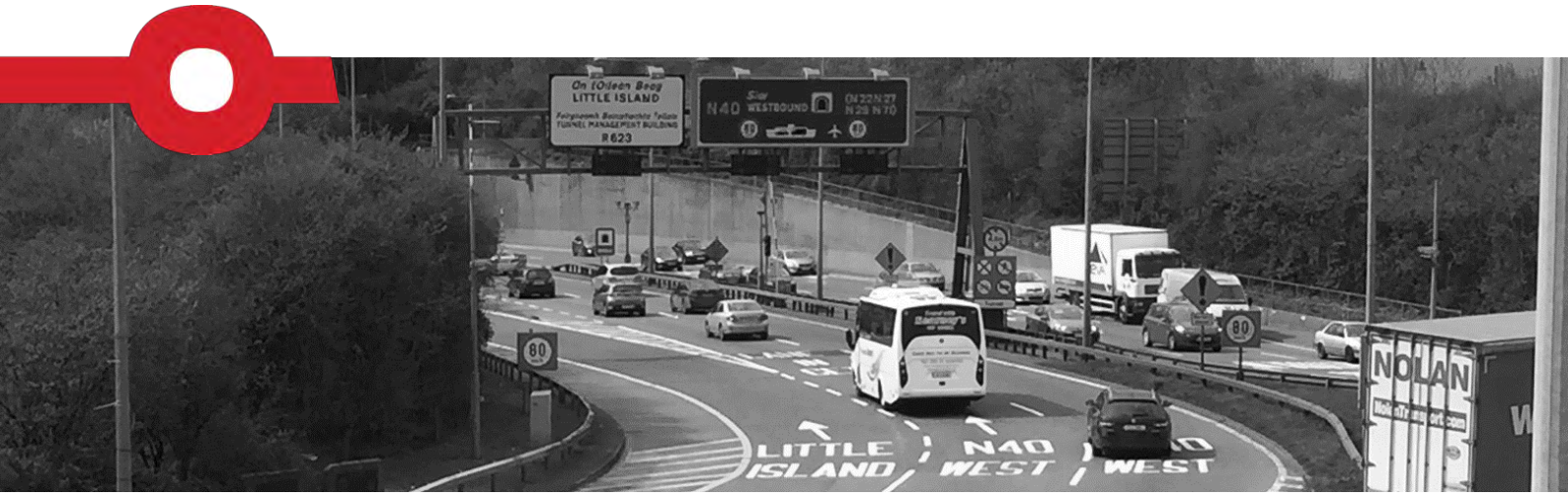
Little Island Transportation Study **16/02/2018**

Reference number 30033912

FINAL STRATEGY DEVELOPMENT REPORT



Cork County Council
Comhairle Contae Chorcaí

CH2M Barry

SYSTRA

LITTLE ISLAND TRANSPORTATION STUDY

FINAL STRATEGY DEVELOPMENT REPORT

IDENTIFICATION TABLE	
Client/Project owner	Cork County Council
Project	Little Island Transportation Study
Study	Final Strategy Development Report
Type of document	Final
Date	16/02/2018
File name	LITS Strategy Development Report
Reference number	30033912
Number of pages	210

APPROVAL

Version	Name		Position	Date	Modifications
1	Author	Diarmuid Bailey / Tim Delaney / Adrian O'Neill		21/12/2017	
	Checked by	Andrew Archer		21/12/2017	
	Approved by	Ian Byrne		11/10/2017	
2	Author	Diarmuid Bailey / Tim Delaney / Adrian O'Neill / Ben Huskinson		14/02/2018	2nd Draft incorporating CCC review comments
	Checked by	Andrew Archer		16/02/2018	
	Approved by	Ian Byrne		16/02/2018	

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

1.1 Background & Study Requirements

1.1.1 Cork County Council have commissioned SYSTRA and CH2M Barry to develop a transportation strategy for Little Island. The overall aim of the Little Island Transportation Study (LITS) is to:

- identify the existing transportation issues within Little Island;
- explore potential solutions; and
- ensure that there is an integrated and balanced approach to transportation engineering for the future of the Island.

This is required so that Little Island can fulfil its strategic function as an employment location, logistics hub and residential community.

1.1.2 Little Island is a significant employment location in Metropolitan Cork, which also encompasses the village of Little Island. It has been extensively developed over the last few decades, particularly in view of its strategic location adjacent to the national road network and central location in Metropolitan Cork. Given the geographical constraints, vehicular access to Little Island is limited to the N25 interchange and slip roads off the Dunkettle Interchange, with most travel to and from the island during peak period by car. The road network within Little Island itself is also restricted. Whilst a frequent rail service provides access to Kent Station and Midleton, the public transport offering on island is very limited. As such, Little Island suffers from severe peak hour traffic congestion.

1.1.3 The LITS will determine what transport infrastructure improvements and policy measures are needed to alleviate the severe peak hour traffic congestion on the road network within Little Island. These measures shall also explore the potential to reduce dependency on single occupier car journeys and look at ways of increasing active travel and public transport use. The study will make recommendations on what interventions are required to improve the environment for general traffic, cyclists, pedestrians and public transport vehicles.

Figure 1.1 Little Island Study Area

1.2 Outline of Study Approach

1.2.1 The overall methodology for the LITS is outlined in Figure 1.2 below, and can be broken down into the following key steps:

- **Evaluation of Existing Situation:** SYSTRA and CH2M Barry have carried out a baseline study of Little Island to gain an appreciation of current conditions within the area, including the identification of potential transportation issues. A public consultation event has been held to present the study to the general public and employees/employers, and to invite opinions and concerns regarding the future of Little Island.

- **Visioning, Evaluation Framework & Strategy Development:** The vision for Little Island has been defined based on feedback from the public consultation and a review of national, regional and local policy. Objectives and Key Performance Indicators (KPI's) have been developed to help achieve the defined vision. A package of strategy measures were developed for testing based on current transportation issues identified within the Little Island local area.

- **Strategy Assessment & Emerging Strategy:** The various strategies have been tested using the National Transport Authority's (NTA) South West Regional Model (SWRM) and a strategic traffic model developed for Little Island. The results of the model runs were analysed using the defined KPI's to identify which package of measures best achieves the study objectives. This preferred package of measures will form the finalised transport strategy for Little Island.

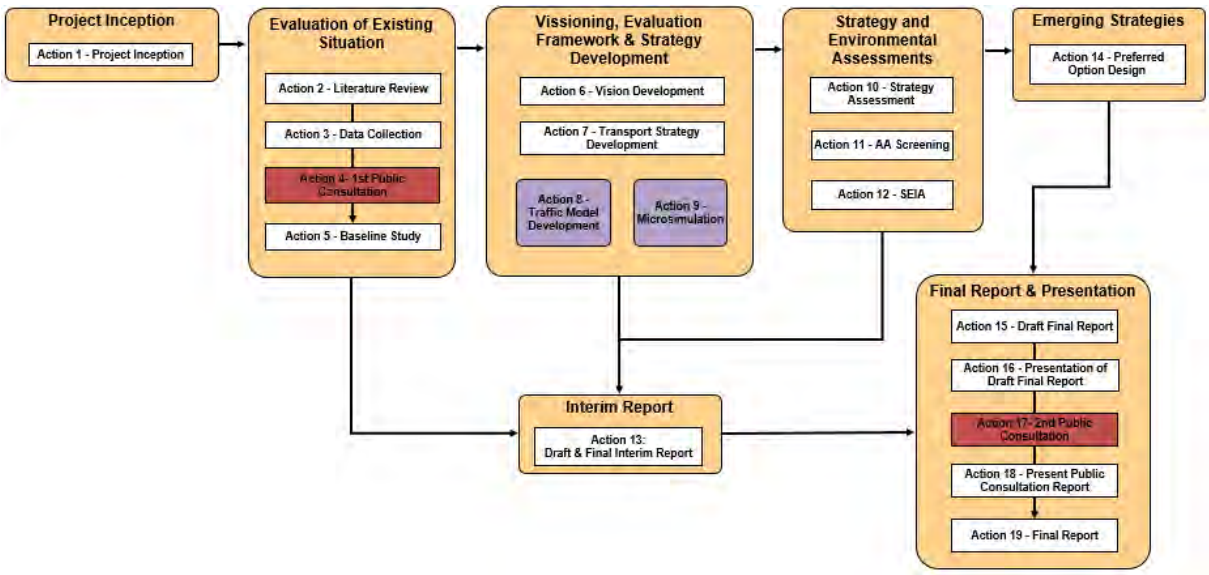


Figure 1.2 LITS Methodology

1.3 Purpose of this Report

1.3.1 This report focuses on Actions 1 –12 (excluding microsimulation) outlined in Figure 1.2 above, and will provide information on the following:

- National, regional and local planning and policy documents guiding the development of Little Island;
- current traffic conditions in Little Island including key issues identified during site visits and public consultation;
- the evaluation framework utilised to assess various LITS strategies including the development of a study vision and goals;
- the development of the Little Island Traffic Model (LITM) used to test various transport strategies;
- the assessment of test strategies through the identified evaluation framework; and
- the identification of the emerging preferred LITS Strategy.

1.4 Report Structure

Chapter 2 – Review of Planning and Policy Documents

Chapter Two provides a summary of relevant planning and policy documents relating to transport issues in Little Island.

Chapter 3 – Public Consultation

Chapter Three outlines the public consultation process carried out and details the responses received from key stakeholders.

Chapter 4 – Baseline Transport Assessment

Chapter Four evaluates the current traffic conditions experienced in Little Island. The current available public transport facilities are reviewed along with details of cycle and pedestrian infrastructure.

Chapter 5 –Evaluation Framework

Chapter Five outlines the framework developed for evaluating the various transport strategies leading to a preferred integrated package of measures and recommendations.

Chapter 6 – Little Island Local Area Model Development

Chapter Six provides an overview of the development of a local area traffic model which will be utilised to test the various LITS transport strategies.

Chapter 7 – Strategy Development

Chapter Seven provides an overview of the strategies which were identified to achieve the vision and objectives of the LITS.

Chapter 8 – Strategic Environmental Assessment and Appropriate Assessment

Chapter Eight outlines the results and recommendations which have been developed from the outputs of the SEA and AA process.

Chapter 9 – Strategy Appraisal

Chapter Nine outlines the comparative assessment of the five proposed transport strategies identified to support the sustainable growth of Little Island.

Chapter 10 – Emerging Preferred Strategy

Chapter Ten uses the results from the appraisal in Chapter 9 to establish the emerging preferred LITS Strategy. Results are also provided from re-testing the emerging preferred strategy through the Evaluation Framework to ensure that it is achieving all of the study objectives

Chapter 11 – Summary & Next Steps

Finally, Chapter Eleven provides a general summary of this report and the next steps of the study.

2. REVIEW OF PLANNING AND POLICY DOCUMENTS

2.1 Introduction

2.1.1 As part of the Strategy Development Report, the County and Local Development Plans, Regional Guidelines and other transport studies have been reviewed in the context of this study.

2.1.2 The following documents are considered to have relevance to the study and have been reviewed:

National Policy and Strategies

- Towards a National Planning Framework (2015);
- Building on Recovery: Infrastructure and Capital Investment (2016-2021
- National Spatial Strategy (2002-2020);
- Smarter Travel: A Sustainable Transport Future (2009-2020);
- Achieving Effective Workplace Travel Plans Guidance for Local Authorities (2013); and
- Spatial Planning and National Roads: Guidelines for Planning Authorities (Department of Environment, Community and Local Government, 2012)

Regional Plans and Strategies

- Southwest Regional Planning Guidelines (2010-2022).

Local Plans and Strategies

- Cork County Development Plan (2014);
- Cork 2050: Cork's Submission to the National Planning Framework (March 2017);
- Cobh Municipal District Local Area Plan (August 2017);
- Cork Area Strategic Plan (2008 Update);
- Cork Cycle Network Plan (2017); and
- Cork Area Transit Study (2010)

Environment Policy

- Cobh Municipal District Local Area Plan – Volume 2, Environmental Report (August 2017);
- Cork County Development Plan 2014

2.2 National Policy and Strategies

Towards a National Planning Framework (2015)

2.2.1 A new planning framework is currently being prepared known as the National Planning Framework (NPF). The NPF will supersede the 2002 National Spatial Strategy. Spanning 20 years, it will provide a long-term central spatial planning policy strategy that will guide future

development and investment decisions and guide future regional strategies and county development plans.

2.2.2 The NPF will be informed by the Regional Spatial and Economic Strategies, which are to be prepared in tandem with the NPF process, by the 3 new Regional Assemblies namely the Eastern and Midland, Northern and Western and Southern Regional Assemblies.

2.2.3 Due to the large geographical extent of each assembly, their overall strategy will be informed by smaller Strategic Planning Areas (SPA)which cover key economic catchments. Cork lies within the South-West SPA.

2.2.4 Cork County and City Councils prepared a joint submission in March 2017 entitled 'Cork 2050: Cork's Submission to the National Planning Framework'. This document is reviewed in Section 2.4 of this report.

2.2.5 The NPF will outline a strategic approach that promotes sustainable settlement and transport strategies in both urban and rural areas. Specifically, the NPF will do the following:

- Identify national priorities in terms of future employment growth and development;
- Distinguish between the role of the larger cities as major international cities and our regional towns in extending the influence of the cities; and
- Establish a clear policy framework within which there will be more dynamic participation by rural areas in overall regional development by re-emphasising the contribution from rural based enterprise in food, tourism, natural resource and innovation sectors.

2.2.6 This new framework will also provide the strategic context for the following:

- Investment in critical national infrastructure by both the public and private sectors in key areas such as housing, transport, energy, water services, communications and waste management;
- Planning at regional and local levels for Ireland's requirements in relation to housing, commercial, office and industrial accommodation;
- Preparation of new Regional Economic and Spatial Strategies by the three new Regional Assemblies and the associated enhancement of the economic development focus of local authorities as provided for under the Local Government Reform Act 2014; and
- Interactions between the development of Ireland's land mass and its neighbours in the EU, including our territorial waters through integrated territorial and marine spatial planning.

Building on Recovery: Infrastructure and Capital Investment (2016-2021)

2.2.7 The government released its revised National Development Plan for the period from 2016 to 2021. The National Development Plan is a road map for the development of Ireland, setting out the planned expenditure for large-scale national infrastructure. The Plan prioritises spending on areas of greatest need as the economy continues to recover. A considerable improvement in public finances has allowed the Government to increase the level of expenditure on capital infrastructure gradually over the six-year period.

2.2.8 The Capital Plan includes allocations for new projects across a number of key areas and funding to ensure that the present stock of national infrastructure is refreshed and

maintained. The Plan comprises Exchequer and non-Exchequer spending. The Exchequer component is primarily targeted at addressing priority needs in transport, education, housing and health care. The non-Exchequer component focuses on energy infrastructure developments.

2.2.9 The Capital Plan sets out the Government's commitment to an investment plan of some €42 billion of which €27 billion will be from direct Exchequer investment with additional investment of €15 billion from the wider State-Owned Enterprise sector, non-commercial State bodies and PPPs.

2.2.10 Chapter 3 and 4 of the Infrastructure and Capital Investment Report presents the details of the Exchequer investment allocations and looks at the level of other State support for investment through non-Exchequer channels, including proposed investments through Public Private Partnerships (PPPs) and State bodies. Chapter 4 also examines the steps the Government is taking to maximise the availability and impact of alternative sources of funding for infrastructure provision.

2.2.11 A Mid-Term Review of the Capital Plan (Review of the Capital Plan 2016-2021) was undertaken in 2017 which confirms significant progress has been made in delivering priority public capital investments under the Capital Plan. The context for public capital investment has changed dramatically in the relatively short period since the Capital Plan – Building on Recovery was published in 2015. In overall terms, the planned total increase in public capital investment between 2018 and 2021 is almost 40% greater than what was initially envisaged under the Capital Plan in 2015.

2.2.12 The Review highlights the need for increased public capital investment which is increasingly important in light of the challenges presented by Brexit for Ireland's economy and society. The Government have already responded to this investment requirement through the increased allocation of resources announced in the recent Summer Economic Statement 2017 which will see public capital investment spending increase by over 70% over the next four years to almost €7.8 billion by 2021.

2.2.13 The review of the Capital Plan therefore provides an opportunity to undertake an evidence - based assessment of infrastructural priorities against the backdrop of a changed economic and fiscal environment to:

- Enhance the economy's growth potential;
- Address significant bottlenecks; and
- Build the resilience of the economy

2.2.14 Chapter 3 of the Review of the Capital Plan 2016-2021 sets out the progress to date on the delivery of the Capital Plan including a breakdown of the expenditure in 2016 and the projected expenditure for 2017. It also includes a list of ongoing as well as planned infrastructure projects.

2.2.15 Regarding transport, the Exchequer's transport capital allocation is largely framed by the recommendations and priorities set out in the recently published *Strategic Investment Framework for Land Transport.* These priorities are threefold:

- To maintain and renew the strategically important elements of the existing land transport system;
- To address urban congestion; and
- To improve the efficiency and safety of existing transport networks.

2.2.16 The report includes the following table which shows a selection of transport projects contained in the Capital Plan to 2021, including the N8/N25 Dunkettle Interchange.

Table 2.1 Transport Projects – Capital Plan

Roads	Public Transport
N5 Westport to Turlough	Metro North
N22 Ballyvourney to Macroom	First phase of Dart Expansion Programme
N8/N25 Dunkettle Interchange	New and replacement buses
N4 Collooney to Castlebaldwin	Further upgrading of Quality Bus Corridors
M7 Naas to Newbridge Bypass Widening	Completion of the Luas Cross City Project
N56 Dungloe to Glenties	Completion of the Dublin City Centre Re-signalling programme
Sallins Bypass and Moycullen Bypass	The reopening of the Phoenix Park tunnel
N56 Mountcharles to Inver Road	The construction of a new Central Traffic Control centre for commuter and intercity rail
N17/18 Gort to Tuam (PPP)	
M11 Gorey to Enniscorthy (PPP)	Ongoing maintenance to ensure the safety and efficincy of the rail network
N25 New Ross By Pass (PPP)	
Sustainable Transport	
€ 100 million for smarter travel and carbon reduction measures (incl. Greenways)	

National Spatial Strategy (2002-2020)

2.2.17 The National Spatial Strategy (NSS), 2002-2020 is a twenty year strategic planning framework designed to counterbalance disparities in regional development. Cork is classed as a "Gateway" under the NSS. As a Gateway, Cork has a strategic location, nationally and relative to their surrounding areas, and provides national scale social, economic infrastructure and support services.

2.2.18 According to the NSS, of the regional cities, Cork has the most immediate potential to be developed to the national level scale required to complement Dublin. The Cork AREA Strategic Plan (CASP) sets a positive agenda for proceeding in this direction, given the emphasis in it on enhancing Cork's capabilities as a metropolitan, business friendly, public transport based and physically attractive city.

Smarter Travel – A Sustainable Transport Future (2009-2020)

2.2.19 Under Government Smarter Travel policies, it would be desirable to promote Little Island as a model commercial, industrial and residential hub with regards to sustainable travel. The Little Island Transport Study (LITS) can provide Little Island with a substantial head start in making progress towards the government targets and can act as an exemplar area for ensuring that this long term objective is realised.

2.2.20 To ensure these long term sustainable travel objectives are met, it is essential that sustainable public transport and active travel options are available, accommodated and encouraged.

2.2.21 There are five key goals which form the basis of the policies:

- Improve quality of life and accessibility to transport for all and, in particular, for people with reduced mobility and those who may experience isolation due to lack of transport;
- Improve economic competitiveness through maximising the efficiency of the transport system and alleviating congestion and infrastructural bottlenecks;
- Minimising the negative impacts of transport on the local and global environment through reducing localised air pollutants and greenhouse gas emissions;
- Reduce overall travel demand and commuting distances travelled by the private car; and
- Improve security of energy supply by reducing dependency on imported fossil fuels.

2.2.22 Achieving sustainable transport will require a suite of actions that will have complimentary impacts in terms of travel demand and emissions. Although the Policy contains 49 actions, they can be grouped into essentially four overarching actions:

- Reduce distance travelled by private car and encourage smarter travel, including focusing population growth in areas of employment and the use of pricing mechanisms or fiscal measures to encourage behaviour change;
- Ensure that alternatives to the car are more widely available, mainly through a radically improved public transport service and through investment in cycling and walking;
- Improve the fuel efficiency of motorised transport through improved fleet structure, energy efficient driving and alternative technologies; and
- Strengthen institutional arrangements to deliver these targets.

2.2.23 It is evident from the list of Smarter Travel Objectives that any transport plans and traffic management arrangement developed for Little Island must actively focus on public transport options and the attractiveness of travel throughout Little Island by cycling and walking.

Achieving Effective Workplace Travel Plans Guidance for Local Authorities (2013)

2.2.24 Achieving Effective Workplace Travel Plans Guidance for Local Authorities was prepared by the National Transport Authority (NTA) to assist local authorities with integrating the principles and practice of Workplace Travel Plans into the development plan and development management processes.

2.2.25 The guidance suggests a 'Standard' Workplace Travel Plan or a Workplace Travel Plan 'Statement' be assessed on an individual case basis taking account of location, scale of development, nature of the uses proposed and anticipated impact on the surrounding area, in terms of trip volume and congestion. As an indicative threshold, a 'Standard' Workplace Travel Plan should be required if an existing or proposed development has the potential to employ over 100 persons.

Spatial Planning and National Roads: Guidelines for Planning Authorities (Department of Environment, Community and Local Government, 2012)

2.2.26 *Spatial Planning and National Roads: Guidelines for Planning Authorities* set out planning policy considerations relating to development affecting national primary and secondary roads, including motorways and associated junctions, outside the 50-60 km/h speed limit zones for cities, towns and villages.

2.2.27 The guidelines aim to facilitate a well-informed, integrated and consistent approach that affords maximum support for the goal of achieving and maintaining a safe and efficient

network of national roads in the broader context of sustainable development strategies, thereby facilitating continued economic growth and development throughout the country.

2.2.28 The following Key Principles have informed these guidelines:

- Land-use and transportation policies are highly interdependent;
- Proper planning is central to ensuring road safety;
- Development should be plan-led;
- Development Management is the key to Plan Implementation; and
- Planning Authorities and the National Roads Authority and other public transport bodies must work closely together.

2.3 Regional Plans and Strategies

Southwest Regional Planning Guidelines (2010-2022)

2.3.1 The Planning and Development Act 2000 requires each regional authority to prepare regional planning guidelines. To this end, the South West Regional Authority prepared Regional Planning Guidelines for the South West Region to act as a regional tier in the hierarchy of plans and policies that influence local plans such as development plans.

2.3.2 The task of the guidelines is to provide a broad canvas to steer the sustainable growth and prosperity of the region and its people until the year 2022. The plan contains statements and analysis of key economic objectives, together with a set of planning guidelines to be incorporated within the development plans of the local authorities in the region. The strategy covers the South West Region, which incorporates County Cork together with County Kerry. The specific areas that have been identified are divided into four functional areas, namely:

- Greater Cork Area (including Cork Gateway and Mallow Hub);
- Tralee/Killarney Linked Hub;
- Northern Area; and
- Western Area.

2.3.3 Development priorities that have been identified for the Greater Cork Area (which includes Little Island) in these guidelines are:

- Realignment and reinforcement of spatial planning and land use policies;
- Plan for an increase in the population and employment of the Cork Gateway;
- Refocusing of economic and investment strategy;
- Front-loading of infrastructure investments for the Cork Docklands.

2.3.4 The guidelines also prioritise a number of infrastructural provisions and up-grades for the Greater Cork Area (some of which, have now been completed or are under construction). These include:

- Cork Docklands road and bridge infrastructure;
- The remaining stages of the Cork suburban rail network;
- Upgrading of N25 Cork-Waterford;
- The N28 servicing the major industrial developments at Ringaskiddy; and
- The N25 flyovers within Cork City.

2.4 Local Plans and Strategies

Cork County Development Plan 2014

2.4.1 The Cork County Development Plan 2014 was adopted by the Members of Cork County Council on the 8th December 2014 and came into effect in January 2015. It is expected to remain in force (subject to any interim variations) until late 2020.

2.4.2 It is a six year development plan for the County that attempts to set out Cork County Council's current thinking on planning policy looking towards the horizon year of 2022. The plan also sets out the overall planning and sustainable development strategy for the county which must be consistent with the National Spatial Strategy 2002-2020 and the South West Regional Planning Guidelines 2010-2022.

2.4.3 The Development Plan is the county's principle strategic planning policy document. Detailed land-use zoning maps for the main settlements of the county are contained in Electoral Area Local Area Plans and the Special Local Area Plans.

2.4.4 These Plans provides a blueprint for the development of County Cork for the latter part of this decade and the early years of the next. The Development Plan vision and main aims for the County will be underpinned by the core principles of sustainability, social inclusion, quality of design and climate change adaptation.

2.4.5 All of the policies and objectives of this plan are intended to contribute to the delivery of a number of key aims for the county as a whole. They are as follows:

- Enhanced quality of life for all, based on high quality residential, working and recreational environments and sustainable transport patterns;
- Sustainable patterns of growth in urban and rural areas, that are well balanced throughout the county reflecting the need to reduce energy consumption and greenhouse gas emissions, reduce use of non-renewable resources while taking account of the need to plan for the effects of climate change.
- Sustainable and balanced economic investment, in jobs and services, to sustain the future population of the County together with wise management of the County's environmental, heritage and cultural assets;
- An effective physical and community infrastructure supporting living, economic recovery, enterprise and social integration;
- A quality built environment integrating the conservation of County Cork's built heritage with best practice modern architecture and urban design;
- A network of enhanced natural resources of clean water, biodiversity, nature conservation areas, landscape, coastline, greenbelts, parks and open spaces, and agricultural land;
- Responsible guardianship of the County so that it can be handed on to future generations in a healthy state.

2.4.6 As set out in Chapter 1 of the Development Plan, there are four main strategic planning areas in the county. They are as follows:

- County Metropolitan Cork Strategic Planning Area;
- Greater Cork Ring Strategic Planning Area;

- North Cork Strategic Planning Area; and
- West Cork Strategic Planning Area

2.4.7 The plan sets out a vision and supporting strategy that directs significant future growth into the Metropolitan Cork Area, while protecting the critical mass that allows other settlement areas to continue to provide essential local services and quality of life.

2.4.8 The strategy facilitates a number of key regional objectives as set out in CASP and national planning guidance, including:

- Protecting of existing regional assets;
- Facilitating the orderly provision of supporting infrastructure;
- Maximising benefits arising from infrastructure investment;
- Supporting the regions socioeconomic goals;
- Creating places capable of providing high quality of life;
- Protection of the environment including the protection, restoration and enhancement of water and biodiversity resources.

2.4.9 The scale and diversity of County Cork requires a strategy to carefully match the individual potential of the main areas that make up the County. The plan sets out the County Strategy in relation to four 'Strategic Sub Areas' that best reflect the differing mix in socioeconomic, cultural and environmental issues that define the main areas within the County.

2.4.10 Little Island is designated as a Strategic Employment Area in the 2014 Plan with a specific objective to promote its development for large scale developments where such development is compatible with relevant environment, nature and landscape protection policies as they apply around Cork Harbour.

2.4.11 The Plan outlines critical infrastructure requirements for the area. These include:

- Introduction of bus services;
- Walking/cycling infrastructure;
- Connectivity to rail station; and
- Upgrading local access roads.

Cork 2050: Cork's submission to the National Planning Framework (March 2017)

2.4.12 Cork 2050 is a joint submission by Cork County and Cork City Councils to the National Planning Framework (NPF) as part its consultation process for a new framework. It outlines the joint approach for the 'whole of Cork' as to the future growth of the region to a horizon year of 2050.

2.4.13 The submission outlines the region's approach to maximising the potential of Metropolitan Cork which includes Cork City, County Towns, Villages, Rural Areas and Islands by building on strengths and addressing issues that limit opportunities.

2.4.14 The submission outlines Cork's capacity to relieve pressure on Dublin and drive growth in the Southern Region. It states that Cork is the best location nationally capable of:

- Achieving a critical mass within the Metropolitan area with in excess of 500,000 people by 2050.

- Creating up to 120,000 jobs over the next 33 years, supporting high capacity public transport corridors of a scale that underpins high levels of sustainable economic and population growth (87% of the Metropolitan population living within 1km of public transport services).
- Facilitating growth through significant existing infrastructure capacity and supplemented by committed upgrades and a programme of investment up to 2050.

2.4.15 In support of the above, Cork 2050 provides an evidence base for the policy commitment and investment in the required infrastructure to support growth to include:

- Rapid Transit Corridor (RTC), running from Ballincollig town to the Docklands and Mahon via the City Centre.
- Commuter Rail network running through Kent Station between the Mallow and Midleton lines, interchange between rail and the RTC and electrification of the rail network serving Mallow, Monard, Midleton and Cobh, and potentially Youghal.
- A high capacity Core Bus Network serving all of the main corridors within the Cork Metropolitan Area, including Cork Airport, and connecting with intercity and rural transport services.
- Strategic road infrastructure required to drive balanced regional economic growth and local assets, to include the Port at Ringaskiddy.

2.4.16 Cork 2050 identifies Little island as being located within the Metropolitan East-West Growth Corridor and Little Island Train Station and the N25 as part of the strategic transport corridor vital to support the future growth of Metropolitan Cork, see Figure 2.1 below.

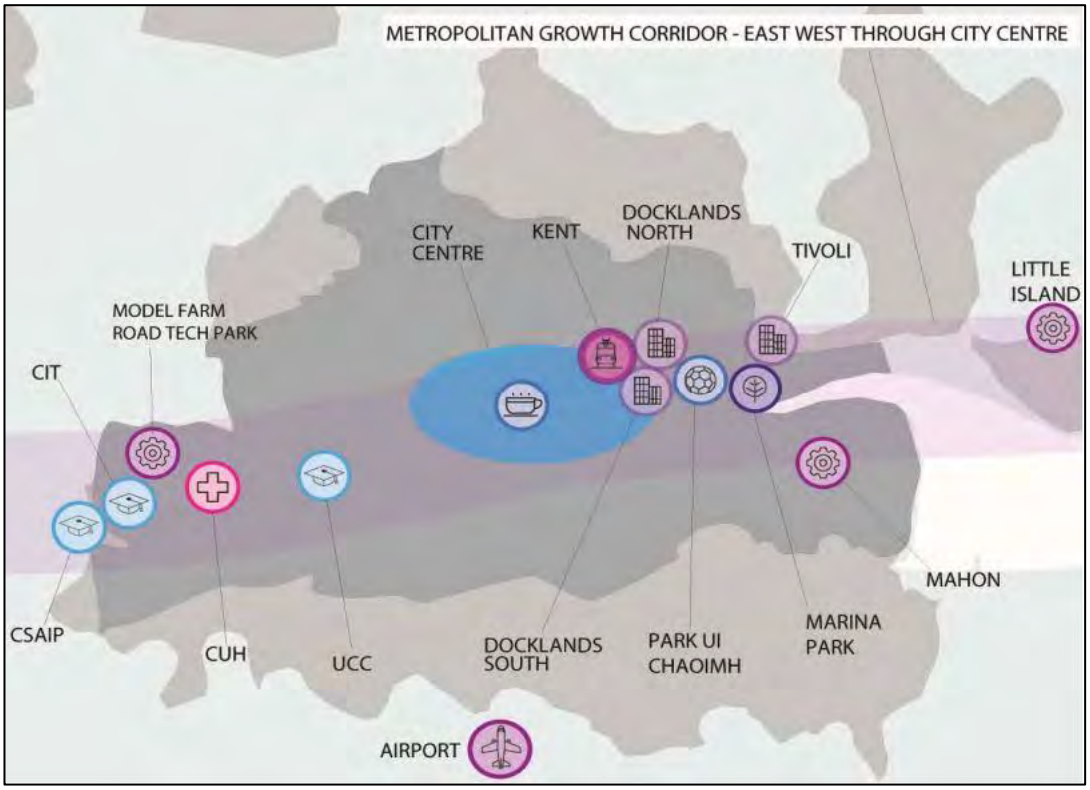


Figure 2.1 Cork 2050 – Metropolitan Growth Corridor

2.4.17 Principle actions specific to transport and relating to Little Island included in Cork 2050 include:

- Deliver public transport corridors across Metropolitan Cork in the form of BRT / LRT and rail.
- Increase population densities along public transport corridors at certain locations to achieve averages of between 3,500 - 4,500 persons per sq. km within a 1km zone.
- Support expansion of towns along public transport corridors in Metropolitan Cork.
- Invest in local infrastructure (water services, roads, cycling etc.) and the public realm of Cork City, county towns and villages, focussing on improving health and well-being.
- Develop key roads infrastructure, particularly the Dunkettle Interchange, M20, M28 and Northern Ring Road and in strategic transport corridors.

Cobh Municipal District Local Area Plan (August 2017)

2.4.18 The current Cobh Municipal District Local Area Plan (LAP) considers Little Island as one of the key employment locations in Metropolitan Cork. The plan states that the main vision for the area is to promote high quality work place environment for existing and future workforce population with limited residential expansion.

2.4.19 The Cobh LAP refers to the 2011 census observes that there are 5,693 persons working in Little Island with 1 in 5 categorised as employers and managers. The LAP reaffirms Little Island's function as a strategic centre of general business development while protecting the amenity enjoyed by existing residential communities.

2.4.20 The LAP states that Little Island has a strategic location on the N25 and on the suburban rail corridor and that access to Little Island will be greatly improved by the upgrading of the Dunkettle Interchange, leading to an increased demand for further development.

2.4.21 Little Island's close proximity to Cork City makes it one of the principle employment locations in Cork. Little island has also a residential element with 1,050 persons (540 dwellings) living on the island.

2.4.22 The LAP identifies green-field and brown-field sites suitable for development. It proposes to retain the zoning of circa 91 hectares of land zoned for industrial development as part of the 2011 Cobh Electoral Area Plan and additional land at Harbour Point Golf Club for business use as part of its mixed use redevelopment. The LAP has an objective to protect lands in these areas from inappropriate development which may undermine its suitability as a Strategic Employment Centre.

2.4.23 In relation to public transport connectivity, the LAP highlights the pedestrian connectivity between the Little Island train station and the major employment centres as inadequate and that the nearest Bus Éireann bus stop is located remotely on the local Glounthaune/Old Youghl Road Road north of the N25 and does not serve the Island itself. It points out that staff parking is adequately provided for within the Island, which relies heavily on car usage with 82% (i.e. 4680) of workers using a private car as the principle mode of transport.

2.4.24 In relation to road connectivity, the LAP points out that the upgrade to the existing junction with the N25 has not yet been commenced and that traffic congestion during peak hours

remains a concern. As part of the An Bord Pleanala approved upgrade of the Dunkettle Interchange, an associated new link road to the Island should help to ease congestion.

2.4.25 The Plan states that a detailed Little Island Transportation Study (LITS) is to be carried out within the lifetime of the 2017 LAP to address:

- Transport requirements of the existing community and of the development lands, specifically to protect the strategic employment function of the Island; appropriate scale of residential development; and the accessibility of community facilities and the protection and enhancement of existing residential areas and amenity;
- Accessibility to the National Road Network including the feasibility of a third entrance/exit point at the eastern end of the Island;
- Compatibility with the upgrade of the Dunkettle Interchange by Transport Infrastructure Ireland (TII);
- Feasibility of a Park and Ride facility as part of the solution to providing a sustainable access for the Island;
- Public transport proposals as part of the solution to the provision of sustainable access for the Island; and
- Pedestrian and cycling improvements with Little Island and connectivity to the local cycle network, in line with the measures outlined within the Cork Cycle Network Plan 2017.

2.4.26 The Plan then describes the Environment and Heritage issues that relate to Little Island. A review of this section of the LAP can be found in Section 2.5 of this report.

2.4.27 In terms of Planning Proposals, the LAP outlines its objectives for Little Island over the life of the Plan in terms of Overall Scale, Development Boundaries, Industry, Retail, Open Space and Recreation, Community Facilities and for Special Policy Areas (i.e. Harbour Point golf Club).

2.4.28 The LAP outlines what its general objective are (to include provision for 2,000 jobs up to 2022, secure 250 no. dwellings, boundary to special protection areas and areas of conservation and to complete LITS among other objectives).

2.4.29 The LAP outlines its Specific Objectives relating to Industry, Special Policy Areas (which include link road LI-U-02 shown in Figure 2.2 of this report), Community, 'Open space, Sport, Recreation and Amenity' and Utilities.

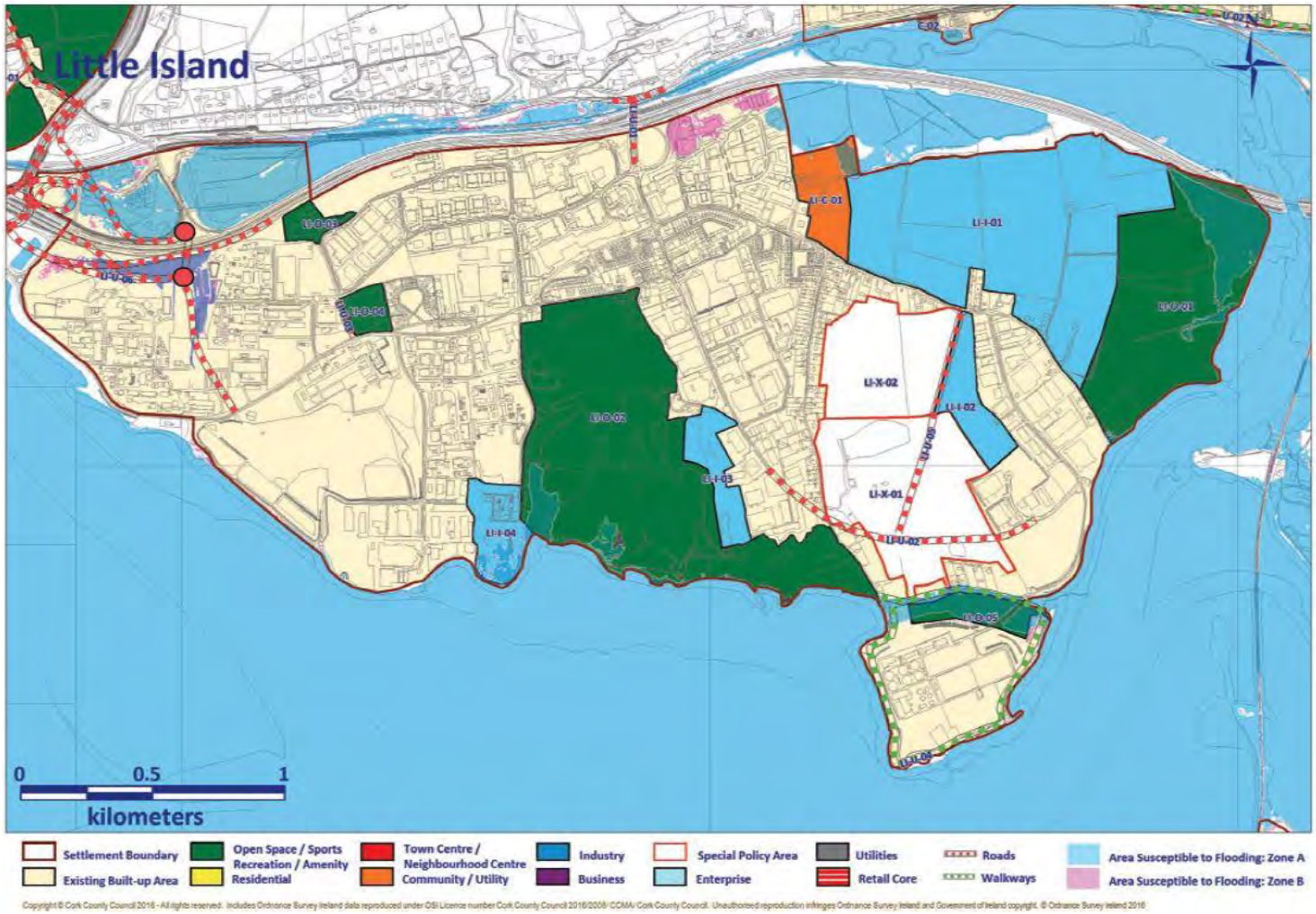


Figure 2.2 Planning Objectives Map (extract from the LAP)

Cork Area Strategic Plan (2008 Update)

2.4.30 The aim of the Cork Area Strategic Plan (CASP) was to achieve a vision for Cork, to address key issues identified and to improve the quality of life for all over a 20 year period. The CASP strategy provides a framework for the implementation of public policy and the provision of services. CASP recognises the need to support the use of sustainable transport modes such as public transport, cycling and walking in a balanced way between all transport modes so that congestion can be reduced.

2.4.31 CASP sets out a framework in order to:

- Attain critical mass;
- Integrate land use and transport;
- Make efficient use of investment in infrastructure;
- Provide a high-quality environment; and
- Improve the competitiveness and attractiveness of the region.

2.4.32 The CASP 2008 Update predicts that employment growth in Little Island and Carrigtwohill to be in the order of 2,174 jobs up to 2022.

Cork Cycle Network Plan (2017)

2.4.33 The Cork Cycle Network Plan was updated in January 2017 to incorporate comments and suggestions received during the a Public Consultation process undertaken in 2016. The plan was developed jointly by Cork City Council and Cork County Council. The objective of the project was to provide a clear plan for the future development of the cycling network within the Metropolitan area to encourage greater use of cycling for trips to work, school, recreation and leisure. Figure 2.3 below outlines the study area for the network plan.

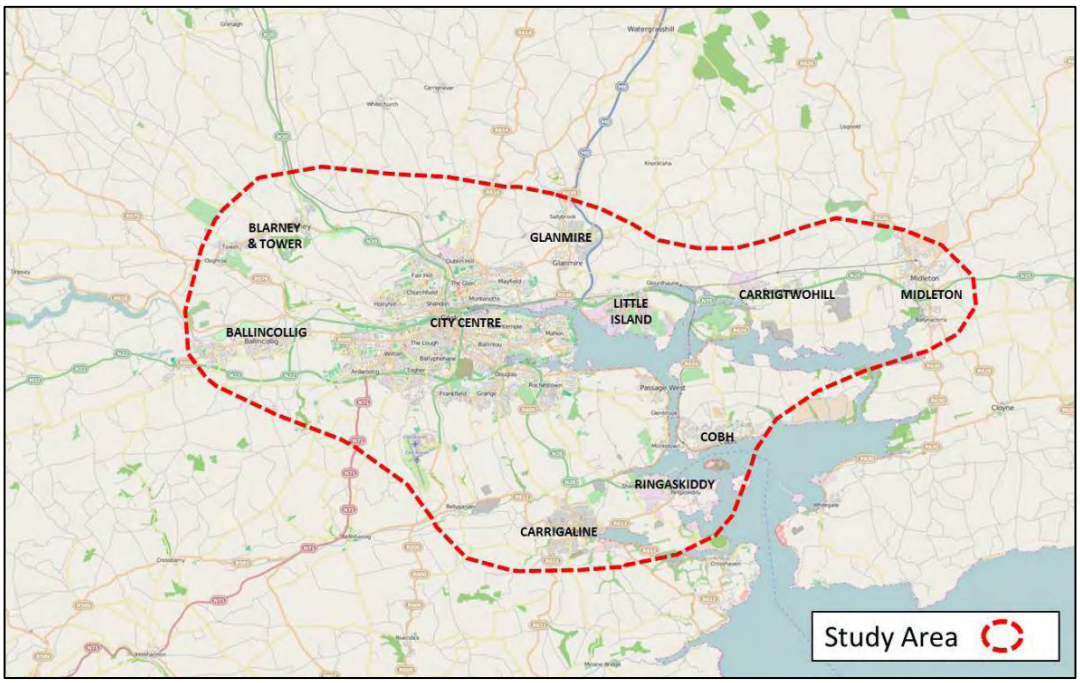


Figure 2.3 Cork Cycle Network Study Area

2.4.34 The Cork Cycle Network plan outlines the proposed cycle network plans for Corks metropolitan towns including Little Island. Currently 0.7% of trips to work in Little Island are by bike. There are difficulties in encouraging cycling in the area due to relatively inhospitable infrastructure and the longer distances of the trip to Little Island. The overall mode share target for Little Island is 5%. This includes cycling trips to work and to the Primary School:

- Cycling trips to work to increase from 0.7% to 5%; and
- Primary school cycling trips to increase form 0.5% to 2%.

2.4.35 Little Island currently has a limited number of cycle access routes with the N25 acting as a boundary to the north, while to the east and south is Cork Harbour, and Fota Island can be accessed across a channel to the west. Presently the area can only be accessed via the Dunkettle interchange at its westernmost extent, slip lanes on and off the N25 and an overbridge which connects it with the Old Youghal Road north of the N25. The only route from which it can currently be accessed by vulnerable road users is via the overbridge to and from the Old Youghal Road. There are currently no dedicated cycling facilities going to or from the Island.

2.4.36 The cycling network proposals (see Figure 2.4) for the area include three primary routes, LI-01, LI-02 and LI-03 which will run in north-south and east-west directions respectively with three secondary routes interlinking with these. LI-01 will form a primary connection across the existing overbridge to the Old Youghal Road while a new link to the west of the Island will span across the N25 to connect into two interurban routes extending to Glanmire and the future Glanmire masterplan site as well as an inter-urban route which connects directly with the city centre to the west of Carrigtwohill and Midleton to the east.

2.4.37 It is an objective of the plan to identify a high quality direct cycle link between the Tivoli area of Cork City and Little Island. While no specific route has been selected as part of the Cork Cycle Network Plan, it remains an objective of the plan to make provision for such a link.

Figure 2.4 Proposed Future Network – Little Island

2.4.38 In total, the Cork Cycle Network Plan outlines 10 routes to/from/within Little Island. A full description of each of these routes is outlined within the Plan. They include:

- 3 primary routes – LI-01, LI-02 and LI-03;
- 2 proposed primary routes – LI-06 and LI-10; and
- 5 interurban routes – LI-04, LI-05, LI-07, LI-08 and LI-09.

Cork Area Transit Study (2010)

2.4.39 The Cork Area Transit Study (CATS) was prepared to examine strategic public transport measures that would provide for future growth in the Cork Metropolitan area. An integrated package of measures was identified that would provide for a state of the art public transport system to ensure that all road users can move around in a less congested environment. Measures included:

- A BRT system linking Ballincollig and Mahon, via the City Centre and Docklands,
- Significantly improved bus services and priority measures on the key north-south corridor linking the Airport to the City Centre and onto Ballyvolane;
- Reconfigured bus network with improved frequencies, better linkages and improved on-street priority throughout the Cork Region;
- Revised Traffic Management arrangements to improve accessibility, and facilitate introduction of improved public transport throughout the Cork Region;
- Supportive Parking Strategies in the Cork Region to achieve the desired study outcomes, and to support investment in public transport;
- Implement integration measures, including: park and ride;
- High quality bus stop infrastructure with Real Time Information and mapping;
- integrated ticketing/ fares, and
- Seamless interchange at Kent Station.

2.4.40 Figure 2.5, overleaf, outlines the public transport measures recommended within CATS.

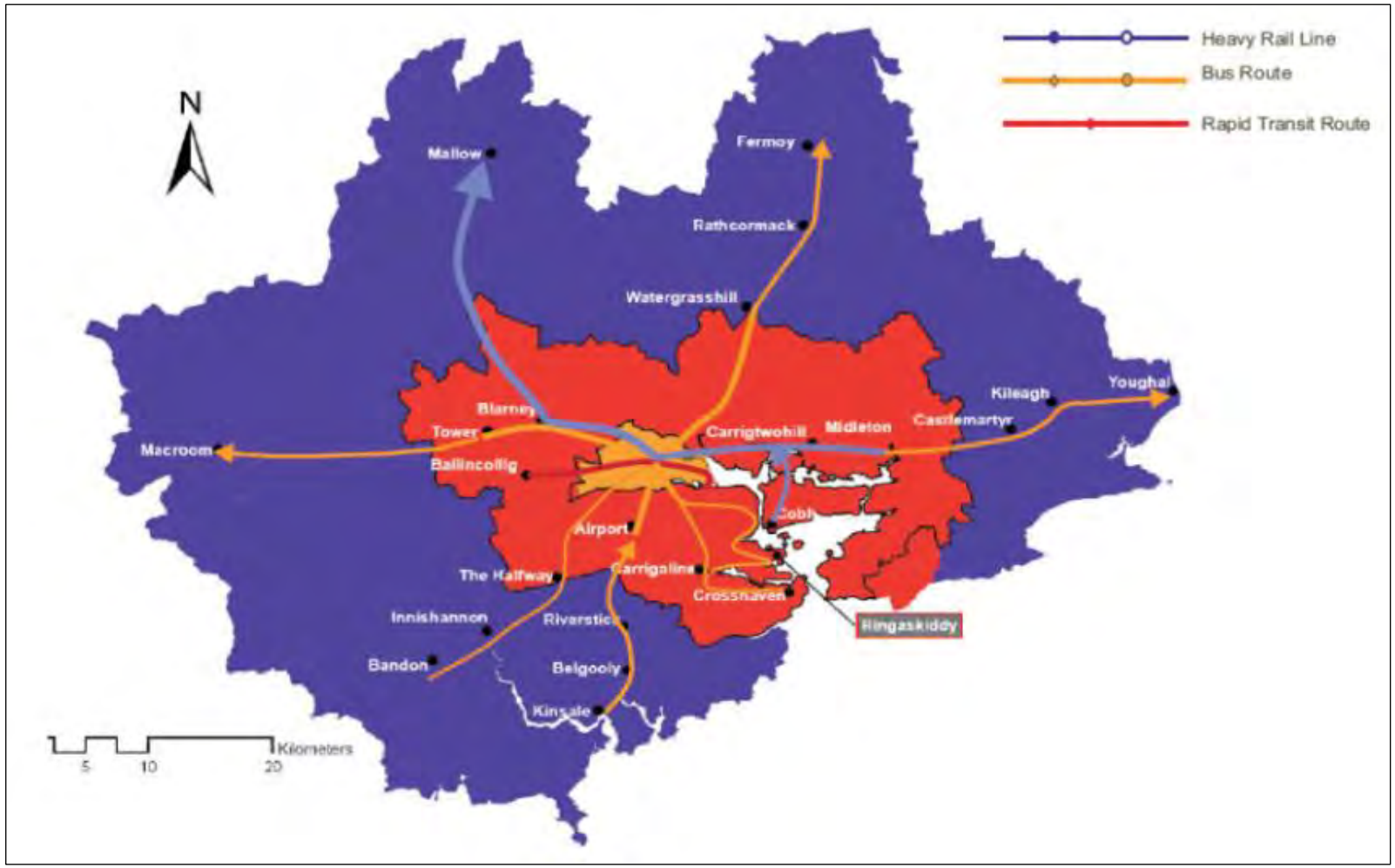


Figure 2.5 CATS Public Transport Route

2.5 Environmental Policy

Cork County Development Plan (2014) and Cobh Municipal District Local Area Plan (August 2017)

2.5.1 The Cobh Municipal District Local Area Plan (LAP) (Augusts, 2017) and the Cork County Development Plan (2014) was generally reviewed within Section 2.4 of this report. This section considers specifically the Environmental and Heritage elements for both the County Development plan and the Local Areas Plan, together with the Environmental Reports that accompany both documents. Elements that are applicable or relevant to Little Island and the scope of the Study have been identified for inclusion in this section.

2.5.2 Biodiversity - The largest concentration of environmental designations in the County is around Cork Harbour, which affects the southern part of the Cobh Municipal District. Designated Environmental Areas that are within or adjacent to Little Island include:

- Great Island Channel cSAC/pNHA (Site Code: 001058) – This candidate Special Area of Conservation stretches from Little Island to Midleton, with its southern boundary being formed by Great Island. It is an integral part of Cork Harbour which contains several other sites of conservation interest. This site is of major importance for the two habitats listed on the EU Habitats Directive that it contains, as well as for its important numbers of wintering waders and wildfowl.
- Cork Harbour SPA (Site Code: 004030) – This Special Protection Area lies to the north and east of Little Island. Cork Harbour is designated an SPA for the occurrence of nationally and internationally important wintering waterfowl which use coastal habitats including mudflats and saltmarsh protected under the SAC designation.
- Rockfarm Quarry, pNHA – this proposed National Heritage Area because of its geological characteristics and because it hosts a number of rare plants and contains a diverse limestone flora. It is also a seasonal home to a number of migrating bird species.
- Dunkettle Shore pNHA (Site Code 001086). Shares part of its boundary with intertidal mudflats and open shallow bay of Cork Harbour SPA.

2.5.3 It is an Objective of the County Development Plan (HE 2-1) to provide protection to all natural heritage sites designated or proposed for designation under National and European legislation and International Agreements, and to maintain or develop linkages between these. This includes Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas, Statutory Nature Reserves, Refuges for Fauna and Ramsar Sites.

2.5.4 It is an Objective of the County Development Plan (HE 2-2) to provide protection to species listed in the Flora Protection Order 1990, on Annexes of the Habitats and Birds Directives, and to animal species protected under the Wildlife Acts in accordance with relevant legal requirements. These species are listed in Volume 2, Chapter 4 of the plan.

2.5.5 It is an Objective of the County Development Plan (HE 2-4) requires that an appropriate level of assessment is completed in relation to Ensure that an appropriate level of assessment is completed in relation to wetland habitats subject to proposals which would involve drainage or reclamation. This includes lakes and ponds, watercourses, springs and swamps, marshes, heath, peatlands, some woodlands as well as some coastal and marine habitats.

2.5.6 Water – The Cobh Local Area Plan provides indicative flood zone mapping that takes into account information that has become available from the National CFRAM programme

(Catchment Flood Risk Assessment and Management), and other Flood Schemes undertaken by the OPW.

2.5.7 All proposals for development within the areas identified as being at risk of flooding will need to comply with Objectives WS 6-1 and WS 6-2 as detailed in Chapter 11, Volume 1 of the Cork County Development Plan, 2014, as appropriate, and with the provisions of the Ministerial Guidelines – 'The Planning System and Flood Risk Management'. In particular, a site-specific flood risk assessment will be required as described in WS 6-2.

2.5.8 Landscape & Visual Amenity - The County Development Plan 2014 addresses the landscape of the County with reference to 16 defined landscape types that were derived from a study of the 76 smaller landscape character areas. Little Island lies within the City Harbour and Estuary Landscape Character Area, an area of very high landscape value and sensitivity. The Cork County Draft Landscape Strategy (2007) has suggested that this area is of national landscape importance. There are two scenic routes located to the north of Little Island,

- The R639 Regional Road & Local Road from Dunkettle to Glanmire and eastwards to Carherlag and Glounthaune
- Local Road a Forest-town, N.W Carrigtwohill and Westwards to Caherlag.

2.5.9 It is an Objective of the County Development Plan (GI 7-2) Scenic Routes Protect the character of those views and prospects obtainable from scenic routes and particularly stretches of scenic routes that have very special views and prospects identified in the plan

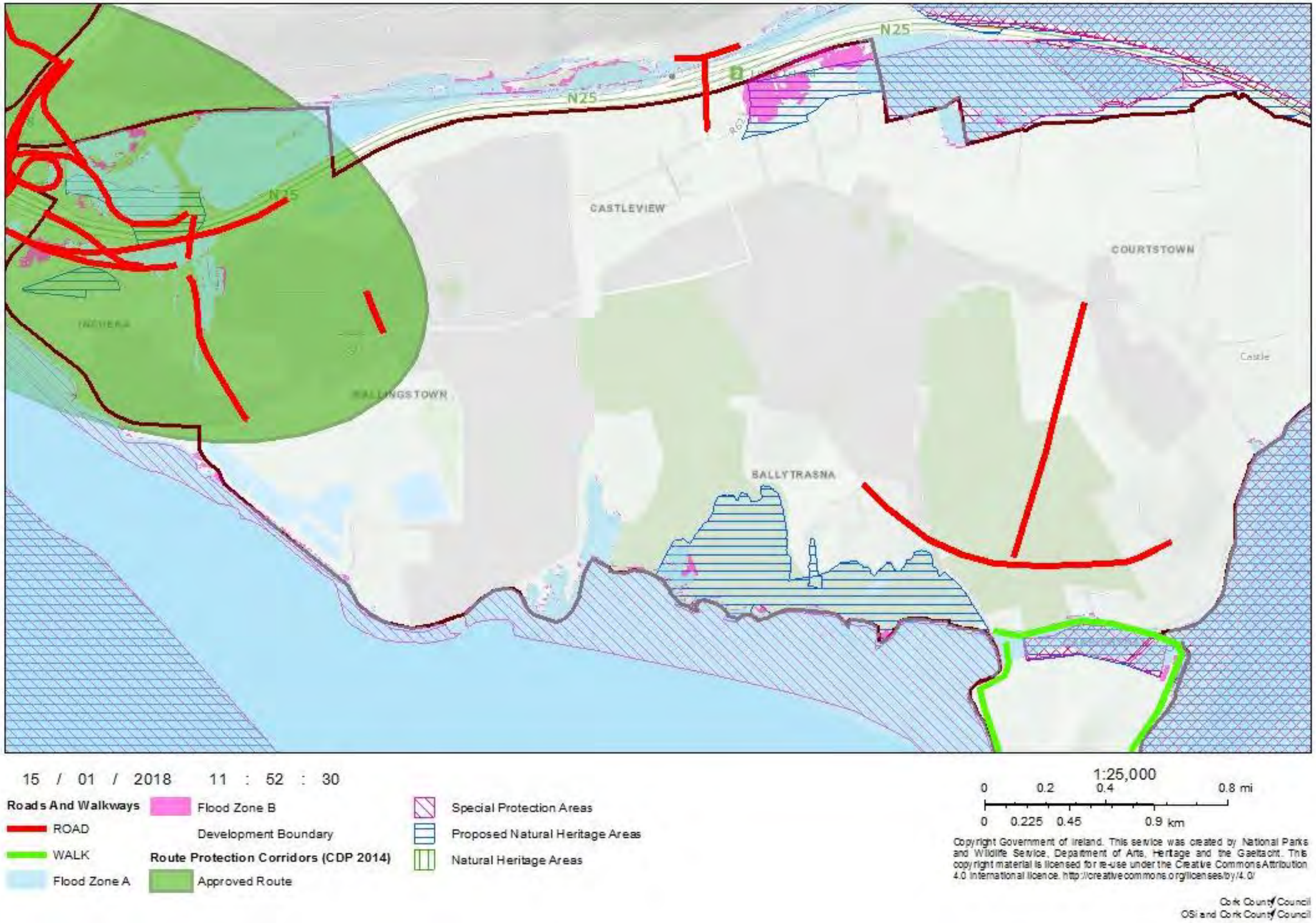
2.5.10 Architectural Heritage - It is an objective of the County Development Plan 2014 (HE 4-1) to seek the protection of all structures within the County which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. In accordance with this objective, a Record of Protected Structures has been established and is set out in Volume 2, Chapter 1 of the CDP.

2.5.11 It is an objective of the County Development Plan 2014 (HE 3-6): Archaeology and Infrastructure Schemes to have regard to archaeological concerns when considering proposed service schemes (including electricity, sewerage, telecommunications, water supply) and proposed roadwork's (both realignments and new roads) located in close proximity to Recorded Monuments and Places and their known archaeological monuments.

2.5.12 There are 4 no. protected structures on Little Island, Wallingstown Tower House (RPS no 00491), Little Island Church (in ruins, RPS no 00495), the lodge (RPS no 00501) and Ditchley House (RPS no 00502).

2.5.13 Noise Emissions - It is an objective of the County Development Plan Objective (GI 13-1) to a) Seek the minimisation and control of noise pollution associated with activities or development, having regard to relevant standards, published guidance and the receiving environment; and b) Support the implementation of Noise Action Plans prepared for the Cork County area.

2.5.14 Light Emissions - It is an Objective of the County Development Plan (GI 13-2) to seek the minimisation and control of light pollution associated with activities of development, having regard to relevant standards, published guidance and the receiving environment.


N25
CASTLEVIEW
COURTSTOWN
BALLINGSTOWN
BALLYTRASNA
Castle
15 / 01 / 2018 11 : 52 : 30
Roads And Walkways
ROAD
WALK
Flood Zone A
Flood Zone B
Development Boundary
Route Protection Corridors (CDP 2014)
Approved Route
Special Protection Areas
Proposed Natural Heritage Areas
Natural Heritage Areas
1:25,000
0 0.2 0.4 0.8 mi
0 0.225 0.45 0.9 km
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Cork County Council
OSi and Cork County Council

2.6 Summary

2.6.1 This section provided an overview of the relevant national, regional, local and environment policies, strategies and plans that relate to Little Island and this study. In Summary, the following documents were reviewed:

- National Policies and Strategies:
  - Towards a Natrional Planning Framework;
  - Building on Recovery: Infrastructure and Capital Investment;
  - National Spatial Strategy;
  - Smarter Travel: A Sustainable Transport Future;
  - Achieving Effective Workplace Travel Plans Guidance for Local Authorities; and
  - Spatial Planning and National Roads: Guidelines for Planning Authorities
- Regional Plans and Strategies:
  - Southwest Regional Planning Guideline.
- Local Plans and Strategies:
  - Cork County Development Plan;
  - Cork 2050: Cork's Submission to the National Planning Framework;
  - Cobh Municipal District Local Area Plan;
  - Cork Area Strategic Plan;
  - Cork Cycle Network Plan; and
  - Cork Area Transit Study.
- Environment Policies:
  - Cobh Municipal District LAP – Vol 2, Environmental Report; and
  - Cork County Development Plan 2014.
- Key points contained in the above documents include:
  - Capital Plan to 2021 includes the N8/N25 Dunkettle Interchange and €100M for Smarter Travel and Carbon Reduction measures;
  - Cork is a "Gateway" with a strategic location, nationally and regionally;
  - LITS must focus on public transport, cycling and walking options;
  - Workplace Travel Plan required for companies with over 100 employees;
  - Plan for an increase in population and employment of the Cork Gateway
  - Little Island is designated as a Strategic Employment Area requiring improved bus service, walking/cycling, connectivity and local roads;
  - Little island is located within the East-West Growth Corridor with its Train Station and N25 strategically vital for future growth of Metropolitan Cork;
  - LAP general objectives include provision for 2,000 jobs up to 2022, 250 no. dwellings and complete LITS;
  - The overbridge to/from the Glounthaune Road is the only access for vulnerable road users with no dedicated cycling facilities;
  - Cork Cycle Network Plan outlines 10 routes to/from/within Little Island

3. PUBLIC CONSULTATION

3.1 Introduction

3.1.1 At the outset of the Little Island Transportation Study, an extensive public and stakeholder consultation was undertaken. Section 3 of this report provides an overview of the written responses relating to traffic and transportation issues received during the first phase of the public consultation process. Also provided in this report are the findings from the evaluation of questionnaires completed as part of the consultation process.

3.1.2 The consultation process forms an important component of the development of the Little Island Transportation Study as the responses play a key role in developing a detailed understanding of the current issues affecting Little Island and its environs. The consultation process also provides an insight into potential solutions to these issues and a view as to how Little Island should develop in terms of transport improvements. In general, input from the public and stakeholders is required for the following reasons:

- Local community and local stakeholders have an in-depth understanding of local issues, given that they experience these conditions daily. It is therefore crucial to gain an understanding of these issues at an early stage in the study, so that opportunities to address these issues can be considered. Furthermore, public representatives and local community groups are best placed to relay the views of residents for consideration as part of this study.
- Local businesses are impacted by traffic conditions because of general traffic congestion, which increases the costs (and reduces the attractiveness) of accessing their premises to do business. This is particularly true for businesses in the retail industry, where alternative competing locations are generally available. Deliveries are also impacted by general traffic congestion, as is the availability of conveniently located areas to perform these activities. It is important that these issues are understood in the context of making traffic study recommendations.
- Greater insight is provided, from the day to day users of the road network, in terms of the impact on all road users (i.e. car drivers, public transport users, cyclists and pedestrians and vulnerable road users) of current traffic conditions and existing traffic management arrangements in the Little Island area.

3.2 Consultation Process

3.2.1 The public consultation process carried out for the Little Island Transportation Study involved a number of stages including public exhibition, travel survey questionnaires, direct correspondence with key stakeholders and local transport operators and meetings with local schools.

3.2.2 There were five main channels for the public and key stakeholders to provide feedback for the study:

- **Attending the public exhibition:** A public exhibition was held for members of the public on 28 June 2017 to inform the study with local knowledge and views on current transportation issues and possible solutions. Feedback was received by way of

conversation and/or by questionnaire. In total, 86 submissions were received by this method.

- **Sending questionnaires by post:** Members of the public also completed questionnaires at home or at their place of work and sent them by post or delivered them by hand. In total, 10 questionnaire submissions were received by this method.
- **Sending questionnaires via email:** A total of 7 completed questionnaires were received via email by the CH2M Barry contact.
- **General email submissions:** Some members of the public did not complete the questionnaire available, however, submitted relevant comments via email. A total of 10 submissions were received by this method.
- **Submitting a stakeholder letter/email:** Key stakeholders were invited to submit the views of their group/organisation to be considered by the study. Five submissions were received.

First Public Consultation

3.2.3 On the 28th June, a public exhibition was held in Radisson Blu Hotel between the hours of 1:00 pm and 7:00pm. Members of the public were invited to attend and the event was advertised in local newspapers and on local radio. The purpose of the exhibition was to make people aware of the study and to invite them to make submissions and to inform the study team of any issues or concerns they may have.

3.2.4 The event was hosted by members of the Little Island Transportation Study (LITS) team from Cork County Council, CH2M Barry consultants and SYSTRA. Visitors who attended were invited to view a number of presentation boards which outlined the aims, objectives, methodology and timeframe for the development of the LITS. A copy of these boards is included in Figures 3.1, 3.2 and 3.3. Visitors were encouraged to talk to members of the team and discuss any issues or concerns in relation to the study. Visitors were also given the travel survey questionnaire to complete at the event or return by post/email at a later date.

3.2.5 The exhibition was well attended, with a constant flow of visitors throughout the day. In total over 130 people attended the exhibition.

Travel Survey Questionnaire

3.2.6 A travel survey questionnaire was developed and made available at the First Public Consultation event. The aim of the questionnaire is to assist in better understanding travel patterns and trips made to/from/within Little Island. Analysis of the questionnaires will inform the study and identify current transportation issues and the potential solutions to be explored. The questionnaire had six main sections as follows:

- SECTION A – ABOUT YOURSELF
- SECTION B – ABOUT YOUR JOURNEY TO WORK or EDUCATION
- SECTION C – TRAVEL BY CAR
- SECTION D – TRAVEL BY PUBLIC TRANSPORT, CYCLE OR WALKING
- SECTION E – TRANSPORT INFRASTRUCTURE
- SECTION F – ISSUES OF CONCERN TO YOU

3.2.7 The majority of questionnaires were completed in person by members of the public attending the public exhibition. At the event, a total of 86 completed questionnaires were received. The 14th July 2017 was set as a deadline to return the questionnaires. A further 17 questionnaires were returned by post or email with 10 further general submissions by email.

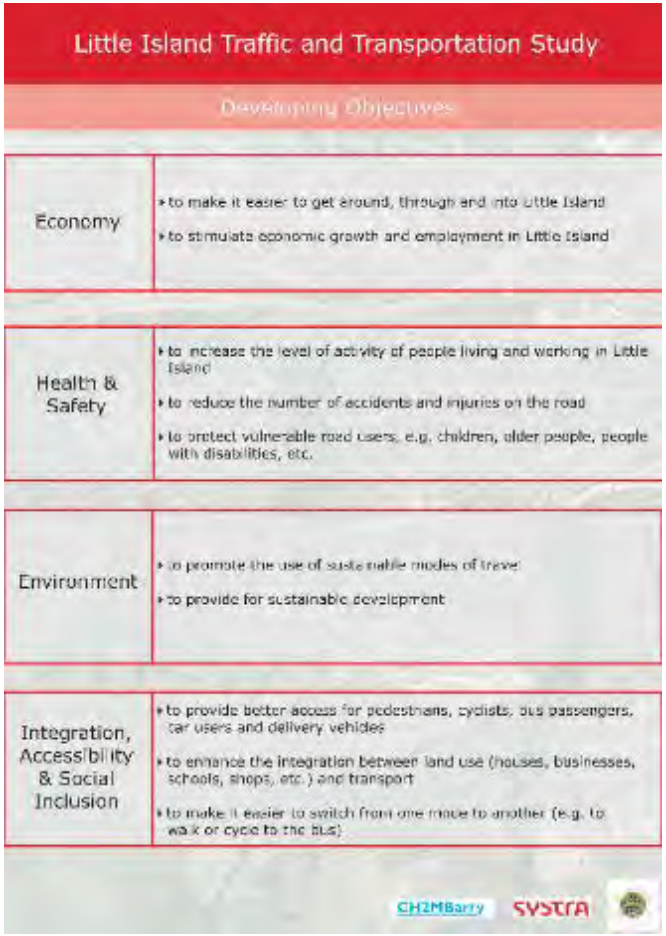


Figure 3.1 First Exhibition Posters (1 to 3)

Figure 3.2 First Exhibition Posters (4 to 6)

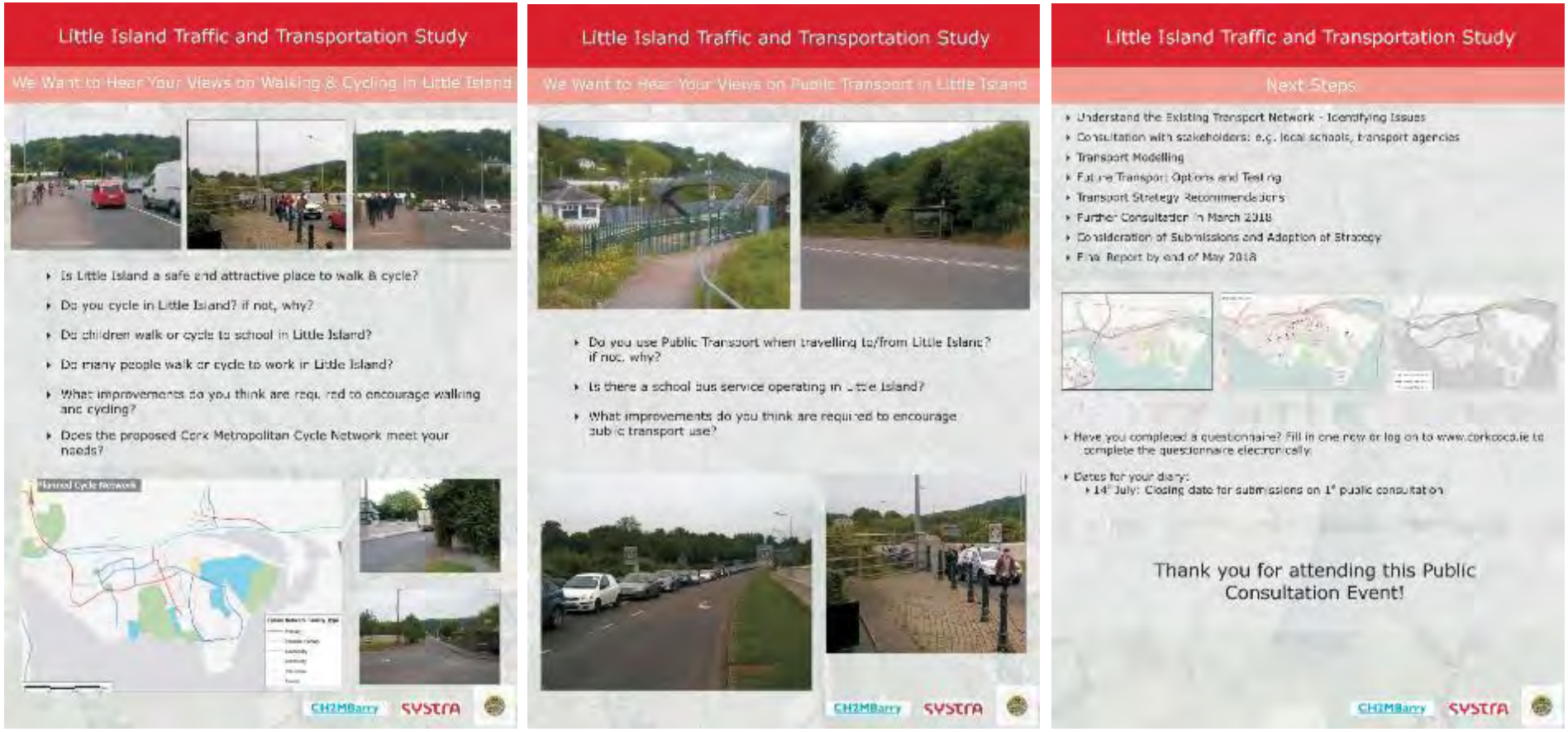


Figure 3.3 First Exhibition Posters (6 to 9)

Key Stakeholders

3.2.8 To ensure a comprehensive and representative response, a total of 19 key stakeholders were contacted and invited to make submissions. These included:

- Public bodies (i.e. Transport Instructure Ireland, National Transport Authority, An Garda Síochána, Bus Éireann, Iarnród Éireann);
- The local primary school (Little Island National School);
- Regional and local business associations (i.e. Cork Chamber, LIBA);
- Special access groups (i.e. HSE National Ambulance Service, Cork City Partnership); and
- Cork County Council:
  - Elected Members
  - Local Engineers Office
  - Traffic and Transport Section
  - Planning Policy Unit
  - Fire and Building Control Department
  - Disability Access Officer

3.2.9 Figure 3.4 below details the stakeholders consulted.

Stakeholders	Consulted
Public Bodies	
National Transport Authority	Y
Gardaí	Y
Bus Éireann	Y
Iarnród Eireann	Y
Transport Infrastructure Ireland	Y
Relevant Business Associations	
Little Island Business Association	Y
Cork Chamber of Commerce	Y
Eastgate Management Co. (O'Flynn Construction)	Y
Little Island Community Association	Y
Special Access Groups	
HSE National Ambulance Service	Y
Cork City Partnership	Y
Schools	
Little Island NS	Y
Gaelscoil Uí Drisceoil	Y
Gate Childcare (Creche)	Y
Cork County Council	
Elected Members*	Y
Area Engineer's Office	Y
Traffic and Transportation Section, FP & SD, County Hall	Y
Planning Policy Unit (PPU), County Hall	Y
County Council Chief Fire Officer, Ballincollig	Y
Disability Access Officer, County Hall	Y

Figure 3.4 Stakeholders Consulted/Submissions

3.3 Submissions from Local Stakeholder Organisations

3.3.1 A total of 122 responses were received during the consultation process, including 86 responses via the ballot box at the public exhibition, 10 completed questionnaires by post, 7 via email, 10 general submissions with comments via email and 7 formal stakeholder submissions.

3.3.2 Approximately four weeks was allowed for the receipt of submissions in relation to the study. The number and names of the local stakeholders who were contacted in relation to this study, and the number of submissions received are illustrated in Table 3.1 below. This table shows that a broad representative response was received from local groups and stakeholders.

Table 3.1 Stakeholder Groups Consulted

GROUP/ORGANISATION	CONTACT METHOD	NO. CONTACTED	RESPONSES
Key Stakeholders	Letter/Email	21	9
General Public	Public Meeting	Open Invitation	103 Questionnaires + 10 Written Responses

Public Bodies/Stakeholders

3.3.3 Submissions in the form of written response and/or by meeting, have been received from the following public bodies:

- An Garda Síochána;
- Bus Éireann;
- Transport Infrastructure Ireland;
- Iarnród Éireann;
- National Transport Authority; and
- Cork County Council

Submissions from the Business Community

3.3.4 Submissions in the form of a written response have been received from the Little Island Business Association and the Cork Chamber of Commerce. Both submissions highlighted the potential future development of Little Island and proposed suggestions to enable the region to realise its potential as an employment hub and residential area. Both submissions suggested solutions to the identified transport issues in the area to enable Little Island to become an attractive place to live and work.

Summary of Stakeholder Submissions

3.3.5 By the end of the consultation process a number of submissions had been received from a variety of different stakeholders. Whilst analysing the responses received, it was evident that certain patterns were developing in the responses submitted. It was clear that the main transportation issue for respondents is traffic congestion at peak times. The proposed solutions which were repeated throughout the submissions included improved public transport, walking and cycling facilities, road infrastructure changes and an additional entrance to the Island.

3.3.6 Transport Infrastructure Ireland (TII) advises that there is a clear need to avoid consequences of unsustainable commuting patterns and promote smarter solutions whereby local traffic generated by development is catered for primarily within the framework of the local (i.e. non-national) road network and transport solutions rather than overload the national roads with such local traffic, thereby compromising their strategic role and function. Measures should include for demand management measures, smarter workforce travel planning, area travel planning and management revised traffic management arrangements, and modifications of the local roads network.

3.3.7 The TII remains to be convinced of the requirement for a third entrance/exit point to the eastern end of Little Island. The M8/N25/N40 Dunkettle Interchange Upgrade scheme involves the upgrade of the existing Dunkettle Interchange to free flow for most movements to address existing traffic congestion. The Scheme offers the Little Island Transportation Study opportunities to improve modal split within and to the Little Island Area for residents, workers and visitors which should be investigated.

3.3.8 A full summary and comprehensive review of these submissions is contained within the *Little Island Transportation Study First Public Consultation Report.*

3.4 School Consultation

3.4.1 Little Island National School is the only school located on Little Island. The school is situated on St. Lappins Place. Figure 3.5 below illustrates the location of the school and the surrounding roads. School traffic adds to the congestion on the R623 and St. Lappins Place, particularly in the AM drop off. It is therefore important to understand the travel patterns associated with the National School.

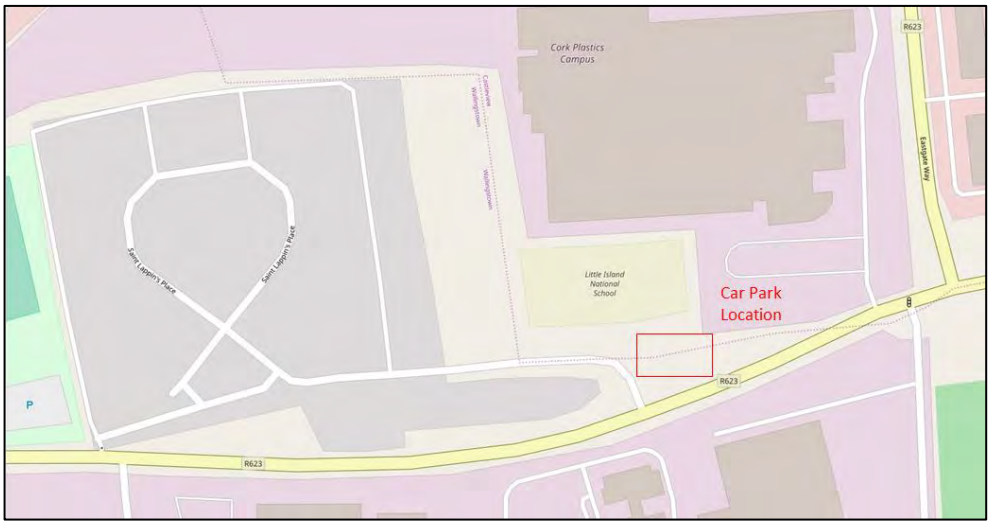


Figure 3.5 Little Island National School Location

3.4.2 There are currently 200 pupils attending the National School with 15 full-time and 3 part-time staff. The school building is open from 08:00 to 16:00, with classes from 08:30 to 14:30.

3.4.3 The school has an existing car park for staff and visitors with 20 available spaces. It was noted during the consultation that this is at or near capacity. There is one disabled space in the car park and one on the road outside the school gates. During peak school times, vehicles park in local residential estates, at the local credit union and on existing double yellow lines. This exacerbates congestion issues due to the relatively narrow widths of the carriageway outside the school.

3.4.4 The school has implemented an initiative to encourage pupils to walk, cycle or scoot to school under the Green Schools Programme. Cycle parking facilities (15-20 spaces) exist close to the school building, however, the pedestrian/cycle facilities in the vicinity of the school and surrounding network are poor and lack safe and appropriate crossing points in many areas. The school operates a walking bus scheme when accessing local facilities such as the Sports Complex, The Church, Cork Golf Club and the Radisson Hotel.

3.4.5 There is no public bus service operating in Little Island, however, a private bus service operates for school pupils which completes a 'Little Island' (A) and an 'outside Little Island' (B) route. The school has a dedicated drop-off/collection point outside the school gates. Route B operates from Carrigtwohill to Little Island via Glounthane. Pupils are dropped off at school at 08:30. The bus service then proceeds to complete run A with pupils from Little Island being dropped off at 08:50. Pick-up times for the service include:

- 13:30 – Infants, dropped to A and B.
- 14:30 – Little Island pupils
- 14:50 – Pupils outside Little Island

3.4.6 A number of key issues have been highlighted as ongoing problems for the school and its management:

- Due to the lack of an appropriate public transport service within Little Island, all staff currently drive to work. As a result of congestion in the wider road network and within Little Island, staff can sometimes be delayed in traffic queues.
- Due to the common congestion in and around Little Island, the school is restricted in attracting schools pupils from areas outside Little Island. Parents are choosing not to send their children to the school, specifically due to traffic congestion.
- There is a lack of safe pedestrian facilities in the road network, restricting the number of children who might otherwise walk to school from local residential areas.

3.4.7 A number of suggestions have been put forward to improve the safety of children and traffic flow around the school.

- Include provision for a roundabout or right turn lane on the R623 to improve access and slow down traffic;
- Improve turning areas on St. Lappins Place;
- Appropriate warning signage approaching the R623/St. Lappins Place junction;
- Realign and extend the existing car park for additional parking and set down. Provide direct access (one-way system) to/from the car park;
- Extend the existing footpath from St. Lappins Place to the Little Island sports complex, including appropriate accessibility features and lighting;
- Include and improve pedestrian facilities on route from the school to the Church, Golf Club, Radisson Hotel and local historical sites;
- Give pedestrians increased priority at the nearby Cork Plastics entrance; and
- Improve general access to Little Island at the eastern gateway; this may remove the concerns some parents have regarding enrolment at the school.

3.5 Public Consultation Summary

3.5.1 A public consultation process was carried out at the beginning of the project to inform people of the study and invite their views regarding their transportation issues and concerns in Little Island.

3.5.2 On the 28th June, a public exhibition was held with over 130 attendees to gather the local knowledge of residents and receive input from employees, businesses and formal stakeholders to identify **travel patterns, current transportation issues and potential solutions** to be explored. A travel survey questionnaire was developed and made available at the public exhibition.

3.5.3 There were five channels available for the public and key stakeholders to provide feedback for the study. These included:

- Attending the public exhibition and completing a questionnaire;
- Sending completed questionnaires by post;
- Sending completed questionnaires by email;
- General email submissions; and
- Submitting a stakeholder letter/email.

3.5.4 In total, 121 responses were received including 86 responses via the ballot box at the public exhibition, 10 completed questionnaires by post, 7 via email, 10 general submissions with comments via email and 8 formal stakeholder submissions.

	Completed Questionnaire: Public Exhibition Ballot Box	**Completed Questionnaire:** By post	**Completed Questionnaire:** Via Email	**General Comments:** Via Email	**Stakeholders**	**Total Responses**
Number of Responses	86	10	7	10	8	121

3.5.5 Formal Stakeholder responses were received from An Garda Síochána, Bus Éireann, Transport Infrastructure Ireland (TII), National Transport Authority, Little Island Business Association, Cork Chamber of Commerce, one Elected Member of Cork County Council and the Little Island National School.

Travel Patterns

3.5.6 Of the 103 submissions made using the questionnaire

- 65 (63%) of respondents live in Little Island;
- 30 (29%) of respondents live outside Little Island; and
- 8 (8%) did not state their place of residence.

3.5.7 Of the 65 Little Island residents who responded, 47 work/study either full time or part time. The remaining 18 are either retired, looking after family/home or unable to work. Of these 18, 15 travel daily within Little Island.

3.5.8 Of the 30 respondents living outside Little Island, 27 travel to work in Little Island daily or 3-4 times/week.

3.5.9 Of the 80no respondents who work/study full/part-time, 65 (81%) travel as a car driver, 3 (4%) took public transport, 4 (5%) cycle or walk and 8 (10%) did not state their travel details.

Current Transportation Issues

3.5.10 By the end of the consultation process, a significant number of submissions had been received from a variety of different stakeholders. All respondents, public/key stakeholders were invited to provide comments regarding specific issues in and around Little Island. A review of the submissions identified key recurring themes as the main areas of concern. These comprised:

- Traffic Congestion/Volume – Negative comments relating to the volume and congestion of traffic entering/exiting Little Island, particularly at peak hours.
- Safety Concerns – Negative comments in nature. More specifically, they refer to safety concerns for pedestrians, cyclists, children in residential areas, safety for drivers, speeding HGVs and access for emergency vehicles.

- Requests for improvements to infrastructure – Respondents made suggestions regarding upgrades to existing infrastructure including provision for an additional access to Little Island.
- Walking/Cycling – these comments highlighted the lack of pedestrian/cyclist facilities and outlined possible solutions.
- Public Transport – Generally negative comments relating to the lack of a bus service and requests for improved public transport services.
- Parking – Comments relating to the negative impact of illegal parking. More specifically, HGVs parking illegally and employees parking in residential areas.
- Speeding – negative comments regarding speeding vehicles.
- Condition of existing infrastructure – these were generally negative comments relating to poor road surfaces and pinch points on the road network.
- Other – other comments mostly referred to suggestions to improve transport conditions including lighting, signage and traffic light sequences.

Suggested Solutions

3.5.11 Many respondents suggested solutions which they felt could alleviate the key issues. The suggested solutions fall generally under the following headings.

- Creation of a new/additional entrance to Little Island
- Road Infrastructure improvements
- Improved walking and cycling facilities
- Improved public transport services and associated infrastructure
- Improved safety (e.g. enforcing speed limits and parking regulations)
- Other (e.g. awareness campaigns/improved lighting and signage)

3.5.12 A comprehensive review of received submissions, including all the statistical information, is provided in the *Little Island Transportation Study First Public Consultation Report.* In summary:

- A public exhibition was held on 28th June 2017, with over 130 attendees, to inform people of the study and invite their views regarding their transportation issues and concerns in Little Island.

- A travel questionnaire was developed to identify **travel patterns, current transportation issues and potential solutions** to be explored.

- In total, 122 responses were received including 86 responses via the ballot box at the public exhibition, 10 completed questionnaires by post, 7 via email, 10 general submissions with comments via email and 8 formal stakeholder submissions.

- Formal Stakeholder responses were received from An Garda Síochána, Bus Éireann, Iarnroid Éireann, Transport Infrastructure Ireland (TII), National Transport Authority, Little Island Business Association, Cork Chamber of Commerce, one Elected Member of Cork County Council and the Little Island National School.

- The travel patterns identified from the evaluation of the questionnaires highlighted the high dependency on the car for travelling to/from/within Little Island.

- Key recurring transport issues include:
  - Traffic Congestion/Volume
  - Safety Concerns
  - Requests for improvement to infrastructure
  - Walking/Cycling
  - Public Transport
  - Parking
  - Speeding

- Suggested solutions generally fall under the following:
  - Creation of a new/additional entrance to Little Island
  - Road Infrastructure Improvements
  - Improved walking and cycling facilities
  - Improved public transport and associated infrastructure
  - Improved safety and other measures.

4. BASELINE TRANSPORT ASSESSMENT

4.1 Introduction

4.1.1 This chapter provides a detailed summary of current traffic conditions in Little Island and includes a review of the following:

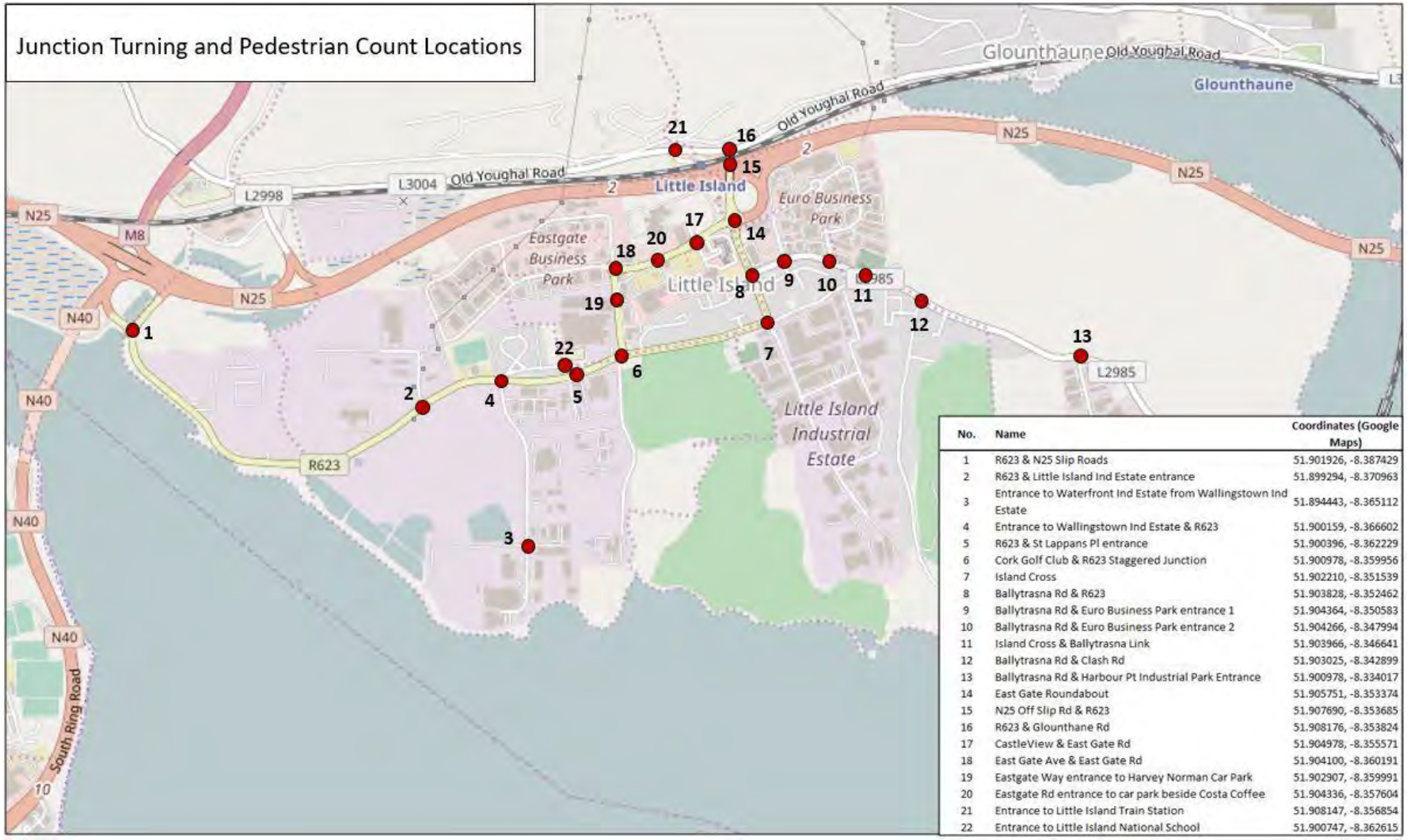
- **Traffic Survey Results:** outlines the results of a series of traffic surveys carried out in Little Island which provide an insight into current traffic conditions in the area;
- **Travel Survey Results:** provides a summary of the results of the travel questionnaire completed by the general public and stakeholders. This gives an insight into current travel patterns and the perception of traffic conditions and facilities available within Little Island;
- **Road Network Description and Issues:** provides an overview of the current road network serving Little Island including issues noted during site visits and public consultation;
- **Junction Evaluation:** describes the current operation and performance of key junctions identified in Little Island;
- **School Transportation:** provides an overview of transportation currently available for school children travelling to school including items such as pick-up/drop-off facilities, school bus availability etc.
- **Pedestrian Facilities:** describes the facilities available for pedestrians at key locations in Little Island focussing on pedestrian crossing points and key issues noted.
- **Cyclist Facilities:** provides a summary of facilities available for cyclists in Little Island.
- **Public Transport Provision and Facilities:** outlines the current public transport services in Little Island.
- **HGVs and Servicing:** provides an overview of HGV movements within Little Island and the associated impacts.
- **Parking Arrangements:** provides a high level overview of current parking availability and arrangements in Little Island.

4.2 Traffic Survey Results

4.2.1 To gain an understanding of current traffic conditions in Little Island, and to assists in calibrating and validating the transport model (see Chapter 7 for further details), the following traffic surveys were commissioned in Little Island:

- Junction Turning Counts (JTC) at 22 locations;
- Automatic Traffic Counts (ATC) at 12 locations;
- Queue Length Observations at 27 locations;
- Journey Time Surveys; and
- Pedestrian Crossing Counts

4.2.2 The next sections of this chapter provide information on each of the surveys outlined above including observed results. For full information on all surveys undertaken and analysis of results, please refer to the *Little Island Transportation Study – Traffic Survey Data Collection Report.* Figure 4.1 and 4.2 overleaf illustrates the locations of the Junction Turn Counts, Pedestrian Count and Automatic Turn Counts locations.



No.	Name	Coordinates (Google Maps)
1	R623 & N25 Slip Roads	51.901926, -8.387429
2	R623 & Little Island Ind Estate entrance	51.899294, -8.370963
3	Entrance to Waterfront Ind Estate from Wallingstown Ind Estate	51.894443, -8.365112
4	Entrance to Wallingstown Ind Estate & R623	51.900159, -8.366602
5	R623 & St Lappans Pl entrance	51.900396, -8.362229
6	Cork Golf Club & R623 Staggered Junction	51.900978, -8.359956
7	Island Cross	51.902210, -8.351539
8	Ballytrasna Rd & R623	51.903828, -8.352462
9	Ballytrasna Rd & Euro Business Park entrance 1	51.904364, -8.350583
10	Ballytrasna Rd & Euro Business Park entrance 2	51.904266, -8.347994
11	Island Cross & Ballytrasna Link	51.903966, -8.346641
12	Ballytrasna Rd & Clash Rd	51.903025, -8.342899
13	Ballytrasna Rd & Harbour Pt Industrial Park Entrance	51.900978, -8.334017
14	East Gate Roundabout	51.905751, -8.353374
15	N25 Off Slip Rd & R623	51.907690, -8.353685
16	R623 & Glounthane Rd	51.908176, -8.353824
17	CastleView & East Gate Rd	51.904978, -8.355571
18	East Gate Ave & East Gate Rd	51.904100, -8.360191
19	Eastgate Way entrance to Harvey Norman Car Park	51.902907, -8.359991
20	Eastgate Rd entrance to car park beside Costa Coffee	51.904336, -8.357604
21	Entrance to Little Island Train Station	51.908147, -8.356854
22	Entrance to Little Island National School	51.900747, -8.362615

Figure 4.1 JTC and Pedestrian Count Locations

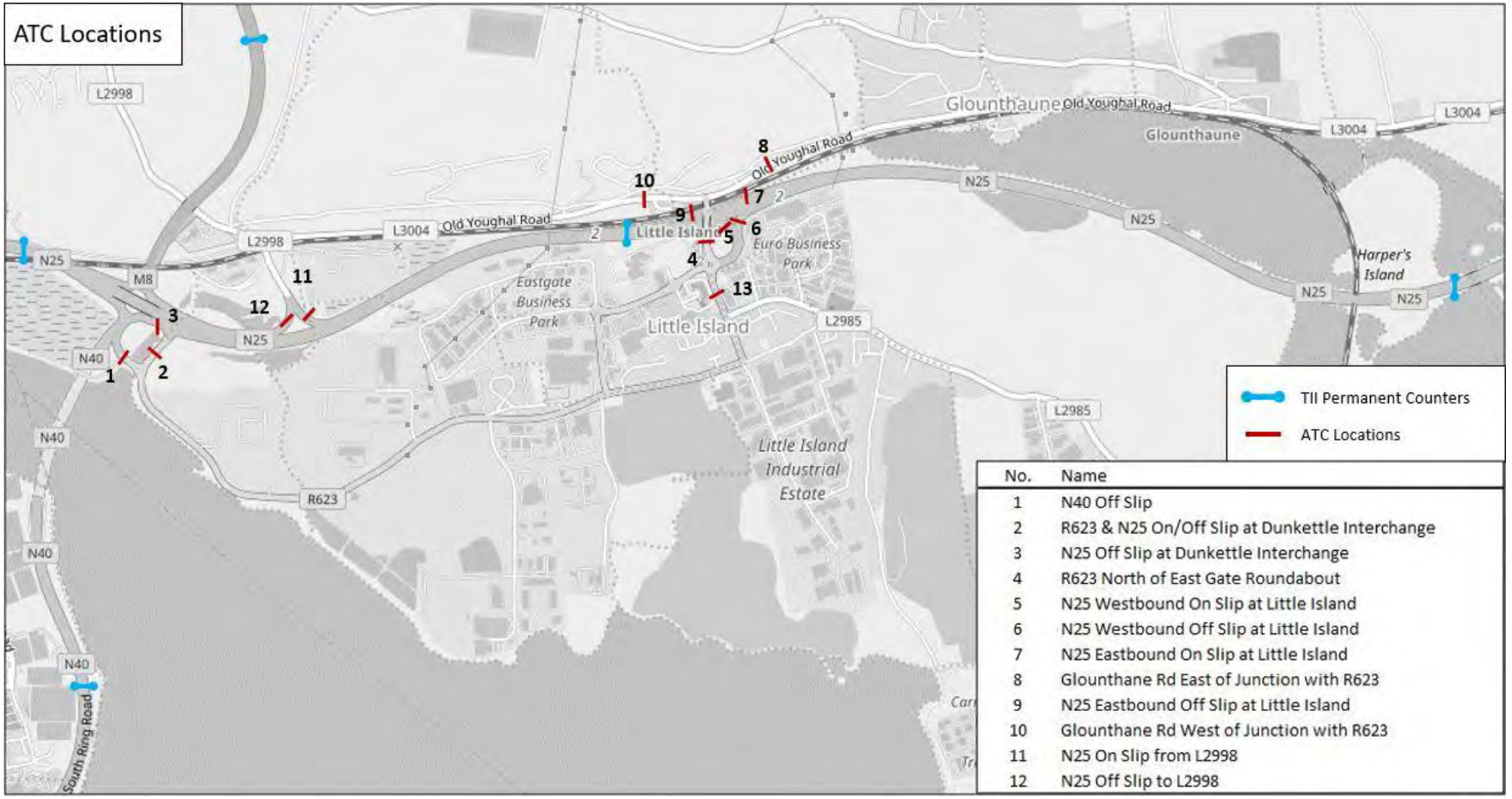


Figure 4.2 Automatic Turn Count Locations

Junction Turning Counts – AM and PM Results

4.2.3 The analysis of the junction turning counts focusses on the traffic entering/exiting Little Island in the AM and PM peak periods.

Western 'Gateway' – Dunkettle Interchange

AM Peak Results and Observed Traffic Flow Conditions

4.2.4 Referring to Figure 4.1 for illustration of junction location, as expected high levels of traffic were observed entering via the west entrance from the Dunkettle Interchange (Site 1) between 07:30 and 08:30. Figure 4.3 below illustrates the observed traffic counts. The inbound figure (781) reflects the high number of employees travelling to work. Conversely, there were 340 vehicles travelling westbound out of Little Island to the Dunkettle Interchange during the morning peak. It should be noted, there were zero vehicles counted from Arm C to arm B, indicating that traffic travelling from the East on the N25 does not generally enter Little Island via the west entrance.

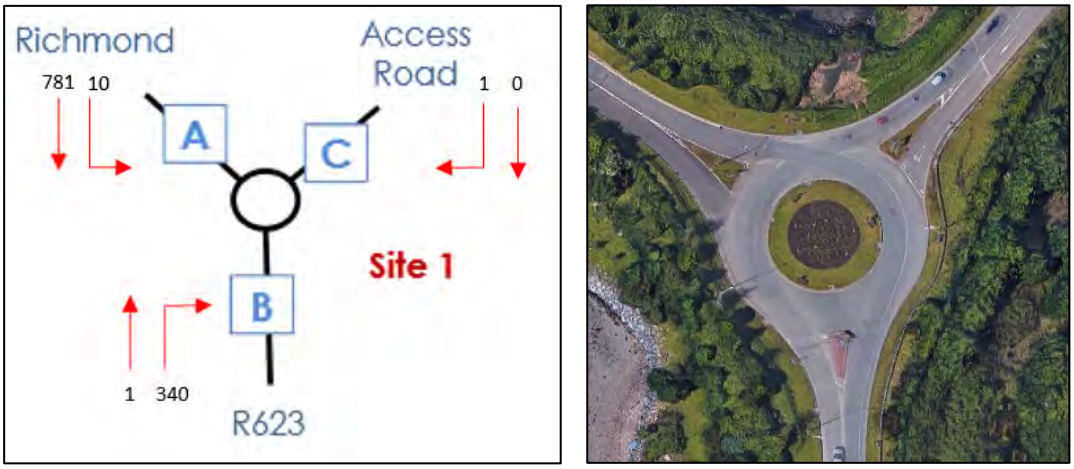


Figure 4.3 AM Peak – West Entrance Junction Turning Count

PM Peak Results and Observed Traffic Flow Conditions

4.2.5 Inversely, the traffic entering Little Island significantly decreases in the evening compared to the AM Peak (91 to 781); if it is assumed that most of the inbound traffic in the AM peak are employees travelling to work, it would be expected that in the evening peak, numbers would increase proportionally due to commuters leaving work, however, the traffic volumes exiting in the evening does not increase proportionally (407 to 340).

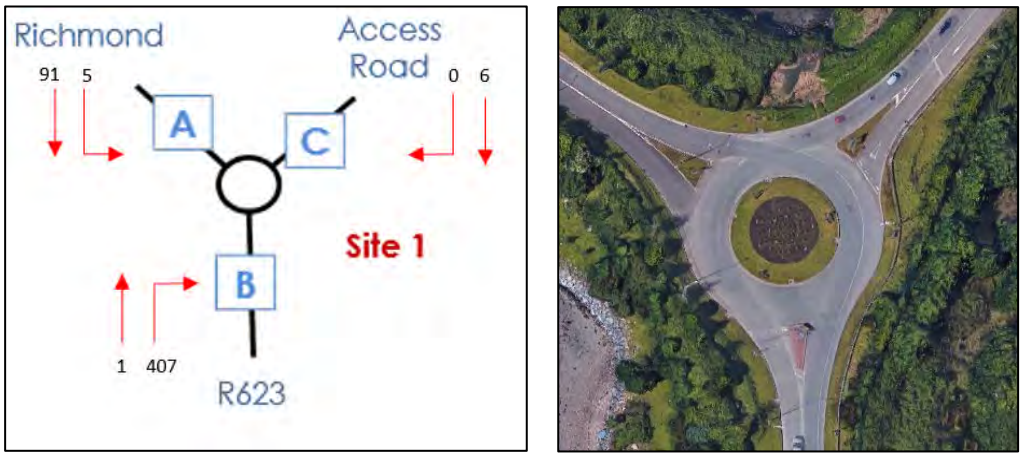


Figure 4.4 PM Peak – West Entrance Junction Turning Count

Eastern 'Gateway' – N25 Little Island Interchange

AM and PM Peak Results and Observed Traffic Flow Conditions

4.2.6 Again using Figure 4.1 to illustrate junction location, the routes used to enter/exit Little Island using the eastern entrance/exit comprise:

- The westbound slip road onto the N25 (Site 14)
- The eastbound slip road off the N25 (Site 15)
- The eastbound slip road onto the N25 (Site 15)
- Eastbound on the Old Youghal Road (Site 16)
- Westbound on the Old Youghal Road (Site 16)

4.2.7 Figure 4.5, overleaf, outlines the turning counts for the junctions which include the above routes. This will focus on the turning movement for vehicles entering/exiting via the eastern access junction. The highest level of traffic was recorded for peak hour (08:15 to 09:15).

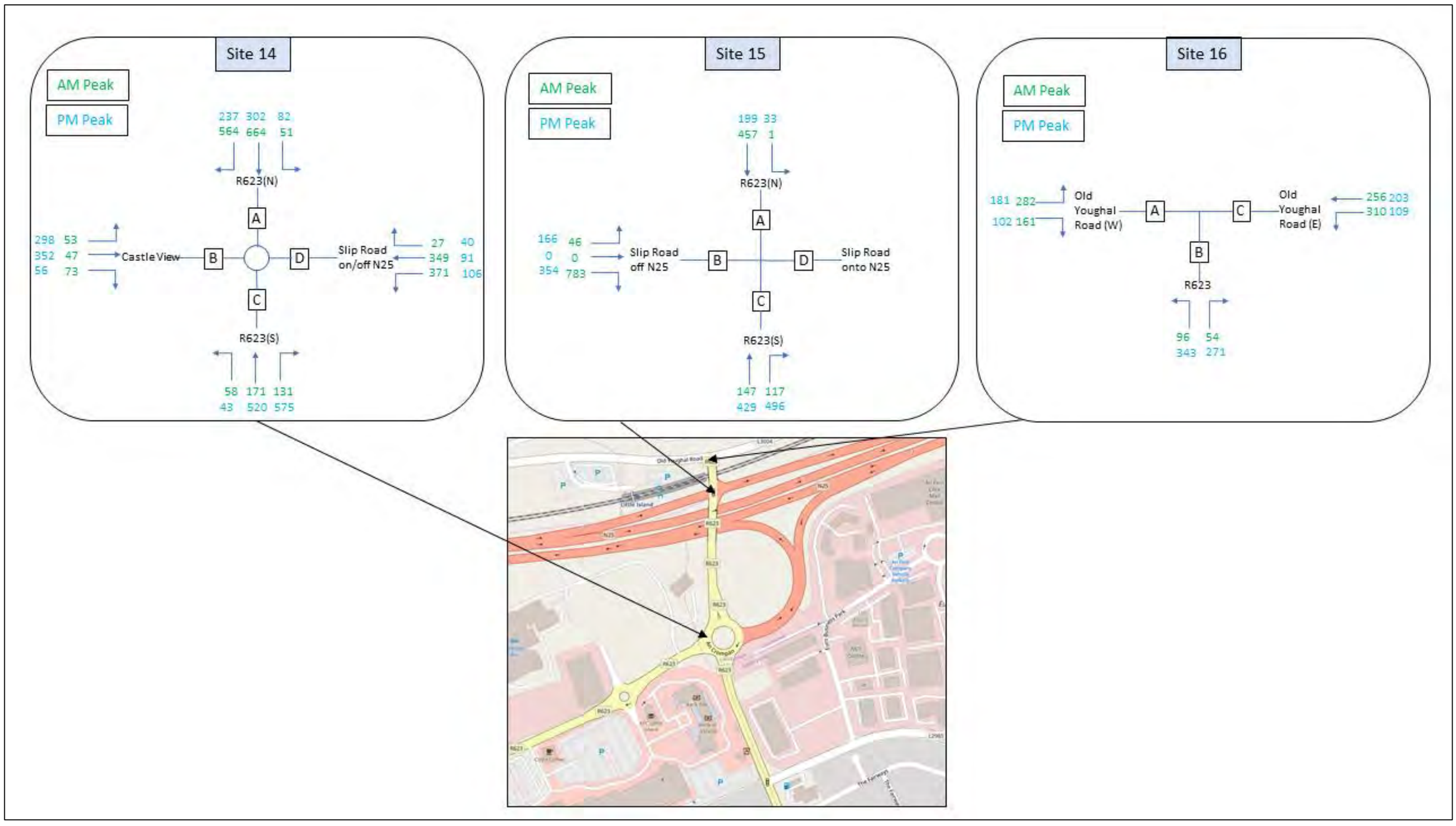


Figure 4.5 Junction Turning Count – Eastern 'Gateway'

Site 15 - R623(N)/ Slip road off N25/R623(S)/Slip road onto N25

4.2.8 Figure 4.5 above illustrates the turning counts for this junction. The observed junction turning counts can be utilised to identify the traffic flows through the eastern 'gateway'. Like the western entrance, at this junction, the traffic entering in the AM peak (between 08:15 and 09:15) totalling 1240 exceeds the traffic leaving in PM peak (16:30-17:30) which totals 925. The high number of vehicles are expected at this junction due to it accessing the national primary road, N25.

Site 16 – Old Youghal Road (W)/R623/Old Youghal Road (E)

4.2.9 As illustrated in Figure 4.5, there are 471 inbound vehicles and 150 outbound vehicles between the AM peak hours of 07:45 and 08:45. In the PM peak (16:45-17:45), there are 614 outbound vehicles and 211 inbound vehicles.

Site 14 – R623 (N)/Castleview/R623 (S)/Slip road on/off N25

4.2.10 An Crompan roundabout is the distributor roundabout upon entering Little Island at the eastern access point. In the evening peak, with internal routes exiting Little Island merging at this roundabout, congestion and increased journey times arise. This creates a backlog on the routes leading to the roundabout. All traffic entering/exiting Little Island at the N25 Interchange travels via this roundabout. In total, in the AM peak there were 2,559 vehicle movements and 2,702 in the PM peak. (See Figure 4.5).

Queue Length Observations

4.2.11 In total 27 sites/locations were identified for queue length surveys. Excessive queueing on the road network can result in congestion, particularly at controlled and uncontrolled junctions and pinch points on the network. The remainder of this section outlines the congested areas of the entrances/exits in the AM and PM peaks.

Western 'Gateway' – Observed Queue Lengths

4.2.12 Observed queue lengths in the AM and PM peak times quickly identify the congested areas. Figure 4.6 summarises the maximum queue lengths observed in the AM and PM peaks at the Dunkettle interchange.

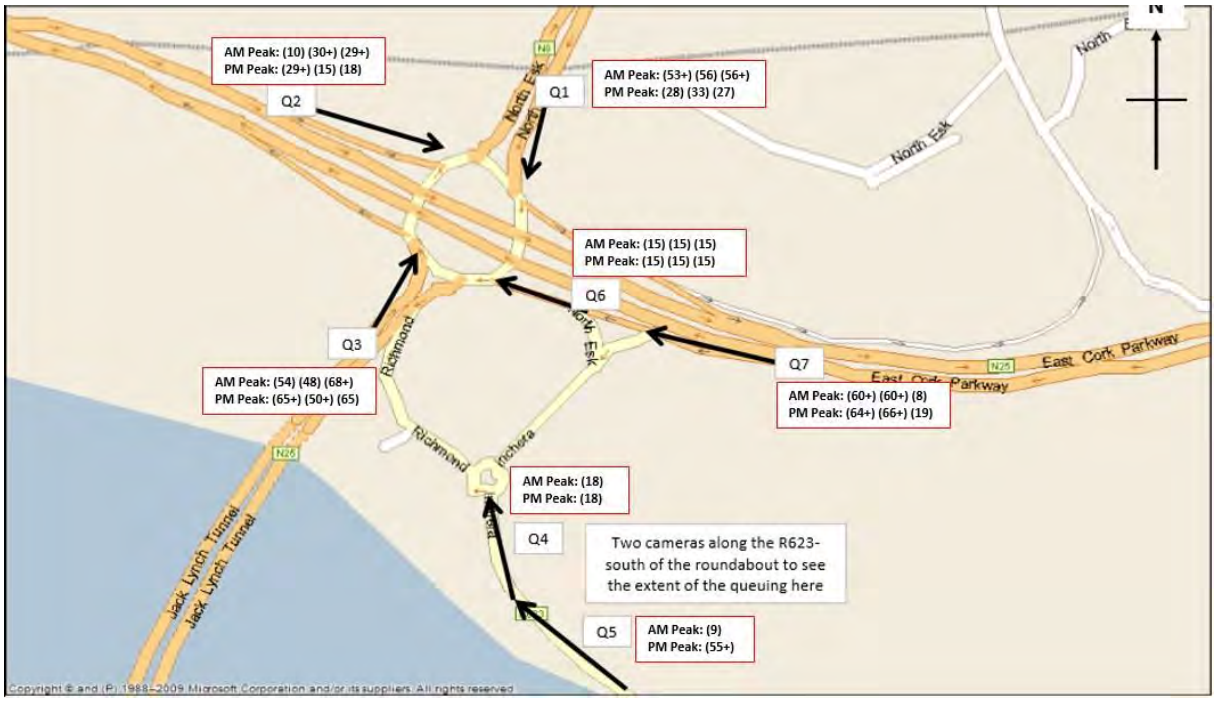


Figure 4.6 AM and PM Queue Lengths – Western 'Gateway'

4.2.13 From the observed queue lengths in Figure 4.6, congestion occurs at the approaches onto the Dunkettle Interchange, during both AM and PM peak times. It should be noted that the west entrance/exit to Little Island is adjacent to the Dunkettle Interchange which forms the junction between the busy M8, N25 and N40, therefore traffic trying to access the Island through the west entrance can become caught in the congestion.

4.2.14 It is evident from Q5 that the number of vehicles exiting Little Island is much greater in the PM peak than the AM peak. Queue lengths are high entering the Dunkettle Interchange from the East (Q7) which has access to the Island via the R623 access road. Similarly, if accessing the entrance to Little Island from the west, north or south, all approaches have queuing traffic. It should be noted that Q6, AM and PM peak have a maximum of 15. These numbers are identical as this section of the carriageway is between traffic signals. This results in this section of the junction, between the signals, being at capacity in AM and PM peak periods.

Eastern 'Gateway' – Observed Queue Lengths

Observed queues in the AM and PM peak quickly identify the congested areas. Figure 4.7 below summarises the maximum queue lengths observed in the morning and evening peak at the eastern access.

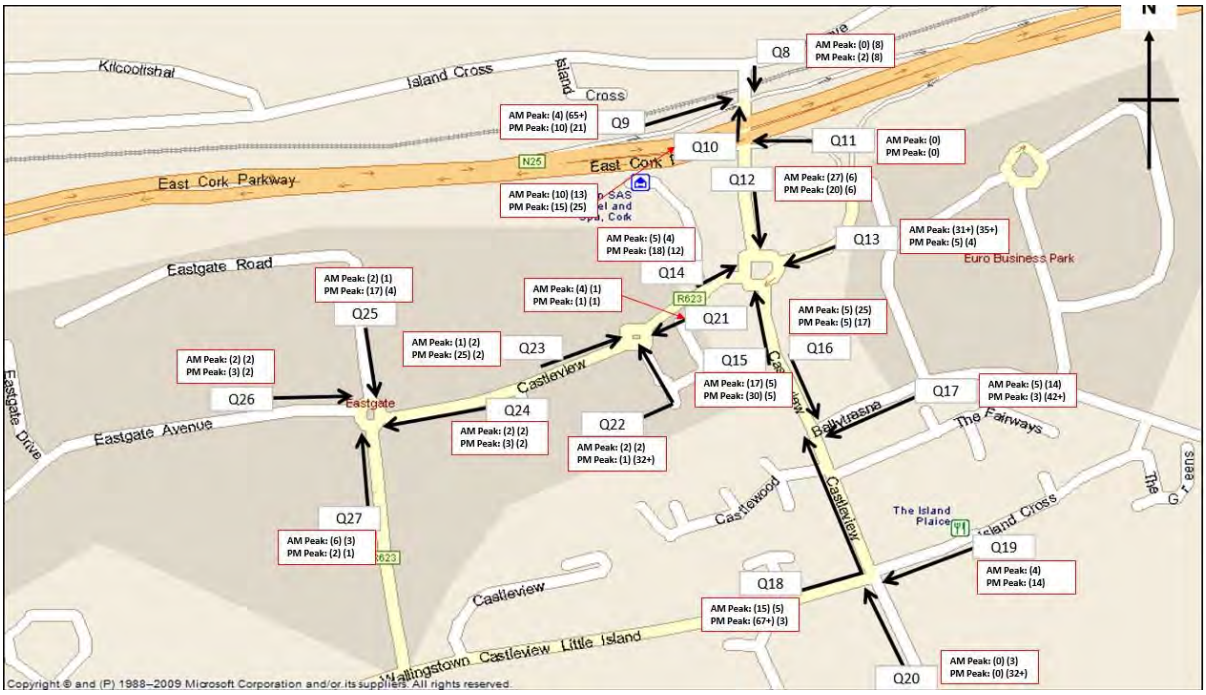


Figure 4.7 AM and PM Queue Lengths – Eastern 'Gateway'

4.2.15 As with the west entrance/exit, the east access sees high levels of queuing traffic in the AM and PM peak. The east access of Little Island serves a number of business, retail and industrial estates in close proximity to the Crompan roundabout; additionally, the majority of residential areas within Little Island are located on the eastern side of the island. As a results, high levels of queuing traffic are observed entering Little Island in the AM peak. Q9 (eastbound slip road off N25) and Q13 (westbound slip road off N25) confirm this. These are the two major pinch points in the AM peak; Q9 is a right turning lane with signals and Q13 enters an uncontrolled roundabout.

4.2.16 In the PM peak, the opposite occurs. The queuing lengths in the PM peak illustrate the employees leaving work from the industrial estates/business parks. There are a few different routes which merge to two main routes to the exit. In the eastern access, these include, but are not limited to:

- Q17/Q18/Q20 to Q15
- Q25/Q23/Q22 to Q14

4.2.17 It should be noted that the queue lengths of Q14 and Q15 indicate capacity levels are reached. Both Q14 and Q15 queuing traffic emerge at the An Crompan roundabout which leads to the overbridge for eastbound traffic or the westbound N25 slip road. Eastbound traffic approaches a signalised junction on the overbridge Q10 and westbound Q11 is free

flowing. Q10 and Q11 are the exits to the N25. There is also another exit onto the Old Youghal Road from the overbridge; this adds to queuing traffic on the overbridge in the PM peak.

Journey Times Surveys

4.2.18 Journey Time Surveys were carried out on four identified routes around Little Island between the hours of 07:00-10:00 and 16:00-19:00 on Tuesday 23rd May 2017. Bluetooth recording units were set up at key timing points along each of the specified journey time routes. The results of these surveys allow the estimation of average journey time throughout the network during peak times which can then be utilised in the model validation process to ensure delays are being represented accurately in the base model.

4.2.19 The four separate routes can be categorised into two groups:

- traffic entering/exiting the western 'gateway' (Route A and B); and
- traffic exiting Little Island (Route C and D)

4.2.20 The selected journey time routes, and their associated overall average recorded time are illustrated in Figure 4.8 below.

Journey Times entering/exiting Western 'Gateway'

4.2.21 From the results summarised in Figure 4.8 below, the route with the longest duration is Route A, clockwise from R623 to the roundabout south of overbridge. The average journey time on this route is 15min 57sec. The maximum journey time recorded was 23min 19sec with a starting time at 4:23:47PM.

4.2.22 This compares to an average time of 9min 44sec in the PM peak in the opposite direction (Route B) with a maximum of 15min 09sec. This is anticipated as the vehicles travelling on route A must fully negotiate the Dunkettle Interchange. Route B vehicles travel on a slip road off the Dunkettle Interchange entering Little Island. Additionally, it should be noted from Junction Turning Count (JTC) data analysis that no vehicles entered the western access from the east during the recording time. It can be concluded that vehicles accessing Little Island travelling westbound will use the eastern access only.

Journey Times entering/exiting Eastern 'Gateway'

4.2.23 The same analysis can be seen with route C. It's evident from the journey times there is a greater travelling time out of Little Island in the evening compared to the AM time. The journey time for route C almost doubles in the evening peak compared to the AM peak.

The opposite occurs, expectedly, for route D, where inbound vehicles in the morning have a greater journey time than inbound vehicles in PM peak. This correlates with the JTC data in sections 4.2.5-4.2.8 within this chapter.

Route	AM/PM	Minimum	Start Time	Maximum	Start Time	Average
Route A	AM	10min 36sec	9:41:31 AM	20min 09sec	8:41:34 AM	15min 03sec
	PM	9min 36sec	6:31:31 PM	23min 19sec	4:23:47 PM	15min 57sec
Route B	AM	7min 30sec	7:48:54 AM	12min 46sec	8:27:40 AM	9min 50sec
	PM	7min 01sec	6:42:03 PM	15min 09sec	5:23:50 PM	9min 44sec
Route C	AM	3min 21sec	7:19:43 AM	5min 14sec	9:39:13 AM	4min 16sec
	PM	3min 16sec	6:25:02 PM	12min 18sec	5:07:14 PM	8min 01sec
Route D	AM	2min 52sec	9:49:37 AM	5min 19sec	8:24:03 AM	3min 44sec
	PM	2min 48sec	5:43:46 PM	3min 34sec	5:02:29 PM	3min 05sec

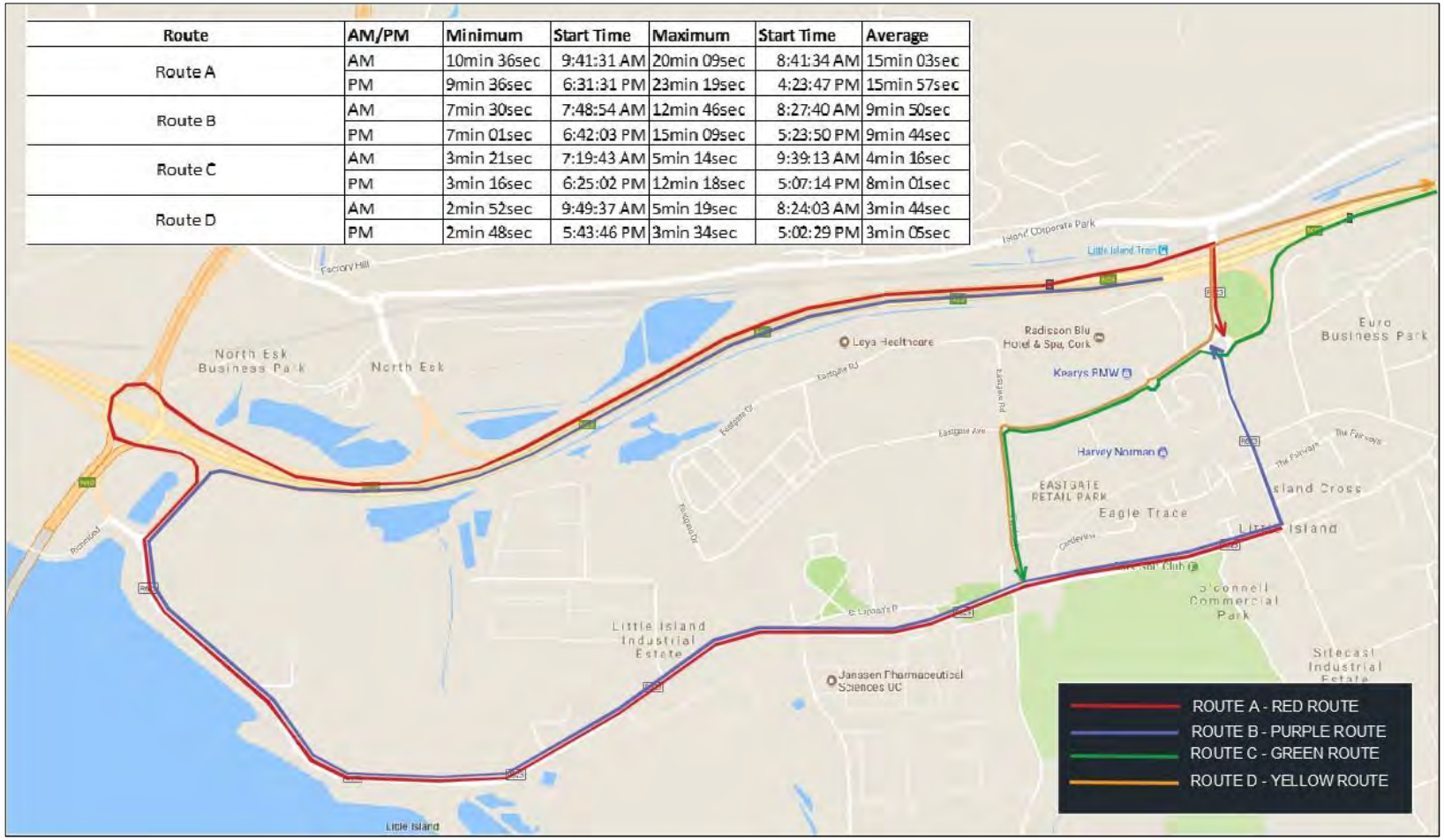


Figure 4.8 Journey Times Survey (Map courtesy of Google Maps)

Pedestrian Crossing Counts

4.2.24 Two-way pedestrian crossing counts were undertaken at the same location as the junction turning counts. (See Figure 4.10 overleaf).

4.2.25 The count data offers a snapshot of peak pedestrian activity on a typical day during the peak morning and evening periods. The data assists in understanding existing pedestrian travel patterns and preferences providing benchmarking information about walking rates as well as preferred routes and destinations.

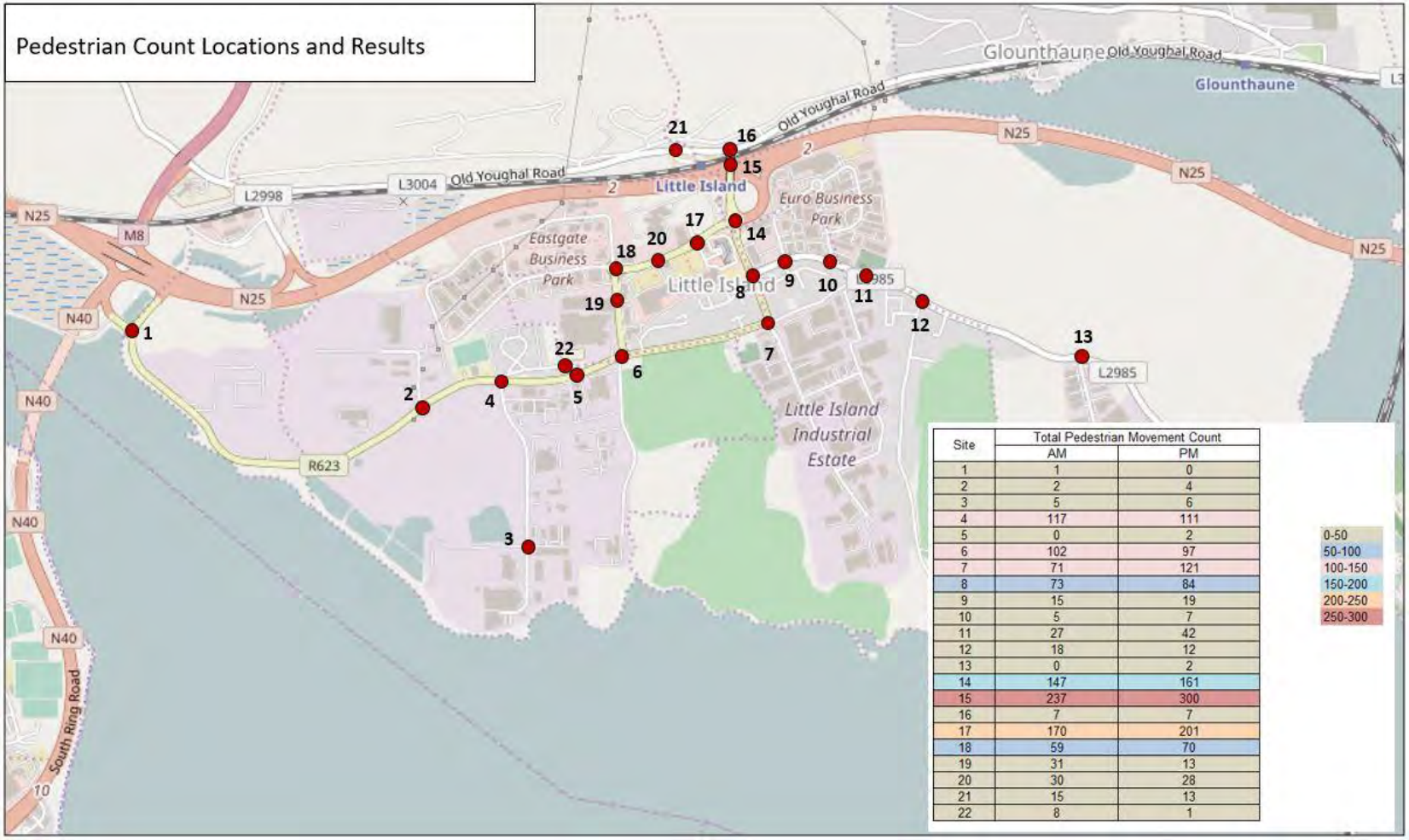
4.2.26 The highest pedestrian numbers were observed at site 15. This is a signalised junction with a pedestrian phase and is the first interchange pedestrians encounter walking from the train station or bus stop. It can be seen from Figure 4.9 below that a significantly high number of pedestrians travel inbound in the AM peak with similar numbers travelling in the opposite direction in the evening peak. The highest flow was 249 pedestrians in the evening peak travelling towards the train station.

Figure 4.9 Junction 15 Pedestrian Counts

4.2.27 Apart from site 15, sites 14 and 17, shown in Figure 4.10 below, have the highest level of pedestrian activity. The three sites follow the route from the train station towards the Eastgate Retail and Business Parks. The highest observed pedestrian flows can be seen entering Little Island from the train station in the morning and the reverse occurs in the evening.

4.2.28 Site 14 is a large uncontrolled roundabout. This junction distributes traffic south and west on entering the island. Most pedestrians enter Little Island on the western footpath of the overbridge from the train station/bus stop. Site 17 is an uncontrolled roundabout upon entering the Eastgate Business/Retail park. There are no pedestrian facilities e.g. dropped kerbs at this roundabout, other than a splitter island.

4.2.29 This indicates that even though the pedestrian facilities at these locations are currently quite poor (narrow footpaths in areas, few or no pedestrian crossing points, no dropped kerbs etc.), there is a high level of pedestrian activity in the area. This level of demand indicates the need to improve facilities at these junctions, which in turn might increase the attractiveness of this route for pedestrians and increase the numbers using the train service. Other sites with notable pedestrian activity are 4, 6, 7, 8 and 18 which follow the main arterial routes through Little Island. Sites 5 and 22 are the count locations adjacent to Little Island National School. The figures for these locations illustrate low levels of pedestrian activity.



Site	Total Pedestrian Movement Count	
	AM	PM
1	1	0
2	2	4
3	5	6
4	117	111
5	0	2
6	102	97
7	71	121
8	73	84
9	15	19
10	5	7
11	27	42
12	18	12
13	0	2
14	147	161
15	237	300
16	7	7
17	170	201
18	59	70
19	31	13
20	30	28
21	15	13
22	8	1

0-50
50-100
100-150
150-200
200-250
250-300

Figure 4.10 Pedestrian Count Locations and Results

Automatic Traffic Counts

4.2.30 Automated Traffic Counts (ATC's) were undertaken for all key radial accesses to/from the study area over a 7-day period. The ATC's provide information on the daily/weekly profile of the traffic entering/exiting Little Island.

4.2.31 As the ATC's cover all the entry/exit points, they allow us to establish the volume of traffic entering and leaving Little Island during the survey period. This information will be utilised during the traffic model calibration process to ensure that the model is representing traffic entering/exiting Little Island in an appropriate manner.

4.2.32 Figure 4.2 at the beginning of chapter 4 above, illustrates the locations of the automatic traffic counts. Although the counts were carried out for a seven-day period, the analysis focussed on the five-day average figure, as the figures at the weekend are significantly less than those for Monday to Friday. Due to the large employer base in Little Island, a large proportion of the vehicle numbers are due to commuter traffic during the working week.

Automatic Traffic Counts - AM Peak Results

4.2.33 Table 4.1 overleaf, outlines the results of the ATC surveys carried out during the AM Peak period from 08:00 to 09:00.

4.2.34 The results in Table 4.1 indicate that the largest traffic flows were recorded on the R623 at the N25 overbridge and after the Crompan roundabout. The two largest counts in the AM peak period were southbound on the R623 on the overbridge entering Little Island (928 vehicles), and southbound after the Crompan roundabout entering Little Island (823). The results indicate that the primary movement in the AM peak hour is along the R623 entering Little Island.

4.2.35 The N25 slip road towards the Dunkettle Interchange (Site 3) and the slip road off the N25 (Site 9) are also heavily utilised routes in the AM peak hour with traffic volumes of 732 and 581 respectively.

Automatic Traffic Counts – PM Peak Results

4.2.36 Table 4.1 below also outlines the results of the ATC surveys carried out during the PM peak period from 17:00 to 18:00.

4.2.37 Similar to the AM peak, the PM peak results show the largest traffic flows were recorded on the N25 slip road toward the Dunkettle Interchange, the R623 and the slip road (westbound) to the N25. (The traffic flows for the PM peak hours are the reverse of the AM routes) The N25 slip road towards the Dunkettle Interchange has the highest traffic volume with 1064 vehicles.

4.2.38 The results show the primary movement in the PM peak is towards the exits from Little Island. The R623 northbound approach towards the Crompan roundabout has a traffic volume of 871 vehicles while the slip road northbound onto the N25 has a total of 818 for the PM peak. Similar to the AM peak, the results show the N25 overbridge is also heavily used in the evening peak with a traffic flow of 625 vehicles.

Table 4.1 ATC Survey Results

Site No.	Location.	Direction.	Speed Limit - PSL (km/h)	Total Vehicles Mon-Sun	5 Day Ave.	7 Day Ave.	AM Peak - 08:00-09:00	PM Peak - 17:00-18:00
1	Little Island Slip Road, West of JTC Site 1	Eastbound	50	17876	3212	2554	492	60
2	N25 Slip Road, north of JTC Site 1	Northbound	60	16083	2827	2298	180	189
		Southbound	60	687	126	98	8	8
		Northbound/Southbound	60	16770	2953	2396	188	197
3	N25 Slip road towards Dunkettle Roundabout	Westbound	60	94209	13638	13458	732	1064
4	R623, at N25 Overbridge	Northbound	50	41361	6826	5909	189	675
		Southbound	50	63981	10705	9140	928	464
		Northbound/Southbound	50	105342	17531	15049	1116	1139
5/6	Slip Roads onto/Off N25	Northbound	50	48290	8157	6899	119	818
		Southbound	50	25979	4333	3711	546	180
		Northbound/Southbound	50	74269	12490	10610	958	1302
7	Slip Road Onto N25	Eastbound	120	22171	3723	3167	95	405
8	Island Corporate Park, east of JTC Site 16	Eastbound	50	29179	4521	4168	186	392
		Westbound	50	26929	4205	3847	366	272
		Eastbound/Westbound	50	56108	8726	8015	552	664
9	Slip Road Off N25	Eastbound	50	41382	7061	5912	581	318
10	Island Corporate Park, west of JTC Site 16	Eastbound	50	23170	3728	3310	293	256
		Westbound	50	28275	4564	4039	263	428
		Eastbound/Westbound	50	51445	8292	7349	556	683
11/12	Slip Roads Onto/Off N25	Northbound	60	18618	2973	2660	138	282
		Southbound	60	5160	863	737	113	55
		Northbound/Southbound	60	23778	3836	3397	252	337
13	Castleview between JTC Sites 8 and 14	Northbound	50	54804	9635	7829	308	871
		Southbound	50	52596	9246	7514	823	342
		Northbound/Southbound	50	107400	18882	15343	1130	1213

Traffic Survey Results Overview

4.2.39 The previous sections of this chapter have described the results of various traffic surveys carried out in Little Island. In summary:

Junction Turning Count Results

As expected, the highest levels of traffic on Little Island are experienced at the exits/entrances to and from Little Island. At both accesses, there are pinch points on the network which include roundabouts and signalised junctions. The pinch points, combined with the high volumes of vehicles, creates congestion and delays during both the AM and PM peak hours.

The JTC results indicate the busiest junction turning point to be the right turn onto the overbridge from the N25 eastbound slip road with 783 vehicles during the AM peak. The western entrance (Richmond to R623) has a similar number of vehicles, at 781.

In the PM peak, the locations with the highest level of turning traffic occur at the accesses to the N25 slip roads east and westbound at the eastern 'gateway' with flows of 496 and 575 vehicles respectively. The results indicate less vehicles travelling through the western exit at PM peak (407) when compared with the eastern exit. This may be a result of drivers wishing to avoid the busy Dunkettle Interchange.

The busiest junction in Little Island is the An Crompan roundabout junction. All traffic entering/exiting Little Island at the N25 Interchange travels via this roundabout. In total, in the AM peak there were 2,559 vehicle movements and 2,702 in the PM peak.

Queue Lengths Summary

To summarise, the main routes where traffic queues form include:

- Dunkettle Interchange and surrounding approach roads;
- R623 approaching the Dunkettle Interchange;
- Approaches to Ballytrasna and Island Cross junctions;
- N25 slip road onto N25 overbridge;
- N25 overbridge heading east; and
- R623 between the three internal roundabouts exiting Eastgate.

Due to the current capacity constraints at existing junctions and the large number of employees working on the Island, congestion is common in peak times with employees and residents travelling to/from/within Little Island. Motorists queueing regularly in traffic may try alternative routes, however as there are only two entrances/exits, both exits are generally congested on an average weekday during peak hours. Employees may attempt to minimise their commute time by leaving before or after the rush hour period.

Journey Time Summary

To summarise, routes A to D comprise two routes entering Little Island and two routes exiting:

- Route A – Red Route – Exiting
- Route B – Purple Route – Entering
- Route C – Green Route – Exiting
- Route D – Yellow Route – Entering

It is evident from the recorded journey times that the vehicles travelling via the Dunkettle Interchange experience the longest duration and journeys entering in the morning or exiting in the evening.

Route A has the longest duration in the AM and PM peak and is likely due to the route travelling via the Dunkettle Interchange. Routes (A and C) travelling toward the exits in the PM peak have a higher journey time than would be expected for the length of route and speed limit of the road. Conversely, routes B and D have longer than expected journey times when entering Little Island. It is clear from the results of route A and B, that travelling via the Dunkettle Interchange will increase journey times in both AM and PM peak periods.

Similarly, there is congestion at the internal junctions of Eastgate retail/business parks in the PM peak, where the journey time is twice as long as in the AM peak. Route D experiences the least duration and congestion. From the survey results, the quickest route entering Little Island in the morning is the Eastern entrance travelling from the east on the N25 (Route C - 3min 44sec).

Pedestrian Count Results

In the AM and PM peak, the junctions between the train station and Eastgate business park experience the highest pedestrian flows indicating that this route is heavily utilised by employees of the retail/business parks commuting by train.

The current pedestrian facilities on this route are poor, yet still have a high level of activity suggesting that, if pedestrian facilities are improved, more employees may use the train service.

In both the AM and PM peaks, survey sites outwith the main business/retail parks observed very low levels of pedestrian activity.

Automatic Turn Count Results

ATC's were carried out in 12 locations across Little Island. In summary:

The R623 and N25 slip roads experience the heaviest traffic volumes in the AM and PM peak periods.

The primary movement for traffic in the AM peak is on the N25 overbridge (R623) and through the Crompan roundabout entering Little Island, while in the PM peak, the predominant movement is in the opposite direction towards the exits of Little Island. Between the peak hours of 17:00 and 18:00, there are four locations with >1000 turning vehicles. These include:

- The N25 sliproad westbound toward the Dunkettle Interchange
- Slip roads onto/off N25 at the N25 Interchange
- Castleview between Island Cross and the Crompan; and
- The R623 at the N25 overbridge.

A traffic survey was carried out to gain an understanding of the current traffic conditions in Little Island. In total, five surveys were carried out. These included:

- Junction Turning Counts (JTC) at 22 locations;
- Automatic Traffic Counts (ATC) at 13 locations;
- Queue Length Observations at 27 locations;
- Journey Time Surveys for four routes; and
- Pedestrian Crossing Counts at 22 locations.

The highest levels of traffic in Little Island are experienced at the exit/entrance to the Dunkettle and N25 Interchanges. At both accesses, there are pinch points on the network including roundabouts and signalised junctions. The capacity constraints at these junctions, combined with high vehicle volumes, create congestion and delays during both the AM and PM peak hours.

The busiest junction in Little Island is the An Crompan roundabout junction. All traffic entering/exiting Little Island at the N25 Interchange travels via this roundabout. In total, in the AM peak there were 2,559 vehicle movements and 2,702 in the PM peak.

The N25 slip road accessing the N25 overbridge has the highest vehicle movements of any junction arm with 783 movements in the AM peak.

Pedestrian movements were highest at the junctions between the train station and Eastgate Business/Retail Park. The N25 overbridge experienced the highest pedestrian volumes in the PM peak with 249 pedestrians travelling towards the train station.

4.3 Travel Survey Results

4.3.1 A comprehensive review of these submissions, including all the statistical information is provided within the *Little Island Transportation Study First Public Consultation Report.*

General Public Questionnaire

4.3.2 Statistical information was gathered from a total of 103 questionnaires completed by members of the general public. Whilst the sample rate is not sufficiently high to enable a disaggregation of findings, the results do provide a good overview of the perceived quality of transportation in Little Island and the key issues which need to be addressed.

4.3.3 A summary of the key statistical findings is as follows:

- A total of 98% of respondents owned or have access to a car. A total of 50% of the respondents had access to a bicycle.
- A total of 91% of respondents stated they travel to/from/within Little Island daily. 92% of respondents stated that the car is the mode of transport most often used for work/education.
- In respect to public transport and specifically to train use, respondents were asked to choose the top reasons which would encourage them to use the train to travel to Little Island. The top two responses were:
  - Better quality walking and cycling links from the Railway Station to Little Island; and
  - More direct services/links to other areas.
- Respondents were asked which improvements would encourage them to use the bus. The top three responses were:
  - More direct service/links;
  - Provision of a direct service into Little Island; and
  - More frequent and direct services.
- With respect to cycling, respondents were asked to choose the top 3 reasons which would encourage respondents to cycle to Little Island. These comprise:
  - Improved cycle paths/lanes;
  - Improved and secure parking; and
  - A pick-up/drop-off shared bike scheme and improved public transport bike carriage.
- Regarding walking, respondents were asked to choose the top 3 reasons which would encourage respondents to walk to Little Island. Results included:
  - Better quality footpaths as the most important improvement that could be made to the existing pedestrian facilities.
  - Improved road crossings; and
  - Safer routes.
- In terms of public perception of the existing roads/traffic status of Little Island:

- 77% rate the general traffic conditions in Little Island as very poor (1% rating it as good)
- 35% rate pedestrian infrastructure in Little Island as very poor (3% rating it as good)
- 67% rate the cycling infrastructure as very poor (1% rating it as good)
- 53% rate the public transport provision as very poor (3% rating it as good)
- 26% rate car parking provision as poor (11% rating it as very good)

Summary

Statistical information was gathered from a total of 103 questionnaires completed by members of the public. Key statistical findings include:
- 98% of respondents owned or have access to a car;
- 91% of respondents stated they travel to/from/within Little Island daily;
- 77% rate the general traffic conditions in Little Island as very poor (1% rating it as good);
- 35% rate pedestrian infrastructure in Little Island as very poor (3% rating it as good);
- 67% rate the cycling infrastructure as very poor (1% rating it as good);
- 53% rate the public transport provision as very poor (3% rating it as good); and
- 26% rate car parking provision as poor (11% rating it as very good).

4.4 Road Network Descriptions and Issues

4.4.1 Traffic management arrangements (e.g. no. of lanes, lane widths etc.) and related conditions experienced (observed levels of queuing, congestion, ambient traffic speeds etc.) at junctions are described in this section of the report. Conditions are described for all national, regional and third class road classifications in the study area as per the key routes shown in Figure 4.11. The road network is separated into three categories:

- National Roads – providing connection between major cities and towns;
- Regional Roads – providing connection between Little Island and surrounding areas; and
- Third Class Roads – connecting local areas within Little Island.

4.4.2 The road network within Little Island is made up of public and private roads. Due to the commercial nature of many developments in Little Island, a number of business park roads fall under private ownership. It is estimated that the total private road length within the Island is approximately 6km. There are three main business parks which make up the majority of private roads. These include:

- Eastgate Business Park;
- Euro Business Park; and
- Harbour Point Business Park.

4.4.3 Figure 4.11 below also illustrates the estimated extent of private roads within Little Island.

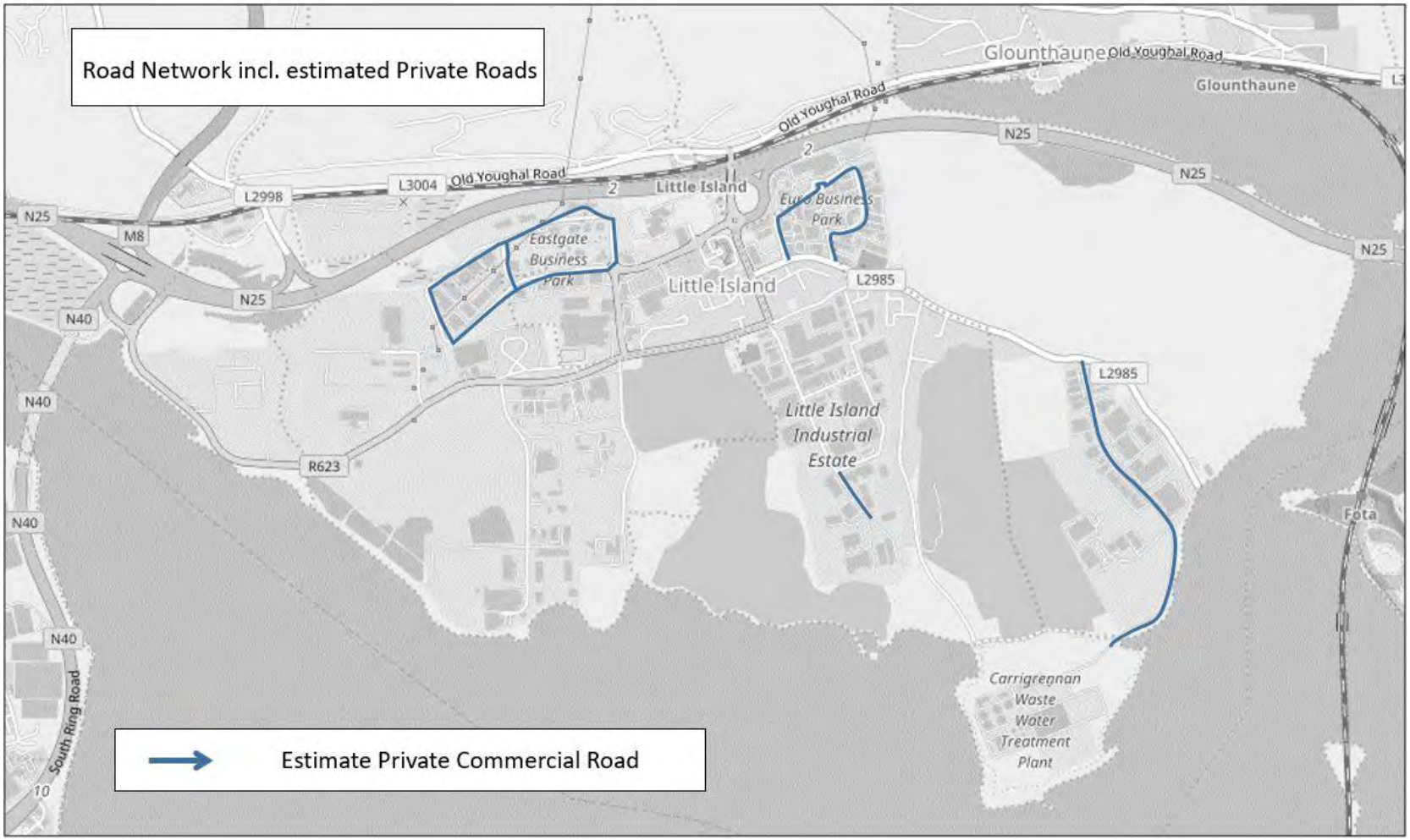


Figure 4.11 National, regional and third class roads incl. estimated private roads

National Roads

4.4.4 There are a number of national routes feeding into the 'gateways' used to access Little Island. Both the Dunkettle Interchange (Western Gateway) and the N25 Interchange (Eastern Gateway) are major road junctions with access to Little Island. The Dunkettle Interchange forms the junction between the M8, N25 and N40 providing access to the wider national road network.

4.4.5 The M8 is an inter-urban motorway forming part of the Cork-Dublin motorway. It is a heavily trafficked route travelling North-South. The N40, commonly known as the South Ring Road, is a national primary road forming the orbital route around the south side of the city. It links Ballincollig in the west to the Dunkettle Interchange. The N25 is a national primary route forming part of the route from Cork to Rosslare Europort via Waterford. The Dunkettle Interchange is one of the busiest junctions in the country. It is heavily trafficked and is prone to congestion and delays during peak periods.

4.4.6 Traffic from the south and west of Cork City approaches the western gateway to Little Island via the N40, Jack Lynch tunnel and Dunkettle Interchange. Traffic travelling from North East Cork (i.e. Fermoy, Mitchelstown) and further afield travel southbound via the M8. Both sets of traffic, from the N40 and M8, have the option of travelling further east to Little Island via the N25.

4.4.7 Eastbound traffic on the N25 enters the study area at the Dunkettle Interchange. Traffic travelling from Cork City to Little Island has the option to travel via the western or eastern gateways. An eastbound slip road to the Dunkettle Interchange is the first option. More commonly, commuters travel east using the Dunkettle junction flyover and access Little Island via the N25 Interchange. During the AM peak, commuters can experience queuing traffic and delays on the slip road off the N25 at the eastern gateway. This creates safety issues due to static traffic queuing on the N25, west of the slip-road.

4.4.8 Access to Little Island from the N25 westbound is provided via the westbound slip road. Westbound traffic on the N25 experiences the least delays in the AM peak with direct access to the Crompan roundabout.

Picture 1: Queuing traffic on N25 slip road - inbound

Picture 2: N25 slip road onto overbridge

Picture 3: Dunkettle Interchange toward Tunnel from N25

Picture 4: Aerial view of Dunkettle Interchange

Figure 4.12 National Roads

Regional Roads

R623

4.4.9 There is only one regional road within Little Island. The R623 is the arterial regional road linking the Dunkettle Interchange and N25 Interchange through Little Island. It is a single carriageway distributor road connecting all local roads, some residential estates and a number of business/industrial parks to the wider road network (See Figure 4.11 above).

4.4.10 It is heavily trafficked and due to junction capacity constraints at existing junction congestion and long queuing occurs during peak periods, particularly in the PM peak. Further to the gateway exits, there are particular issues at the junctions exiting the Eastgate Business/Retail Park, Island Cross and the L2985 junction.

4.4.11 The local roads linking areas of Little Island to the R623 create pinch points on the network adding to delays. The junctions which create these pinch points will be evaluated in detail in section 4.6 Junction Evaluation below.

4.4.12 Due to the industrial/commercial nature of developments in Little Island, the R623 experiences a high volume of HGVs with narrow carriageways widths and tight turns on some sections. As the majority of residential estates are located on the eastern side of Little Island, HGVs and high traffic volumes create safety concerns for pedestrians/cyclists on the R623.

4.4.13 Little Island National School is located on St. Lappin's Place, off the R623. During consultation with the school and site visits, it was noted that congestion occurs on the R623 during the AM peak period. Vehicles turning right towards the school from the R623 get held up due to oncoming traffic; resulting in queuing of traffic westbound on the R623 behind turning vehicles.

Picture 1: R623 westbound at the St. Lappins Junction

Picture 2: R623 Eastbound at the Eastgate Retail Park entrance/exit

Figure 4.13 Regional Road (R623)

Local Roads

L2985 – Ballytrasna Park Road

4.4.14 The L2985, also known as Ballytrasna Park Road, is a district distributor road connecting the R623 to the eastern side of Little Island, including the Euro and Harbour Point Business Parks. It is not a through route and provides east to west access only to the R623. It links the residential area of Clash Road to the wider road network. This road is a single carriageway road and generally has a good standard of carriageway, however, the eastern end of this road deteriorates to a narrow width. This road becomes congested with queueing during peak times at the signalised junction with the R623. It's evident from responses to the first public consultation that speeding HGVs on this route are an issue.

L3004 - Old Youghal Road

4.4.15 The L3004, commonly known as the Old Youghal Road, is a district distributor road running parallel to the N25 connecting the residential areas of Glanmire, Glounthane and Carrigtwohill to Little Island. It is a single carriageway road passing through largely undeveloped areas until it reaches Glanmire in the north west and Carrigtwohill in the east. Traffic along this route is largely free flowing, however, traffic slows and queues form when accessing Little Island from the Glanmire side. The present junction is uncontrolled with a dedicated right turn lane. This creates issues for vehicles exiting Little Island. Safety concerns have been raised through the first public consultation regarding the current junction layout.

L7075, L7031 and L2986

4.4.16 There are three other local roads identified within Little Island:

- L7075 – Wallingstown Industrial Estate Access Road;
- L7031 - St. Lappins Place; and
- L2986

4.4.17 All three roads are accessed from the R623 arterial route. The L7075 provides access to a number of pharmaceutical/industrial plants, commercial warehouses and offices. This road is a single carriageway road and although is regularly trafficked with HGVs, it is generally free flowing. The L7031 provides access to the Little Island National School, the local credit union and a residential area. Both of these roads are not through routes. Congestion can occur on the L7031 during the AM peak due to school drop-off.

The L2986 is one arm of the signalised Island Cross junction. The L2986 is a through route and connects with the L2985 Ballytrasna Park Road. As a result of this connection, HGVs occasionally utilise this narrow single carriageway road. There are a number of local amenities located on this road including the post office, barbers and dry cleaners.

Picture 1: Congestion on Old Youghal Road

Picture 2: Queuing traffic on the L2985

Figure 4.14 Queuing traffic on local roads

Unclassified and Private Roads

4.4.18 There are also number of unclassified and private roads throughout Little Island. The largest of these include:

- Clash Road (unclassified);
- Little Island Industrial Estate (unclassified);
- Euro Business Park Roads (private);
- Eastgate Business/Retail Park roads (private); and
- Harbour Point Business Park Road (private).

4.4.19 The private roads are located in and around the commercial business parks, with responsibility for these falling to the owners of the business parks. Generally, these are single carriageway roads tying in with the regional road R623 or local road L2985.

4.4.20 The unclassified industrial estate roads above, link industrial parks with the R623. These are single carriageway roads carrying high numbers of HGVs and are not through roads, only providing access to industrial estates. Clash Road is a single carriageway residential road with a poor surface condition. Like the industrial park roads, it is not a through road, providing access only to residential properties.

Picture 1: Eastgate Business Park roundabout

Picture 2: Euro Business Park Exit

Figure 4.15 Private Road Junctions

Summary

Little Island is quite isolated in its location with the N25 acting as a boundary to the north while to the east, west and south is Cork Harbour. Presently, the area is accessed via the Dunkettle Interchange or the N25 Interchange.

National routes accessible from the Dunkettle Interchange and the N25 Interchange include the M8, N25 and N40 providing access to the wider national road network.

There is one regional route (R623) which acts as the arterial route through Little Island. It links the eastern and western accesses and all local and private roads accessing residential/commercial/industrial areas branch from this.

The R623 is heavily trafficked and due to capacity constraints at the 'gateway' junctions exiting/entering Little Island, congestion and long queuing can occur during peak periods. This can be compounded by traffic congestion on the nearby national routes.

Further to the 'gateway' junctions, there are currently capacity issues at the junctions exiting the Eastgate Business/Retail Park, Island Cross and the L2985 Ballytrasna junction.

4.5 Junction Evaluation

4.5.1 To improve Little Island as a residential area whilst realising its full potential as a commercial/industrial zone, improvements are required regarding public transport, walking/cycling facilities and road infrastructure. There is further potential for development at Little Island but, the viability of the area relies on good transport links for all modes of transport.

4.5.2 During the first public consultation, local residents highlighted traffic congestion during peak periods as the major issue which affects their daily lives. Additionally, employee wellbeing was highlighted as a concern for some businesses; currently employees can become delayed in congested traffic for long periods which negatively impacts their work/life balance and impedes businesses expanding and recruiting further staff.

4.5.3 Network operational issues, coupled with very high numbers of regional and district movements within and around Little Island and in particular the Dunkettle Interchange, creates severance issues which impact the local community and its function as an employment zone. Therefore, the following chapter investigates the key junctions within Little Island and the impact they have on the local and wider network.

4.5.4 The main junctions with the highest level of congestion within Little Island include (junction numbers relate to those shown in Figure 4.16 below.

- Junction A – Richmond/R623/Access Road
- Junction B – R623(W)/Access Road/R623(E)
- Junction C – St. Lappin's Place/R623(W)/R623(E)
- Junction D – Cork Plastics/R623(W)/Cork Golf Club/R623(E)/R623(N)
- Junction E – R623(N)/R623(S)/Island Corporate Park(S)/Island Corporate Park(E)
- Junction F – R623(N)/R623(S)/Ballytrasna Park
- Junction G – Ballytrasna Park Access 1/Ballytrasna Park(W)/Ballytrasna(E)
- Junction H – Ballytrasna Park Access 2/ Ballytrasna Park (W)/ Ballytrasna (E)
- Junction I – Ballytrasna Park (W)/ Clash Road/ Ballytrasna Park (E)
- Junction J – Harbour Point Business Park(W)/ Harbour Point Business Park (S)/ Harbour Point Business Park (E)
- Junction K – Eastgate Road (N)/ Eastgate Road (W)/ R623/ Castleview
- Junction L – Access Road/Castleview(W)/ Castleview (S)/ Castleview (E)
- Junction M – R623(N)/ Castleview/ R623(S)/ Slip Road on/off N25
- Junction N – R623(N)/ Slip road off N25/R623(S)/ Slip road onto N25
- Junction O – Old Youghal Road(E)/R623(S)/Old Youghal Road(W)
- Junction P – R623(N)/Dunkettle Access Road/R623(S)

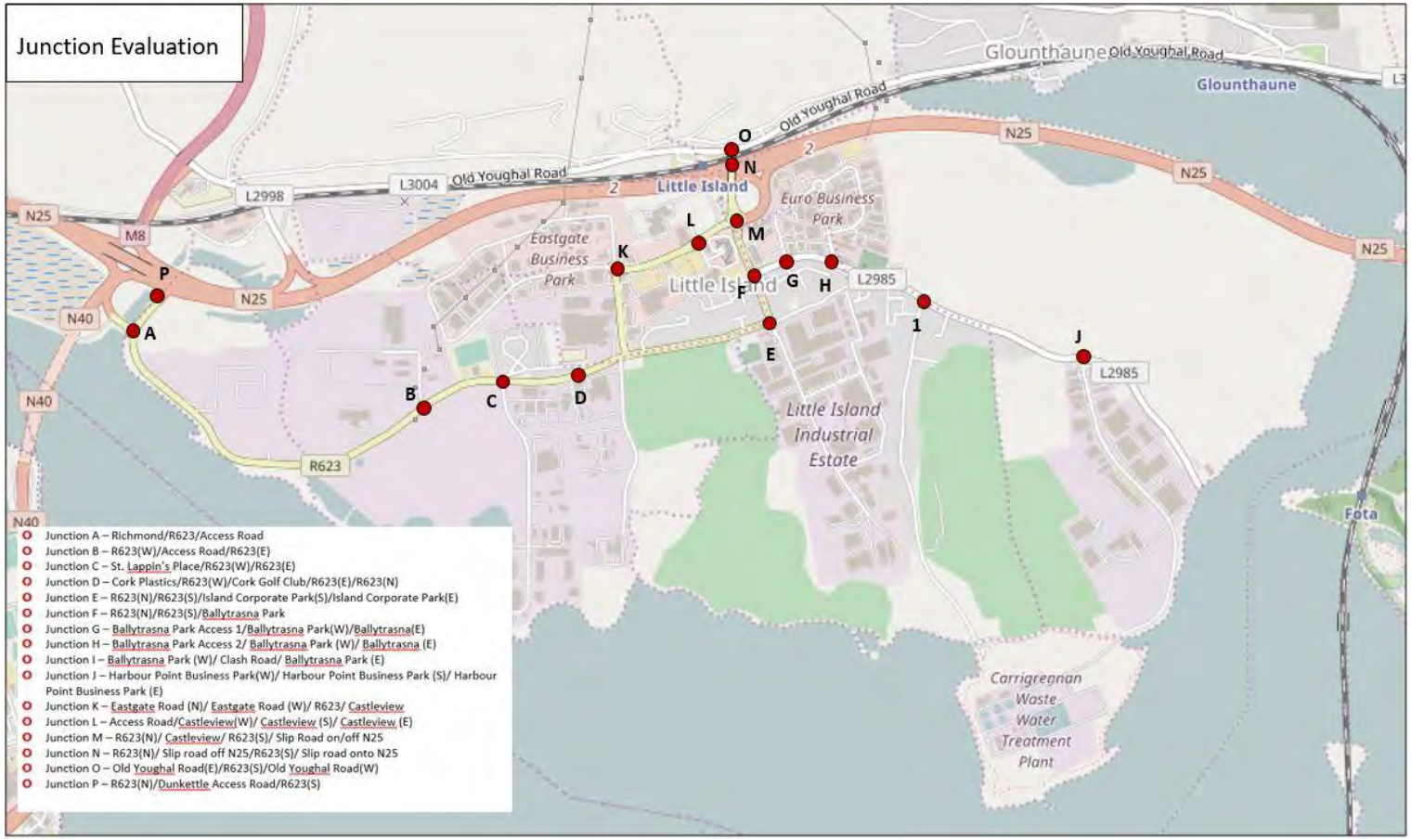


Figure 4.16 Key Junctions – Little Island

Junction A – L3005/R623/Access Road

- This is a 3-arm roundabout junction. It is a normal roundabout with an inscribed circle diameter (ICD) of approximately 25m. It has a single lane approach on all sides and roundabout arms are flared on entry with single exit lanes.
- Traffic volumes are heavy in the peak periods. The junction experiences capacity issues, particularly in the PM peak, when traffic exiting for the Dunkettle Interchange experiences congestion. Inbound traffic generally operates well in peak periods.
- This junction is prone to delays due to its exposure to traffic incidents on the nearby M8, N40 and N25 at Dunkettle
- There are no pedestrian facilities at this junction or in the immediate vicinity. The Dunkettle Interchange forms the junction between the M8, N40 and N25 and does not facilitate pedestrians/cyclists.
- The junction is well lit with sufficient public lighting and is well served by advance signposting. The centre island and two of the three traffic islands are planted with grass.
- The speed limit of this junction is 50km/h.

Picture 1: Plan view of roundabout

Picture 2: View from R623 westbound

Junction B – R623(W)/L7075/R623(E)

- This is a priority T-junction. The L7075 provides access to industrial and commercial units. It is a single carriageway road and is not a through route. HGVs utilise this road regularly. Corner radii are large at this junction to facilitate turning HGVs.
- Pedestrian facilities at this junction are good. There is a crossing point (dropped kerbs and tactile paving) on the minor arm of this junction. A signalised junction with a pedestrian phase, including dropped kerbs and tactile paving is located on the R623. This crossing point provides access via a footpath to St. Lappins Place. The Little Island National School is located at the eastern end of St. Lappins Place (see Junction C below). Anti-skid surfacing has been included on the approach to the signals.
- Traffic volumes on the R623 are heavy during peak period but traffic flows well. In extreme congestion, traffic can back up to this junction from the Dunkettle Interchange.
- The junction is lit with sufficient public lighting with a speed limit of 50km/h.

Picture 1: View from R623 Westbound

Picture 2: Plan view of junction

Junction C – L7031(St. Lappan's Place)/R623(W)/R623(E)

- This is a priority T-junction with St. Lappins Place providing access to a residential area and the Little Island National School. St. Lappins Place is not a through route, therefore this junction is the only access to/from St. Lappins Place. It is controlled with a yield sign.
- The R623 is heavily trafficked in the peak hours. During the AM peak, congestion can occur westbound due to right turning vehicles. There is insufficient room to pass waiting vehicles on the inside causing a build-up of queuing traffic.
- Following consultation with the school, it was outlined that congestion occurs on St. Lappins Place during drop-off/pick-up due to inadequate road widths and turning points. This is often exacerbated by irregular parking on both sides of the road outside the school gates.
- There are some pedestrian facilities at this junction with limited footpath provision. There are no satisfactory or safe crossing points, deterring pupils from walking to school.
- The speed limit on the roads at this junction is 50km/h with hazard/notice signage highlighting the presence of children. Public lighting exists at this junction.

Picture 1: View from R623 Eastbound

Picture 2: View of School entrance, St Lappins Place

Junction D – Cork Plastics/R623(W)/L7078/R623(E)/R623(N)

- This is a 5-arm priority junction where accesses to/from Cork Plastics, Little Island Industrial Estate (L7078) and Eastgate Business Park form the minor arms of this junction. Only the L7078 arm is controlled by a stop sign.
- The entrance/exit to Cork Plastics and Little Island Industrial estate have large corner radii, enabling vehicles to make manoeuvres at higher speeds. The large radii facilitate HGVs from the industrial areas however, they create safety issues for pedestrians and cyclists. Corner radii on the R623(N) entering Eastgate business park are smaller helping to reduce traffic speeds.
- The R623(E&W), the main arterial route within Little Island is heavily trafficked in the peak periods. This junction is the preferred access point to the Eastgate Business Park for traffic travelling eastbound. In the AM peak, traffic generally moves freely on this route, however, congestion frequently occurs eastbound at this junction in the PM peak. Queue lengths can tail back to this junction from the signalised junction E (see next section). Subsequently, queuing traffic is also common on the R623(N) trying to exit the Eastgate business park.
- There are footpaths present on all arms of this junction with the exception of the L7078 which only has a footpath on one side. There are no safe and appropriate crossing points at this junction. There is an 'unofficial' lined crossing (bar markings) resembling zebra crossing lines on the R623(N) minor arm.
- The speed limit on the roads at this junction is 50km/h with existing public lighting.

Picture 1: View from R623 Eastbound

Picture 2: View from R623 Westbound

Junction E – R623(N)/R623(S)/L2986(E)/Sitecast access road

- This is now a 4 arm signalised junction (recently signalised). This junction has capacity issues for a number of reasons relating to trips generated by employees leaving work in the PM peak and the lack of alternative routes to access either of the two exits and the gateways from Little Island.
- Recent changes to the junction include new footpaths, pedestrian crossing facilities and traffic signals. This has made the environment safer and more inviting for pedestrians, particularly as it is on the route from residential areas to the National School.
- This is a heavily trafficked route with queuing od traffic daily, at peak times. The junction is not symmetrical with the north-south route having a skewed alignment.
- There are a number of direct residential and commercial accesses along the approaches to the junction. The R623 eastbound contains a straight ahead and right turn lane at the junction and can accommodate approximately 4 car lengths before single lane queuing occurs. The left turn lane operates on a filter phase to increase the capacity for left turning vehicles. All other routes at this junction consist of single carriageway approaches.
- The L2986 arm of this junction is a single carriageway road facilitating parking on the northern side of the carriageway. This adds to congestion creating a narrow passage for passing vehicles.
- The pedestrian facilities at this junction are good, although the footpath on the north-eastern corner is narrow. All arms of the junction have footpaths, with appropriate dropped kerbs and tactile paving. The footpath widths vary from approximately 1m to 3m.
- The junction is well lit with public lighting with a speed limit of 50km/h.

Picture 1: View eastbound on R623

Picture 2: Pedestrian facilities at Island Cross

Junction F - R623(N)/R623(S)/L2985(Ballytrasna Park)

- This is a 3-arm signalised junction with large corner radii to facilitate the large number of HGVs using this route. This is a heavily trafficked route with congestion common, particularly in the PM peak.
- The L2985 has capacity issues in peak times relating to a number of trip attractors (i.e. Little Island filling station) and generators (i.e. logistics warehouse) in the area and the limited number of alternative viable route options. This junction serves all traffic exiting the industrial/commercial/residential areas located off the L2985. Congestion and delays at this junction are prevalent in the PM peak.
- A busy filling station with shop and food deli is located on the south east corner of the junction with direct access to both the R623 and the L2985. This is the only filling station on Little Island.
- On the R623(N) and R623(S), there are dedicated straight ahead and turning lanes present. The turning lanes are limited in length and turning manoeuvres do not receive a dedicated green time; this can result in single lane queuing, causing delays.
- The L2985 has dedicated left and right turning lanes. A yellow box is located in the right turning lane to provide access to the filling station for oncoming traffic.
- Good quality footpaths exist on all arms of the junction with dedicated crossing points. The crossing facilities at this junction are good with pedestrians receiving a dedicated signalised phase.
- The R623 has a significant gradient, in the order of 5% which is conducive to high speeds northbound in the off peak times. This creates a safety issue due to adjacent residential developments.

Picture 1: Plan view of junction

Picture 2: Queuing traffic on L2985

Junction G - Euro Park Access 1/ L2985 Ballytrasna Park (W)/ L2985 Ballytrasna Park (E)

- This is a priority T-junction where access to the Euro Business Park forms the minor arm controlled with a stop sign and road markings. The junction has relatively small corner radii compared with other similar junctions in commercial industrial areas.
- This junction experiences congestion and queuing traffic in the PM peak time. Westbound traffic on the L2985 stops at the signalised junction F (see above). Queuing traffic forms which prevents traffic exiting the Euro Business Park.
- The major arm L2985 has a speed limit of 50km/h and there is no public lighting at this junction.
- Footpaths exist on all arms of the junction except for on the northside of the L2985. There are no crossing points for pedestrians at this junction.

Picture 1: Euro Park Exit

Picture 2: Queuing traffic past Euro Park exit

Junction H – Euro park access 2/ L2985 Ballytrasna Park (W)/L2985 Ballytrasna Park (E)

- This is a priority T-junction where access to the Euro Business Park forms the minor arm controlled with a stop sign and road markings. The junction has wide sweeping radii to facilitate easy turning manoeuvres for HGVs.
- Traffic is generally free flowing at this junction however, congestion and queuing traffic can occur on occasion in the PM peak time. Westbound traffic on the L2985 stops at the signalised junction 6 (see above). Queuing traffic forms, preventing exit from the Euro Business Park.
- Footpaths are present on the minor arm of this junction but are not continuous. The L2985 (major arm) has one continuous footpath on the southside.
- Public lighting exists at this junction and the major arm L2985 has a speed limit of 50km/h.

Picture 1: View from L2985 Eastbound

Picture 2: View exiting Europark Access

Junction I – L2985 Ballytrasna Park (W)/ Clash Road/L2985 Ballytrasna Park (E)

- This is a priority T-junction with Clash Road forming the minor arm of the junction, controlled by a stop sign and road markings. Carriageway widths are good and the L2985 Ballytrasna Park (major arm) includes a right turn lane for traffic entering Clash Road. The right turn lane can accommodate three car lengths before single lane queuing occurs. Sight lines are good at this junction.
- Traffic in this area is generally free flowing. Residents of Clash Road raised concerns during the public consultation regarding speeding HGVs on the L2985.
- There are existing footpaths on the southern side of this junction. Clash Road is a residential area, and some crossing facilities (dropped kerbs) are present. The corner radii at this junction are narrowed using road markings to reduce speed and improve the safety and sightlines at the pedestrian crossing. Public lighting exists at this junction.
- The junction is well signposted with advance notice signage travelling east and westbound on the L2985.

Picture 1: Westbound view

Picture 2: Plan view of junction

Junction J – L2985 Ballytrasna park(W)/ Harbour Point Business Park (S)/ L2985 ballytrasna Park (E)

- This is a priority T-junction with Harbour Point Business Park Road forming the minor arm, controlled by a stop sign. Carriageway widths are wide with large sweeping corner radii, assisting the large number of HGV movements at this junction.
- Most of the area surrounding the Harbour Point Business Park is undeveloped, therefore, there is less congestion enabling free-flowing traffic at this junction. Both the L2985 and Harbour Point Road are not through roads, therefore it is an origin/destination only.
- The northside boundary of this junction is a residential area with one-off housing. The existing footpaths are located on the southside only, and there are no appropriate crossing points for pedestrians. The crossing distance for pedestrians is lengthy due to the large corner radii.
- The speed limit is unclear in the area due to the lack of signage. Public lighting does exist at this junction.

Picture 1: View from L2985 Westbound

Picture 2: Plan view of junction

Junction K – Eastgate Road (N)/ Eastgate avenue (W)/ R623 (Eastgate way)/ R623 (Castleview)

- This is a 4-arm roundabout junction, controlled by yield signs and road markings. It is a normal roundabout with an inscribed circle diameter (ICD) of approximately 40m. Roundabout arms are flared on entry with single lane exits. Traffic calming measures are located on all 4 arms approaching the junction.
- Traffic is generally free flowing in the AM peak, however, the junction frequently has capacity issues in the PM peak. Congestion at the signalised Junction E can form long queue lengths on the R623(E), preventing left turning traffic at Junction 4. This can create queues the full length of R623 (Eastgate Way), which in turn causes congestion at this junction. This coupled with long queuing at junction L and M causes delays to commuters in the PM peak.
- Footpaths are present on all 4 arms of the junction. The footpath surface is good with crossing points on the southern and western approaches. The other two arms do not have crossing points. Splitter islands are present on all 4 arms which are used as refuge islands for crossing pedestrians. Some pedestrians use the traffic calming speed bumps as crossing points prior to the junction.
- The junction is well lit with public lighting and is well signposted in advance. The centre island is planted with shrubbery and the splitter islands have an asphalt surface.

Picture 1: View from R623 (Eastgate Way) northbound **Picture 2:** Plan view of junction

Junction L – Access Road/R623 Castleview(W)/ R623 Castleview (S)/ R623 Castleview (E)

- This is a 4-arm roundabout priority junction, controlled by yield signs and road markings. It is a normal roundabout with an inscribed circle diameter (ICD) of approximately 40m. Roundabout arms are flared on entry with single lane exits.
- A large retail park and a busy food outlet are located to the southeast and southwest of this junction. Additionally, this is the through route for commuters to the Eastgate Business Park. The corner radii are large which is conducive to high speed manoeuvres particularly travelling west/east on the R623. The northern arm of the junction is an access to a car sales showroom. This junction is heavily trafficked in the AM and PM peak, due to its proximity to the N25 Interchange (eastern gateway). Traffic is generally free flowing in the AM peak, however, there is continual congestion in the PM peak.
- Due to the large number of commuters exiting the Business Park in the PM peak, towards the N25 interchange, congestion and long queue lengths occur daily. This is, in part, to traffic waiting to exit at the priority junction M. Commuters use the Eastgate Retail Park as a rat run to skip queuing eastbound traffic on the R623.
- There are no traffic calming measures on approach to this junction; coupled with large corner radii, during free flowing traffic, vehicles travel at high speed through this junction. This creates an unsafe environment for pedestrians/cyclists.
- Footpaths are present on all 4 arms of the junction. The footpath surface is good however, no crossing points are located at this junction. There are splitter islands on all 4 arms which are used as refuge islands for crossing pedestrians.
- The junction is well lit with public lighting and is well served with advance signposting. The centre island is planted with shrubbery and the splitter islands have an asphalt surface.

Picture 1: View from R623 Westbound

Picture 2: Lack of pedestrian crossing points

Junction M – R623 castleview(W)/R623 (S)/R623 (N)/N25 Sliproad

- This is a 4-arm roundabout priority junction, controlled by yield signs and road markings. It is a normal roundabout with an inscribed circle diameter (ICD) of approximately 50m. Roundabout arms are flared on entry with single lane exits.
- This junction (Crompan Roundabout) is a large distributor roundabout providing access to the N25 Interchange and internal regional and local routes on Little Island. Due to its proximity to the eastern gateway and connections to other routes, this important junction experiences daily traffic congestion.
- Traffic volumes are heavy and congestion is common on the southern and western arms, particular in the PM peak. Traffic generally flows freely in the AM peak however, queuing can occur on the N25 slip road approaching the junction. This arm is the main access to Little Island for vehicles travelling westbound on the N25.
- Given that this is the main pedestrian route to/from the Little Island train station, facilities are poor. On the northern arm of the junction leading to the station, there is only one footpath on the western side of the road. The western and southern arms also have footpaths. Splitter islands are located on the junction approaches and are used by pedestrians as a crossing refuge. There is only one crossing point for pedestrians, located on the western arm of the junction. Dropped kerbs are present, however tactile paving is only utilised on the splitter island.
- There are safety concerns at this junction; the large corner radii enable vehicles to travel at speed, making it difficult for pedestrian to cross the road. Many pedestrians have been observed walking on the grass verge on the northern and eastern arms of the junction.
- The junction is well let by public lighting and is well signposted in advance. The centre island is planted with grass and the splitter island have a mix of paving and planted grass.

Picture 1: Plan view of junction

Picture 2: Eastbound view of junction

Junction N – R623(N)/ Slip road off N25/R623(S)/ Slip road onto N25

- This junction forms part of the N25 Interchange. It is a signalised 4-arm junction including the N25 overbridge. The R623(S) forms the overbridge arm of this junction consisting of three lanes; one inbound and two outbound. The outbound lanes comprises a straight ahead and right turn lane. The right turn lane can accommodate approximately 7 vehicles before single vehicle queuing occurs. Traffic congestion can form on this arm in the PM peak, occasionally causing queuing traffic to tail back to junction M (above).
- The slip road from the N25 is the main access to Little Island for vehicles travelling Eastbound. This arm contains a left and right turning lane. The right turning lane accesses Little Island and queuing traffic is common in the AM peak. Traffic in the left turning lane is generally free flowing.
- The slip road onto the N25 is a single carriageway road with a speed limit of 120km/h. The slip road receives traffic from both the R623(N) and R623(S).
- The R623(N) consists of two outbound lanes and an inbound lane. The outbound lanes comprise one lane flared at the junction to provide a right and left turn lane. The left turn lane accommodates three car lengths before single lane queuing occurs. Similarly the right turn lane can accommodate two car lengths. The R623(N) forms one arm of junction O (See below for further detail).
- There are pedestrian footpaths on all arms of the junction. The footpath runs adjacent to the slip road from the N25 forming the main access to/from the Little Island train station. This is a narrow footpath with many pedestrians walking on the existing grass verge.
- A signalised pedestrian crossing phase is provided on the western side of this junction to facilitate pedestrians walking from the station. The footpath on the western side of the overbridge is approximately 4m wide to accommodate pedestrians. The crossing point at the signalised junction does not have appropriate dropped kerbs or tactile paving. During static queuing traffic, many pedestrians cross the N25 slip road prior to the junction and walk on the opposite grass verge.
- The junction is well lit by public lighting and signposted.

Picture 1: Plan view of junction

Picture 2: Queuing traffic on N25 slip road

Junction O – Old Youghal Road(E)/R623(S)/Old Youghal Road(W)

- This is a priority T-junction where the R623(S) forms the minor arm controlled by stop signs and road markings. The R623(S) comprises a right and left turning lane on the rail overbridge. The left turn lane accommodates three car lengths before single lane queuing occurs. Similarly the right turn lane can accommodate two car lengths. As this is the minor arm, congestion can occur causing queuing traffic in the PM peak to tail back through junction 14 (above).
- On the Old Youghal Road(W), there is a dedicated straight ahead and right turn lane present. The right turn lane is limited in length and accommodates approximately 7 vehicles before single lane queuing occurs. In the AM peak, there are capacity issues, due to queuing traffic from the signalised junction 14 (above).
- The speed limit at this junction is 50km/h and the junction is signposted in advance. It is well lit with public lighting.
- There are only footpaths present on the R623(S) and the southern side of the Old Youghal Road. There are no pedestrian crossing facilities at this junction.

Picture 1: View from Old Youghal Road (E)

Picture 2: Plan view of junction

Junction P – R623/ N25 (Dunkettle Approach Road)

- This junction is the western exit from Little Island. There is a single outbound carriageway which flares into two lanes approaching the Dunkettle Approach Road. This is a controlled signalised junction providing access to the wider road network of the M8, N40 and N25 via the Dunkettle Interchange.
- As this is the main exit from Little Island on the western side, congestion is daily due to capacity restraints and short sequencing of traffic signals. Queuing traffic forms through junction A and continues eastwards on the R623 in the PM peak.
- The Dunkettle Approach Road at this junction is signalised. Both roads have alternate green phases at the signals. This is a three lane carriageway accessing the Dunkettle Interchange from the N25.
- There is a single inbound carriageway from the Dunkettle Approach Road entering Little Island. This is infrequently used; the majority of westbound traffic on the N25 tends to enter Little Island via the slip road at the N25 Interchange.
- There are no pedestrian facilities at this junction or in the immediate vicinity. The Dunkettle Interchange does not facilitate pedestrians/cyclists.
- The junction is well lit with sufficient public lighting and is well signposted in advance. The speed limit of both arms of this junction is 60km/h.

Picture 1: Plan View of Junction

Picture 2: View from Dunkettle Approach Road

4.6 School Transportation

4.6.1 As was highlighted earlier in section 3.4 school traffic contributes to congestion on the road network surrounding the school, particularly in the drop-off and collection periods. It is therefore important to understand the travel patterns associated with the National School.

4.6.2 School children generally travel to Little Island National School by car, bus, walking or cycling. School staff largely travel by car. Although some children walk and cycle to school, it is not common due to the limited capabilities of children at a young age, lack of appropriate facilities on route, safety concerns and the need to carry some school books.

4.6.3 There is a private bus operating a school run; the bus travels from Carrigtwohill to Glounthaune with drop off at 08:30 at the school; it then proceeds to collect pupils within Little Island for drop off at 08:50. The majority of pupils utilising the service live in the residential areas on the Eastern side of Little Island. There is a specific set-down area outside the school gate for the bus.

4.6.4 In relation to pupils being dropped-off/collection by car, the National School has a specific set-down/collection area, however it is continually at capacity during the peak periods. St. Lappins Place is a cul de sac; a lack of turning facilities combined with narrow carriageway widths and irregular parking prevents an efficient and safe collection system.

4.6.5 Regarding walking, the school is connected to the public footway network; however there are a number of issues and safety concerns. There is no continuous footpath heading eastwards on the southern side of the R623 outside the school. All pedestrians use the northside footway on the R623. A number of pupils currently walk to school from the residential estates on the east side of the Island. During the school year, a number of local facilities in the area are utilised by the school and children access them by walking. These include:

- The local Church;
- The Sports Complex;
- The Golf Club;
- The Radisson Blu Hotel; and
- The Train Station

4.6.6 The school utilises the footway network throughout Little Island when accessing the above facilities, however, the network lacks safe and accessible crossing points. The junction at Island Cross has recently been upgraded to include signals with a pedestrian phase but there is poor pedestrian provision at other crossing points throughout Little Island which do not meet the appropriate standards.

4.6.7 The school begins supervision from 08:30, with lessons beginning at 09:00 and staff generally travel to the school by car. There is a dedicated staff car park which can also be used by visitors, however, the car park is at or near capacity continually. Double yellow lines are present on the carriageway opposite the school, nevertheless, unregulated parking occurs during the AM and PM drop-off/collection. Little Island Credit Union is located a short distance from the school and includes parking for approximately 13 vehicles. These spaces are often utilised by parents for parking and as a turning point during the drop-off/collection.

4.7 Pedestrian Facilities

4.7.1 Pedestrian facilities are of varying quality throughout Little Island. Issues highlighted during the first public consultation include narrow footpaths, missing footpaths, lack of crossing facilities, poor surfacing and inadequate lighting.

4.7.2 School children are among the most vulnerable groups of pedestrians, and as such they deserve particular consideration. Apart from distance, one of the key factors determining the levels of pedestrian activity related to school trips is the safety of the walking environment. Young children particularly will be less inclined to walk when there are high traffic volumes or excessive traffic speeds on route. The existence of a continuous pedestrian network allowing for journeys on foot from door (of home) to door (of school) and vice versa is crucial if pedestrian related school journeys are to be encouraged.

4.7.3 Another vulnerable pedestrian group are those with reduced mobility, which includes the elderly and parents with prams/buggies. These pedestrians take longer than average to cross the road, which can become an issue at junctions with lengthy crossing distances.

4.7.4 The following sections of this chapter provide an overview of the pedestrian facilities and conditions at a number of key areas in Little Island.

R623(N)/Slip road off N25/R623(S)/Slip road onto N25

Volumes of pedestrian activity observed

- The highest pedestrian flows were observed travelling to/from the train station and the bus stop on Old Youghal Road in the AM and PM peaks (238 pedestrian movements in AM and 300 movements in PM – See section 4.2.26 previously). This is to be expected as this is the first/last junction pedestrians encounter walking to/from the train station or bus stop.

Footpaths

- Generally wide footways (approx. 4m) on the overbridge toward the *Crompan* roundabout.
- There are two possible routes to the train station from this junction, however the majority of pedestrians take the single footpath (Slip road off N25) as it is more direct. This is a narrow footpath with many pedestrians crossing the carriageway to walk on the narrow grass verge on the opposite side.

Pedestrian Crossing Facilities

- One pedestrian crossing phase provided at the signalised junction on the northern side of the overbridge.

Issues

- On exiting the train station, some pedestrians cross the N25 slip road to the opposite verge to avoid waiting for the pedestrian signal phase at the junction.
- Lack of direct access for mobility impaired persons from the train station towards Little Island.
- Lack of appropriate kerb upstand and tactile paving at crossing point.
- Narrow footway exiting the train station. Pedestrians witnessed walking into the grassy verge to overtake other pedestrians walking at a slower pace.

Picture 1: Pedestrians using opposite verge

Picture 2: Wide footpath on N25 overbridge

An Crompán Roundabout

Volumes of pedestrian activity observed

- Some of the highest pedestrian flows were surveyed at the Crompan Roundabout in the AM and PM peaks (147 pedestrian movements in AM and 161 exiting in PM). This is the second junction pedestrians navigate travelling from the train station/bus stop. It is evident from section 4.2.28 above that most pedestrians either enter Eastgate Business/Retail Park on the northern footpath or cross the junction at this point.

Footpaths

- Generally wide footpaths on the overbridge approaching the Crompan roundabout.

Pedestrian Crossing Facilities

- Pedestrian crossing facilities at this uncontrolled junction are poor with priority given to vehicles. This junction has a very high volume of traffic during the AM and PM peak.
- There are only two pedestrian crossing points at this junction; one at the west side and the other on the south side of the junction.
- Splitter Islands offer a half-way refuge for pedestrians at the crossing points.
- Dropped kerbs are present with blister tactile paving located on the splitter islands only.

Issues

- There are no footpaths or crossing points present on the northern and eastern side of this junction. Some pedestrians use the grass verges to access the Euro Business Park as it is the most direct route.
- As it is an uncontrolled crossing, pedestrians have to navigate oncoming traffic to cross the road. This creates difficulties for anyone with a disability or mobility issue.
- There is a lack of direct footpaths; pedestrians use the grass verge to access the Spar Shop within the Eastgate Retail Park in the AM peak.
- Lack of appropriate tactile paving at crossing points.
- It was noted during the site visit that traffic travels quite fast at this junction, forcing pedestrians to run when crossing sections of this junction.

Picture 1: View of junction from R623 (W)

Castleview(W)/Castleview(S)/Castleview(E)/Access Road

Volume of pedestrian activity observed

- High levels of pedestrian activity were observed at the uncontrolled roundabout upon entering the Eastgate Business/Retail park. In total, there were 170 pedestrian movements in the AM peak and 201 in the PM peak.

Footpaths

- Generally footways have adequate width on both sides of the road with a good surface.

Pedestrian Crossing Facilities

- There are no pedestrian crossing facilities at this junction. Splitter Islands provide a refuge to crossing pedestrians.

Issues

- There are no pedestrian crossing facilities i.e. dropped kerb, tactile paving present at this junction. Vehicles are given priority over pedestrian at this junction, with high traffic volumes in the AM and PM peak.
- There are speed reducing features on the western approach to this junction which some pedestrians use as crossing point. (see picture 2)

Picture 1: View of junction from R623 (E)

Picture 2: Traffic calming features approaching junction

R623 (filling station to Little Island National School)

Volume of pedestrian activity observed

- Moderate levels of pedestrian activity were observed along this route.

Footpaths

- Large sections of this route have footway provision on one side only.
- Footway widths vary along this route, but is particularly narrow on the eastern side from the Filling Station to Island Cross.
- Footpaths are not continuous in areas, forcing pedestrians to cross to continue their journeys.

Pedestrian Crossing Facilities

- There are two controlled pedestrian crossing facilities on this route, both the Island Cross and Ballytrasna Park junctions have recently been signalised.

Issues

- Lack of pedestrian crossings and narrow footway widths lead to an unattractive pedestrian environment. As this is largely a residential part of Little Island, there is potential for National School pupils to walk to school.
- Lack of continuous footways and pedestrian network; pedestrians forced to cross carriageway to continue their journey. This creates a safety issue for pedestrians.
- This area has high traffic volumes, particularly in the PM peak.
- Traffic on sections of the R623 travel above the speed limit on this route under non-congested conditions.
- A number of side roads have large corner radii creating wider crossing points for pedestrians on the desire line. It also enables vehicles to travel at higher speeds when turning.

Picture 1: R623 - Lack of continuity on footways between Filling Station and National School

4.8 Cyclist Facilities

4.8.1 Currently, cyclist facilities are very poor in Little Island. There are no dedicated cycle lanes on any routes within the Island. Apart from cycle parking provision at a number of businesses, there are no cycle parking facilities. Encouraging cycling is a challenge in the Little Island area due to the relatively inhospitable road infrastructure and the relatively long distances from the city and surrounding residential areas.

4.8.2 The Cork County Council Cycle Network Plan currently outlines the existing cycle mode share for AM work trips as 0.7%. The projected target for cyclists commuting to work by bicycle is 5%.

4.8.3 The road network within Little Island represents a poor cycling environment due to the following:

- Lack of cycle lanes and bike parking facilities within Little Island;
- The N25 is one of the major routes connecting the city and suburban areas to Little Island via the Dunkettle Interchange and the N25 Interchange. This dual-carriageway road is not the ideal environment for cycling due to high-speed traffic.
- Presence of large volume of HGV traffic accessing the industrial/commercial estates within Little Island.
- Junction design – there are a number of roundabout junctions within Little Island. These can be difficult for cyclists to negotiate safely.
- During peak times, traffic congestion can be significant on the roads, creating obstructions for cyclists and forcing them to navigate between/around stationary vehicles.
- Cyclists have been observed cycling on footways due to traffic volumes at peak times and vehicle speed in off-peak times.

4.8.4 The above factors represent a major barrier to cycling to/from/within Little Island. As a result, low levels of cycling activity were observed in the area. It should be noted, during a site visit, multi modal trips were evident with some commuters travelling by train to Little Island and continuing their journey by bicycle. Cyclists were observed cycling on the footway of the N25 overbridge travelling from the train station. See Figure 4.17 below.

4.8.5 The improvement of cycling facilities should be taken into consideration in all future planning, particularly to provide a safe environment for children cycling to school.

Picture 1: Cyclist using footpath on N25 overbridge

Picture 2: Cycle parking facilities at some office buildings

Figure 4.17 Cycle Facilities

4.9 Public Transport Provision & Facilities

4.9.1 At present Little Island does not have a dedicated bus service. There is one infrequent service travelling adjacent to Little Island via 'The Old Youghal Road'. Route 260 operates from Cork (Bus Station – Parnell Place) to Ardmore via Youghal. There is one service operating in the AM peak, travelling from the city, stopping at Little Island at 08:05. In the PM peak, one service stops at Little Island at 17:00.

4.9.2 Figure 4.18 illustrates that the nearest bus stop to Little Island is opposite the rail station junction. To the right of the image, the station car park can be seen. Currently, a bus service does not run within Little Island, predominantly due to frequent congestion and associated timetable problems.

Figure 4.18 Bus stop located adjacent to the train station on Old Youghal Road

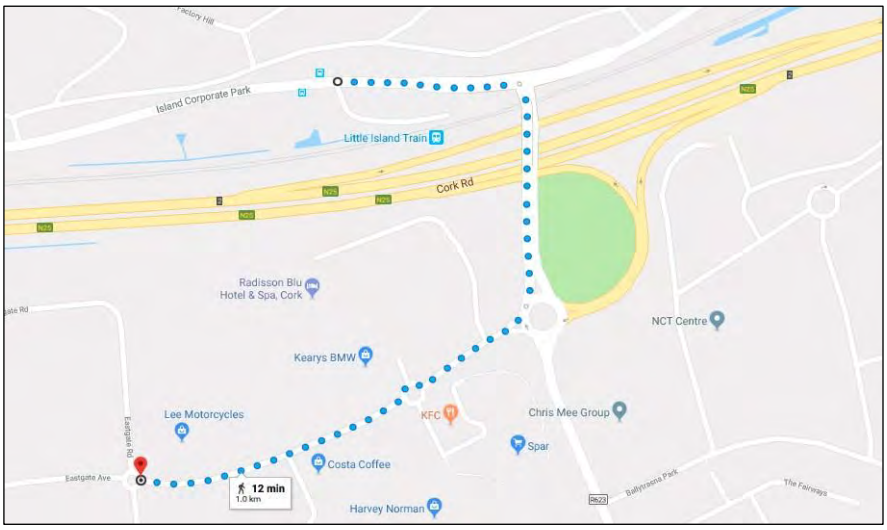


Figure 4.19 Distance from Bus stop/train station to Eastgate Business Park

4.9.3 The lack of suitable bus services is offset by the frequent train service operating to/from the Little Island train station. The service operates on the Cork-Cobh and Cork-Midleton lines. In the AM and PM peak times, services are frequent, running every 15 minutes. Outside peak hours services are reduced at times to every 45 minutes. In total, 42 trains per day run on the Midleton to Cork route on weekdays and similarly 46 trains per day operate the Cobh to Cork route.

4.9.4 Both the train station and the bus stop are located outside Little Island so commuters have to walk/cycle to their destination within Little Island. From either the bus or train station, it is approximately 500m to the Crompan roundabout (5 minutes' walk) and 1km to the centre of the Eastgate retail park (15 minutes' walk) (See Figure 4.19 above).

Figure 4.20 Little Island Train Station

4.9.5 Concerns regarding the distance to the train station were noted during the public consultation, with calls for an improved and more direct route to/from the station. Many respondents proposed new infrastructure for pedestrian/cyclists, a bike share scheme similar to the "Coca Cola bikes" as well investigating a shuttle bus service from the train station to and around the Island.

4.9.6 As noted in the 'Pedestrian Facilities' section previously, the lack of appropriate pedestrian crossing facilities at the Crompan roundabout and other junctions throughout Little Island, highlights the lack of a clear, safe and accessible route to/from the train station. This is a

particular issue for people with reduced mobility and will be investigated further as part of this study.

4.10 HGVs & Servicing

4.10.1 It was noted through site visits, traffic counts and public consultation that a significant volume of HGVs travel to/from/within Little Island. This is due to the commercial and industrial nature of some areas within Little Island. HGVs have a negative impact on walking and cycling and safety concerns were raised through the public consultation, particularly where industrial/commercial areas are located close to residential housing estates. HGV movements have defined the layout of a number of junctions i.e. large turning radii, which negatively impacts the safety of pedestrians crossing roads.

4.10.2 Little Island is the destination/origin for all HGVs. It is not a through route to any other destination. Industrial and commercial areas generating HGV trips in Little Island, include:

- Little Island Industrial Estate;
- Wallingstown Industrial Estate;
- Waterfront Business Park;
- Site Cast Industrial Estate;
- Euro Business Park; and
- Harbour Point Business Park.

4.10.3 The R623 is the main arterial route running from the Dunkettle Interchange junction to the N25 Interchange junction. The majority of industrial and commercial estates within Little Island link up to the R623 via three main junctions (see Figure 4.21 below):

- Site B – R623 at junction with Wallingstown
- Site E – Island Cross Junction
- Site F – R623 at junction with Ballytrasna Park

4.10.4 High volumes of HGVs were noted at the above junctions during site visits and traffic surveys. It is difficult to affect the volume of HGVs on the roads, however, improved pedestrian and cycling facilities, proposed as part of this study should assist in creating a safer and more pleasant environment for walking and cycling.

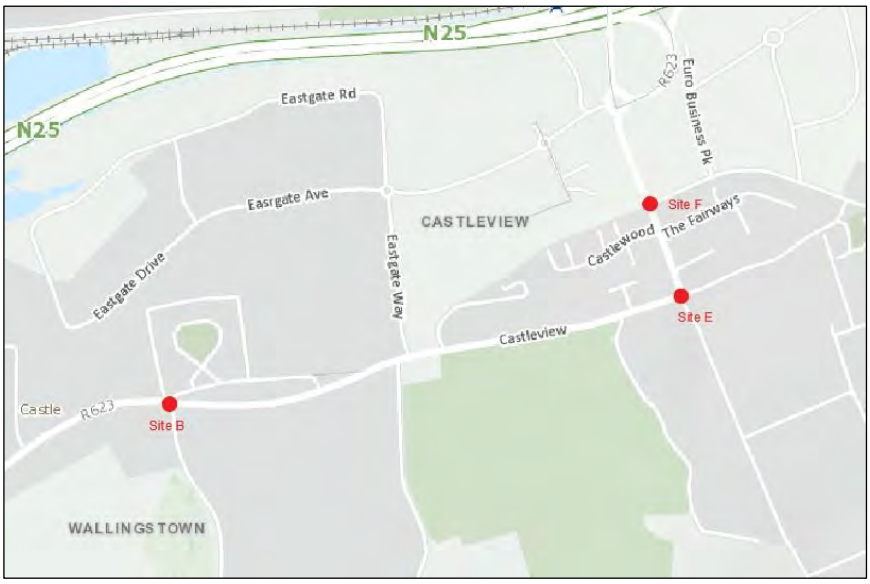


Figure 4.21 Main junctions on the R623

4.11 Parking Arrangements

4.11.1 Due to the nature and density of the developments in Little Island, there are differing types and mixes of uses, mainly office blocks, industrial plants, factories/warehouses and retail parks. Based on the first public consultation, 80-90% of employees drive a vehicle to work. There are a large number of parking spaces within Little Island to cater for the demand. This high level of surface parking facilitates travelling by car and creates barriers to encouraging a modal shift to non-car methods of travel.

4.11.2 There is a mix of public and private parking with many companies having private car parks. Office buildings provide a number of car parking spaces based on the floor area of the office space. Figure 4.22 overleaf illustrates a breakdown of the zones in Little Island and the main car parking areas.

4.11.3 The *'Car Parking Assessment'* report, outlines a full breakdown of the approximate number of spaces throughout Little Island including the percentage of available spaces. From that report, the areas with the highest number of spaces include:

- The Eastgate Business Park;
- The Eastgate Retail Park; and
- The Euro Business Park

4.11.4 Both business parks comprise a high number of office buildings accommodating large numbers of employees. The Eastgate Retail Park provides ample parking for customers (approx. 1300 spaces) with a large proportion of spaces available throughout the day.

4.11.5 Little Island train station offers free parking (approx. 100 spaces) for commuters travelling to Cork City, Midleton or Cobh. Little Island National school offers a car park for staff and school visitors. From a site visit and the car parking assessment report, this is known to be continually at or near capacity.

Figure 4.22 Parking Zones – Little Island

4.11.6 Even though there is ample parking in many areas of Little Island, there are a number of issues arising. It was noted during the public consultation that many HGVs illegally park when stopping at the Petrol Station and shop. Local residents have highlighted an issue whereby, employees of Business Parks utilise parking facilities in nearby residential areas to avoid queuing in PM peak. Figure 4.23 below illustrates some of the measures to discourage employees parking in nearby residential.

Picture 1: No parking posters – Residential Estate

Picture 2: Restricted Parking - for residents only

Figure 4.23 Parking Restrictions in Residential Areas

4.12 Summary

4.12.1 The previous sections provide detail on school transportation, cycling and pedestrian facilities, public transport provision, HGVs and parking arrangements for Little Island. A full evaluation of key junctions was also undertaken. In Summary:

School Transportation

- School traffic contributes to congestion on the R623 and St. Lappins Place during school drop-off/collection.
- School children generally travel to school by car, private bus, walking or cycling.
- School staff travel by car.
- A private bus operates a school run serving Carrigtwohill, Glounthane and Little Island.
- The key issues for the school and the management team include:
  - Staff commuting issues and lack of public bus service;
  - Lack of safe pedestrian facilities on the road network; and
  - Parents choosing not to enrol children in the school, specifically due to traffic congestion.
- Suggested improvements include:
  - Improved turning areas for vehicles
  - Appropriate warning signage approaching the R623/St. Lappins Place junction
  - Realign and extend the existing car park, including a one-way system
  - Include and improve pedestrian facilities from the school on route to the Church, Sports Complex, Golf Club and Radisson Hotel.

Cycling Facilities

- Cyclist facilities within Little Island are very poor. There are no dedicated cycle lanes on any routes and cyclists have been observed cycling on footways due to traffic volumes at peak times and vehicle speed in off-peak times.
- The current road network represents a poor cycling environment due to the following:
  - Lack of cycle lanes and bike parking facilities within Little Island;
  - The N25 is one of the major routes connecting the city and suburban areas to Little Island via the Dunkettle Interchange and the N25 Interchange. This dual-carriageway road is not the ideal environment for cycling due to high-speed traffic.
  - Presence of large volume of HGV traffic accessing the industrial/commercial estates within Little Island.
  - Junction design – there are a number of roundabout junctions within Little Island. These can be difficult for cyclists to negotiate safely.
- During peak times, traffic congestion can be significant on the roads, creating obstructions for cyclists and forcing them to navigate between/around stationary vehicles.

Pedestrian Facilities

- The pedestrian facilities throughout Little Island vary in quality. Issues highlighted include narrow footpaths, missing footpaths, lack of crossing facilities, poor surfacing and inadequate lighting.
- School children and pedestrians with reduced mobility are among the most vulnerable users and those most affected. The busiest pedestrian route was observed from the train station to the Eastgate Business/Retail Park.

Public Transport Provision

- There are no dedicated bus services operating in Little Island.
- A frequent train service operates on the Cork-Cobh and Cork-Midleton lines. In the AM and PM peak times, services are frequent, running every 15 minutes. Outside peak hours services are reduced at times to every 45 minutes
- Concerns regarding the distance to the train station were noted during the public consultation, with calls for an improved and more direct route to/from the station. New infrastructure, a bike share scheme and a shuttle bus service were all suggested as potential solutions.

HGVs and Servicing

- Due to the commercial and industrial nature of many of the areas in Little Island, a significant volume of HGVs travel to/from/within Little Island. Little Island operates as the destination/origin for all HGVs.
- HGVs have a negative impact on walking and cycling and safety concerns were raised through the public consultation, particularly where industrial/commercial areas are located close to residential housing estates.
- HGV movements have defined the layout of a number of junctions i.e. large turning radii, which negatively impacts the safety of pedestrians crossing roads.

Parking Arrangements

- Due to the nature and density of the developments in Little Island, there are differing types and mixes of uses, mainly office blocks, industrial plants, factories/warehouses and retail parks.
- Based on the first public consultation, 80-90% of employees drive a vehicle to work.
- There are a large number of parking spaces within Little Island to cater for the demand. This high level of surface parking facilitates travelling by car and creates barriers to encouraging a modal shift to non-car methods of travel.

Junction Evaluation

- In total, 16 junctions were evaluated identifying the current facilities and key issues at each. There is scope for improvement at all junctions apart from the recently upgraded Island Cross junction. Amendments to junction layout can increase traffic capacity while pedestrian and cycle facilities can be improved at the majority of junction.

5. EVALUATION FRAMEWORK

5.1 Introduction

5.1.1 This chapter describes the process used to evaluate the transport strategies identified to support the sustainable growth of Little Island.

5.1.2 The evaluation framework, developed to assess the various LITS test strategies, is illustrated in Figure 5.1 below and comprises of the following key elements:

- **Vision Statement:** A transport strategy is developed by first defining a Vision Statement which outlines the future aspirations for the area and its citizens and provides an over-arching context for the study.
- **Objectives:** Once the study vision was developed, specific and measurable evaluation objectives have been defined for the Little Island area that support:
  - its sustainable future;
  - the Vision Statement;
  - the specific concerns as communicated during the public and stakeholder consultation process; and
  - issues identified from extensive traffic surveys, site visits and from the detailed land use and transport modelling, analysis and evaluation.
- **Test Strategies:** A package of strategy measures were developed for testing based on current transportation issues identified in Little Island.

Figure 5.1 LITS Evaluation Framework

- **Key Performance Indicator (KPI) Evaluation:** Both quantitative and qualitative KPIs have been defined to assess how well the test strategies achieve the specified LITS objectives.
- **Preferred Strategy:** Based on the results of the KPI analysis, an emerging preferred strategy has been identified.

5.1.3 The following sections of this chapter provide further information on each of the aspects outlined above including the development of a Vision Statement and objectives, and the definition of KPIs which have been utilised to identify the preferred LITS strategy.

5.2 Developing a Transport Vision for Little Island

5.2.1 The identification of a Vision Statement is a very important part of the LITS Strategy development process, as, without it, the evaluation objectives would be developed in isolation.

5.2.2 The Vision Statement provides the over-arching context for the specific measures within the strategy, providing the all-encompassing blanket to which the evaluation objectives fall

under, and ultimately the basic justification for the proposed set of road, public transport, walking and cycling improvements.

5.2.3 Figure 5.1, above, illustrates the link between the Vision Statement, objectives, policies and measures and performance measurement. The Vision Statement creates a sense of what the LITS will achieve in the medium to long term so that the public can easily identify with its rationale and purpose. It communicates the desire to improve quality of life in Little Island while also supporting its function as strategic employment location. Evaluation objectives may then be set within the broad framework provided by the Vision Statement, such that transport is integrated with the future aspirations for Little Island and its surrounding areas. The Vision Statement, therefore, focuses more on the future transport environment than the current situation.

5.2.4 Three key sources were utilised to assist in the development of the Vision Statement for Little Island, namely:

- **National, Regional and Local Policy:** To ensure that the vision for Little Island is in line with existing aims and objectives for the area set out in national and local policy, such as *Smarter Travel: A Sustainable Transport Future 2009-2020, Cork County Development Plan, Cobh Municipal District Local Area Plan* etc. *(*A review of local and national policy documentation is outlined in Chapter 2 of this report).

- **Baseline Study:** To gain an understanding of the key issues apparent within Little Island, the Project Team carried out extensive traffic surveys and site visits.

- **Public Consultation:** As outlined previously in Chapter 3, public consultation was carried out in Little Island to allow the local community and key stakeholders to provide their views on the area, including existing issues and potential solutions. This provided the local community and businesses (i.e. the people most impacted by any potential strategy) with an opportunity to define a vision for the future of Little Island.

5.2.5 Information gathered through a review of national and local policy, baseline studies and consultation with the general public was utilised to develop the following Little Island Transportation Study Vision Statement:

"To create a safe and efficient transport network supporting ease of movement for all, which allows residents and businesses to work together to improve the quality of life within Little Island, and strengthen its position as a Strategic Employment Centre"

5.3 Developing Objectives

5.3.1 A series of evaluation objectives have been developed to assist in achieving the defined vision for Little Island. The Department of Transport, Tourism and Sport's (DTTAS) Guidelines on a Common Appraisal Framework for Transport Projects and Programmes sets out high level objectives which can be applied to the LITS. These can be broadly categorised as follows:

- Economic;
- Safety and Physical Activity;
- Environmental; and
- Integration, Accessibility and Social Inclusion.

5.3.2 The LITS objectives have been developed under these headings utilising the SMART criteria i.e. they must be:

Specific: the objectives defined should be clear and unambiguous;

Measurable: in order for the various Little Island strategy options to be tested and evaluated, the defined objectives must be measurable to ensure that the finalised strategy best achieves the identified goals.

Achievable: the defined objectives should be realistic and achievable. For the LITS recommendations to be adopted in future planning guidelines its objectives must be attainable.

Relevant: the objectives must be relevant to Little Island i.e. they should be specifically focussed on improving issues identified in the area.

Time-Bound: this criteria stresses the importance of grounding the objectives within a time-frame.

5.3.3 The following sections of this chapter outline the various objectives defined under each of the broad DTTAS guideline headings. Figure 5.2, overleaf, illustrates how the Little Island vision relates to these key headings.

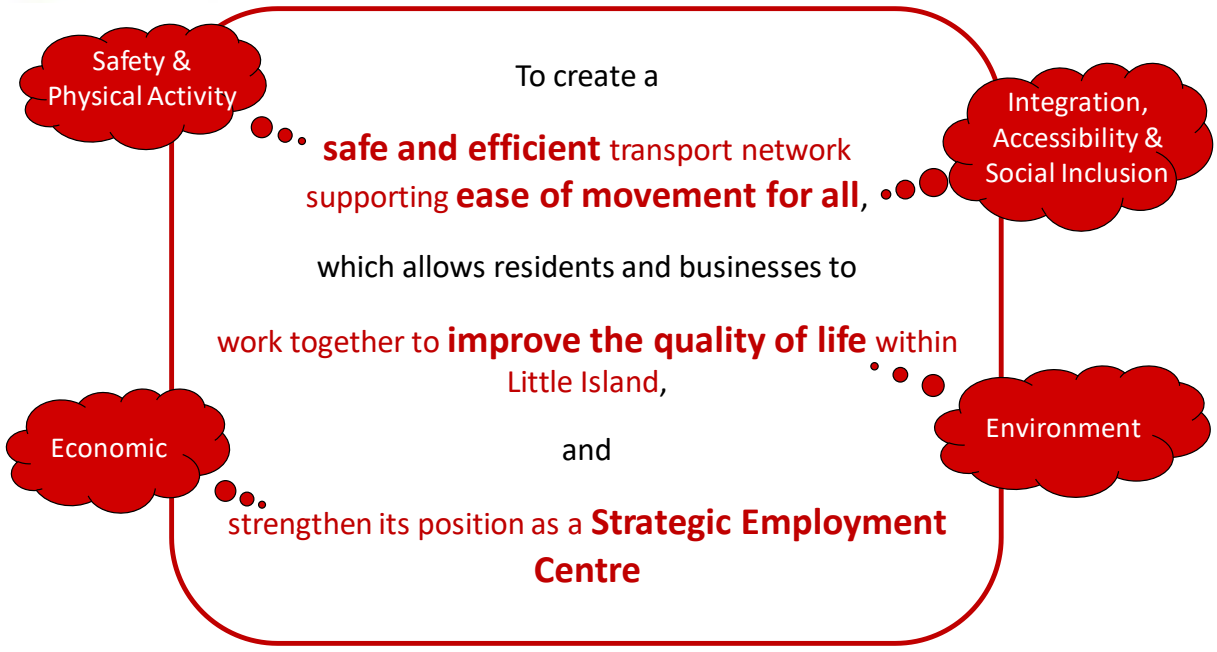


Figure 5.2 Linking LITS Vision Statement with Evaluation Objectives

Economic

5.3.4 Economic evaluation objectives can be defined in a number of ways depending on the tools which are available to realise change, and the needs of the area. The LITS strategy can contribute to economic growth by encouraging development at Little Island and making it an attractive location for businesses to set up. This can be achieved by improving accessibility and reducing congestion on the road network in the peak periods. High levels of traffic congestion and delay can adversely impact on the ability to recruit and retain staff, and can also increase transport related business costs.

Economic Objective

Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network

Safety & Physical Activity

5.3.5 The Safety & Physical Activity evaluation objectives are concerned with a variety of issues including the reduction in injuries and loss of life, damage to property, loss of income and improving the overall well-being of people living in Little Island (e.g. improving fitness, reducing obesity).

Safety & Physical Activity Objective

Develop a safe and healthier transport network for all transport modes and users

Environmental

5.3.6 Environmental evaluation objectives are concerned with conservation of Bio-diversity, Cultural Heritage, and Landscape. The environmental evaluation objectives seek to reduce the harmful impacts of development and transportation on the environment and support travel by sustainable modes.

Environmental Objective

Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island

Integration, Accessibility and Social Inclusion

5.3.7 According to the Department of Transport, Tourism and Sport's guidelines, a number of aspects of integration need to be considered. For Little Island, it will be necessary to demonstrate some consideration of modal integration (i.e. integrating amongst transport modes), and effectively integrating land uses with transport infrastructure in ways that promote sustainable development and efficient use of resources.

5.3.8 Social inclusion is concerned primarily with accessibility for those without a car and those whose mobility is impaired. A sub-objective of the Social Inclusion evaluation objective is that of equity. This is primarily concerned with ensuring that the benefits of a transport strategy are reasonably well distributed across society. Differing groups of people will have differing levels of need. An equitable strategy would generally prioritise the needs of the disadvantaged or those with special needs. This includes disabled or elderly people, but more generally is a group described as having no car available.

5.3.9 Accessibility is usually defined as 'ease-of-reaching'. This evaluation objective relates to providing access for people from a variety of areas, with differing availability and means of transport, to facilities in different locations. This is usually considered from the point of view of residents, such that residential areas may be categorised by their ease of access to the main facilities provided in the area (e.g. schools, shops etc.).

Integration, Accessibility and Social Inclusion Objective

Provide equal opportunity for all through improving accessibility and enhancing the integration of land-use and transport

5.4 Key Performance Indicators

5.4.1 Performance measurement is used to determine if the recommendations proposed under the LITS achieve the desired outcomes. Key Performance Indicators (KPI's) have been identified and were used to measure the performance of the Little Island strategies under the various objectives outlined above. These KPI's, therefore, had to be measurable and clearly related to the desired outcome.

5.4.2 This allowed scenarios to be easily comparable and successful scenarios to be identified. Furthermore, the particular attributes which influence a KPI one way or another (for example provision of bus priority, or the location and density of a development) could be fine-tuned to obtain a transport scenario that meets the targets and, therefore, satisfies the LITS evaluation objectives.

5.4.3 The KPI's are both qualitative and quantitative with the Little Island Traffic Model (LITM) being used to calculate the majority of the quantitative KPI's. The qualitative KPI's for each option were given a ranking or score relative to the Do Minimum Scenario. Further details on the appraisal and scoring of KPIs is provided in Section 9.1 of this report.

5.4.4 As outlined in Section 5.1, the various Little Island test strategies have been assessed through an objectives and KPI evaluation framework. Table 5.1 overleaf, summarise the key evaluation objectives, associated KPI's and means of measurement that have been used to evaluate each Little Island strategy option. Note, the approach recommended for the evaluation of alternative strategies is to give each evaluation objective (i.e. economy, health & physical activity and so on) an equal weighting.

5.5 Summary

5.5.1 The previous sections provide an overview of the evaluation framework developed to test the various proposed LITS strategy options. In Summary:

- The following Vision Statement was developed which provides an overall context for the study:

  "To create a safe and efficient transport network supporting ease of movement for all, which allows residents and businesses to work together to improve the quality of life within Little Island, and strengthen its position as a Strategic Employment Centre"

- Evaluation objectives have been developed to assist in achieving the defined vision for Little Island under guidance from DTTAS's Common Appraisal Framework for Transport Projects and Programmes;

- Key Performance Indicators (KPI's) have been identified and were used to measure the performance of the Little Island strategies under the various study objectives; and

- The KPI's are both qualitative and quantitative and were given a ranking score relative to the Do Minimum scenario.

Table 5.1 Little Island Objectives and KPIs

No.	Key Project Objectives	Key Performance Indicators	Measure By
Economic	Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network	Network wide delay/queueing	% Junctions with V/C > 85%
		Journey times (Car and PT)	% Change in public transport travel costs
			% Change in car journey times
		Cost efficiency of proposals	High level comparison of cost measures
Safety & Physical Activity	Develop a safe and healthier transport network for all transport modes and users	Change in vehicle emissions particularly those that cause higher health risks	% change in vehicular emissions within Little Island
		Sustainable transport mode share	Walking, Cycling and PT Mode Share
Environmental	Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Minimising impact on environmentally sensitive areas	Rating scale
		Reduce traffic congestion on Little Island	% Change in total queuing
Integration, Accessibility and Social Inclusion	Provide equal opportunity for all through improving accessibility and enhancing the integration of land-use and transport	Compatibility of transport measures with Local, Regional and National policy	Review of policy and rating scale
		Availability for transport interchange	Rating scale

6. LITTLE ISLAND LOCAL AREA MODEL DEVELOPMENT

6.1 Introduction

6.1.1 As outlined in the methodology description in Chapter 1 previously, a strategic traffic model has been developed for Little Island to adequately assess the various transport strategies developed as part of the LITS.

6.1.2 The National Transport Authority's (NTA) South West Regional Model (SWRM) covers Cork City, Cork County and neighbouring counties, and was utilised as a base for developing the strategic traffic model for Little Island. The base SWRM was updated with additional network and zonal detail to provide an enhanced representation of the road network, and route choice, in the study area.

6.1.3 Traffic survey data was collected in Little Island in May 2017, and was then used to calibrate and validate the base Little Island Traffic Model (LITM) to ensure that it provides a robust and accurate representation of traffic flow within the study area.

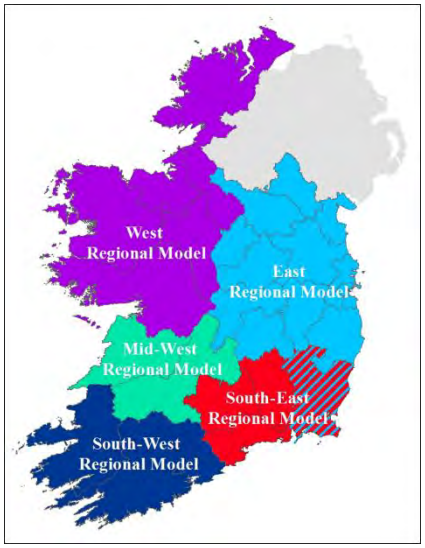
6.1.4 This chapter provides a brief overview of the SWRM, and describes the local area model development process used for the base year LITM, including a detailed description of:

- Base Highway network development;
- Trip matrix development; and
- Calibration and validation.

6.1.5 For further information on the development of the LITM, including detailed calibration and validation statistics, the reader is referred to the *Little Island Traffic Model Development Report*.

6.2 Overview of the SWRM

6.2.1 The SWRM is a strategic multi-modal transport model representing travel by all the primary surface modes – including, walking and cycling (active modes), and travel by car, bus, rail, tram, light goods and heavy goods vehicles, and covers the area to the southwest of Ireland including the counties of Cork and Kerry.



General Model Structure

6.2.2 The SWRM sits within the overall NTA Regional Modelling System which comprises of the following three main components, namely:

- The National Demand Forecasting Model (NDFM);
- 5 Regional Models (including the SWRM); and
- A suite of Appraisal Modules

6.2.3 The NDFM takes input land-use attributes such as population, no. of employees etc., and estimates the total quantity of daily travel demand produced by, and attracted to, each of the 18,488 Census Small Areas.

6.2.4 The SWRM is then comprised of the following key elements:

- **Trip End Integration:** The Trip End Integration module converts the 24 hour trip ends output by the NDFM into the appropriate zone system and time period disaggregation for use in the Full Demand Model (FDM);

- **The Full Demand Model (FDM):** The FDM processes travel demand, carries out mode and destination choice, and outputs origin-destination travel matrices to the assignment models. The FDM and assignment models run iteratively until an equilibrium between travel demand and the cost of travel is achieved; and

- **Assignment Models:** The Road, Public Transport, and Active Modes assignment models receive the trip matrices produced by the FDM and assign them in their respective transport networks to determine route choice and the generalised cost for each origin and destination pair.

6.2.5 Destination and mode choice within the SWRM have been calibrated using two main sources: Census 2011 Place of Work, School or College - Census of Anonymised Records (2011 POWSCAR), and the Irish National Household Travel Survey (2012 NHTS). Therefore, the SWRM is an ideal tool to estimate the multi-modal impact of transport schemes on Little Island, as well as forecasting the future trip demand and distribution to/from the island.

6.3 Network Development

6.3.1 The following sections describe the development of the base LITM highway network with reference to the following aspects:

- Modelling software used;
- Model time periods and user classes; and
- Network development

Model Software Platform: SATURN

6.3.2 The model software used is the SATURN (Simulation Assignment of Traffic to Urban Road Networks) suite of transportation modelling programs.

6.3.3 SATURN has 6 basic functions:

1) As a combined traffic simulation and assignment model for the analysis of road-investment schemes ranging from traffic management schemes over relatively localised networks (typically of the order of 100 to 200 nodes) through to major infrastructure improvements where models with over 1,000 junctions are not infrequent;

2) As a “conventional” traffic assignment model for the analysis of much larger networks (e.g., up to 6,000 links in the standard PC version, 37,500 in the largest);

3) As a simulation model of individual junctions;

4) As a network editor, data base and analysis system;

5) As a matrix manipulation package for the production of, for example, trip matrices; and

6) As a trip matrix demand model covering the basic elements of trip distribution, modal split, etc.

Modelled Time Periods and User Classes

6.3.4 Through a review of survey data, it was noted that the highest traffic flows entering and leaving Little Island were experienced from 08:00 to 09:00 in the AM, and 17:00 to 18:00 in the PM. Therefore the LITM was developed, calibrated and validated to represent the following time periods:

AM Morning peak period:	**08:00 to 09:00**
PM Evening peak period:	**17:00 to 18:00**

6.3.5 The trip demand matrices for these time periods, representing a base year of 2017, were developed for the LITM using extractions from the SWRM and survey data. The demand matrices are segregated into two vehicle types (or user classes), as follows:

User Class One - Cars and light Goods Vehicles (LV's). All cars and two axle trucks or other type commercial vehicles are considered LV's; and

User Class Two - Heavy Goods Vehicles (HV's). This user class is comprised of goods vehicles with 3 or more axles.

Network Development

6.3.6 The goal in developing the LITM was to create a model that accurately reflects current traffic conditions in the study area (illustrated in Figure 1.1 previously) for the 2017 base year, and to a sufficient level of detail to allow assessments to be made on both local and strategic interventions. To achieve this goal, the model must be defined in terms of road network and trip demand representation.

6.3.7 The SWRM developed for the NTA was utilised as a base for generating the highway network for the LITM. However, as the SWRM is primarily focused on Cork City, areas outside the city are represented in lesser detail within the model. The Little Island road network, represented in the SWRM, is outlined in Figure 6.1 below. The N25, R623 and Dunkettle Interchange are all represented in detail, however, localised areas such as Eastgate Business Park, Euro Business Park etc. are not included in the SWRM which is to be expected due to its strategic nature.

Figure 6.1 SWRM Little Island Road Network

6.3.8 In developing the LITM, additional detail was added to the SWRM to enhance the road network and better represent localised access points for traffic. As part of the regional model development process for the NTA, SYSTRA have carried out a review of traffic modelling processes and generated a best practice approach for coding road networks, including:

- Standardised turning saturation flows at junctions;
- Standardised speeds used on different types of road;
- The use of flares for turns at junctions with sufficient space etc.

6.3.9 This best practice approach was utilised to generate the detailed traffic network for the LITM. Digital mapping systems such as Google Earth were used to get a high level view of the network including junction layout details, such as permitted or banned turns, junction priority etc., to ensure it represented, as accurately as possible, the existing road network.

6.3.10 Figure 6.2, overleaf, illustrates the newly developed road network for the LITM. To ensure full network coverage and route choice, all roads have been taken into account from the national primary routes to minor residential streets with accurate access points for traffic.

6.3.11 A detailed zoning system has been put in place to connect to the network. Major trip production / attraction zones such as housing estates, employment locations, schools and car parks have all been designated individual zones to provide detail in trip distribution between zones and destination choice.

Figure 6.2 Little Island Traffic Model Road Network

6.4 Prior Trip Matrix Development

Zone System Development

6.4.1 As outlined previously, the SWRM was used as a basis for development of the LITM road network. However, as Little Island is located outside the main model area, the SWRM zone structure is at too aggregate a level to accurately reflect traffic loading on-island.

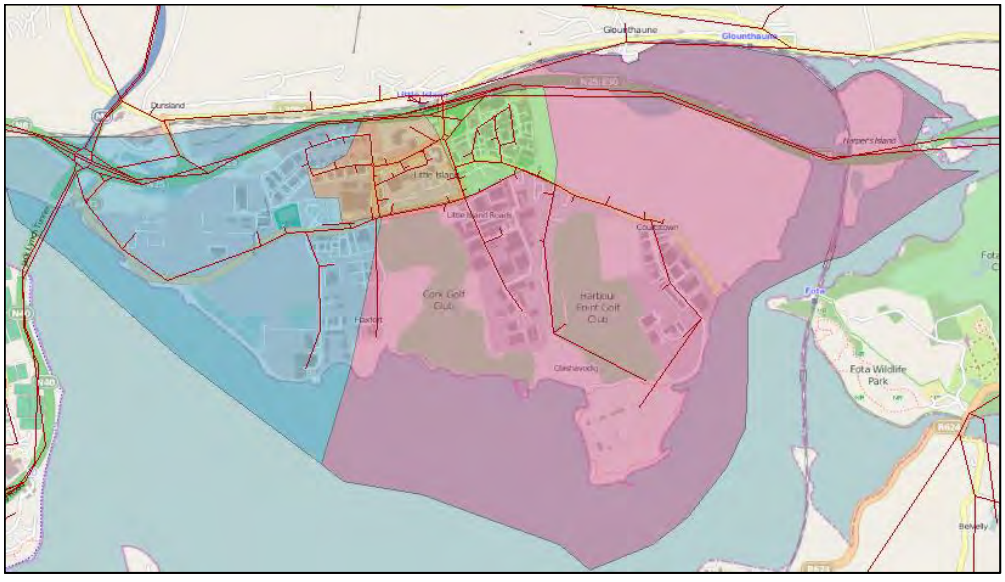


Figure 6.3 SWRM Zone System covering Little Island

6.4.2 To provide an accurate representation of traffic loading in Little Island, a detailed zonal structure was developed for the LITM to reflect key generators and attractors of trips such as:

- Schools;
- Key employment locations e.g. Eastgate Business Park, Euro Business Park etc.;
- Housing Estates etc.

6.4.3 Figure 6.4 illustrates the zonal system developed for Little Island. In total, 53 zones have been created and provide sufficient detail to ensure that traffic loads accurately onto the Little Island road network.

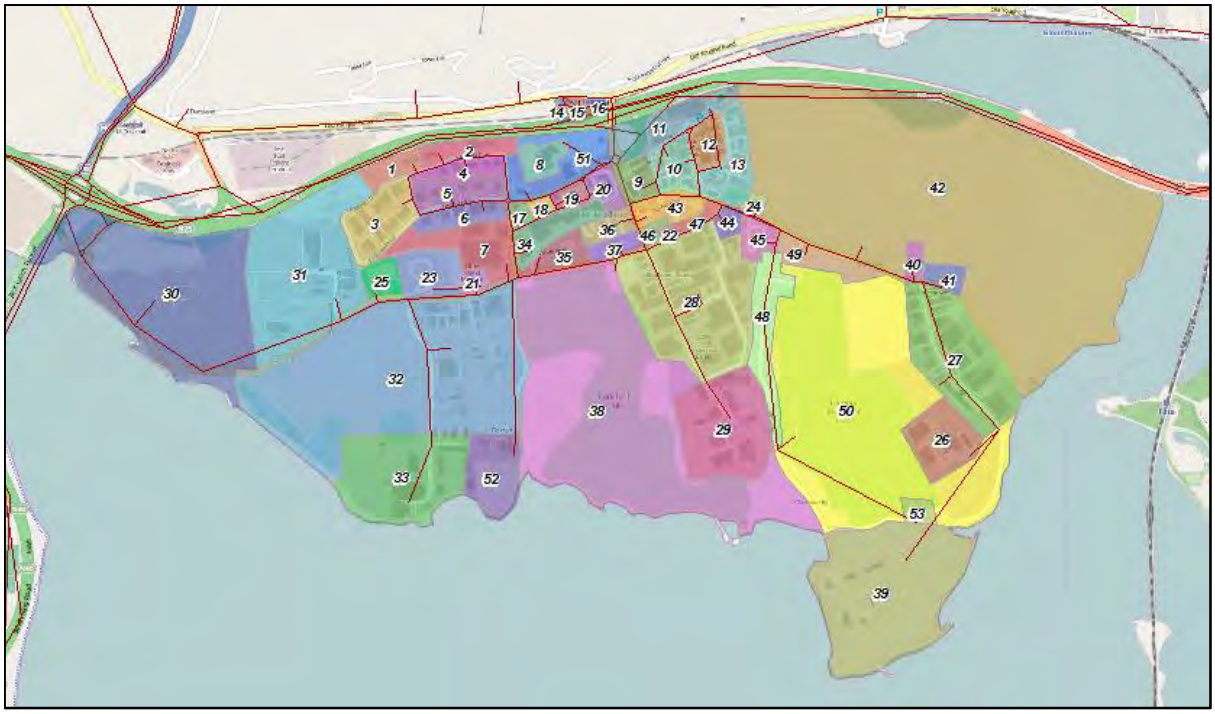


Figure 6.4 Disaggregated Little Island Zone System

Prior Matrix Development

6.4.4 As noted previously in Section 6.2, the Full Demand Model carries out mode and trip destination choice for all zones within the SWRM. The FDM has been calibrated using Census data, and hence, provides a robust and accurate representation of trip distributions across the model network. In order to generate prior matrices for Little Island, a cordon was extracted from a 2017 run of the SWRM. The cordon function facilitates the extraction of trip matrices for a subset area of the SWRM whilst still maintaining route and destination choice from the full model.

6.4.5 As illustrated in Figure 6.3, the SWRM zone system is quite aggregate for Little Island, with only four zones covering the entire island. A bespoke Excel spreadsheet tool was created to disaggregate the cordoned SWRM matrices to each of the 53 LITM zones. This tool used available parking data and desktop research on household numbers, school size etc., to apportion the trips entering, exiting and staying within Little Island to the local area model zone system. This allowed for an accurate representation of traffic loading within Little Island, whilst maintaining the overall distribution to the wider road network from the SWRM.

6.5 Model Calibration & Validation

6.5.1 The LITM was calibrated and validated in accordance with Transport Infrastructure Ireland's (TII) *Project Appraisal Guidelines (PAG) for National Roads Unit 5.1 – Construction of Transport Models (October 2016).* This is a widely accepted standard in Ireland that provides robust calibration and validation criteria to which certain types of highway models should adhere.

6.5.2 Comprehensive traffic count survey data was gathered for the study area in order to fully understand traffic conditions as they currently exist, including:

- Junction Turning Counts;
- Automated Traffic Counts; and
- Journey Time Surveys.

Further information on traffic counts undertaken, and associated results are provide in Chapter 4 of this report.

6.5.3 The prior demand matrices (described in Section 6.4) were passed through a process known as Matrix Estimation (ME2) in SATURN which adjusts origin-destination patterns to produce a trip demand matrix that better replicates counts when assigned to the network. Stringent controls were introduced to ensure that the ME2 process wasn't significantly altering the trip distribution provided by the SWRM, or creating unrealistic levels of trip making from zones which contain low quantum of development.

6.5.4 Following on from the matrix estimation process, a link count calibration was carried out. During this stage, modelled flows were compared with actual flows. TII PAG recommend acceptability criteria when comparing modelled and observed traffic flows. Table 6.1 presents the PAG calibration criteria along with results from the AM and PM LITM. The results indicate an excellent calibration has been achieved between modelled and observed flows with all falling well within acceptable guidelines.

Table 6.1 PAG Calibration Criteria

Criteria and Measures	Scenario 5	AM	PM
Individual flows within 100 v/h for flows less than 700 v/h	More than 85% of cases	98%	90%
Individual flows within 15% for flows between 700 & 2,700 v/h		88%	100%
Individual flows within 400 v/h for flows greater than 2,700 v/h		N/A[1]	N/A
GEH[2] Statistic: Individual flows – GEH < 5	More than 85% of cases	89%	87%

6.5.5 Further checks were carried out to ensure that the calibration process didn't overly distort the prior matrices derived from the SWRM. For the key sector movements within the model

[1] No links included with flows > 2,700 v/h in counts

[2] The GEH statistic is a measure used to determine differences between modelled and observed flows that considers both absolute and proportional differences in flows.

area (illustrated in Figure 6.5), analysis was carried out on the trip distribution before and after matrix estimation. As an example, Figure 6.6 illustrates the distribution profile for trips exiting Little Island in the PM peak hour. The results indicate that the calibration process has not significantly distorted the distribution calculated by the SWRM. Please note that this analysis has been carried out for all sector movements in both the AM and PM peak hours and the reader is referred to the *Little Island Traffic Model Development Report* for further information.

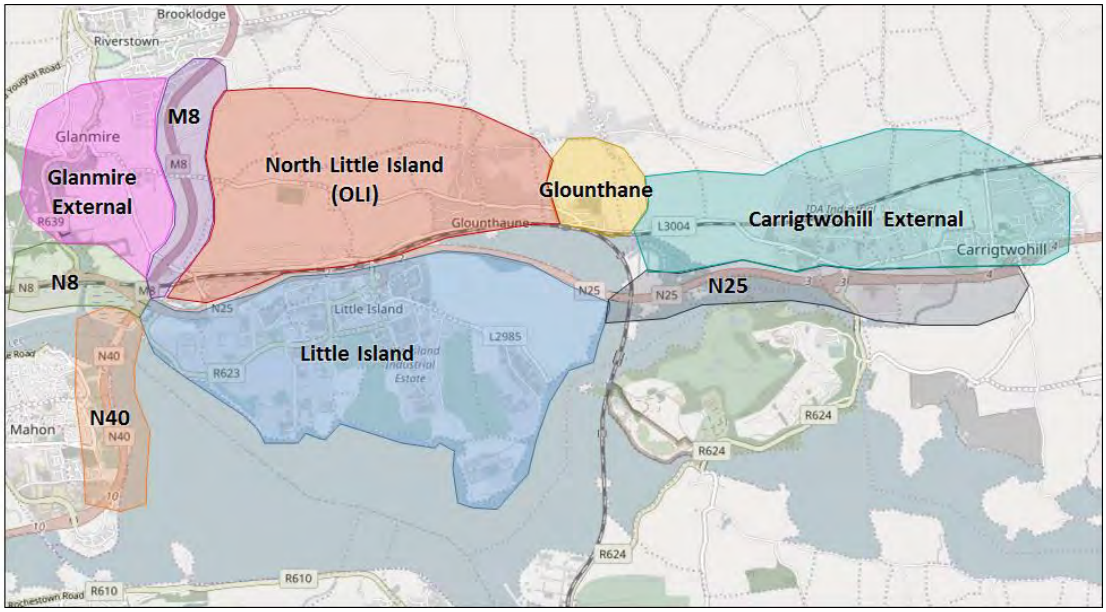


Figure 6.5 LITM Sector System

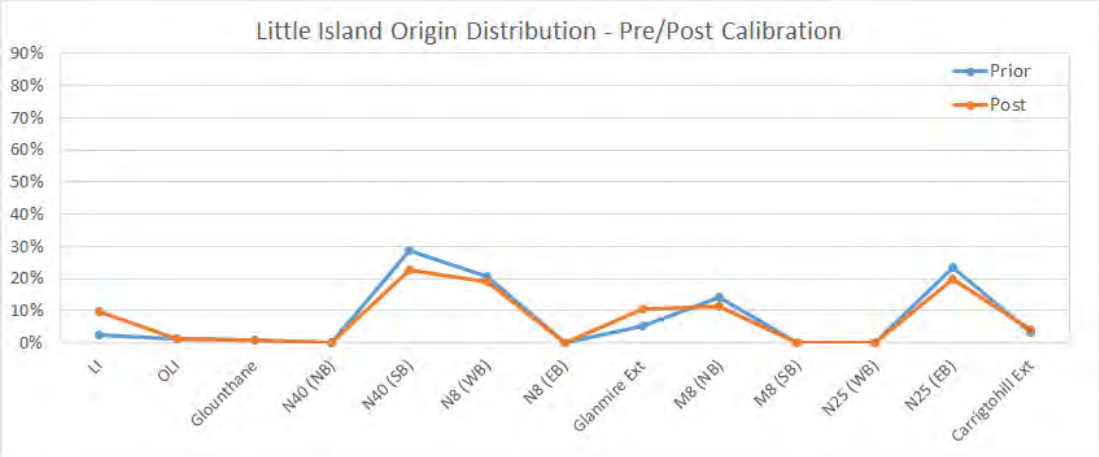


Figure 6.6 Little Island Origin Distribution – PM Peak

6.5.6 PAG also recommends that trip length distributions be checked to ensure that they have not been adversely affected by the matrix estimation process. ME2 can sometimes generate increased short distance trips to match count information, thus distorting the profile of trip

making on the network. PAG suggests that the coincidence ratio[3] should be used to compare trip length distributions before and after estimation, with a desirable range between 0.7 and 1.0. Figure 6.7 displays the trip length distribution profiles for the AM peak hour, and the coincidence ratio for both the AM and PM peaks. The results indicate that the calibrated LITM falls well within PAG recommendations for both peak periods.

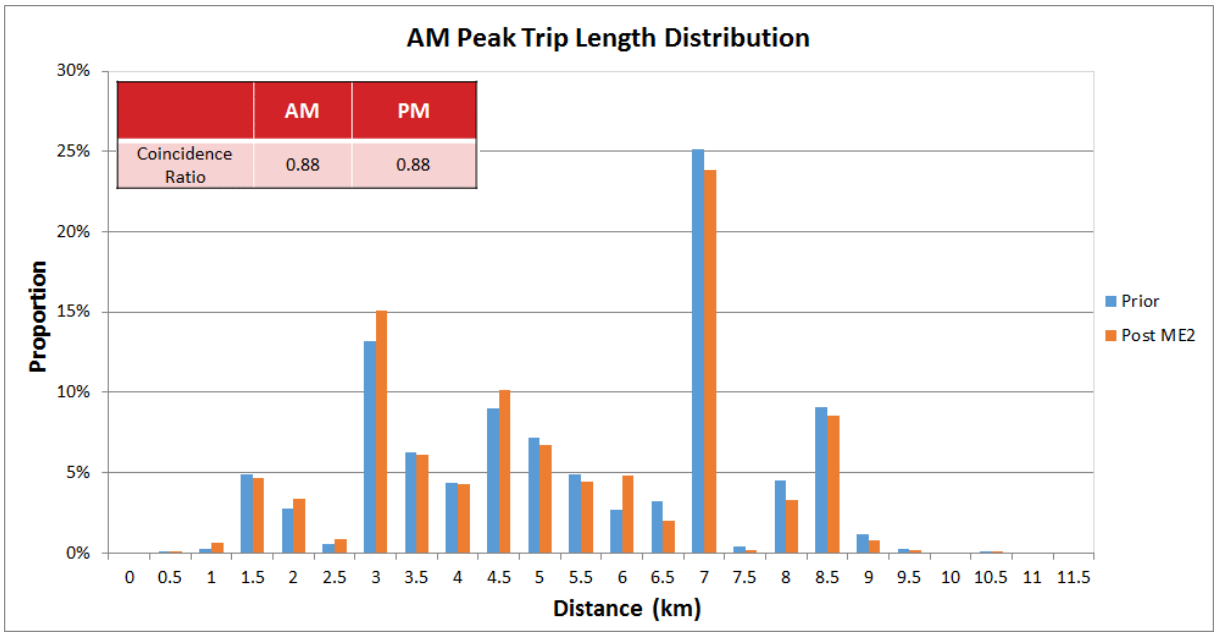


Figure 6.7 LITM Trip Length Distribution – AM Peak

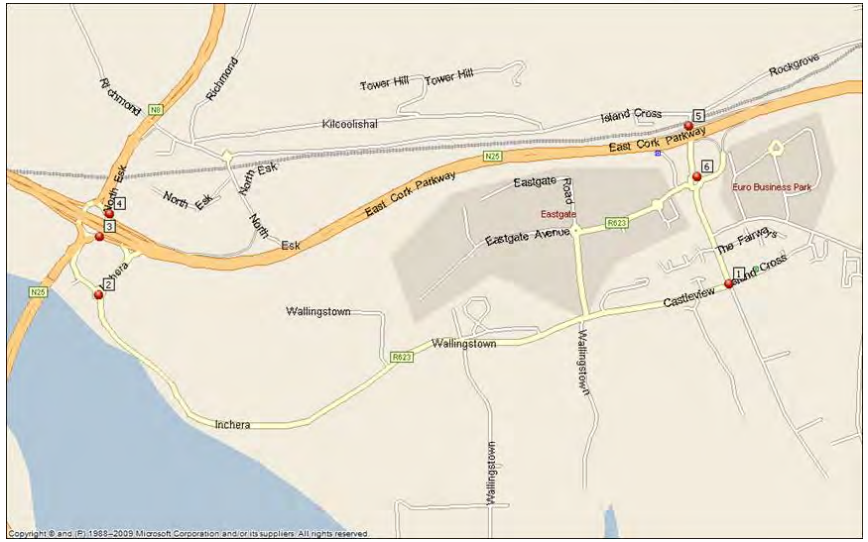
6.5.7 The validation of the model uses additional comparative measured by which the robustness of the calibrated model may be judged. For the LITM, comparison of modelled to observed journey times was primarily used to assess model validation. PAG recommends that modelled journey times should be within 15% of the observed time, or 1 minute if higher, in more than 85% of cases. As noted in Chapter 4, journey times surveys were carried out on two identified routes through Little Island (in both directions of travel). A comparison of modelled to observed journey times has been carried out for each route, and the full results are provided in the *Little Island Traffic Model Development Report.* The results for two of the most congested routes are presented in Figure 6.8 overleaf, namely:

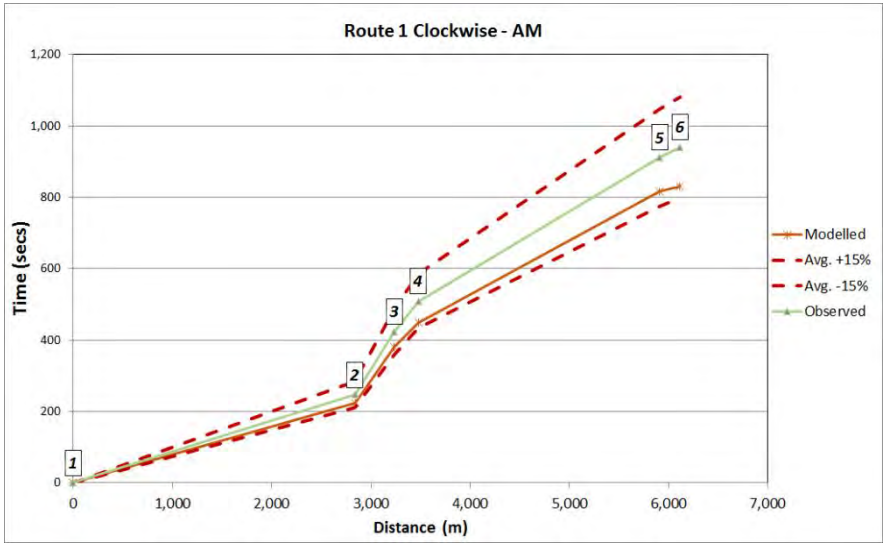
- Entering Little Island in AM peak via the existing N25 interchange with the R623; and
- Exiting Little Island in the PM peak travelling eastbound on the N25.

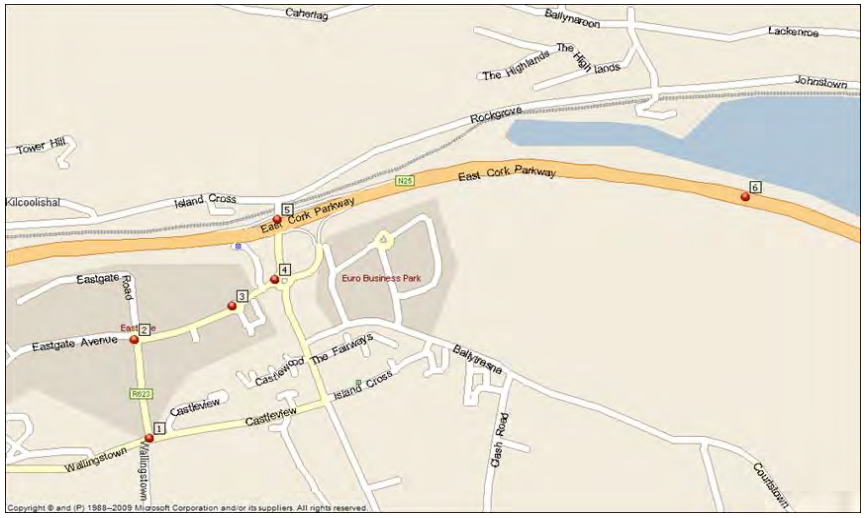
6.5.8 The results indicate that the modelled journey times are slightly faster than observed when entering Little Island in the AM peak, however, they are within the +/- 15% criteria recommended by PAG. In the PM peak, the model provides an extremely accurate representation of journey times for traffic exiting Eastgate towards the N25 eastbound.

6.5.9 The results of the journey time validation indicate that all surveyed routes fall within the +/- 15 % criteria specified by PAG for both the AM and PM peak periods.

[3] The coincidence ratio is a calculation used to examine the how the total area under different distributions coincide, with a value of 1 representing an identical distribution.







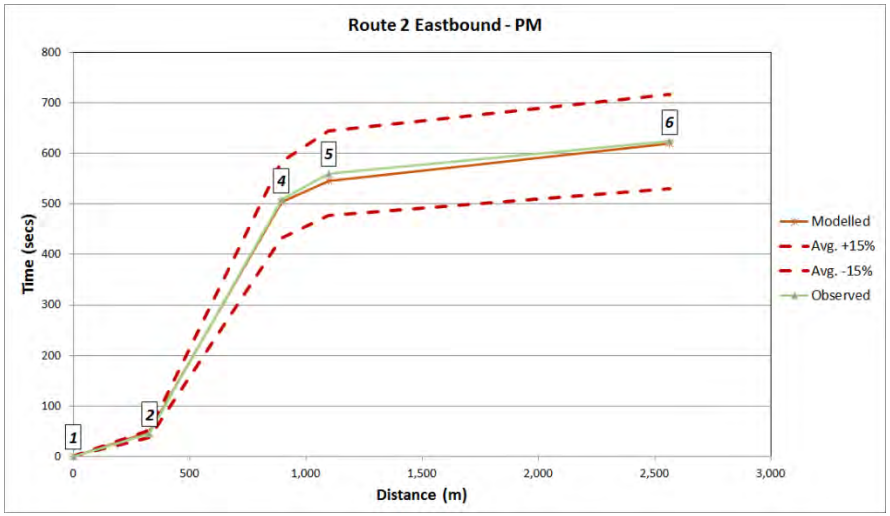


Figure 6.8 LITM Journey Time Validation Results

6.6 Summary

6.6.1 The previous sections provide an overview of the local area traffic model developed for Little Island to assess the various transport strategies proposed as part of the LITS. In summary:

- The NTAs SWRM was used as a basis for development of the Little Island Traffic Model with additional network and zonal detail added to more accurately represent localised traffic movements;
- The model has been calibrated and validated in-line with TII Project Appraisal Guidelines and meets all specified criteria for both the AM and PM peaks;
- The Little Island Traffic Model is fit for purpose, and represents AM and PM peak period base year traffic conditions well, as demonstrated statistically through calibration and validation. It provides a robust basis for assessing the impacts on the road network of any future infrastructure improvements/developments.

7. STRATEGY DEVELOPMENT

7.1 Overview

7.1.1 This chapter provides an overview of the strategies which were identified to achieve the vision and objectives of the LITS. The proposed strategy measures have been developed through a review of policy, public consultation responses and taking cognisance of existing plans for the wider Cork Area.

7.1.2 The following sections provide a brief description of the measures proposed for Little Island by mode. It should be noted, that all strategies and measures remain at a high level for the initial KPI assessment and identification of the emerging preferred strategy. It is also assumed that all proposed walking and cycling infrastructure measures will be common across all scenarios, and as such, they have been excluded from this initial assessment. Once the emerging preferred strategy has been identified, a comprehensive plan will be developed focusing on specific detail such as local junction designs, cycle lane designs, road cross-sections, pedestrian upgrades etc.

7.2 Road Based Measures

Dunkettle Interchange Upgrade

7.2.1 TII, in conjunction with Cork County Council and Cork City Council, are currently working to upgrade the existing Dunkettle Interchange which is located immediately to the west of Little Island, where the M8/N8 road from Dublin to Cork intersects with the N25 road from Waterford to Cork.

7.2.2 Under the proposed upgrades, the interchange will be re-designed, with the central roundabout and traffic lights removed facilitating free flow of traffic. This will provide significant additional capacity on all approaches reducing congestion and delay. Figure 7.1, overleaf, illustrates the existing Dunkettle Interchange along with the proposed upgrade. Currently, traffic can enter/exit Little Island using slip roads immediately adjacent to the interchange. In the proposed upgrade, this access will be replace by a new connection further east. Unlike the present junction arrangement, the new Dunkettle Interchange will enable motorists to directly enter and exit the western side of Little Island from the N40, N25, N8 and Glanmire.

7.2.3 The upgrade of the Dunkettle Interchange is due to begin construction in 2019, and as such, it has been included in all forecast year scenario tests.

Figure 7.1 Proposed Dunkettle Interchange Upgrade

3rd Interchange on the N25

7.2.4 The proposal for another interchange onto the N25 to the east of Little Island was included in a substantial number of submissions received through the public consultation process. The proposed measure includes for a link road connecting Lower Courtstown to the N25 via currently undeveloped lands with a new interchange facilitating movements to/from the N25.

7.2.5 It is envisaged that the provision of a new access point onto the N25 could have the following benefits:

- Significantly reduce the volume of traffic using the current N25 interchange, thus substantially decreasing traffic congestion and delay when travelling to/from Little Island in the peak hours; and
- Open up development lands to the northeast of the island with a direct access to the N25, thus supporting economic growth and increasing Little Island's attractiveness as a Strategic Employment Area (as designated in the County Development Plan).

7.2.6 Two proposed variations of the new N25 interchange were identified for testing, namely:

- A full grade separated interchange facilitating movements in all directions to/from Little Island as illustrated in Figure 7.2; and
- A Left-In/Left-Out junction arrangement which facilitates movements accessing Little Island from the east and exiting to the west as illustrated in Figure 7.3. Whilst not providing the same level of accessibility as the grade separated junction, It is envisaged that this option could be delivered for a substantially reduced cost and a lesser impact on environmentally sensitive lands.

Figure 7.2 Full Movements N25 Interchange

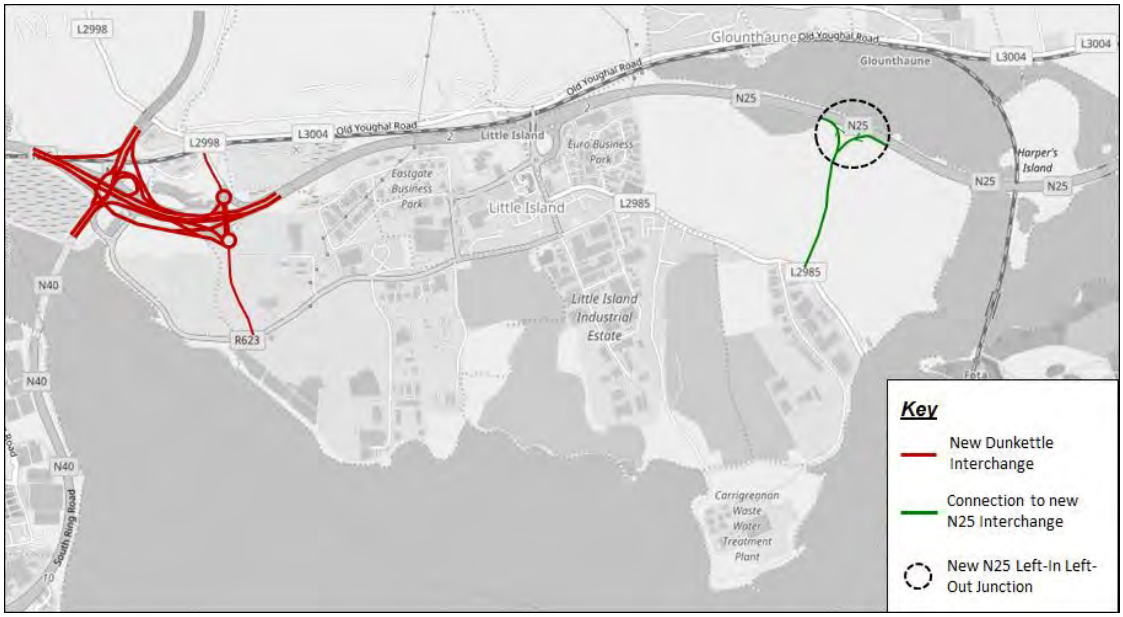


Figure 7.3 Left-In/Left-Out N25 Interchange

Local Capacity Enhancements

7.2.7 ARUP Consulting Engineers were commissioned by Cork County Council to examine the potential of providing additional capacity at a number of junctions in the vicinity of the current N25/R623 interchange accessing Little Island. This analysis was undertaken in the context of the upcoming Dunkettle Interchange Upgrade project and ongoing severe traffic congestion..

7.2.8 The analysis identified the following junction and network upgrades which would provide additional vehicular capacity to the local road network:

- ***N25/R623 Interchange:*** The proposed upgrades are illustrated in Figure 7.4, and include:
  - An additional southbound receiving lane over the bridge facilitating right turning traffic to exit the N25 off-slip from both lanes; and
  - The inclusion of a second northbound lane from the An Crompán Roundabout which would provide additional capacity for traffic turning right onto the N25.

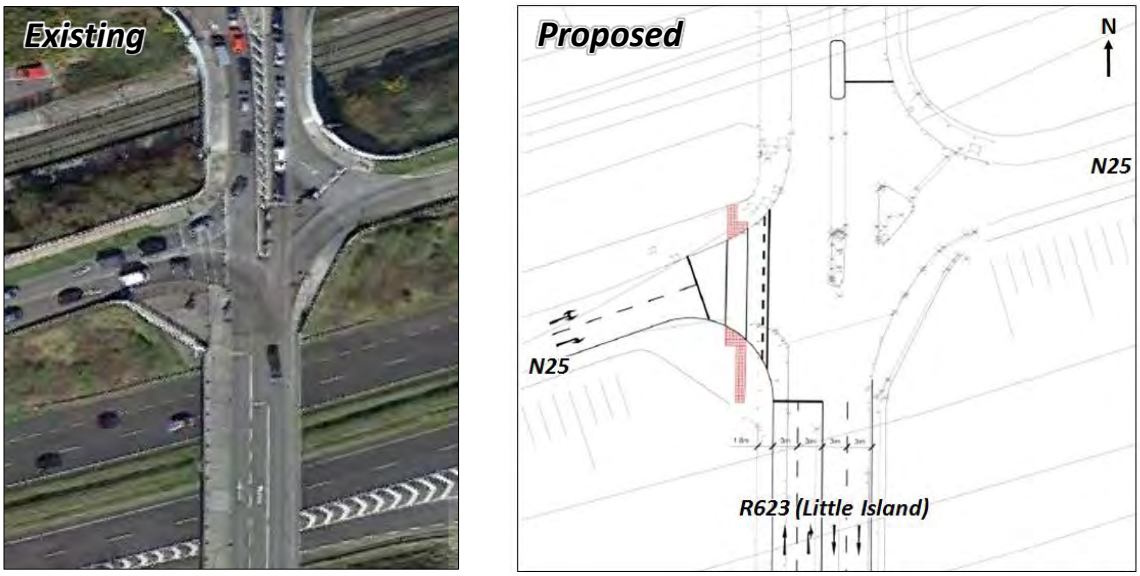


Figure 7.4 Proposed Upgrade to the N25 Off-Slip/R623 Interchange at Little Island

- ***An Crompán Roundabout:*** The proposed upgrades are illustrated in Figure 7.5, and include:
  - Widening of the northbound, eastbound and southbound approaches to two lanes each, thus providing significant additional capacity through the junction;

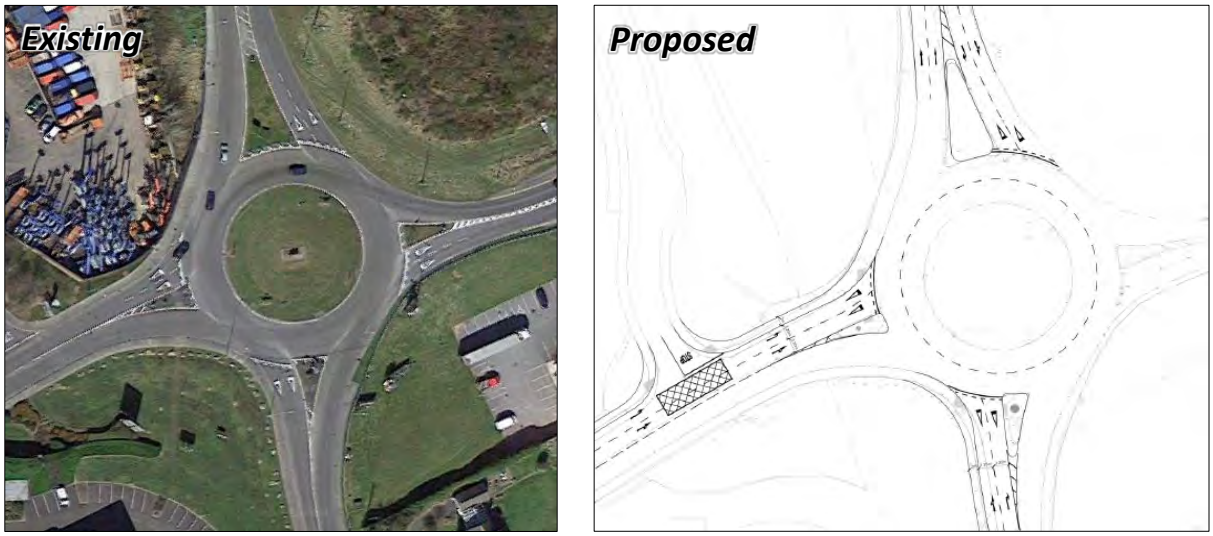


Figure 7.5 Proposed Upgrade to the An Crompán Roundabout

- **Ballytrasna Park/R623 Junction:** The proposed upgrades are illustrated in Figure 7.6, and include:
  - Traffic entering the junction from south will be able to use either of the two available lanes to travel northbound;
  - Traffic entering from the east (Ballytrasna Park) will be able to use either of the two available lanes to turn northbound onto the R623.

Figure 7.6 Proposed Upgrade to the R623/Ballytrasna Park Junction

7.2.9 These proposed junction upgrades represent relatively low cost measures which can be delivered in the short term to provide a considerable increase in road capacity, and as such have been included for testing as part of the LITS strategy development. Further information on the junction upgrade proposals, and associated modelling results, are provided in the 'Little Island Junction Capacity Assessment' Report prepared by ARUP Consulting Engineers.

7.3 Public Transport Based Measures

Public Transport Priority

7.3.1 Currently, there are no bus services which operate on Little Island. This is predominantly due to the level of congestion on access and egress in the AM and PM peaks which makes it difficult for operators to schedule services and provide reliable journey times.

7.3.2 In their submission to the LITS 1st round public consultant, Bus Éireann stated that the study needs to promote modal shift to public transport, identifying that adequate Bus Lanes / Bus Priority measures need to be provided in Little Island.

7.3.3 Therefore, in order to improve the competitiveness and reliability of journey times, and support travel by public transport, it is proposed that bus lanes are introduced in a clockwise

direction on-island, as illustrated in Figure 7.7. The main area of congestion in the peak hours is along the R623 between the An Crompán Roundabout and Island Cross Junction. As such, it is proposed that public transport priority will be provided along this section of road, and on the exit to the new Dunkettle Interchange.

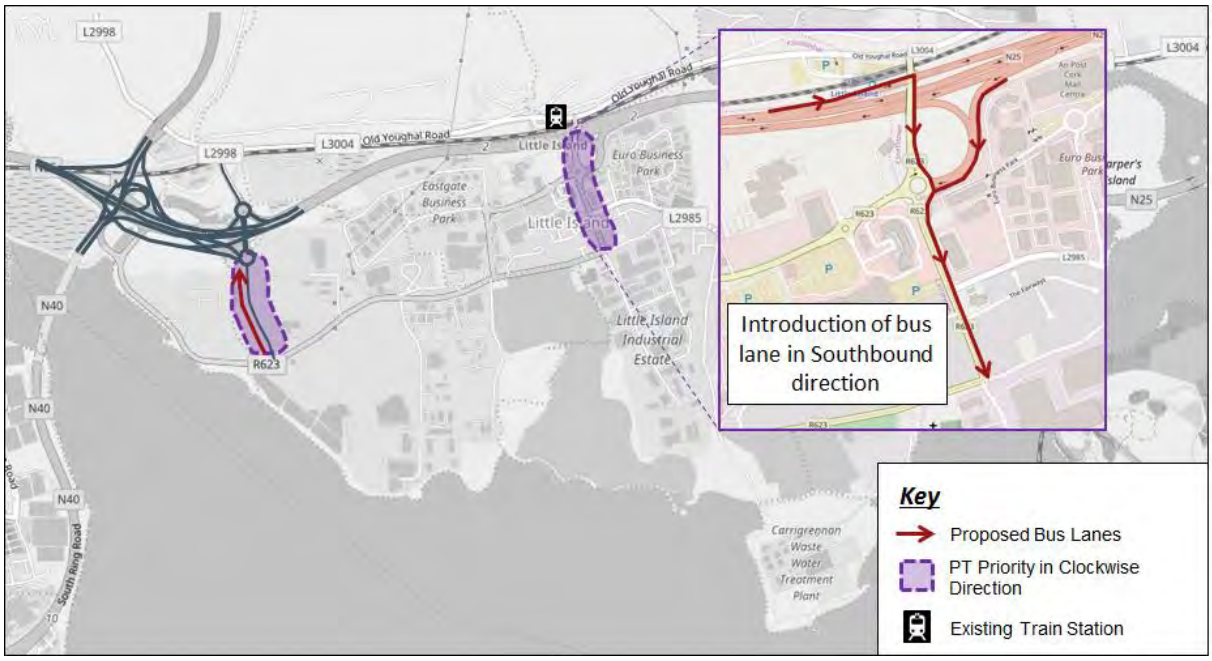


Figure 7.7 Proposed Little Island Public Transport Priority

7.3.4 It is proposed that public transport priority is only provided in one direction of travel due to carriageway width constraints on the network. It would not be possible to provide bus lanes in both directions along the R623 without the acquisition of a substantial number of properties and lands. On the southbound approach to Island Cross Junction, the carriageway narrows significantly, and therefore, to provide bus lanes in even one direction will require land acquisition.

7.3.5 Therefore, due to the fact that priority can only be provided in one direction, it is proposed that bus services operating on Island would travel in a clockwise direction to ensure efficiency and reliability of journey times. As such, eastbound buses would be required to enter Little Island at the existing N25 interchange and travel in a clockwise direction before exiting at the new Dunkettle Interchange continuing to their scheduled destinations. Other bus priority measures such as traffic signal priority, queue jump facilities etc. could also be provided along this route, however, these will be analysed in further detail during review of the emerging preferred strategy.

Re-routing of Existing Bus Services

7.3.6 Currently, a number of Bus Éireann services (including route 40, 240, 241, 260 and 261) operate along the N25 towards Cork City bypassing Little Island. In order to improve the public transport offering for residents and employees in Little Island, it is proposed that these existing services could be re-routed on-island as illustrated in Figure 7.8, overleaf. Note that this would only be a possibility if some level of public transport priority is provided on Little Island.

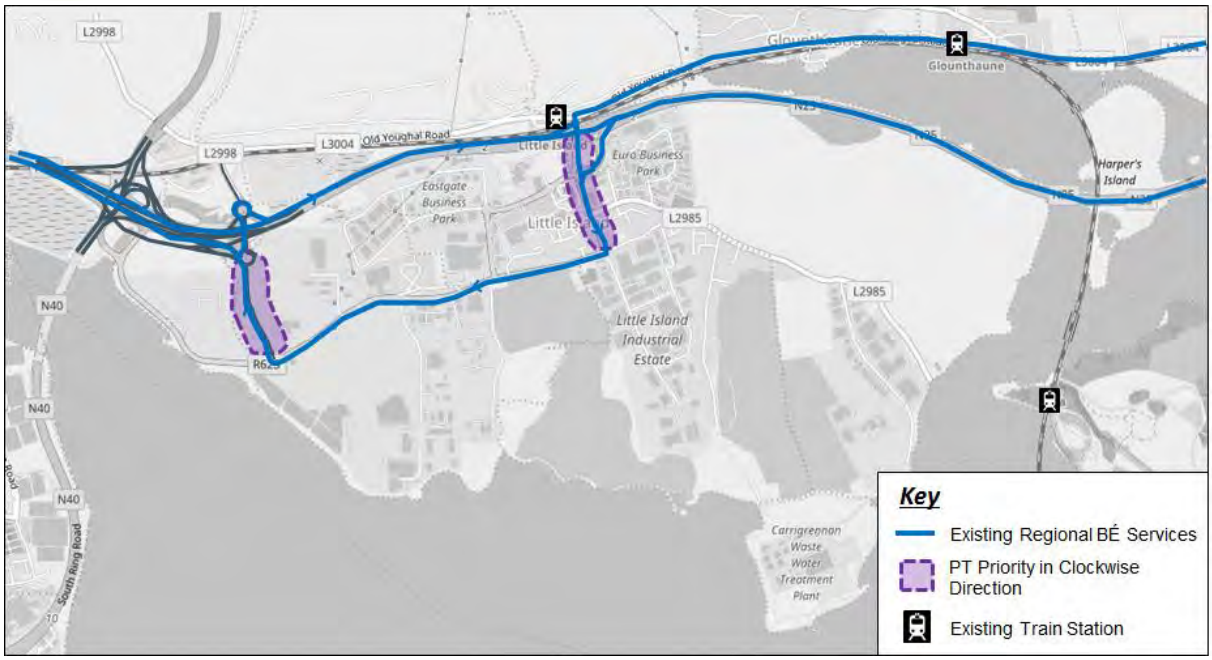


Figure 7.8 Re-routing Existing Services on Little Island

7.3.7 In a westbound direction, services could easily re-route through Little Island along the R623 with a relatively minor increase in overall journey times. In the eastbound direction, it is proposed that services would perform a clockwise loop on-island to avail of the public transport priority, and as such avail of faster and more reliable journey times.

Additional Bus Services

7.3.8 The NTA, in conjunction with Cork County Council and Cork City Council, are currently preparing the draft Cork Metropolitan Area Transport Study (CMATS) which is focusing on interventions to substantially improve sustainable travel in the metropolitan area.

7.3.9 As part of this study, demand analysis was carried out to identify key origins and destinations of travel and potential public transport measures which could support this demand. This analysis was adopted and assessed in further detail for Little Island as part of the LITS.

7.3.10 The results of this analysis highlighted two bus services, illustrated in Figure 7.9 below, which could operate via Little Island in the future and potentially serve travel demand, namely:

- **Southern Inner Orbital:** Operating on a 10 minute frequency in the AM and PM peak periods from Cork University Hospital via Douglas, Mahon and Little Island; and

- **Midleton to City Centre Radial Route:** Operating on a 30 minute frequency in the AM and PM peak from Midleton to Cork City Centre via Little Island.

7.3.11 The provision of these additional bus services would significantly increase the public transport offering providing direct services to Cork City Centre and the south of the city at a relatively high frequency.

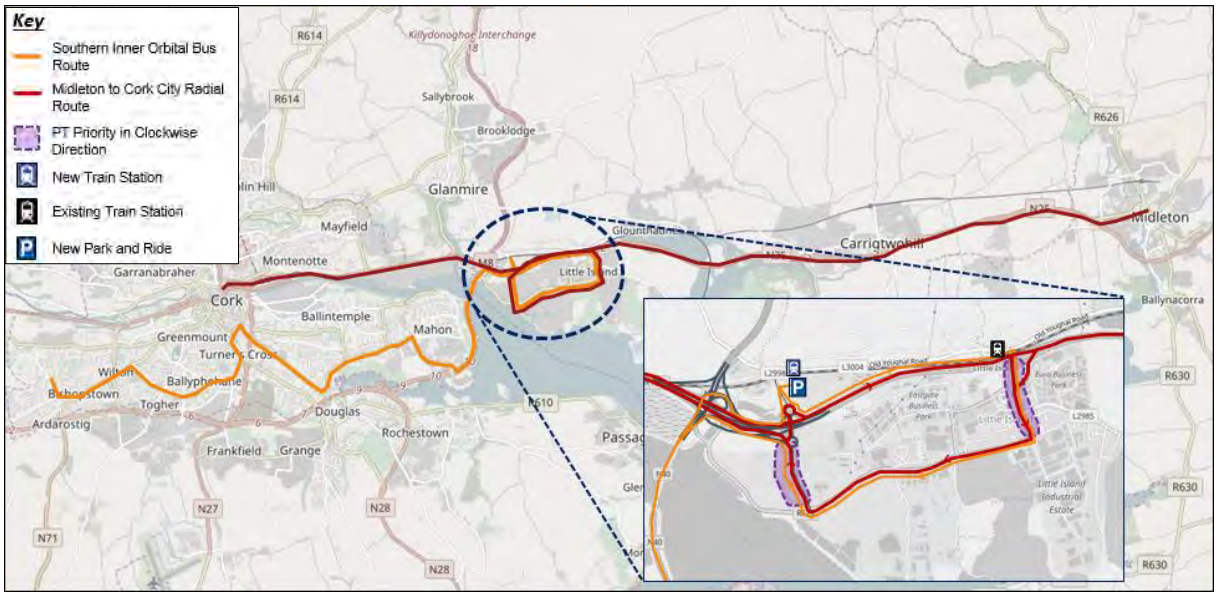


Figure 7.9 Proposed Additional Bus Services

New Train Station and Park and Ride

7.3.12 The Cork Area Strategic Plan (CASP update 2008) and the Cork Area Transit System Study (CATS) both identify the development of a new park and ride site near Dunkettle with an associated new train station.

7.3.13 The availability of a large Park and Ride site adjacent to Little Island would provide the opportunity for people to park off-island and either walk, cycle, or get a bus to their destination. This could reduce the volume of traffic entering the island in the peak hours. However, it is likely that demand management measures would be required (e.g. parking restrictions, parking charges etc.) to encourage people to park off-island.

7.3.14 The additional train station at North Esk (illustrated in Figure 7.9 above) is of limited advantage to current residents and employees in Little Island. However, it could provide benefits if lands to the west of the Island are developed further and strong walk and cycle links are provided to this station.

Shuttle Bus Service

7.3.15 In order to support sustainable travel, and encourage people to use park and ride or travel via public transport, it is proposed that a shuttle bus service could be established on-island accessing key employment locations.

7.3.16 The proposed service, illustrated in Figure 7.10, would operate in a clockwise direction around the island making use of the public transport priority measures to avail of quick and reliable journey times. The bus could operate at a relatively high frequency linking the two train stations adjacent to Little Island (one existing and one proposed at North Esk), and the proposed new park and ride site, with key employers on-island. It is hoped that the availability of this service will encourage people to park off-island, or interchange with rail rather than travel via car.

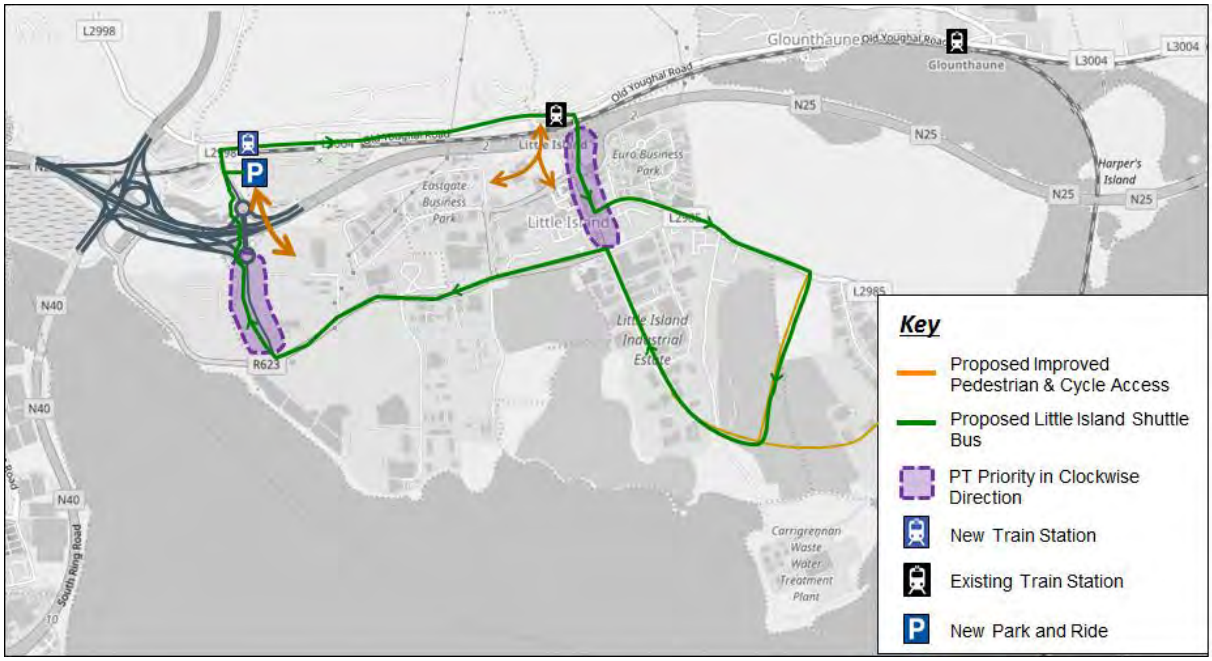


Figure 7.10 Proposed Shuttle Bus Service

7.4 Development of Scenarios for Testing

7.4.1 The transport measures outlined above have been combined into three road based, and two public transport based, strategies with varying levels of infrastructure and required investment.

7.4.2 In reality, it is highly unlikely that a strategy would be developed around a single transport mode, however the testing of road based and public transport based solutions is initially undertaken separately to enable the sifting of weak and strong performing individual measures, before they are combined to form an integrated strategy.

7.4.3 The road based strategies were developed to assess whether upgrades to the road network could sufficiently achieve the LITS objectives set out in Chapter 5 previously, and address the traffic congestion issues currently experienced in the peak hours. The strategies have been separated based on the level of funding required ranging from minor local capacity upgrades to the provision of a full grade separated interchange.

7.4.4 The public transport based strategies were developed to assess whether improvements to public transport services, and the provision of additional priority on-island, could obtain a significant shift away from the private car, and thereby provide sufficient transport capacity to support the growth of Little Island without the need for investment in road infrastructure.

7.4.5 The strategies developed for testing against the identified study objective and KPIs are as follows:

- **Do Minimum:**
  - includes only committed schemes up to the forecast year 2040 i.e. the upgrade to the Dunkettle Interchange;
  - is used as the reference case against which all other scenarios are assessed;

- **Scenario 1:**
  - includes a new Left-In/Left-Out interchange on the N25;
  - tested to assess whether this junction arrangement could provide sufficient transport benefits without the need for construction of a full movements interchange.

- **Scenario 2:**
  - includes a new full movements grade separated interchange on the N25;
  - tested to evaluate the transport benefits that could be achieved by providing a 3rd access onto the N25.

- **Scenario 3:**
  - includes road capacity upgrades at the existing N25 interchange, An Crompán Roundabout and Ballytrasna Park Junctions;
  - tested to assess whether these short-term and relatively inexpensive upgrades could provide sufficient benefits without the need to construct an additional junction onto the N25.

- **Scenario 4:**
  - includes public transport priority measures and the re-routing of existing Bus Éireann services through Little Island;
  - tested to evaluate the modal shift, and associated reduction in car demand and congestion, which could be obtained from a minimal investment in public transport.

- **Scenario 5:**
  - incorporates the full set of public transport measures outlined above including public transport priority, additional bus services, a shuttle bus service, park and ride etc.;
  - tested to ascertain the level of mode shift that could be achieved with a substantial investment in public transport, and whether this is sufficient to provide enough capacity to support the economic growth of Little Island.

7.4.6 All of the above scenarios have been tested through the evaluation framework with the best performing measures forming the emerging preferred LITS strategy. Further details on the scenario testing and the emerging preferred strategy are provided in Chapters 9 and 10 later in this report.

7.5 Summary

7.5.1 The previous sections provide an overview of the various strategies identified for testing against the LITS objectives and KPIs. In summary:

- Various road and public transport measures have been identified through a review of policy, public consultation responses and taking cognisance of existing plans for the wider Cork Area;

- These measures have been combined into six distinct strategies for testing, namely:

  Do Minimum:
  - Reference case including only committed transport schemes such as the Dunkettle Interchange upgrade

  Scenario 1:
  - includes a new Left-In/Left-Out interchange on the N25

  Scenario 2:
  - includes a new full movements grade separated interchange on the N25

  Scenario 3:
  - includes road capacity upgrades at the existing N25 interchange, An Crompán Roundabout and Ballytrasna Park Junctions

  Scenario 4:
  - includes public transport priority measures and the re-routing of existing Bus Éireann services through Little Island

  Scenario 5:
  - includes public transport priority measures, re-routing existing bus services on-island, additional proposed bus routes, a new shuttle bus service, and a new train station and park and ride site at North Esk

- All of the above scenarios have been tested through the evaluation framework with the best performing measures forming the emerging preferred LITS strategy.

8. STRATEGIC ENVIRONMENTAL ASSESSMENT AND APPROPRIATE ASSESSMENT

8.1 Introduction

8.1.1 As detailed in Chapter 1 of this report, a Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) has been undertaken and integrated into the decision-making processes and overall development of the Strategy.

8.1.2 Details regarding the SEA itself is detailed in the Draft Environmental Report, which will be included within this portfolio of Strategy documentation. Details of the more significant findings of the SEA and AA processes are provided below, together with developed mitigation measures to ensure that the overall strategy complies with regulatory requirements and to ensure that it does not significantly impact on, or result in significant effects to, the surrounding environment.

8.2 Regulatory Framework for Environmental Protection and Management

8.2.1 SEA in the European Union originates from the EU Directive 2001/42/EC (Assessment of the Effects of Certain Plans and Programmes on the Environment), which is commonly referred to as the 'SEA Directive'. The main objective of the SEA Directive is to "provide for a high level of protection for the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development."

8.2.2 The SEA Directive was transposed into Irish Law through the following Regulations:

- European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (Statutory Instrument Number (SI No. 435 of 2004); and
- the Planning and Development (SEA) Regulations 2004 (SI No. 436 of 2004).

8.2.3 S.I. No. 435 of 2004 relates to sectors including transportation plans and was subsequently amended by the European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011 (SI No. 200 of 2011). Both the 2004 and 2011 regulations are applicable to the development of this Transport Strategy.

8.2.4 The Directive and the transposing Regulations requires that an environmental assessment shall be carried out for plans and programmes that are subject to preparation and/or adoption by an Authority at national, regional or local level.

8.3 Development of the SEA

8.3.1 The SEA process is being undertaken in five main stages that run parallel to the development of the overall Strategy development. These are:

- **Stage 1** - Screening: Determination on whether an SEA of the LITS is required. Section 1.3 of the Draft Report confirms the factors that determine that an SEA process is appropriate for the Little Island Transportation Strategy.

- **Stage 2** – Scoping: Consultation with defined statutory bodies on the scope and level of detail to be included in the SEA. A draft version of this Report was issued to statutory consultees and will be finalised following completion of the consultation process.
- **Stage 3** - Assessment of options: An assessment of the likely significant impacts on the environment as a result of the LITS. This stage will conclude with the production of a draft environmental report that provides an assessment of the impacts of the identified preferred options for the LITS. This will identify the positive and negative effects and any associated mitigation and monitoring requirements.
- **Stage 4** – Consultation on the draft LITS and associated Environmental Report. The LITS Environmental Report will be updated further following feedback.
- **Stage 5** – Publication of the LITS with an associated SEA Adoption Statement identifying how environmental considerations and consultation have been integrated into the final LITS.

8.3.2 As part of the scoping process and in accordance with the SEA Regulations (S.I. No. 435 of 2004), as amended by S.I.200 of 2011, a draft scoping report was issued to the following statutory consultees:

- The Minister for the Environment, Community and Local Government (now the Minister for Housing, Planning, Community and Local Government); and
- Minister for Agriculture, Food and the Marine, and the Minister for Communications Energy and Natural Resources (now the Minister for Communications, Climate Action and Environment), where it appears to the competent authority that the plan or programme, or modification of the plan or programme, might have significant effects on fisheries or the marine environment

8.4 Appropriate Assessment

8.4.1 In accordance with Article 6(3) of the Habitats Directive 92/43/EEC, Appropriate Assessment (AA) screening of the Transportation Strategy is currently being undertaken in conjunction with the Strategic Environmental Assessment.

8.4.2 The Habitats Directive places legal obligations on member states to ensure the protection, conservation and management of the habitats and species of conservation interest in all European Sites. The Habitats Directive has been transposed into Irish law by the Planning and Development Act 2000 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

8.4.3 Article 6 of the Directive obliges member states to undertake an 'appropriate assessment' (AA) for any plan or project which may have a likely significant effect on any European Site. The outcome of an AA process fundamentally affects the decisions that may lawfully be made by competent national authorities in relation to the approval of plans or projects. In accordance with this requirement.

8.5 Assessment of Alternatives

8.5.1 Following feedback from the Scoping process and AA screening process, the five scenarios as developed under the LITS were subject to comparative assessment with the 'Do-Minimum'

scenario. The range of environmental headings considered assessment are based on the list of environmental topics as specified in S.I. 435 of 2004, as follows:

- Biodiversity, flora & fauna;
- Landscape;
- Population & Human health;
- Air quality;
- Climatic factors & climate change;
- Soil & geology;
- Material assets;
- Cultural heritage (incl. architectural and archaeological heritage), and
- The inter-relationships between the above.

8.5.2 The SEA assessed the scenarios presented within the LITS across a range of environmental headings, in accordance with the SEA Directive, and relevant legislation. The findings of the SEA have been integrated into this report as follows:

- Aspects relating to Population, Human Health, Air & Climate have been integrated into the **Wellbeing, Safety and Physical Activity** section of this report. (Refer to Section 9.3);
- Aspects relating to Material Assets has been integrated into the **Economic** section of this report. Refer (Section 9.2);
- Aspects relating to Biodiversity (Flora & Fauna), Water, Landscape, Cultural Heritage, Soil are presented in Section 8.6 of this report.

8.6 Strategic Environmental Assessment

8.6.1 This section provides a summary of the main findings of the Strategic Environmental Assessment that has been undertaken to date. It presents an overview of the existing environment of the local area for which the LITS has been developed and presents the main findings and constraints identified by the assessment.

Biodiversity – Flora & Fauna

8.6.2 Ireland is required under the terms of the EU Birds Directive (2009/147/EC) to designate Special Protection Areas (SPAs) for the protection of endangered species of wild birds:

- Listed rare and vulnerable species;
- Regularly occurring migratory species, such as ducks, geese and waders; and
- Wetlands, especially those of international importance, which attract large numbers of migratory birds each year.

8.6.3 Ireland is also required under the terms of the Wildlife Acts (1976-2012) to:

- Avoid significant impacts on relevant habitats, species, environmental features or other sustaining resources in designated sites including Wildlife Sites and to contribute towards compliance with the Wildlife Acts 1976-2012 with regard to the protection of listed species; and
- Enhance the conservation of wildlife species (flora and fauna) and their habitats

8.6.4 The Cork Harbour SPA site comprises most of the main intertidal areas of Cork Harbour, and includes the waters surrounding Little Island as illustrated in Figure 8.1.

Figure 8.1 Cork Harbour SPA at Little Island

8.6.5 Special Areas of Conservation (SACs) are prime wildlife areas in the country, considered to be important on a European as well as Irish level. The legal basis on which SACs are selected and designated is the EU Habitats Directive, transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended. The Great Island Channel has been designated as an SAC and stretches from Little Island to Midleton and is illustrated in Figure 8.2. It covers the sheltered tidal sand and mudflats and the Atlantic salt meadows which are home to a number of marine species.

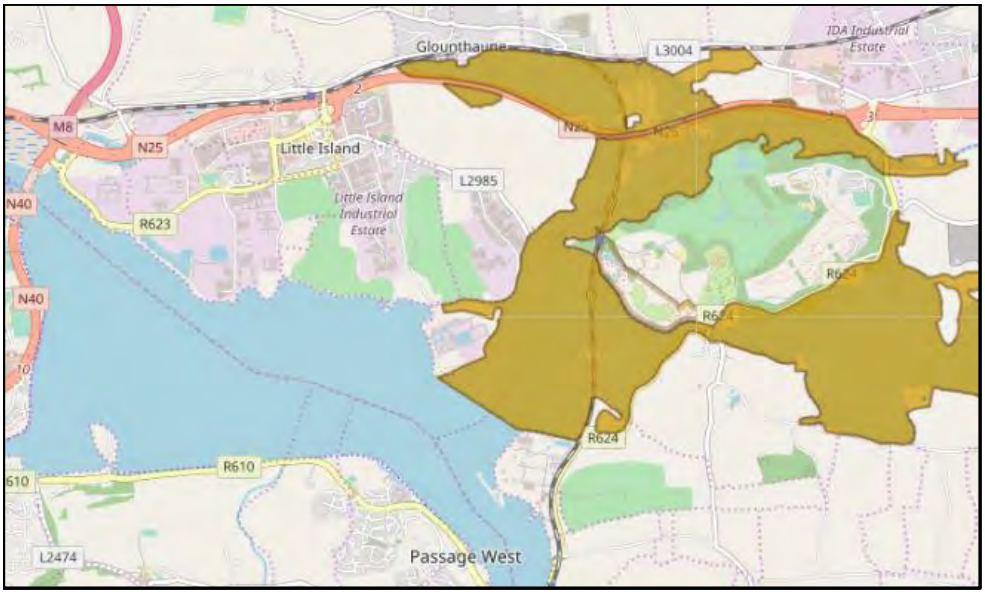


Figure 8.2 The Great Island Channel SAC at Little Island

8.6.6 The key biodiversity, flora and fauna resources in the Little Island Area are the network of Natura 2000 sites that are located in the local and wider vicinity. These comprise of Special Conservation Areas (SACs) and Special Protection Areas (SPAs). These have been designated

on the basis of their sensitivity, rareness and ecological value in Europe. In addition to these sites, two proposed Natural Heritage Areas (pNHA) are located in the Little Island Area. The basic designation for wildlife is the Natural Heritage Area (NHA). This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation. Proposed NHAs are sites which have not since been statutorily designated, but which still require consideration in the preparation of development plans.)

8.6.7 As outlined in Chapter 7, Scenario 1 and Scenario 2 include the construction of a new 3rd interchange to the east of Little Island. As noted above, the waters in this area are protected as both SPAs and SACs. Therefore, the construction of any interchange at this location will present challenges in terms of potential impacts on these Natura 2000 sites. Potentially, the Left-In/Left-Out Interchange (Scenario 1) could be constructed on Little Island with relatively minor impacts on the SPA and SAC lands. However, development adjacent to these sites is likely to require substantial environmental assessment and stringent mitigation measures.

8.6.8 Scenarios 3, 4 and 5 all include development on Little Island itself, predominantly along the R623 corridor, and as such, will not impact on environmentally sensitive areas.

Summary

Scenarios 1 and 2 require development of a 3rd interchange to the east of Little Island, and as such, are likely to significantly impact on the designated SACs and SPAs, their conservation objectives and qualifying species.

Scenarios 3, 4 and 5 all include development on Little Island, predominantly along the R623 corridor, and as such, will not impact on environmentally sensitive areas.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Minimising impact on environmentally sensitive areas (Biodiversity)						

Landscape

8.6.9 The Little Island area is located within the designated Landscape Character Area of 'City Harbour and Estuary'. This is considered an area of very high landscape value and sensitivity and suggested as being of national landscape importance in the Cork County Draft Landscape Strategy (2007). There are two designated scenic routes to the north of the Little Island area, as illustrated in Figure 8.3 below.

Figure 8.3 Landscape Character & Scenic Routes (Cork County Council, 2018)

8.6.10 It is an objective of the LITS to;

- Avoid or, where unfeasible, minimise conflicts with the appropriate protection of statutory designations relating to the landscape, including those included in the land use plans of planning authorities

8.6.11 Both the landscape and visual amenity of residential and scenic areas in the harbour environs need to be considered in terms of the development of the LITS within the context of the visual envelope of the harbour.

8.6.12 Scenarios 1 and 2 require development of a 3rd interchange to the east of Little Island and have the potential to negatively impact on the Landscape Character (high value landscape), Scenic Routes (S41 and S42, subject to indivisibility with the works) and overall integrity of the landscape character.

Summary

Scenarios 1 and 2 require development of a 3rd interchange to the east of Little Island, and have the potential to negatively impact on the Landscape Character, Scenic Routes and overall integrity of adjacent designated sites. Scenarios 3, 4 and 5 all include development which will not impact on the Landscape Character of the Little Island area.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Minimising impact on environmentally sensitive areas (landscape)						

Water

8.6.13 Under the Water Framework Directive (WFD) (2000/60/EC) Ireland's various water resources are managed on a catchment basis. Little Island is located within the Lee, Cork Harbour and Youghal Bay Hydrometric area (HA19), the Owenacurra Water Management Unit, and in the Tibbotstown sub-catchment (SC_19).

8.6.14 Ireland is required by law under the terms of the EU Water Framework Directive to:

- Protect and improve water quality in all waters so that we achieve good ecological status. It applies to rivers, lakes, groundwater, and transitional coastal waters.
- Ensure all Irish ground and surface water achieves at least a "good" status, and no deterioration of water quality occurs.

8.6.15 The current Groundwater WFD Status of the Little Island study area is classified as "good", as detailed in Figure 8.4.

Figure 8.4 WFD Groundwater Status (EPA, 2018)

8.6.16 There are no significant streams, rivers or lakes within the study area (see Figure 8.5), and potential negative effects to these water resources in the wider area are not likely to occur as a result of the new transport infrastructure promoted within the LITS.

Figure 8.5 Surface Water Body Network (EPA, 2018)

8.6.17 The Carrigrennan WWTP (Wastewater Treatment Plant) is located at the most southern point at Little Island, Co. Cork. The plant was commissioned in 2004 with a design organic load to capacity of 413,000 population equivalent (p.e.). to treat from Cork City and surrounding areas in the County. The plant was designed to ensure compliance with the Urban Wastewater Directive. It is not anticipated that the LITS will result in any impacts or effects on the operation of this WWTP.

Summary

Scenarios 3, 4 and 5 involve road capacity upgrades and public transport priority measures within the confines of existing roads, and as such are unlikely to have any negative impacts upon the quality and status of surface and ground water. Scenarios 1 and 2 have the potential for both negative direct and indirect effects on designated, protected and undesignated water resources from new transport infrastructure and its use, and subsequent conflict with the policies and programmes under the WFD.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Minimising impact on environmentally sensitive areas (Water Quality)						

Minimising Flood Risk

8.6.18 Flooding presents a risk in the Little Island area, with some areas known to be at risk of flooding under certain hydrological and fluvial conditions. Consequently, two studies will be used to inform the development of the overall LITS:

- The Lee CFRAM Study provides flood extent, depth, velocity and hazard maps for the estuarine area surrounding Little Island, both for current and future climate scenarios. The future scenario is known as the Mid-Range Future Scenario (MRFS) which includes an allowance for climate change (0.55m);

- The Irish Coastal Protection Strategy Study (ICPSS) is a national study that was commissioned in 2003 with the objective of providing information to support decision making about how best to manage risks associated with coastal flooding and coastal erosion. The Study was completed in 2013 and provides strategic current scenario and future scenario (up to 2100) coastal flood hazard maps and strategic coastal erosion maps for the national coastline. Figure 8.6 below is an extract from the study that displays the extent of the 0.5% AEP extent (1 in 200 chance in any given year)

8.6.19 The preferred strategies progressed under the LITS will also be carried out in accordance with 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (DoEHLG, 2009). The main objectives of these guidelines are to:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface water run-off;
- Ensure effective management of residual risks for development permitted in floodplains;
- Avoid unnecessary restriction of national, regional or local economic and social growth;
- Improve the understanding of flood risk among relevant stakeholders; and,
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

8.6.20 The Preliminary Flood Risk Assessment (PFRA) mapping (Irish Coastal Protection Strategy Study) indicates that within the proposed site, a large part of the northern and eastern sections and a narrow section along the southern boundary are within the 100-year coastal flood zone (Flood Zone A). A significant area in the north of the site is also mapped within Flood Zone B (See Figure 8.6).

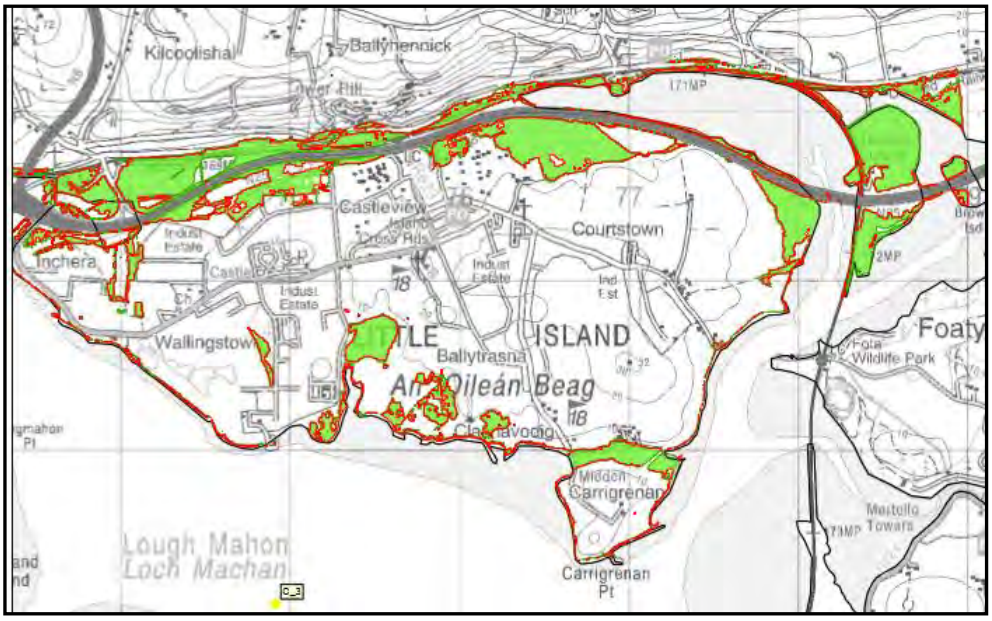


Figure 8.6 ICPSS mapping showing spatial extent of a 1 in 200 chance flood event

8.6.21 The OPW Preliminary Flood Risk Assessment (PFRA) mapping also suggests that there is potential for some localised pluvial flooding in certain parts of the Little Island site area (See Figure 8.7).

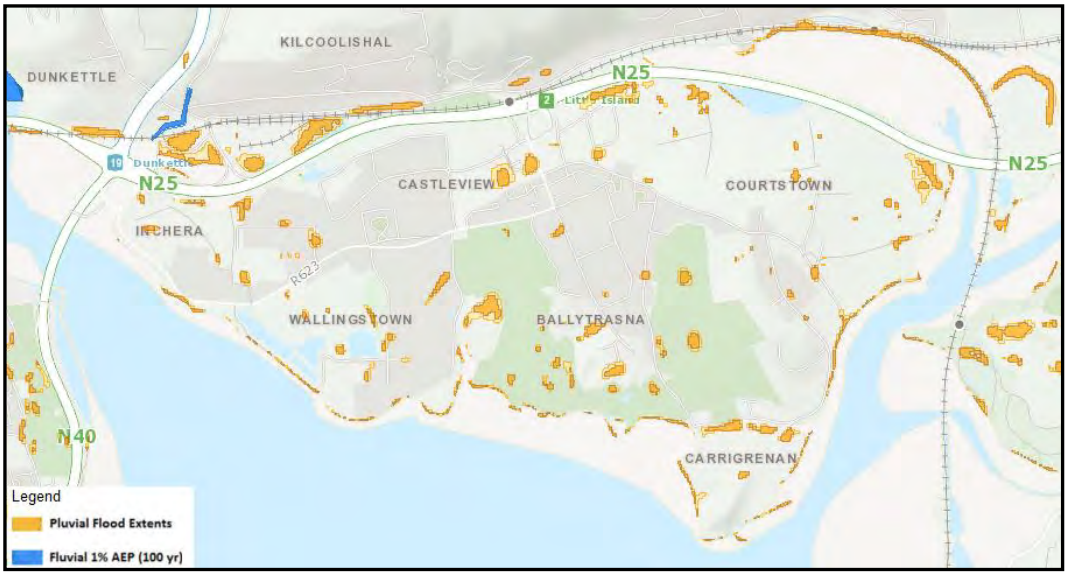


Figure 8.7 OPW PRFA Flood Zone Mapping (EPA, 2018)

8.6.22 In terms of historical flooding events, no areas of recurring flooding incidences within the Little Island area have been noted by the Office of Public Works within their National Flood Hazard Mapping (refer to Figure 8.8). Coastal Flooding presents as a potential risk in the Little Island area, with further potential for localised pluvial flooding in some areas

Figure 8.8 OPW Interactive Flood Map (OPW, 2018)

Summary

Scenario 4 involves public transport priority measures which will not impact on the level of flood risk. Scenarios 1 and 2 present potential moderate to major adverse effects if flood risks are present and unmitigated due to the construction of new road infrastructure in areas identified with a 1 in 200 chance flood event.

Scenarios 3 and 5 present potential minor adverse effects as they include for limited widening of existing carriageways within the built environment.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Minimising impact on environmentally sensitive areas (Flood Risk)						

Population and Human Health

8.6.23 The following Objectives, as identified in Section 5.3. of this report, are integral to the Population and Human Health assessment:

- Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network;
- Develop a safe and healthier transport network for all transport modes and users; and
- Provide equal opportunity for all through improving accessibility and enhancing the integration of land-use and transport.

8.6.24 The LITS is being progressed to cater for the residential population, working population and visiting population within the area. Any developments of projects implemented as a result of the study has the potential to impact these populations from an Economics safety and Physical well-being perspective.

8.6.25 Figure 8.9 below, illustrates the residential population density (population per km^2) in and around the Little Island area.

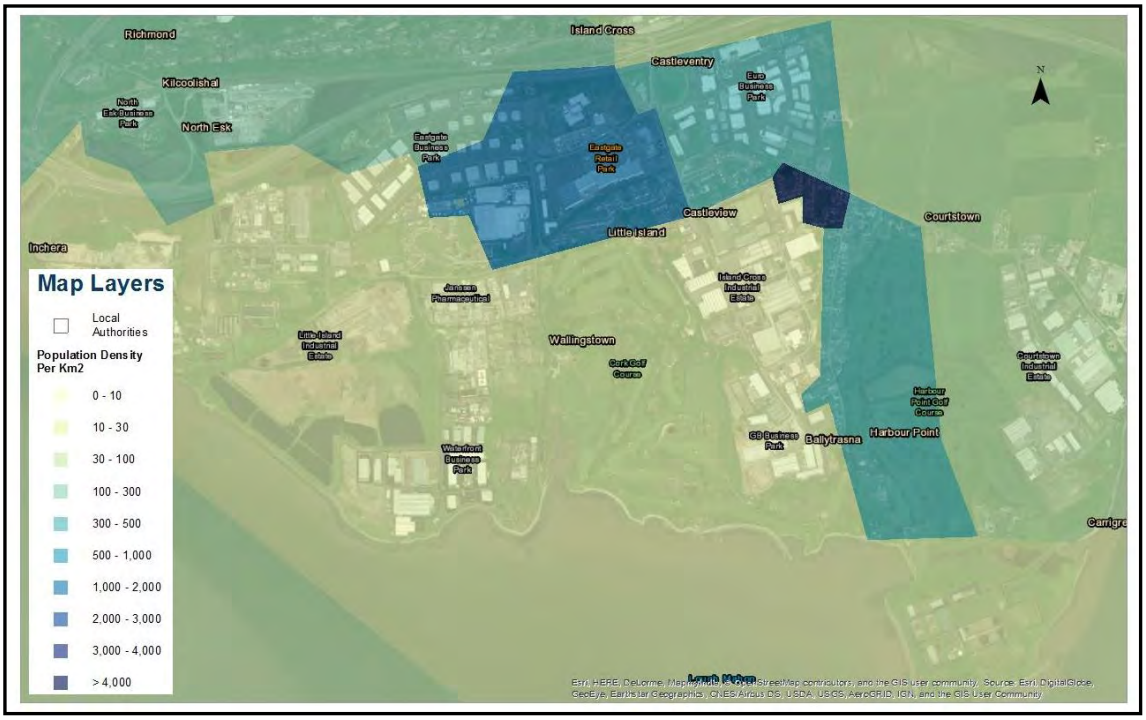


Figure 8.9 Population Density in Little Island (residents/km^2)

8.6.26 Potential Impacts on Population and Human Heath have been integrated into the **Economic** evaluation (Section 9.2) and the **Safety and Physical Activity** sections (Section 9.3) of this report.

Air Quality and Climate Change

8.6.27 There is no specific Air Quality Monitoring data available for Little Island. The closest EPA Monitoring site is located in Ballincollig, Co. Cork which can be considered representative of

the study area. Generally, air quality in in the Cork Conurbation is very good. Transport related emissions are expected to improve due to developments in passenger vehicle technology and the electrification of public and private transport. That said, air quality is negatively impacted where heavy traffic flows are present with the potential for poor air quality in these locations, particularly for those affecting those living and working in close proximity to congested roads. This can be also considered the case for Little Island.

8.6.28 Any effects on Air Quality and Climate will result from transport infrastructure improvements and policy measures are needed to alleviate the severe peak hour traffic congestion on the road network within Little Island.

8.6.29 Measures that explore the potential to reduce dependency on single occupier car journeys and encourage modes of transport such as walking, cycling and forms of transport that are environmentally friendly and sustainable are expected to improve overall air quality. Different options can be compared to the do-minimum scenario through modelled reduction in vehicle emissions.

8.6.30 Potential Impacts relating to Air Quality & Climate have been integrated into Section 9.3 of this report.

Soils and Geology

8.6.31 The environmental topic of soils and geology is concerned with vulnerable soil resources (e.g. prime agricultural land) and designated geological and geomorphological sites. Any potential effects on Soils and Geology are likely to result from new transport infrastructure promoted within the Strategy. It is not anticipated that Soils and Geology will become a major influence in the overall LITS assessment, though any geological constraints have been identified and mapped through the environmental assessment of the area.

8.6.32 It is an objective of the LITS to;

- Minimise damage to the hydrological and ecological function of the soil resource.

8.6.33 The mapped soil type in the area of the proposed study area is this predominantly consists of coarse loamy drift type with siliceous stones. The mapped subsoil type in the area of the proposed site (outside of Urban classification) is till derived chiefly

8.6.34 from limestone (TLs) and sandstone (TDSs), with alluvium (A) mapped along the northern section of the study area. The mapped bedrock geology below the site generally contains Waulsortian Limestones (WA), Limestone (LI) and Cork Red Marble (CK).

8.6.35 Potential negative effects due to development of transport infrastructure on important and vulnerable soil resources (e.g. development on greenfield areas or prime agricultural land), potential adverse effects on the integrity of the Rock Farm Quarry pNHA must be considered as part of the overall assessment.

Summary

Scenarios 3, 4, and 5 involve road capacity upgrades and public transport priority measures, and provision of additional transport infrastructure within or adjacent to existing development of brownfield sites. As such, they are unlikely to have any negative impacts upon the quality and status of the local soil and geology composition. Scenarios 1 and 2 have the potential for direct impact on the local soil resource due to land take for new or improved transport infrastructure.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Minimising impact on environmentally sensitive areas (soils & geology)						

Cultural Heritage

8.6.36 It is an objective of the LITS to;

- Contribute towards the protection of archaeological heritage including entries to the Record of Monuments and Places and/or their context; and
- Contribute towards the protection of architectural heritage including entries to the Records of Protected Structures and Architectural Conservation Areas and their context.

8.6.37 Within the study area, there are numerous buildings and built structures that are classified as protected structure (See Figure 8.10). It is likely that due to the number of recorded monuments in the wider area that further potential for undiscovered archaeological sites remains in Little Island, and it is recommended that the site is subject to a thorough archaeological assessment (including targeted geo-physical assessment, if required) as part of any works in greenfield sites. Subject to the above, it is not thought that the occurrence of National Monuments within the study area will be an impediment to the development of the LITS.

Figure 8.10 National Monuments within study area (Archaeology.ie [DoEHLG], 2018)

8.6.38 Within the study area, there are a number of buildings that are listed within the Record of Protected Structures (See Figure 8.11). Potential beneficial effects on the setting of cultural heritage features within the Little Island area (townscapes, heritage buildings etc.) include a reduction in the presence of heavy traffic flows past these sites, thus increasing their amenity value.

8.6.39 Subject to final archaeological assessment of the overall LITS, it is not thought that the occurrence of protected structures (buildings) within the study area will be an impediment to the development of any of the proposed Scenarios of the LITS.

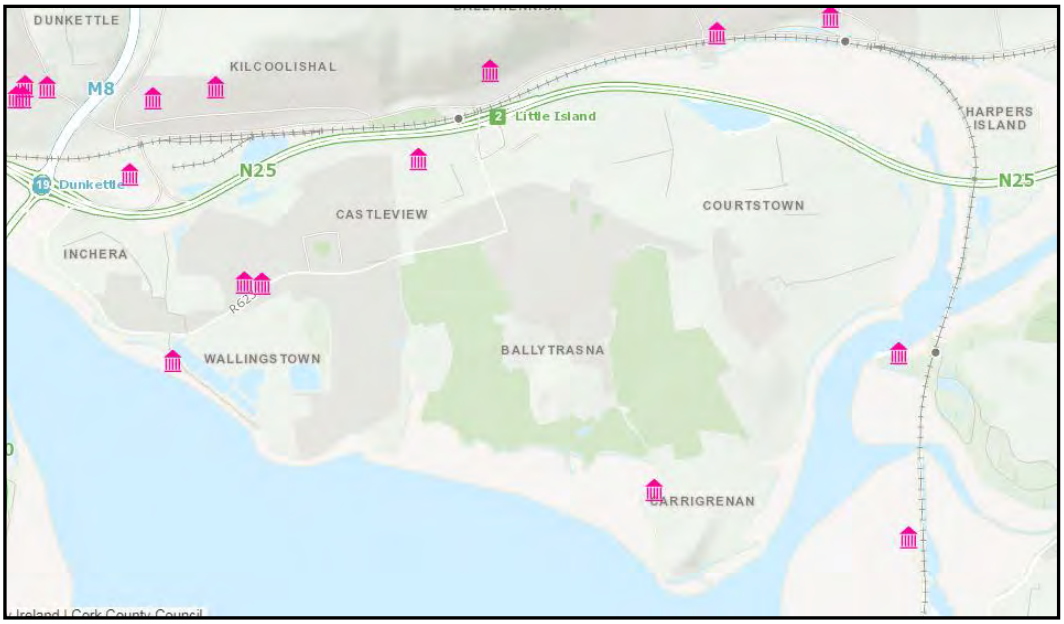


Figure 8.11 Protected structures within study area (Cork County Council, 2018)

8.6.40 Scenarios 1 and 2 (provision of road and interchange on the N25) have the potential for moderate adverse effects if impacting on known or unknown archaeological resources. A full archaeological assessment (geophysical survey / test trenching etc. – subject to DoEHLG approval) would be recommended in advance of any new development works associated

with this Scenario. It is not envisaged that any of Scenarios 3-5 will negatively impact on the Cultural Heritage of the LITS development area

8.6.41 Subject to final archaeological assessment of the overall LITS, it is not thought that the occurrence of protected structures (buildings) within the study area will be an impediment to the development of any of the proposed Scenarios of the LITS.

Summary

Scenarios 1 and 2 (provision of road and interchange on the N25) have the potential for moderate adverse effects if impacting on known or unknown archaeological resources.

It is not envisaged that any of the presented LITS Scenarios (1-5) will negatively impact on any buildings as listed within the Record of Protected Structures, or areas of Architectural Heritage.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Minimising impact on environmentally sensitive areas (archaeology)						

Assessment Summary

8.6.42 The following table provides an overview of the SEA results for the identification of the emerging preferred strategy.

Scenario	Environmental Assessment
Do Minimum	- Largely neutral from an Natural Environment Perspective
Scenarios 1 & 2	- Requires development of a 3rd interchange to the east of Little Island, and as such, are likely to significantly impact on the designated SACs and SPAs, with potential negative impacts on conservation objectives and the qualifying species of these sites; - Provision of new infrastructure has the potential for negative impacts on surface water and ground water and conflicts with the policies and programmes under the WFD; - Provision of new infrastructure presents potential adverse effects (e.g. increased development in areas which may flood, increased flood risk due to surface water run-off); and - the potential to negatively impact on the Landscape Character and Scenic Routes identified in the area.

Scenario	Environmental Assessment
Scenario 3	- Does not present potential for significant impacts on biodiversity, landscape, soils and geology, or cultural heritage; and - Involves road capacity upgrades within the confines of existing roads, and as such is unlikely to have any negative impacts upon the quality and status of surface and ground water.
Scenario 4	- Does not present potential for significant impacts on biodiversity, landscape, water, soils and geology, or cultural heritage.
Scenario 5	- Does not present potential for significant impacts on biodiversity, landscape, water, soils and geology, or cultural heritage; - Involves public transport priority measures and upgrades within the confines of existing roads, and as such is unlikely to have any negative impacts upon the quality and status of surface and ground water.

8.7 Summary

8.7.1 The previous sections provide an overview of the SEA and AA that is being undertaken in conjunction with the development of the LITS. It also provides the background for the environmental aspects to the evaluation framework developed to test the various proposed LITS strategy options. In Summary:

- The LITS has integrated all recommendations arising from the SEA and Appropriate Assessment (AA) processes into the Strategy;
- The Strategy facilitates significant improvements in sustainable mobility and associated positive effects relating to emissions to air (including greenhouse gas emissions and noise) and human health;
- The Strategic Environmental Assessment for the identification of the emerging preferred strategy has been presented. In Summary:
    - Scenarios 1 & 2 have the potential to have adverse impacts on the conservation objectives and qualifying interests of the Cork Harbour SAC and SPA; and
    - Scenarios 3, 4 and 5 involve road capacity upgrades and public transport priority measures within the confines of existing roads, and as such are unlikely to have any negative impacts on biodiversity, landscape, soils and geology, flooding or cultural heritage.

9. STRATEGY APPRAISAL

9.1 Introduction

9.1.1 This chapter outlines the comparative assessment of the five proposed transport strategies identified to support the sustainable growth of Little Island. These strategies are described in further detail previously in Chapter 7, and include the following:

- ***Do Minimum:*** reference case do minimum network with only committed future year transport schemes included i.e. the new Dunkettle Interchange;
- ***Scenario 1:*** additional Left-In/Left-Out third interchange on the N25 to the eastern side of Little Island;
- ***Scenario 2:*** additional full movements third interchange on the N25 to the eastern side of Little Island;
- ***Scenario 3:*** increased road capacity provided for access to Little Island at the R623 intersection in line with proposals identified in the 'Little Island Junction Capacity Assessment' Report prepared by ARUP Consulting Engineers;
- ***Scenario 4:*** public transport priority measures (e.g. bus lanes, advance signalling etc.) provided on Little Island with existing bus services routed through the island; and
- ***Scenario 5:*** public transport priority measures provided on Little Island with improved bus and rail services to the island.

9.1.2 All of the above scenarios have been tested through the Evaluation Framework described in Chapter 5 of this report. Key project objectives have been identified under the main criteria outlined in the Department of Transport's Common Appraisal Framework for Transport Projects and Programmes (March 2016). For each of these objectives, Key Performance Indicators were identified and used to measure the performance of the various LITS strategies. Further details on the objectives and related KPIs are provided in Chapter 5.

9.1.3 The following sections of this chapter provide an overview of the scenario test results for each of the identified objectives and KPIs. It should be noted that all scenarios have been tested in the forecast year 2040 (in-line with the planning and population forecasts recently published in the Draft National Planning framework Report), and were assessed relative to the 2040 Do Minimum scenario using the rating scale outlined in Table 9.1, overleaf.

Table 9.1 Assessment Rating Scale

Rating	Description
	Major Benefit: The proposal is expected to have a clear and considerable benefit or positive impact, which should be a principal consideration when assessing a proposals eligibility for funding
	Moderate Benefit: The proposal is expected to have a moderate benefit or positive impact, which taken in isolation may not determine a proposals eligibility for funding, but considered collectively may do so
	Minor Benefit: The proposal is expected to only have a minor benefit or positive impact, which is worth noting, but are not likely to contribute materially to determining whether a proposal is funded or otherwise
	Neutral: Overall, the proposal is expected to have neither a positive or negative impact
	Minor Disbenefit: The proposal is only expected to result in a minor negative impact, which is worth noting, but are not likely to contribute materially to determining whether a proposal is funded or otherwise
	Moderate Disbenefit: The proposal is expected to have a moderate negative impact, which taken in isolation may not discount a proposals eligibility for funding, but considered collectively may do so
	Major Disbenefit: The proposal is expected to have a clear and considerable negative impact, which depending on its severity, should be a principal consideration when assessing a proposals eligibility for funding

9.2 Economic

9.2.1 The identified economic study objective is to:

Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network.

9.2.2 The following three KPIs were used to measure the performance of the various strategy measures in achieving this economic objective, namely:

- Network wide delay/queuing;
- Journey times by car and public transport; and
- Cost of proposals

Network Wide Delay/Queuing

9.2.3 The ability to access Little Island has a significant impact on its economic performance and growth. Large levels of traffic congestion can adversely affect:

- The ability of existing businesses to retain and recruit new staff;
- The attractiveness of Little Island as a location for new business;

- Journey times for delivery vehicles leading to increased transport costs etc.

9.2.4 To assess the impact of the proposed scenarios on network delay in the forecast year, volume over capacity ratios (V/C) were extracted for key junctions in Little Island, illustrated in Figure 9.1, using the Local Area Model. Volume over capacity is a commonly used index to assess the performance of junctions, and in general, a V/C of greater than 100% means that demand through the junction exceeds capacity leading to significant congestion and delay. Typically, junctions with V/C in excess of 85% are regarded as suffering from traffic congestion.

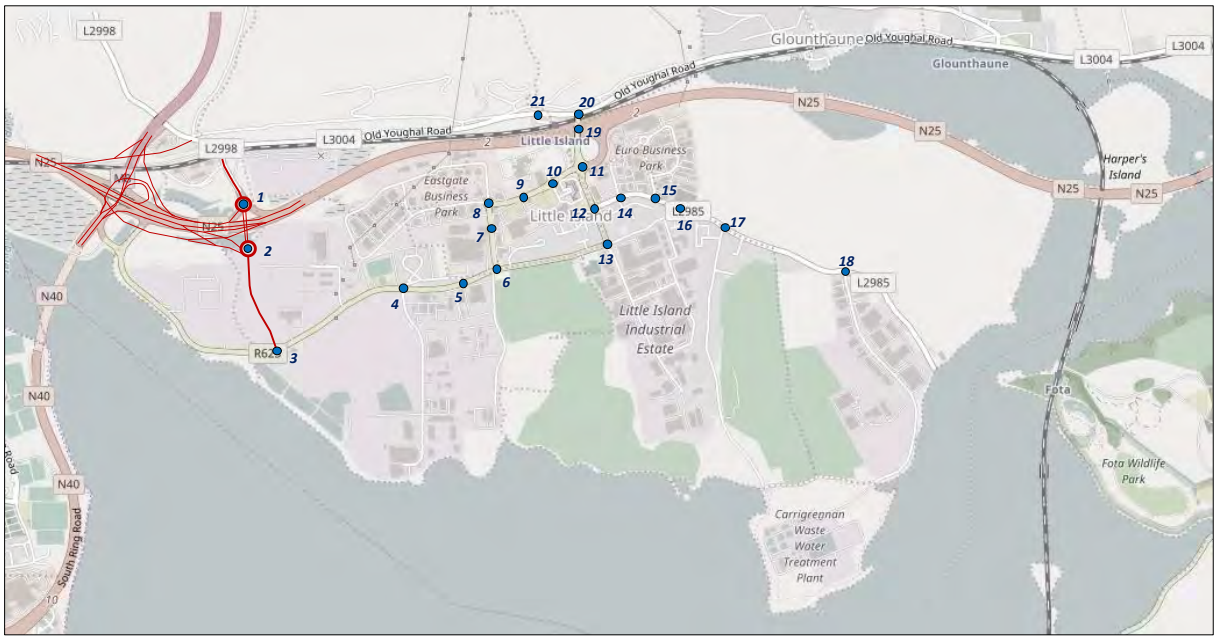


Figure 9.1 Volume over Capacity Assessment Locations

9.2.5 For each of the test scenarios, the turning V/C has been extracted for all junctions illustrated in Figure 9.1, and the results are detailed in Table 9.2 and Table 9.3 below.

Table 9.2 AM Turning V/C Results

V/C (%)	Do Min	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
<50	133	136	142	141	134	134
>50 & <85	13	13	15	11	13	13
>85 & <100	6	5	6	3	5	5
>100	12	10	1	9	12	12
% > 85%	***11%***	***9%***	***4%***	***7%***	***10%***	***10%***

Table 9.3 PM Turning V/C Results

V/C (%)	Do Min	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
<50	131	145	148	142	132	136
>50 & <85	12	13	13	12	14	12
>85 & <100	1	2	3	4	2	4
>100	20	4	0	6	16	12
% > 85%	***13%***	***4%***	***2%***	***6%***	***11%***	***10%***

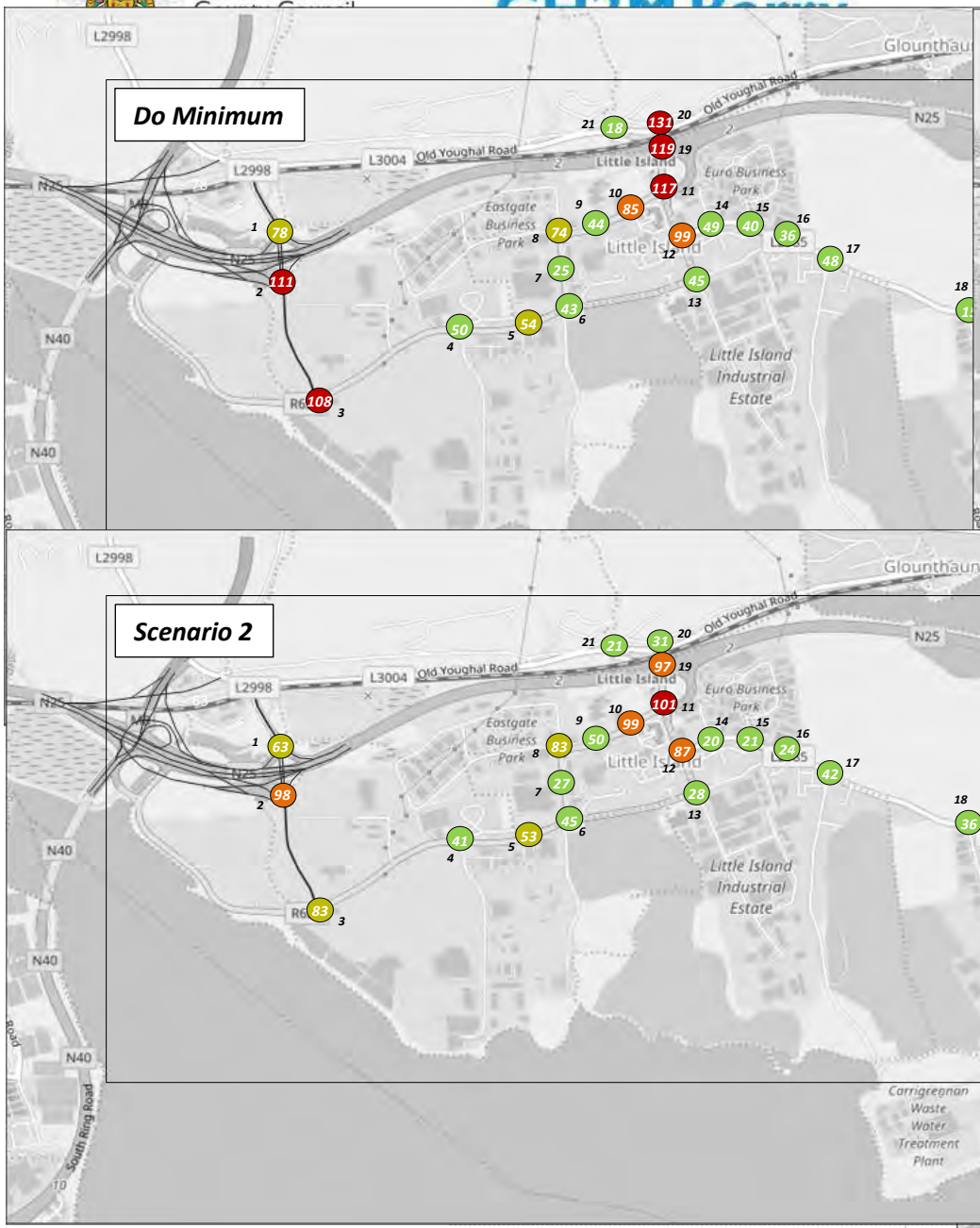
9.2.6 The results indicate that Scenario 2 (Full Movements 3rd Interchange) performs the best in the AM and PM peak periods in terms of reducing the number of junctions operating over capacity. The availability of a 3rd entry and exit point onto the N25 reduces the number of vehicles that need to travel via the existing interchange thus improving congestion in this area.

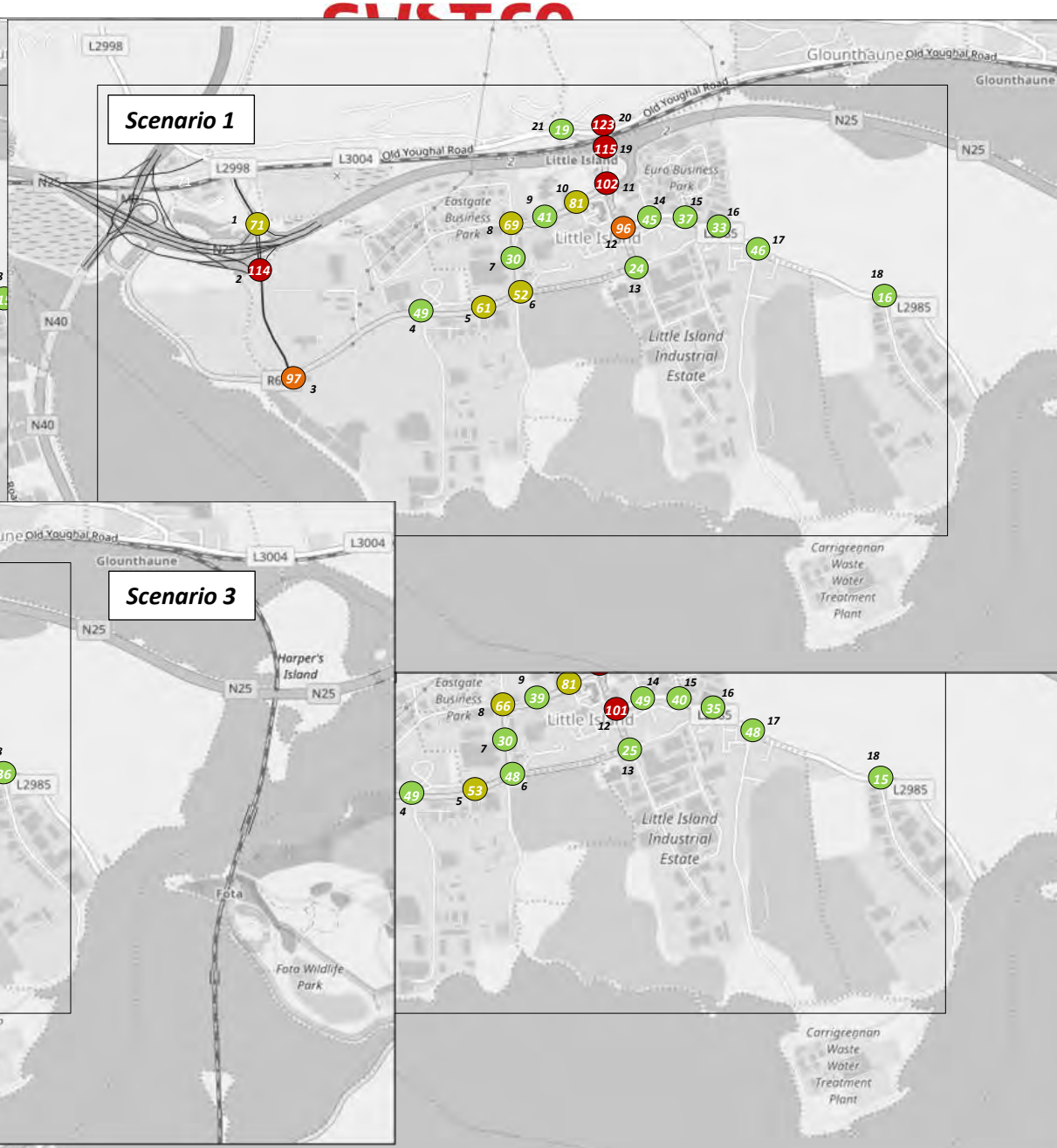
9.2.7 Scenarios 1 and 3 perform comparably well in terms of reducing the number of junctions over capacity. Scenario 3 (ARUP Capacity Enhancements) provides additional road capacity at the current N25 interchange thus facilitating a reduction in congestion in this area, particularly in the AM peak hour (08:00-09:00).

9.2.8 Scenario 1 (Left-In/Left-Out 3rd Interchange) allows traffic to exit Little Island in a westbound direction and enter from the east. This option doesn't perform as well as the full movements interchange in scenario 2, and the results indicates that it provides most benefits in the PM peak hour (17:00-18:00). This is due to the fact that the majority of people entering Little Island in the AM, and exiting in the PM, are from the west. Therefore, in the AM peak, as the 3rd interchange only facilitates entry from the east, the majority of traffic accessing Little Island from the west still need to use the existing N25 interchange. In the PM, however, the majority of traffic are travelling westward and can use the new Left-In/Left-out junction to access the N25 directly thus removing traffic from the existing interchange.

9.2.9 Figure 9.2, overleaf, displays the maximum turning V/C for a number of junctions in Little Island in the AM Peak hour for the Do Minimum reference and Scenarios 1, 2 and 3. It should be noted that maximum turning V/C should not be used as an absolute determination as to whether a junction is operating adequately. A number of other factors need to be considered including the volume of traffic making the movement that is over capacity, the level of delay and queueing occurring etc. However, the maximum V/C is a good indicator of where the network may be coming under pressure and operating close to capacity, and can be used as a comparative assessment to show where one network may be performing better than another.

9.2.10 In the AM peak, traffic surveys, site visits and public consultation responses indicate that the N25 off slip in an eastbound direction is the main source of congestion leading to increased journey times. The results in Figure 9.2 suggest that Scenario 2 (Full Movements Interchange) and Scenario 3 (ARUP Capacity Enhancements) will significantly decrease the V/C at this location (Junction 19) when compared to the reference Do Minimum, thus assisting in reducing congestion and delay for traffic entering Little Island in the AM peak.


Do Minimum
L2998
L3004
Old Youghal Road
N25
N40
Little Island
Euro Business Park
Eastgate Business Park
Little Island Industrial Estate
R6
Glounthaune


Scenario 1
L2998
L3004
Old Youghal Road
N25
N40
Little Island
Euro Business Park
Eastgate Business Park
Little Island Industrial Estate
Glounthaune
L2985
Carrigreenan Waste Water Treatment Plant

Scenario 2
L2998
L3004
Old Youghal Road
N25
N40
Little Island
Euro Business Park
Eastgate Business Park
Little Island Industrial Estate
Glounthaune
L2985
Carrigreenan Waste Water Treatment Plant
South Ring Road

Scenario 3
L3004
N25
Harper's Island
Fota
Fota Wildlife Park
Little Island Industrial Estate
L2985
Carrigreenan Waste Water Treatment Plant

9.2.11 The results in Table 9.2 and Table 9.3 above, indicate that the public transport focussed Scenarios 4 and 5 provide a relatively minor benefit in terms of reducing the number of junctions operating over capacity. Both of these scenarios include no update to the Do Minimum road network and varying levels of improvement in public transport provision. The provision of additional public transport services and facilities does assist in reducing the car mode share for Little Island (see Section 9.3 for further details), thus reducing the number of cars accessing/egressing in the AM and PM peaks. This reduction in car demand has a positive impact when compared to the Do Minimum, however, the shift to public transport is not substantial enough to provide comparable benefits to scenarios which include road capacity upgrades (i.e. Scenarios 1, 2 and 3).

Summary

Overall, it is considered that Scenario 2 (Full Movements Interchange) performs the best in terms of reducing the number of junctions operating over capacity. Scenario 1 (Left-In/Left-Out) and Scenario 3 (ARUP Capacity Enhancements) perform comparably well and do provide a substantial benefit when compared with the operation of the Do Minimum reference network. Scenarios 4 and 5 represent the public transport proposals and the results indicate that they provide a relatively minor benefit in terms of reducing the number of junctions operating over capacity.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network	Network wide delay/queueing						

Journey Times by car and public transport

9.2.12 As noted in the previous section, access to Little Island can have a significant impact on its economic growth, and high levels of congestion with long journey times can jeopardise its position as a Strategic Employment Centre. An assessment of access journey times to/from Little Island was carried out for both the private car and public transport to investigate how the various scenarios performed versus the Do Minimum reference case. A key objective of this study is to support the sustainable future growth of Little Island and, as such, the analysis has not focused solely on the private car. It is important that the proposed LITS strategy will facilitate quicker and easier access for all people, including those that may not have access to a car.

Car

9.2.13 Journey times by car to and from Little Island in the AM (08:00-09:00) and PM peak hours (17:00-18:00) have been extracted from the forecast year Local Area Model for each of the test scenarios. The analysis focused on the key routes where congestion is experienced in the AM and PM illustrated in Figure 9.3.

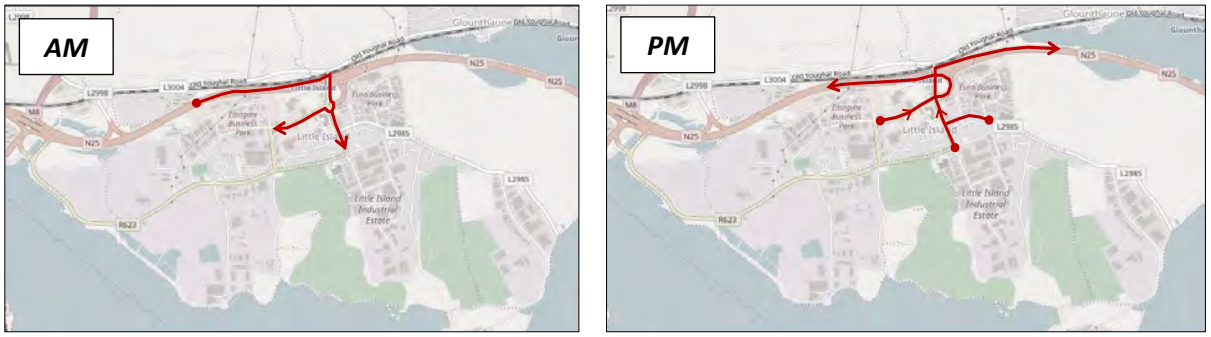


Figure 9.3 Key Routes for Journey Time Analysis

9.2.14 The average journey time along each route has been compiled for the five test scenarios to identify the overall percentage change when compared to the reference case Do Minimum, and the results are provided in Table 9.4.

Table 9.4 Average Car Journey Time Assessment

Scenario	AM % Change	PM % Change
Scenario 1	-13%	-34%
Scenario 2	-59%	-58%
Scenario 3	-32%	-32%
Scenario 4	-8%	-2%
Scenario 5	-21%	-29%

9.2.15 The results indicate that Scenario 2 (Full Movements Interchange) provides the greatest reduction in journey times for vehicles travelling to/from Little Island in the AM and PM peak hours. As noted in the V/C analysis previously, the availability of the 3rd interchange reduces the volume of traffic which are required to use the existing N25 junction, thus positively impacting on congestion and delay leading to reduced journey times.

9.2.16 In the PM peak hour, Scenario 1 (Left-In/Left-Out Interchange) and Scenario 3 (ARUP Capacity Enhancements) provide comparable reductions in journey times with a significant benefit experienced when compared to the Do Minimum. The increased capacity in Scenario 3 along the existing N25 junction, An Crompán Roundabout and the Ballytrasna park junction corridor facilitates a reduction in traffic congestion versus the reference case and a decrease in travel times. In the PM, the Left-In/Left-Out junction is of significant benefit as a substantial proportion of traffic leaving Little Island are travelling westbound. The Left-Out arrangement means that traffic can utilise this junction to access the N25 reducing the number of vehicles that need to use the existing N25 interchange.

9.2.17 In the AM peak hour, Scenario 3 provides substantially higher journey time savings than Scenario 1. This is due to the fact that the majority of traffic entering Little Island in the AM is from the West. Due to the nature of the Left-In/Left-Out junction, this traffic must continue to use the existing N25 interchange to access Little Island. It was noted that some traffic may

decide to continue on the N25, turn at Cobh Cross and use the Left-In junction arrangement to access Little Island in Scenario 1. However, the modelling analysis suggests that almost no vehicles undertake this manoeuvre with people willing to wait on the N25 off-slip to access Little Island.

9.2.18 Interestingly, Scenario 5 (Full PT) provides considerable journey time savings in both the AM and PM peaks. This scenario includes for a number of high quality, high frequency bus services to be routed on-island with priority given to improve journey times. As detailed in Section 9.3 later in this chapter, Scenario 5 facilitates a significant shift (approx. 6%) of people from car to public transport. This reduction in car demand positively impacts on congestion and delay leading to improved journey times.

9.2.19 Similarly, Scenario 4 includes for improvements to public transport, however, not to the same extent proposed in Scenario 5. In Scenario 4, exiting bus services are routed on-island with priority given to public transport services. However, as the public transport offering is not as frequent and wide-spread in this scenario, less people switch away from the car. As such, Scenario 4 provides improved journey times over the reference case Do Minimum, but the shift to public transport is not significant enough to provide comparable results to Scenario 5.

Summary

Overall, Scenario 2 (Full Movements Interchange) performs the best in terms of reducing car journey times to/from Little Island in the AM and PM Peak Hours. Scenario 1 (Left-In/Left-Out) and Scenario 3 (ARUP Capacity Enhancements) provide comparable results in the PM peak. In the AM, Scenario 3 performs considerably better than Scenario 1 due to the increased capacity along the N25 Interchange, An Crompán and Ballytrasna Park junction corridor. The mode shift to public transport in Scenario 5 (Full PT) leads to reduced car demand on the network thus positively impacting on journey times versus the Do Minimum. Scenario 4 sees a minor improvement in travel times versus the reference case, however, the shift to public transport is not significant enough to provide comparable results to Scenario 5.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network	% Change in Journey Times						

Public Transport

9.2.20 For assessing travel by public transport, this study has focused on overall perceived travel costs rather than concentrating on journey times. The reason for this is that perceived travel costs reflect all aspects of public transport use, including:

- Journey Time;
- Wait time at the bus stop/train station;
- Walk time to access the bus/train;
- Fare paid etc.

9.2.21 The SWRM public transport assignment analyses all public transport journeys in the region and calculates a 'cost of travel' for all passengers. This is composed of the elements outlined above and is the key factor in a person's choice in whether to use public transport or not. This 'cost of travel' has been extracted from the model for all journeys to/from Little Island. For ease of analysis, the results have been grouped at a sector level covering key origins and destinations of travel. Figure 9.4 – Figure 9.6 below illustrate the percentage change in travel costs by public transport to Little Island versus the Do Minimum reference case for each of the five scenarios. Please note, in order to keep this report concise, only results for travel to Little Island in the AM are presented, however similar figures for origin trips in the PM peak are provided in Appendix A of this report.

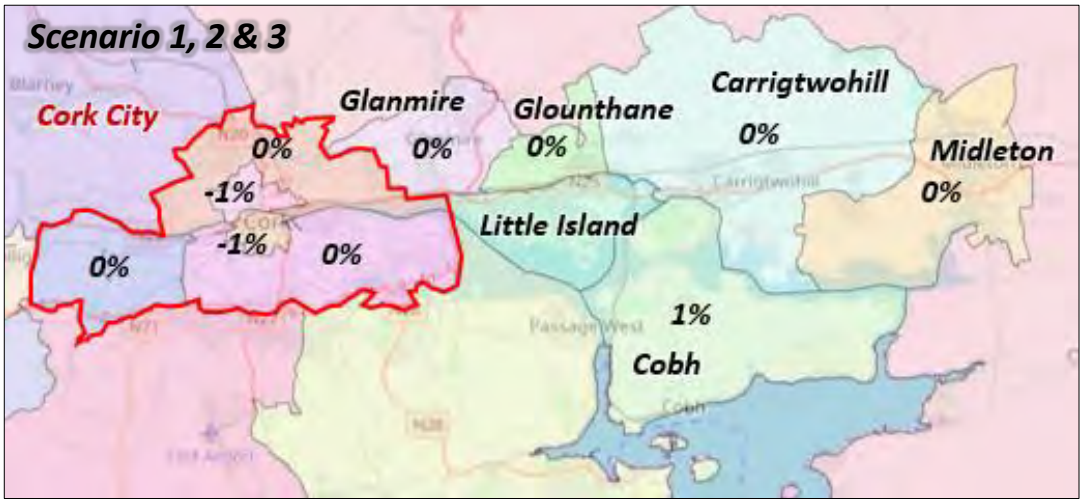


Figure 9.4 Scenarios 1, 2 & 3 % Change in Public Transport Travel Costs versus Do Minimum

9.2.22 Scenarios 1 (Left-In/Left-Out), Scenario 2 (Full Movements Interchange) and Scenario 3 (ARUP Capacity Enhancements) do not include any proposed improvements to the public transport network. As such, the cost of travel by public transport remains unchanged from the reference case.

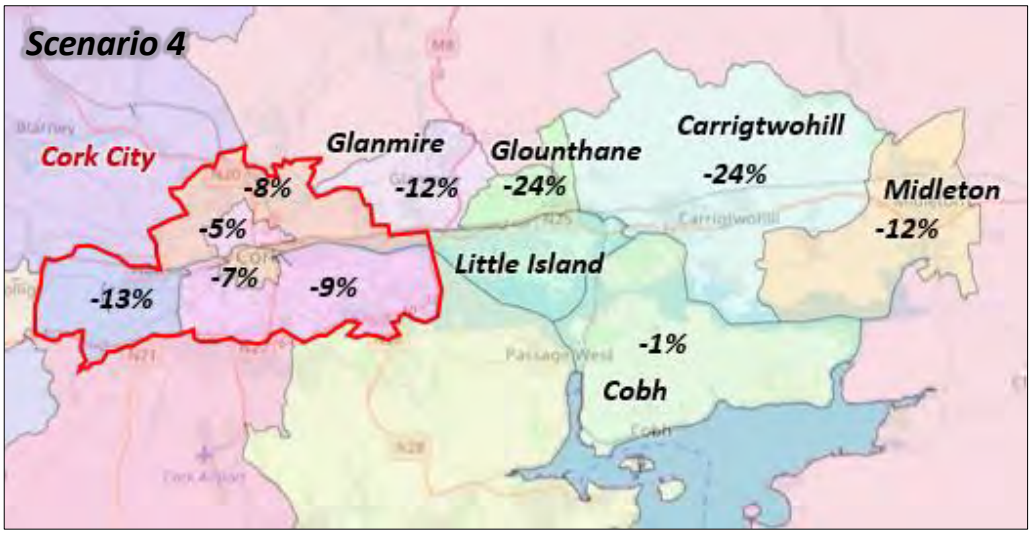


Figure 9.5 Scenarios 4 % Change in Public Transport Travel Costs versus Do Minimum

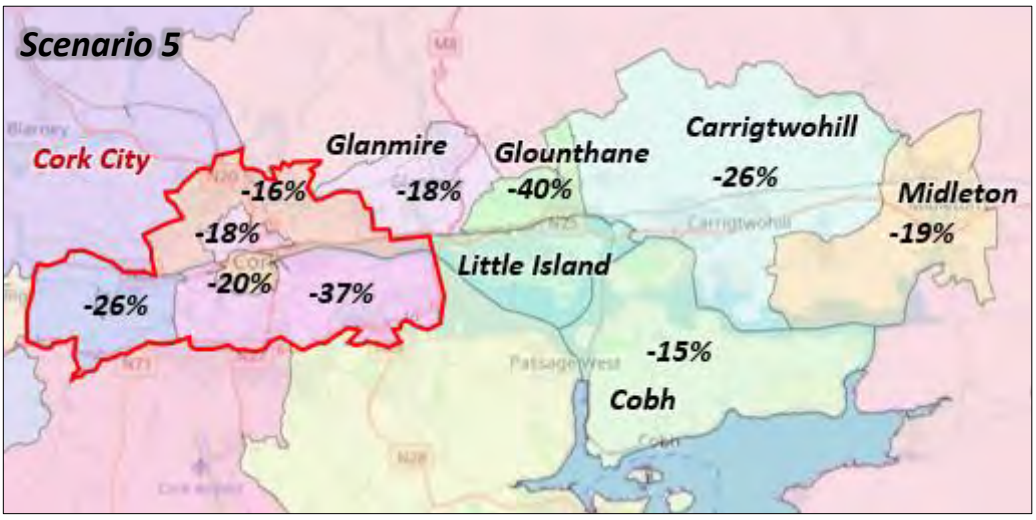


Figure 9.6 Scenarios 5 % Change in Public Transport Travel Costs versus Do Minimum

9.2.23 Scenario 5 (Full PT) displays the highest reductions in public transport travel costs due to the inclusion of a host of improvement measures including:

- New high frequency bus services operating to Little Island;
- Re-routing of existing bus services through the island to better serve residential and employment locations;
- Creation of public transport priority on-island reducing journey times;
- Linking the commuter rail service from Cobh/Midleton to Mallow direct without interchange at Kent Station; and
- The provision of a shuttle bus service operating on-island to key employment locations supporting park and ride.

9.2.24 Scenario 4 has improved travel costs versus the Do Minimum primarily due to the inclusion of public transport priority measures and the routing of existing bus services on-island. This facilitates shorter walking distances and journey times for services operating to/from Little Island versus the Do Minimum Scenario.

Summary

Scenario 5 (Full PT) provides the greatest reduction in public transport travel costs due to the inclusion of a range of improvement measures. Scenario 4 only includes some minor upgrades to the public transport network, and as such, does not provide a comparable level of travel cost reduction to Scenario 5. Scenarios 1, 2 and 3 do not include any proposed improvements to the PT network, and as such, travel costs remain unchanged from the reference case.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network	% Change in PT Travel Costs						

Cost of Proposals

9.2.25 Whilst it is beyond the scope of this initial strategic assessment to carry out a full cost/benefit analysis, it is important to ensure value for money and take cognisance of the proposed level of costs required for delivery of each scenario. Table 9.5 details the infrastructure requirements for each of the five test scenarios including a high-level estimate of costs.

Table 9.5 Cost of Proposals

Scenario	Requirement	Cost (€m)
Scenario 1	Requires construction of a new link road circa 750metres with left in-left out arrangement on the N25	1.5[4]
Scenario 2	Requires construction of a grade separated interchange on the N25, plus a new link road circa 750metres	15.5
Scenario 3	Requires improvement works along the N25 flyover, Eastgate Avenue and the R623 to Ballytrasna Park junction	0.5
Scenario 4	Requires acquisition of properties for construction of public transport priority measures along the R623	1
Scenario 5	Requires acquisition of properties for construction of public transport priority measures along the R623 plus investment in new Park and Ride (P&R) and Little island Shuttle Bus Service	2.5[5]

[4] Cost estimates for scenarios 1, 2 and 3 have been extracted from Spon's "Civil Engineering and Highway Price Book" based on the proposed upgrades. Note that these include construction costs only and do not account for potential land acquisition costs.

[5] For Scenarios 4 and 5, cost of infrastructure measures (e.g. bus lanes) have been extracted from Spon's "Civil Engineering and Highway Price Book". A high level price estimate for the acquisition of lands and provision of additional bus services has been obtained from on-line desktop research.

9.2.26 Scenario 2 has substantially higher capital costs than all other scenarios. The construction of a full movements 3rd interchange is costly in itself, however, the proposed location may also cause a number of complications and cost risks due to existing environmentally sensitive areas. The Left-In/Left-Out arrangement of the 3rd interchange (Scenario 1) should be able to be delivered for a reduced cost when compared to Scenario 2, however, there still may be potential issues with the proximity of environmentally sensitive lands.

9.2.27 Scenario 4 and 5 require the acquisition of land and properties for the construction of public transport priority measures along the R623. Also required in Scenario 5 is investment in new high frequency bus services, a Little Island Shuttle Bus and new Park and Ride facilities.

9.2.28 The capacity enhancement proposals in Scenario 3 include the removal of footpaths, widening of carriageway widths, replacement of kerbing etc. and should be able to be delivered for a relatively low cost (when compared to the other scenarios).

Summary

The high level assessment shows that Scenario 2 would have substantially higher costs compared to all other scenarios. Scenarios 1, 4 and 5 all contain high cost elements, however, overall they should be considerably less expensive than Scenario 2. Scenario 3 could be delivered for the lowest cost as it only requires relatively minor network upgrades.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network	Cost of Proposals						

9.3 Safety and Physical Activity

9.3.1 The identified Safety and Physical Activity study objective is to:

Develop a safe and healthier transport network for all transport modes and users.

9.3.2 The following two KPIs were used to measure the performance of the various strategy measures in achieving this objective, namely:

- Change in vehicle emissions particularly those that cause higher health risks; and
- Sustainable transport mode share.

Change in Vehicular Emissions

9.3.3 Vehicular emissions are composed of varying amounts of:

- water vapor;
- carbon dioxide (CO2);
- Nitrogen;
- Oxygen;
- pollutants such as: carbon monoxide (CO), nitrogen oxides (NOx), unburned hydrocarbons (UHCs) and particulate matter (PM).

9.3.4 In order to assess the impact of each scenario, vehicular emissions have been extracted from the SATURN local area model. Table 9.6 displays the percentage change in vehicular emissions for the combined AM and PM peak periods when compared to the Do Minimum scenario.

Table 9.6 % Change in Vehicular Emissions

Measurement	Scenario1	Scenario2	Scenario3	Scenario4	Scenario5
% Change in vehicular Emissions	-8%	-10%	-4%	0%	-5%

9.3.5 The results indicate that Scenario 2 (Full Movements Interchange) performs the best in terms of reducing overall vehicular emissions. Transport emissions are directly related to fuel consumption which increases at lower speeds in congested networks. As outlined previously, Scenario 2 experiences a significant reduction in congestion on the road network versus the Do Minimum scenario, and this is reflected in the vehicular emission results.

9.3.6 Scenario 5 (Full PT) performs well with an approximate five percent reduction in emissions. This is essentially due to the Increased sustainable mode share which means that there is a reduction in cars on the road network leading to less congestion and emissions when compared to the Do Minimum.

9.3.7 Scenario 3 (ARUP Capacity Enhancements) provides a positive reduction in vehicular emissions and improves journey times on some key routes entering and exiting Little Island in the AM and PM peaks. However, due to the increased road capacity, more traffic re-routes along the N25 Flyover, An Crompán Roundabout and Ballytrasna Park Junction corridor. This leads to knock on congestion at other areas of the network trying to access this corridor in the AM and PM peaks. This is predominantly the reason why Scenario 3 does not perform as well as Scenario 1 (Left-in/Left-Out Interchange).

9.3.8 Scenario 4 includes minor public transport upgrades, but as described previously, the shift to public transport in this scenario is not significant enough to substantially improve the operation of the road network in the future year. As a result there is almost no change in vehicular emissions experienced when compared to the 2040 Do Minimum.

Summary

Scenario 2 (Full Movements Interchange) performs best in terms of reducing vehicular emissions in Little Island. Scenario 1 (Left-In/Left-Out interchange) performs well with an approximate 8% decrease in emissions predominantly due to the reduction in congestion experienced in the PM peak hour. Scenarios 3 and 5 have comparable results with considerable improvements in emissions when compared to the Do Minimum. Scenario 4 does not provide enough of a mode shift to substantially improve vehicular emissions.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Develop a safe and healthier transport network for all transport modes and users	% Change in Vehicular Emissions, particularly those that cause higher health risks						

Sustainable transport mode share

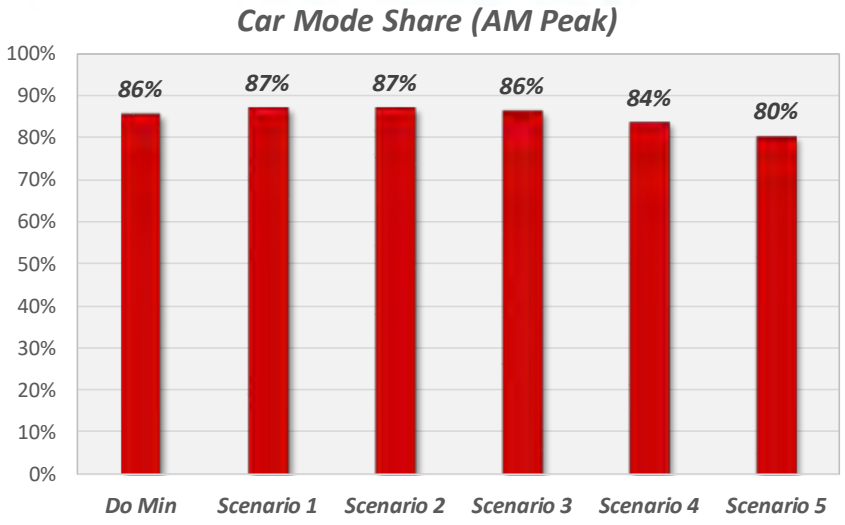
9.3.9 One of the key objectives of the LITS is to support the sustainable growth of Little Island. Improving facilities for walking, cycling and public transport, and attracting more people to use these modes can have a number of benefits, including:

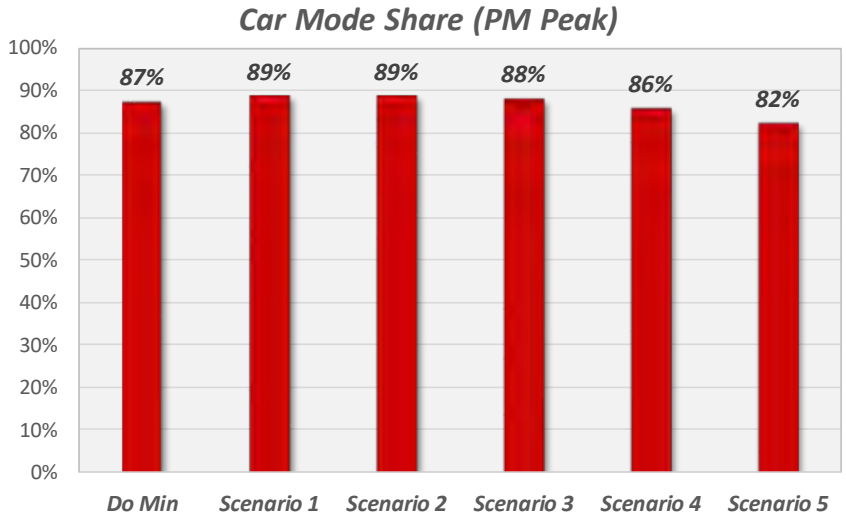
- Improved health for residents and employees on Little Island through increased level of exercise including walking and cycling;
- Reduced number of cars on the road network leading to less congestion, safer environment for walking and cycling and a decrease in vehicular emissions.

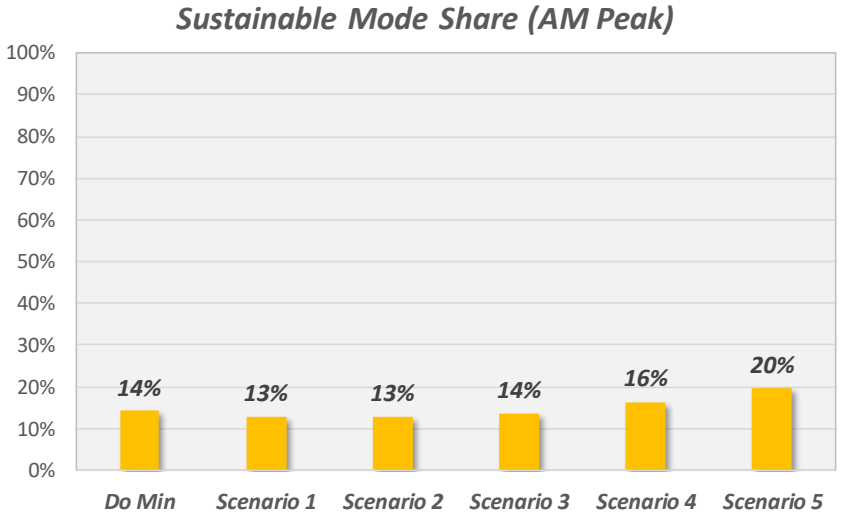
9.3.10 The mode share for all travel to and from Little Island in the AM and PM peaks have been extracted from the SWRM, and the results are illustrated in Figure 9.7, overleaf. The results indicate that Scenario 5 (Full PT) provides the largest sustainable transport[6] mode share (20% in the AM and 18% in the PM) with a subsequent 6% reduction in car mode share versus the Do Minimum Scenario in the AM, and 5% reduction in the PM. This represents a significant shift in mode share to sustainable travel given the constraints provided at Little Island such as:

- The dispersed nature of travel to/from Little Island which can be difficult to service via public transport;
- The availability of free car parking which supports use of the private car; and
- The relatively short commute times in Cork in general which can be difficult to match via public transport.

[6] Sustainable transport covers walking, cycling and public transport







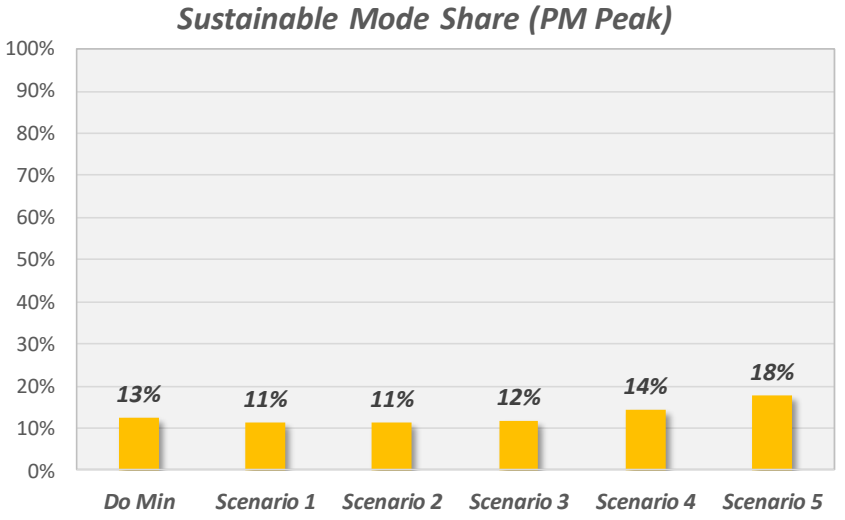


Figure 9.7 Mode Share Analysis

9.3.11 Albeit starting from a low position, public transport mode share doubles in Scenario 5 (Full PT) versus the Do Minimum reference case. This is extremely encouraging and is predominantly due to the range of improvement measures proposed in the future year including:

- The provision of high frequency bus services operating on Little Island;
- Routing of existing bus services on-island providing quicker access to employment and residential locations;
- The inclusion of a high frequency shuttle bus service promoting park and ride;
- The provision of public transport priority on-island supporting improved travel times etc.

It is envisaged that with the implementation of further demand management measures (e.g. reduced parking availability, parking charges etc.) this public transport mode share would increase even further. It should be noted that all scenarios will include improvements to walking and cycling infrastructure on-island. These measures have not been included in this strategic assessment, however, they will be outlined in detail in final LITS strategy.

9.3.12 Scenario 4 includes for public transport priority improvements with existing bus services routed on-island. However, the results indicate that these measures provide a relatively minor increase in sustainable mode share.

9.3.13 Scenarios 1 (Left-In/Left-Out Interchange), 2 (Full Movements Interchange) and 3 (ARUP Capacity Enhancements) all include upgrades to the road network with no associated change in public transport measures. The results in Figure 9.7 indicate that these scenarios experience an increase in car mode share and a decrease in sustainable travel. This represents a worrying trend with development in Little Island continuing in an unsustainable manner. Therefore, if improvements are only made to the road network, it is envisaged that at some stage in the future the additional road capacity made available will be used up by unsustainable travel to new developments in Little Island, thus leading to congestion and delay.

Summary

Scenario 5 (Full PT) provides the largest sustainable transport mode share. Scenario 4 includes for improvements to public transport, however, these are not substantial enough to provide a significant shift away from the private car. Scenarios 1 (Left-In/Left-Out Interchange), Scenario 2 (Full Movements Interchange) and Scenario 3 (ARUP Capacity Enhancements) all experience an increase in car mode share leading to unsustainable growth in Little Island.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Develop a safe and healthier transport network for all transport modes and users	Sustainable Transport Mode Share						

9.4 Environmental

9.4.1 The identified Environmental study objective is to:

> **Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island.**

9.4.2 The following two KPIs were used to measure the performance of the various strategy measures in achieving this Environmental objective, namely:

- Minimising impact on environmentally sensitive areas; and
- Reduce traffic congestion on Little Island.

Minimising impact on environmentally sensitive areas

9.4.3 It should be noted that an Appropriate Assessment (AA) and Strategic Environmental Assessment (SEA) have been carried simultaneously with the development and evaluation of the emerging preferred LITS strategy. Further information on this, including results and recommendations are outlined in detail in Chapter 8 of this report, together with accompanying draft Environmental Report and Appropriate Assessment Screening Report.

9.4.4 The SEA assessed the scenarios presented within the LITS across a range of environmental headings, in accordance with the SEA Directive, and relevant legislation. The findings of the SEA have been integrated into this report as follows:

- Aspects relating to Population, Human Health, Air & Climate have been integrated into the **Safety and Physical Activity** criteria outlined in Section 9.3 above;
- Aspects relating to Material Assets has been integrated into the **Economic** criteria assessment (Section 9.2); and
- Aspects relating to Biodiversity (Flora & Fauna), Water, Landscape, Cultural Heritage, Soil are presented Chapter 8 of this report.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Minimising impact on environmentally sensitive areas						

Reduce traffic congestion on Little Island

9.4.5 Vehicular emissions which are harmful to the environment are directly related to fuel consumption which increases at lower speeds in congested networks. Analysis was undertaken of congestion and queueing across the entire Little Island study are under each of the test scenarios, and the results are provided in Table 9.7.

Table 9.7 % Change in Total Queuing (AM and PM Peaks)

Measurement	Scenario1	Scenario2	Scenario3	Scenario4	Scenario5
% Change in Total Queuing	-22%	-40%	-15%	-2%	-15%

Scenario 2

9.4.6 The results indicate that Scenario 2 (Full Movements Interchange) provides the greatest reduction in queuing on the Little Island network. Figure 9.8, overleaf, is extracted from the SATURN local Area Model and illustrates the main areas experiencing delay in the AM and PM peak hours. It should be noted that the bandwidths represent level of delay with wider bands indicating higher levels of congestion. Only areas experiencing the highest levels of delay in the Local Area Model have been highlighted to allow a quick visual comparative between scenarios. All values displayed represent average delay per vehicle in seconds.

9.4.7 As illustrated in Figure 9.8, the main areas of congestion and queuing in the AM peak are entering Little Island from the N25 slip roads and at the Ballytrasna Park junction. It should be noted that the Glounthane Road is illustrated has having very high levels of congestion. This may be an overestimation due to the way SATURN models queuing and delay. Essentially queuing southbound at the N25 interchange heading into Little Island causes traffic to block back into the junction between the Glounthane Road and the R623. This is reflective of reality, however, in situations like this SATURN cannot fully reflect driver behaviour and, as such, can lead to an overestimation of queuing. This junction is not seen as critical in determining the appropriate strategy for Little Island and the way that delay is modelled in SATURN is appropriate for this high level comparative assessment. Further analysis of this junction, and its operation in relation to nearby junctions will be modelled in further detail using micro-simulation during analysis of the preferred LITS strategy.

Figure 9.8 Do Minimum and Scenario 2 Delay Plot AM and PM Peak Hours

9.4.8 In the PM peak, the model suggests that the area experiencing the worst congestion and delay is exiting the island along the N25 Flyover, An Crompán Roundabout and Ballytrasna Junction corridor.

9.4.9 The results in Figure 9.8 indicate that the introduction of the new full movements interchange significantly reduces congestion and delay experienced on the Little Island road network in both the AM and PM peak periods. The availability of another access to the N25, significantly reduces the traffic volumes utilising the existing interchange, thus substantially decreasing congestion and delay in this area. Figure 9.9 illustrates a 'Select Link Analysis[7]' (SLA) in the PM peak hour for traffic originating in a zone to the northeast of Little Island which has been highlighted for employment growth. Please note that results are displayed in bandwidths for visual purposes, with the wider band representing higher levels of traffic volume. The results illustrate that in Scenario 2, almost all traffic accessing the N25 from this zone use the new full movements interchange, whereas in the Do Minimum scenario this traffic is forced to utilise the existing N25 interchange or the upgraded Dunkettle exit.

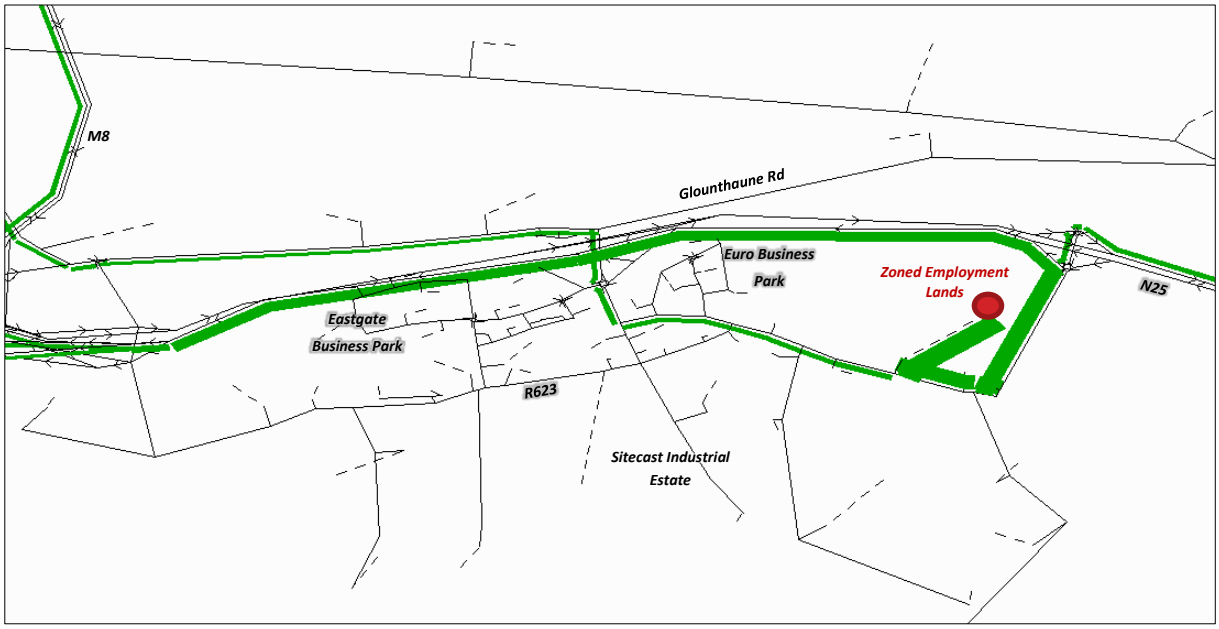


Figure 9.9 Scenario 2 Select Link Analysis PM peak

Scenario 1

9.4.10 Scenario 1 provides the 2nd highest reduction in overall queueing across the AM and PM time periods. However, the majority of benefits of this scenario are experienced in the PM peak. Figure 9.10, overleaf, illustrates delay plots for Scenario 1 in the AM and PM peak hours compared to the Do Minimum scenario. The results indicate that the Left-In/Left-Out junction arrangement does little to reduce the queuing and delay experienced on the current N25 eastbound off-slip in the AM peak. This is due to the fact that the majority of traffic entering Little Island in the AM are travelling from the west, and due to the Left-In/Left-Out arrangement, this traffic must continue to use the existing N25 interchange.

[7] Select Link Analysis is a function in SATURN which traces the route undertaken by traffic passing a specific location or from a defined origin/destination.

Figure 9.10 Do Minimum and Scenario 1 Delay Plot AM and PM Peak Hours

9.4.11 Scenario 1 does facilitate a substantial reduction in traffic congestion on the N25 westbound off-slip in the AM peak hour. This is due to the availability of the new interchange further east allowing traffic to enter Little Island, thus reducing volumes using the existing N25 off-slip.

9.4.12 In the PM peak hour, Scenario 1 displays a significant reduction in delay along the Ballytrasna Park road accessing the junction with the R623. This is due to the fact that the traffic exiting from Euro Business Park and employment lands to the east of Little Island can use the new 'Left-Out' interchange. However, similar levels of delay are still experienced on the N25 flyover for traffic travelling eastbound. Due to the Left-In/Left-Out arrangement of the new junction, eastbound traffic must continue to use the existing N25 interchange.

Scenario 3

9.4.13 Scenario 3 includes capacity enhancements along the N25 Flyover, An Crompán Roundabout and Ballytrasna Park junction corridor to improve access and egress from Little Island in the peak hours. The results in Table 9.7 above indicate that the proposed upgrades significantly improve congestion and delay when compared to the Do Minimum scenario (approx. 15% reduction in total queuing). Figure 9.11, overleaf, illustrate delay plots in the AM and PM peak hours compared to the Do Minimum scenario. As with all results presented previously, only the areas experiencing the most congestion are plotted.

9.4.14 The inclusion of a second right turning lane on the N25 eastbound off-slip, and widening of the bridge accessing Little Island to two receiving lanes, significantly reduces delay at this location (approx. 70% reduction in delay per vehicle on the N25 off-slip). However, the results suggest that the reduction in delay, and additional capacity, attract a larger volume of traffic to use this interchange to access Little Island in the AM. The Local Area Model indicates an approximately 40% increase in traffic demand travelling southbound on the N25 flyover in Scenario 3 (1,643 pcus in Scenario 3 versus 1,178 in the Do Minimum). This increase in traffic in a southbound direction negatively impacts on the performance of An Crompán Roundabout. This is particularly prevalent for traffic using the westbound off-slip to access Little Island from an easterly direction. Due to the increased traffic volumes entering the An Crompán Roundabout from the north, vehicles from the east find it increasingly difficult to exit onto the roundabout and this leads to additional delay. This issue could potentially be mitigated through signalisation of the An Crompán Roundabout in order to provide a greater level of priority for traffic approaching from the east.

9.4.15 In the PM peak, the proposed upgrades at the Ballytrasna junction significantly improve delay and queuing at this location versus the Do Minimum scenario. However, due to development of employment and residential lands to the east of Little Island, a significant amount of additional traffic (when compared to Scenario 1 or 2) need to use the Ballytrasna Park road to exit in the PM peak. This makes it increasingly difficult for traffic to exit the Euro Business Park leading to congestion and queueing. This could be mitigated through localised junction improvement measures, however, this has not been investigated further as part of this high level strategy assessment.

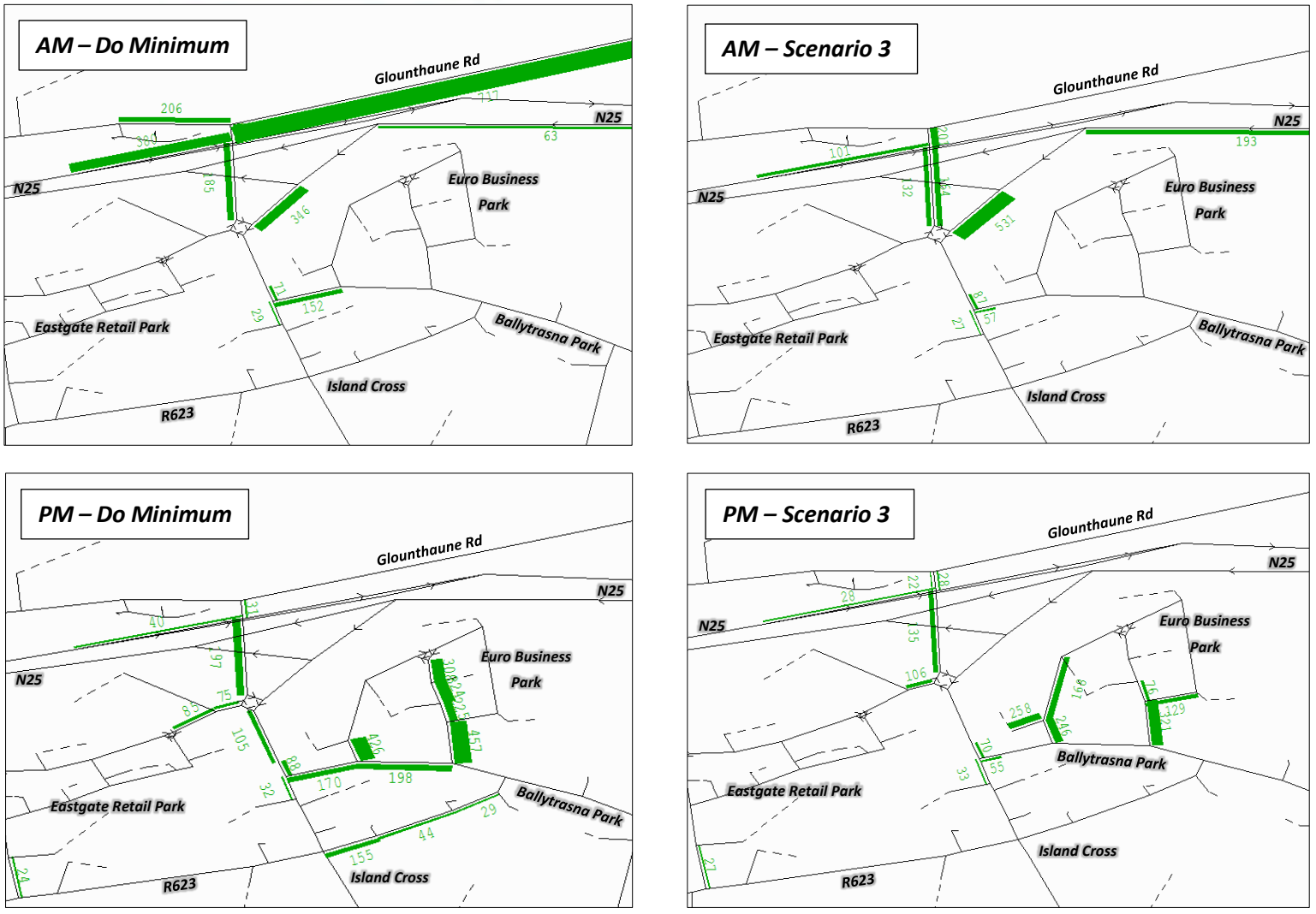


Figure 9.11 Do Minimum and Scenario 3 Delay Plot AM and PM Peak Hours

9.4.16 The widening of the N25 Flyover to facilitate two lanes in the northbound direction does reduce congestion for traffic travelling toward the N25 eastbound in the PM peak hour. However, as noted in the AM peak, the increased capacity along the Ballytrasna Park Junction, An Crompán Roundabout and N25 flyover corridor attracts more demand to use this route to exit Little Island. Figure 9.12 displays a SLA on the N25 flyover in a northbound direction in the PM peak for Scenario 3 and the Do Minimum. The results indicate that in the Do Minimum, the majority of traffic using this link are travelling eastbound toward the N25 and Glounthane. However, in Scenario 3, the increased capacity and improved journey times mean that traffic re-routes and starts to use this exit to travel westbound toward Glanmire and northeast Cork City. This leads to a 60% increase in traffic volumes on this link in Scenario 3 versus the Do Minimum.

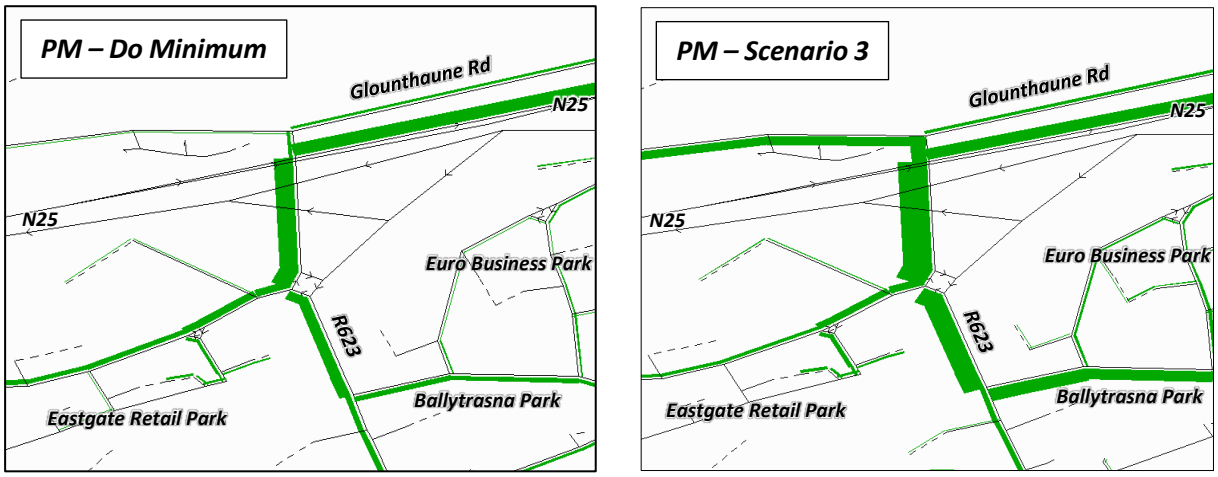


Figure 9.12 Scenario 3 Select Link Analysis PM peak

Scenario 4 and 5

9.4.17 As outlined previously in Chapter 7, Scenario 5 includes a host of public transport improvement measures including upgrades to bus and rail infrastructure. Analysis in Section 9.3 indicated that this scenario provides a reduction in overall car mode of approximately 6%. The results in Table 9.7 suggest that this decrease in car volumes provides a considerable reduction in overall queuing on the network with a reduction of 15% versus the Do Minimum scenario in the AM and PM peak periods.

9.4.18 Figure 9.13, overleaf, illustrate delay plots in the AM and PM peak hours for Scenario 5 compared to the Do Minimum reference case. In the AM peak, congestion and queueing occur at the same locations as the Do Minimum scenario, however, the level delay is reduced due to the decrease in car mode share.

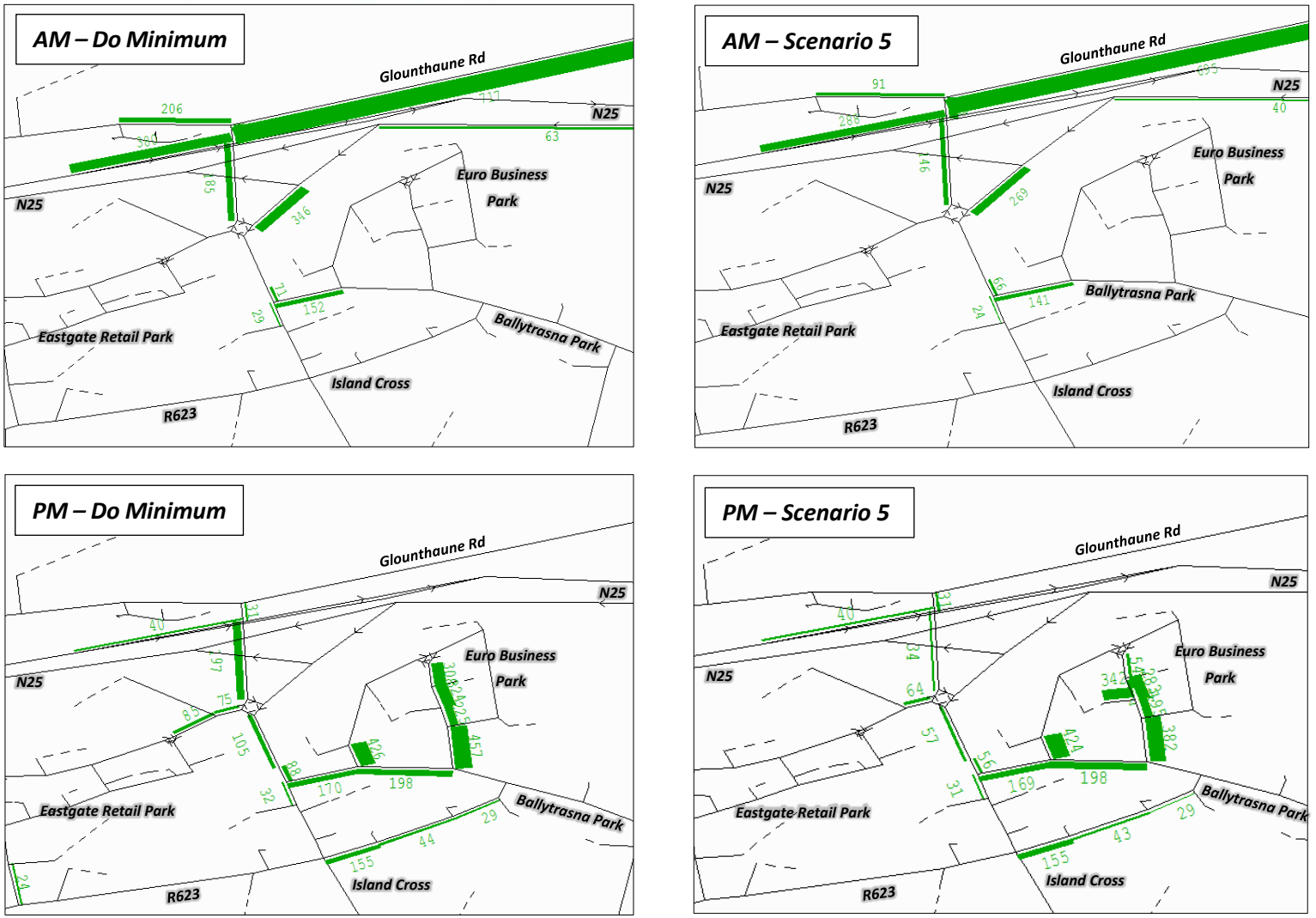


Figure 9.13 Do Minimum and Scenario 5 Delay Plot AM and PM Peak Hours

9.4.19 In the PM peak, congestion remains on the Ballytrasna Park Road exiting Little Island. However, the reduced car demand has a considerable reduction in delay for vehicles exiting from Eastgate Business Park and traveling eastbound toward the N25. In the Do Minimum scenario, the right turn for traffic exiting Little Island in an eastbound direction on the N25 flyover has a traffic demand which exceeds capacity causing queueing along the stacking lane leading to delay. With the decrease in car mode share experienced in Scenario 5, the traffic volume making this turning movement is reduced. In this scenario all vehicles can clear within a single traffic signal cycle without queuing past the stacking lane. As such, Scenario 5 experiences a reduction in congestion at this location.

9.4.20 Scenario 4 includes minor improvements to the public transport network with additional priority and existing bus services routed on-island. However, these improvements are not significant enough to generate a substantial shift away from the private car. As such, the results in Table 9.7 indicate that Scenario 4 provides a very minor decrease in overall queuing across the network. With no upgrades proposed to the Do Minimum road network, queuing occurs in the same locations with slight reductions in delay due to a small mode shift towards public transport.

Summary

- Scenario 2 (Full Movements Interchange) provides the greatest benefits in terms of reducing queueing in Little Island in the AM and PM peaks;
- Scenario 1 (Left-In/Left-Out Interchange) provides a considerable reduction in queuing when compared to the Do Minimum scenario (approx. 22%). However, the majority of these benefits occur in the PM peak. In the AM, Scenario 1 does little to improve the congestion on the N25 eastbound off-slip for traffic entering Little Island;
- The proposed capacity enhancements in Scenario 3 improve congestion and queueing levels on key routes accessing/exiting Little Island. However, this additional capacity attracts increased traffic volumes which has a knock on negative impact on queueing at other locations on the network;
- The reduced car demand due to modal shift in Scenario 5 leads to a decrease in queueing compared to the Do Minimum scenario. This is particularly prevalent for traffic exiting Eastgate Business Park in the PM peak; and
- Scenario 4 provides a very minor decrease in overall queuing due to a limited mode shift to public transport and no proposed changes to the road network.
- **It is important to note that whilst the road based scenarios result in less congestion on the network in the short/medium term, they also result in an increase in car mode share. Without investment in public transport or demand management measures, the car will remain the primary mode of travel to Little Island. Any short term benefits accrued from the additional road capacity will be negated in the future by unsustainable travel to existing and new developments in Little Island, thus ultimately leading to congestion and delay on the network. This is likely to impact on the attractiveness of Little Island for investment, and as such, hinder its long term economic growth.**

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Reduce traffic congestion on Little Island						

9.5 Integration, Accessibility and Social Inclusion

9.5.1 The identified Integration, Accessibility and Social Inclusion study objective is to:

Provide equal opportunity for all through improving accessibility and enhancing the integration of land-use and transport.

9.5.2 The following two KPIs were used to measure the performance of the various strategy measures in achieving this objective, namely:

- Compatibility of transport measures with Local, Regional and National policy; and
- Availability for transport interchange.

Compatibility of transport measures with Policy

9.5.3 Chapter 2 of this report provides an overview of the key national, regional and local policies which guide the LITS. The key policy's relevant to Little Island and the development of this transportation study are summarised in Table 9.8 below:

Table 9.8 Relevant Policy for Little Island

Policy Document	Relevant Policy
Smarter Travel	- Improve quality of life and accessibility to transport for all and, in particular, for people with reduced mobility and those who may experience isolation due to lack of transport
Cork County Development Plan	- Support the Economic growth of Little Island - Protect all natural heritage sites designated or proposed for designation under National and European legislation and International Agreements including SACs and SPAs
Cobh Municipal District Local Area Plan	- Promote high quality work place environment for existing and future workforce population - Improve public transport connectivity - Improve road connectivity
Cork 2050	- Provide a high capacity Core Bus Network serving all of the main corridors within the Cork Metropolitan Area - Strategic road infrastructure required to drive balanced regional economic growth
Building on Recovery	- Address urban congestion - Improve the efficiency and safety of existing transport networks.

Policy Document	Relevant Policy
Southwest Regional Planning Guidelines	- Plan for an increase in the population and employment of the Cork Gateway
Cork Area Strategic Plan	- Support the use of sustainable transport modes such as public transport, cycling and walking in a balanced way between all transport modes
Cork Cycle Network Plan	- Develop a cycling network within the Metropolitan area to encourage greater use of cycling for trips to work, school, recreation and leisure
Cork Area Transit Study	- Reconfigure the bus network with improved frequencies, better linkages and improved on-street priority throughout the Cork Region; - Improve accessibility and public transport throughout the Cork Region; - Support Parking Strategies in the Cork Region to achieve the desired study outcomes, and to support investment in public transport; - Implement integration measures, including: park and ride - Provide a high quality bus stop infrastructure with Real Time Information and mapping
Spatial Planning and National Roads: Guidelines for Planning Authorities	- Maintain a safe and efficient network of national roads through the delivery of sustainable development strategies, thereby facilitating continued economic growth and development throughout the country.

9.5.4 A qualitive assessment has then been undertaken for each of the five test scenarios to assess their compatibility with the relevant policy guidance listed in table 9.8. The results are presented in Table 9.9 below.

Table 9.9 Compatibility with Policy Qualitive Assessment

Scenario	Assessment
Do Minimum	- Does not contribute to improving the quality of life and accessibility to transport for all - Provides no additional transport network capacity to enable economic growth; - Fails to address urban congestion - Does not impact on designated natural heritage sites - No investment in public transport; and - Fails to address the need for encouraging active travel.
Scenario 1	- Provides some additional road network capacity to enable economic growth; - Requires construction of a new interchange adjacent to environmentally protected lands; - Does little to improve accessibility to transport for all; - No investment in public transport; - Fails to address the need for encouraging active travel; and - Contrary to policy which aims to protect the safety and efficiency of the National Road Network.

Scenario	Assessment
Scenario 2	- Provides a significant amount of additional road network capacity to enable economic growth; - Requires construction of a new interchange adjacent to environmentally protected lands; - Does little to improve accessibility to transport for all; - No investment in public transport; - Fails to address the need for encouraging active travel; and - Contrary to policy which aims to protect the safety and efficiency of the National Road Network.
Scenario 3	- Provides additional road network capacity to enable economic growth; - Fails to address the need for encouraging sustainable travel; - Does little to improve accessibility to transport for all; - No investment in public transport; and - Fails to address the need for encouraging active travel.
Scenario 4	- Provides a modest investment in public transport infrastructure; - Facilitates a small increase in sustainable travel; - Does not impact on designated natural heritage sites - Provides insufficient transport capacity to support the economic growth of Little Island.
Scenario 5	- Supports the sustainable economic growth of Little Island; - Provides a substantial investment in public transport infrastructure; - Does not impact on designated natural heritage sites - Encourages active travel through provision of an integrated transport network - Improves accessibility to transport for all.

Summary

- Scenario 5 (Full PT) performs best in terms of compatibility with National, Regional and Local Policy. This scenario provides a significant shift in mode share from the private car, thus supporting the sustainable development of Little Island. This reduction in car demand decreases congestion and delay on the network, providing additional capacity for the future economic growth of the island;

- Scenario 4 supports sustainable travel, however, the proposed public transport measures are insufficient to achieve a significant shift away from the car. As such, queueing and delay remain on the network which will hinder the economic expansion of Little Island;

- Scenarios 1,2 and 3 provide additional road capacity to support the economic growth of Little Island. However, these scenarios support access by car, and result in a reduction in sustainable mode share, thus promoting the growth of Little Island

in an unsustainable manner. Scenario 1 and 2 are also contrary to TII National Road Policy and will interfere with environmentally protected lands.

- The Do Minimum scenario provides no additional transport capacity and fails to support sustainable travel. As such, heavy levels of congestion remain on entry and exit to Little Island in the peak periods stifling development and economic growth.

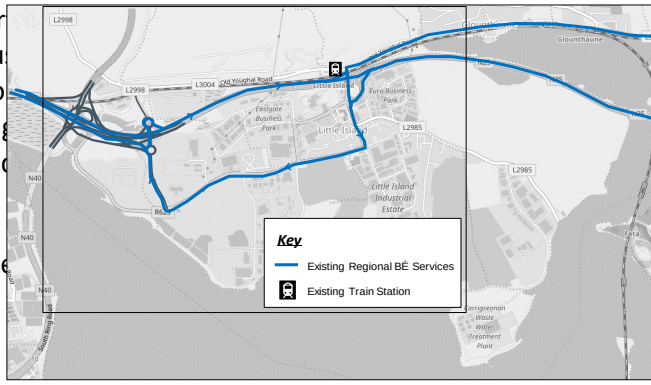
Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Provide equal opportunity for all through improving accessibility and enhancing the integration of land-use and transport	Compatibility of transport measures with Local, Regional and National policy						

Availability for Transport Interchange

9.5.5 The availability of transport interchange points facilitates integration between the various modes of travel, thus supporting accessibility for all. As part of this strategic assessment, a qualitative review was undertaken of the availability for interchange in each of the five test scenarios.

9.5.6 Scenarios 1 (Left-In/Left-Out Interchange), 2 (Full Movements Interchange) and 3 (ARUP Capacity Enhancements) all contain upgrades to the road network at Little Island with no additional public transport proposals. As such, these scenarios provide no additional opportunity for transport interchange when compared to the Do Minimum reference case.

9.5.7 Scenario 4 includes the provision of public transpor priority measures and the routing of existing Bu Éireann services on-island. This provides a mino transport interchange benefit arising from existin diverted bus routes interchanging with the Little Islan train station.



9.5.8 Scenario 5 includes major improvements to the Littl Island public Transport Network, including:

- High frequency bus services operating on-island;
- Re-routing of existing Bus Éireann services through Little Island;
- Public transport priority on-island;
- The inclusion of a new rail station and Park and Ride site at North Esk; and
- A shuttle bus service connecting to the main employment locations in Little Island.

9.5.9 Full details on Scenario 5 are provided in Chapter 7 of this report and illustrated in Figure 9.14. This scenario provides substantial transport interchange benefits. The availability of the Park and Ride site allows people to park off-island and interchange with bus to access their employment destination. The inclusion of a shuttle bus provides a high frequency service that circulates around the Island linking key businesses to the nearby train stations facilitating interchange between bus and rail.

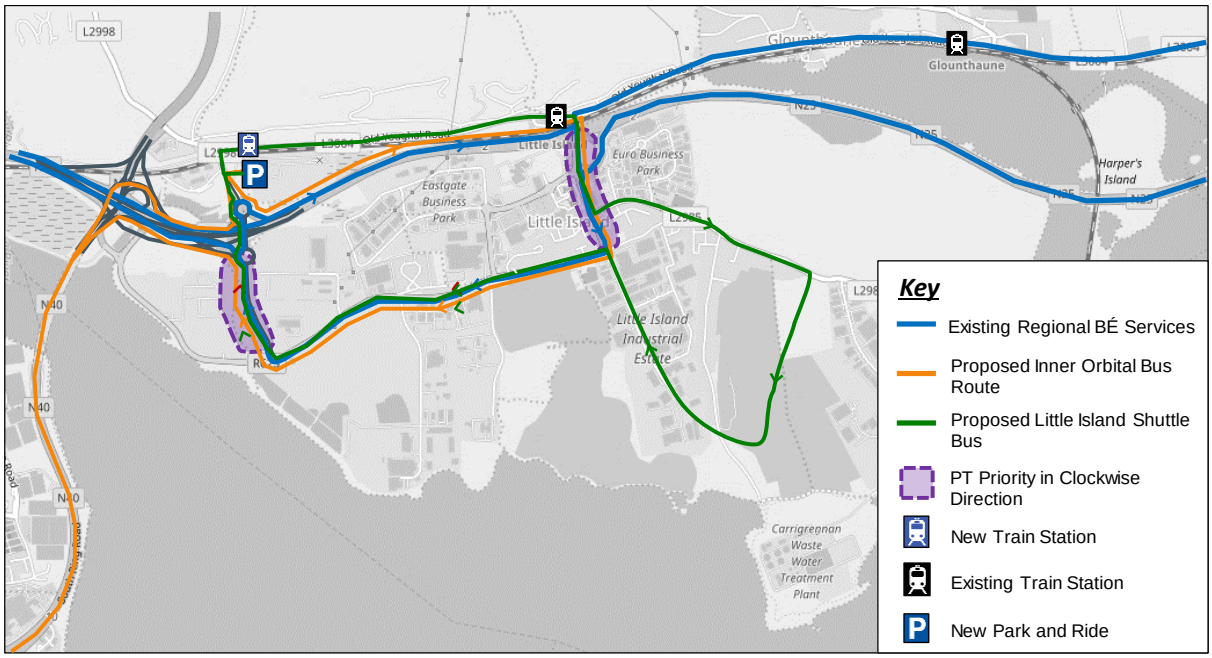


Figure 9.14 Scenario 5 Public Transport Proposals

Summary

Scenario 5 performs best in terms of facilitating transport interchange. Scenario 4 provides minimal transport interchange benefits arising from diverting existing bus services on-island via Little Island Train Station. Scenarios 1, 2 and 3 provide no additional opportunity for transport interchange when compared to the Do Minimum scenario.

Objective	KPI	DM	Sc1	Sc2	Sc3	Sc 4	Sc5
Provide equal opportunity for all through improving accessibility and enhancing the integration of land-use and transport	Availability for transport interchange						

9.6 Appraisal of Scenarios - Summary

9.6.1 Table 9.10 below, summarises the results presented above for each of the study objectives and corresponding KPIs. The analysis indicates that Scenario 2 (Full Movements Interchange) performs the best in terms of providing substantial additional road capacity and reducing congestion and delay on the network, thus improving journey times on and off island in the AM and PM peak hours. However, the cost of this scenario is substantially higher than all other alternatives, and the construction of the full movements interchange may not be feasible due to the location of environmentally protected lands. Funding for this new interchange may also be very difficult to source as it does not correspond with national policy and directly contradicts TII policy regarding the function of the National Road network. This

scenario also promotes unsustainable growth in Little Island with an increase in car mode share. The continued dependence on the private car means that additional road capacity generated by the new interchange is likely to be used up in the future if Little Island grows beyond the levels assumed in this assessment.

9.6.2 Scenario 1 (Left-In/Left-Out Interchange) provides a substantial reduction in congestion and delay when compared to the Do Minimum scenario. However, queuing remains in the peak periods, particularly in the AM as the junction configuration does little to ease congestion on the current N25 eastbound off-slip to Little Island. The construction of this 3rd interchange would also be quite expensive and likely to experience difficulties due to the close proximity of environmentally protected lands. Similar to Scenario 2 described above, this scenario fails to support sustainable modes, and as such, any development growth will be dependent on the private car and the level of available capacity on the road network.

9.6.3 The additional road capacity provided in Scenario 3 results in a considerable reduction in queuing and delay in Little Island when compared to the Do Minimum scenario. The proposed works are comparatively minor in nature (e.g. kerb removals, carriageway widening etc.) and could be delivered for a low cost in a relatively short timeframe. This scenario focuses on road enhancements and, as such, does not support a mode shift to more sustainable travel. The results indicate that, due to the continued reliance on the private car, additional capacity generated by the road improvement works starts to get used up by additional demand in the 2040 forecast year. This has a knock on impact on queuing at other areas on the network.

9.6.4 Scenario 5 includes a host of public transport measures aimed at supporting the sustainable growth of Little Island. This scenario provides a substantial increase in public transport mode share with an approx. 6% reduction in car demand. This decrease in vehicular traffic considerably reduces the level of congestion on the network when compared to the Do Minimum scenario. This scenario also complies with all national, regional and local policies and supports access for all people, including those who do not have access to a car. However, in this scenario queuing still occurs in the peak hours, and the measures could be costly to introduce due to the requirements to purchase properties and lands to obtain sufficient levels of public transport priority on-island. Scenario 5 also does little to assist with the short-term congestion problems on the network as all schemes identified are not likely to be implemented until the medium to long term.

9.6.5 Scenario 4 includes some minor public transport upgrades with existing bus services routed through Little Island and the provision of additional network priority (e.g. bus lanes, advanced signals etc.). This scenario provides some minor reductions in queuing and delay when compared to the Do Minimum scenario, however, significant levels of congestion remain in the AM and PM peak periods which is likely to stifle economic growth. The measures in Scenario 4 do promote sustainable travel, however, they are not substantial enough to generate a significant mode share response.

Table 9.10 Appraisal of Scenarios - Summary

No.	Key Project Objectives	Key Performance Indicators	DM	Sc1	Sc2	Sc3	Sc4	Sc 5
Economic	Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network	Network wide delay/queueing						
		% Change in PT Travel Costs						
		% Change in Car Journey Times						
		Cost efficiency of proposals						
Safety & Physical Activity	Develop a safe and healthier transport network for all transport modes and users	Change in vehicle emissions particularly those that cause higher health risks						
		Sustainable transport mode share						
Environmental	Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Minimising impact on environmentally sensitive areas						
		Reduce traffic congestion on Little Island						
Integration, Accessibility and Social Inclusion	Provide equal opportunity for all through improving accessibility and enhancing the integration of land-use and transport	Compatibility of transport measures with Local, Regional and National policy						
		Availability for transport interchange						

9.7 Summary

9.7.1 The previous sections of this report outline the results of testing carried out on identified LITS Strategy options measured against the study objectives and KPIs. The following chapter uses these results to identify the emerging preferred strategy which will support the sustainable development of Little Island. In summary:

Scenario 1

- provides a substantial reduction in congestion and delay when compared to the Do Minimum scenario;
- queuing remains in the peak periods, particularly in the AM; and
- fails to support sustainable modes, and as such, any development growth will be dependent on the private car.

Scenario 2

- performs the best in terms of providing substantial additional road capacity and reducing congestion and delay on the network;
- the cost of this scenario is substantially higher than all other alternatives;
- the construction of the full movements interchange may not be feasible due to the location of environmentally protected lands; and
- promotes unsustainable growth in Little Island with an increase in car mode share.

Scenario 3

- additional road capacity results in a considerable reduction in queuing and delay in Little Island;
- upgrades could be delivered for a low cost in a relatively short timeframe;
- does not support a mode shift to more sustainable travel; and
- additional road capacity starts to gets used up in the future year due to growth in Little Island and the reliance on the private car leading to congestion.

Scenario 4

- proposed measures are not significant enough to generate a substantial mode share response; and
- significant levels of congestion remain in the AM and PM peak periods.

Scenario 5

- provides a substantial increase in public transport mode share with an approx. 6% reduction in car demand; and
- considerably reduces the level of congestion on the network, however, queuing still occurs in the peak hours

10. EMERGING PREFERRED STRATEGY

10.1 Overview

10.1.1 Chapter 9 presented the results from a comparative assessment of the five strategies identified to support the sustainable growth of Little Island. The strategies were tested through the Evaluation framework with quantitative and qualitative KPI results measured against study objectives. This chapter uses these results to establish the emerging preferred LITS Strategy. Once the preferred strategy is identified, it is then re-tested through the Evaluation Framework to ensure that it is achieving all of the study objectives.

10.2 Identification of the Emerging Preferred Strategy

10.2.1 The results in Chapter 9 demonstrate that scenario 4 performs comparatively poorly against all other scenarios. This scenario includes some minor public transport upgrades and was developed to utilise the existing public transport network as efficiently as possible to increase the level of sustainable travel and reduce the reliance on the private car. However, the assessment results indicate that the public transport measures are not significant enough to generate a substantial mode share response. As such, queuing and delay remains in both the AM and PM peak periods with only very minor improvements over the Do Minimum scenario.

10.2.2 Scenarios 1 and 2 include the development of a new 3rd interchange on the N25 to the east of Little Island. Whilst the modelling results indicate that the provision of this additional road reduces congestion and delay in Little Island, it has been concluded that the provision of a 3rd interchange on little Island should not form part of the transport strategy for the following reasons:

- The creation of another interchange on the N25 directly contradicts national policy seeking to safeguard the capacity and safety of the national road network;
- The cost of construction of this scheme is extremely high and is unlikely to be funded by national agencies;
- The construction of the new interchange at its proposed location has the potential to have adverse impacts on the conservation objectives and qualifying interests of the Cork Harbour SAC and SPA; and
- An alternative, cost effective and less environmentally sensitive, road capacity enhancement solution (Scenario 3) has been developed which could be delivered in a short term horizon.

10.2.3 Both Scenario 3 and 5 have been shown to provide significant benefits in terms of improving journey times to and from Little Island and reducing overall queuing. Scenario 3 includes a number of capacity enhancements along the N25 Flyover, An Crompán Roundabout and Ballytrasna Park junction corridor. Scenario 5 focuses on improvements to the public transport network with upgraded bus services and improved priority. This scenario produces a substantial reduction in car mode share and supports the sustainable development of Little Island. Through analysis of the assessment results, it was determined that these two scenarios could be combined to achieve the LITS vision and objectives. Scenario 3 provides relatively short term capacity enhancements on the road network reducing congestion and facilitating economic growth. While scenario 5 includes a range of public transport measures

which will support sustainable development, comply with national policy and reduce the reliance on the private car.

10.2.4 Therefore, based on the overall scenario assessment results contained in Chapter 9, the emerging preferred LITS strategy is considered to be a combination of Scenario 3 and Scenario 5 outlined previously, and includes:

- Short term road capacity enhancements to assist in reducing congestion and delay for traffic entering and exiting Little Island in the AM and PM peak hours;
- A range of public transport improvements to support sustainable travel, including:
  - High frequency bus services operating to Little Island;
  - Re-routing existing bus services on-island;
  - Introduction of public transport priority;
  - Creation of a new Park and Ride site and train station at North Esk;
  - Provision of a direct Commuter Rail service to Mallow; and
  - Introduction of a new shuttle bus service linking employment locations to the train stations and Park and Ride site.
- A suite of demand management measures (including elements such as parking restrictions, flexi-time working etc.) to support the use of sustainable travel and assist in reducing car demand on the network.

10.3 Evaluation of the Emerging Preferred Scenario

10.3.1 The identified emerging preferred strategy (known as scenario 6 for testing purposes), was re-tested through the evaluation framework to ensure that it supports all of the LITS objectives. The following sections present the results of this assessment for each of the Key Performance Indicators. In each case, the emerging preferred strategy is compared against the Do Minimum reference case and the best performing scenario for each objective from the initial evaluation in Chapter 9.

Economic

Network Wide Delay/Queuing

10.3.2 As noted previously, to assess the impact of the proposed scenarios on network delay in the forecast year, volume over capacity (V/C) was extracted for key junctions in Little Island, illustrated in Figure 9.1, using the Local Area Model. Volume over capacity is a commonly used index to assess the performance of junctions, and in general, a V/C of greater than 100% means that demand through the junction exceeds capacity leading to significant congestion and delay. Typically, junctions with V/C in excess of 85% are regarded as suffering from traffic congestion.

10.3.3 The results of the V/C analysis are illustrated in Table 10.1, overleaf, for the AM and PM peak hours. The results indicate that Scenario 6 provides a considerable reduction in over-capacity turning movements when compared to the Do Minimum scenario in both time periods. The availability of additional road capacity, along with a mode shift response towards more sustainable travel, ensures that a number of junctions perform significantly better in the peak hours, thus improving congestion and delay.

10.3.4 Scenario 2 still performs best in terms of reducing the number of junctions operating over capacity due to the provision of a full movements 3rd interchange. However, as discussed earlier in this chapter, the provision of this interchange will be extremely difficult due to the significant expense and the location adjacent to environmentally sensitive lands. The emerging preferred strategy provides short term capacity enhancements which assist in reducing delay on network. It is envisaged that this additional road capacity will be protected through the provision of viable public transport alternatives, and demand management measures, which will ensure that these short term benefits remain in the future as Little Island continues to grow.

Table 10.1 Turning V/C Results

V/C (%)	AM			PM		
	Do Min	Scenario 2	Scenario 6	Do Min	Scenario 2	Scenario 6
<50	133	142	143	131	148	141
>50 & <85	13	15	9	12	13	12
>85 & <100	6	6	4	1	3	7
>100	12	1	8	20	0	4
% > 85%	***11%***	***4%***	***7%***	***13%***	***2%***	***7%***

Objective	KPI	DM	Sc2	Sc6
Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network	Network wide delay/queueing			

Journey Times by Car

10.3.5 Journey times by car to and from Little Island in the AM (08:00-09:00) and PM peak hours (17:00-18:00) have been extracted from the forecast year Local Area Model for the emerging preferred scenario. The analysis focused on the key routes where congestion is experienced in the AM and PM illustrated in Figure 9.3 previously. The average journey times have been compiled to identify the overall percentage change when compared to the reference case Do Minimum scenario, and the results are provided in Table 10.2.

Table 10.2 Average Car Journey Time Assessment

Scenario	AM % Change	PM % Change
Scenario 2	-59%	-58%
Scenario 6	-39%	-43%

10.3.6 The results indicate that the increased road capacity along the N25 Flyover, An Crompán Roundabout and Ballytrasna Park junction corridor, along with a reduction in car demand due to mode shift to sustainable travel, significantly decreases journey times to/from Little Island in the peak hours (when compared to the Do Minimum scenario). The journey time reductions are greater than both scenario 3 and Scenario 5 when tested individually (results presented in Table 9.4 previously). This indicates that the two scenarios, when combined, complement each other to provide reduced congestion and improved journey times on the network.

10.3.7 Scenario 2 (Full Movements Interchange) still provides the highest journey time savings in the future year. However, Scenario 6 can be delivered in a much shorter time frame with benefits experienced in the relatively near future (i.e. the next 2-3 years). It is also envisaged that with the introduction of specifically targeted demand management measures, a further shift to sustainable travel can be achieved in Scenario 6, hence reducing congestion and journey times even further. More detailed information on potential demand management measures is provided in Section 10.4 below.

Objective	KPI	DM	Sc2	Sc6
Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network	% Change in Journey Times			

Public Transport Travel Costs

10.3.8 As noted previously, this assessment focuses on the overall perceived public transport travel costs which reflect all aspects of its use, including:

- Journey Time;
- Wait time at the bus stop/train station;
- Walk time to access the bus/train;
- Fare paid etc.

10.3.9 The 'cost of travel' has been extracted from the SWRM model for all journeys to/from Little Island. Figure 10.1 illustrates the percentage change in travel costs by public transport to Little Island versus the Do Minimum reference case in the AM peak for Scenario 6 (Emerging Preferred Strategy).

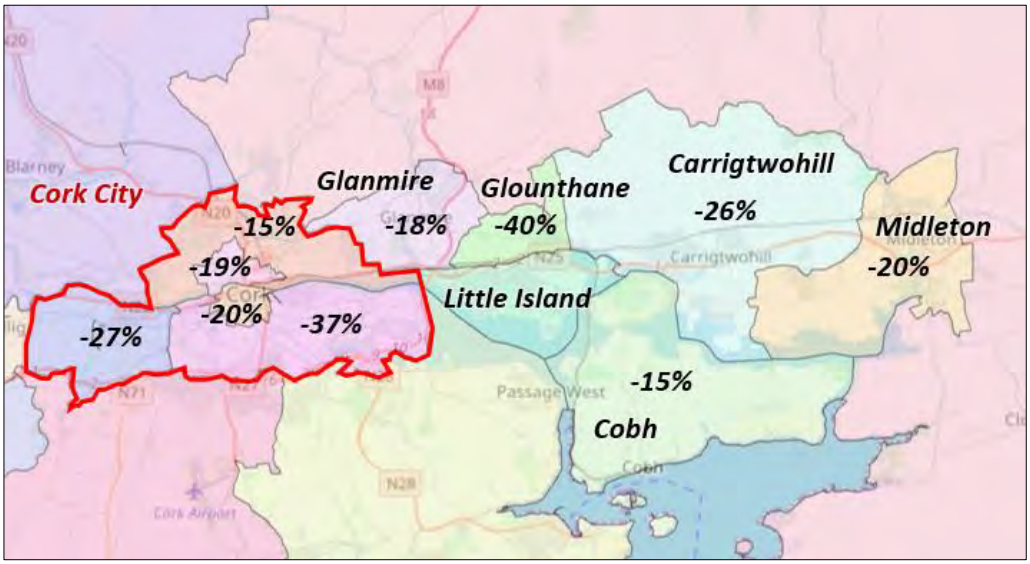


Figure 10.1 Scenario 6 % Change in Public Transport Travel Costs versus Do Minimum

10.3.10 As the emerging preferred strategy includes all of the proposed public transport measures contained in Scenario 5, the results in Figure 10.1 are almost identical to those presented earlier in Figure 9.6. The results indicate that the provision of improvements to the public transport network and services significantly reduces the perceived cost of travel when compared to the Do Minimum and all road based scenarios. As such, public transport becomes more competitive as a viable alternative mode of travel promoting a shift away from the private car.

Objective	KPI	DM	Sc5	Sc6
Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network	% Change in PT Travel Costs			

Cost of Proposals

10.3.11 Table 9.5 outlines high level cost elements for each of the five scenarios initially tested in Chapter 9. As the emerging preferred strategy is a combination of elements from scenario 3 and scenario 5, the estimated cost of implementation would be circa €3 million. The proposed public transport measures require the acquisition of land and properties to support the provision of bus lanes on Little Island, along with investment in new bus services and park and ride facilities. However, it should be noted that all these measures are substantially less expensive than constructing a new interchange.

10.3.12 It is envisaged that the proposed capacity enhancements to the existing N25 interchange, An Crompán Roundabout and Ballytrasna Park junction corridor can be delivered in the short term for a relatively low cost as only minor network upgrades are required (i.e. carriageway widening, removal of footpaths, replacement kerbing etc.). Through the delivery of the Cork Metropolitan Transportation Study (CMATS), the NTA are focusing on interventions to

substantially improve sustainable travel in the metropolitan area. The delivery of these sustainable transport measures will be a priority of the NTA in the Cork region and funding will be identified to secure their implementation.

Objective	KPI	DM	Sc3	Sc6
Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network	Cost of Proposals			

Safety and Physical Activity

Change in Vehicular Emissions

10.3.13 Vehicular emissions can be damaging to the environment and can also have health implications with particulate matter being especially harmful to people in close proximity. Emissions have been extracted from the SATURN local area model, and the results for the combined AM and PM peaks are outlined in Table 10.3.

Table 10.3 % Change in Vehicular Emissions

Measurement	Scenario2	Scenario6
% Change in vehicular Emissions	-10%	-10%

10.3.14 The results indicate that the emerging preferred strategy performs comparably to Scenario 2 (Full Movements Interchange) predominantly due to the following:

- Capacity enhancements on the existing N25 Interchange, An Crompán Roundabout and the Ballytrasna Park junction reduce congestion and improves vehicle speeds to and from Little Island. This assists in decreasing fuel consumption and associated emissions.; and
- Improved public transport measures promote a shift away from the private car towards sustainable modes of travel, hence reducing overall emissions.

Objective	KPI	DM	Sc2	Sc6
Develop a safe and healthier transport network for all transport modes and users	% Change in Vehicular Emissions, particularly those that cause higher health risks			

Sustainable Transport Mode Share

10.3.15 The mode share for all travel to and from Little Island in the AM and PM peaks have been extracted from the SWRM, and the results are illustrated in Figure 10.2 and Figure 10.3 below.

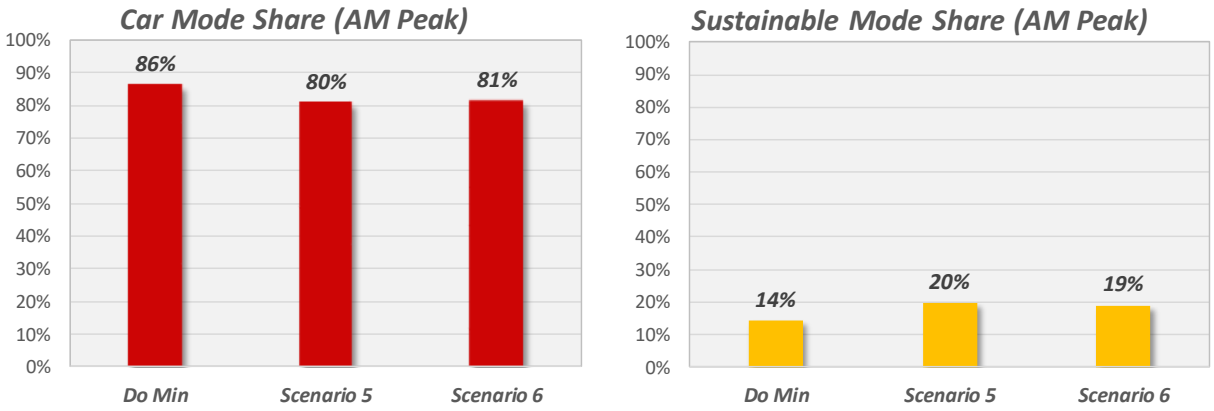


Figure 10.2 AM Mode Share Analysis

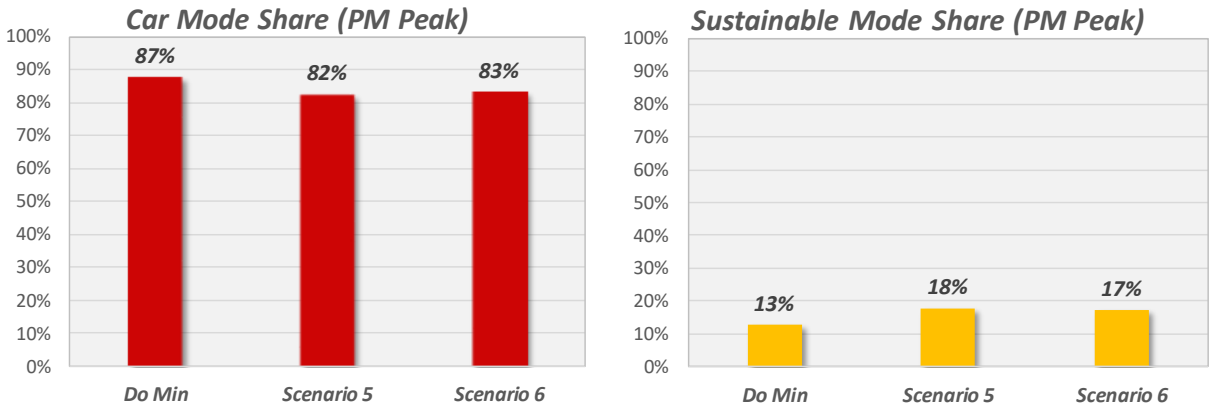


Figure 10.3 PM Mode Share Analysis

10.3.16 The results indicate that the proposed public transport improvement measures included in the emerging preferred strategy provide a significant shift towards sustainable travel and an associated reduction in car demand when compared to the Do Minimum (4%-5% reduction in the AM and PM peaks). As noted previously, this is an encouraging figure given the constraints to public transport use existent at Little Island, such as the availability of free parking and the dispersed nature of travel to the island etc. It is envisaged that with the implementation of additional demand management measures (e.g. reduced parking availability, parking charges etc.) this public transport mode share would increase further.

10.3.17 Scenario 6 provides comparable results to Scenario 5 outlined previously with a slight increase in car mode share of less than 1%. This is due to the fact that the road capacity enhancements proposed as part of the emerging preferred strategy make Little Island more accessible by car when compared to Scenario 5, which included no upgrades to the do minimum road network.

Objective	KPI	DM	Sc 5	Sc6
Develop a safe and healthier transport network for all transport modes and users	Sustainable Transport Mode Share			

Environmental

Minimising impact on environmentally sensitive areas

10.3.18 The emerging preferred strategy includes relatively minor road network upgrades along with improvements to public transport services and facilities on Little Island, predominantly on the R623 corridor. As such, it is not envisaged that any of these improvement works will impact on environmentally sensitive areas adjacent to Little Island.

Objective	KPI	DM	Sc3	Sc 4	Sc5	Sc6
Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Minimising impact on environmentally sensitive areas					

Reduce traffic congestion on Little Island

10.3.19 Vehicular emissions which are harmful to the environment are directly related to fuel consumption which increases at lower speeds in congested networks. Analysis was undertaken of congestion and queueing across the entire Little Island study area for the emerging preferred strategy, and the results are provided in Table 10.4.

Table 10.4 % Change in Total Queuing (AM and PM Peaks)

Measurement	Scenario2	Scenario6
% Change in Total Queuing	-40%	-28%

10.3.20 The results indicate that the emerging preferred strategy provides a substantial reduction in queuing on the Little Island network. Figure 10.4, overleaf, is extracted from the SATURN Local Area Model and illustrates the main areas experiencing delay in the AM and PM peak hours. It should be noted that the bandwidths represent level of delay with wider bands indicating higher levels of congestion. Only areas experiencing the highest levels of delay in the Local Area Model have been highlighted to allow a quick visual comparative between scenarios. All values displayed represent average delay per vehicle in seconds.

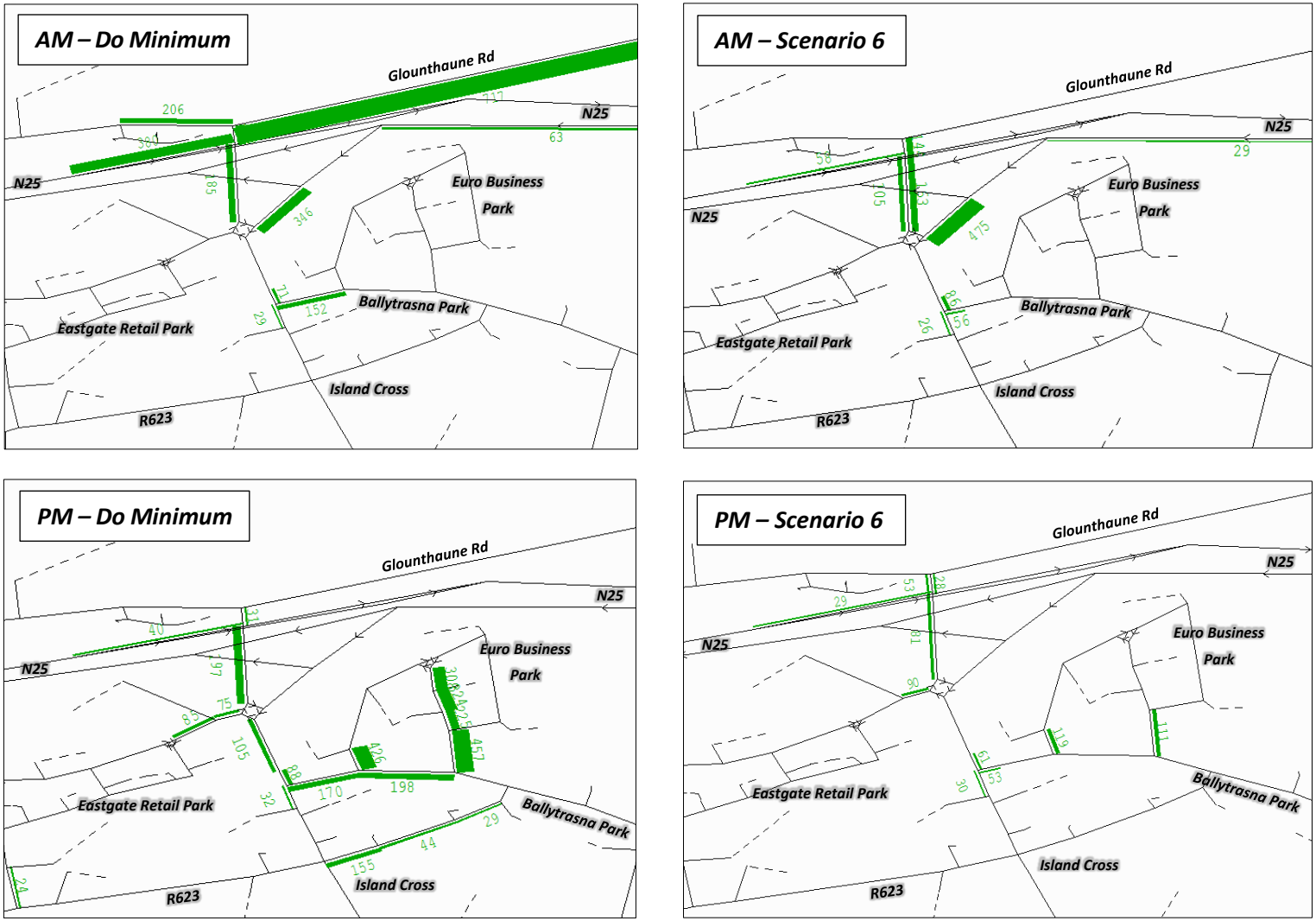


Figure 10.4 Do Minimum and Scenario 2 Delay Plot AM and PM Peak Hours

10.3.21 In the AM peak, the results indicate that the additional capacity provided on the N25 eastbound off-slip at Little Island significantly reduces queueing and delay at this location. However, the reduced travel time results in additional traffic utilising this route to access Little Island, thus increasing volumes at An Crompán Roundabout. The modelling analysis indicates that approximately 40% additional traffic enter this roundabout from the north in the AM peak when compared to the Do Minimum scenario. As a result, vehicles from the east find it increasingly difficult to exit onto the roundabout and this leads to additional delay. This issue could potential be mitigated through signalisation of the An Crompán Roundabout which would allow traffic from all directions to efficiently travel through the junction. This will be investigated further during the detailed review of the emerging preferred strategy.

10.3.22 In the PM peak, additional capacity measures at Ballytrasna junction, An Crompán Roundabout and the existing N25 interchange significantly reduce queuing and delay for traffic exiting Little Island. Due to new employment and residential developments to the east of the Island, there is a significant increase in traffic using Ballytrasna Park to exit in the PM. This makes it increasingly difficult for traffic to exit the Euro Business Park leading to some queuing . However, the levels of delay experienced here have been substantially reduced due to the mode shift to sustainable travel when compared to Scenario 3 previously. It is envisaged that this issue could be further mitigated through localised junction improvements which will be investigated further during the detailed review of the emerging preferred strategy.

10.3.23 In summary, the emerging preferred strategy provides an approximately 28% reduction in queuing on the network in the AM and PM peak hours. This strategy performs comparatively better than both Scenario 3 and Scenario 5 tested individually in Chapter 9. This indicates that the two scenarios, when combined, complement each other to provide reduced congestion and improved journey times on the network. It is envisaged that with some minor network adjustments, and demand management measures, that the level of queuing and delay experienced in the forecast year could be reduced even further.

Objective	KPI	DM	Sc2	Sc5
Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Reduce traffic congestion on Little Island			

Integration, Accessibility and Social Inclusion

Compatibility of transport measures with Policy

10.3.24 A qualitative assessment was undertaken for the emerging preferred strategy and the results indicate that it is in-line with all policy guidance, as:

- The additional network capacity and decrease in car mode share significantly reduce congestion on the network thus facilitating the economic growth of Little Island. This is

an objective of the Cobh Municipal District LAP, along with the County Development Plan and NPF.;

- The inclusion of specific public transport measures and the support of sustainable travel is in line with national guidance such as the Smarter Travel Policy;
- No measures are proposed which are likely to impact on environmentally sensitive areas. It is a direct objective of the County Development Plan 2014 to provide protection to all natural heritage sites such as SACs and SPAs; and
- No measures are proposed that directly impact on the National Road network which complies with TII policy and guidance.

Objective	KPI	Sc5	Sc6
Provide equal opportunity for all through improving accessibility and enhancing the integration of land-use and transport	Compatibility of transport measures with Local, Regional and National policy		

Availability for Transport Interchange

10.3.25 The emerging preferred strategy contains all of the public transport measures included in Scenario 5, and as such performs comparably well (see Section 9.5 for further details on Scenario 5 results). It provides substantial transport interchange benefits. The availability of the Park and Ride site allows people to park off-island and interchange with bus to access their employment destination. The inclusion of a shuttle bus provides a high frequency service that circulates around the Island linking key businesses to the nearby train stations facilitating interchange between bus and rail.

Objective	KPI	Sc5	Sc6
Provide equal opportunity for all through improving accessibility and enhancing the integration of land-use and transport	Availability for transport interchange		

Appraisal Summary

10.3.26 Table 10.5, overleaf, summarises the results presented above for each of the study objectives and corresponding KPIs.

Table 10.5 Appraisal of Scenarios - Summary

No.	Key Project Objectives	Key Performance Indicators	DM	Sc1	Sc2	Sc3	Sc4	Sc 5	Sc6
Economic	Support the existing employment function and planned economic expansion of Little Island through delivering an efficient and reliable transport network	Network wide delay/queueing							
		% Change in PT Travel Costs							
		% Change in Car Journey Times							
		Cost of proposals							
Safety & Physical Activity	Develop a safe and healthier transport network for all transport modes and users	Change in vehicle emissions particularly those that cause higher health risks							
		Sustainable transport mode share							
Environmental	Deliver a multi-modal transport network which supports sustainable travel and reduces the environmental impact of transportation in Little Island	Minimising impact on environmentally sensitive areas							
		Reduce traffic congestion on Little Island							
Integration, Accessibility and Social Inclusion	Provide equal opportunity for all through improving accessibility and enhancing the integration of land-use and transport	Compatibility of transport measures with Local, Regional and National policy							
		Availability for transport interchange							

10.3.27 The analysis indicates that the emerging preferred strategy performs well in achieving the identified LITS Vision and Objectives. In summary, the proposed measures:

- reduce journey times to/from Little Island, thus supporting its planned economic expansion;
- reduce congestion and queueing leading to a decrease in vehicular emissions and reduce the environmental impact of transportation in Little Island;
- promote the use of public transport which supports sustainable travel; and
- comply with all National, Regional and Local policies and deliver a multi-modal transport network which facilitates access for all.

10.4 Transport Demand Management Measures

What is Transport Demand Management?

10.4.1 Transport Demand Management (TDM) is the implementation of programmes of measures which seek to change travel demand patterns by:

- **Trip reduction** – to reduce the need to travel and thereby reduce overall travel demand
- **Reduction in vehicle use** – in particular, to reduce the amount of car travel
- **Increase in vehicle occupancy** – to reduce the amount of single occupancy car trips and increase car occupancy
- **Increase in travel by alternative modes** – this includes measures to encourage public transport use, walking and cycling in preference to car use
- **Trip retiming** – to encourage travel at less congested times
- **Offering alternative destinations** – to encourage travel to destinations that are closer, and that lead to less overall congestion
- **Reduction in trip length** – by planning for the provision of employment, retail and other services closer to where people live.

10.4.2 Transport Demand Management programmes attempt to manage people's travel rather than seeking to provide more physical capacity for travel. Transport Demand Management programmes can, however, complement proposed infrastructure schemes, particularly those aimed at reducing the capacity for private vehicles or providing priority for public transport services. An example would be where on-street parking availability is reduced as a demand management measure and the space is reallocated to provide for cycle facilities or improved pedestrian environment or public transport priority.

Transport Demand Management's Role within the Little Island Transportation Strategy

10.4.3 One of the primary aims of LITS is to reduce demand for travel by private vehicles particularly during the commuter peaks and to encourage use of walking, cycling and public transport. The public transport measures proposed by the strategy will provide the capacity to cater for the future growth in travel demand up to the year 2040 and beyond. However, without

complementary transport demand management measures, the full benefits of the Strategy will not be achieved.

10.4.4 Therefore, it is recognised that demand management measures will be required to accompany a comprehensive public transport system. In particular, demand management will be required where it is difficult for the public transport system to achieve a distinct competitive advantage over the private car. Without such demand management, the public transport system will not operate as effectively and may be less efficient; car use will remain high; and congestion will continue to worsen.

10.4.5 To supplement the proposed measures contained in LITS, transport demand management measures will be required to:

- protect investment in the local and strategic road network;
- support the efficient and effective use of the public transport system;
- maximise the benefits of the proposed investment in public transport; and
- to manage congestion in order to facilitate economic growth.

Potential Transport Demand Management Measures for inclusion in LITS

10.4.6 There are numerous transport demand management measures available which could be applied to Little Island in the short, medium or long term. Table 10.6, overleaf, provides a list of TDM measures potentially applicable in Little Island. These measures will be reviewed with the project steering group and key stakeholders to determine their acceptability and applicability to Little Island. A refined list of TDM measures will be identified and combined with the emerging preferred scenario proposals detailed within this chapter, in addition to further walking & cycling measures, to form a final set of study measures.

10.4.7 Where feasible, the contribution of the TDM measures to achieving the study objectives will be modelled using the SWRM and/or LAM. Further information on the selection of the proposed TDM Measures and their evaluation will be contained in the Transport Strategy Report programmed for March / April 2018

Type of Measure	Description	Application to little Island	Responsible bodies	Timeframe
Providing for Permeability	Designing a connected transport network with walking, cycling and public transport accessibility in mind.	Opportunity exists to improve active travel on Little Island through the development of a walking and cycling network segregated from vehicular traffic, particularly in congested area e.g. planned footbridge over the N25 linking the railway station to Eastgate Business Park.	CCC	Short / Medium Term
Cycle to Work Scheme	The Cycle to Work Scheme is a tax incentive scheme which aims to encourage employees to cycle to and from work. The employee is not liable for tax, PRSI or the Universal Social Charge on their repayments.	Opportunities exist for effective marketing to encompass a greater number of employees under Smarter Travel and encourage participation in the Cycle to Work Scheme.	Employees / CCC/ NTA/ Business Associations	Ongoing
Tax Saver Tickets	Employees can purchase seasonal public transport tickets from their gross salary, providing savings of either 31% or 51% depending on the level of Tax and PRSI that would otherwise be charged.	Given the strategic employment function of Little Island, the promotion of public transport tax saver tickets could contribute significantly to encouraging sustainable travel. Continued marketing and promotion of the benefits of the TaxSaver scheme will support a continued growth in take-up.	Employees / CCC/ NTA/ Business Associations	Ongoing
Real Time Passenger Information	Real Time Passenger Information (RTPI) systems communicate the anticipated arrival/departure time of services and assist passengers in using public transport.	The provision of RTPI systems on island at bus stops and at the premises of major employees on island could increase the attractiveness of public transport.	NTA	Medium Term
Incident Detection Systems	Through the monitoring of traffic loops and static CCTV, the system is able to monitor traffic flow patterns and identify incidents (e.g. dramatic increases in congestion) quickly, thereby enabling a more efficient and appropriate response.	There is potential for increased roll out of Incident Detection Systems on the National roads around Cork alerting drivers of problems on the network	TII	Medium Term

Type of Measure	Description	Application to little Island	Responsible bodies	Timeframe
Bus Priority Measures	Local traffic management measures that give priority to buses by means of bus lanes, bus lane violation detection, bus gates and traffic signal pre-emption.	Potential for the development of bus priority measures at the entry /exit points to Little Island to address delays in the bus network and improve journey time reliability.	CCC / NTA	Short / Medium Term
Parking Standards for New Developments	A reduction in the number of parking spaces on offer, particularly where there are high levels of public transport accessibility	A reduction in the number of parking spaces for new developments could be introduced in tandem with the delivery of enhanced public transport services on island.	CCC	Short / Medium Term
Workplace Travel Plans	The Smarter Travel Workplaces programme supports large employers to promote travel choices among their staff. Free expert advice and support for workplaces can be given to encourage employees to move to smarter ways of traveling; whether on foot, by bike, public transport, or through car sharing.	Given the strategic employment function of Little Island, the promotion of Workplace Travel Plans could contribute significantly to encouraging sustainable travel. Continued marketing and promotion of the benefits of Workplace Travel Plans should be pursued.	Employees / CCC/ NTA/ Business Associations	Ongoing
Green Schools Programme	Travel is a specific theme within the An Taisce Green Schools programme which is an international environmental education programme. As part of their Action Plan, participating schools set their own travel targets, with the ultimate aim of increasing the number of pupils walking, cycling, parking and striding, car-sharing or using public transport.	Whilst there is only one school on Little Island, the development (or refresh) of a School Sustainable Travel Action Plan should be encouraged as improved walking and cycling measures are delivered on island.	School	Short / Medium Term
Travel Awareness Programme	Making people aware of their options with regard to sustainable methods of transport.	Innovative marketing campaigns could be developed as on-island public transport options come on stream.	CCC / Bus Éireann / NTA	Short / Medium Term

Type of Measure	Description	Application to little Island	Responsible bodies	Timeframe
Public Bike Hire Scheme	Provision of accessible on-street bicycles for rent	Potential to encourage rail travel by providing on-street bicycles for rent at the railway station and employment locations throughout the island. Would require feasibility assessment.	CCC / NTA	Medium Term
Workplace Destination Facilities	Provision of bike storage, lockers and shower facilities for those who choose to walk/run/cycle to work.	There is an opportunity to encourage all workplaces on Little Island to provide facilities for those wishing to walk or cycle to work.	CCC / NTA	Short Term
Car Sharing	Two or more people arranging to travel to work together.	Further marketing will allow for greater development of this travel option. This initiative could be supported through the reallocation of parking spaces to car-pooling	Employees / CCC/ NTA/ Business Associations	
E-working	The ability to work from remote locations, in particular home.	Advances in broadband and communications capabilities have allowed for greater numbers of people working from home. Given the strategic employment function of Little Island, the promotion of E-Working could contribute significantly to encouraging sustainable travel.		

Table 10.6 Potential TDM Measures Applicable to Little Island

10.5 Summary

10.5.1 The previous sections of this report outline the identification of the emerging preferred LITS Strategy and present the results of its performance measured against the study objectives and KPIs. In Summary:

- It has been concluded that the provision of a 3rd interchange on little Island **should not** form part of the transport strategy for the following reasons:
  - The creation of another interchange on the N25 directly contradicts national policy seeking to safeguard the capacity and safety of the national road network;
  - The cost of construction of this scheme is extremely high and is unlikely to be funded by national agencies;
  - The construction of the new interchange at its proposed location is directly adjacent to environmentally protected lands; and
  - An alternative, cost effective and less environmentally sensitive, road capacity enhancement solution (Scenario 3) has been developed which could be delivered in a short term horizon.

- The emerging preferred strategy for Little Island is a combination of measures from Scenario 3 and Scenario 5, and includes:
  - **Short term road capacity enhancements** to assist in reducing congestion and delay for traffic entering and exiting Little Island in the AM and PM peak hours;
  - A **range of public transport improvements** to support sustainable travel; and
  - A suite of **demand management measures** (including elements such as parking management, flexi-time working etc.) to support the use of sustainable travel and assist in reducing car demand on the network.

- The KPI assessment indicates that the emerging preferred strategy performs well in achieving the identified LITS Vision and Objectives, as the proposed measures:
  - reduce journey times to/from Little Island, thus supporting its planned economic expansion;
  - reduce congestion and queueing leading to a decrease in vehicular emissions and reduce the environmental impact of transportation in Little Island;
  - promote the use of public transport which supports sustainable travel; and
  - comply with all National, Regional and Local policies and deliver a multi-modal transport network which facilitates access for all.

11. SUMMARY & NEXT STEPS

11.1 Overview

11.1.1 Cork County Council have commissioned SYSTRA and CH2M Barry to develop a transportation strategy for Little Island. The overall aim of the Little Island Traffic and Transportation Study (LITS) is to:

- identify the existing transportation issues within Little Island;
- explore potential solutions; and
- ensure that there is an integrated and balanced approach to transportation engineering for the future of the Island.

11.1.2 This is required so that Little Island can fulfil its strategic function as an employment location, logistics hub and residential community.

11.1.3 This Strategy Development Report provides an overview of progress to date including:

- National, regional and local planning and policy documents guiding the development of Little Island;
- current traffic conditions in Little Island including key issues identified during site visits and public consultation;
- the evaluation framework utilised to assess various LITS strategies including the development of a study vision and goals;
- the development of the Little Island Traffic Model (LITM) used to test various transport strategies; and
- the assessment of test strategies through the identified evaluation framework; and
- the identification of the emerging preferred LITS Strategy.

11.1.4 The Strategy Design Report will include a Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) undertaken in conjunction with the preparation of the Little Island Transport Strategy.

Policy Context

11.1.5 Chapter 2 of the report provided an overview of the relevant national, regional, local and environment policies, strategies and plans that relate to Little Island and this study. Key points contained in the plans pertinent to Little Island include:

- Cork identified as a “Gateway”: a strategic location, nationally and regionally;
- The draft NPF plans for an increase in population and employment in the Cork Gateway
- Little Island is designated as a Strategic Employment Area requiring improved bus service, walking/cycling, connectivity and local roads;
- The Cobh Municipal District LAP general objectives include provision for 2,000 jobs up to 2022, 250 no. dwellings and complete LITS; and
- The Capital Plan to 2021 includes the N8/N25 Dunkettle Interchange and €100M for Smarter Travel and Carbon Reduction measures;
- Cork Cycle Network Plan outlines 10 routes to/from/within Little Island;
- Workplace Travel Plans are required for companies with over 100 employees.

1st Phase Public consultation

11.1.6 Chapter 3 outlines the stakeholder consultation process undertaken and the submissions received. After carrying out a thorough consultation process it was established that the main concerns of key stakeholders in Little Island are as follows:

- Traffic Congestion/Volume –comments relating to the volume and congestion of traffic entering/exiting Little Island, particularly at peak hours;
- Safety Concerns – Safety concerns for pedestrians, cyclists, children in residential areas, safety for drivers, speeding HGVs and access for emergency vehicles;
- Walking/Cycling –comments highlighted the lack of pedestrian/cyclist facilities and outlined possible solutions;
- Public Transport –comments relating to the lack of a bus service and requests for improved public transport services;
- Parking - comments relating to the negative impact of illegal parking. More specifically, HGVs parking illegally and employees parking in residential areas;
- Speeding – negative comments regarding speeding vehicles;
- Condition of existing infrastructure – concerns relating to poor road surfaces and pinch points on the road network; and
- Improvements to infrastructure – suggestions regarding upgrades to existing infrastructure including provision for an additional access to Little Island;

Baseline Transport Assessment

11.1.7 In Chapter 4, a detailed evaluation was undertaken of the current traffic and public realm conditions within Little Island. The results of this are summarised below:

Traffic Movements

- Due to the current capacity constraints at existing junctions and the large number of employees working on the Island, congestion is common in peak times with employees and residents travelling to/from/within Little Island.
- As expected, the highest levels of traffic on Little Island are experienced at the exits/entrances to and from Little Island. The traffic count results indicate that the busiest movement during the AM peak is the right turn onto the overbridge from the N25 eastbound slip road with 783 vehicles. The western entrance (Richmond to R623) has a similar number of vehicles, at 781.
- In the PM peak, the locations with the highest level of turning traffic occur at the accesses to the N25 slip roads east and westbound at the eastern 'gateway' with flows of 496 and 575 vehicles respectively. The results indicate less vehicles travelling through the western exit at PM peak (407) when compared with the eastern exit.
- The busiest junction in Little Island is the An Crompan roundabout junction. All traffic entering/exiting Little Island at the N25 Interchange travels via this roundabout.
- Pedestrian movements were highest at the junctions between the train station and Eastgate Business/Retail Park. The N25 overbridge experienced the highest pedestrian volumes in the PM peak with 249 pedestrians travelling towards the train station.

Travel Survey Results

11.1.8 Statistical information was gathered from a total of 103 questionnaires completed by members of the public. Key statistical findings include:

- 98% of respondents owned or have access to a car;
- 91% of respondents stated they travel to/from/within Little Island daily;
- 77% rate the general traffic conditions in Little Island as very poor (1% rating it as good);
- 35% rate pedestrian infrastructure in Little Island as very poor (3% rating it as good);
- 67% rate the cycling infrastructure as very poor (1% rating it as good);
- 53% rate the public transport provision as very poor (3% rating it as good); and
- 26% rate car parking provision as poor (11% rating it as very good).

Road Network Descriptions and Issues

- Little Island is effectively a peninsula settlement; with the N25 acting as a boundary to the north while to the east, west and south is Cork Harbour. The area is accessed via the Dunkettle Interchange or the N25 Interchange;
- National routes accessible from the Dunkettle Interchange and the N25 Interchange include the M8, N25 and N40 providing access to the wider national road network;
- There is one regional route (R623) which acts as the arterial route through Little Island. It links the eastern and western accesses and all local and private roads accessing residential/commercial/industrial areas branch from this;
- The R623 is heavily trafficked and due to capacity constraints at the 'gateway' junctions exiting/entering Little Island, congestion and long queuing can occur during peak periods. This can be compounded by traffic congestion on the nearby national routes; and
- Further to the 'gateway' junctions, there are currently capacity issues at the junctions exiting the Eastgate Business/Retail Park, Island Cross and the L2985 Ballytrasna junction.

Pedestrian Facilities

- Pedestrian facilities are of varying quality in Little Island with issues such as narrow footpaths, lack of crossing facilities and poor surfacing and lighting noted during public consultation and site visits;
- The poor pedestrian facilities, combined with a high level of HGV volumes, create an unattractive environment for pedestrian travel.

Cyclist Facilities

11.1.9 Currently, cyclist facilities are very poor in Little Island. There are no dedicated cycle lanes on any routes within the Island. Apart from cycle parking provision at several businesses, there are no cycle parking facilities. Encouraging cycling is a challenge in the Little Island area due to the relatively inhospitable road infrastructure and the relatively long distances from the city and surrounding residential areas.

11.1.10 The Cork County Council Cycle Network Plan currently outlines the existing cycle mode share for AM work trips as 0.7%. The projected target for cyclists commuting to work by bicycle is 5%.

11.1.11 The road network within Little Island represents a poor cycling environment due to the following:

- Lack of cycle lanes and bike parking facilities within Little Island;
- The N25 is one of the major routes connecting the city and suburban areas to Little Island via the Dunkettle Interchange and the N25 Interchange. This dual-carriageway road is not the ideal environment for cycling due to high-speed traffic;
- Presence of large volume of HGV traffic accessing the industrial/commercial estates within Little Island;
- Junction design – there are several roundabout junctions within Little Island. These can be difficult for cyclists to negotiate safely; and
- During peak times, traffic congestion can be significant on the roads, creating obstructions for cyclists and forcing them to navigate between/around stationary vehicles.

Public Transport Provision & Facilities

- At present Little Island does not have a dedicated bus service. There is one infrequent service travelling adjacent to Little Island via 'The Old Youghal Road'
- Little Island train station is situated on the Cork-Cobh and Cork-Midleton railway lines. In the AM and PM peak times, services are frequent, running every 15 minutes. Outside peak hours' services are reduced at times to every 45 minutes. In total, 42 trains per day run on the Midleton to Cork route on weekdays and similarly 46 trains per day operate the Cobh to Cork route.
- Both the train station and the bus stop are located outside Little Island so commuters must walk/cycle to their destination within Little Island. From either the bus or train station, it is approximately 500m to the Crompan roundabout (5 minutes' walk) and 1km to the centre of the Eastgate retail park (15 minutes' walk).

HGVs & Servicing

- Due to the commercial and industrial nature of many of the areas in Little Island, a significant volume of HGVs travel to/from/within Little Island. Little Island operates as the destination/origin for all HGVs;
- HGVs have a negative impact on walking and cycling and safety concerns were raised through the public consultation, particularly where industrial/commercial areas are located close to residential housing estates;
- HGV movements have defined the layout of several junctions i.e. large turning radii, which negatively impacts the safety of pedestrians crossing roads.

Parking Arrangements

- Due to the nature and density of the developments in Little Island, there are differing types and mixes of uses, mainly office blocks, industrial plants, factories/warehouses and retail parks;
- Based on the first public consultation, 80-90% of employees drive a vehicle to work;
- A significant number of parking spaces are provided within Little Island to cater for the demand.

Junction Evaluation

- In total, 16 junctions were evaluated identifying the current facilities and key issues at each. There is scope for improvement at all junctions apart from the recently upgraded Island Cross junction. Amendments to junction layout can increase traffic capacity while pedestrian and cycle facilities can be improved at most junctions.

Evaluation Framework

11.1.12 Chapter 5 outlined the evaluation framework which will be utilised to identify the preferred Little Island Transport Study.

11.1.13 Through a review of local and national policy, public consultation and site visits, the following vision was developed for the Little Island Transport Study:

"To create a safe and efficient transport network supporting ease of movement for all, which allows residents and businesses to work together to improve the quality of life within Little Island, and strengthen its position as a Strategic Employment Centre"

11.1.14 Evaluation objectives have been developed to assist in achieving the defined vision for Little Island under guidance from DTTAS's Common Appraisal Framework for Transport Projects and Programmes;

11.1.15 Key Performance Indicators (KPI's) have been identified and were used to measure the performance of the Little Island strategies under the various study objectives; and

11.1.16 The KPI's are both qualitative and quantitative and were given a ranking score relative to the Do Minimum scenario.

Little Island Local Area Model Development

11.1.17 Chapter 6 describes the development of AM and PM peak traffic models for the little Island area which has been used to test the various Little Island Transport scenarios. In summary:

- The NTAs SWRM was used as a basis for development of the Little Island Traffic Model with additional network and zonal detail added to more accurately represent localised traffic movements;
- The model has been calibrated and validated in-line with TII Project Appraisal Guidelines and meets all specified criteria for both the AM and PM peaks;
- The Little Island Traffic Model is fit for purpose, and represents AM and PM peak period base year traffic conditions well, as demonstrated statistically through calibration and validation. It provides a robust basis for assessing the impacts on the road network of any future infrastructure improvements/developments.

Strategy Development

11.1.18 Chapter 7 provides an overview of the strategies which were identified to achieve the vision and objectives of the LITS. Various road and public transport measures have been identified

through a review of policy, public consultation responses and taking cognisance of existing plans for the wider Cork Area;

11.1.19 These measures have been combined into six distinct strategies for testing, namely:

- **Do Minimum:** Reference case including only committed transport schemes such as the Dunkettle Interchange upgrade
- **Scenario 1:** includes a new Left-In/Left-Out interchange on the N25
- **Scenario 2:** includes a new full movements grade separated interchange on the N25
- **Scenario 3:** includes road capacity upgrades at the existing N25 interchange, An Crompán Roundabout and Ballytrasna Park Junctions
- **Scenario 4:** includes public transport priority measures and the re-routing of existing Bus Éireann services through Little Island
- **Scenario 5:** includes public transport priority measures, re-routing existing bus services on-island, additional proposed bus routes, a new shuttle bus service, and a new train station and park and ride site at North Esk

11.1.20 All of the above scenarios have been tested through the evaluation framework with the best performing measures forming the emerging preferred LITS strategy.

Strategic Environmental Assessment

11.1.21 The LITS has integrated all recommendations arising from the SEA and Appropriate Assessment (AA) processes into the Strategy;

11.1.22 The Strategy facilitates significant improvements in sustainable mobility and associated positive effects relating to emissions to air (including greenhouse gas emissions and noise) and human health;

11.1.23 The Strategic Environmental Assessment for the identification of the emerging preferred strategy has been presented. In Summary:

- Scenarios 1 & 2 have the potential to have adverse impacts on the conservation objectives and qualifying interests of the Cork Harbour SAC and SPA; and
- Scenarios 3, 4 and 5 involve road capacity upgrades and public transport priority measures within the confines of existing roads, and as such are unlikely to have any negative impacts on biodiversity, landscape, soils and geology, flooding or cultural heritage.

Strategy Appraisal

11.1.24 Chapter 9 details the comparative assessment of the five proposed transport strategies identified to support the sustainable growth of Little Island. Each Scenario has been assessed quantitively, using the previously described transportation models, and qualitatively against the study objectives and KPIs. In summary, the scenario results are as follows:

Scenario 1

- provides a substantial reduction in congestion and delay when compared to the Do Minimum scenario;

- queuing remains in the peak periods, particularly in the AM; and
- fails to support sustainable modes, and as such, any development growth will be dependent on the private car.

Scenario 2

- performs the best in terms of providing substantial additional road capacity and reducing congestion and delay on the network;
- the cost of this scenario is substantially higher than all other alternatives;
- the construction of the full movements interchange may not be feasible due to the location of environmentally protected lands; and
- promotes unsustainable growth in Little Island with an increase in car mode share.

Scenario 3

- additional road capacity results in a considerable reduction in queuing and delay in Little Island;
- upgrades could be delivered for a low cost in a relatively short timeframe;
- does not support a mode shift to more sustainable travel; and
- additional road capacity starts to gets used up in the future year due to growth in Little Island and the reliance on the private car leading to congestion.

Scenario 4

- proposed measures are not significant enough to generate a substantial mode share response; and
- significant levels of congestion remain in the AM and PM peak periods.

Scenario 5

- provides a substantial increase in public transport mode share with an approx. 6% reduction in car demand; and
- considerably reduces the level of congestion on the network, however, queuing still occurs in the peak hours

Emerging Preferred Strategy

11.1.25 Building upon the comparative assessment of the five strategies undertaken in Chapter 9, Chapter 10 establishes the emerging preferred LITS Strategy. This chapter identifies the preferred strategy and has re-tested it through the Evaluation Framework to ensure that it is achieving all of the study objectives.

- It has been concluded that the provision of a 3rd interchange on little Island should not form part of the transport strategy for the following reasons:
- The creation of another interchange on the N25 directly contradicts national policy seeking to safeguard the capacity and safety of the national road network;
- The cost of construction of this scheme is extremely high and is unlikely to be funded by national agencies;
- The construction of the new interchange at its proposed location is directly adjacent to environmentally protected lands; and

- An alternative, cost effective and less environmentally sensitive, road capacity enhancement solution (Scenario 3) has been developed which could be delivered in a short-term horizon.

11.1.26 The emerging preferred strategy for Little Island is a combination of measures from Scenario 3 and Scenario 5, and includes:

- Short term road capacity enhancements to assist in reducing congestion and delay for traffic entering and exiting Little Island in the AM and PM peak hours;
- A range of public transport improvements to support sustainable travel; and
- A suite of demand management measures (including elements such as parking management, flexi-time working etc.) to support the use of sustainable travel and assist in reducing car demand on the network.

11.1.27 The KPI assessment indicates that the emerging preferred strategy performs well in achieving the identified LITS Vision and Objectives, as the proposed measures:

- reduce journey times to/from Little Island, thus supporting its planned economic expansion;
- reduce congestion and queueing leading to a decrease in vehicular emissions and reduce the environmental impact of transportation in Little Island;
- promote the use of public transport which supports sustainable travel; and
- comply with all National, Regional and Local policies and deliver a multi-modal transport network which facilitates access for all.

11.2 Next Steps

11.2.1 With reference to the study methodology flow chart contained in Chapter 1 of this report, this Strategy Design Report represents Actions 1-13 of the Little Island Transportation Study. The following steps in the study are as follows:

- Presentation of the emerging preferred Strategy to the elected Cork Co. Co. members;
- Carry out design of the preferred option and write the draft final report;
- Carry out a second round of public consultation; and
- Complete the Little Island Transportation Study final report based on feedback from members of the public, key stakeholders and elected Cork Co. Co. members.

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