key to figures

Figure A.1 Do Nothing Scenario – AM Peak Hour Flows

Figure A.2 Do Nothing Scenario – PM Peak Hour Flows

Figure A.3 Measure D.2 - N27 Road Widening (PM Peak 2020 Traffic Impact)

Transportation Management Plan, Cork Airport

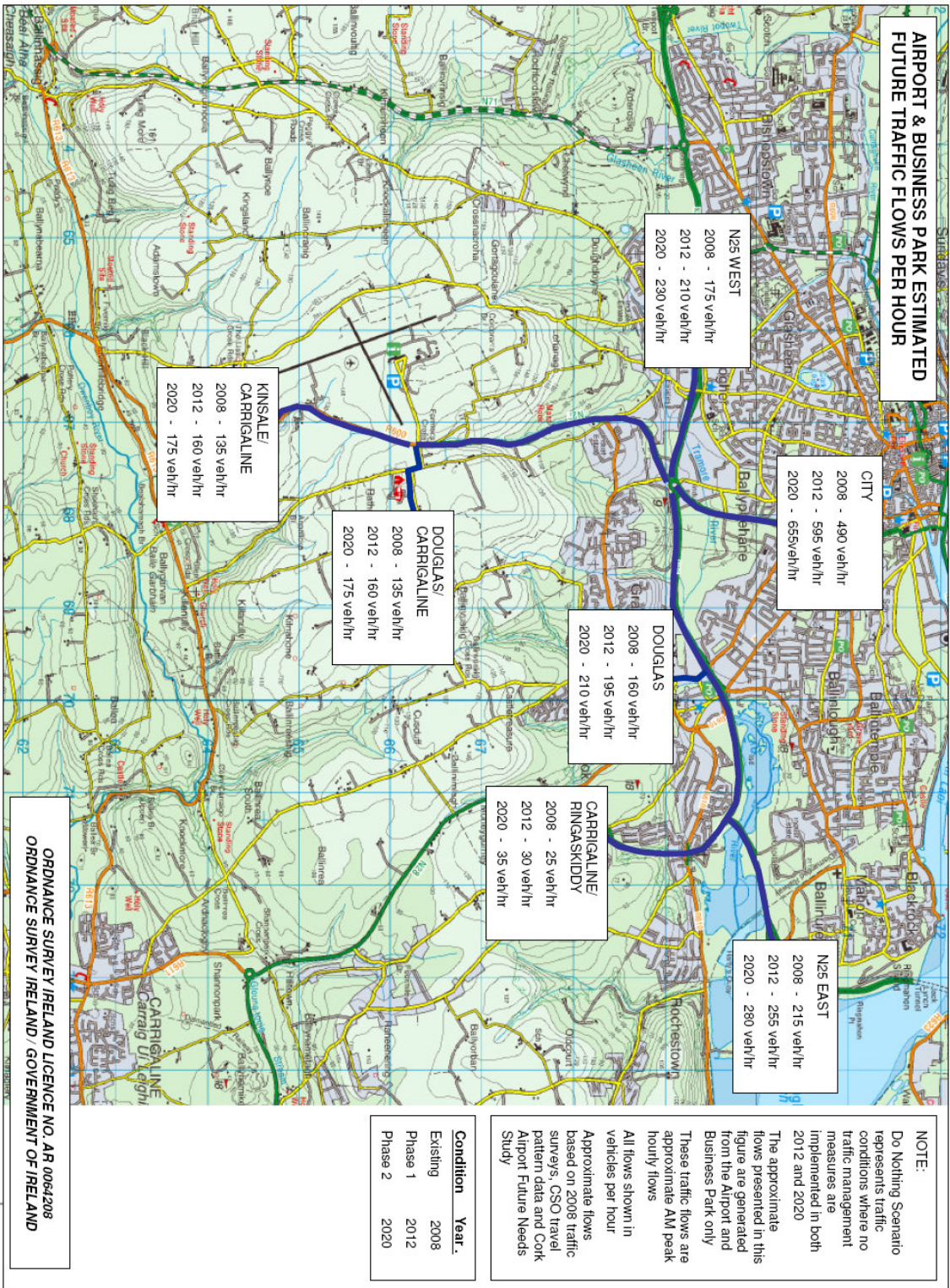


Figure A.1 Do Nothing Scenario – AM Peak Hour Flows

Transportation Management Plan, Cork Airport

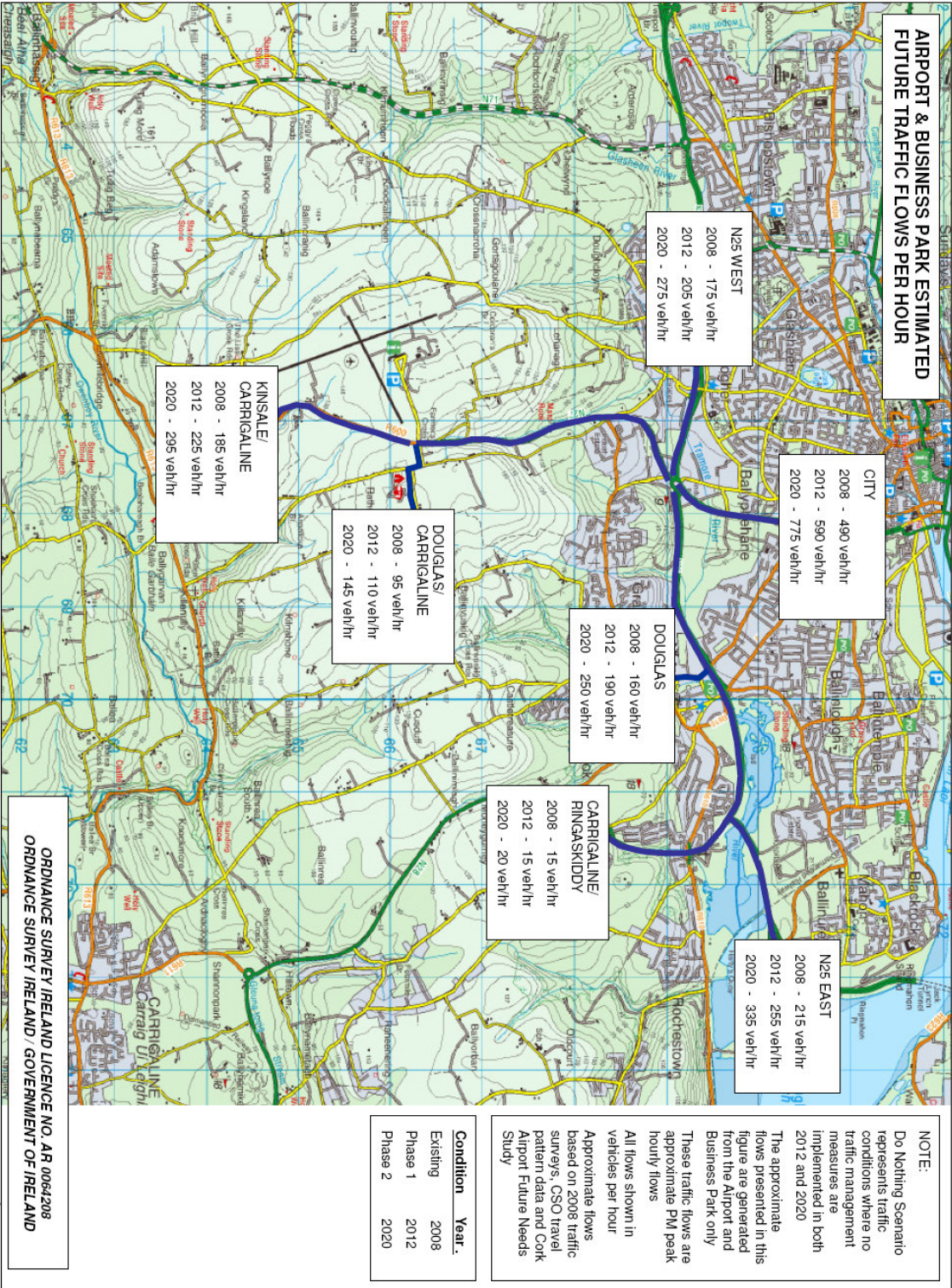


Figure A.2 Do Nothing Scenario – PM Peak Hour Flows

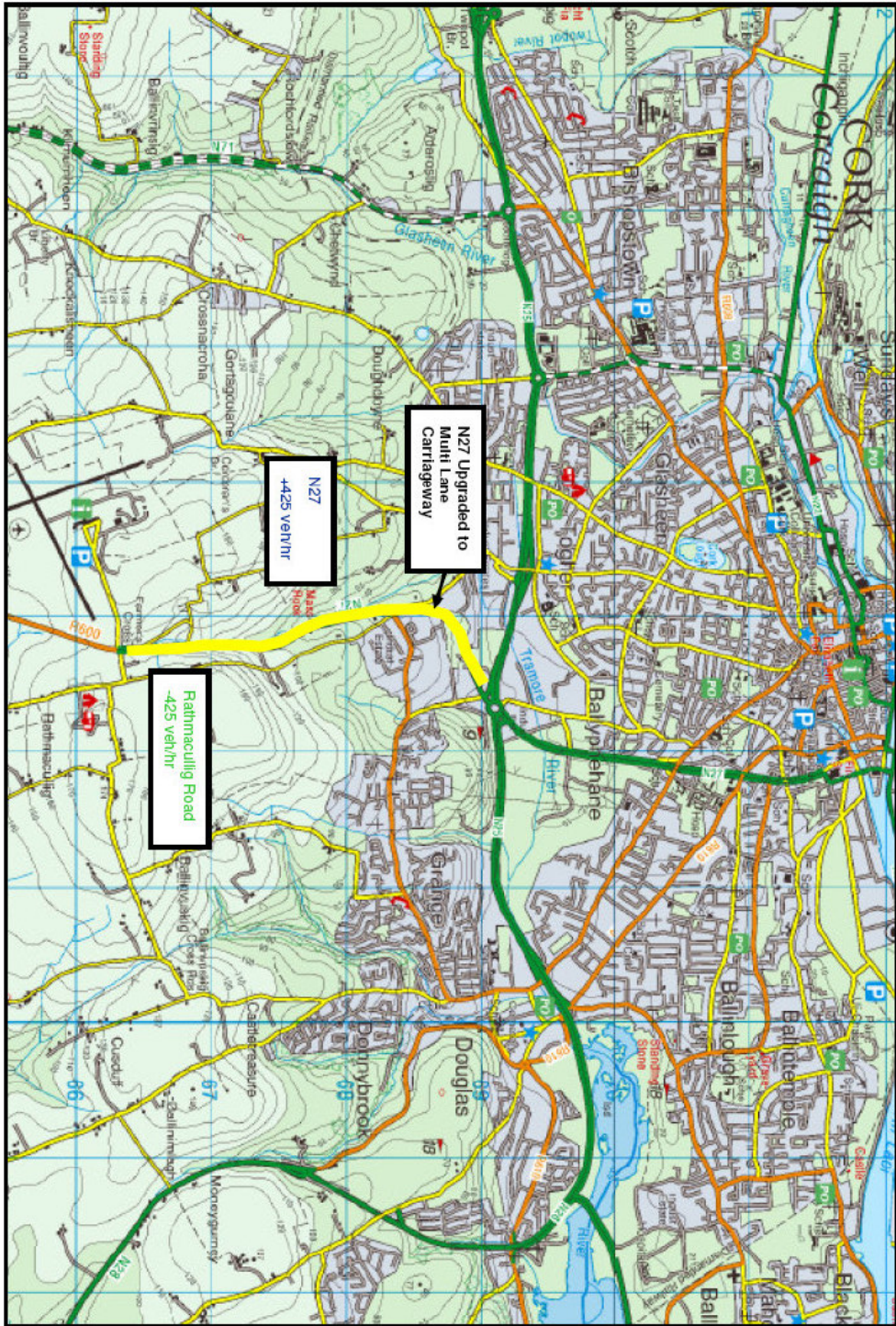


Figure A.3: Measure D.3 - N27 Improvement (PM Peak 2020 Redistribution)

ORDNANCE SURVEY IRELAND LICENCE NO. AR 0064208
 ORDNANCE SURVEY IRELAND / GOVERNMENT OF IRELAND

FABER MAUNSELL AECOM

Airport & Business Park
 Commuter Traffic
 Redistribution
 + Increase in Vehicles
 per hour
 - Decrease in Vehicles
 per hour

NOTE:
 The approximate flows presented in this figure are generated from the Airport and Business Park only.
 These traffic flows are approximate AM peak hourly flows
 All flows shown in vehicles per hour
 Approximate flows based on 2008 traffic surveys, CSO travel pattern data and Cork Airport Future Needs Study
 This figure shows the estimated impact of the measure in isolation.