DRAFT

City Centre Transport Assessment Study

National Transport Authority
Dun Scéine
Harcourt Lane
Dublin 2

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Contents

1 Introduction 6
1.1 Purpose 6
1.2 Structure of this report 7
2 Study Area and Context of Study 8
2.1 Overview 8
2.2 Land Use Context 8
2.3 Network Context 12
3 Dublin City Council Planning and Policy Perspective 15
3.1 Dublin City Development Plan 2011-2017 15
3.2 Your City, Your Space – Dublin City Public Realm Strategy 17
4 Identification of Issues 22
4.1 Introduction 22
4.2 The Pedestrian Environment 22
4.3 The Cycling Environment 23
4.4 The Public Transport Environment 25
4.5 The Private Vehicle Environment 27
4.6 Goods Distribution and HGV Environment 29
4.7 Site-Specific Issues 31
4.8 In Summary 38
5 Objectives 39
6 Measures and Proposals 40
6.1 Key Network & Other Assumptions 40
6.2 Proposed Measures 41
7 Description of Network Measures 43
7.1 New Orbital Route 43
7.2 New Traffic Signal Settings in the City Centre 48
7.3 Reconfiguration of Bus Network 50
7.4 Creation of a Quality Cycle Network 55
7.5 Creation of a Quality Pedestrian Network 56
7.6 Improved management and control of city centre freight / goods movement 59
8 Description of site specific measures 61
8.1 Pedestrianisation of Suffolk Street 61
8.2 Re-design of College Green 64
8.3 Improvements to Westmoreland Street 67
8.4 Redesign of D'Olier Street 69
8.5 Redesign of Beresford Place / Custom House Area 71
8.6 Redesign of Westland Row 75
8.7 Redesign of Christchurch Place 76
8.8 Development of Coach Parking Facilities 78
8.9 Rationalisation and control of city centre taxi ranks 79
9 Assessment Methodology 80
9.1 Overview 80
9.2 Development of Scenarios Modelled 81

9.3 Modelling Assessment Leading to Preferred Option 82
9.4 Steps in the Development of the Re-designed Bus Network 83
10 Evaluation of the Transport Proposals 87
10.1 Overview 87
10.2 Measuring against Objectives 89
11 Summary of Benefits of Proposals 108
11.1 Transport benefits 108
11.2 Commercial, Retail and Tourism benefits 109
11.3 Improvements to the Urban Realm, Civic Space and City Ambience 110

Figures

Figure 2-1 City Centre Study Area 8
Figure 2-2 Employment distribution within the City Centre (inside the Canals and Docklands Area) 10
Figure 2-3 City Centre Key Destination Quadrants 11
Figure 7-1 Proposed City Centre Orbital Route 45
Figure 7-2 Orbital Route Indicative Cycle Time and Staging Arrangements (AM Peak) 46
Figure 7-3 Orbital Route Indicative Cycle Time and Staging Arrangements (PM Peak) 46
Figure 7-4 Possible City Centre Bus Services (in Peak Hour) 52
Figure 7-7 Proposed Pedestrian Routes – from Dublin City Council's Development Plan 58
Figure 8-1 Suffolk Street / Church Lane following re-configuration (westerly aspect) 63
Figure 8-2 College Green following re-configuration (westerly aspect) 65
Figure 8-3 Indicative design for the reconfigured College Green and its environs 66
Figure 8-4 Re-designed Westmoreland Street (Southerly Aspect) 68
Figure 8-5 D'Olier Street re-configured as two-way (Southerly Aspect) 70
Figure 8-6 Reconfigured space at Beresford Place 73
Figure 8-7 Indicative design for the reconfigured space at Beresford Place 74
Figure 8-8 Redesign of Westland Row 76
Figure 8-9 Christchurch Place following re-configuration – View A 77
Figure 8-10 Christchurch Place following re-configuration – View B 78
Figure 9-1 City Centre Transport Feasibility Assessment Process 81
Figure 9-2 Principal Sectors 84

Figure 9-3 Four City Centre Quadrants superimposed on proposed Orbital Route 85

Figure 10-1 Change in mode share of trips entering the City Centre (AM Peak) 90

Figure 10-2 Changes in cycle times at the signalised junctions 91

Figure 10-3 Bus Speed inside City Centre Area (AM Peak) 93

Figure 10-4 Bus Speed inside City Centre Area (PM Peak) 93

Figure 10-5 Number of junction on the Orbital route within V/C range on the AM period 96

Figure 10-6 Number of junction on the Orbital route within V/C range on the PM period 96

Figure 10-7 Select link assessment toward city centre – PM period 98

Figure 10-8 Select link assessment on the orbital 98

Figure 10-9 Differences in flows between proposal with new bus routes and the existing situation, in the AM peak period. 100

Figure 10-10 Differences in flows between proposal with new bus routes and the existing situation, in the PM peak period. 100

Figure 10-11 Links from Radial Corridors to City Centre Quadrants 102

Figure 10-12 Number of gateway junctions within V/C ranges in the AM peak period 104

Figure 10-13 Number of gateway junction within V/C ranges in the PM peak period 104

Tables

Table 10.1 Study Objectives Evaluation Framework.....88

Table 10.2 Average Car journey times inside the Orbital Route.....94

Table 10.3 Orbital Route Car journey times (AM & PM Peaks) 95

Appendices

.....112

1 Introduction

1.1 Purpose

The Authority has undertaken this *City Centre Transport Assessment Study* to examine in some detail the issues relating to the management and movement of people and goods to, from and within Dublin City Centre, and to propose potential solutions. This study represents the accumulation of work undertaken by the Authority, in consultation with Dublin City Council, during 2012. It proposes outline traffic management proposals, public transport infrastructure improvements, and specific measures to encourage walking and cycling to, from and within the city centre. The study was motivated by a number of key issues and concerns regarding the city centre, including the need to:

- Develop a framework for infrastructural investment in the City Centre;
- Improve accessibility to the City Centre;
- Improve the integration and utilisation of public transport in the city centre – in particular, addressing poor journey times, bus congestion (especially around bus stops) and the negative impact of bus activities on the public realm;
- Improve the quality of service for walking and cycling, with a particular emphasis on movement within the city centre;
- Ensure the future development of the city centre and to improve confidence in the ability of the city centre to be the key focus of future investment both in transport infrastructure, and for key land uses; and
- Move away from incremental traffic changes towards a strategic plan that will be the basis for future planned decisions.

As a starting point, to ensure that the Authority's work was consistent with Dublin City Council's aspirations and objectives, the Authority sought clarity from Dublin City Council regarding the various policies set out in the *Dublin City Council Development Plan 2011 – 2017*, and the concepts and ideas presented by Dublin City Council in their recently published *Dublin City Public Realm Strategy (2011)*. A cross disciplinary team from the Roads & Traffic Department and the Planning Department liaised with the study team, concentrating on:

- Setting out Development Plan and other planning policies, as they relate to city centre traffic and transport;
- Defining the principal traffic and transport related deficiencies within the city centre, and their causes; and
- Outlining a potential approach to addressing these deficiencies through traffic management, revised public transport routing and public transport interchange.

This *City Centre Transport Assessment Study* represents the output of this work Taking into account the findings of this study, in the coming months the Authority will work closely with Dublin City Council to determine an agreed set of measures and proposals for the City Centre, and a programme for their implementation.

1.2 Structure of this report

This report begins by setting out the context for the study in Chapter 2. It spatially defines the area designated as the City Centre for the purposes of this analysis. It also gives a brief overview of the current transport networks, how these are currently viewed and their potential future role in serving the transport needs of the City Centre. Chapter 3 reviews and summaries Dublin City Council's perspective in relation to the development of the city centre, highlighted the vision and objectives set out in the Dublin City Development Plan, and corresponding measures outlined in the Council's Public Realm Strategy.

Chapter 4 identifies the issues currently affecting transport in the City Centre and examines both mode-specific and site-specific problem areas. Chapter 5 outlines the objectives of the study, summarising the key parameters of the study using critical elements of the Authority's Draft Transport Strategy, the Dublin City Development Plan and Dublin City Council's Public Realm Strategy to define the future requirements for the city centre, and establishing what the proposed solutions should aim to achieve.

Chapter 6 lists potential measures and proposals devised by the study team to address the issues previously presented in the report, and meet the overall objectives of the study. Chapter 77 (network measures) and Chapter 8 (site specific measures) explain and illustrate these measures in more detail.

Chapter 9 (methodology) and Chapter 10 (evaluation) provide a comprehensive assessment of the proposed measures, setting out the potential impacts and benefits these interventions would have on the overall transport provision in the city centre, and how the measures perform against the agreed objectives. Finally, Chapter 11 summarises the potential benefits for the City Centre of implementing the various measures proposed in this study.

2 Study Area and Context of Study

2.1 Overview

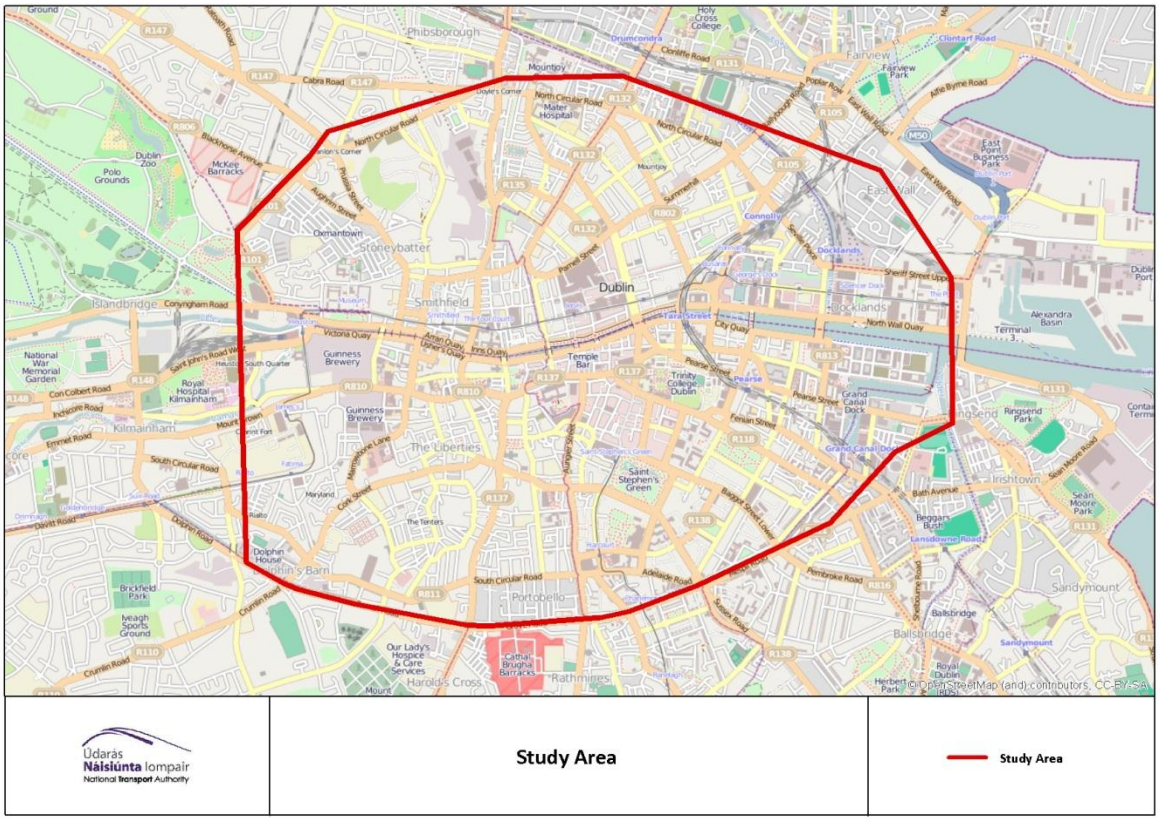
Over 500,000 people access Dublin City Centre every day, comprising approximately 235,000 workers, 45,000 students, and 120,000 visitors/tourists/shoppers[1]. Although it is important to note that, as a city, Dublin must cater for all trip purposes throughout the day, the reality is that the transport network is under most pressure during the morning and evening commuter rush hours.

Despite the economic downturn, it is still projected that by 2020 the numbers accessing Dublin City Centre will grow to roughly 600,000 visitors per day. It is clear that with this increased level of demand for limited movement space within the City Centre, the management of the movement of people and goods within the City Centre will become increasingly important to ensure the city continues to function.

2.2 Land Use Context

At the outset it was determined that for the purposes of this study, the City Centre study area would be defined spatially as the area within the canals and North Circular / South Circular Roads. This boundary had previously been used in the development of the Authority's Draft Transport Strategy. The study area is set out in Figure 2-1.

Figure 2-1 City Centre Study Area



[1] Dublin City Public Realm Strategy

It is important to understand and assess what land use types exist, and are planned for, within the Canals. Dublin City Council, through the Development Plan and subsequent Public Realm Strategy, has identified the land use characteristics of the city, including the key destinations for retail / offices / residential / industrial / tourism. Other important considerations include the conservation areas, listed buildings, and 'Key Spaces and Connections' which must be taken into consideration in the design of any transport proposals.

Further analysis of the land uses within the canals, shows clearly that the area is far from homogeneous. Looking at the distribution of travel to work demand (taken from the 2011 Census), it is noticeable that the vast majority of trips are going to the eastern side of the study area. This is illustrated in Figure 2-2Figure 2-2 Employment distribution within the City Centre (inside the Canals and Docklands Area), which shows the intensity of employment on a colour coded basis.

Using this information, the study team further defined the focus of analysis within the study area, concentrating particularly on the eastern end. This resulted in the identification of the "Core City Centre" area, a sub-set of the wider canal study area. This Core City Centre area was further broken into 4 quadrants, roughly centred on College Green, and is illustrated in Figure 2-3. These quadrants form the spatial framework for the development of transport measures and proposals to the Core City Centre area.

Figure 2-2 Employment distribution within the City Centre (inside the Canals and Docklands Area)

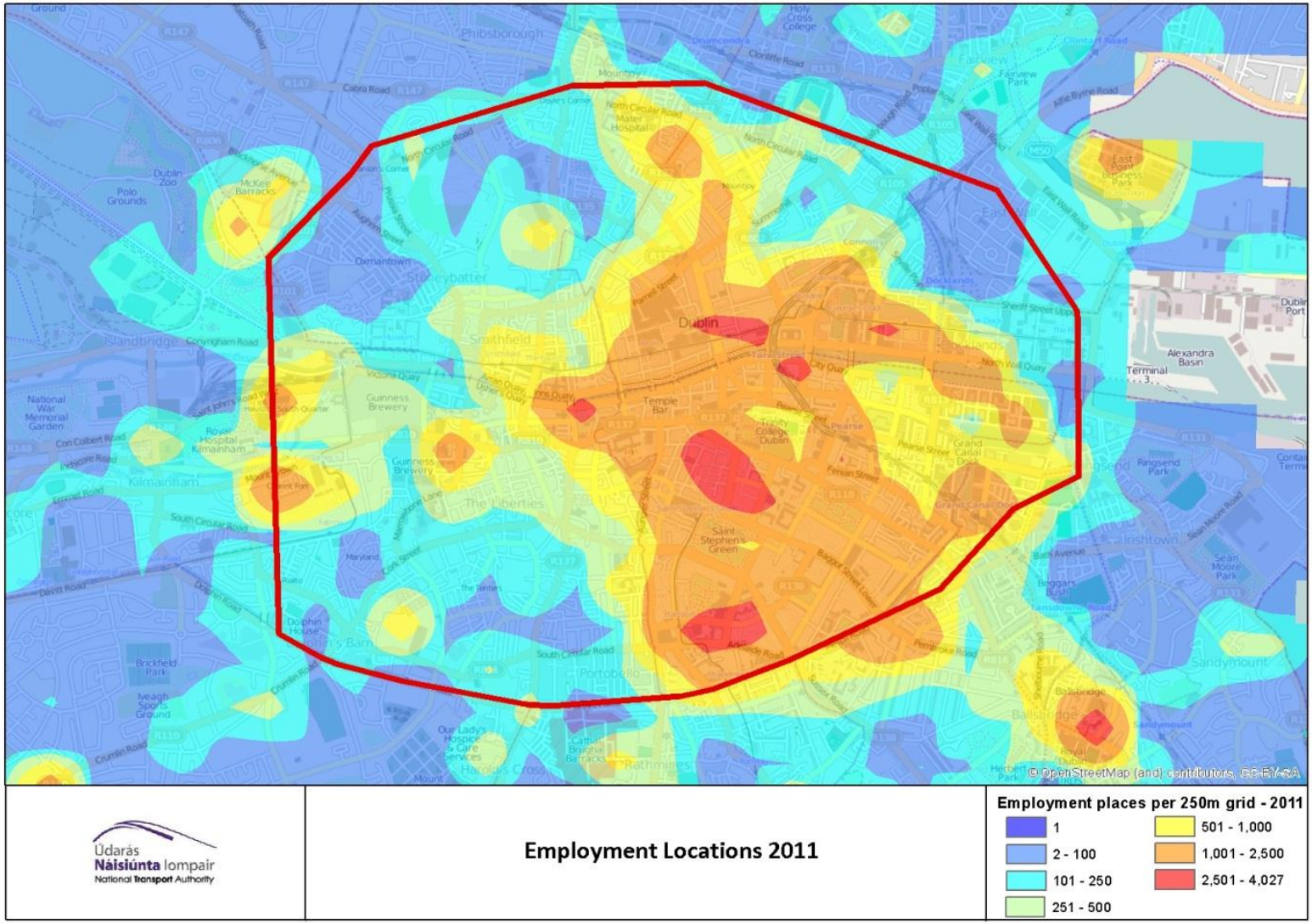
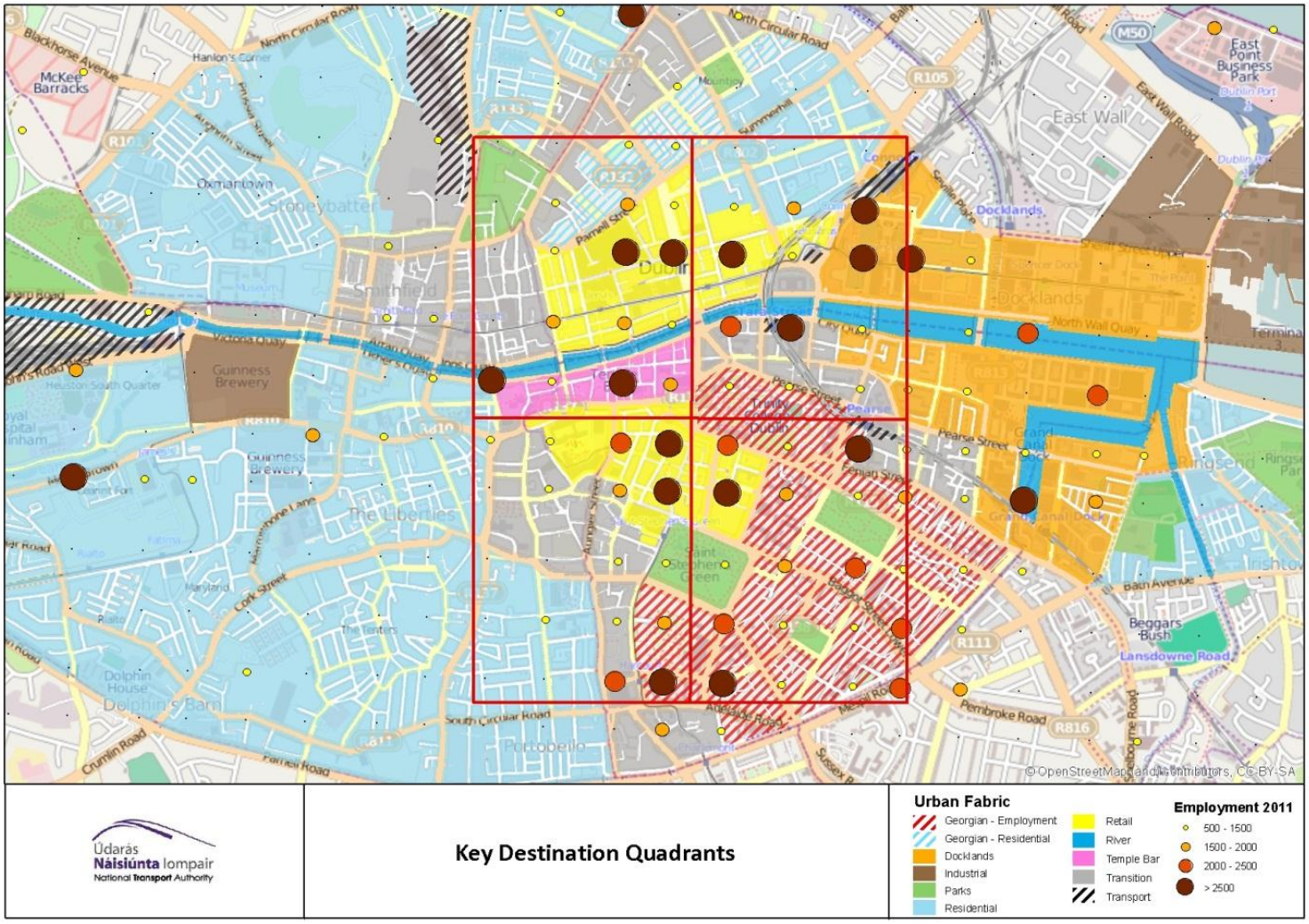


Figure 2-3 City Centre Key Destination Quadrants



2.3 Network Context

Major traffic management initiatives have already been introduced in Dublin city in recent years and some of these – in particular the College Green bus gate and the 5 axle HGV ban – have had significant beneficial impacts. Despite these initiatives, it is clear that there is little physical room left within the current city transport environment to increase capacity for movement of people and goods. For this reason, this study has looked at how the city can change the current transport environment to allow the city to expand the capacity for movement and facilitate further growth in the City Centre.

In advance of identifying the main issues with the current transport networks serving the City Centre, it is useful to give a brief overview of the different modes and networks and identify key considerations that set the context for this study.

2.3.1 Pedestrian

No matter how an individual gets into Dublin, once within the City Centre they will almost certainly walk at some point during their journey, be it from their bus stop or car park. The pedestrian environment serves all users, including commuters, tourists and shoppers. It must also serve a range of needs, from legibility and design for mobility impaired and disabled users, to serving visitors and residents who require space to enjoy the sights and sounds of the City Centre. The pedestrian environment must also cater for the heavy flows of commuters moving to and from work every day. Consideration of the pedestrian environment is, therefore, a key requirement of the study.

In many places the pedestrian network is compromised, particularly in terms of junction signal timings and footpath widths. To encourage walking as a mode, this balance will have to be reconsidered in some locations to ensure a functional and well performing pedestrian network for the city centre.

Finally, it is primarily as a pedestrian that the Public Realm is best experienced and enjoyed. Many aspects of the public environment in the City Centre can be lost to the public because traffic movements preclude pedestrians from the space, block the view, or simply overpower the street ambience. A quality pedestrian environment (in terms of width, comfort and unpressurised / decluttered space) is a priority for an improved Public Realm experience.

2.3.2 Cycle

There has been a large increase in cycling in Dublin city in recent years, albeit from a relatively low base. This is probably exemplified best by the success of the ‘dublinbikes’ scheme, but it is also noticeable in the number of bicycles moving around and parked in the city centre. Preliminary analysis of the 2011 Census travel data reveals that cycling trips to work within the city centre increased by 40% between 2006 and 2011. Junction counts in May 2012 indicate that bicycles make up 20% of all vehicles at the junction of Dame Street and Georges Street.

Despite this, the current environment for cyclists in the city centre remains relatively poor. The development of the cycle network for the city will provide defined routes for cyclists to transverse and access the City Centre with minimal conflict with other road users.

2.3.3 Integrated Public Transport

The provision of a fully integrated public transport network is an essential element of success in increasing public transport patronage for trips to and within Dublin City. The roll out of initiatives such as the introduction of public transport integrated ticketing (including integrated fares), public transport interchange and Real Time Passenger Information (RTPI) will improve the attractiveness of travelling by public transport.

2.3.4 Rail

This study does not directly attempt to address the future function and use of heavy rail services, DART and Luas within the City Centre. However, it is assumed that Luas Cross City will be completed in accordance with the Railway Order, and that rail services will, generally, operate as they do currently in the short term. Accordingly, the main focus of this study is to examine how the other networks (car, bus, walking and cycling) can be made to operate more efficiently to provide additional City Centre capacity in the short to medium term. In proposing measures to improve the efficiency of non-rail networks, the study team were cognisant of the need for consistency with the longer term rail proposals.

2.3.5 Bus

The bus network servicing Dublin City Centre is currently operated predominantly by state run operators, Dublin Bus, and to a lesser extent Bus Eireann. However, an increasing number of private operators have entered the market in recent years, particularly serving longer distance commuter and intercity services. Since 2010, Dublin Bus has introduced significant changes to the network of bus services operating into and through the city centre under its “Network Direct” programme. The aim of these changes was to achieve greater efficiency in delivering bus users to the key destinations within the City Centre, and to provide better cross-city services.

The management of buses on the road network, and the management of where bus services stop is an underlying element of this study. In the context of planned alterations to the city centre road network, to facilitate major infrastructural development such as Luas Cross City, the alignment of bus routes and stops must be considered, and reconfigured, to improve the efficiency of both the bus services and, also, the use of the limited road space within the City Centre area. Additionally, Dublin, as a tourist city, requires a number of tourist bus services that circle the City Centre on a regular basis. These services need to be considered in any revision of bus services and bus stops.

2.3.6 Private Vehicles

The private car is an important mode for people travelling to the City Centre, especially for commercial purposes (as opposed to commuting). However it is also the least efficient in terms of the use of road space – a key asset that needs to be managed to optimise the benefits for the city as a whole. Although it is essential that all areas of the city maintain some form of road access - in particular for good deliveries and access to private car parks - there is a general presumption against any increase in the overall amount of private vehicles entering the City Centre. The current pattern of vehicular movement both through and within the City Centre should be examined - in particular, new arrangements that discourage through traffic away from the central areas in favour of orbital routes should be considered.

2.3.7 Goods Vehicles / Deliveries

The supply chain for goods and services into Dublin must be carefully considered as an essential element of a working City Centre. Light Goods Vehicles (LGVs) and Vans make up the majority of goods vehicles serving the City Centre. The destination of these vehicles is dispersed, and although there is a predominance of deliveries in the morning, the movement of goods has an all day trip pattern.

Access to the shopping areas and reliability of delivery are essential considerations for this study, together with planning for future development within the city core. The development of a City Centre core area where through traffic is discouraged represents a fundamental opportunity for time-restricted city centre deliveries without concern for impact on moving traffic.

3 Dublin City Council Planning and Policy Perspective

This study has not been done in isolation, it builds upon the on-going work of Dublin City Council and intentionally links directly with the principles, concepts and objectives outlined in the Dublin City Development Plan 2011-2017 and the City Councils Public Realm Strategy (2011).

The City Council, both directly, and as part of larger multi-agency implementation groups, has planned and implemented some of the vital infrastructural projects within which the proposals outlined in this study have been set. Successful projects, such as the city centre 5-axle HGV ban, College Green bus gate, the removal of free on-street car parking and the introduction of the Dublinbikes scheme, have incrementally changed how movement in and around the city centre takes place (A full list of such schemes is set out in Appendix 1).

It is the cumulative effect of such schemes, in conjunction with the opportunities arising from new developments in the provision of transport in Dublin, like the forthcoming construction of Luas CrossCity which give scope to achieving the City Council's objectives as outlined in the Development Plan and Public Realm Strategy.

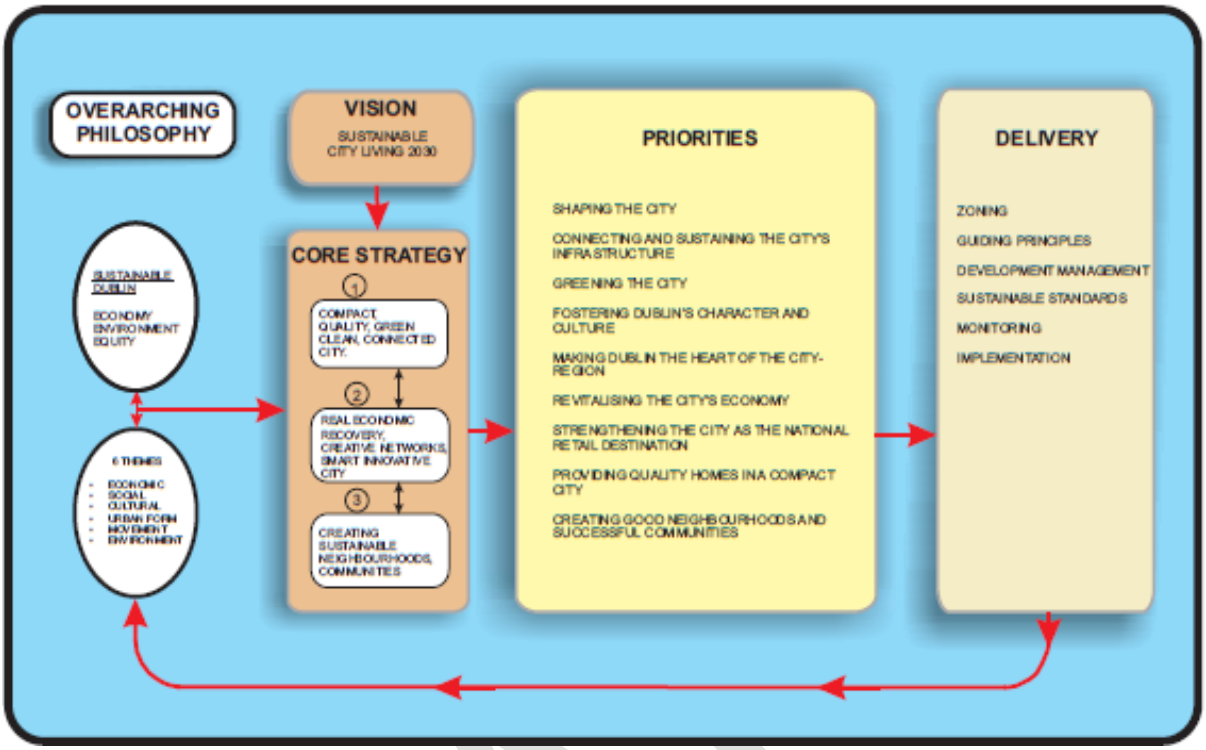
3.1 Dublin City Development Plan 2011-2017

The context of the current Dublin City Development Plan is illustrated in Figure 3.1. The City Council's vision for this city is:

> Within the next 25 to 30 years, Dublin will have an established international reputation as one of the most sustainable, dynamic and resourceful city regions in Europe. Dublin, through the shared vision of its citizens and civic leaders, will be a beautiful, compact city, with a distinct character, a vibrant culture and a diverse, smart, green, innovation-based economy. It will be a socially inclusive city of urban neighbourhoods, all connected by an exemplary public transport, cycling and walking system and interwoven with a quality bio-diverse greenspace network. In short, the vision is for a capital city where people will seek to live, work and experience as a matter of choice.

This study, at its core, seeks the same outcome - sustainability in terms of reducing emissions; resourceful and socially inclusive through the promotion of the most affordable means of travel; facilitating consolidation of development and a compact city, and connected by a variety of travel modes which maximise accessibility for the people of the city.

Figure 3-1 Overarching Philosophy of the Dublin City Council Development Plan 2011-2017



The City Council also developed six core themes which should considered in all aspects of development within the council area, from plan-making to the management and delivery of infrastructure. These themes can be summarised as follows:

1. **Economic** – Developing Dublin city as the heart of the Dublin region and the engine of the Irish economy;
2. **Social** – Developing Dublin city as a compact city with a network of sustainable neighbourhoods;
3. **Cultural** – Making provision for cultural facilities and protection of our built heritage throughout the city and increasing our awareness of our cultural heritage and built heritage promoting safe and active streets through design of buildings and the public realm;
4. **Urban Form and Spatial** – Creating a connected and legible city based on active streets and quality public spaces with a distinctive sense of place;
5. **Movement** – Helping to build an integrated transport network and encouraging the provision of greater choice of transport. Planning and zoning objectives will be brought together to increase the opportunities to live and work close to transport hubs and corridors;
6. **Environmental** – Providing for an overall framework involving key principles, strategies and objectives to drive a vision of 'Sustainable Dublin' over the next 25 to 30 years;

The study embraces these themes. In terms of the Economic, Social and Cultural Themes, the proposals outlined in the following chapters maximise the movement of people into the city centre, supporting a critical mass of employment, retail and facilitating access to cultural and recreational

activities. By prioritising the movement of public transport, pedestrian and cyclists – modes which exploit scarce city centre road space to the greatest effect, and with the least environmental impact, the study proposals also advance to potential of making 'Sustainable Dublin' a reality. The study proposals will free up space in the city centre, facilitating the creation of new civic spaces, and significantly benefiting the urban realm. The reduction in traffic volumes will also have the added advantage of reducing the impact of pollution on the city's built heritage.

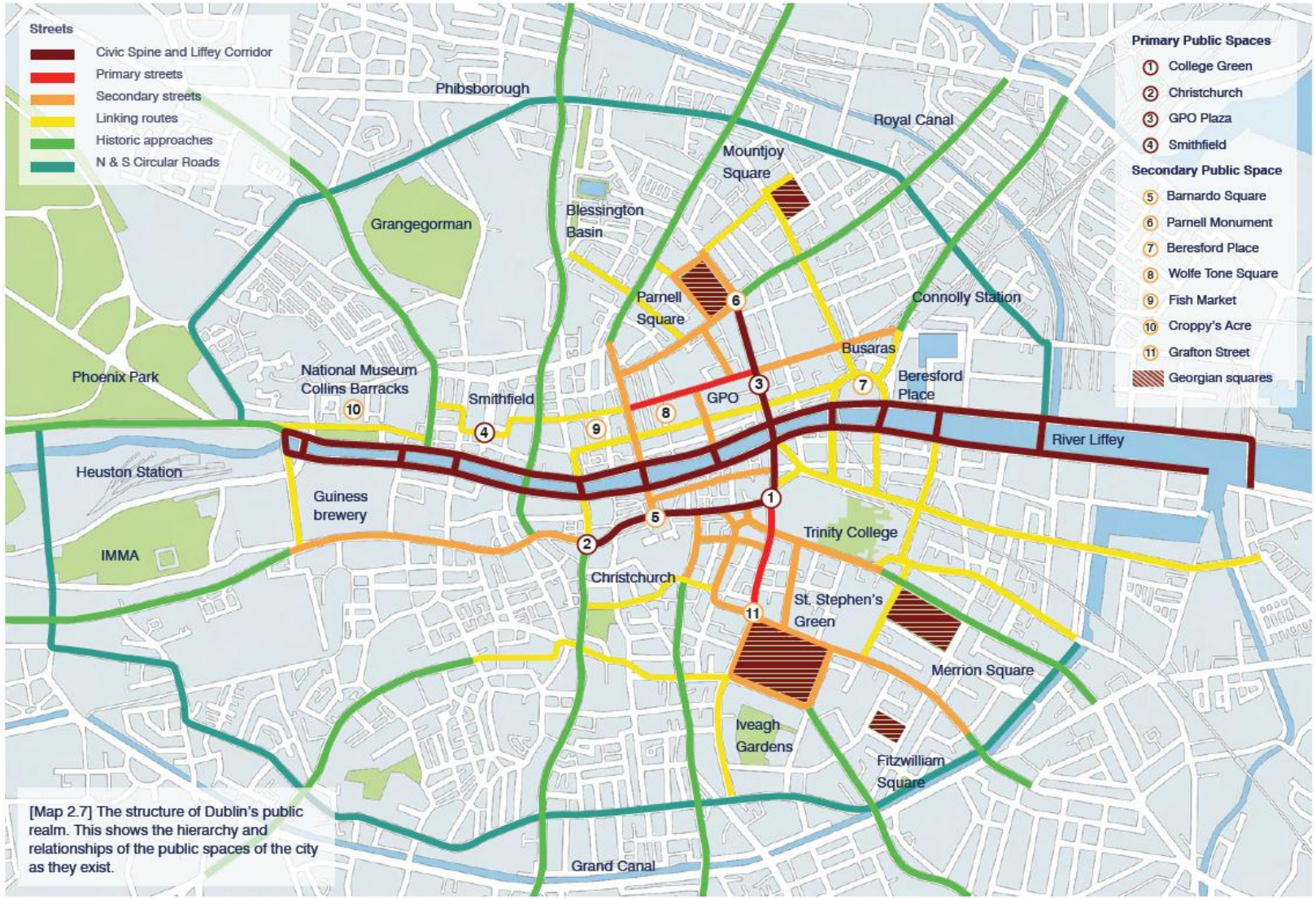
In terms of the Movement theme, a principle function of the study is to demonstrate transport proposals which will enable the creation of an integrated network by bringing rail, light rail, BRT and buses, walking and cycling together in a coherent, properly planned manner.

In addition to the Vision and Themes, the Dublin City Development Plan also states a number of specific objectives which the Council will strive to meet during the plan period (2011-2017). A full list of the relevant schemes is set out in Appendix 2. Again this study take these objectives into account, and the proposals outlined in the subsequent chapters can facilitate their delivery. There is a clear and unambiguous policy platform expressed in the Dublin City Development Plan which seeks to promote public transport, walking and cycling in the city. This study proposes transport solutions in this context.

3.2 Your City, Your Space – Dublin City Public Realm Strategy

Dublin City Council's Public Realm Strategy seeks to highlight how important the public realm is to success of Dublin City as a place to live in, work in, or visit. The public realm is vital to city life and the Public Realm Strategy identifies the most pressing issues and pinpoints key areas for improvement. This study has fully incorporated the philosophy and suggestions as set out in the Public Realm Strategy, and has proposed solutions which strive to achieve the design policies outlined in the Strategy. The structure of Dublin's public realm, as illustrated in the Council's Public Realm Strategy is set out in Figure 3.2.

Figure 3-2 The Structure of Dublin's Public Realm



The table below (figure 3.3), taken directly from the Dublin City Public Realm Strategy, highlight the areas which need to be considered most carefully in terms of public realm, the proposals set out in this study take these factors into account.

Figure 3-3 List of Principle Public Realm Consideration

Public spaces	Character
The Liffey Corridor	The most important landmark public space in many people's understanding of the city's public realm is the River Liffey. It provides an orientation point and is a focal point for an understanding of the 'city centre'. It is articulated by many bridges of high quality in which it is possible to see the chronological development of the city in phases along the estuary of the river. The channelling of the river in the 17th century provided the city with significant shipping facilities and a dramatic connection to the majesty of Dublin Bay.
The Civic Spine	The name given to the route through the city centre along which the city's primary civic, economic, cultural and historic attractions are located. It runs from Parnell Square through O'Connell Street, College Green and Dame Street to Christchurch Place. This route forms the spine for the central network of city streets that make up the inner city area. It is of national and civic importance as a 'ceremonial route' for civic processions such as parades and demonstrations.
Primary Streets	The most significant destination streets in the city, these include the iconic Grafton Street and Henry Street. They are the capital's main shopping streets and have both national and local appeal.
Secondary Streets	These are the significant streets which support the primary retail streets through mixed uses and offer retail, cultural and social activities. Examples include; Capel Street, Talbot Street, South William Street, and Wicklow Street.
Link Routes	The link routes are important streets that link the city's core network of streets and spaces to other destinations within the city centre area. These include Mary Street, Thomas Street and Gardiner Street and link such destinations as Heuston Station, Collins Museum, Docklands and the Georgian Squares.
Historic approach routes and North and South Circular Roads	These historic approach routes are significant places in the city because they define the way the city was historically experienced by visitors. Today they function as significant places in themselves, often displaying a 'high street' character in parts and are the locations for many of the capital's tourist attractions. In form they are focal points for surrounding blocks and streets. In most cases their historical alignments are retained, and some have their origins in pre-Viking times.

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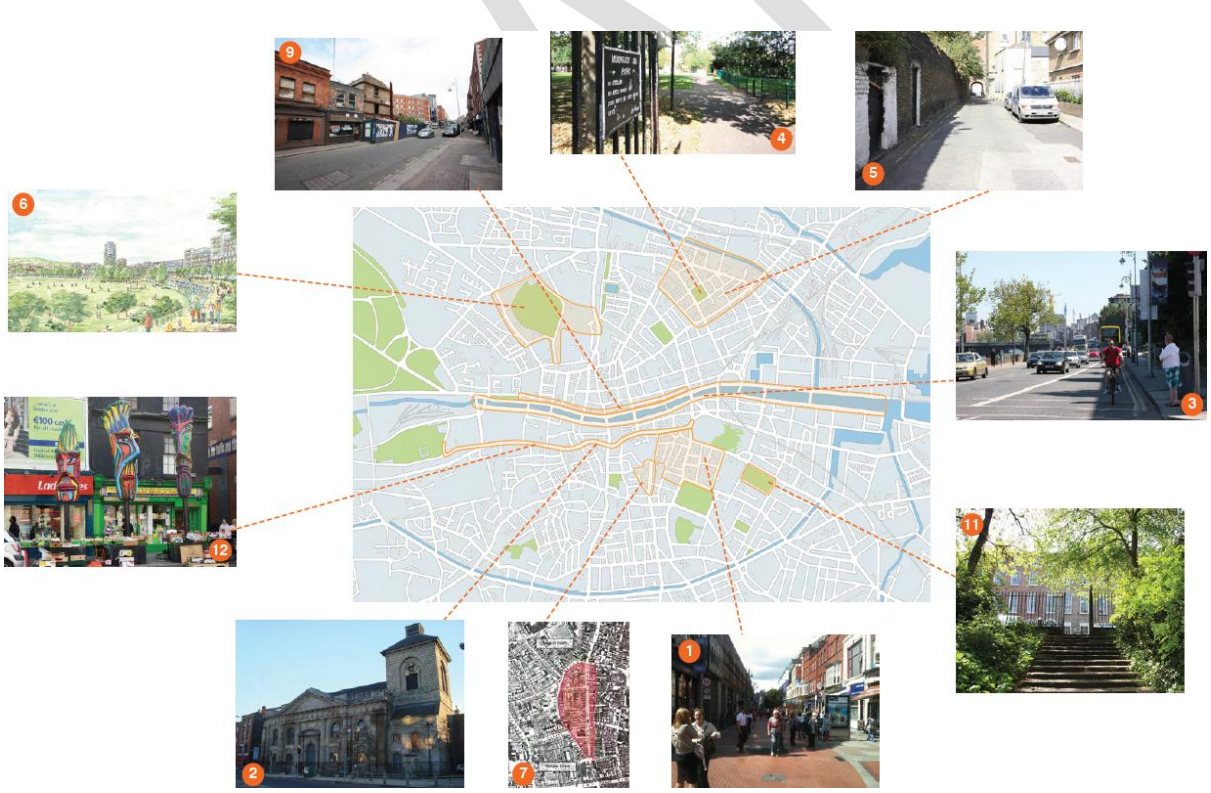
Primary Public Spaces	The city's key civic spaces form a network of connection points in the oldest parts of the city. At College Green, Dublin's most recognisable, connected and iconic urban space (see Section 2.1), the flow of the civic spine from Christchurch along Dame Street opens out to create a majestic space before turning dramatically northwards along the colonnade of Parliament Buildings (Bank of Ireland) to become the capital's main thoroughfare, O'Connell Street. Despite the erosion of its quality by the need to accommodate large traffic volumes with its associated signage, controls and markings, College Green still retains a magnetic attraction and claims a major role in our most important civic occasions. Christchurch Place is another key civic space, terminating the Civic Spine to the west and marking the heart of the medieval city but suffering under the weight of significant through-traffic. Like College Green, this space has the potential for reinvention as a primary civic space.
Secondary Public Spaces	A network of open spaces providing opportunities for amenity and occasional events and activities within the city centre. A number of the spaces identified have as yet unrecognised potential to be changed into formal gathering and amenity spaces.
The Georgian Squares	Originally private, the city's beautiful Georgian Squares provide impressive centrepieces to the North and South Georgian cores. They contribute significantly to the green space available in the city centre. However, they could be better integrated into the pedestrian network and made more easily accessible.

It is also noted that the City Council are already working on a number of project aimed at improving the public realm, these are highlighted in Figure 3.4.

Figure 3-4 Public Realm Strategy Projects 2012-2013

	Project (Lead Department)	Description	Actions
1	**Grafton Street Quarter Public Realm Plan** (South East Area)	This is the regeneration project proposed for the Grafton Street Quarter. The status of the area requires a high standard of design and integration with the historic fabric of the city. The design work when complete will guide the section of the Design Manual relevant to the Civic Spine and character areas of the city (part of Action 3).	2, 3, 4, 5, 6, 9, 10, 11
2	**Trinity to IMMA East-West Route** (South Central Area, Traffic)	This project ties together a number of projects at various stages so as to maximise value to the city and improve this key route. Projects already underway include Castle Street public realm works, Thomas Street QBC, Fáilte Ireland public realm funding. There are potential partnerships with the Digital Hub and NCAD.	2, 3, 4, 6, 8, 9, 10, 11, 12
3	**Liffey Corridor Project** (Planning)	A research project to apply innovative urban design and landscape design to the Liffey Quays. It is intended that the outputs of this project will inform a proposed Local Area Plan.	3, 4, 6, 10, 11, 12
4	**Mountjoy Square Park and Environs Regeneration** (Parks and Central Area Office)	Development of a plan to guide the long-term regeneration of Mountjoy Square Park that is sensitive to its Georgian background.	2, 3, 5, 7, 9, 10, 11
5	**North East Inner City Quadrant** (Central Area Office)	This project pilots design and management approaches to improve quality of everyday life and to identify design opportunities that may reduce crime and anti-social behaviour in an inner urban residential area. The area of Parnell Street between O'Connell Street and Gardiner Street should be the focus of a sustained examination and assessment - in conjunction with local businesses - with a view to producing a set of proposals to enhance and improve the public realm at this location.	2, 4, 5, 7, 11, 12, 13, 14
6	**Grangegorman – Connections with the City** (Engineering)	A project to define the strategic connections necessary to integrate the Grangegorman redevelopment into the surrounding districts and the city centre. It includes key public realm connections at Broadstone, Smithfield and Prussia Street as well as within the site.	2, 3, 4, 5, 9, 14

	Project (Lead Department)	Description	Actions
7	**Aungier Street Historic Street Regeneration Pilot** (City Architects and the South East Area Office)	A pilot multi-disciplinary project to develop a conservation led approach to the regeneration of Aungier Street, a C17th historic core street, thus improving the quality of experience for residents, visitors and businesses.	2, 3, 4, 6, 9, 11, 12
8	**Public realm information management project** (Roads, IS Section, Planning)	A Project to review and develop work processes and information systems to provide efficiency and effectiveness in utility opening and reinstatement works in the public realm. Develop a web consultation tool to better engage with the public.	5, 8, 9, 10, 13
9	**Dereliction Project** (Planning, City Architects)	This pilot project will focus on the route of the Luas red line, from O'Connell St to Collins Barracks which has high levels of dereliction, vacancy, buildings in need of maintenance and development sites. The Project will work in collaboration with stakeholders, owners, Area Management and all Departments of Dublin City Council setting standards of maintenance, lighting, cleanliness and appearance with a view to improving the overall public realm.	4, 6, 7, 8, 11, 12
10	**Design Manual for working with Historic Public Realm** (Roads, Heritage Office)	The first step is the production of the Design Manual (Action 4), which will specify materials and workmanship when carrying out works-in areas with historic street surfaces. This will build on the research in the 2009 Historic Street Surfaces study and develop it into a working manual.	2, 3, 5, 8, 9, 14
11	**Merrion Square Tearooms** (Parks Dept)	Provision of Café/Tearooms, interpretive space and public toilets within the Park.	2, 3, 4, 7, 10, 11
12	**Street Charter Pilot Initiative** (Planning Dept and South Central Area Office)	This pilot initiative will apply to Thomas Street Dublin 8. The key objective will be to collaborate with all interest groups in defining the role, vision for an area or street, gain a consensus on issues, and work proactively together to improve all aspects of the urban environment.	2, 3, 10, 11, 12



4 Identification of Issues

4.1 Introduction

This chapter summarises the main issues affecting the City Centre that need to be addressed by this study. While Chapter 2 highlighted the contextual rationale behind the need for changing the current transportation environment within Dublin city, this section examines the different transport networks serving the City Centre and highlights the main network issues and problems that need to be addressed. It also identifies a number of site-specific problem areas that need to be resolved in order to address specific network problem areas, and achieve the objectives of the study.

4.2 The Pedestrian Environment

The pedestrian network is arguably the most important transport network in the City Centre as it has to serve all users, including commuters, students, shoppers and tourists. The key issues for the pedestrian environment within the City Centre are summarised below:

Key Issues with the Pedestrian Environment
• The lack of a defined 'strategic' pedestrian network that provides a consistently high quality of service for pedestrian movement within the city; • Unnecessary street clutter (aggregated over the years) in parts of the city centre impeding pedestrian movement; and • A lack of pedestrian friendly areas of public open space (as highlighted in the DCC Public Realm Strategy), particularly in parts of the city that attract large number of tourists e.g. – College Green, Christchurch, Customs House.

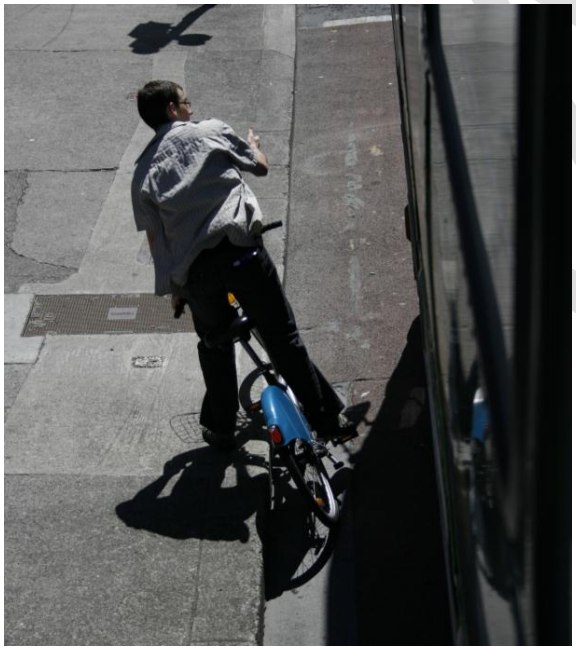
4.3 The Cycling Environment

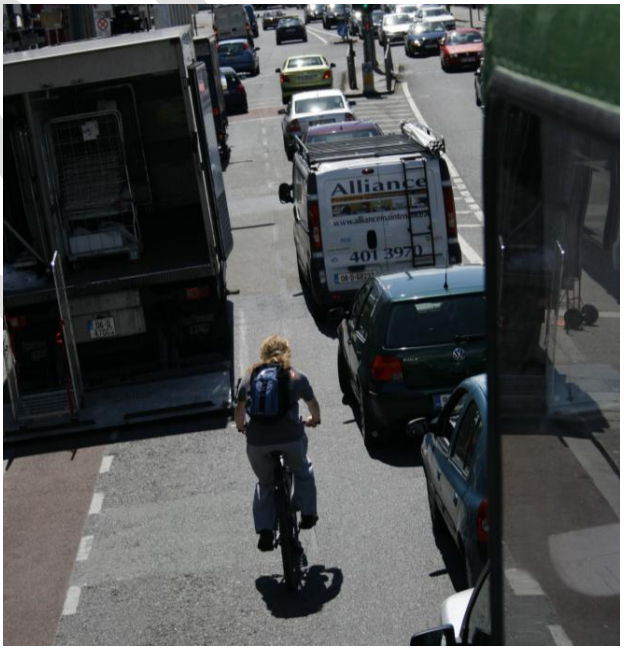
The amount of cyclists on the streets of Dublin City Centre has increased dramatically over the last number of years. To ensure that the increasing number of cyclists travelling within, to and from the city centre continues to rise, it was essential that the study team understand and address their needs and propose measures to address these needs.

Despite the significant increase in the number of cyclists, the current quality of service for cyclists both within and travelling to and from the City Centre is poor. The network lacks continuity and coherence and the degree of priority provision varies greatly across the city. In order to further develop cycling use, the city centre will require a defined strategic cycle network, with prioritised routes for cyclists to transverse and access the City Centre. The network should facilitate cyclists and avoid (or at least minimise) interaction with other road users as much as possible. The cycle network also needs to cater for the needs of all types of cyclists (from experienced / regular cyclists to tourists, recreational and inexperienced cyclists). The key issues for the cycling environment within the City Centre are summarised below:

Key Issues with the Cycle Environment

- The lack of a defined 'strategic' cycle network that provides a consistent quality of service for cyclists traversing the city;
- The lack of permeability within the city centre, with a number of one-way streets and long gyratory traffic movements; and
- The ad hoc nature of cycle parking in some parts of the City Centre, at some locations having a negative impact on pedestrian movement.





4.4 The Public Transport Environment

There have been a number of operational changes over the last number of years to improve the efficiency of the public transport network for both operators and passengers. The most noticeable work was carried out by Dublin Bus under its "Network Direct Programme". A number of infrastructural measures by Dublin City Council have also been put in place to improve journey time reliability, namely the introduction of the College Green bus gate and bus route priority along sections of major radial routes into the city centre.

In considering the current issues with public transport within the city centre, the study team examined all the different public transport modes currently used by people to access and travel within the city centre – including bus, rail, Luas, and taxi. The key issues for the public transport environment within the City Centre are set out below:

Key Issues for the Public Transport Environment

- The concentration of bus routes / vehicles on a small number of key city centre streets;
- The use of the City Centre for bus layover and bus parking;
- Bus stop congestion at some key areas of the city centre – both for pedestrians and buses;
- Bus and bicycle conflicts at various locations;
- There are over 100 bus stops in the core City Centre and many more within the Study Area as a whole. The lack of coordination of these stops and services is detrimental to the legibility of the bus network, and is a particular problem for people who do not use the bus regularly;
- The use by taxis of some bus lanes causing congestion on some key public transport corridors, particularly at pinch points such as College Green /Dawson Street / Westmoreland Street; and
- The large number of taxis serving the City Centre compared to the limited taxi rank space, with the potential for taxis queuing at a rank to overspill into the carriageway or obliging taxis to circulate around the streets and bus lanes unnecessarily, either way added to congestion on the city streets.

Other specific issues in relation to the public transport environment which need to be directly addressed as part of this study include the construction of the proposed Luas Cross City and the possible introduction of Bus Rapid Transit (BRT). These are described further below:

4.4.1 Construction of Luas Cross City

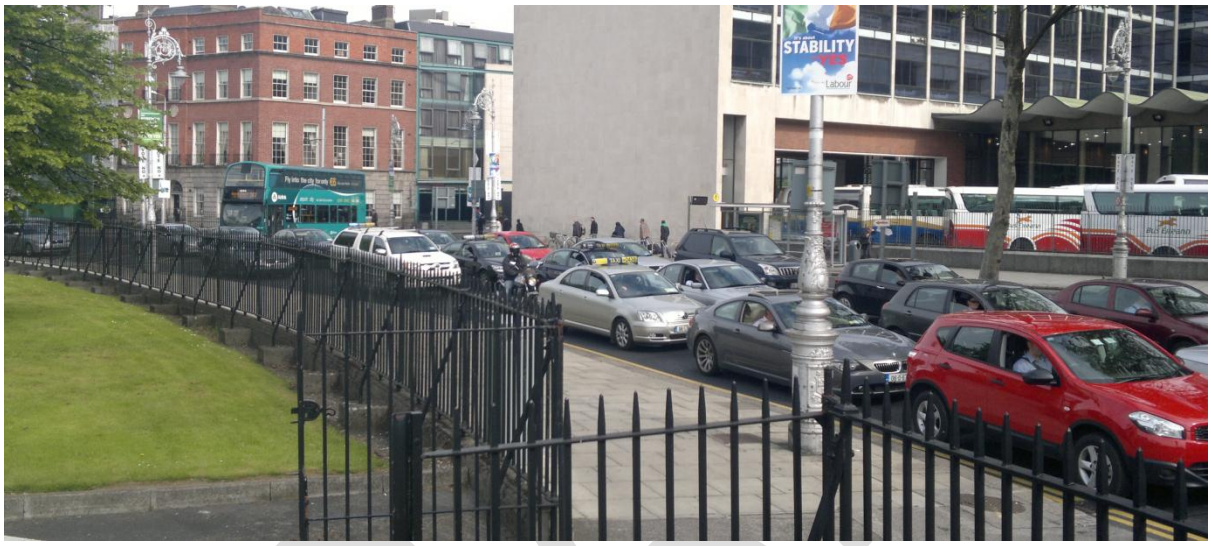
Dublin City Centre will be getting a new Luas line within the next four years. The railway order for Luas Cross City has been granted, and it is anticipated that enabling works will commence in mid-2013. Construction work along the alignment of this route will have a significant impact on the current operations of the bus network servicing the City Centre in the short term, and once completed, the new Luas Cross City route will alter bus movement around large areas of central Dublin (notably O'Connell Street, College Green and Dawson Street/Nassau Street). The bus network will have to be adjusted to accommodate these changes.

4.4.2 Bus Rapid Transit (BRT)

The potential for BRT bus routes servicing high demand bus corridors is being considered by the Authority. Initial feasibility work has identified two BRT corridors criss-crossing the city, which would allow cross city BRT services running from Blanchardstown to UCD, and Clongriffin to Tallaght. In addition, the potential to provide a BRT to service the Swords/Airport to City Centre in the period in advance of Metro North is also being considered. Specific changes to the transport arrangements currently operating in the city centre would be needed to facilitate the introduction of these BRT routes in the short to medium term.

4.5 The Private Vehicle Environment

The private car will continue to be an important choice of mode for people travelling to the City Centre, particularly for shopping and other commercial activities. However, it is essential that the current pattern of vehicular movement both through and within the City Centre is examined to see where changes can be made to meet the overall objectives set out earlier. Currently, both traffic travelling through the City Centre, and traffic with a destination in the city, rely heavily on major radial routes to access and leave the centre. This results in traffic congestion, and also impacts on the efficiency and ease of movement for other modes.



Currently, there are many traffic movements unnecessarily traversing parts of the City Centre owing to the absence of a better alternative route. For example, traffic entering the city from the West (N4) with a destination in the South-east of the city is most likely to use the Quays, as the alternatives of using the South Circular Road or the Grand Canal are less direct and do not function well as orbital routes. In addition, many vehicles arriving at the Grand Canal from the south of the city cannot make right turns onto the Canal route, and are obliged to cross into the City Centre simply to turn right and head back out.

There is a clear rationale to try and provide for the movement of vehicular through traffic away from the central areas by providing an Orbital Route. To function as a distributor route, an orbital needs to operate at the periphery of the core City Centre area (outside the quadrants illustrated in Figure 2-3 City Centre Key Destination Quadrants, and must maintain access into the city core, in particular to allow access to the main city car parks.

The current movement of traffic within the City Centre is dependent on a number of gyratory systems – e.g. St Stephen's Green, Westmoreland Street / D'Olier Street, Beresford Place and Camden Street. The gyratories are prone to congestion and blocking back of traffic at peak hours, with heavy flows of relatively fast-moving and weaving traffic in the off-peak periods. This in turn provides little priority for large volumes of pedestrians, and also impacts on the safety of cyclists. In addition, such arrangements do not give priority to buses or cyclists, and often force them to deviate significantly from the most direct route.

The key issues for the private vehicle environment are summarised in the table below:

Key Issues for the Private Vehicle
• There are a large number of vehicles travelling through the City Centre, without having a destination or origin within the City Centre, i.e. there is a lot of unnecessary through traffic; • The dependence on gyratory systems (e.g. Westmoreland Street / D'Olier Street, Beresford Place, St Stephen's Green, Camden Street) for traffic movements within the City Centre; and • The need to retain vehicular access to City Centre parking, including car parks adjacent to the City Centre retail areas, and private access.

4.6 Goods Distribution and HGV Environment

Maintaining an efficient supply chain for goods and services into Dublin City Centre is essential to the commercial life of the city. Many of these goods vehicles travel between the City Centre and Dublin Port, while access to the Port for other heavy goods vehicles is primarily via the Dublin Port Tunnel.

Dublin Port is Ireland's largest port and is a primary trade hub for the country as a whole. Maintaining and enhancing the role and efficiency of the Port Tunnel access route to Dublin Port is a key consideration for this study. This issue will be of particular importance in the context of potentially extending the current 5-axle ban in the city centre to include 4-axle vehicles.

Maintaining and improving access for deliveries to the main shopping areas in the City Centre is also an important consideration for this study. The destination of these vehicles is dispersed, and although there is a predominance of deliveries in the morning, the movement of goods has an all day trip pattern. The potential for changed freight delivery practices needs to be considered, including the potential use of different vehicle types for a range of distribution purposes, the use of Intelligent Transport Systems, and the use of a Freight Consolidation Centre for distribution within the city and beyond.

The key issues for Goods Vehicles are set out in the table below:

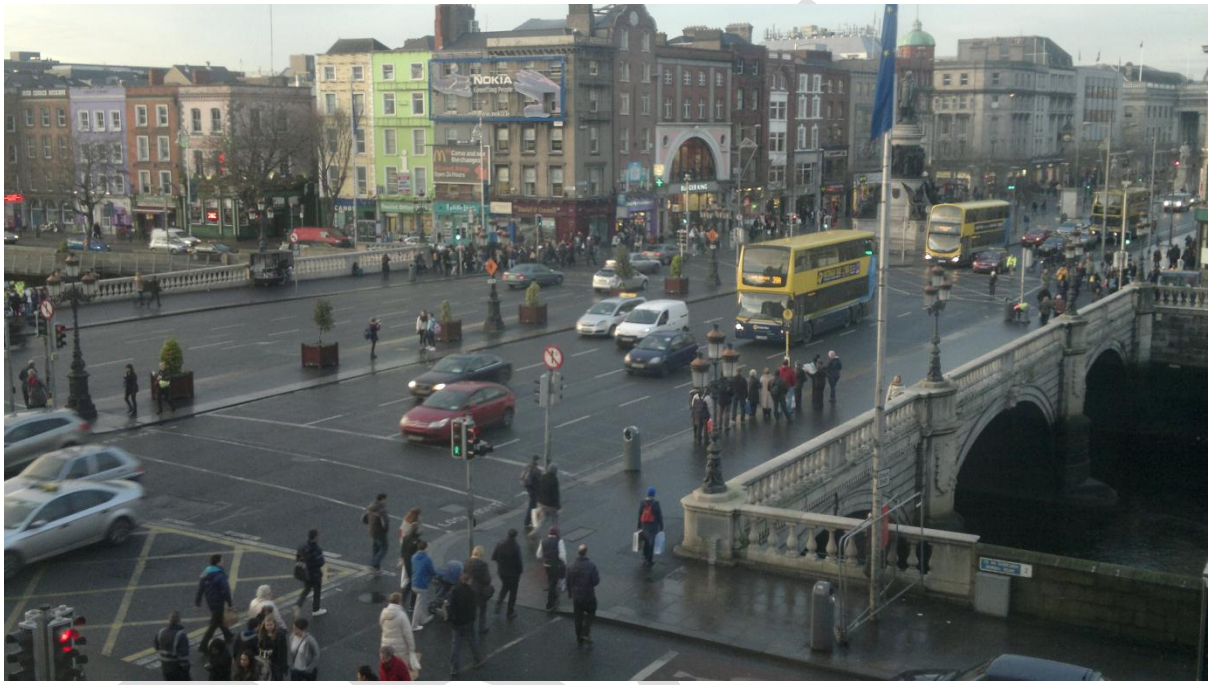
Key Issues for Goods Vehicles

• The potential to extend the current HGV ban in the city centre to include 4-axle vehicles;
• The need to maintain access to Dublin Port, as Ireland's largest port;
• The movement of freight in a range of vehicle types into and around the city must be facilitated; and
• The potential for changed freight delivery practices needs to be considered, including:
  ○ An operational strategy for a range of freight trip generating sectors within the city;
  ○ The development of delivery and servicing plans in areas subject to HGV management;
  ○ The use of different vehicle types for a range of distribution purposes;
  ○ The greater use of Intelligent Transport Systems in the management of freight movement;
  ○ The potential for the use of rail for the distribution of freight; and
  ○ The location of a Freight Consolidation Centre for distribution within the City Centre and beyond.

4.7 Site-Specific Issues

In addition to the identification of the main issues relating to the transport networks serving the City Centre, the study team also identified a number of site-specific problem areas that will need to be addressed as part of this study. These issues will require particular attention to ensure that a suitable solution can be found to address the specific nature of the issues at the specific location. The areas identified were:

4.7.1 O'Connell Street – Westmoreland Street – D'Olier Street




This area is considered by many as the spine of the City Centre. It experiences some of the heaviest pedestrian movements in the city, but does not currently provide an attractive environment for pedestrians. The construction of Luas Cross City will require some level of re-design of Westmoreland Street and O'Connell Street, and this reorientation of street space will afford an opportunity to greatly enhance the transport and street scape environment in this critical part of the city.

4.7.2 College Green – Suffolk Street – Dawson Street


This is a key area of the city for shopping and tourism – but currently suffers from a significant level of bus congestion, over-crowded bus stops, and cluttered, narrow footpaths providing an inadequate amount of space for the high pedestrian demand. The construction of Luas Cross City will require the

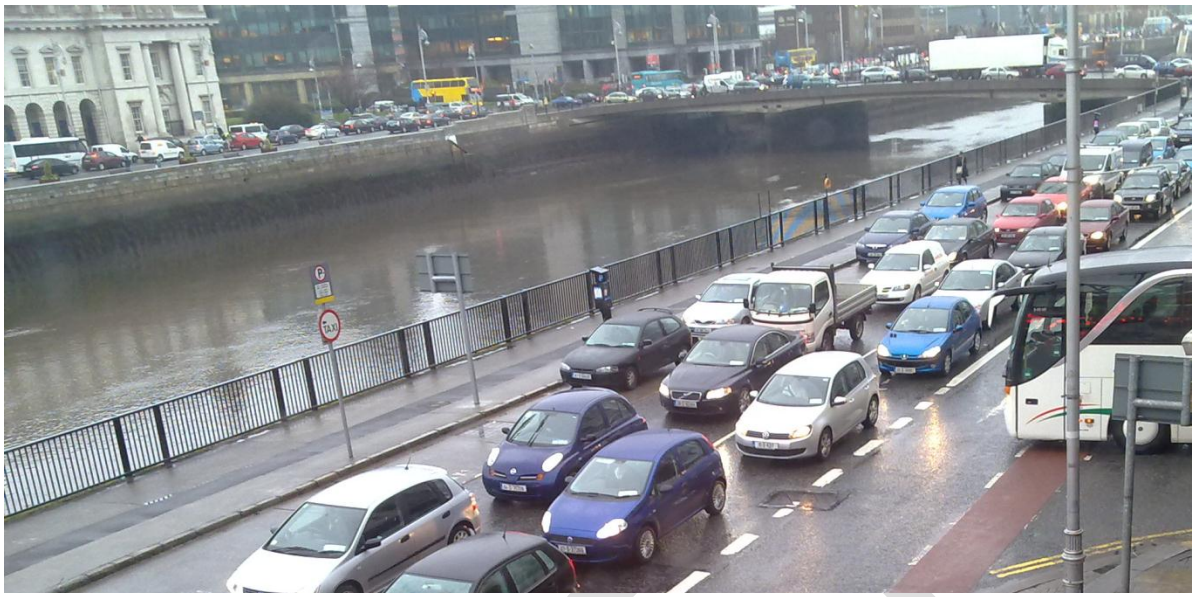
re-design and reorientation of street space in College Green, Upper Grafton Street, and Dawson Street and will afford an opportunity for further improvement of this area.

4.7.3 Westland Row

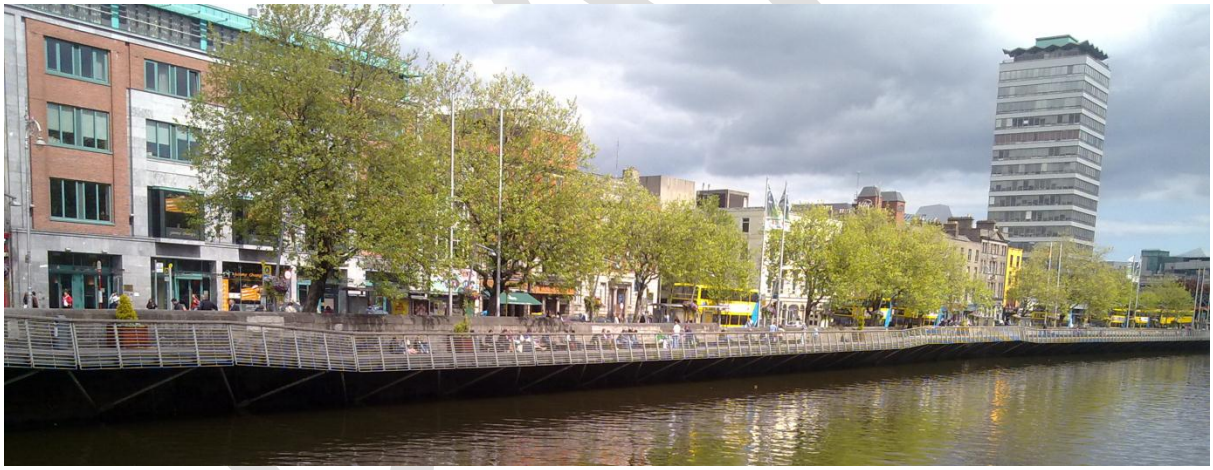
This is a key route for pedestrians accessing Pearse Street DART station (one of the busiest stations in the entire heavy rail network). However, at peak times, the footpaths do not provide sufficient room for pedestrians, causing spill over onto the roadway and cycle paths. The level of priority given to pedestrians and cyclists is not in general commensurate with the volumes of these modes using the street and this balance needs to be redressed.

The requirement of the city to provide for Luas Cross City will also necessitate Westland Row to become a more important cross city link for bus services.

4.7.4 The City Quays (Grattan Bridge – Matt Talbot Memorial Bridge)



The city quays currently provide a key main artery into the heart of the City Centre for vehicular traffic, and this is reflected in the design of the road environment and junction signal timings. This has resulted in a poor urban realm along the quays, with the roadway poorly reflecting the significance of the City's main waterway.



The construction and operational phases of Luas Cross City will have some impacts on the performance and operation of the quays. In addition, the quays will also need to provide for the growing volumes of other road users (particularly cyclists and public transport users) moving along this route, and also to better provide for the significant volumes of shopping, tourist and other pedestrians movements crossing the Liffey. The city quays are currently not an attractive environment for any purpose and it is worthwhile giving consideration to rebalancing the use of the road space along this important section of the city.

4.7.5 Beresford Place – Customs House Gyratory

The Customs House gyratory road layout does not function well for any of the transport modes using it, with traffic congestion often impacting on Luas and bus flow through the area. Poor road lane management also makes it difficult for cyclists to negotiate through the space. Bus Aras is situated on a restricted site on Beresford Place and bus traffic congestion on Store Street is a common problem. In addition to the on-road issues, the area is a key entry point to the city for tourists and commuters via Bus Aras and Connolly Station. This, in addition to the close proximity of the high employment intensive IFSC area, means that pedestrian movement is of great importance. Currently the pedestrian environment at this location is quite poor. It is clear that this area would benefit from a redesigned layout that would enhance the environmental amenity of the area and improve the movement of all transport modes.

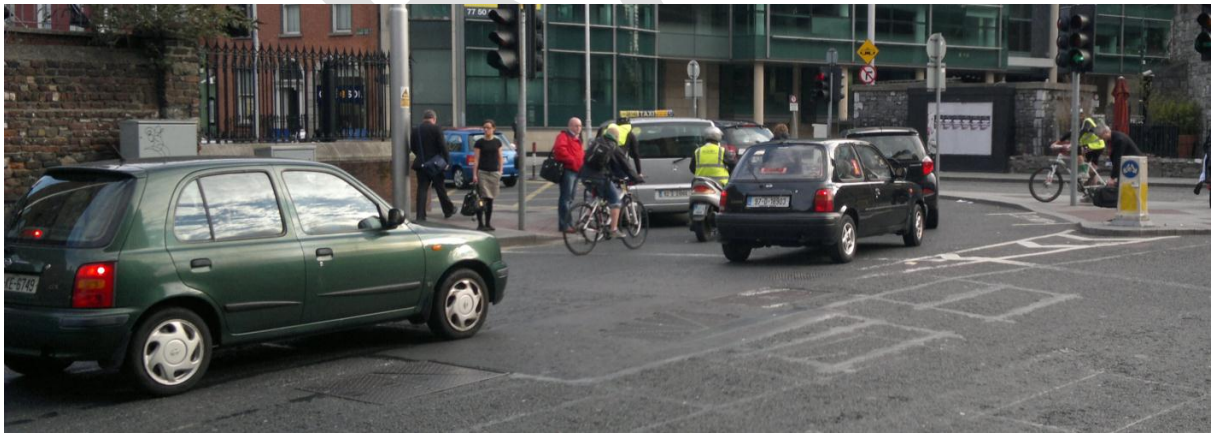
4.7.6 Christchurch

This area is dominated by the junction of Patrick Street – High Street – Christchurch Place, which is currently a key vehicular entry point to the City Centre from the south west. Adjacent to this junction, however, are key components of Dublin City's heritage, including City Hall, Christchurch Cathedral, and Dublin Castle. These attractions, along with a number of significant employment destinations, including the Civic Offices, mean that the area experiences heavy volumes of pedestrians throughout the year. To manage this area of the city as a functional space for the movement of tourists and other vulnerable road users, as well as facilitate heavy volumes of traffic, will require that this space be designed to better facilitate this mix of uses.

4.7.7 Camden Street/Harcourt Street Gyratory

The Camden Street/Harcourt Street gyratory is an important point of access to the City Centre for vehicular traffic, buses and cyclists coming from the south of the city. The area also has a large amount of employment and nightlife in the vicinity, which ensures that there is a constant pedestrian presence.

The current gyratory design of the area leads to congestion at peak hours, and heavy flows of fast moving traffic off peak, giving little priority for large volumes of pedestrians, and impacting on the safety of cyclists. In addition, the gyratory does not give priority to buses or cyclists, and also forces them to deviate from the most direct route. There is a clear need for this location to be redesigned to provide a better transport environment for all modes.



4.8 In Summary

This chapter has identified and set out certain key issues relating to the transport networks serving the City Centre. It also identified a number of site-specific issues that need to be addressed. Before proceeding to examine measures and solutions aimed at addressing these issues, it is important to clearly establish the objectives that these solutions are required to achieve. These objectives are detailed in the next chapter.

5 Objectives

Given the background and context of the study set out in Chapter 2 and having identified the key issues in Chapter 3, the aim of this study is to identify potential feasible and implementable solutions to these problems.

The policy framework for this study draws on the policies of the Dublin City Council Development Plan and the Public Realm Strategy, while utilising the principles set out in the Authority's draft Transport Strategy. Overall, the seven objectives for the study are:

Objective 1: To **increase the capacity** for the movement of people and goods into and within the City Centre.

Objective 2: To **increase the efficiency** of the movement of all modes within the City Centre.

Objective 3: To **develop a safer City Centre** for all transport modes and users.

Objective 4: To **improve accessibility and permeability** to, and within, the City Centre for pedestrians, cyclists and public transport users, while also maintaining access for vehicular traffic to private and public car parks.

Objective 5: To **improve the functionality, legibility and consistency** of the transport networks in the City Centre for all users, with particular focus on the movement of public transport, private vehicles and goods vehicles.

Objective 6: To **ensure value for money** in the implementation of City Centre proposals.

Objective 7: To **reduce the negative impact of transport** on the Public Realm in the City Centre.

Having identified the main issues impacting on transport serving the City Centre and clearly set down the objectives for the study, the study team developed a series of measures and interventions aimed at addressing the issues and achieving the study objectives. These are set out in the next chapter.

6 Measures and Proposals

Following on from the identification of issues and the establishment of the study objectives, this chapter lists the measures and proposals developed for the City Centre. Underpinning the specific measures recommended by the study is a list of key assumptions developed by the project team. These assumptions are set out below.

6.1 Key Network & Other Assumptions

KEY NETWORK ASSUMPTIONS:

- Vehicular through traffic will be actively discouraged from the City Centre. An orbital vehicular traffic route with limited access points to the City Centre will be established to remove through traffic and free up the City Centre for other modes.
- Vehicular access to the City Centre will be maintained primarily to serve access for public car parking and for goods delivery.
- Greater priority will be given to pedestrians in the City Centre, particularly at conflict points, and areas where safety has been a problem.
- The movement of pedestrians and cyclists around the city (in particular north - south across the River Liffey) and around public transport nodes will be improved.
- The success of the College Green bus gate in reducing the level of through car traffic in the core of the City Centre will be built on.
- Interchange between public transport services will be significantly improved.
- Luas Cross City will be operational by the end of 2017.
- The routing of Luas Cross City through College Green, Lower Grafton Street and Nassau Street has the following implications for the City Centre:
  - General car traffic will not be able to use this route during Luas operating hours; and
  - Significant numbers of buses will no longer be able to use College Green.
- A small number of Bus Rapid Transit type services will operate through the City Centre in line with the Core BRT Network report published by the Authority in 2012.
- Existing bus routes and bus fleet will be modified over time, including the progressive roll-out of buses with two doors.
- Bus routes should no longer terminate in the City Centre and there will be no parking/layover of buses in the City Centre.
- Real time passenger information displays will be available at key bus stops, and available online and via Smart Phone App for all stops.
- Integrated public transport ticketing (supporting faster boarding and alighting and facilitating easier passenger transfer between public transport services) will be fully rolled out in 2013. Fare capping, and zonal fare structuring will be introduced within the planning horizon of this study.
- Further phases of the ‘dublin bikes’ scheme will be rolled out (including Heuston/James Street area and Docklands).

6.2 Proposed Measures

The study proposes 15 key interventions aimed at significantly improving the ambience and environment of the City Centre, as well as providing for better movement of people and vehicles to and through the City Centre. The interventions are also proposed to meet the study objective (outlined in Chapter 5), the issues identified in Chapter 3, and also the objectives of the Dublin City Development Plan, the Dublin City Public Realm Strategy as well as providing inputs into the Authority's Integrated Implementation Plan and Strategic Traffic Management Plan. The proposed interventions can be broken into two categories – i.e. Network measures and Site Specific measures. They are as follows:

Network Measures:

1. A newly defined Orbital Route around the City Centre using the North Circular / South Circular Roads;
2. New traffic signal timings in the City Centre area facilitating easier movement of public transport, pedestrians and cyclists;
3. Re-configuration of the bus network to reduce public transport related congestion, better match passenger travel needs and optimise interchange facilities between routes and other transport modes;
4. Creation of a quality City Centre cycling network, enabling safe and convenient movement around the City Centre area*;*
5. Creation of a quality City Centre pedestrian environment*;* and
6. Improved management and control of City Centre freight / goods movement.

Site Specific Measures:

7. Removal of vehicular traffic from Suffolk Street allowing for an expansion of the Grafton Street pedestrianised area;
8. In conjunction with Luas Cross City changes, the removal of vehicular traffic on the southern half of College Green, facilitating the creation of a Civic Space / Public Realm area;
9. Improvements to the public realm and pedestrian environment on Westmoreland Street with the removal of general car traffic and revised arrangements for the movement of public transport vehicles using the street;
10. D'Olier Street to become a two way street, facilitating significant bus movement and bus stopping along the street and including a new contraflow bus lane on Pearse Street;
11. Introduction of a bus only road section (bus gate) at Beresford Place between Bus Aras and Custom House, creating a bus access only area and improving the public realm;
12. Westland Row to become a public transport only corridor, incorporating wider footpaths;
13. Christchurch Place to become a pedestrian friendly space;
14. Development of a coach parking facility in close proximity to the City Centre to cater for the needs of tourist and commuter coach parking; and
15. Expansion and associated rationalisation of City Centre taxi ranks.

These fifteen measures are explained in more detail in Chapters 7 and 8.

7 Description of Network Measures

This Chapter provides a more detailed description of the proposed network measures listed in Chapter 6, and illustrates the measures with appropriate diagrams and drawings.

7.1 New Orbital Route

7.1.1 Purpose

A critical component of the measures proposed in this study is the development of a fully functional Orbital Route around the core City Centre. The proposed new Orbital Route is shown in Figure 7-1 below.

The proposed Orbital Route will:

- provide an attractive alternative for vehicular traffic that currently uses the city centre as a through route;
- facilitate vehicular traffic accessing the City Centre at key 'Gateways'. These Gateways will, in each case, provide direct access to certain sections of the inner city core. The through movement of private vehicles within the city core will be discouraged in order to promote the use of the Orbital Route; and
- allow traffic to approach from any radial, turn left or right onto the orbital, and turn left or right off the orbital.

Traffic turning into the City Centre from the Orbital Route will be able to access the local zone, but will find it difficult to move into other parts of the city centre – so entering the city from the correct junction (or "Gateway") will be important.

As the Orbital Route will be the main traffic route around the core city centre, the needs of traffic will be given priority, and it may not be possible to provide equal priority for other modes, in order that the central traffic objective is achieved.

7.1.2 Description

Specific attributes of the Orbital Route include:

- 15 'Gateway' junctions and 5 supporting 'Secondary Gateway' junctions;
- All traffic turning movements to be allowed at Gateway junctions (except at Gateways Junctions 2, 5, 9, 10, 13, 14, where the movements are provided through a combination of junctions);
- Where not all movements can be provided, Secondary Gateway junctions to be used to support the Gateways;

- Traffic Signal right turns may be banned at other (non-gateway) junctions along the Orbital during the peak periods, if such turns interfere with the effectiveness of the orbital ; and
- To aid the movement of pedestrians, cyclists and public transport, traffic signal cycle times on the Orbital Route are likely to be a maximum of 100 seconds generally, with one or two junctions extending to 120 seconds maximum (e.g. Gateway 5 (North Wall Quay / Guild Street, in the morning peak) and Gateway 14 (Merchants Quay / Bridge St) in the evening peak. Figure 7-2 and Figure 7-3 show the proposals for indicative signal times recommended for signalised junctions on the Orbital Route for the AM and PM peaks respectively.

Figure 7-1 Proposed City Centre Orbital Route

Figure 7-2 Orbital Route Indicative Cycle Time and Staging Arrangements (AM Peak)

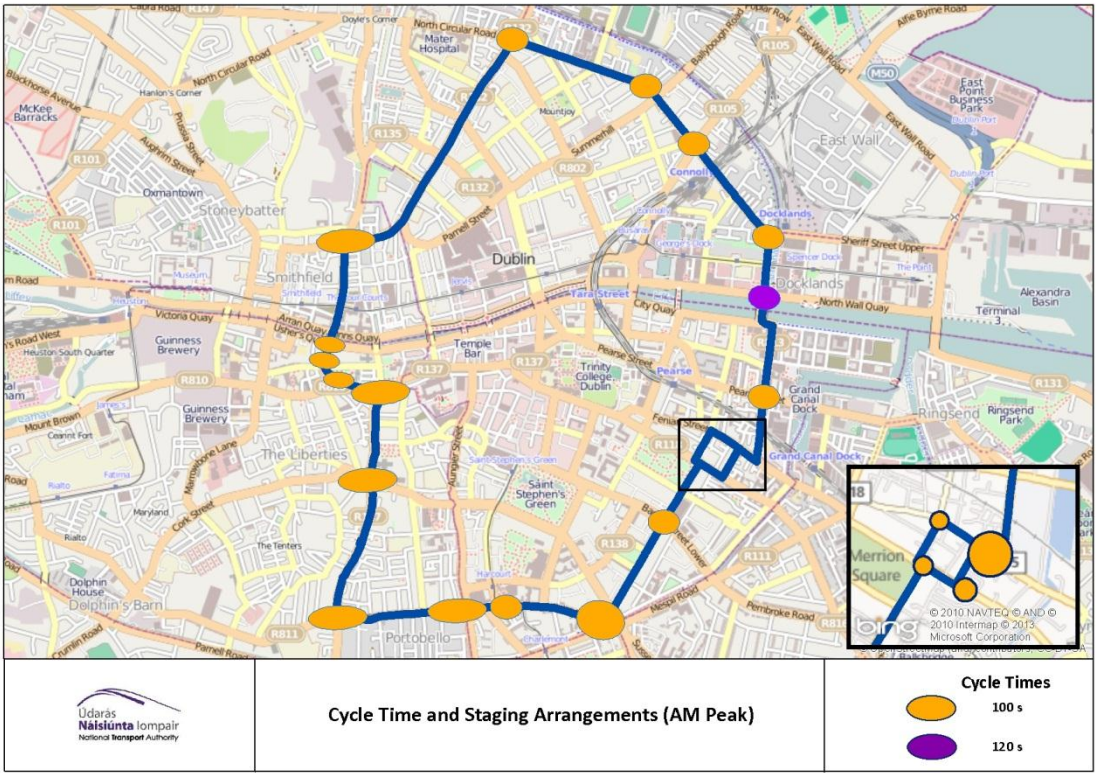
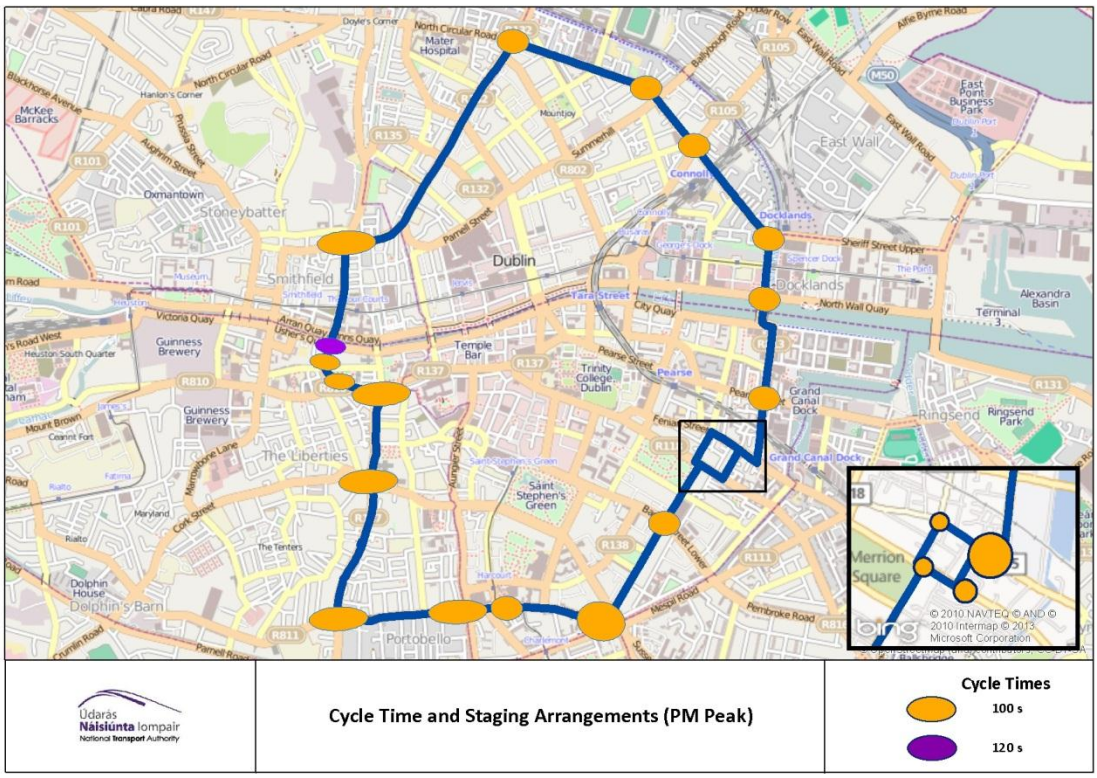


Figure 7-3 Orbital Route Indicative Cycle Time and Staging Arrangements (PM Peak)



7.1.3 Key Changes

Key changes required to deliver the Orbital Route include:

(i) **Leonard's Corner**: This junction will be reconfigured to allow traffic heading west on South Circular Road to turn right onto Clanbrassil Street towards the River Liffey. This will provide a new route for traffic leaving the south east of the city, which currently ends up on Pearse Street / Tara Street and the south quays;

(ii) **South Circular Road / Adelaide Road**: It is essential that traffic heading towards the city on South Circular Road can continue to move orbitally with ease. Harcourt Road and Adelaide Road will revert to two-way along its length. Road width on the section of Harcourt Road incorporating the Luas tracks is particularly restricted and will be required to be reconfirmed as adequate for two way traffic at a later stage. Alternative arrangements can be considered for this particular location if necessary. Eastbound traffic will no longer have to negotiate the Camden Street /Harcourt Street gyratory;

(iii) **Winetavern Street (under Christchurch Arch):** Having enabled a quality Orbital Route along the South Circular Road, it is important that the traffic entering the city from the West along the Quays can easily access this route. A strong right hand turn lane is required from the North Quays. The optimum location for this is in front of the Four Courts, with traffic then turning onto the bridge and climbing the hill up Winetavern Street under Christchurch Arch and onto Patrick Street / Clanbrassil Street. Winetavern Street will therefore become two-way;

(iv) **Macken Street:** With the intention that locally-based traffic would migrate to using Macken Street (and avoid using other City Centre bridges around the Custom House), it is important that the clearance constraint under Macken Street railway bridge be re-examined. Options include (a) dropping the road level under the bridge (b) replacing the railway bridge with a visually attractive and slender structure, with attractive provision for pedestrians, cyclists and regular traffic. This would address issues with the use of Westland Row for high vehicles;

(v) **Merrion Square East at Holles Street:** The current staggered junction is sub-optimal for all modes. In order to complete the orbital between Fitzwilliam Street / Merrion Square East and Macken Street, the junction at Holles Street will be re-configured together with Grattan Street and Holles Street to provide local improvements and to facilitate orbital movement; and

(vi) **Kelly's Corner / Camden Street / Charlemont Street:** In order to provide good turning movements onto and off the South Circular Road – Adelaide Road orbital, there will be

considerable changes to the junctions at South Richmond Street, Charlemont Street, Harcourt Street and Earlsfort Terrace.

7.1.4 Benefits

The Orbital Route has been designed to ensure that the current volume of vehicular traffic accessing the City Centre can be accommodated. On its own, it represents a sensible intervention. However, the Orbital Route also enables the city core inside the Orbital Route to be re-designed to provide more physical space, junction priority and journey time reliability for pedestrians, cyclists and public transport. This reallocation of road space will also allow for a transformation of the urban fabric within the City Centre, as set out in the City Council's Public Realm Strategy, enabling the creation of new civic spaces and tourist attractions, and increasing the vibrancy and vitality of Dublin as a commercial and retail centre that can rival any other European capital.

In addition to freeing up space in the City Centre to facilitate the implementation of a number of other measures set out in this chapter, the Orbital Route will also improve the efficiency and safety of roads and junctions used as part of the route.

7.2 New Traffic Signal Settings in the City Centre

7.2.1 Current Position

The current phasing of traffic lights at signalised junctions within the City Centre is designed in many cases to facilitate a high volume flow of traffic in and out of the city along strategic routes, such as the Liffey Quays, Amiens Street, Clanbrassil Street, Dorset Street, etc. This is especially so in the evening peak, with the intention of discharging traffic build-up from the city.

The presence of network gyratories represents a significant constraint on traffic signalling. Junction signals must not only be designed to manage vehicular traffic in an efficient way and address the needs of vulnerable road users, but must also be designed to avoid the risk of blocking-back to ensure gyratories do not lock up. In general, catering for such demands of general traffic results in a pre-determined signalling regime with relatively high signal cycle times, and little or no demand response is possible for buses, trams, pedestrians or cyclists.

7.2.2 Purpose

The purpose of the signal intervention (which follows the delivery of the Orbital Route), is to provide revised traffic signal settings at signalised junctions within the City Centre that rebalance the needs of pedestrians, cyclists, buses and trams with other vehicular traffic, and reduce overall junction delays and improve safety.

7.2.3 Description / Key Changes

The key changes in signal settings proposed at signalised junctions in the City Centre are shorter cycle times and a reduced number of stages. The study proposes reduced cycle times, in the region of 45 seconds, at all signalised junctions within the area bounded by the Orbital Route. Where

feasible, there would be a reduced number of cycle phases, ideally a maximum of three stages on each cycle, at these City Centre junctions. This would significantly reduce the 'wait time' for pedestrians to cross at junctions (which can currently be up to two minutes) and reduce the crowding and congestion that occurs frequently at City Centre crossing points.

Short signal times are appropriate to city centre environments, where the vast majority of road users are walking, cycling or in public transport. Essential points supporting the rationale for short signal times in the City Centre include:

- Buses generally do not benefit from traffic light "green waves", i.e. long sequences of green time for routes designed to flush traffic through an area. This is because buses generally have to stop at intermediate bus stops, while the rest of the traffic benefits from moving through sequenced traffic light plans. Buses approaching signalised junctions benefit from more frequent changes in traffic lights, (i.e. shorter cycle time) leading to faster and more reliable journey times and reduced delays for passengers;

- Primary research in 2003 in Dublin indicated that dropping the signal cycle time to 77 seconds would be a major contributor to the elimination of pedestrians crossing against the red man. Direct crossings (rather than multi-stage crossing using traffic islands) are much more attractive to pedestrians;

- It reduces pedestrian delays at crossing points, thereby reducing the crowding and congestion that frequently occurs with the current signal timings;

- It makes it easier and quicker for pedestrians (shoppers, tourists, workers) to move around the City Centre; and

- Short signal cycle times are a key component of simplified cycle-friendly junctions.

In addition to short cycle times, the study also recommends a reduction in the number of stages at City Centre signalised junctions. Dedicated turning movements (e.g. green filters) require certain minimum amounts of time, adding to the signal cycle time. These turning stages are significantly less efficient in terms of moving vehicles or people through a junction. In addition, pedestrians and cyclists in particular are reluctant to wait for such stages, and may occasionally be confused by them.

7.2.4 Benefits

The introduction of short cycle times and the reduction in the number of phases at signalised junctions will provide significantly more frequent pedestrian phases at all junctions within the city centre bounded by the orbital route, and will significantly improve pedestrian safety and ease of movement.

In addition to improving journey times for pedestrians crossing at junctions, the shorter cycle times will also be beneficial to cyclists and public transport that will be able to traverse junctions more quickly. Shorter cycle times also allow for clearing junctions of turning traffic more effectively.

7.3 Reconfiguration of Bus Network

7.3.1 Current Position

The City Centre is critically important both to the accessibility of the City by public transport and to the efficient operation of the bus network. The attractiveness of bus based public transport is highly influenced by the routes taken by services through the City Centre, the location of stops, the opportunities for interchange with other transport modes and services, and the overall bus speeds through the area.

In recent years, some initiatives have improved the operation of buses in the City Centre, for example the introduction of the College Green Bus Gate and the increase of cross-city bus services under the Dublin Bus "Network Direct Programme", which removed some terminating buses from City Centre streets. However, it remains the case that the bus network is concentrated on a small number of streets and there is further scope to improve the overall efficiency of the movement of buses, bringing benefits for all modes within the City Centre.

7.3.2 Purpose

One of the principal initiatives identified by the study team that will help improve the City Centre environment and accessibility is the further coordination and expansion of cross-city bus links. In broad terms the objectives are:

- to maximise the benefits for bus based public transport by utilising additional street space, and alternative route options made available following the rerouting of vehicular traffic onto the Orbital Route bounding the City Centre;
- to re-coordinate the bus network by identifying and prioritising those cross-links that support the largest actual or potential cross-city passenger demand;
- to ensure that adequate penetration and coverage of the City Centre is obtained from all suburbs of the city;
- to reduce the dependency on particular streets by identifying a number of corridors for routing bus services through the City Centre; and
- to identify and develop key interchange points on the public transport network at a smaller number of high quality locations.

7.3.3 Description / Key Changes

The proposal to reconfigure the core bus network will involve establishing a network of dedicated bus corridors that penetrate the City Centre and converge on key streets which can cater for larger volumes of buses, particularly:

- Beresford Place;
- Dame Street (East of South Great Georges Street);
- D'Olier Street / College Street;
- Pearse Street; and
- Westland Row.

Whilst the total number of buses is high, there are many instances within Dublin where similar and higher bus volumes operate at present (O'Connell Street, D'Olier Street, Suffolk Street). By way of example, the maximum number of buses per hour along key streets in the proposed bus scenario is set out in Figure 7.4. The proposed bus network is set out in Figure 7.5.

Interchange will be required to undertake some journeys. A set of proposed interchange locations, which seek to optimise interchange facility has been identified – these are shown in Figure 7-6. These are at strategically attractive locations, and because the number of locations is small – and the volume of interchange movements likely to be relatively high – these could be prioritised for investment in facilities and infrastructure which adopt international best practices.

Figure 7-4 Possible City Centre Bus Services (in Peak Hour)

Key Streets	Bus per hour
North Quays	26
South Quays	26
Eden Quay	38
North Wall Quay	20
Beresford Place	**73**
Amiens Street	43
Prussia Street	30
Thomas Street	48
Dame Street	48
Dame Street (east end)	**70**
Capel Street	20
Constitution Hill	29
College Green	**64**
D'Olier Street	42
Gardiner Street	30
Pearse Street	**75**
Mount Street Lower	25
Westland Row	**54**
South Great Georges Street	40
Cork Street	23
Kildare Street	43
St Stephen's Green East	43
St Stephen's Green South	34
Kevin Street	33
Cuffe Street	34
Clanbrassil Street	21
O'Connell Street	30
Camden Street	39
Leeson Street	27
Dorset Street	30

Figure 7-5 Possible City Centre Bus Network and Services

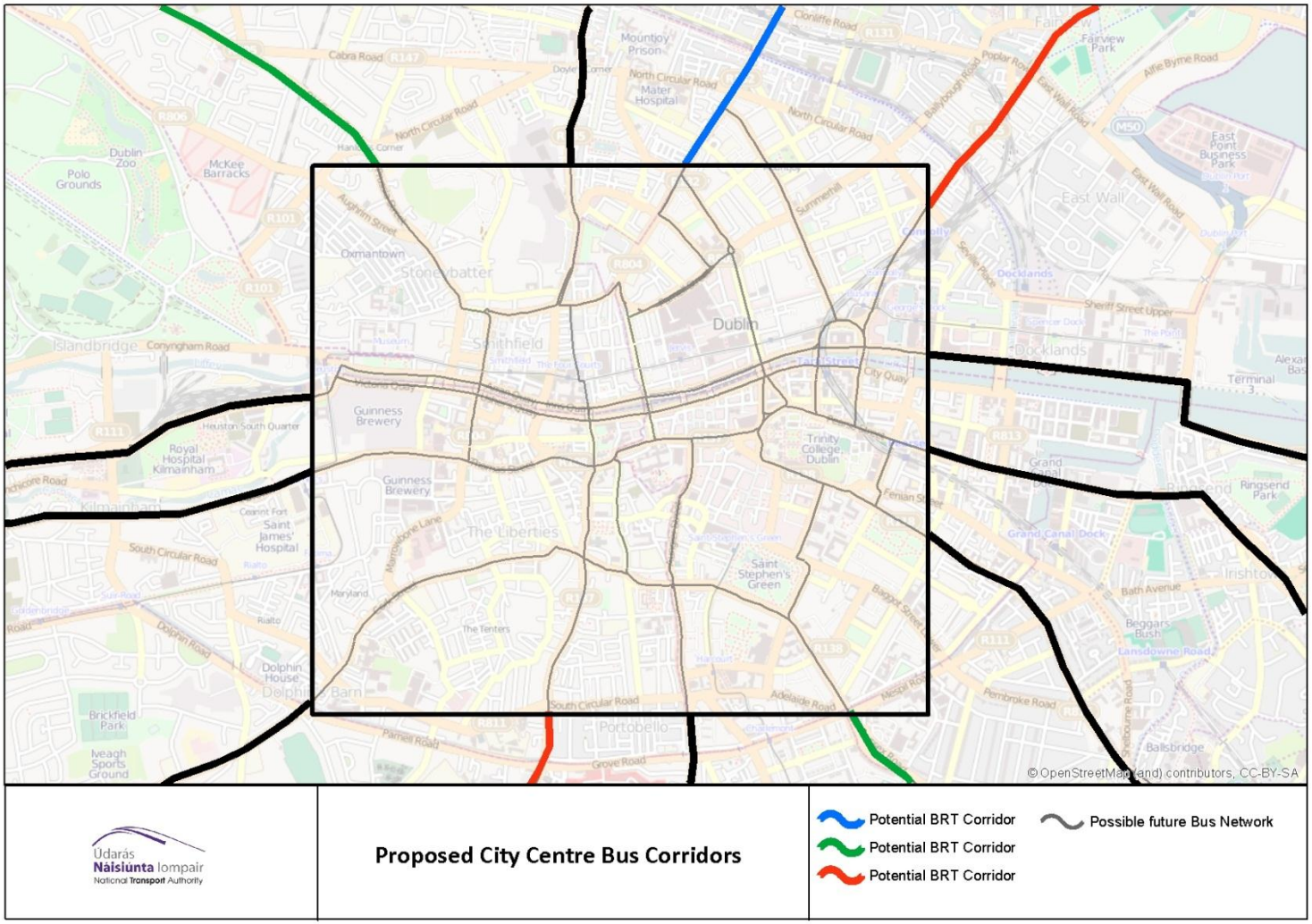
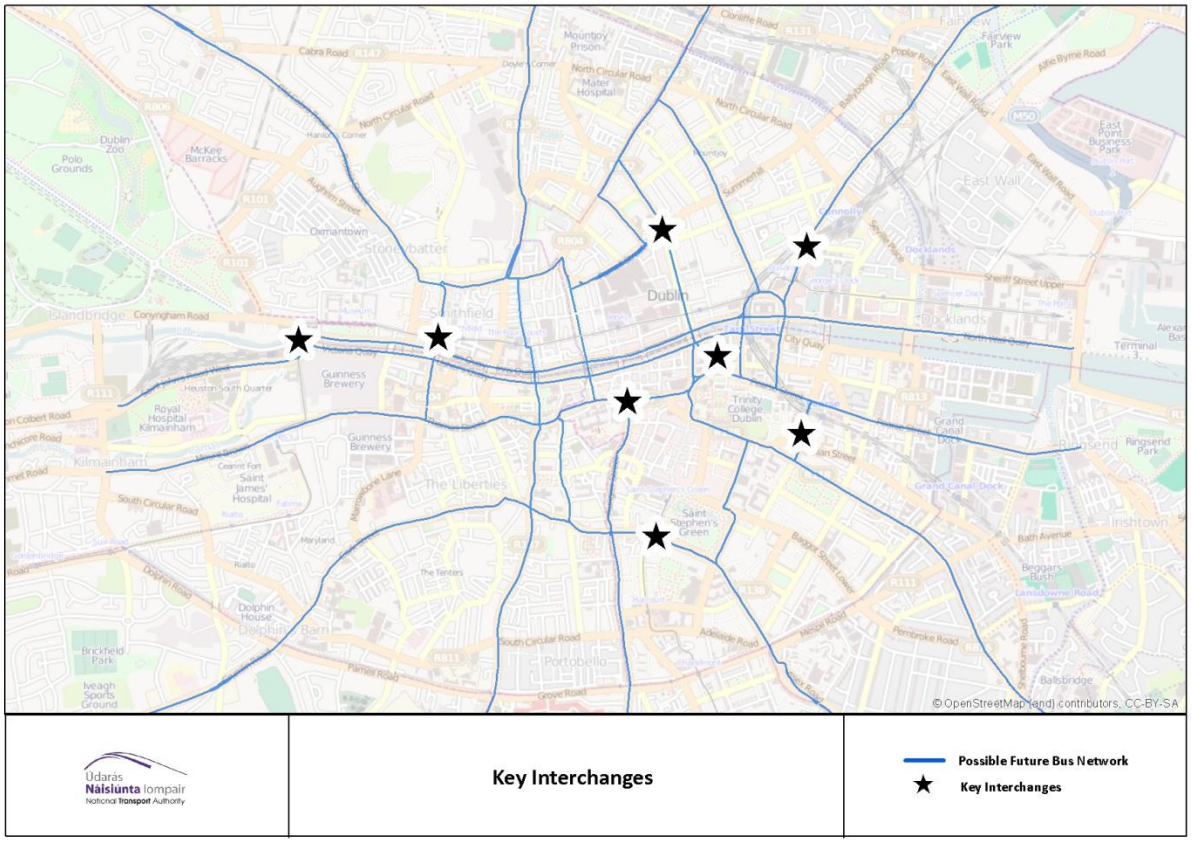


Figure 7-6 Key Interchange locations



7.3.4 Benefits

The re-configured bus network will simplify the existing network pattern and provide cross-city services running to high frequencies. It will complement the benefits released by the introduction of the Orbital Route and the new City Centre traffic signal settings, and will feature:

- Standardised frequencies and journey times for bus routes traveling across the City Centre;
- More even distribution of bus services across the City Centre network;
- Removal of bus layover in the City Centre;
- Removal of bus congestion at key City Centre located bus stops;
- Direct bus links to the four major City Centre quadrants; and
- High quality public transport interchange facilities at a select number of locations. .

In addition, an assessment of the impacts of the re-configured bus network (see Chapter 9) shows that the reconfigured bus network would attract significant additional numbers of people using public transport to access the City Centre – with a 4% increase in passenger numbers over the current network arrangement. This would be equivalent to 3 million additional people travelling by public transport to the City Centre per annum[2].

[2] This is without any additional demand management measures or external improvements to the public transport network.

7.4 Creation of a Quality Cycle Network

7.4.1 Current Status

While there have been significant cycling developments in Dublin City in recent years, key elements of a high quality cycle network remain to be developed. The development of a City Centre cycle network is an essential component to improve cycling usage within the City. It would integrate with the further expansion of the very successful 'dublinbikes' scheme and would cater for the growing number of cyclists in the city, as evidenced by the growth in cycling reported in the 2011 Census. A proposed core cycle network has been developed as part of the GDA Cycle Network Plan undertaken by the Authority.

7.4.2 Purpose

The core cycle network highlights the key strategic cycle corridors which should be designed to prioritise the ease of cycle movement along the network. The core network is designed to bring the key strategic cycle movements from the wider city area along prioritised corridors with a high quality of service.

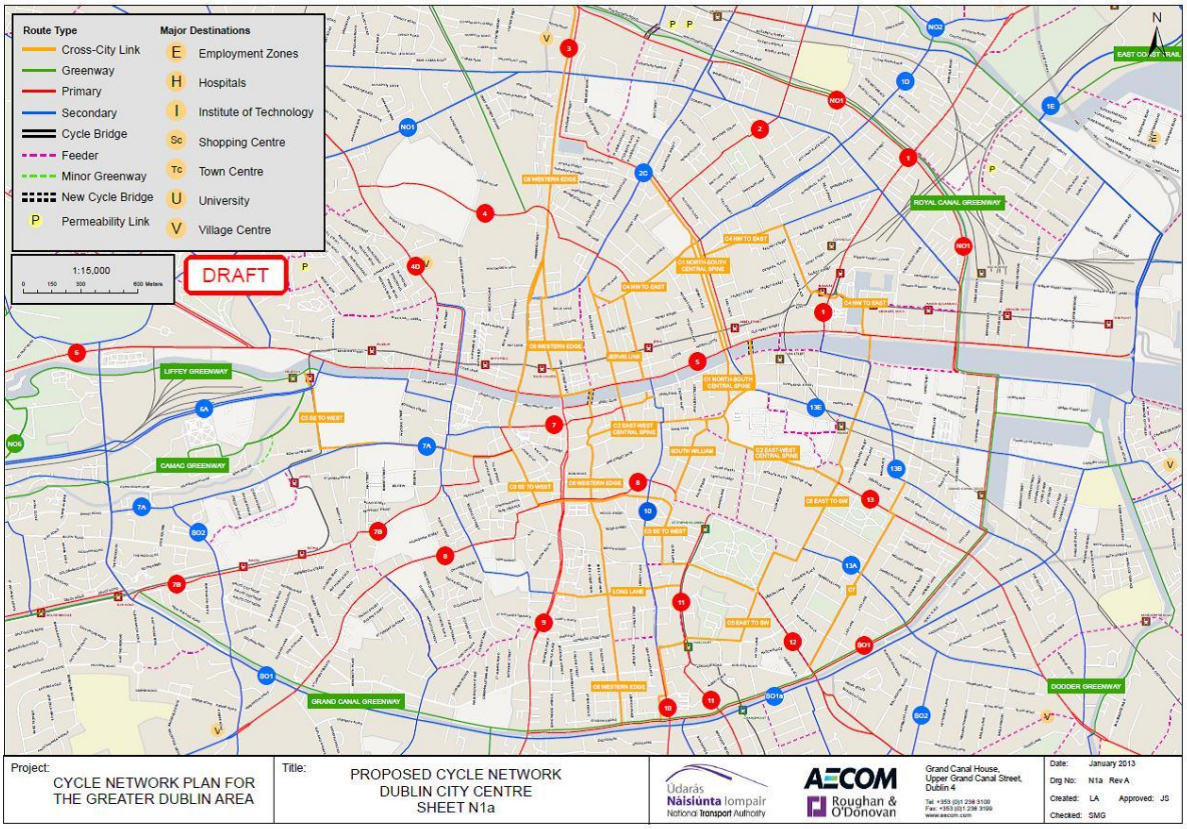
The core cycle network will have to provide a high quality of cycle facilities, with a corresponding level of priority given to cycle movements at junctions. Some of the key cycling measures reviewed as part of this study include:

- A defined 'strategic' cycle network to be established:
- The design of junctions to take cyclists into consideration;
- The current and assumed expansion of the 'dublinbike' scheme;
- Land use 'cells' within the city centre to be cycle friendly;
- Where possible, one-way streets to be two-way for cyclists, possibly through the introduction of contraflow cycle lanes; and
- Location and security/design of cycle parking to be considered in the design of the City Centre network;

7.4.3 Description

The core cycle network as proposed in this study is shown in Figure 7-7.

Figure 7-7 Proposed City Centre Cycle Network (Draft Jan 2013)



7.4.4 Benefits

The development of a high quality cycle network that provides safe and attractive access by bike to and through the city centre will attract more commuters into the city centre by bicycle, reducing car dependency and congestion, improving the vitality and ambience of the City Centre, and providing an attractive infrastructure for visitors and tourists to explore and enjoy the city.

It will also provide a personal transport solution for those living in the city's central districts, and for many residents will obviate the need to own or drive a car.

7.5 Creation of a Quality Pedestrian Network

7.5.1 Current Status

The study team identified areas of the city which had significant pedestrian footfall. These areas, in addition to a number of key street junctions (such as Dame Street – Georges Street), and a number of the Liffey bridges were highlighted as points on the pedestrian network which need specific attention due to sheer volumes of pedestrians and safety concerns.

7.5.2 Purpose

The development of routes and areas that are designed primarily with the pedestrian in mind will reduce delays and increase the comfort for those walking, visiting, socialising and living in the city centre, as well as contributing significantly to the objectives in the public realm strategy. This measure will also provide the essential last link for all public transport trips within the city.

7.5.3 Description / Key Changes

The core pedestrian network (as shown in Figure 7-58) is based on the network outlined in Dublin City Council's development plan. This network highlights the key strategic pedestrian corridors which should be designed to prioritise the ease of pedestrian movement and activity. This core network, and in particular the Central Priority Routes in the City Centre, will have to provide a high quality of pedestrian facilities, with a corresponding level of priority given to pedestrian movements at junctions. Some of the key pedestrian measures reviewed as part of this study include:

- A defined 'strategic' pedestrian network, which sets out pedestrian priority routes within the city centre pedestrian environment;
- Wider footpaths at key locations;
- Pedestrian priority at junctions and key locations;
- Provision for tourists and mobility impaired or disabled users by linking their key destinations into the 'strategic' network;
- Good signage, surfaces and lighting;
- The concept of 'shared space' where feasible and appropriate;
- The removal of unnecessary street clutter to facilitate ease of movement for pedestrians and the mobility impaired; and
- Where possible, pedestrian friendly areas of public open space to be established and enhanced. This will be cognisant of the public open spaces identified in the DCC Public Realm Strategy – College Green, Christchurch, GPO Plaza, Smithfield, Custom's House.

Figure 7-5 Proposed Pedestrian Routes – from Dublin City Council's Development Plan

7.5.4 Benefits

The proposed pedestrian network will:

- Provide a much more attractive environment for shoppers, tourists and other pedestrians to move around the City Centre more easily, safely and with less delay;
- Encourage greater numbers of people to choose this sustainable mode of travel within the core of the City; and
- Provide much improved walk access for all users of public transport within the city.

7.6 Improved management and control of city centre freight / goods movement

7.6.1 Current status

The supply chain for goods and services into Dublin must be carefully considered as an essential element of a working City Centre, and also to safeguard and enhance the key function of Dublin Port as the nation's primary trade hub. Dublin City Council introduced a 5-axle Heavy Goods Vehicle (HGV) ban which covered most of the area with the canals in 2007. This ban has reduced the number of HGVs within the city centre to, on average, 30-40 per day. The main demand for HGV movements within or through the city centre is to serve such centres as the Guinness Factory, the city Fruit Markets and large City Centre retailers.

The vast majority of goods vehicles serving the city centre however are light goods vehicles (LGVs) and vans. The destination of these vehicles is dispersed, and although there is a predominance of deliveries in the morning, the movement of goods has an all day trip pattern. Access to the shopping areas and reliability of delivery are an essential consideration of this study

7.6.2 Purpose

The purpose of the Goods Management interventions is to ensure that the city has the capacity to receive and distribute goods and services in accordance with the growing needs of the population and economic centres, in an efficient and least disruptive manner.

7.6.3 Description / Key Changes

The Goods Management interventions will ensure that the movement of goods to the City Centre is maintained and will promote better management of freight in the City Centre.

Some key interventions may include:

- Extension of the current HGV ban in the City Centre to include 4-axle and / or all articulated vehicles;

- Control of loading/unloading, especially where it interferes with pedestrian, cycling or public transport activities;
- A number of other supporting management measures as identified by Dublin City Council will also be considered, including;
    - The potential for changed freight delivery practices, including a different approach to vehicle types / use of Intelligent Transport Systems / prioritised freight routes;
    - The potential use and location of a Freight Consolidation Centre (possibly in the vicinity of Dublin Port or another city centre location);
    - Demand management at buildings, to limit the frequency and loading times of goods and service vehicles; and
    - Noise management for city centre loading activity.

7.6.4 Benefits

The better management of freight movement and better regulation and control of loading/unloading will:

- Reduce the number of goods vehicles on the city streets, reducing congestion and improving the urban environment with less emissions, noise, and less weight damage to the roadways;
- Greatly benefit cyclists, pedestrians and bus movements; and
- Improve efficiency bringing benefits to freight operators and retailers with journey and delivery time reliability and potentially reduced costs by consolidation of deliveries.

8 Description of site specific measures

The space created by the new Orbital Route and the alteration to bus movements provides an opportunity to improve the urban fabric and street ambience within the central core of the City Centre. This Chapter provides a detailed description (including illustrations using photo images and drawings) of the proposed site specific measures listed in Chapter 6. The site specific measures can be divided into four groups as follows:

- **Measures in the College Green area and its environs**. These measures arise mainly out of the need to provide for LUAS Cross City and to provide for better bus movement, walking and cycling movements through the core of the city centre. Meeting these central objectives also provides an opportunity to improve the public realm in this key central core of the city. The measures are described in sections 8.1 to 8.4.
- **Measures aimed at providing improved access to key public transport interchange.** These measures are aimed at improving access to two of the key public transport interchange points in the City Cente – i.e. Busaras and Pearse Street rail station. They are described in sections 8.5 and 8.6.
- **Measures aimed at improving the public realm.** The reduced through vehicular traffic in the city centre afforded by the Orbital Route provides opportunities to improve the public realm in key area of the city's core. Section 8.7 describes one example of how the public realm might be improved in the historic area of the city near Christchurch Place that also includes key tourist attractions.
- **Measures aimed at providing for other modes of transport.** These measures are aimed at improving facilities for coach parking and a rationalisation of the locations of Taxi ranks, and are described in sections 8.8 and 8.9.

8.1 Pedestrianisation of Suffolk Street

8.1.1 Current Status

Currently Suffolk Street and Church Lane are part of a heavily used bus corridor linking the Dawson Street / Naasau Street / Kildare Street area to the O'Connell Street / D'Olier Street / Westmoreland Street area. Suffolk Street and Church lane are relatively narrow streets, with limited width footpaths on either side. While both are marked with two traffic lanes, the turning difficulties from Suffolk Street to Church Lane, effectively reduces the capacity to a single lane at this point.

Church Lane is an undesirable route for the large numbers of scheduled bus routes and tourist coaches currently using this route. Features such as the sharp turn entry, narrow footpaths, the presence of many pedestrians and cyclists, and the visibility issues exiting onto College Green all render the route less than ideal for buses.

8.1.2 Purpose

The construction of Luas Cross City will require the re-design and reorientation of street space in College Green, Upper Grafton Street, and Dawson Street and will afford an opportunity to greatly enhance the transport environment and public realm in this critical part of the city. This reconfiguration of the movement of public transport opens up the opportunity of pedestrianising Suffolk Street, extending and complimenting the Grafton Street commercial area, and significantly improving pedestrian areas on Church Lane.

8.1.3 Description / Key Changes

The key change to facilitate the improvements to these two streets is the rerouting of bus services currently using these streets to go northwards. It is proposed that these would be rerouted on Grafton Street Lower, co-running with the northbound Luas Cross City line. This mirrors the arrangement on Naasau Street, between its junctions with Dawson Street and Grafton Street.

A photomontage of what the newly re-designed Suffolk Street / Church Lane might look like is shown in Figure 8-1. This proposal would see the pedestrianisation of Suffolk Street and widened footpath areas on Church Lane. This will extend the current premium Grafton Street shopping area and will greatly benefit the retailers operating on Suffolk Street, Lower Grafton Street and Dame Street.

8.1.4 Benefits

The pedestrianisation of Sufflolk Street and the improvements to Church Lane will provide a much more attractive environment for shoppers, and will bring major benefits to retailers on these streets. The pedestrianisation also provides an immediate opportunity to anchor and expand the Grafton Street environment and experience. In addition, Church Lane / Andrew Street is the location of

Dublin's main tourist office. This pedestrianisation will allow tourists room to congregate and meet at a designated focal point off the main shopping thoroughfare. This will be of significant benefit to Dublin's tourist industry, and will also improve the general flow of pedestrian traffic in the popular Grafton Street area.

Figure 8-1 Suffolk Street / Church Lane following re-configuration (westerly aspect)

8.2 Re-design of College Green

8.2.1 Current Status

College Green forms an important part of the city's north - south public transport corridor. Underpinning this importance, a "bus gate" was introduced on the street to provide priority for public transport vehicles.

The arrangements at College Green will alter with the construction and operation of Luas Cross City. These changes also afford an opportunity to improve the environment for cycling, public transport users and, in particular, for the large volume of pedestrians in and around the College Green / Trinity College area.

8.2.2 Purpose

One of the proposed changes at College Green is that the existing peak-hour bus gate time periods will be extended to facilitate both the construction and the operation of Luas Cross City.

The implementation of this change provides the opportunity to improve the physical layout of the area, improve the social and commercial opportunities, enhance the public realm, and allow for public transport needs.

In particular, it would provide a quantum improvement in the facilities and experience for pedestrians – College Green represents a defining location for the tourist, visitor and pedestrians, especially for the pedestrian corridor between Grafton Street and O'Connell Street.

The intervention builds on the College Green Bus Gate, which removes through traffic from the area during peak hours.

8.2.3 Description / Key Changes

This proposal is linked to the earlier proposed changes to Suffolk Street and Church Lane. The rerouting of a significant portion of buses from College Green during the construction and operation of Luas Cross City, coupled with the transfer of the remaining northbound buses onto Grafton Street Lower, means that the southbound carriageway on College Green between Grafton Street Lower and Church Lane can be considered for pedestrianisation.

A photomontage of what the newly re-designed College Green might look like is shown in Figure 8-2. With parts of College Green ceasing to function as a through route for non-public transport vehicular traffic, the freed up road space (on the southern side of the Green) can be re-designed as open civic space. There will remain a significant number of bus movements through College Green from Dame Street. However, due to the permanent removal of general traffic, it will be possible to accommodate these movements by converting the two inbound traffic lanes beside the Bank of Ireland building on the north side of the street into a two-way bus street.

A drawing of an indicative design and layout for the College Green and its environs is shown in

Figure **8-3**2. Within the roadspace between the *Bank of Ireland* building and Trinity, there will be three general movements as follows:

(i) Two-way Tram (and co-sharing bus) movements on the North-South axis,

(ii) Two-way bus movements on the East-West axis (Dame Street – College Street),

(iii) Pedestrian and cycle movements.

The rest of College Green (essentially the southern half of the Street between Grafton Street Lower and Church Lane) will become traffic-free open space.

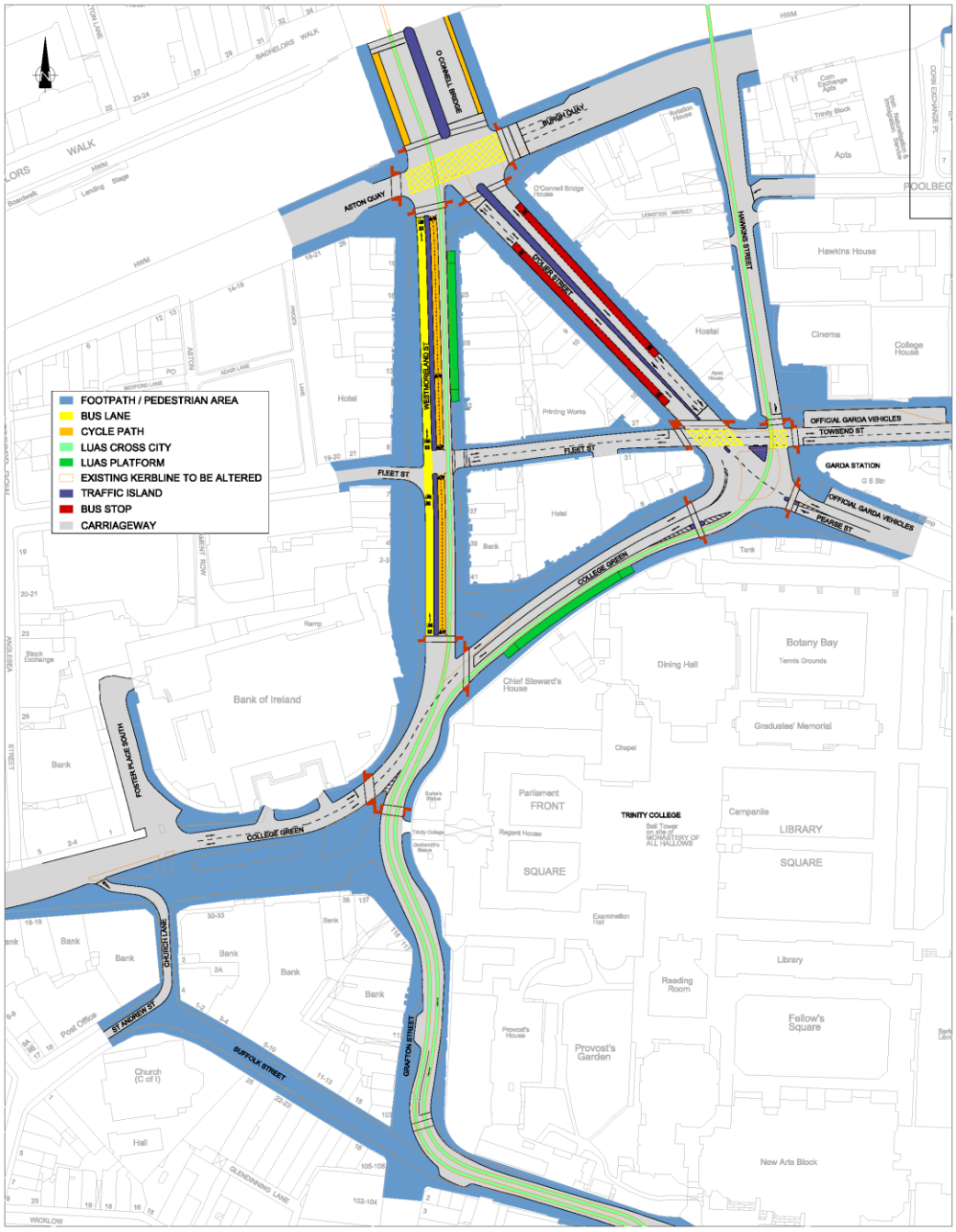
8.2.4 Benefits

The new design will provide an attractive pedestrian route for Dubliners and tourists to move from the North of the city via Temple Bar through the College Green Area to St Stephens Green in a pleasant, safe and pedestrian friendly environment. Specifically, the new design will enable pedestrians to move between Grafton Street and the Liffey by negotiating only one short pedestrian crossing.

The improved public realm will allow people to enjoy some of the best of Dublin's architectural heritage in comfort and space, and should also significantly raise the profile and attractiveness of the large retail premises facing onto College Green. Finally, the new open space will provide opportunities to anchor the "Civic Spine" at the front of Trinity College, create a heritage for future generations, and a natural gathering location for civic events.

Figure 8-2 College Green following re-configuration (westerly aspect)

Figure 8-3 Indicative design for the reconfigured College Green and its environs



8.3 Improvements to Westmoreland Street

8.3.1 Purpose

The redesign of Westmoreland Street is intended to provide improvements for the significant pedestrian flows, provide a direct two-way cycle route from O'Connell Street to College Green, facilitate and exploit the operation of LUAS Cross City, and provide for a limited (but reduced) number of buses. At present, the street cross-section provides for up to 6 lanes of traffic, with pedestrians confined to a relatively narrow area containing trees, phone boxes, side road entrances, front-of-shop promotions etc. Crossing the street has always been difficult if not dangerous – this sense of danger is reinforced by guardrails approaching the Liffey. There have also been fatalities on the street.

8.3.2 Description / Key Changes

For this proposal to proceed, it is proposed to re-route many of the northbound bus movements currently on Westmoreland Street to D'Olier Street. Westmoreland Street will continue to provide for the limited number of buses that co-run with Luas Cross City. This will reduce the number and activity of bus stops along Westmoreland Street.

While there will be some local access traffic and a requirement for a two-way cycle route, the vast majority of the street space will be given over to providing a high quality pedestrian environment, complementing works on College Green, associated with the premium pedestrian corridor in Dublin City.

A photomontage of what the newly re-designed Westmoreland Street might look like is shown in Figure 8-4. Both footpaths will be widened, but the critical additional space will be on the sunny Western side, where the paved area will allow for front-of-shop / restaurant type activities, as well as providing a comfortable area for the major flows of pedestrians on the street.

The area at the junction of College Street and Westmoreland Street will be significantly improved, with the footpath area widened in front of the Old Parliament building, and linking across to the Westin Hotel on the Eastern side of Westmoreland Street.

At the other end of Westmoreland Street, the guardrail on the street approaching O'Connell Bridge will be removed, as part of the significant footpath widening.

There will be a two-way cycle facility, providing direct access between College Green and O'Connell Bridge, thus removing the need to cycle through D'Olier Street.

8.3.3 Benefits

The re-development of Westmoreland Street will provide a premium walking environment within a large-scale prominent street. The inclusion of a two-way cycle route, Luas stop and selected bus routes will retain the street as a highly accessible destination. In addition, it will provide a much enhanced linkage between the two commercial centres of Henry Street / O'Connell Street and the Grafton Street Quarter.

In addition, the reconfiguration of Westmoreland Street, coupled with the changes on D'Olier Street (see section 8.4 below) will allow significant improvements to be made at the O'Connell Bridge junction. The layout of this junction can be simplified with improved pedestrian space and crossing facilities, and a reduction in conflicts with vehicular traffic. In particular, there will be improved safety for pedestrians crossing Aston Quay near O'Connell Bridge, as buses will be banned from turning left from Westmoreland Street and will head west along the quays from D'Olier Street instead.

Noise levels in this area are currently some of the highest in the city – the new regime will render the street one of the quieter locations within the city centre. The street will be much easier to cross between both sides. In overall terms, the improved ambience, reduced traffic impacts, and widened pedestrian areas will assist in significant business re-generation for this landmark location.

The architectural merits of the street will become more visible through the removal of through car traffic. New economic opportunities associated with the street (especially the weaker East side) will become available, bringing life into the city centre.

Figure 8-4 Re-designed Westmoreland Street (Southerly Aspect)

8.4 Redesign of D'Olier Street

8.4.1 Purpose

There is a requirement for defined locations where it is convenient to access and interchange between buses, and between bus and tram. D'Olier Street represents a central corridor, located between the Luas Cross City northbound line (running along Westmoreland Street) and the Luas Cross City southbound line (running along Hawkins Street). Coupled with the fact that it is a wide street encompassing four existing traffic lanes plus parking and loading areas, D'Olier Street was identified as a potential corridor for two-way running, with a high concentration of bus stops in each direction.

The orientation of D'Olier Street provides an excellent opportunity to direct buses to and from Pearse Street, and to and from Dame Street, the two principal alignments for cross-city buses.

The proposal will provide much greater opportunities for pedestrians to cross the street, including at the midpoint of the street, and will attract significant new pedestrian activity to the western side of the street.

8.4.2 Description / Key Changes

As part of this proposal, D'Olier Street would be converted to a two-way street, with extensive revisions to the junction with College Street (i.e. the Trinity College end of D'Olier Street). Similar to the current O'Connell Street layout, a central median would be provided, enhancing the street environment and assisting in pedestrian movement of the street. Bus stops would be located on both sides of the street, together with footpath widening and improvements. While some access traffic may use the route, the extended College Green Bus Gate would remove through traffic.

A photomontage of what the newly re-designed D'Olier Street might look like is shown in Figure 8-5 Environmentally, there will be an overall reduction in road space, an increase in pedestrian space, and new planting appropriate to the new design.

8.4.3 Benefits

As part of the proposal to re-configure the bus network in the City Centre, D'Olier Street will become a key street for facilitating bus movements.

The redesign and changed function of the street will bring more pedestrians, particularly onto the western side which should improve the vitality and vibrancy of street, and raise the profile and attractiveness of retail units and offices located there.

In overall terms, D'Olier Street will be reconfigured as a destination street in itself, coupled to significant passenger movements, on both sides of the street. It will provide an economic opportunity to strengthen the land uses in the heart of the city centre.

Figure 8-5 D'Olier Street re-configured as two-way (Southerly Aspect)

8.5 Redesign of Beresford Place / Custom House Area

8.5.1 Current Status

At present, Beresford Place serves the function of providing a weaving area for traffic joining and leaving the road system at the back of the Custom House. The one-way weaving nature of the road within the city centre is prone to congestion every day, but especially in the evening peak.

Despite the volume of bus and coach movements, the road layouts provide no bus priority due to the weaving nature of the traffic, including buses.

Access to Busaras is complicated by the one-way nature of the street layout. Coaches are obliged to circle Busaras in order to enter it, and then circle it again on departure. In addition, the building arches into Busaras present significant conflict risks to pedestrians and passengers in the vicinity of the terminus. These risks to pedestrians and passengers mean that Bus Eireann currently have to man the two arches to ensure safe access and egress of coaches.

The area also presents difficulties for pedestrians and cyclists, and the dominance and intensity of traffic represents a significant barrier to movement between the Docklands and the north City Centre.

Due to the presence of bridge abutments north of Liberty Hall, there is considerable weaving of outbound traffic in order to be on the correct side of the Butt Bridge abutment for Fairview or Dorset Street.

8.5.2 Purpose

The reconfiguration of the Custom House area is designed to achieve the following key objectives:

(i) Provide improved connectivity and reduced severance between the Docklands, the principal transport hubs, and the city centre for pedestrians and cyclists;

(ii) Improve pedestrian access and safety in the area, in particular in the environs of major public transport hubs (rail, bus, coach and LUAS);

(iii) Improve bus journey time reliability and provide direct protected bus paths through the area, both for buses using the Quality Bus Corridors and buses accessing Busaras, and

(iv) Provide good local vehicular access in the area.

8.5.3 Description / Key Changes

The changes necessary to facilitate the introduction of this arrangement would see both Gardiner Street and Amiens Street extended as two-way streets, each diverting around the Custom House to the Liffey.

The two way traffic movement on Amiens Street would extend along Memorial Road to its intersection with Custom House Quay, with northbound traffic travelling along Custom House Quay

to turn left onto the proposed northbound lanes on Memorial Road in order to go northwards on Amiens Street.

In a similar manner the two way traffic movement on Gardiner Street Lower would extend along Beresford Place to link with Butt Bridge, with a southbound lane continuing across Butt Bridge to allow a right turn onto Burgh Quay.

Northbound traffic would be displaced from Tara Street to the next block to the east, providing a direct route outbound to Amiens Street. This will remove a significant amount of evening peak traffic from the Tara Street area, and will allow for the narrow part of Pearse Street to become two-way for buses from Tara Street to Moss Street (and onwards to Westland Row).

The redesign will see the removal of the current gyratory system and provide that buses only would be permitted to cross Beresford Place between Gardiner Street and Amiens Street.

A photomontage of what the newly re-designed Beresford Place might look like is illustrated in Figure 8-5, while Figure 8-6 sets out an indicative design and traffic layout for the area.

The weaving requirement for traffic will effectively be removed. Outbound traffic for Dorset Street will use the west side of the Custom House, and outbound traffic for Fairview may use the East side of the Custom House. Under this arrangement, it will be possible to provide bus lanes as required on the two-way streets on each side of the Custom House. Access traffic for the Store Street area may be maintained, although the redesign allows for the potential Pedestrianisation of Store Street around the LUAS stop.

8.5.4 Benefits

The removal of vehicular traffic from Beresford Place will allow for the space between Busaras and the Customs House to be redeveloped. Part of the area may be used to expand the hard standing of Busaras, with the bus entrance from Amiens Street, and exit (in either direction) onto Beresford Place. As a result, buses would no longer have to circle Busaras in order to enter it. Critically, this would remove the daily hazard to pedestrians at both arches under Busaras.

As buses will be able to move in both directions through Beresford Place, the scheme reduces the need for Dublin Bus to use Talbot Street as an access to the City Centre. Accordingly, Talbot Street could become available as a strong cycling and pedestrian corridor, offering economic redevelopment opportunities. It would also open up the possibility of pedestrianising sections of Talbot Street.

The reconfiguration of the road space at Beresford Place would also allow for an expanded pedestrian area and improved public realm in this area. The entire scheme would present Busaras, Custom House Park, and Beresford Place as an attractive destination and link the Docklands to the north City Centre.

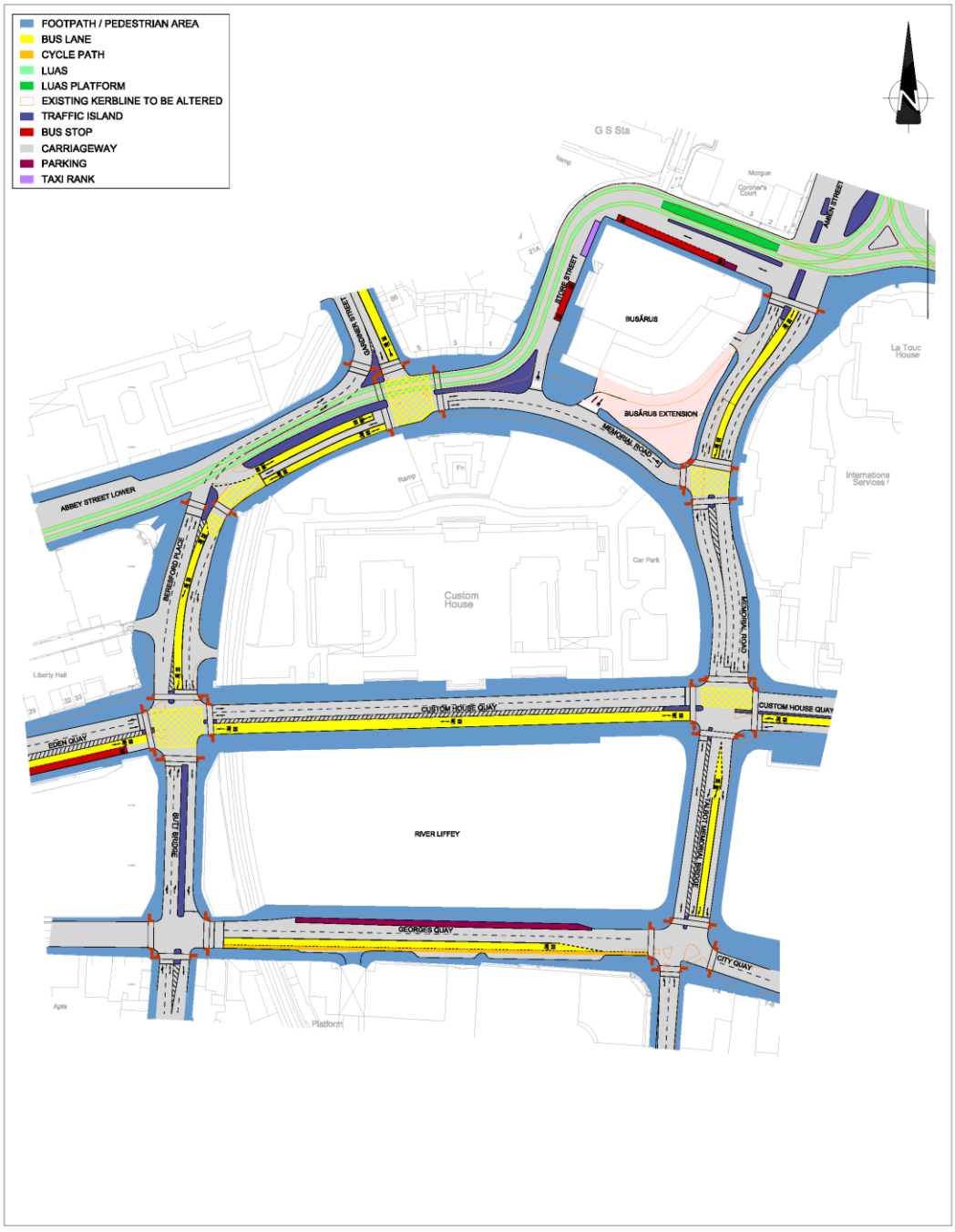
It will also improve significantly the access to the public park at the rear of the Custom House (one of the few green areas in the North Docklands area.

The scheme also provides for direct bus access to Eden Quay and the contraflow bus lane, thus reducing the pressure on George's Quay bus lane, which is currently used by buses and significant numbers of coaches.

By providing direct outbound egress for traffic from Pearse Street along Moss Street and northbound over Matt Talbot Memorial Bridge, the scheme should significantly reduce both traffic volumes and traffic speeds in the Pearse Street / Tara Street area.

Figure 8-6 Reconfigured space at Beresford Place

Figure 8-7 Indicative design for the reconfigured space at Beresford Place



8.6 Redesign of Westland Row

8.6.1 Purpose

One of the principal motivations for this intervention arises from the construction of Luas Cross City, which will require the reconfiguration of a significant number of bus routes. In particular, many cross-city buses that currently use Suffolk Street /College Green/ Lower Grafton Street will have to divert onto Westland Row, to get north of Trinity College. Hence, during the construction of Luas Cross City, and potentially during its operation, Westland Row will become a key route for busses traversing the City Centre.

Westland Row is also the location of Pearse Station, the busiest DART station on the rail network. Pearse Station represents the primary rail access point to the vitally important south east business district. Currently, the footpaths on Westland Row are too narrow to cater for the volumes of pedestrians accessing and egressing from Pearse Railway Station. In addition, the potential for interchange between the rail network and the bus network is currently quite limited at this location.

8.6.2 Description / Key Changes

Arising from the changes necessitated by Luas Cross City, it is proposed to refocus Westland Row as a public transport corridor, with improved facilities for pedestrians and cyclists. This proposal would see the removal of non-public transport vehicular traffic from Westland Row, although it is recognised that an arrangement to facilitate high vehicles on this route may be required pending the increase of the existing bridge clearance on Macken Street. This could be operated on a permit basis, based on the current 5-axle permitting system, supplemented with enforcement technology.

A photomontage of what the newly re-designed Westland Row might look like is shown in Figure 8-8.

The removal of through car traffic from Westland Row will allow for the removal of the northbound bus lane, and the provision of wider footpaths, cycle lanes and a (bus and permitted users) traffic lane in each direction. Access traffic will be retained for the premises on the street.

8.6.3 Benefits

Westland Row will be more functional and attractive to the vast majority of those using the street (pedestrians, cyclists, retailers, bus operators). The junction with Lincoln Place will be greatly simplified, allowing for improved and safer pedestrian flows to Merion Square and Nassau Street. Connection between the business district and the primary rail station serving the area will be significantly enhanced. In addition, there will be increased opportunity for bus to rail interchange at this location.

As an ancillary benefit, the creation of an effective “bus only” street on Westland Row will encourage traffic to move onto the Orbital Route (South Circular Road / Clanbrassil Street, and Macken Street) and avoid the Pearse Street / Tara Street area, especially in the evening peak.

Figure 8-8 Redesign of Westland Row

8.7 Redesign of Christchurch Place

8.7.1 Purpose:

With the College Green Bus Gate time periods being extended, the traffic requirement to use Christchurch Place is significantly reduced to a smaller amount of traffic accessing a relatively small area off the Lord Edward Street / Dame Street corridor. The aim of this measure is to reconfigure the junction of High Street / Patrick Street / Christchurch Place as part of the Orbital traffic route. However, the design includes for significantly reduced vehicular movements into and out of Christchurch Place, and includes for the integrated design of a space primarily for pedestrians and tourists.

8.7.2 Description / Key Changes:

Photomontage images of what the newly re-designed Christchurch Place might look like are shown in Figure 8-9 and Figure 8-10. The scheme will limit entry and exit from the core city centre to one lane per direction, with an entry treatment that is attractive and appropriate to the historic surroundings of Christchurch.

The project will reduce the road space for vehicular movement to a minimum, and will include a review of the entire area within the building lines of Christchurch Place, including seating, lighting and other relevant aspects.

A significant improvement in the pedestrian and tourist offer, especially for those viewing and visiting Christchurch, will be included. This could include the creation of a unified area incorporating the small park opposite Christ Church.

8.7.3 Benefits

The project will see Christchurch becoming an entry point to a significant iconic corridor in the centre of Dublin City that extends to Trinity College and Westmoreland Street, and will serve to present some of Dublin's premier tourist attractions – including Christchurch Cathedral, Dublin Castle and City Hall - in an attractive environment with minimal traffic intrusion.

Figure 8-9 Christchurch Place following re-configuration – View A

Figure 8-10 Christchurch Place following re-configuration – View B

8.8 Development of Coach Parking Facilities

8.8.1 Current Status

There are a number of private coach operators running commuter services in the morning and evening peak. Throughout the year tourist coaches also serve the City Centre ferrying tourists to attractions such as Trinity College.

At present, coach parking and layover takes place primarily on streets across the City Centre, with a number of designated areas, such as Nassau Street being heavily used.

8.8.2 Description / Key Changes

It is proposed that at least one Coach Parking Facility would be developed for the City Centre, providing secure bus parking and driver facilities off-street. This will remove a large amount of bus layover from the city centre, which will have a number of benefits both for the city's public realm, with the removal of the bus parking spaces. In addition, it should also benefit coach operators, who will have a safe secure rest area for the layover of buses.

8.9 Rationalisation and control of city centre taxi ranks

8.9.1 Current Status

There are currently 18,522 taxis authorised to operate nationally, and some 10,931 of these are registered in the Dublin area. The number of taxis serving the City Centre can, and has, resulted in insufficient taxi rank space being available. This can mean that taxis queuing at a rank can overspill into the carriageway at rank locations, or that taxis are forced to circulate around the streets and bus lanes unnecessarily. Alternatively, taxis may park at inappropriate and unauthorised locations, potentially impacting traffic movements and causing safety issues.

8.9.1 Description / Key Changes

There is a clear need for additional taxi rank capacity beyond what currently exists. Accordingly, it is proposed to identify opportunities to extend taxi rank provision in the City Centre area, whether on a full-time or night-time basis. In addition, the potential for the provision of alternative storage arrangements will be investigated.

9 Assessment Methodology

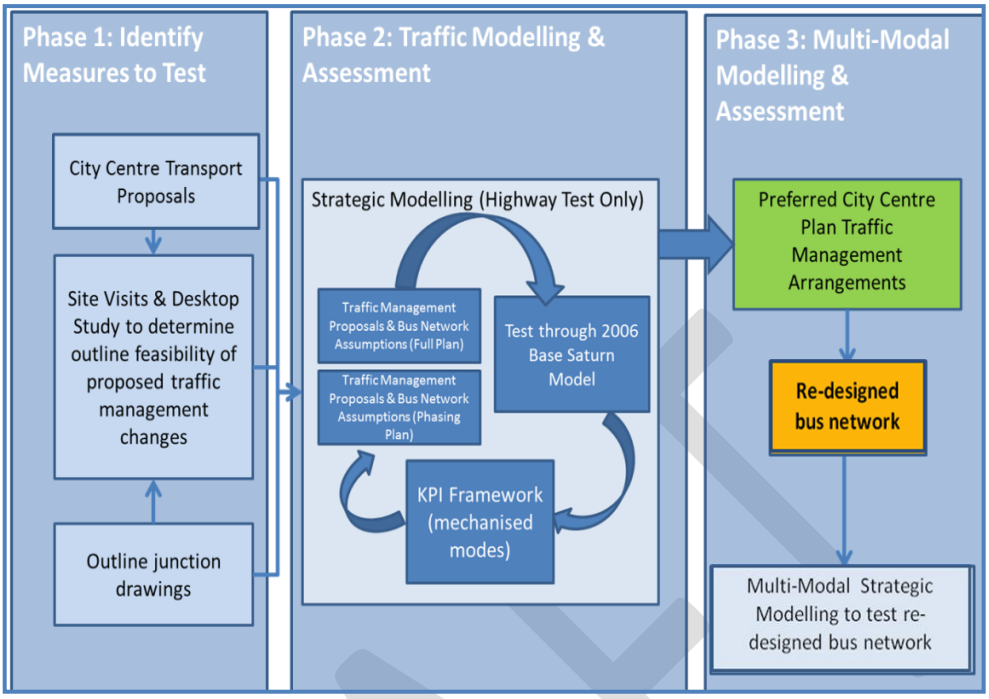
9.1 Overview

A detailed account of the assessment of the measures described in Chapters 6 and 7 is contained in a separate technical volume that accompanies this study entitled: "City Centre Transport Assessment Study – Modelling Report". This technical volume fully describes the assessment methodology, the scenarios tested and the model results for each scenario and scenario variant.

This chapter gives a brief summary of the assessment process. The process is outlined in diagrammatic form in Figure 9-1 below. The assessment process had a number of key components including:

- Development of a set of traffic management measures / proposals aimed at addressing the issues identified in Chapter 3;
- Site visits to key junctions impacted by the traffic management proposals to determine (in visual terms) the feasibility of the measures / proposals;
- Creation of outline junction drawings to reflect traffic management proposals at a junction level;
- Development of a number of traffic management scenarios and scenario variants, and an evaluation of the highway impacts of these scenarios and variants using a cordon of the GDA transport model. The process of developing these scenarios is summarised in Section 8.2 below;
- Establishment of a number of Key Performance Indicators (KPIs) based on model outputs against which the performance of the various scenarios can be tested;
- Determination of the proposals to be included in the preferred City Centre traffic management proposals and the testing of their impacts using the full GDA multi-modal transport model; and
- The development of new bus proposals to complement and take advantage of the traffic management proposals, and the testing of these new bus proposals in combination with the preferred traffic management plan in the full GDA multi-modal transport model.

Figure 9-1 City Centre Transport Feasibility Assessment Process



9.2 Development of Scenarios Modelled

A total of 13 traffic management scenarios were developed for testing using a combination of the GDA Highway and multi-modal model and a specifically developed cordoned City Centre model. Each scenario was tested in both the AM and PM peaks to ascertain the implications of the traffic management proposals.

To ensure robustness and to represent a worst case scenario, a conservative approach has been taken to the modelling evaluation in that the same car trip demand matrices have been used for all traffic management scenario tests (i.e. the same demand as used for the Base Case Scenario) in the development of the preferred traffic management option. Therefore, in developing the preferred option, account has not been taken of the expected transfer to other modes (such as public transport, walking & cycling) as a result of the improvements/enhancements that the traffic management proposals are expected to deliver for sustainable modes. However, following on from the development of the preferred option, the NTA's GDA Multi-modal model has been run to determine the likely transfer to public transport (particularly bus) as a result of the assessment study and associated traffic management proposals.

In total, over 100 modelling scenarios and scenario sub-variants have been assessed using a combination of the NTA's GDA Highway and Multi-Modal Model and a specifically developed cordoned City Centre model. The assessment was undertaken for both AM and PM Peaks to understand the implications of the various elements of the traffic management proposals and to iterate to a preferred option.

In summary the modelling process included:

- Development and testing of 13 traffic management scenarios through the GDA Highway Model and compared against a 2012 Base case scenario (Refer to Chapter 3 of the modelling technical volume for a detailed breakdown of the modelling scenarios undertaken);
- Testing each scenarios in the AM (08.00-09.00) & PM (17.00-18.00) peak periods;
- Development of a Cordoned City Centre model for each scenario for both the AM & PM Peaks in tandem with the full area model to test the core City Centre impacts of the proposals;
- Cycle time variation testing for each modelling scenario, including the testing of 120, 100, 90, 60 and 45 second cycle times and numerous variations of staging arrangements and inter-green time variation within these cycle times to test pedestrian phase variations and their impact;
- Signal optimisation testing (across the full network and at specific junctions);
- Signal priority testing on the Orbital Route;
- Evaluation of the impacts of measures on the existing bus service pattern through the City Centre;
- Numerous sub-options testing to reflect local option variations within the feasibility testing; and
- Outline feasibility assessment of traffic management proposals through site visits and workshops to discuss network constraints and assumptions relating to the coding of the junctions arrangements for traffic management options.

9.3 Modelling Assessment Leading to Preferred Option

The modelling assessment leading to the selection of the preferred traffic management proposals was undertaken in four stages as follows:

Stage 1: Initial Preliminary Feasibility Testing:

- Initial feasibility testing based on desktop analysis of issues and outline city centre options including testing various strategic assumptions on orbital and city centre signal arrangements, staging combinations and level of priority given to orbital movement in both AM / PM peaks .

Stage 2: More Detailed Feasibility Testing and Fine Tuning Local Arrangements:

- More detailed feasibility testing following site visits to determine local issues and constraints associated with key junction arrangements. Further evaluation of the sensitivity to varying cycle time arrangements on the Orbital Route and stress testing various cycle time/staging arrangements.

Stage 3: Further Fine Tuning & Multi-Modal Modelling:

- Further refinement of options and capacity checking on movements with further fine tuning of cycle times on the Orbital Route and staging arrangements. Identifying a preferred minimum cycle time required at key Orbital Route junctions with a determination of priority to be allocated to the Orbital Route. Also at this stage initial multi-modal testing is undertaken to examine potential benefits the proposals may have for sustainable modes such as public transport, walking and cycling.

Stage 4: Finalisation of Preferred Option & Conceptual Bus Network:

- Finalisation of the preferred option with further examination of junction issues. Development of new bus proposals to better match services to travel demand and to make best use of the core City Centre traffic management arrangements recommended (the process of development of the re-designed bus network is described in section 8.4 below). Full testing of the preferred traffic management arrangements through the full GDA Multi-Modal Model to test transfer to public transport and bus for the existing bus network and also with the new bus proposals.

9.4 Steps in the Development of the Re-designed Bus Network

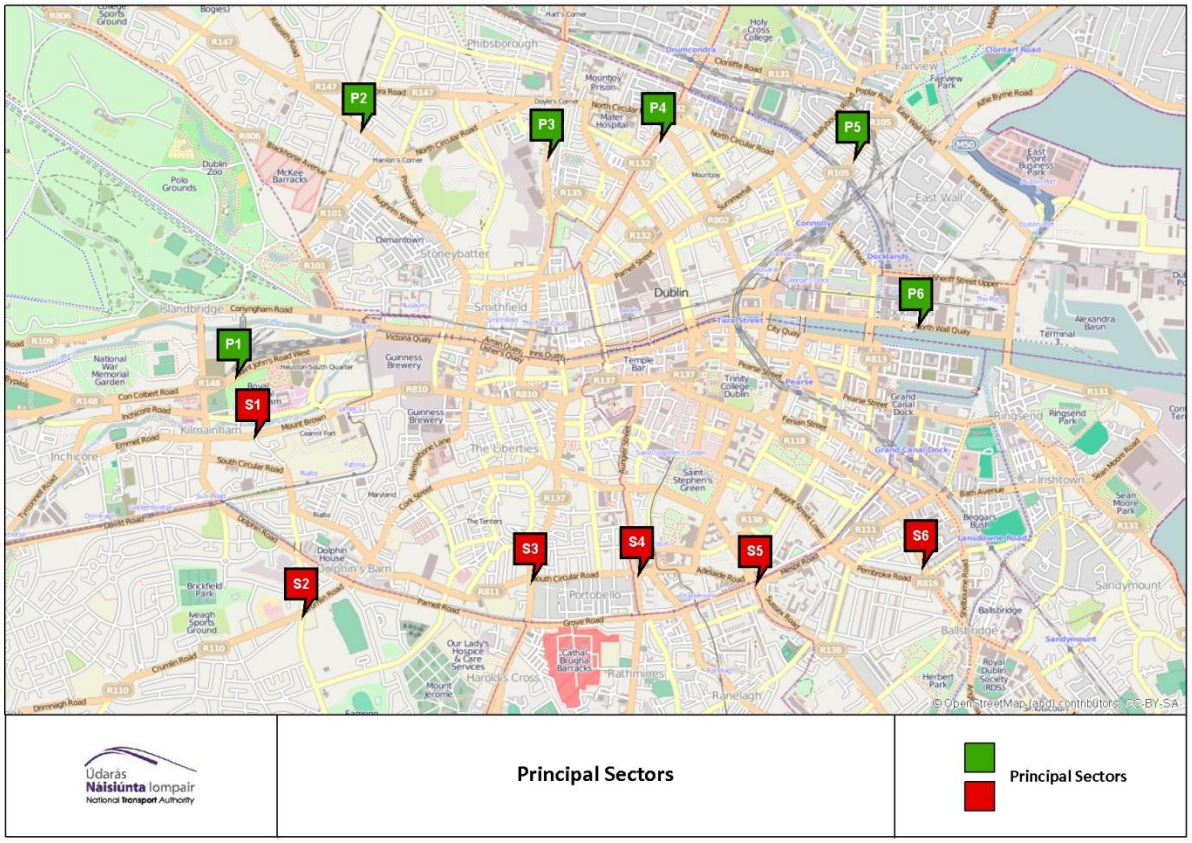
In developing the Redesigned Bus Network, a three step approach was adopted as described below.

Step 1: Determine Optimal Cross city Linkages

There are a number of potential points of entry for bus services to/from the City Centre area (broadly defined as the area within the proposed new Orbital Route). To simplify the consideration of cross-city linkage of bus routes, bus corridors were aggregated into a small number of principal sectors – the idea being to join up these principal sectors with an optimal pattern of cross-city services matching demand. The sectors are shown in Figure 9-2, with sectors P1 to P6 in green representing bus services entering the city from the North and West, while sectors S1 to S6 in pink represent the services entering the city from the South and South West.

Everywhere-to-everywhere cross-linking is neither feasible nor practical: for example some pairs of nodes would not be sensible (e.g. S2 to S5). Also, it is widely recognised that simple network patterns support strongest public transport demand, so there is a desire to avoid an overly complicated pattern of cross-links.

Figure 9-2 Principal Sectors



Even after rejecting unsuitable nodal pairs, there are more than 40 potential pairs through Dublin City. Therefore, the cross-links which support the largest actual or potential cross-city demand were prioritised.

Dublin Bus already operates selected cross-city links. These have recently been expanded and simplified as part of the Network Direct Programme. It may be confusing and counter-productive for passengers if significant changes to these cross-links are made – some of which are only recently introduced and only just bedding in.

The redesign of the bus network proceeded as follows:

- cross-link pairs with the strongest volumes of demand, but limited to a maximum of three different corridors through any one sector; and
- where capacity permitted, cross-link existing bus services where these were not captured in the previous steps.

The maximum of three different corridors from each sector was assumed to ensure simplicity whilst allowing for most of the strong cross-city movements to be paired and enabling the retention of most of the principal existing cross-city links. On this basis, only three principal cross-city services will be broken, the 4, 11 and 120.

Given the eventual need to translate these conceptual cross-links into working bus timetables, which will need to accommodate multiple routes towards outer termini, proposed buses per hour were built up in multiples of six (6 buses/hour = a bus every 10 minutes).

Step 2: City Centre Routings

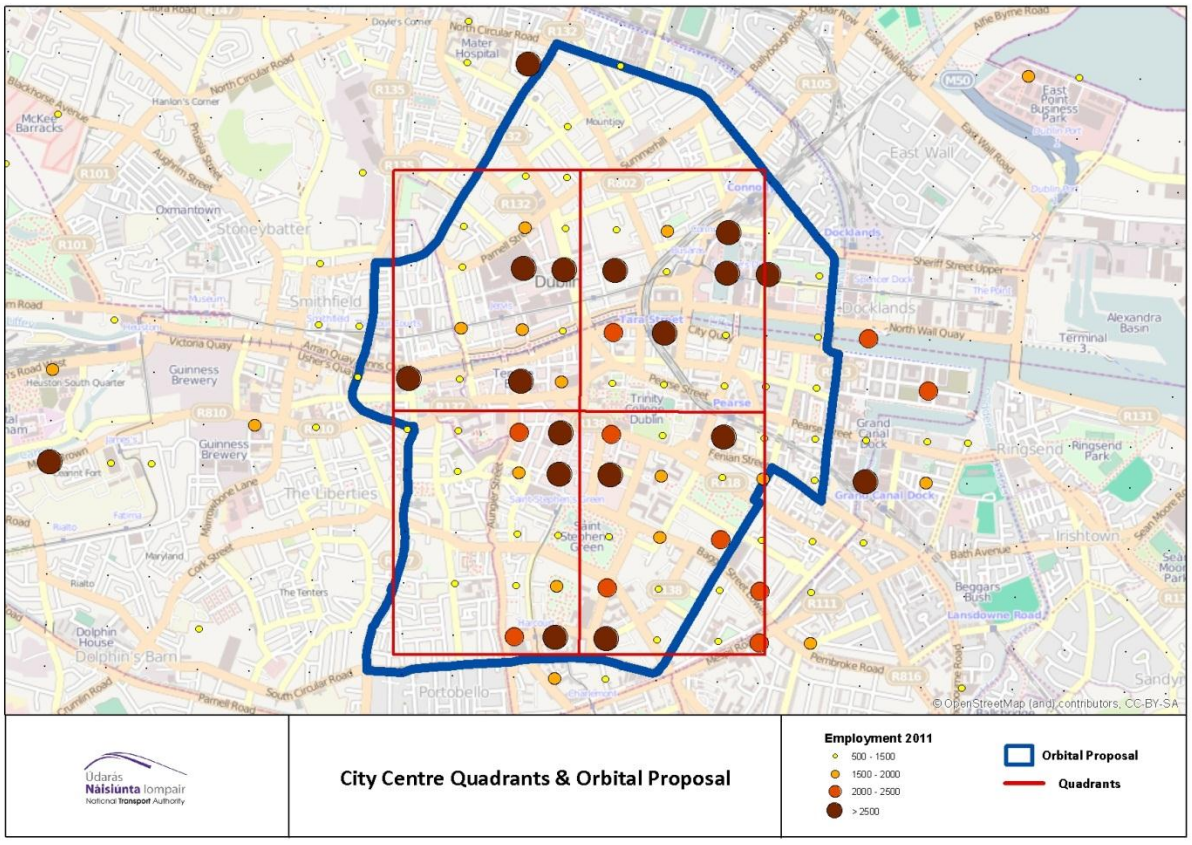
Having identified optimal cross-city links in Step 1, the routes to be followed across the City Centre were identified, by reference to:

- the proposed new orbital road layout and associated traffic management improvements in the City Centre;
- the four quadrants of the City Centre; and
- Existing City Centre routings where appropriate.

A broadly four-quadrant spatial categorisation of the core City Centre within the proposed Orbital Route is shown in Figure 9-3. Ideally, bus services from each sector of the City should be directly linked to each quadrant where possible.

(The resulting proposed cross-city routes are illustrated collectively in **Error! Reference source not ound.**5 in section 7.3.)

Figure 9-3 Four City Centre Quadrants superimposed on proposed Orbital Route



Step 3: Optimise interchange locations

The final step in the development of the new bus proposals was to optimise bus interchange and interchange between bus and other public transport modes (Heavy Rail and Luas). The objective was to consolidate interchange at a small number of strategically attractive locations within the City Centre core – these were described previously in Section 6.3 and shown in Figure 7-. At these locations, there will be a high volume of interchange movements, and hence it is important that each location should have high quality facilities in accordance with best international practices.

10 Evaluation of the Transport Proposals

10.1 Overview

The study objectives presented in Chapter 4 have been evaluated against a set of Key Performance Indicators (KPIs). This chapter presents the results of the assessment of the measures against the agreed objectives, using specific KPIs for each objective. In total, twenty KPIs were used to measure the performance of the City Centre traffic management proposals against the objectives set down, and these are listed in Table 10.1 Study Objectives Evaluation Framework. Some of the KPIs can be measured directly using outputs from the modelling work detailed in Chapter 8. However, in the case of other KPIs, no direct model outputs can be used and the evaluation is based on a qualitative assessment.

Table 10.1 Study Objectives Evaluation Framework

No.	Key Project Objectives	Key Performance Indicators (KPI)		Measured by	To Meet Objective
1	To increase the capacity for the movement of people and goods into and within the City Centre.	KPI 1.1	Increase in public transport mode share	% Change	Positive increase in Mode Share
		KPI 1.2	Shorter signal cycle times in City Centre to increase capacity for pedestrian and cyclist movement	Number of junctions changing	Yes
2	To increase the efficiency of the movement of all modes within the City Centre.	KPI 2.1	Faster bus network speeds	Minutes	Reduction in Journey Time
		KPI 2.2	Better bus stop and interchange management	Bus stop capacity improvement	Increase in Bus Stop Capacity
		KPI 2.3	Journey times around orbital and through city	Minutes	Reduction in Journey Times
		KPI 2.4	Maximising network capacity utilisation (on Orbital)	Volume over Capacity Analysis	Increase in Utilisation of Capacity across Network
		KPI 2.5	Flow distribution through network (Select Link Analysis)	Use of Orbital Route to distribute traffic	Yes
3	To develop a safer City Centre for all transport modes and users.	KPI 3.1	Reduced city centre traffic volumes	Traffic Flow (pcus)	Decrease in City Centre traffic levels
		KPI 3.2	Shorter signal cycle times in City Centre to increase capacity for safer pedestrian and cyclist movement	Number of junctions changing	Yes
4	To improve accessibility and permeability to, and within, the City Centre for pedestrians, cyclists and public trnasport users; while also maintaining access for vehicular traffic to private and public car parks.	KPI 4.1	Better bus network coverage	Map showing coverage	Yes
		KPI 4.2	Bus connectivity to four city centre quadrants from everywhere	Map showing coverage	Yes
		KPI 4.3	Functioning Orbital Route for general traffic movement providing accessibility for trips destined for city centre	Volume over Capacity Analysis at Orbital Gateway Junctions	Operational Improvements
5	To improve the functionality, legibility and consistency of the networks in the City Centre for all users, with particular focus on the movement of public transport, private vehicles and goods vehicles.	KPI 5.1	Simpler / legible bus network with fewer routes	Map showing coverage	Yes
		KPI 5.2	Consistency of phasing at junctions within city centre area	Map showing coverage	Yes
		KPI 5.3	Functioning Orbital Route	Yes / No	Yes
		KPI 5.4	Reduced need for bus layover (reduce bus termination in city centre)	Yes / No	Yes
6	To ensure value for money in the implementation of City Centre proposals.	KPI 6.1	Based around maximising use of existing infrastructure	Yes / No	Yes
7	To reduce the neagative impact of transport on the Public Realm in the City Centre.	KPI 7.1	Better public realm focused on pedestrians cyclists and public transport	Photomontages / Visuals	Improvements to Public Realm

10.2 Measuring against Objectives

Objective 1: To increase the capacity for the movement of people and goods into and within the City Centre.

The performance of Objective 1 is measured through two KPIs, as follows:

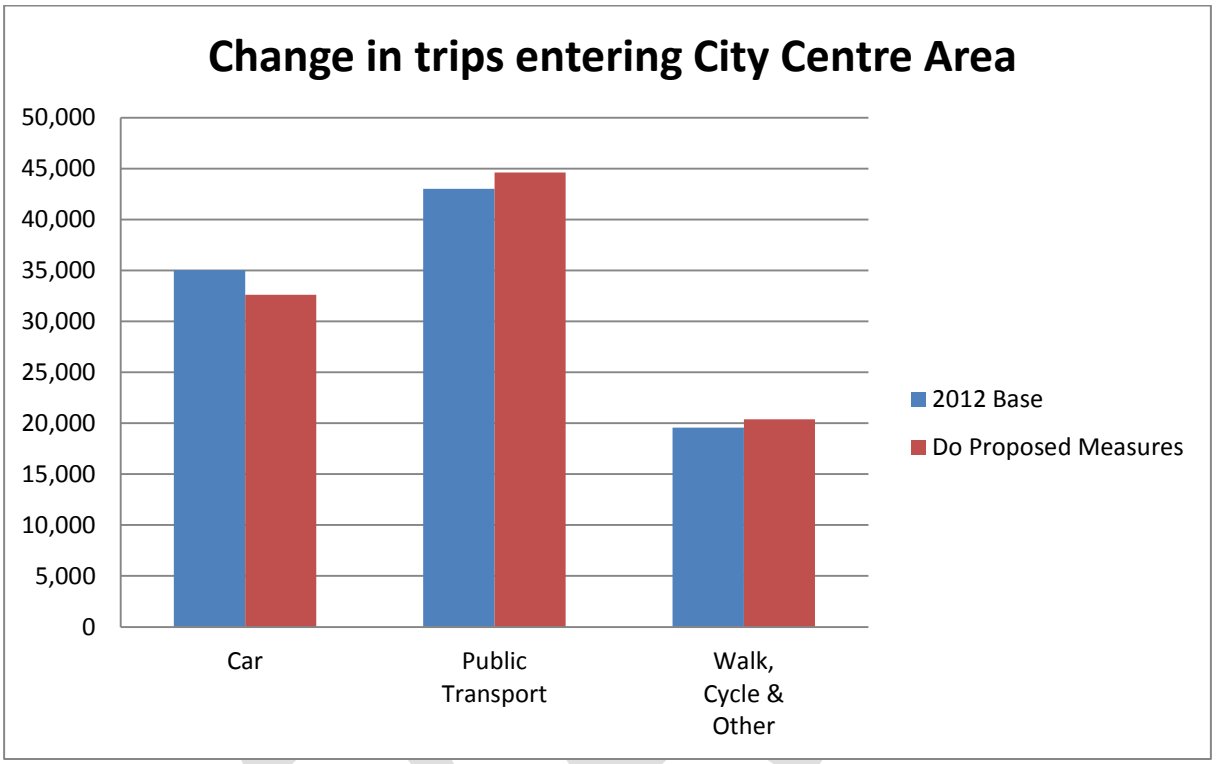
KPI 1.1: Increase in Public Transport Mode Share:-

The impacts of the proposed measures on the use of Public Transport in the City Centre were tested by running the full multi-modal GDA transport model and comparing model outputs for two scenarios – i.e. the "2012 Base" case and the "Do Proposed Measures" scenario. For these two scenarios, model outputs in terms of traffic flows and public transport passenger numbers entering the City Centre Area in the AM peak hour were extracted and compared. Figure 10-1 shows the impacts of the proposed measures on the mode share of trips entering the City Centre in the AM peak hour.

The combined impact of the traffic management measures and the proposed new bus network would mean that some 2,424 person trips to the City Centre currently made by car would now switch to Public Transport and other modes. There would be an increase of some 1,600 trips by public transport (or a 4% increase) in the AM peak hour as a result of the proposals. On the conservative assumption that the total number of trips to the City Centre remains constant, this would mean an estimated increase of 5% in walking and cycling trips as a result of the proposals.

Currently, some 80 million people use Public Transport to access the City Centre annually – hence it can be estimated that the proposals would generate an increase of more than 3 million public transport passengers annually.

Figure 10-1 Change in mode share of trips entering the City Centre (AM Peak)



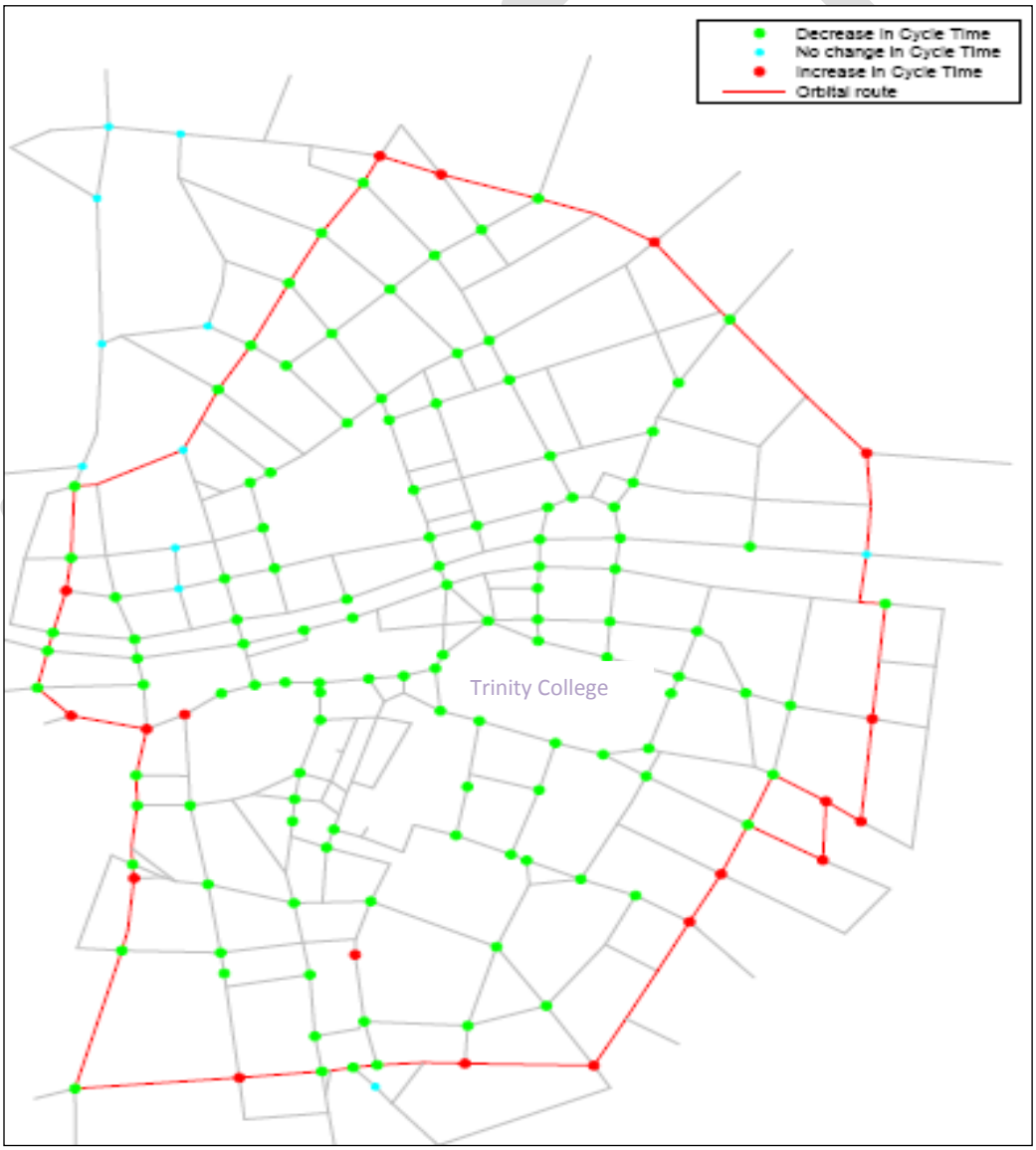
Outcome from KPI 1.1: The new bus network in combination with the traffic management proposals has a significant beneficial impact on the attractiveness of public transport in the city centre and will increase public transport usage by an estimated 3m trips per annum. This KPI performance meets the criteria of Objective 1.

KPI 1.2: Shorter signal cycle times in City Centre to increase capacity for pedestrian and cyclist movement:-

Figure 10-2 illustrates the number of junctions within the city centre area that were changed as part of the traffic management proposals. In total, 147 signalised junctions are represented on the map. The reductions in cycle times involves many of the most heavily used pedestrian crossings in the City Centre seeing a reduction in wait times from up to 2 minutes, down to 45 seconds in many places (a 63% reduction). Overall this assists in pedestrian movement and also aids bus and cycle movement.

Outcome from KPI 1.2: Approximately 80% of signalised junctions in the City Centre have had cycle times reduced to promote better mobility for walking and cycling in the central core of the city. This KPI performance meets the criteria for Objective 1.

Figure 10-2 Changes in cycle times at the signalised junctions



Objective 2: To *increase the efficiency* of the movement of all modes within the City Centre

The performance of Objective 2 is measured through five KPIs, as follows:

KPI 2.1: Faster bus network speeds:-

This KPI measures the performance of bus speeds through the city centre. Figure 10-3 and Figure 10-4 compare bus speeds (in the AM Peak and PM peak respectively) as output by the model for the base case compared to the case of the preferred scheme that includes the new bus proposals within the Orbital Route. Bus speeds for approximately 225 bus routes (travelling at least 1km in the area of the city centre) were extracted from the model outputs. In in the figures below, each point on the horizontal axis scale represents an individual bus route, while the average speed of routes is represented on the vertical axis. While it cannot be expected that the model would accurately represent the bus speeds for each individual bus route, the model outputs do show a clear overall trend. The horizontal blue and pink lines represent the overall average speed of all 225 bus routes for the "Base" and "New bus proposals" scenarios respectively. The figures show that overall there is an increase of approximately 17% in average bus speeds in the AM Peak and 8% in the PM Peak.

Outcome from KPI 2.1: The City Centre transport proposals have a very positive impact on bus speeds within the Orbital Route. This KPI performance meets the criteria of Objective 2.

Figure 10-3 Bus Speed inside City Centre Area (AM Peak)

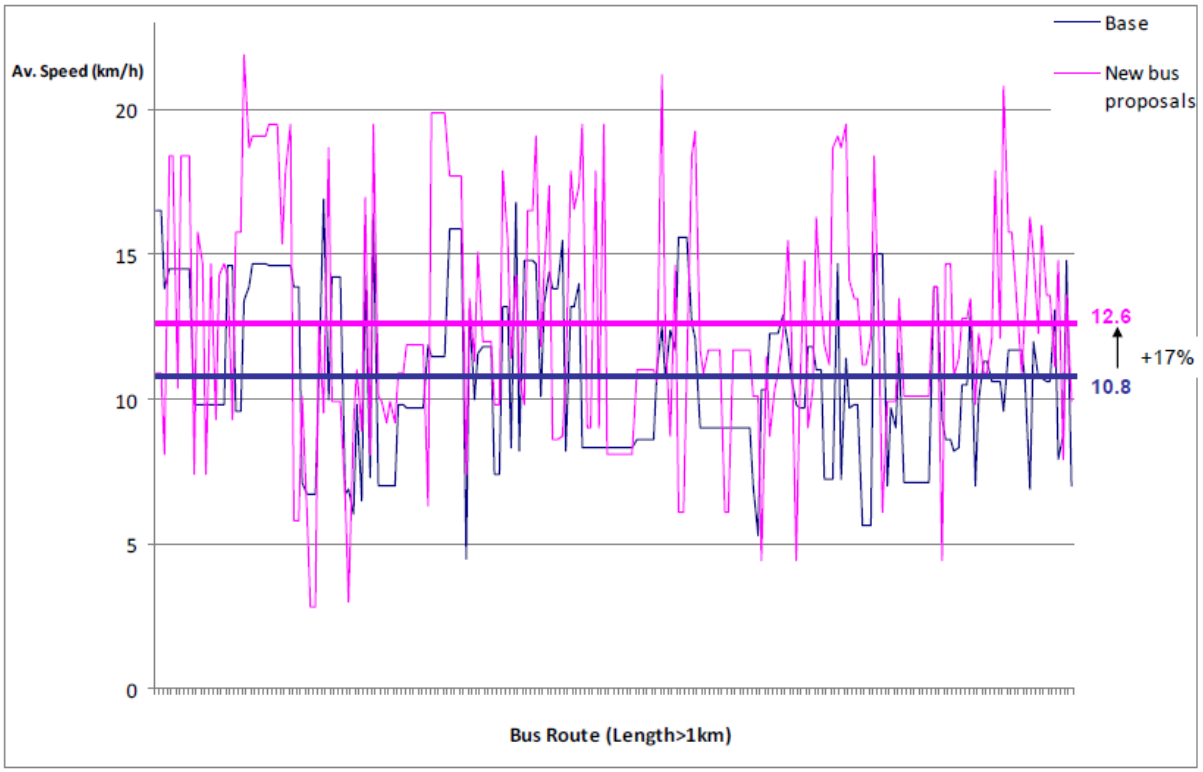
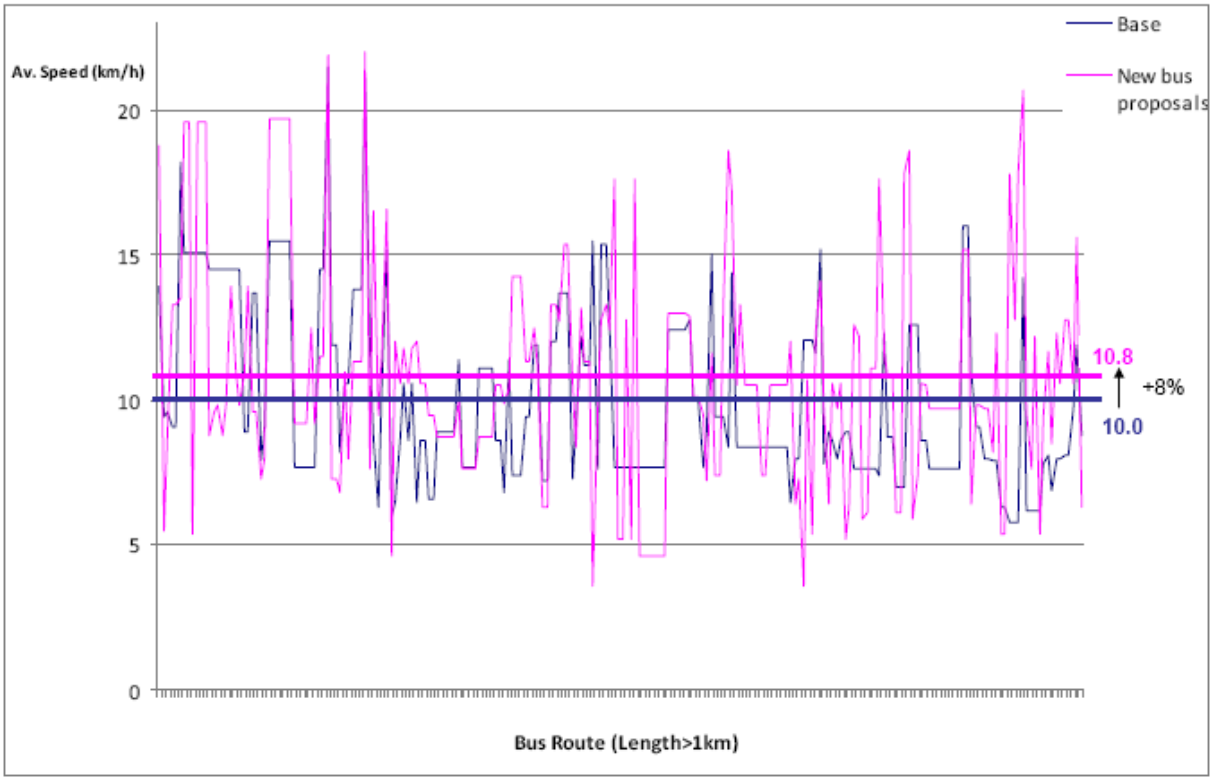


Figure 10-4 Bus Speed inside City Centre Area (PM Peak)



KPI 2.2: Better bus stop and interchange management (improving bus stop capacity):-

This KPI assesses bus stop and interchange management. Under the current network of bus services, some 90 buses terminate in the city centre during the AM peak hour, while the proposed re-designed Bus Network would reduce this to only 16 buses terminating within the study area. In addition, the re-configured bus network would reduce the current concentration of bus routes on a limited number of streets. The combination of these measures, together with the re-design of some City Centre streets will greatly reduce bus congestion and overcrowding at key City Centre bus stops (e.g. Dawson St, Westland Row, Westmoreland St etc.). Furthermore, the proposed network facilitates the development of high quality public transport interchange at a number of key locations.These measures would greatly improve the overall operational efficiency, reliability and ease of use of the bus network within the City Centre.

Outcome from KPI 2.2: The re-configured bus network will deliver much improved operational efficiency at City Centre bus stops, whilst also facilitating the development of key interchange locations. This KPI performance meets the criteria of Objective 2.

KPI 2.3: Car journey times around Orbital Route & through city:-

This KPI measures the journey time performance of the proposals against the base case. Table 10.2 below compares the average car journey times of for the city centre area between the base case and the preferred scheme. Average journey times decrease by 15% in the PM Peak and remain almost the same in the AM Peak for movement within the Orbital Route.

Table 10.2 Average Car journey times inside the Orbital Route

(minutes)	AM	PM
Base case	10.1	12.4
Preferred scheme	9.9	10.5
Change	-1%	-15%

Car journey times on the orbital during the AM and PM Peak periods were also extracted from the model and are shown in Table 10.3 Orbital Route Car journey times (AM & PM Peaks). In the case of the AM Peak, average car journey times with the preferred scheme in place reduce by 15% in the clockwise direction, but increase travel time by 20% in the anti-clockwise direction. In the PM Peak, the impact of the preferred scheme is to improve car journey times by 14% in the clockwise direction and by 7% in the anti-clockwise direction. It should be noted that these journey times are calculated for a full loop of the orbital route, and most trips will only utilise a portion of the oribal network for the overall journey. It is more significant to note that the journey times in each

direction, both in the AM and PM peak, are now more consistent than in the base case. This is an important consideration in terms of assessing journey time reliability for vehicular journeys.

Table 10.3 Orbital Route Car journey times (AM & PM Peaks)

	(minutes)	Base	Preferred scheme	Change
AM	Orbital Clockwise	67	57	-15%
	Orbital Anti-Clockwise	52	63	20%
PM	Orbital Clockwise	66	57	-14%
	Orbital Anti-Clockwise	57	53	-7%

Outcome from KPI 2.3: Overall, the modifications at junctions on the orbital route result in more consistent journey times in both the AM and PM peaks. Overall the journey times have also reduced. This KPI performance meets the criteria of Objective 2.

KPI 2.4: Maximising network capacity utilisation (on the Orbital):-

This KPI measures the ultilisation of network capacity between the base case and the proposals. The City Centre transport accessibility study proposals aim to maximise the use of available capacity across the City Centre network thereby improving network efficiency particiularly in the PM Peak period where traffic congestion is worst. Figure 10-5 and Figure 10-6 compare the distribution of volume over capacity percentages (V/C) for all junctions on the Orbital Route between the base case and the proposed traffic management proposal in the AM Peak and PM peak respectively. Junctions are classified under three V/C category ranges as follows:

- <50% (green bars);
- >50% and <75% (yellow bars); and
- >75% (red bars).

The effect of traffic management proposals is to generally reduce the number of junctions operating at less than a V/C of 50% and increase the number of junctions operating at between 50% and 75%. This is particularly the case in the PM Peak period. The traffic management proposals, therefore, redistribute traffic more evenly across the City Centre network (i.e. Orbital Route is used more) and better utilises network capacity.

Outcome from KPI 2.4: The traffic management proposals will utilise capacity more efficiently across the network. This KPI performance meets the criteria of Objective 2.

Figure 10-5 Number of junction on the Orbital route within V/C range on the AM period

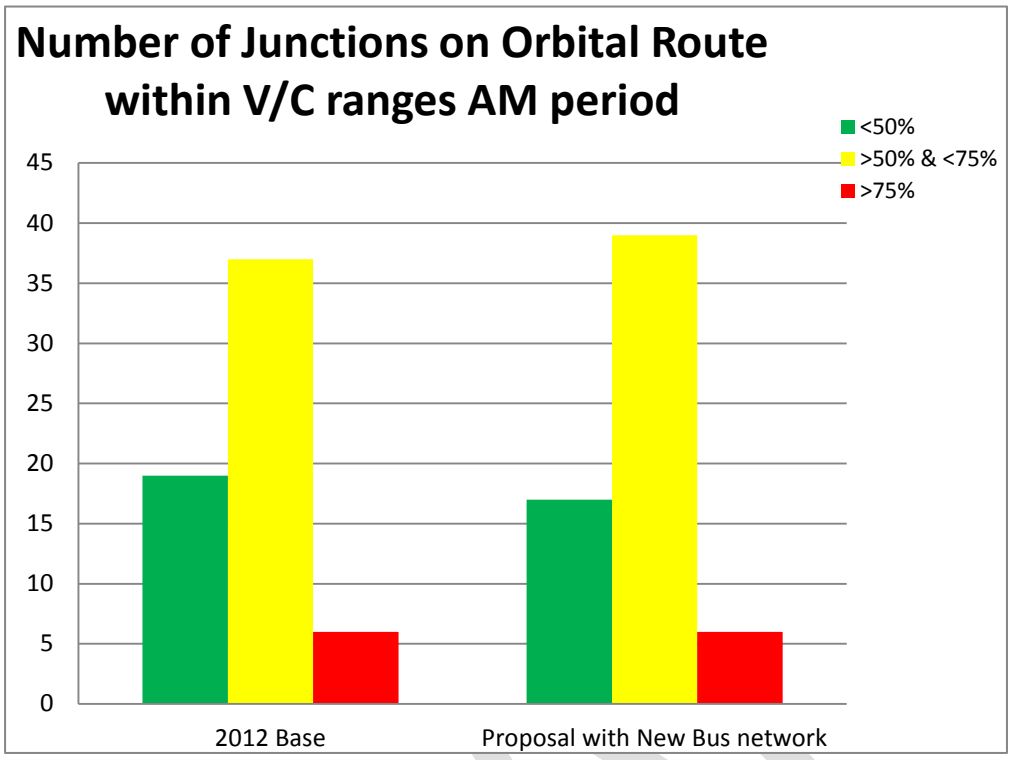
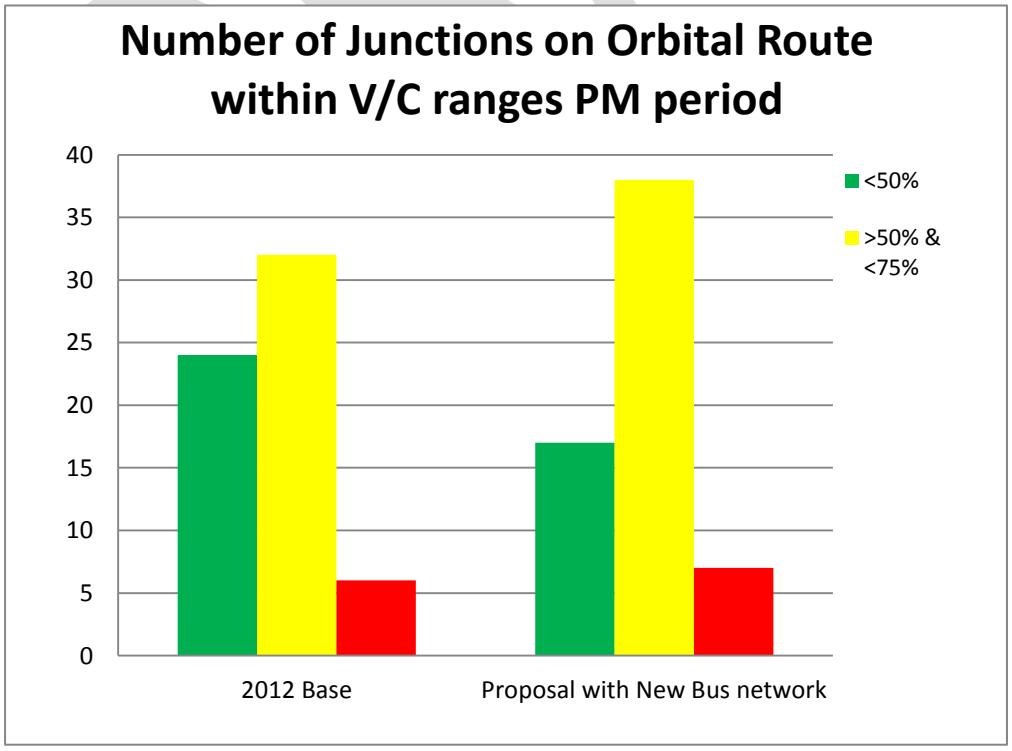


Figure 10-6 Number of junction on the Orbital route within V/C range on the PM period



KPI 2.5: Flow distribution through the network (Select Link Assessment):-

This KPI examines the performance of the Orbital Route in terms of accommodating additional traffic above the base case. The flow distribution is observed using a modelling process called select link assessment. For two strategic links on the Orbital Route, marked in red on the figures, origins and destinations of the traffic through these links are represented on Figure 10-7 and Figure 10-8 to illustrate the effectiveness of the Orbital Route. The figures demonstrate that with the proposed traffic management proposals, more traffic uses the Orbital Route to move around the city, with consequently less traffic passing through the City Centre.

Outcome from KPI 2.5: The traffic along the orbital route increases as it becomes the preferred route for more journeys. This KPI performance meets the criteria of Objective 2.

Figure 10-7 Select link assessment toward city centre – PM period

Base 2012 **Scheme**

Figure 10-8 Select link assessment on the orbital

Base 2012 **Scheme**

Objective 3: To develop a *safer City Centre* for all transport modes and users.

The performance of Objective 3 is measured through two KPI's, as follows:

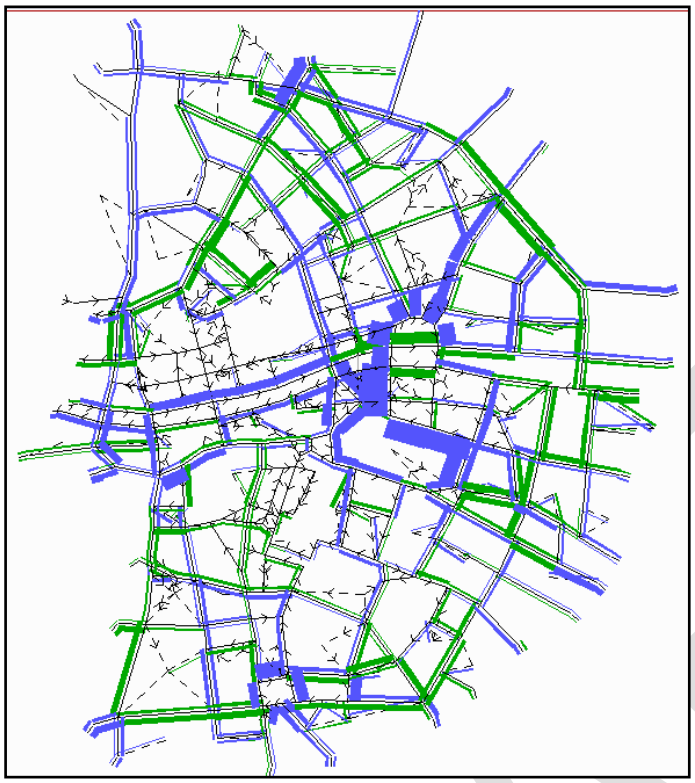
KPI 3.1: Reduced city centre traffic volumes:

This KPI measures the reduction in traffic flow in the city centre area as a result of the traffic management proposals. Figure 10-9 and Figure 10-10 are plots extracted from the transport model to show the changes in car traffic flows in the City Centre as a result of the traffic management and bus network proposals for the AM Peak and PM peak periods respectively.

The plots show that in both the AM and PM Peak periods there is a significant reduction in traffic flow in many areas on the City Centre as a result of the traffic management proposals, particularly in areas of high pedestrian and public transport acitivity – College Green, D'Olier Street, Westmoreland Street, O'Connell Bridge, along the quays and around Beresford Place. In each case, as can be expected, there are increases in traffic flows on the Orbital Route.

Outcome from KPI 3.1: The traffic management proposals reduce traffic levels in the city centre and provide a better environment for pedestrian, cycling and public transport movement in the city centre. This KPI performance meets the criteria of Objective 3..

Figure 10-9 Differences in flows between proposal with new bus routes and the existing situation, in the AM peak period.



AM period	**Car Trips**
Base	26,953
Proposal with New Bus network	25,081
Difference	-1,872

Figure 10-10 Differences in flows between proposal with new bus routes and the existing situation, in the PM peak period.

PM period	**Car Trips**
Base	26,345
Proposal with New Bus network	25,578
Difference	-767

KPI 3.2: Shorter signal times in the City Centre to increase capacity for safer pedestrian and cyclist movement:-

Please refer to Figure 10-2 which illustrates the number of signals within the City Centre area that have been reduced.

Outcome from KPI 3.2: The traffic management proposals would result in shorter cycle times at 80% of signalised junctions within the City Centre. This will provide for an increase in capacity for safer pedestrian and cyclist movements. This KPI performance meets the criteria of Objective 3.

Objective 4: To *improve accessibility and permeability* to, and within, the City Centre for pedestrians, cyclists and public transport; whilst also maintaining access for vehicular traffic to private and public car parks.

The performance of Objective 4 is measured through four KPIs, as follows:

KPI 4.1: Better bus network coverage:-

Error! Reference source not found. in Chapter 7 illustrated the expanded nature of the bus network ithin the City Centre area. The re-configuration of the bus network reduces the congestion of bus routes on a limited number of streets, and facilitates greater accessibility across the whole city centre from outside the study area. The wider network coverage by bus services, combined with better interchange opportunities will result in enhanced public transport accessibility.

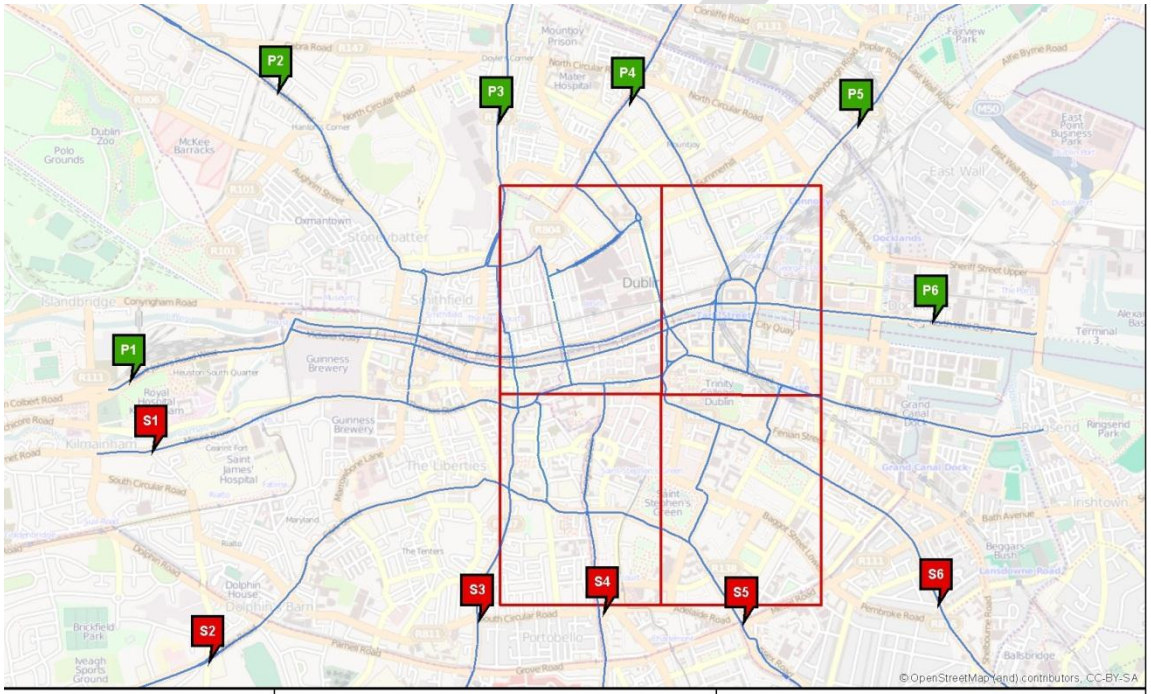
Outcome from KPI 4.1: The re-configured bus network, combined with better pubic transport interchange opportunities will result in better public transport accessibility.. This KPI performance meets the criteria of Objective 4.

KPI 4.2: Bus connectivity to four city centre quadrants from everywhere:-

Figure 10-11 shows the bus network connectivity provided by the new bus proposals in relation to the four City Centre quadrants shown in the figure. As shown by the blue boxes in the table under Figure 10-11, the majority of sectors are directly linked to all four quadrants. The remainder are accessible by way of a single transfer.

Outcome from KPI 4.2: The re-designed bus network will result in most sectors being directly linked to all four City Centre quadrants. This KPI meets the criteria of Objective 4.

Figure 10-11 Links from Radial Corridors to City Centre Quadrants



	S1	S2	S3	S4	S5	S6	S7	P6	P5	P4	P3	P2	P1
NW													
NE													
SE													
SW													

KPI 4.3: Functioning Orbital Route for general traffic movement providing accessibility for trips destined for city centre:-

This KPI measures the performance of the orbital route against the base case. Overall flows on the Orbital Route are increased by approximately 8%-10% in both AM and PM periods. There is more traffic using the orbital in the clockwise direction than the anti-clockwise direction during the morning peak and more traffic on the anti-clockwise than the clockwise during the PM peak.

As illustrated in

Figure 10-12 and Figure 10-13, the performance of the Gateway junctions were measured in terms of V/C percentages changes from the base case. Overall in both the AM and PM Peaks the performance of the Gateway junctions on the Orbital Route improve over the base case as a result of

Outcome from KPI 4.3: The Orbital Route has more capacity to carry more traffic than the base case. This KPI meets the criteria of Objective 4.

Figure 10-12Number of gateway junctions within V/C ranges in the AM peak period

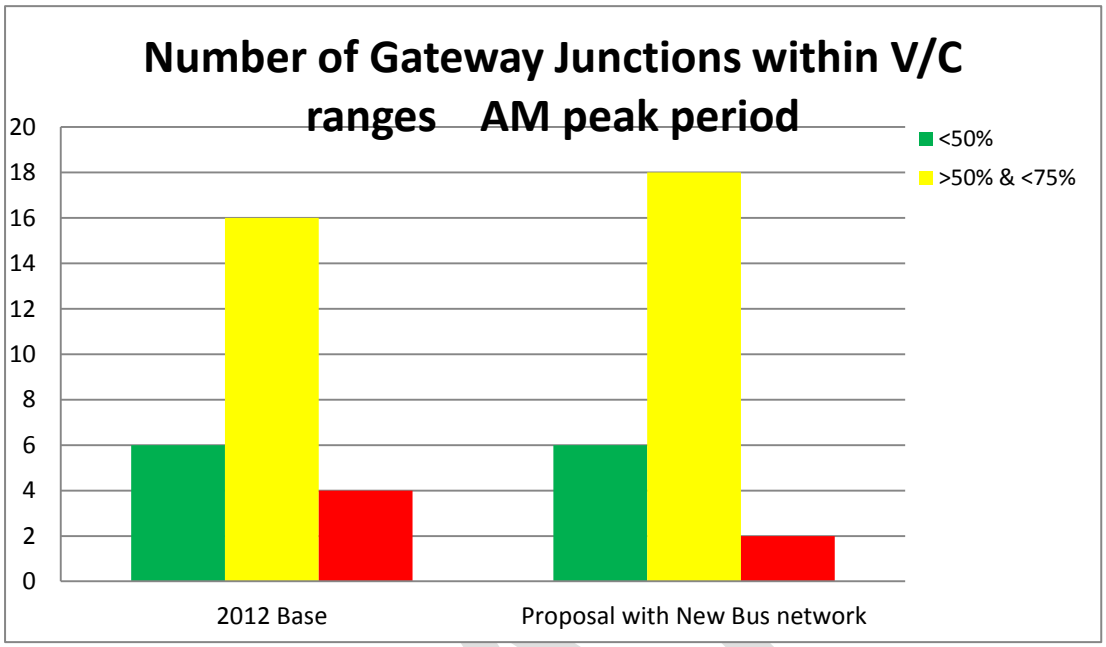
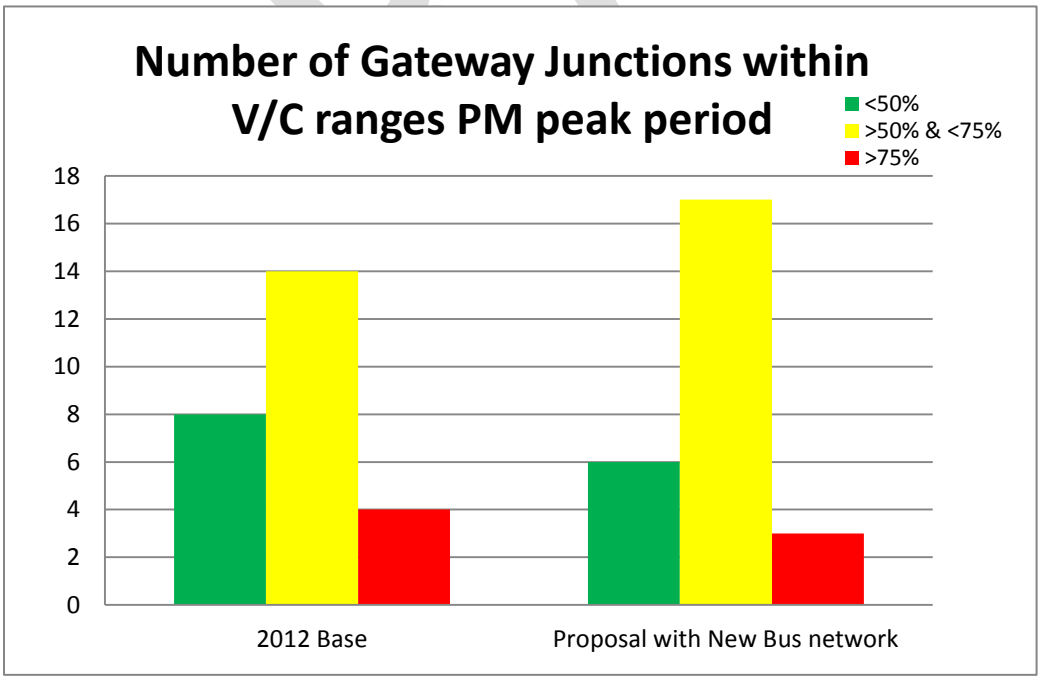


Figure 10-13Number of gateway junction within V/C ranges in the PM peak period



Objective 5: To *improve the functionality, legibility and consistency* of the networks in the City Centre for all users, with a particular focus on the movement of public transport, private vehicles and goods vehicles.

The performance of Objective 5 is measured through four KPI's, as follows:

KPI 5.1: Simpler / legible bus network with fewer routes:-

This KPI measures the performance of the re-configured bus network in terms of providing a more legible network comprising fewer routes. The bus network will result in the cross-linking of services (i.e combining 2 or more services to form a single cross city route which best fits customer demand), thereby reducing the total number of routes. In addition, the primary parts of the network will be routed along a set of identifiable corridors through the City Centre, which will better facilitate interchange between public transport services at key interchange locations.

Outcome from KPI 5.1: The re-configuration of the bus network will reduce the number of routes and simplify the overall network, better facilitating interchange and making it more legible for the public transport user. This KPI performance meets the criteria of Objective 5.

KPI 5.2: Consistency of phasing at junctions within City Centre area:-

This KPI assesses the impact of the proposals on junction signal configuration. The standardisation of junction cycle time and associated phasing allows for better movement and an easier network to navigate particularly for pedestrians and cyclists.

Outcome from KPI 5.2: All signalised junctions within the Orbital Route will have shortened and more consistent cycle times with regular pedestrian green time. This performance meets the criteria of Objective 5.

KPI 5.3: Functioning Orbital Route:-

As described in KPI 4.4, the orbital route provides better access to City Centre.

Outcome from KPI 5.3: Access to the City Centre is maintained and the Orbital Route has capacity to carry more traffic than in the base case. This KPI performance meets the criteria of Objective 5.

KPI 5.4: Reduced need for bus layover (reduce bus termination in city centre):-

This KPI assesses the impact of the re-configured bus network on City Centre layover requirements.

Outcome from KPI 5.4: The revised bus network would reduce the number of buses terminating in the City Centre in the AM peak hour from 90 currently to 16. This KPI performance meets the criteria of Objective 5.

Objective 6: To ensure value for money in the implementation of proposals for the City Centre.

The performance of Objective 6 is measured through one KPI, as follows:

KPI 6.1: Maximising use of existing infrastructure:-

This KPI assesses the value for money provided by the proposals.

***Outcome from KPI 6.1:* The traffic management and re-designed bus network will provide value for money as follows:**

- Makes best use of existing infrastructure, requiring limited junction reconfiguration (e.g. on the Orbital);
- The benefits to sustainable modes will be considerable given the anticipated level of investment required to deliver the proposals (the evaluation has shown there will be a 4% increase in public transport use within the City Centre in the AM peak as a direct result of the measures);
- The proposals can be delivered on a phased basis, with each phase delivering incremental benefits;
- The traffic management proposals and re-designed bus network will deliver faster bus network speeds in the City Centre thereby reducing operational costs for bus whilst higher passenger numbers will support revenue increases; and
- The re-designed bus network will result in the cross linking of services and the consequential reduction in route overlap which will deliver savings to bus operations.

Outcome from KPI 6.1: The traffic management proposals and revised bus network will make better and more efficient use of existing resources and will deliver significant benefits at a small overall cost . This KPI performance meets the criteria of Objective 6.

Objective 7: To reduce the negative impact of transport on the Public Realm in the City Centre

The performance of Objective 7 is measured through one KPI, as follows:

KPI 7.1: Better public realm focused on pedestrians, cyclists and public transport:-

Outcome from KPI 7.1: The traffic management proposals will support and provide for the delivery of improved public realm enhancements in the City Centre. This will deliver a much improved environment for the movement of sustainable modes. This KPI performance meets the criteria of Objective 7

11 Summary of Benefits of Proposals

The evaluation of proposals presented in Chapter 10 clearly shows that the measures deliver significant benefits to all users of the City Centre and achieve the stated objectives of the study. This final chapter summarises the benefits of the recommended proposals for the City Centre under three main headings:

- Transport benefits;
- Commercial, Retail and Tourism benefits; and
- Improvements to the Urban Realm, Civic Space and City Ambience.

11.1 Transport benefits

The proposals would deliver significant transport benefits for the City Centre including:

- Public Transport trips into the City Centre will increase by 4% - equivalent to an increase of more than 3 million public transport trips annually;
- Significant levels of through traffic (i.e. traffic with no origin or destination in the City Centre) will be removed from the core City Centre;
- Shortened signal cycle times, reduced phases at signalised traffic junctions and the additional pedestrianised areas will provide a greatly improved environment for the movement of pedestrians and cyclists within the City Centre. This in turn can be expected to significantly increase the number of people choosing to use these sustainable modes to travel to and within the core of the city. Equally significantly, this improved environment will allow people, including shoppers and tourists, to move around the City Centre area more easily, safely and with less delay;
- Even allowing for no overall increase in the numbers of people accessing the City Centre, it can be estimated that the reduction in car trips will mean a 5% increase in walking and cycling trips;
- More optimal use of road space for vehicular movement on the Orbital Route and dispersal of traffic more evenly across the network; and
- Provide a much better operating environment for bus movement through the city with better bus speeds, less delays, higher quality and more efficient interchange, and more efficient use of road space by buses within the City Centre. The re-configured bus network will result in a revised version of the existing bus network, providing a simplified service pattern focused on cross-city routes with higher service frequencies.. It will complement the benefits released by the Orbital Route and City Centre traffic management proposals and will feature;
    - Accommodation of the planned Luas Cross City extension and the potential delivery of Bus Rapid Transit;
    - An optimisation of City Centre bus routes to minimise congestion and improve reliability, and take full advantage of the reduced vehicular traffic levels associated with delivery of the Orbital Route;

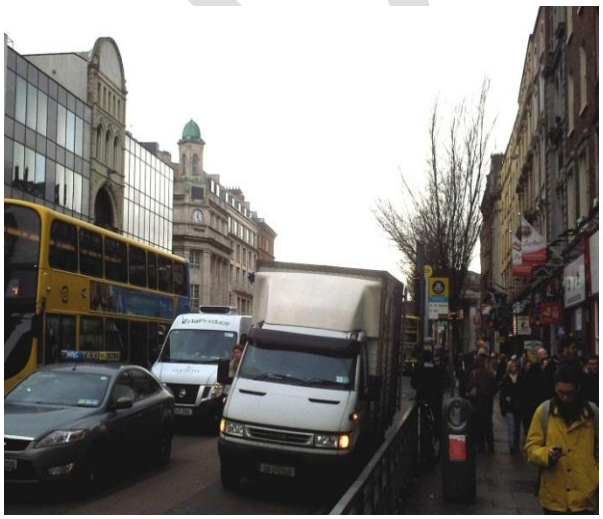
- The provision of high quality bus servicesl running through, and linking each of the four major City Centre quadrants;
-
- The development of public transport interchange facilities, located at a number of key locations across the city centre.
- An evolution of the existing bus service patterns to assist implementation, and minimise service disruption for passengers and bus operators. .

11.2 Commercial, Retail and Tourism benefits

Commercial / Retail

The proposed changes to the Public Transport network will considerably increase the potential number of people who have quick and easy access to Dublin City Centre to work and to shop. These improvements, in addition to the enhancements in the public realm and ambience of Dublin City Centre would significantly boost the attraction of Dublin as a shopping destination. The improved facilities for pedestrians, including the proposed pedestrianisation of Suffolk Street and the enhanced pedestrian facilities on Church Lane, will greatly benefit the retailers operating on these streets, and in adjacent areas like Lower Grafton Street and Dame Street. This would create a contiguous pedestrianised shopping space, effectively extending the premium Grafton Street 'shopping precinct' to these streets.

In addition, the proposed improvement to the pedestrian environment along the central civic spine of the city from O'Connell Street, via Westmoreland Street and College Green to Grafton Street, coupled with the completion of Luas Cross City would provide a vastly improved link between the core shopping areas on the north and south sides of the city. This will benefit the perceived retail offer of Dublin City Centre as a whole, while also specifically raising the profile and attractiveness of the retail premises along the central civic spine, benefitting in particular areas such as Westmoreland Street, which has degraded badly over the years as a retail destination.



Tourism

The recommendations set out in the study will complement Dublin as a premier European tourist destination. The creation of new civic spaces corresponds directly with the location of key tourist attractions like Trinity College and Christchurch Cathedral. Tourists, like residents, will have more space to appreciate and dwell at Dublin city's principal landmarks. The proposed pedestrianisation of Suffolk Street, adjacent to the location of Dublin's main tourist office, will allow tourists more room to congregate and meet at a designated tourist focal point. This will be of benefit to the tourist industry, and also by providing a location for groups to meet off the main thoroughfare, will benefit the general flow of pedestrians in the popular Grafton Street area.

In addition, the improved environment and legibility of the proposed pedestrian and public transport networks is of particular benefit to tourists and visitors not familiar with the layout of the city. The recommendations of this study propose a significant alteration to the public transport network, making it more legible, user friendly and integrated. Also proposed are changes to Beresford Place, which will have direct benefits to tourists and visitors using Bus Aras and Connolly station. These improvements would ensure that from the point of arrival into Dublin City Centre, tourists and visitors are greeted with a non-hostile public realm allowing them to orientate themselves in a more pleasant environment.

11.3 Improvements to the Urban Realm, Civic Space and City Ambience

The Urban Realm

The reconfiguration of the movement of vehicular traffic away from the City Centre, and a rationalisation of how public transport will serve the centre, will allow much more space to be devoted to pedestrians, and facilitate the development of new landmark civic spaces such as at College Green. This is in line with the Vision and Priorities outlined in the Dublin City Council Development Plan and objectives of the Council's Public Realm Strategy. The proposals will vastly improve the ambience of the City Centre, transforming heavily trafficked thoroughfares into pedestrian friendly streets, where people can walk, shop, socialise and appreciate their surroundings in a more stress free environment.

The proposed improvements to the urban realm would also provide a much more attractive environment for people choosing to live in the city centre. This in turn would assist the marketing of central Dublin as a place where a wide spectrum of people could live, work and socialise, increasing the potential for mixed use and consolidated development within the City Centre.

Civic Spaces

Landmark locations within the City Centre, such as College Green and the area surrounding Christchurch Cathedral, are currently dominated by traffic, significantly reducing their utilisation as premium city attractions. A significant benefit of the proposals outlined in this study would be the potential to reallocate space at key landmark locations to improve the public realm and allow for the transformation of these areas into key civic spaces worthy of the buildings/amenities surrounding them. The improved public realm will allow people to enjoy some of the best of Dublin's architectural heritage in comfort and space, and would also significantly raise the profile and attractiveness of the commercial properties at these locations. Dublin will have central civic spaces worthy of a European capital city.

APPENDICIES

Appendix 1

As set out above, the City Council has a wide range of policies and objectives which clearly demonstrate their pre-existing commitment to the core principles and the proposals which have emerged from the study. Measures and projects implemented on the ground to date have demonstrated the same general trend towards developing the city centre in a way which maximises the movement of people. The most noteworthy of these projects are as follows:

Parking

- Removal of free on-street parking in city centre and approaches into the city;
- The introduction of clamping;
- Zonal parking standards based on centrality and access to public transport;

Re-distribution of road space

- The removal of general traffic lanes to provide Quality Bus Corridors;
- Removal of parking spaces to develop the Grand Canal Cycle Route;
- Removal of general traffic lanes to facilitate Luas;

Traffic re-routing

- College Green Bus Gate;
- Banned turning movements, e.g. George's Street to Dame Street
- Pedestrianised and semi-pedestrianised areas, e.g. South King Street, Dame Lane, Fade Street;
- Environmental Traffic Cells;
- New Liffey Bridges, including Macken Street and Marlborough Street;

Street Redesign

- Capel Street, Parliament Street, Wexford Street / Camden Street

Goods

- Port Tunnel and City Centre HGV Management Plan

ITS

- Regional Traffic Management Centre (UTC, CCTV, Emergency response etc.)
- Regional road user information (VMS, radio station, TMC, SMS, web, app etc.)
- Real Time Passenger Information

Cycling

- Dublin Bikes
- Cycle infrastructure provision
- Cycle Counter Monitoring
- Cycle parking

Pedestrians

- Liffey Boardwalk
- Millennium Bridge
- Countdown Timers
- All-pedestrian stages in junctions
- Pedestrian counters

Appendix 2

Selection of Dublin City Development Plan Objectives which can be delivered within the proposals outlined in the study.

SCO1 – To prepare a local area plan for the Liffey quays in the lifetime of this plan in order to develop the public realm of the river and anchor it as a central civic spine, to avail of the enhanced environment arising from the HGV 5-axle Ban and the opening of the port tunnel;

SCO2 – To implement a programme of environmental improvements along the grand civic spine from Parnell Square to Christchurch Place, including College Green and Dame Street arising from the opportunities provided by the introduction of the College Green Bus Priority System;

SCO14 – To examine the possibility of closing the area along the river Liffey in front of the Customs House to motorised traffic on Saturdays and Sundays to create a new public plaza;

SCO15 – To examine the possibility of, and promote the creation of a new public realm improvement space in the area fronting onto Trinity College and the Bank of Ireland at College Green;

SIO3 – To support and facilitate the implementation of 'Transport 21' public transport infrastructure and assist in facilitating the construction and associated mitigation of major public transport infrastructure projects where necessary;

SIO4 – To support and facilitate the implementation of integrated ticketing and real time passenger information systems across the public transport network in association with relevant transport providers and agencies;

SIO5 – To seek to ensure the implementation of integrated ticketing across all public transport modes within two years of the adoption of the development plan;

SIO7 – To implement the Quality Bus Corridor Network measures outlined in the National Transportation Authority's 'A Platform for Change' and secure the development of new Quality Bus

Corridors and the improvement of existing Quality Bus Corridors in co-operation with the Quality Bus Network Project Office;

SIO8 – To facilitate and promote the enhancement of public transport bus services, through the implementation of traffic management measures, and by ensuring that the design and layout of neighbourhoods facilitates the expansion of bus services;

SIO9 – To facilitate and support measures implemented or proposed by transport agencies to enhance capacity on existing lines and services, to provide interchange facilities and to provide new infrastructure including Metro North, DART Underground, Intercity and Commuter services and Luas network extension;

SIO10 – To support relevant transport agencies, providers and adjoining local authorities in assessing the feasibility of developing Bus Rapid Transit systems within the Greater Dublin Area;

SIO11 – To prepare and implement a Dublin Cycling Strategy which sets out the City Council's cycling policies, targets and programmes, together with an annual report on progress towards objectives which will include:

- A cycle training programme
- A 'Safe Routes to Schools' programme
- A cycle signage strategy
- A cycling awareness strategy
- A new cycle parking strategy to provide guidance on the nature, quantum and location of cycling parking facilities in the city to address cycle parking needs at public transport stops and interchange, and other key destinations and attractions

SIO12 – To develop the Strategic Cycle Network for Dublin city connecting key city centre destinations to the wider city and the national cycle network;

SIO13 – To develop new cycle links including:

- Sandymount to Clontarf using Dodder bridge and Macken Street bridge.
- Sutton to Sandycove, including a new off-road cycle and pedestrian route through Docklands and on to Clontarf

- Docklands Route
- Grand and Royal Canal Premium Routes
- Heytesbury Premium Route

SIO14 – To develop a direct cycle linkage system away from the primary traffic network including on and off-road cycle lanes designed and constructed to minimise conflict with other road users;

SIO15 – To improve existing cycleways and bicycle priority measures throughout the city;

SIO16 – To implement a 30kph speed limit inside the city centre (area between the canals);

SIO17 – To monitor the success of the 'dublinbikes' scheme and to expand to the entire city;

SIO18 – To provide additional cycle and pedestrian bridges across the city's canals and rivers to form part of strategic cycling and walking routes;

SIO19 – To provide contra-flow possibilities for cyclists on one-way streets where possible;

SIO20 – To provide increased priority for cyclists at key road junctions where possible, by using road marking, priority light signals and other measures as appropriate;

SIO22 – To extend the river Liffey Boardwalk westwards through the city centre from Capel Street towards Heuston;

SIO23 – To create and support a network of pedestrian infrastructure to promote and facilitate walking, provide improved levels of priority and lighting for pedestrians and cyclists along key desire lines and accommodate growth in public transport commuter numbers;

SIO24 – To develop a high quality pedestrian environment at new public transport interchanges and to identify improvements for existing interchanges;

SIO25 – To provide for safe crossing at vehicular intersections and identify further improvements in tandem with the emerging public transport and vehicular networks;

SIO26 – To avail of opportunities to increase footpath widths within the city centre during the construction of Transport 21 projects;

SIO27 – To provide increased priority for pedestrians at gateways into the city where possible, through the introduction of increased pedestrian crossing points and other measures as appropriate. In particular, pedestrian crossing points on either side of the canal will be prioritised;

SIO28 – To provide an attractive environment for pedestrians that facilitates and encourages social interaction;

SIO29 – To explore the extension of the pedestrian zone in the Grafton Street area to include the creation of new pedestrian streets without compromising access to existing car parks in the city centre. Candidate streets for pedestrianisation would include but would not be limited to:

- Anne Street South;
- Duke Street;
- Clarendon Street; and
- South William Street.