Kilkenny Local Transport Plan

KLTP Draft Optimisation and Refinement Report

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Kilkenny County Council

Kilkenny Local Transport Plan

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Project Manager:	Stewart Loose
Author:	Jennifer Egan
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Jacobs Engineering Ireland Limited

Mahon Industrial Estate
Blackrock
Cork T12 HY54
Ireland
T +353 21 4515777
F +353 21 4358977
www.jacobs.com

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Contents

1. Introduction

1.1 Overview

Kilkenny County Council (KCC) has commissioned Jacobs Engineering Ireland Ltd. (Jacobs) to develop a Local Transport Plan for the City of Kilkenny and its Environs. Kilkenny City is a designated 'Key Town' in the recently adopted *Regional Spatial and Economic Strategy* (RSES) *for the Southern Region* and the second largest settlement in the South-East Region.

Kilkenny City's development in the period up to 2040 is based upon ambitious growth targets, investment in sustainable transport, and a regeneration agenda predicated on the redevelopment of accessible town centre sites and the '10-minute city' concept. The Kilkenny Local Transport Plan (KLTP) must therefore articulate these ambitions in a robust and evidence-based fashion to provide Kilkenny with a framework for prioritising and obtaining sustainable transport investment.

The KLTP is envisaged to be a short to medium term plan to cover the period 2021-2026 and beyond to support the development of a comprehensive, sustainable transport network and to support the implementation of the *Kilkenny City and County Development Plan 2021-2027*.

Jacobs has undertaken the KLTP in line with the *Area Based Transport Assessment (ABTA) Guidance Note* produced by Transport Infrastructure Ireland (TII) and the National Transport Authority (NTA). The overarching aim of the ABTA process is to place the integration of land use and transport planning at the centre of the Local Area Plan preparation process. The methodology for the development of the ABTA is outlined as follows:

- Baseline Assessment;
- Establish Context for ABTA;
- Options Assessment;
- Optimisation and Refinement; and
- Finalisation of the Plan.

1.2 Purpose of this Report

This report builds upon the previous Context Report and Network Development Report where emerging preferred options across transport modes were identified. The proposals outlined in the Network Development Report were preliminary and require further analysis to understand the full impacts of their implementation which will be undertaken at this stage, optimisation and refinement.

This report sets out a more detailed analysis and further refinement of these proposals and will present a more robust reflection on the achievability or otherwise of the options and measures proposed within the Network Development Report.

1.3 Climate Change Emphasis

Since the Network Development Report, increasing emphasis is being applied to the role of transport in reducing greenhouse gas emissions and improving air quality. The Programme for Government 'Our Shared Future' updated in April 2021, outlines a commitment to an average 7% per annum reduction in overall greenhouse gas emissions from 2021 to 2030 (a 51% reduction over the decade) and to achieving net zero emissions by 2050. The Climate Action and Low Carbon Development (Amendment) Act 2021 will support Ireland's transition to Net Zero. The Act ensures a legally binding framework with clear targets and commitments set in law.

Local authorities will have a key role to play in the national net zero ambitions including developing transport policy. Emissions from the transport sector accounted for 20.4% of Ireland's greenhouse gas emissions in 2019. Local Authorities through Local Transport Plans can develop ambitious sustainable transport agendas with net zero and sustainable modes of transport at the heart of transport policy.

The Kilkenny Local Transport Plan will support the 2021 Climate Change Action Plan. A key target of the action plan is to make growth less transport intensive through better planning, remote and home-working, modal shift to public transport and an expansion of cycle and walking networks. This report will consider the proposals developed through the Network Development Report to ensure that options support the climate change agenda. Where options are determined to have a negative impact on climate change and sustainability, this report will ensure such options are refined or replaced to align closely with climate change and sustainability objectives.

1.4 Policy Update – National Investment Framework

Developed by the Department of Transport, The National Investment Framework in Ireland (NIFTI) is a high-level, strategic framework that prioritises future investment in the land transport network to facilitate the delivery of the National Strategic Outcomes. It is designed to support the development of the transport network over the coming decades in enabling the National Planning Framework and to contribute towards positive social, environmental and economic outcomes throughout Ireland in the context of its growing population.

The National Strategic Outcomes are explained in Section 2.2. NIFTI establishes four non-hierarchical investment priorities, which are summarised in Table 1-1 and which replace the three hierarchical investment priorities developed in the Strategic Investment Framework for Land Transport.

Table 1-1 Summary of the four Investment Priorities established in The National Investment Framework in Ireland

Investment Priority	Description
Decarbonisation	The transport sector is Ireland's second largest source of greenhouse gas emissions. Future transport investment should decarbonise to the greatest extent possible whilst also meeting the travel demand of a growing population; this involves investing in sustainable travel modes and adopting low emission vehicles to reduce private car emissions.
Protection and Renewal	Existing infrastructure should be protected and renewed to maximise the benefits of the network in its current state and to lower costs. In some cases, particularly with regards to safety, interventions beyond maintaining the network will be required and should be prioritised accordingly.
Mobility of People and Goods in Urban Areas	Population growth should be compacted to make urban settlements more vibrant and sustainable places in which to live, with a focus on channelling this growth into the five cities. Urban congestion should be tackled through sustainable travel measures, including expanded walking and cycling infrastructure, better public transport services and transit-orientated development.
Enhanced Regional and Rural Connectivity	Delivering more reliable, shorter journey times between centres of scale for people and goods to support regional and rural accessibility and a strong and balanced economy.

The investment priorities are complemented by intervention and modal hierarchies to ensure that investments meet their objectives in the most appropriate, environmentally friendly, and cost-effective manner. Whereas the investment priorities identify the types of investments to make, the hierarchies guide in the execution of these investments.

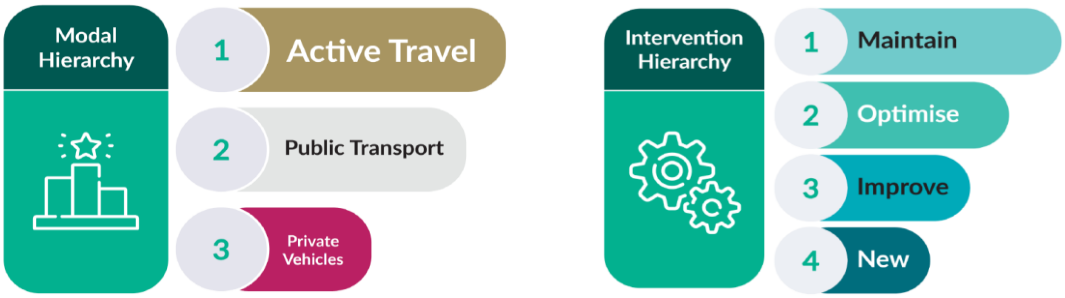

Figure 1-1 Modal and intervention hierarchy. Source: NIFTI

The modal hierarchy pushes future transport planning to advance sustainable travel modes wherever possible, whilst recognising the need for the private car at times and in certain places. The intervention hierarchy aims to keep investment proportionate to the problem identified, prioritising maintaining and optimising the existing network over implementing new infrastructure.

In October 2021, as part of Project Ireland 2040, the National Development Plan (NDP) was published. The development plan sets out the Government's over-arching investment strategy and budget for the period 2021-2030. The plan has a major focus on improving the delivery of infrastructure projects to ensure speed of delivery and value for money. The NDP recognises the importance of significant investment in sustainable mobility (active travel and public transport) networks if the National Planning Framework population growth targets are to be achieved.

Investing in high quality sustainable mobility will improve citizens' quality of life, support our transition to a low-carbon society and enhance our economic competitiveness. The NDP represents a step-change in the approach towards funding active travel in Ireland. Over the next 10 years approximately €360 million per annum will be invested in walking and cycling infrastructure across the country. Significant investment will also be focussed on public transport infrastructure including improved bus services.

In the context of NIFTI and the NDP, the Kilkenny LTP must facilitate the realisation of the National Strategic Outcomes and align with the four investment priorities. This involves making the most of the existing infrastructure, optimising it where needed and generally only building new infrastructure where strictly necessary. Further, the LTP should improve the mobility of people in the city and its environs by prioritising active travel and public transport over private vehicles – for example, through the implementation of low traffic neighbourhoods, walking & cycling routes and improved bus services.

1.5 Option Refinement Assessment Methodology

Figure 1-2 presents an overview of the robust tiered assessment approach that was taken to produce preferred transport options for Kilkenny City and Environs for the Walking Network, Cycling Network, Public Transport Network, Road and Street Network and Demand Management Measures.

Tier 1 of the Option Development process was undertaken during the KLTP Context Stage. During this Stage, the 10-Minute City Context and Movement Strategy was established, as well as the 2040 mode share targets. Further detail can be found in the KLTP Context Report.

Following the Context Stage, Tier 2 consisted of the Option Development Stage which examined the high-level demand for all transport modes, proposed a suite of options and using a series of analyses, sifted through options to identify Emerging Preferred Options using the South East Regional Model (SERM) and Multi-Criteria Analysis (MCA).

This report details Tier 3, the Refinement and Optimisation Stage, which provides a detailed assessment of the emerging preferred options, including the use of the SERM.

The KLTP is subject to a Strategic Environmental Assessment (SEA) in line with the SEA Directive (2001/42/EU) to contribute to the integration of environmental considerations into the preparation and adoption of the Plan as concluded by the SEA Screening process. The SEA is being undertaken in parallel with the development of the KLTP and will influence the option development process.

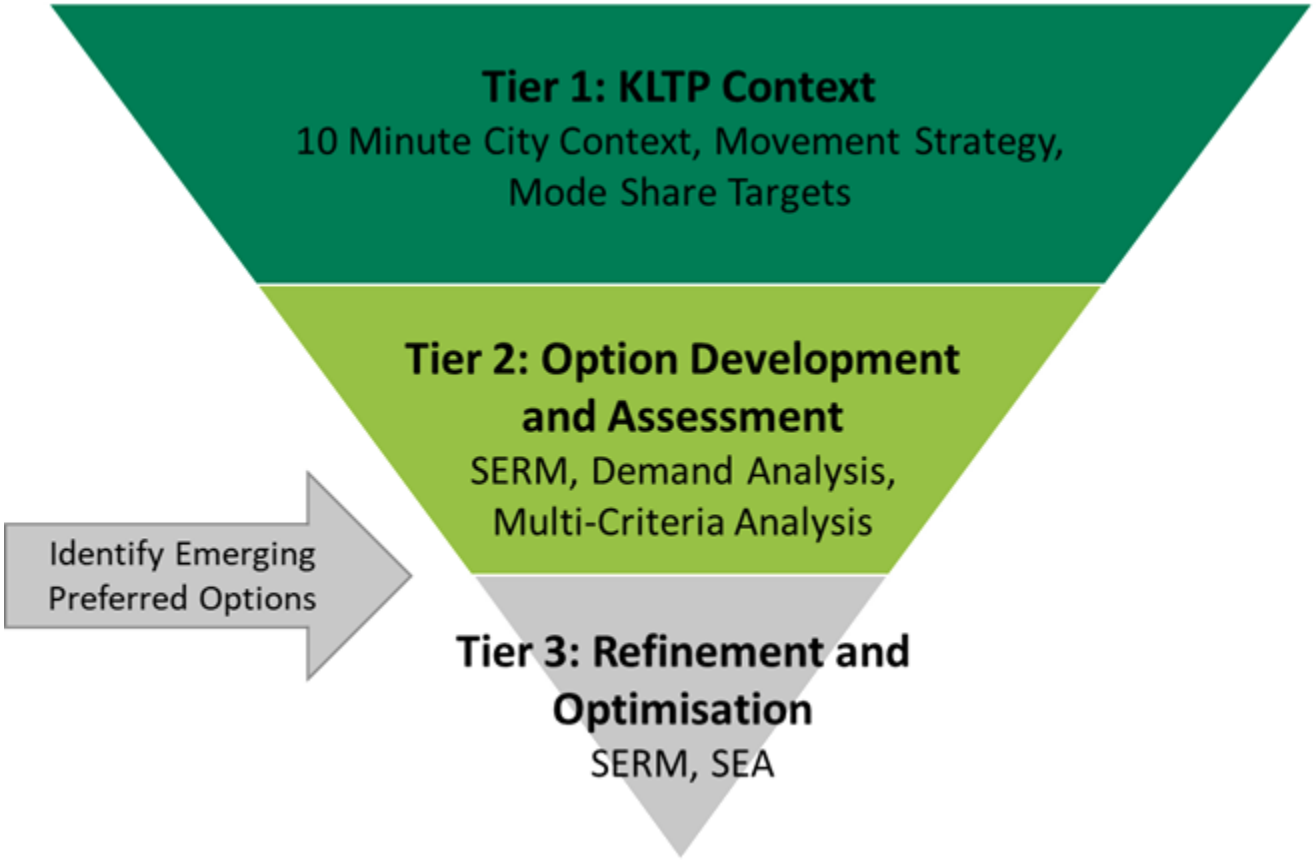

Figure 1-2 KLTP Option Development Methodology.

1.6 Report Structure

The remainder of the report will cover the following chapters:

Chapter 2 - Land-Use Scenario: The chapter provides a summary of the planning datasheet for the 2040 land use scenario produced by Kilkenny City Council in association with the National Transport Authority. The planning datasheets present growth projections for population, employment and education between 2016 and 2040 covering all of Ireland.

Chapter 3 - Walking Network Plan: During the Option Development Stage, an analysis was undertaken to examine the existing pedestrian environment as well as current pedestrian movements across the city. A high-level walking network was identified based on the identification of strategic and feeder routes. This chapter will progress the walking network plan by identifying specific action areas for intervention with a detailed assessment of potential improvements.

Chapter 4 - Cycling Network Plan: The Cycling Network Plan Chapter has identified a long term phased programme of cycling infrastructure improvements. The Network Development Report analysed existing conditions for cycle users as well as determining the potential for interventions. The report also developed a high -level network plan based on existing cycling patterns and desire lines. This chapter will confirm primary routes set out within the network plan for priority implementation, provide the strategic rationale for the network and present the recommended level of provision for individual routes.

Chapter 5 - Public Transport Network: The Network Development Report outlined the demand analysis, option development and route selection for the public transport network. The Network Development Report identified a 'bus service' level of provision as the preferred approach over alternatives such as metro, light rail and heavy rail. The report also recommended route alignment and frequency across a variety of bus corridors. This chapter has progressed the public transport network further by refining the route alignments and confirming recommended level of frequency. The chapter presents examples of bus priority measures which could be implemented within the city of Kilkenny.

Chapter 6 - City Centre Traffic Management: This chapter will continue to progress with a series of options developed during the Option Development stage. Following discussions with KCC, three options will be developed further, including a package of interventions for each option. These three options will be included within the model runs to understand the impacts that various measures would have on the 2040 network. Following the finding of the model, one CCTM option will be taken forward for further analysis.

Chapter 7 - Parking Strategy: During the Option Development Stage, a suite of options for parking management measures were considered. The Network Development Report reviewed existing parking standards as well as the implication of parking provision against the overall objectives of the KLTP. This chapter will present a refinement of parking options to take forward within the KTLP, including measures such as Park and Ride and Park and Stride. The Chapter will provide recommendations which support a functioning city centre within the remit of the KLTP.

Chapter 8 - Western Road Network: During the Network Development stage, a Multi Criteria Analysis (MCA) was undertaken to determine the merits of three options which could be implemented as part of the Western Road Network. The Network Development Report identified Option 2 as the most suitable solution to take forward. Option 2 consisted of the completion of the Kilkenny Ring Road and sustainable transport priority through the new developments. This Chapter will analyse the potential impact of this option including modal share and alignment against the KLTP objectives.

2. 2040 Land-Use Scenario

2.1 Introduction

Kilkenny County Council (KCC), in association with the National Transport Authority (NTA), prepared a planning datasheet for Kilkenny's 2040 land use scenario, aligned with the National Planning Framework 2040 (NPF) and Regional Spatial and Economic Strategy for the Southern Region (RSES) forecasts. The planning datasheets set out projections for population, employment and education figures at a Census Small Area (CSA) level. This section will present a summary of the 2040 planning datasheets and the projected growth from 2016 to 2040.

2.2 National Planning Framework

The NPF envisages significant population and employment growth for Ireland over the next twenty years and sets out a high-level strategic plan to guide this future development. Some of the key National Strategic Outcomes (NSO) and National Policy Objectives (NPO) in relation to accommodating this growth in a sustainable manner relevant to the KLTP are set out below.

2.2.1 National Strategic Outcome 1: Compact Growth

NSO 1 is concerned with managing the sustainable growth of compact cities, towns and villages to create more attractive places in which people can live and work. All our urban settlements contain many potential brownfield development areas, centrally located and frequently publicly owned, that are suitable and capable of re-use to provide housing, jobs, amenities and services, but which need a streamlined and co-ordinated approach to their development, with investment in enabling infrastructure and supporting amenities, to realise their potential. Activating these strategic areas and achieving effective density and consolidation, rather than more sprawl of urban development, is critical.

NSO 1 seeks to:

- Make better use of under-utilised land and buildings, including 'infill', 'brownfield' and publicly owned sites and vacant and under-occupied buildings;
- Improve liveability and quality of life, enabling greater densities of development to be achieved;
- Build on existing assets and capacity to create critical mass and scale for regional growth;
- Improve accessibility to and between centres of mass and scale and better integration with their surrounding areas; and
- Ensure transition to more sustainable modes of travel (walking, cycling, public transport) and energy consumption.

2.2.2 National Policy Objective 1b and 1c

NPO 1b and 1c set out high-level population and employment growth targets for each of the Regions. Kilkenny is located in the Southern Region, which is envisaged to accommodate around 340,000-380,000 additional people (i.e. a population of almost 2 million) and around 225,000 additional people in employment (i.e. 880,000 in total).

2.2.3 National Policy Objective 3a

NPO 3a is linked to achieving NSO 1 and sets out a target to "deliver at least 40% of all new homes nationally, within the built-up footprint of existing settlements".

2.3 Regional Spatial and Economic Strategy for the Southern Region

NPF growth targets are translated at a regional level through the RSES. The RSES has identified that County Kilkenny is to grow significantly from approximately 99,200 people in 2016 to around 114,500 by 2031.

Kilkenny City will be reasonably expected to accommodate a significant proportion of the growth based on the NPF's Compact Growth objective, its designation as a Key Town of the Southern Region and the *Kilkenny County Development Plan 2014-2020's* Core Strategy. The RSES envisages that all Key Towns should plan for population growth of at least 30% by 2040.

2.3.1 Kilkenny Forecast Population Growth

The population projections for Kilkenny City for 2026, 2031 and 2040, based on the NPF and RSES, are presented in Table 2-1 below.

Table 2-1 Kilkenny City Forecast Population Growth.

Year	2016	RSES 2026	RSES 2031	RSES 2040
Population	26,512	29,822 (12.5%)	31,477 (18.7%)	34,965 (30%)

The 2016 population for Kilkenny City as defined for RSES was 26,512 people. As the Kilkenny LTP study area boundary extends further to the environs of the city, the study area population in 2016 was slightly larger at 27,718. The spatial allocation of this population as well as 2040 population, employment and education forecasts are discussed in detail in Section 2.5

2.4 2040 Forecast Modelling

The development of the KLTP was supported by transport modelling using the NTA Regional Modelling System (RMS). Of the five regional models in the RMS, the South East Regional Model (SERM) has been used to model various options as part of the Optimisation and Refinement stage.

The SERM is a multi-modal model which includes 3 core modelling processes:

- Demand Model;
- Road Assignment Model; and
- Public Transport Assignment Model.

The SERM receives inputs from the National Demand Forecast Model (NDFM) and provides outputs for transport appraisal and secondary analysis. Key results are analysed within this report assessing proposed options, with a detailed description of the model development and results available in the *KLTP Transport Modelling Report*.

The model represents an average weekday. The day is split into five time periods considered within each of the regional models, detailed in Table 2-2. The periods allow the relative difference in travel cost between time periods to be represented. Representative peak hours are used in the assignment models, which are based on period to peak hour factors derived from survey data for each time period and mode.

Table 2-2 SERM Time Periods

Period	Demand Model Full Period
AM Peak	07:00-10:00
Morning Inter Peak (IP1)	10:00-13:00
Afternoon Inter Peak (IP2)	13:00-16:00
PM Peak	16:00-19:00
Off Peak	19:00-07:00

2.5 2040 Forecast Planning Datasheet

2.5.1 Overview

The Planning Datasheet is one of the main inputs of the model and is used to develop the land use scenarios to be run within the model. The baseline scenario is based on data from the 2016 Census, while the forecast scenario 2040 is built from the data from national and regional policy forecast growth and distributed at a local level.

The Planning Data referred to above is a national database of demographic and spatial variables for each of the 18,641 CSAs in the state. The main categories of planning data are:

- References and spatial definitions;
- Origin-based person types; e.g. age bands, gender, principal economic status, employment type, and various combinations of categories;
- Destination-based person types; e.g. employment type or education type; and
- Households.

2.5.2 2040 Planning Datasheet Summary

Table 2-3 details the high-level population, employment and education growth proposed for Kilkenny City and environs from 2016 to 2040, showing 2016 baseline, 2040 forecast, absolute growth from 2016 to 2040 and percentage growth from 2016 to 2040.

Table 2-3: Kilkenny City and Environs Summary 2040 Forecast Growth

Kilkenny City and Environs Growth	2016	2040	2016 to 2040 growth	2016 to 2040 %age growth
Population	27,718	36,020	8,302	30%
Employment	15,524	19,156	3,632	23%
Education	7,298	9,544	2,246	31%

2.5.3 Distribution of 2040 Forecast Growth at a Local Level

The sections below present population, employment and education numbers for the 2040 Land Use Scenario at a more granular detail, showing the distribution of growth within Kilkenny City and Environs. Comparisons between the 2016 data and the 2040 forecast are also made. The Study Area comprises three Electoral Divisions (EDs) which are defined by the Central Statistics Office (CSO) and align with the CSAs.

For the analysis in the following sections, the Study Area has been split into 11 sectors. These sectors align with the CSAs and are used to present a breakdown of the values and growth. Figure 2-1 shows the designated sectors.

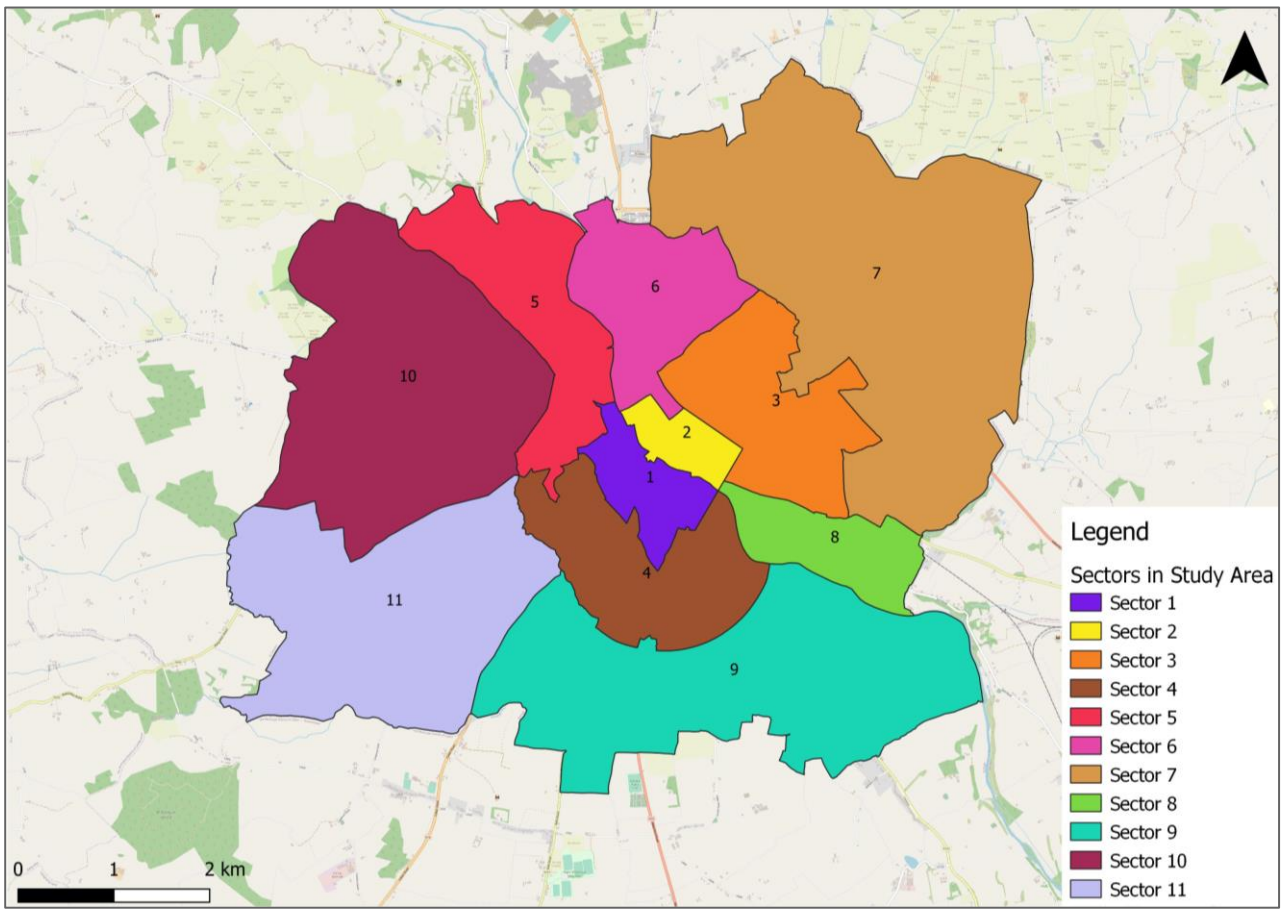

Figure 2-1 Designation of sectors within the Study Area

2.5.4 2040 Population Growth

Table 2-4 provides a comparison between the 2016 and the 2040 Planning Datasheets at a local level for population. As shown, there is a significant uplift in population within the City Centre on brownfield sites, including the Abbey Quarter and Sweeney Orchard sites. There is also significant population growth to the west of the City Centre with greenfield development of two new neighbourhoods, Loughmacask and the Western Environs.

Table 2-4: Kilkenny City and Environs 2040 Population Forecast Growth

Sector	Sector Name	2016 Population	2040 Population	2016 to 2040 Growth	2016 to 2040 %age growth
1	Core City Centre West	2,491	2,909	418	17%
2	Core City Centre East	1,675	2,315	640	38%
3	City SE	5,700	5,808	108	2%
4	City SW	8,785	9,746	961	11%
5	City NW	3,554	3,818	264	7%
6	City NE	2,612	2,678	66	3%
7	East Environs	574	576	2	0%
8	SE Environs	272	292	20	7%
9	Loughboy	736	744	8	1%
10	West Environs	320	2,643	2,323	726%
11	SW Environs	999	4,489	3,490	349%
	Total	**27,718**	**36,020**	**8,302**	**30%**

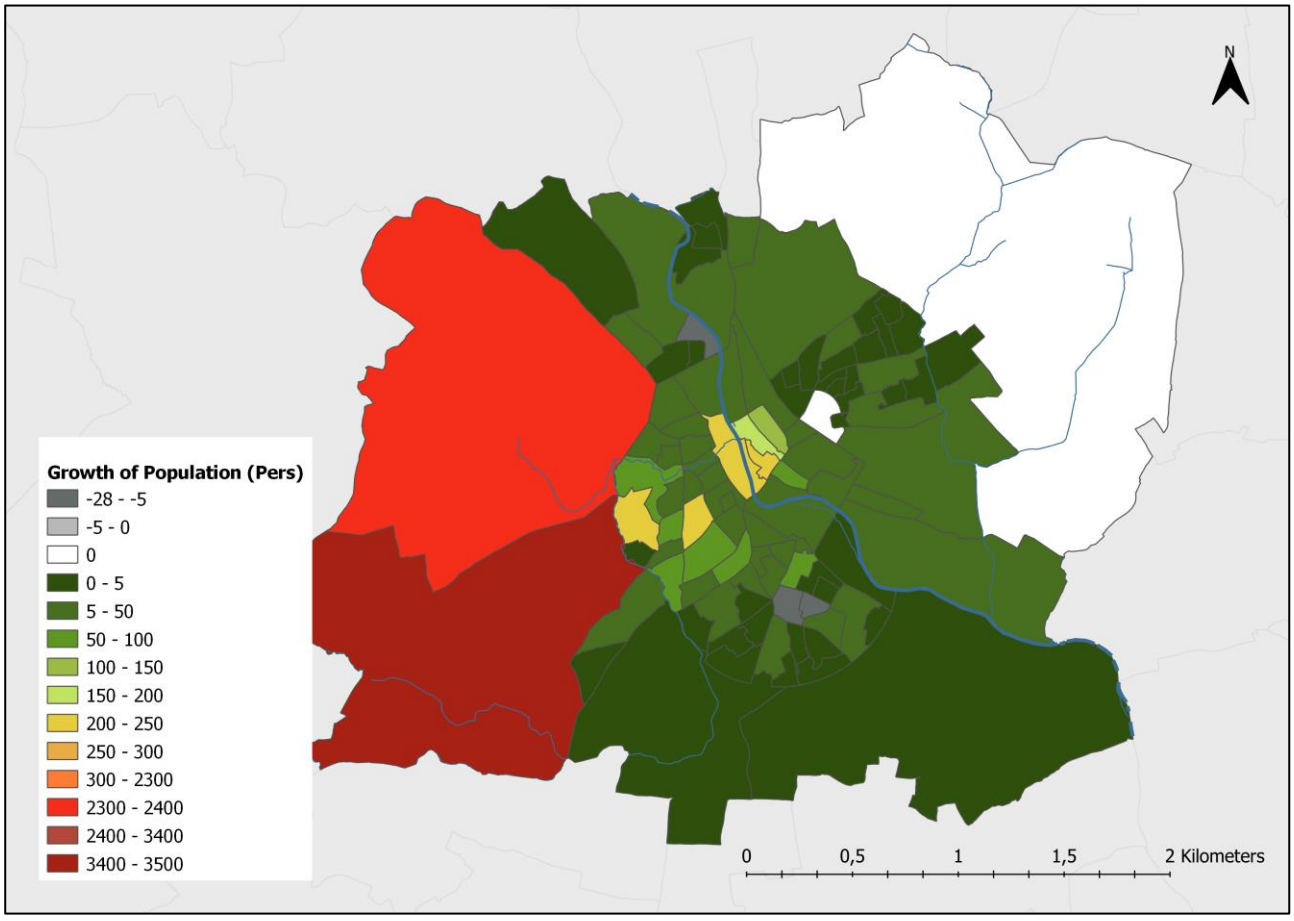

Figure 2-2: Kilkenny City and Environs 2040 Population Forecast Growth Distribution

The population growth distribution between 2016 and 2040 is shown for each CSA in Figure 2-2 and shows the proposed increase in population spatially distributed throughout the study area. As outlined above, there is a significant uplift in population within the City Centre on brownfield sites including the Abbey Quarter and Sweeney Orchard sites, as well as the greenfield development neighbourhoods of Loughmacask and the Western Environs.

2.5.5 2040 Employment Growth

Table 2-5 provides a comparison between the 2016 and the 2040 Planning Datasheets at a local level for employment. As shown in Table 2-5, across the entirety of the Kilkenny and its Environs area there is forecast employment growth of just over 23%. There is a significant uplift in employment in the Core City Centre West, Loughboy, West Environs and the SW Environs sectors; in particular, the latter is forecast to experience substantial growth of 261%, albeit from a low baseline. The other seven sectors are forecast to experience growth of between 0 and 2%.

Table 2-5: Kilkenny City and Environs 2040 Employment Forecast Growth

Sector	Sector Name	2016 Employment	2040 Employment	2016 to 2040 Growth	2016 to 2040 %age Growth
1	Core City Centre West	4,064	5,836	1,772	44%
2	Core City Centre East	1,279	1,301	22	2%
3	City SE	1,207	1,228	21	2%
4	City SW	1,637	1,659	22	1%
5	City NW	2,097	2,143	46	2%
6	City NE	730	737	7	1%
7	East Environs	242	242	0	0%
8	SE Environs	1,726	1,760	34	2%
9	Loughboy	2,248	3,556	1,308	58%
10	West Environs	217	417	200	92%
11	SW Environs	77	278	201	261%
	Total	**15,524**	**19,156**	**3,632**	**23%**

The employment growth distribution between 2016 and 2040 is shown for each CSA in Figure 2-3. This shows the proposed increase in employment numbers spatially distributed throughout the study area.

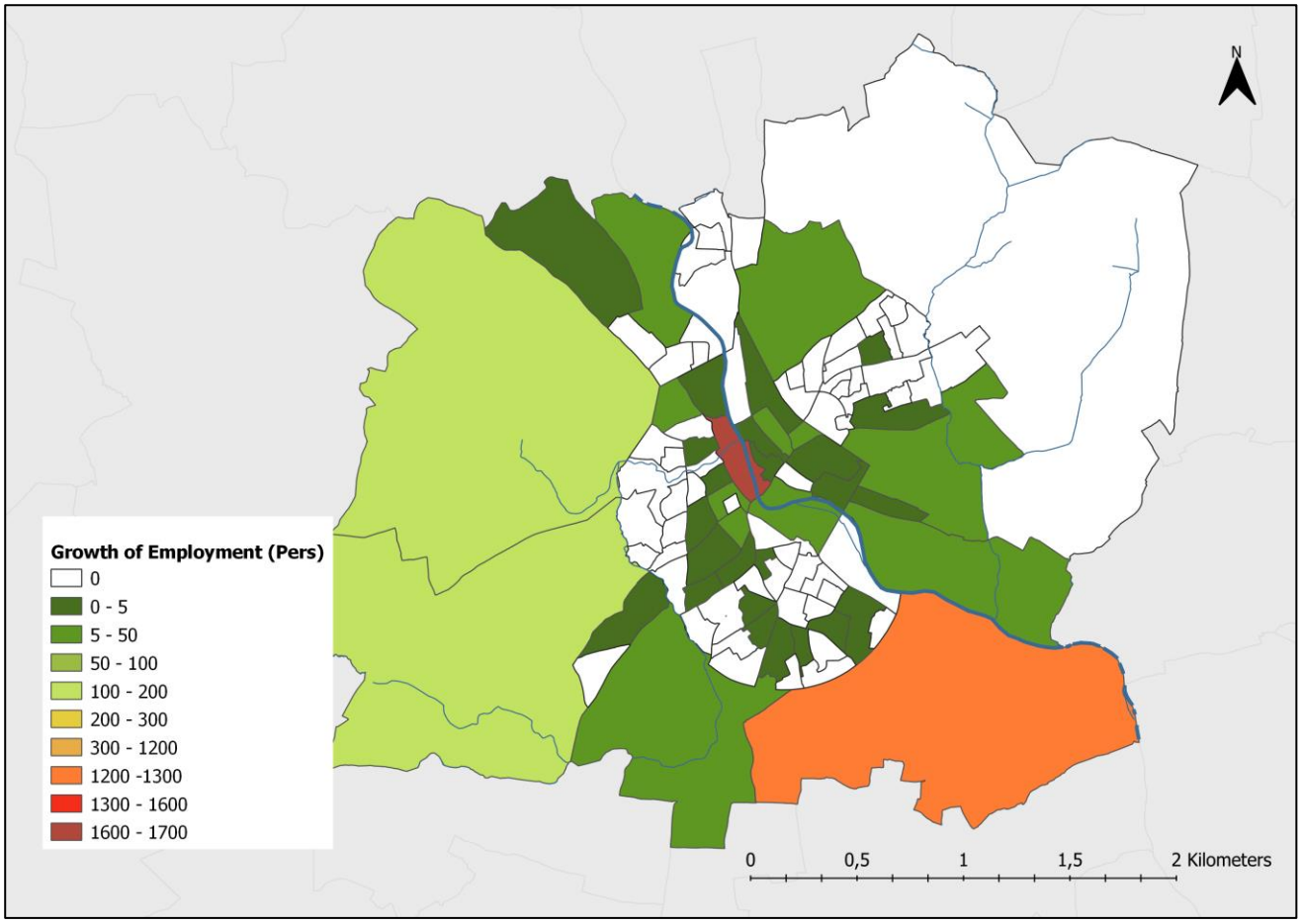

Figure 2-3: Kilkenny City and Environs 2040 Employment Forecast Growth Distribution

2.5.6 2040 Education Growth

Table 2-6 provides a comparison between the 2016 and the 2040 Planning Datasheets at a local level for places of education. As shown in Table 2-6, there is an uplift in education of 31% across the entirety of Kilkenny and its Environs. Most of this growth is focussed on the West and SW Environs, with smaller patches of growth expected in the City SW, City NW and City NE sectors.

Due to existing capacity restraints and in order to meet future demand, the CBS school is due to relocate from its current location on James's Street, in the Core City Centre West sector, to a new site that is approximately four times larger on Dunningstown Road, in the City NW sector.

The education growth distribution between 2016 and 2040 is shown for each small area in Figure 2-4 and shows the proposed increase in employment numbers spatially distributed throughout the study area.

Table 2-6: Kilkenny City and Environs 2040 Education Forecast Growth

Sector	Sector Name	2016 Education	2040 Education	2016 to 2040 Growth	2016 to 2040 %age growth
1	Core City Centre West	1,682	1,215	-467	0%

Sector	Sector Name	2016 Education	2040 Education	2016 to 2040 Growth	2016 to 2040 %age growth
2	Core City Centre East	0	0	0	0%
3	City SE	169	169	0	0%
4	City SW	2,923	3,116	193	7%
5	City NW	1,457	1,559	102	7%
6	City NE	911	1,001	90	10%
7	East Environs	<5	<5	0	0%
8	SE Environs	0	0	0	0%
9	Loughboy	150	158	8	5%
10	West Environs	<5	623	620	> 1,000%
11	SW Environs	<5	1,701	1,700	> 1,000%
	Total	**7,298**	**9,544**	**2,246**	**31%**

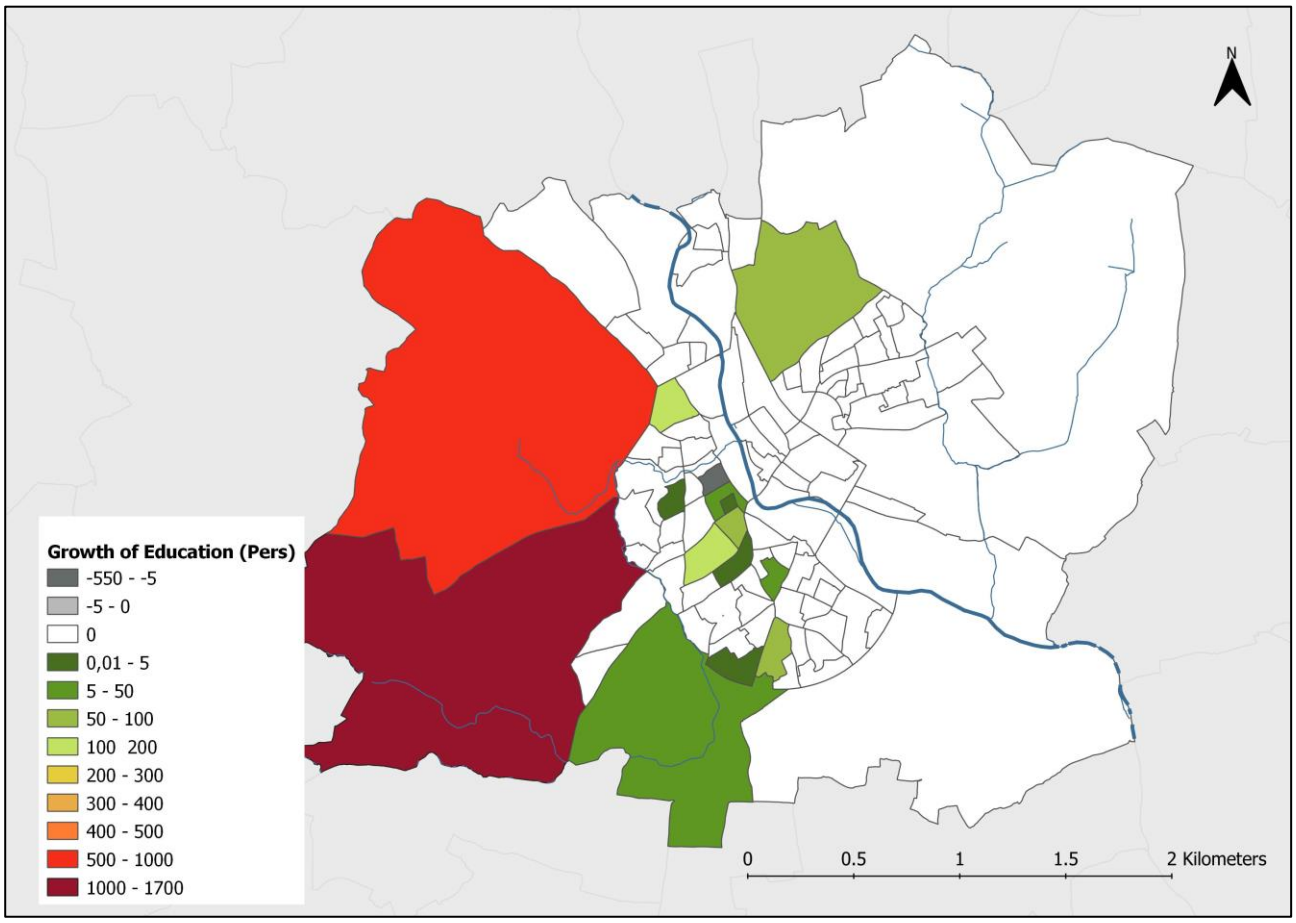

Figure 2-4: Kilkenny City and Environs 2040 Education Forecast Growth Distribution

2.6 2040 Land-Use Scenario Conclusion

By 2040, the Kilkenny and Environs area is forecast to experience substantial growth in population, employment and education. Much of this growth is expected to be in the West and SW Environs.

Kilkenny's population is anticipated to increase by 30% to just over 36,000 people by 2040. The West and SW Environs will constitute a substantial proportion of this increase, with increases of 726% and 349% respectively. The West Environs will become a highly populated sector. The Core City Centre East and West sectors will also experience growth of 17% and 38% respectively. In contrast, little to no population increase is expected in the Loughboy, East Environs, City SE and City NE sectors.

The growth in school places closely aligns with that of population. There will be a high increase in the number of tertiary sector students of 216%, with the growth in primary and secondary at 22% and 20% respectively. The West and SW Environs account for a substantial proportion of this increase. The total forecast growth of education places is 31%.

Compared to general and school populations, the increase in jobs is smaller at 23%, but this still represents a notable rise. In decreasing order, most employment growth is expected in the SW Environs (261%), West Environs (92%), Loughboy (58%) and Core City Centre West (44%) sectors, with the other sectors seeing increases of only up to 2%.

Left unmanaged, Kilkenny and its Environs' growth would likely give rise to an increase in car journeys, with the resultant problems of congestion, sedentary lifestyles and air pollution. For such a scenario to be avoided, improvements will need to be made to public transport, walking and cycling to ensure future demand can be met sustainably and in line with the policies and legislation set out above. Public transport improvements should be implemented to target the increase in demand for the core city centre, whilst active travel measures, including Low Traffic Neighbourhoods, School Streets and cycle lanes, should be focused on new developments, targeting shorter journeys, such as the school run, in particular.

3. Walking Network Plan

3.1 Introduction

As part of the Network Development Report, the pedestrian environment within Kilkenny was analysed to determine the existing provision for pedestrians. A demand analysis was also undertaken to understand where pedestrian movements are currently taking place. This analysis will help to identify areas for priority during this stage of the KLTP. The option development stage also presented a high-level summary of the possibility for pedestrian improvements along a number of key corridors. Based on the evidence gathered, a high-level walking network plan was developed with the identification of strategic and feeder routes.

Improving pedestrian provision will support the Government Climate Change Action Plan as well as local initiatives to support the climate change and sustainability agenda. Walking is a form of net zero transport and will have a crucial role in reducing greenhouse gas emissions from the transport sector. The Walking Network Plan and enabling more journeys to be undertaken on foot will support the 10 minute city concept whilst improving air quality and physical activity.

To progress with the Kilkenny Walking Network Plan, this chapter will focus on key areas for intervention within the network plan. The chapter will provide the strategic rationale for these locations as well as specific interventions to be considered further. Whilst the focus of the refinement stage will be on specific locations within the network plan, the chapter will provide recommendations which can be applied across the network to provide priority and general benefits to pedestrians.

3.2 Walking Network Refinement

During the Baseline Stage, a desktop study of the existing pedestrian environment was undertaken. It identified a number of key issues in Kilkenny for pedestrians, including:

- Severance caused by the River Nore and the Ring Road has the potential to deter walking journeys;
- Poor permeability through housing estates and access to local schools leading to continued car dependency and low levels of short distance walking trips;
- Poor public realm in certain locations within the city centre with accompanying high levels of noise pollution;
- Hostile junction layouts which prioritise vehicular traffic above all other modes, causing significant barriers for pedestrian movement; and
- Lack of tactile paving and dropped kerbs resulting in accessibility issues.

Based on the audit findings and the development of strategic routes as part of the Kilkenny Walking Network Plan, a number of Action Areas have been identified throughout Kilkenny City for priority intervention. The Action Areas have been identified to improve the pedestrian environment in the short-term and to address key issues identified as part of the pedestrian audit.

The key locations identified for specific interventions as part of the Walking Network Plan include:

- **City Centre Gateways and Pedestrian Portals** – A number of gateways and pedestrian portals have been identified which have the potential to provide significant benefits to the pedestrian environment. Gateways and pedestrian portals are used to demarcate a point of arrival from one place to another; an area where the context of the environment changes e.g., from a highway focused environment to a pedestrianised street. As part of the walking network plan, we have identified a number of gateways/portals where we recommend a higher level of pedestrian provision is provided.

- **Neighbourhood Centres (Loughboy and Newpark/Eastern Environs) –** Neighbourhood centres are key locations where a high level of pedestrian movements take place. It is imperative that high quality pedestrian provision is provided from key residential sites to local services to reduce car dependency and promote the '10 minute city' concept.
- **MacDonagh Junction Interchange Hub –** MacDonagh Junction Station is a key trip attractor within Kilkenny City. To promote and enable more multi modal journeys, it is important that safe and convenient pedestrian access is provided to the Railway Station. Improving pedestrian access to this site increases the potential for significant interchange opportunities moving forward.
- **Major junction Improvements –** To improve access to key trip attractors and to encourage walking journeys, it is important that pedestrians are provided with a safe and convenient journey. Junctions, particularly those that experience heavy traffic volumes, are often a major severance for pedestrians unless pedestrian infrastructure is provided. As part of the walking network plan, it will be important to review the major junctions within Kilkenny to assess pedestrian provision and identify interventions if required.
- **School Permeability** – To encourage and enable more children to walk and cycle to school, it is important that the transport network enables direct and convenient access to local schools. A lack of permeability in residential sites can often result in long detours and deter potential active journeys to school. A key aspect of the walking network plan will be to improve permeability and reduce severance, enabling more cycling and walking journeys to school which supports the objectives of the KLTP.

The remainder of this chapter will outline the recommendations for each of these Action Areas.

3.3 Kilkenny City Pedestrian Action Areas

3.3.1 Gateways and Pedestrian Portals

Overview

Gateways are an important traffic-calming tool as they can be used to influence driver behaviour and highlight an area where there is a change in driving conditions ahead such as low-speed, pedestrian-priority areas. This pedestrian-priority could take a variety of forms, including pedestrianisation, shared surfaces and the concept of shared space – particularly within the Pedestrian Portals.

Gateways and pedestrian portals are also effective placemaking and wayfinding tools. By using local materials and adding street furniture, these areas can reinforce a sense of place.

In this way, well designed gateways and pedestrian portals enhance the pedestrian environment.

The remainder of this section presents the proposed gateways and pedestrian portals, followed by design recommendations based on DMURS Advice Note 4 Transition Zones and gateways. The completion of gateways and pedestrian portals are an objective of the Kilkenny City Development Plan 2014-2020.

Kilkenny City Gateways and Pedestrian Portals

Figure 3-1 illustrates the proposed gateways and pedestrian portals in Kilkenny City.

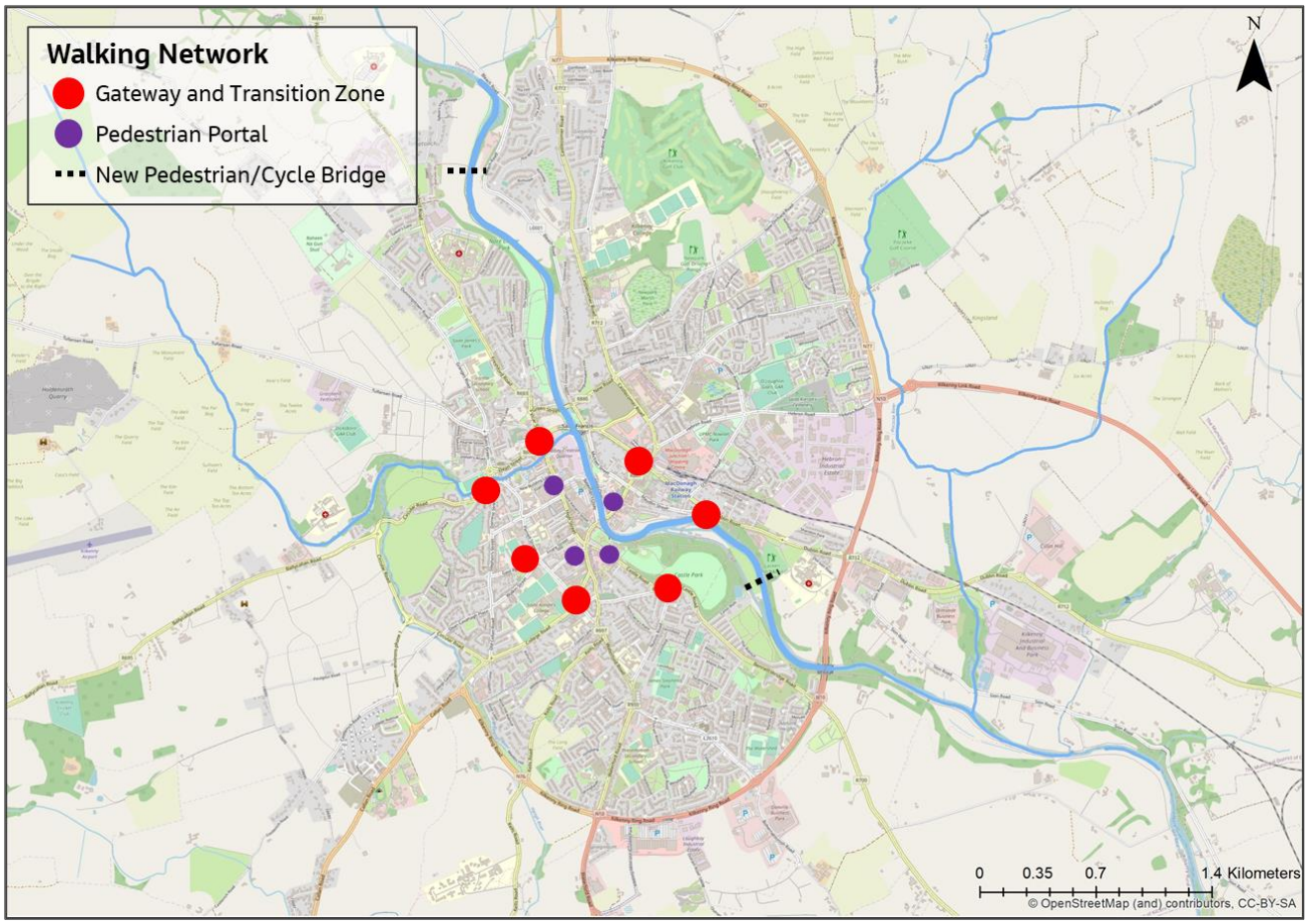

Figure 3-1: Gateways and pedestrian portals to Kilkenny City

In the context of Kilkenny, the City Centre is marked by gateways within which a 30kph speed restriction applies.

These gateways are as follows:

- MacDonagh Junction;
- Bennettsbridge Road / Nuncio Road;
- Irishtown (Vicar Street / Dean Street);
- Dublin Road / Maudlin Street;
- Butt's Green / Black Mill Street;
- Parnell Street / Walkin Street; and
- College Road / Lower New Street.

Pedestrian Portals demarcate the central City Centre core area. These include:

- High Street / St. Kieran's Street;
- John Street Lower / John's Quay; and
- The Parade / Patrick Street / High Street.

Design Recommendations

The *Design Manual for Urban Roads and Streets* (DMURS) (2019) developed an Advice Note on transition zones and gateways which provides guidance on the design of these areas.

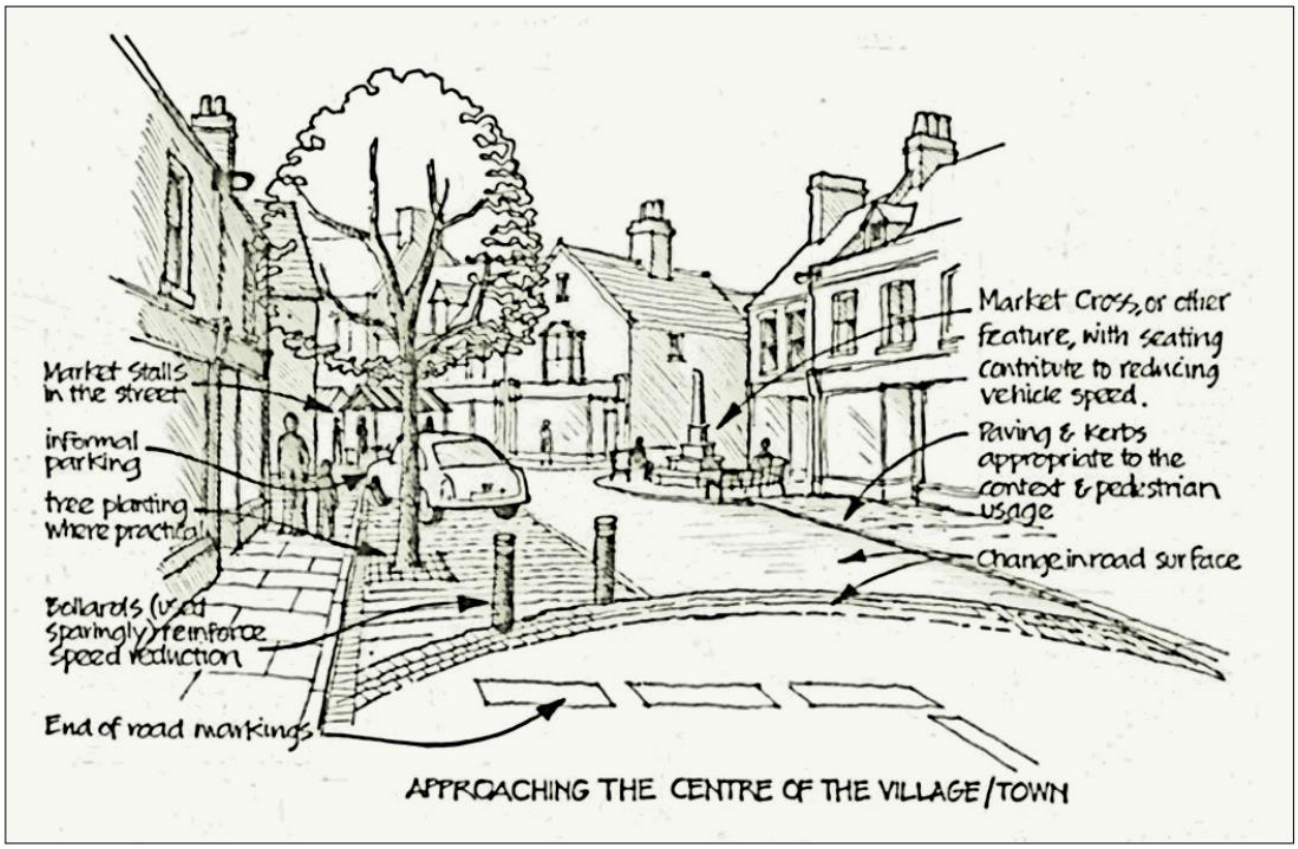

Figure 3-2: Image from Traffic in Villages (2011) showing a various number of gateway treatments designed to enhance the character of the village and calm traffic. Source: P.49, DMURS, 2019.

To determine the specific requirements for each city gateway and pedestrian portal, it will be important to undertake a detailed feasibility study. Whilst the locations identified have similar issues around high traffic volume and limited space, it will be imperative to understand the specific characteristics of each location, including opportunities for space reallocation and public realm requirements. A detailed study is also required to ensure that pedestrian improvements at each location align closely with KLTP proposals across other modes of transport.

Design principles at gateways (including those illustrated in Figure 3-2) can include:

- **Reduce the actual width of carriageways** – To demonstrate a change from a car dominant transport network to a pedestrianised zone, reducing the width of the carriageway is a key intervention. Reducing the width of the carriageway will provide more opportunities to provide high quality pedestrian facilities and public realm.
- **Reduce the perceived width of carriageways** – if required, reducing the perceived width of the carriageway can help to change road user behaviour and change the layout and function of a local road corridor. Reducing the perceived width through changes such as the layout of parking or road markings can help to provide a sense of pedestrian priority and reduce the dominance of the car in a localised setting.

- **Allocation of roadspace to pedestrians** – Allocation of roadspace to pedestrians is a key principle to support traffic calming measures through gateways and pedestrian portals. Providing additional space for pedestrians will provide safety benefits for all users and allow for public realm improvements. Limiting space for cars has the potentially to deter short distance car journeys and create a pedestrian friendly environment.
- **Landscape Improvements** - Use elements of place such as landscape and built form to create a strong sense of enclosure. Improvements could include changes to verges, tree planting and the introduction of bollards to provide a change in transport layout to remove the focus from a highway corridor to a place to enjoy and socialise.
- **Change to surface materials** – changes to both the carriageway and public realm more generally can play a role in changing the focus from a highway corridor to a more sociable environment. Changes to surface material can help road users become aware of a pedestrianised zone and to change behaviour including a reduction in speed.
- **Increase levels of cycle parking and reduction of car parking –** increasing cycle parking can enable more people to cycle by increasing confidence in personal security and valuables. Reducing car parking can provide additional space for pedestrians and cyclists. Reducing car parking provides opportunities for local businesses to utilise the additional space for hospitality purposes.
- **Public realm improvements –** To create pleasant and social environments, improvements to the public realm are essential. Improving the public realm demonstrates that a local area is not purely a highway corridor and encourages residents and commuters to spend time in the area.

3.3.2 Neighbourhood Centres

Kilkenny City's development is predicated on the four neighbourhood model, as illustrated by Figure 3-3. The four neighbourhoods are: Loughboy; Newpark/Eastern Environs; Breagagh Valley/Western Environs; and Loughmacask. Loughboy and Newpark/Eastern Environs are substantially built out, with the two remaining areas of the Breagagh Valley/Western Environs and Loughmacask earmarked for significant greenfield development in the coming years. It is important to provide a high quality pedestrian environment in local neighbourhoods to reduce the demand on the car and encourage more active and environmentally friendly journeys.

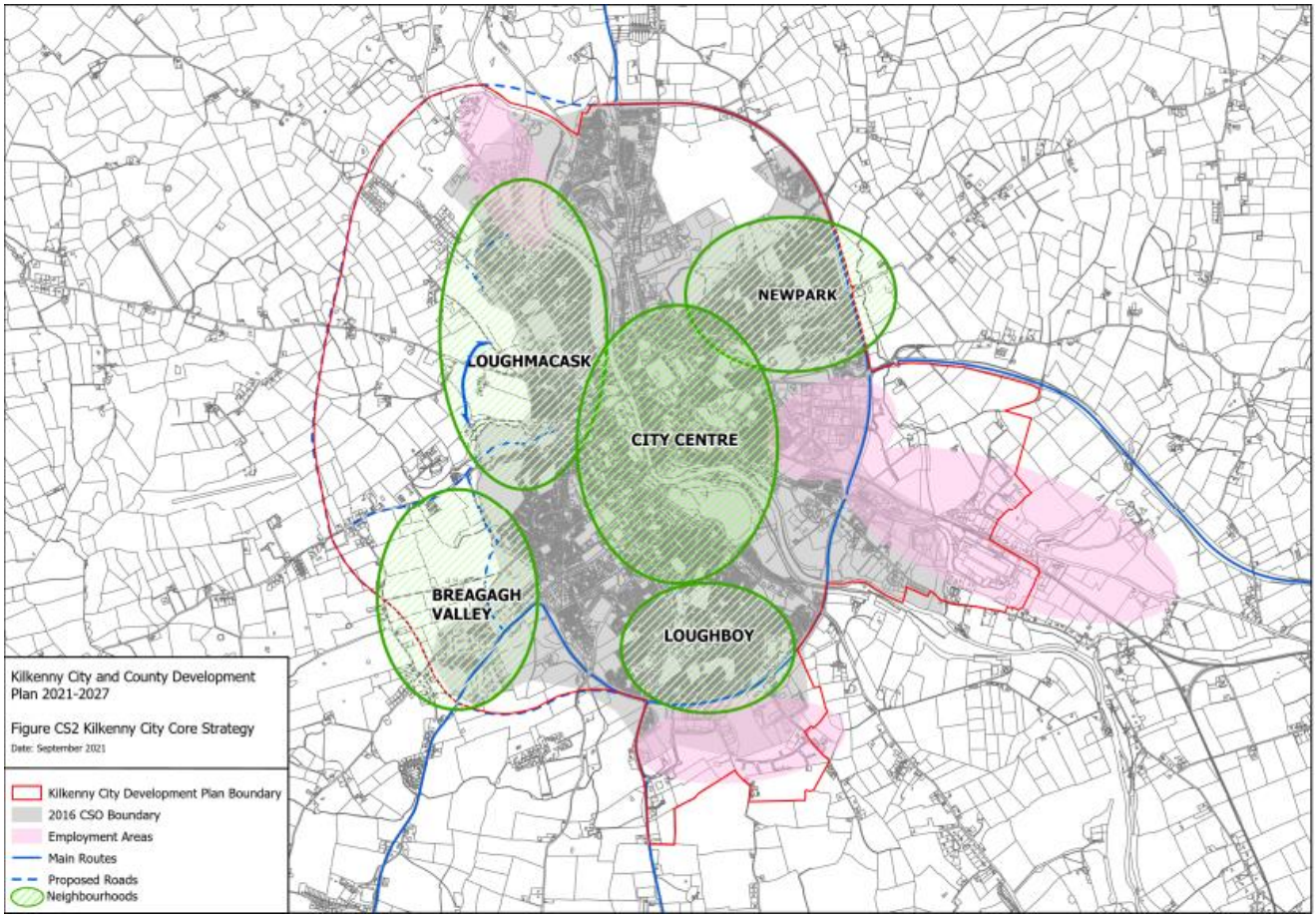

Figure 3-3: Kilkenny City Core Strategy. Source: Kilkenny City & County Development Plan 2021-2027.

The neighbourhood centres for the existing Loughboy and Newpark/Eastern Environs areas will provide a focal point for the surrounding residential areas. Providing easily accessible neighbourhood centres by walking and cycling complements the 10-Minute City concept, which seeks to have all daily essential community facilities and services accessible within a 10-minute walk or cycle from homes.

Measures including enhanced permeability from surrounding residential areas and improvements to the pedestrian environment and public realm will give these centres a sense of place and highlight their role as focal points in the surrounding communities. Ensuring high quality pedestrian infrastructure is provided within local neighbourhoods will encourage more walking journeys to local services. Increasing the amount of walking journeys for short distance journeys will reduce pressure on the local network and support longer distance journeys required by the car.

The remainder of this section provides high-level recommendations for the Loughboy and Newpark/Eastern Environs neighbourhood centres. As the Loughmacask and Western Environs neighbourhoods are developed further, a similar approach of developing key recommendations is advised.

Loughboy Neighbourhood Centre

Loughboy is located to the south of the Kilkenny City. The neighbourhood centre has been identified as the area comprising Loughboy Shopping Centre, ALDI, LIDL, Mulligan's Pharmacy, Primo Italian, St. Fiacre's Church, and the entrance to Presentation Secondary School and Gaelscoil Osraí. The Loughboy neighbourhood centre directly serves the surrounding residential areas of Clongowen, Parcnagowan, Smithsland and Adnore,

Key recommendations for this area include:

- Review and upgrade Bohernatounish Road / R910 Waterford Road roundabout junction to improve pedestrian and cycle facilities and connectivity;
- Investigate filtered permeability access to the Presentation School and Gaelscoil Osraí from the surrounding areas e.g. from Hawthorn Walk and Hazelbrook via the Sports Ground, from Waterford Road via The Springhill Clinic to widen catchment from the Clongowen and Smithsland residential areas and encourage sustainable travel to these schools;
- Urban design and public realm improvements in the area to slow down traffic and create a more neighbourhood feel including:
  - footpath improvements;
  - removal of railings and blank walls where possible;
  - provision of seating at regular intervals;
  - street trees and soft landscaping, etc.
- As part of the LTP's Kilkenny Cycle Network, the Bohernatounish Road is identified as a Primary Route. As a primary cycle route, segregated cycle tracks have been recommended.

Newpark /Eastern Environs Neighbourhood Centre

Newpark /Eastern Environs is located to the north-east of Kilkenny City. The neighbourhood centre has been identified as the area comprising Newpark Shopping Centre, O'Loughlin Gaels GAA Club and St. John's Senior National School. The Newpark neighbourhood centre directly serves the surrounding residential areas of Lintown Hall, Newpark and Upper Newpark.

Key recommendations for this area include:

- Review and upgrade Johnswell Road / Newpark Drive / Golf Links Road roundabout junction to improve pedestrian and cycle facilities and connectivity;
- Investigate filtered permeability access to St. John's Senior National School from the Newpark Drive Road and Hebron Road via Callan Court and Lakeview Drive. This connection has been identified as a Feeder Route as part of the LTP's Kilkenny Cycle Network. This will improve accessibility to the school from a wider catchment and encourage sustainable travel to these schools;
- Urban design and public realm improvements in the area to slow down traffic and create a more neighbourhood feel including:
  - footpath improvements;
  - provision of seating at regular intervals;
  - street trees and soft landscaping, etc.
- Removal of railings and blank walls where possible, e.g. at Lintown Grove
- As part of the LTP's Kilkenny Cycle Network, the Johnswell Road and Golflinks Road is identified as a Primary Route as part of the Eastern Environs route which connects to the City Centre and continues to the Western Environs. Segregated cycle tracks have been recommended for this route.

3.3.3 MacDonagh Junction Interchange Hub Access

MacDonagh Station has excellent public transport interchange opportunities given that heavy rail, regional bus services and the majority of the proposed local routes pass through this point. With a number of residential areas

and the city centre in close proximity, there are significant opportunities for multi-modal journeys with the trip to/from the station undertaken on foot.

Whilst there are opportunities for the vast majority of visitors to the railway station to travel sustainably, the current layout of the junction to MacDonagh Station at Dublin Road poorly serves the needs of pedestrians, cyclists and public transport users. It is recommended that a Quality Audit of the junction(s) is undertaken as a short-term objective of the Plan. Figure 3-4 illustrates a number of recommendations for this area.

The Quality Audit, in line with DMURS principles, should consider the following:

- **Removal of slip lanes and multi-stage crossings** – removal of slip lanes and multi-stage crossings will improve access for pedestrians and cycle users. Whilst multi-stage crossings provide safety for pedestrians, the inconvenience and time delays can deter walking journeys.
- **Removal of all pedestrian guardrails** – potential to improve the pedestrian environment and provide more direct journeys whilst ensuring safety is provided for pedestrians.
- **Footpath widening** on approaches to junction, in particular on John Street and Castlecomer New Road;
- **Pedestrian priority** – consider signalised crossings providing priority for pedestrians at local junctions, e.g. John's Green; and
- **Provision for cyclists**, including Advanced Stop Lines (ASL) at junctions.

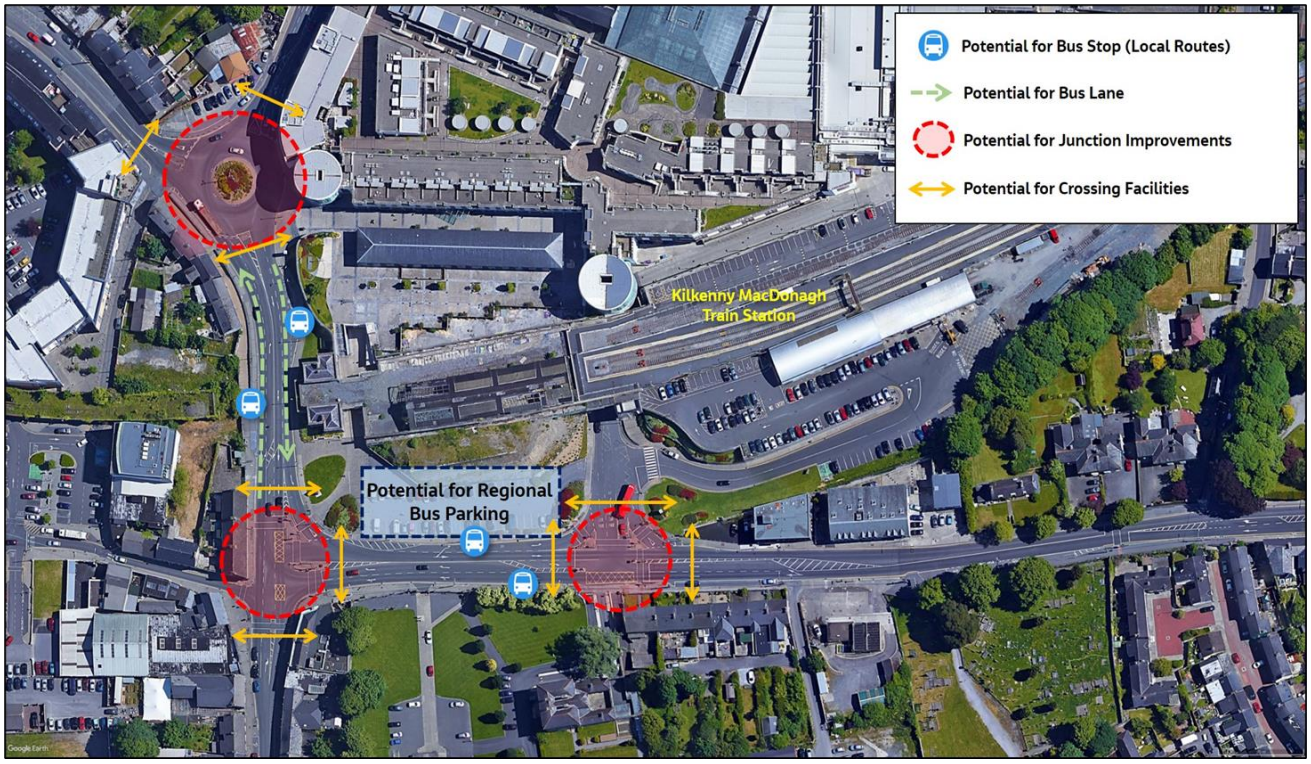

Figure 3-4: Recommended Improvements to MacDonagh Junction

3.3.4 Junction Improvements

To enable more walking journeys to take place, it is imperative that junctions do not deter people from travelling on foot. Through the work undertaken during the option development stage, it was evident that junction

improvements throughout Kilkenny City and environs are required. Improving pedestrian provision at junctions will provide a more balanced quality of service for all users and will help to address safety and comfort issues for vulnerable road users, i.e., pedestrians and cyclists.

Many of the existing key city centre junctions are signalised; however, in general, the environment at these junctions for vulnerable road users can be hostile. Junctions across Kilkenny are a deterrent for pedestrians due to the dominance of vehicular traffic, multi-stage crossings and pedestrian guardrails. Improvements within the City Centre to junctions in response to the sustainable mode proposals in line with DMURS are required. These junctions include:

- Junction on Dublin Road to MacDonagh Station;
- Junction on Dublin Road with John Street Upper; and
- Junction at the intersection of The Parade, High Street, Rose Inn Street and Patrick Street.

DMURS recommends the following should be included in the design of signalised junctions to ensure the safety of pedestrians and cyclists:

- Longer pedestrian phases that ensure enough green time for pedestrians of all ages and abilities to safely cross the road;
- A direct single phase crossing for pedestrians. Research has found that pedestrians are less likely to comply with the detour/delay created by staggered crossings, leading to unsafe crossing behaviour; and
- Advanced Stop Lines (ASL) for cyclists.

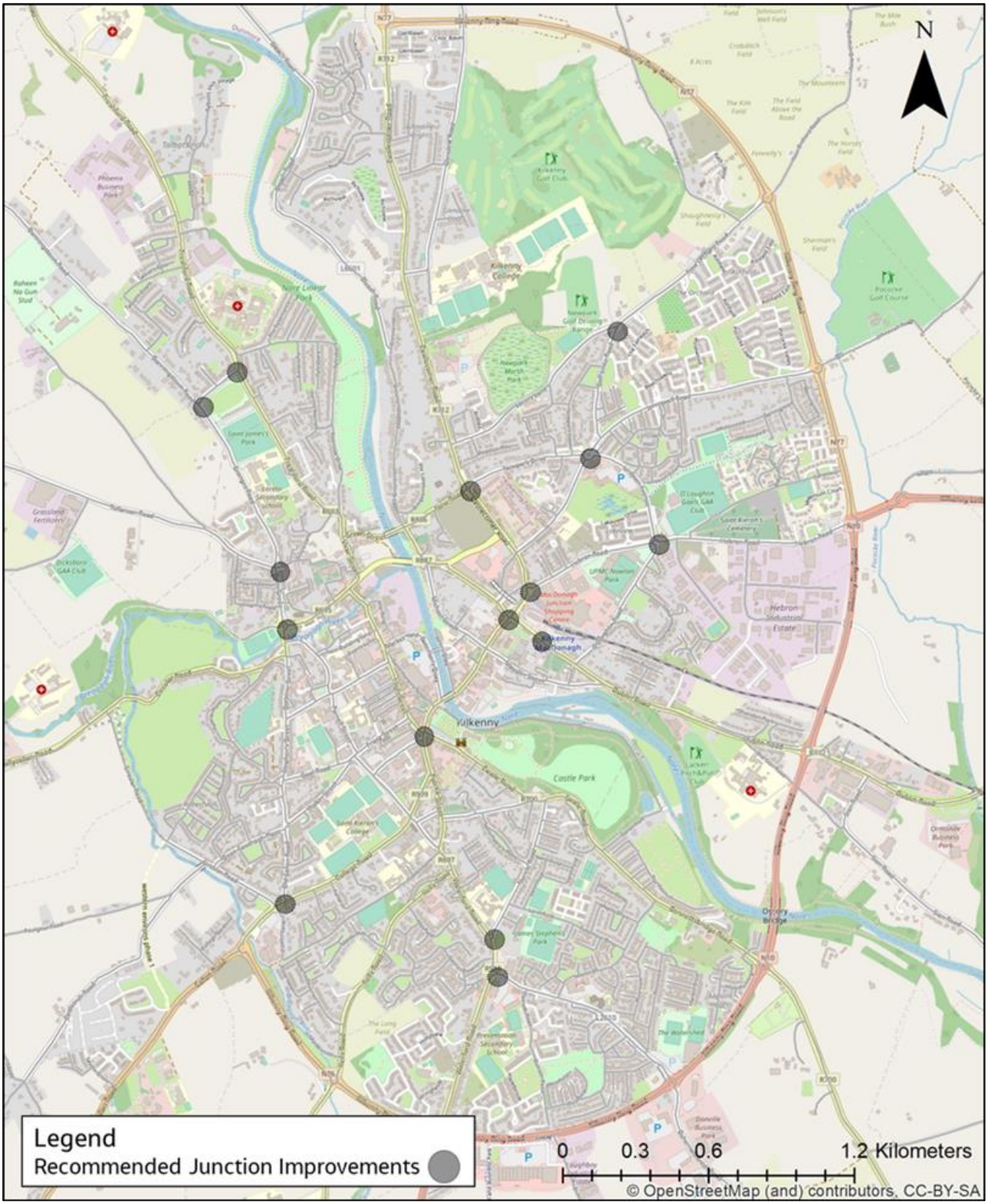

Figure 3-5 Junction Improvements

3.3.5 Permeability Improvements

As outlined in the Network Development Report, providing filtered permeability is an essential component of supporting more walkable and cycle friendly cities and neighbourhoods. Good permeability is achieved through the availability of direct connections between origins and destinations that are accessible, safe and secure. Improving permeability through residential estates, schools and their surrounding areas will require ongoing collaboration between communities, educational bodies and Kilkenny County Council in order to deliver these measures.

At present, while there are good levels of permeability through some residential estates adjacent to Johnswell Road and Bohernatounish Road, there are still many estates surrounded by walls, fences and cul-de-sacs which are significant barriers to pedestrian movements. Furthermore, the accessibility of these paths for people of all ages and abilities varies.

Case Study: Low Traffic Neighbourhoods

Low Traffic Neighbourhoods and Filtered Permeability measures would contribute to the creation of healthy, liveable neighbourhoods. Low Traffic Neighbourhoods (LTNs) are area-based interventions that use modal filters such as planters, bollards or camera gates. They create areas where all homes can be reached by car but where it is difficult or impossible for drivers to cut through from one side of the area to the other. The aim is to discourage driving and simultaneously to create safer and more pleasant walking and cycling environments. Studies of emergency LTNs in the Greater London Area during the Covid-19 pandemic have found that their implementation since mid-2020 had the following impacts:

- Increased walking;[1]
- Reduced car usage;[4]
- Improved perceptions of the local cycling environment;[4]
- Number of road traffic related injuries halved inside LTNs, relative to the rest of London;[2]
- Substantial reductions in pedestrian injury risk.[5]

[1] Aldred R. and Goodman A. 2021. "The Impact of 2020 Low Traffic Neighbourhoods on Active Travel, Car Use, and Perceptions of Local Environment during the COVID-19 Pandemic." *Findings*, March. https://doi.org/10.32866/001c.21390.

[2] Goodman A., Furlong J., Laverty A.A., Thomas A. and Aldred R. 2021. "Impacts of 2020 Low Traffic Neighbourhoods in London on Road Traffic Injuries." *Findings*, July. https://doi.org/10.32866/001c.25633.

Figure 1. An example of a low traffic neighbourhood in Walworth, Southwark (South London).

Left side: New modal filters in 14 places (orange dots) create two low traffic neighbourhoods (red) in Walworth, South London. All homes can be accessed by motor vehicle, but one cannot drive straight through the area. Right side: An example of one of the Walworth modal filters, which blocks motor traffic while allowing pedestrians and cycles to pass freely. This modal filter uses physical barriers, but other modal filters are enforced with cameras. Photo credit: Crispin Hughes.

Figure 3-6: Example of a Low Traffic Neighbourhood in Walworth, Southwark[5]

Examples of permeability opportunities

The following sections outline opportunities throughout Kilkenny City that would improve permeability and promote sustainable travel to local neighbourhood centres and schools. The key principles governing the creation and maintenance of good permeability connections in urban and suburban areas (which are followed in are examples) are as follows:

- Origins and destinations, such as schools and shops, should be linked in the most direct manner possible for pedestrians and cyclists;
- Greater priority should be given to pedestrians and cyclists including safe and efficient crossings of junctions and side roads;
- The physical design of links should be fit for purpose in terms of capacity and security including good visibility; and
- Junctions in urban and suburban areas should cater for pedestrians and cyclists safely and conveniently

Figure 3-7 presents a desk study review to identify locations where improvements to permeability are required

Figure 3-7 Permeability Assessment

The remainder of the section presents examples of where permeability could be improved in Kilkenny. Through the examples provided, the fundamental consideration for enhancing permeability is to identify the rationale for maintaining or providing a link – who we are serving and for what reason. In this regard, the main origins and destinations in an urban area or district should be identified and links maintained or provided between them. The following has been considered when examining permeability in urban areas:

- People should be able to walk and cycle directly and safely to their local neighbourhood centre and district centre from their houses;
- Children should be able to walk and cycle safely from their homes to school;
- Public transport stops and stations should be safely and directly accessible from residential areas.

Johnswell Road

Figure 3-8 shows the distance one must travel at present from a point in Lintown Grove to Newpark Shopping Centre; either 500m or 650m, depending on the route. The distance between these two points as the crow flies is approximately 40m. Permeability could be easily provided by removing a section of the wall. This small improvement would remove a significant severance barrier and encourage more walking journeys.

Figure 3-8 Lintown Grove to Newpark Shopping Centre. Source: Google Maps.

Presentation Secondary School

Figure 3-9 shows the distance one must travel between the Presentation Secondary School and the entrance to Hollybank Park: 850m. The distance between these two points as the crow flies is approximately 130m. Permeability may be difficult to create here in the short-term due to a row of individual dwellings, but it should be an objective to promote permeability between schools and surrounding residential areas to increase the walking and cycling catchment.

Figure 3-9 Residential estates adjacent to Waterford Road to Presentation Secondary School. Source: Google Maps.

Kilkenny Project National School

Similarly, Figure 3-10 shows the distance one must travel between Kilkenny Project National School to Hollybank Lane: 600m. The distance between these two points as the crow flies is approximately 30m. Permeability could be easily provided by removing a section of the wall, thereby increasing the walking and cycling catchment of the school.

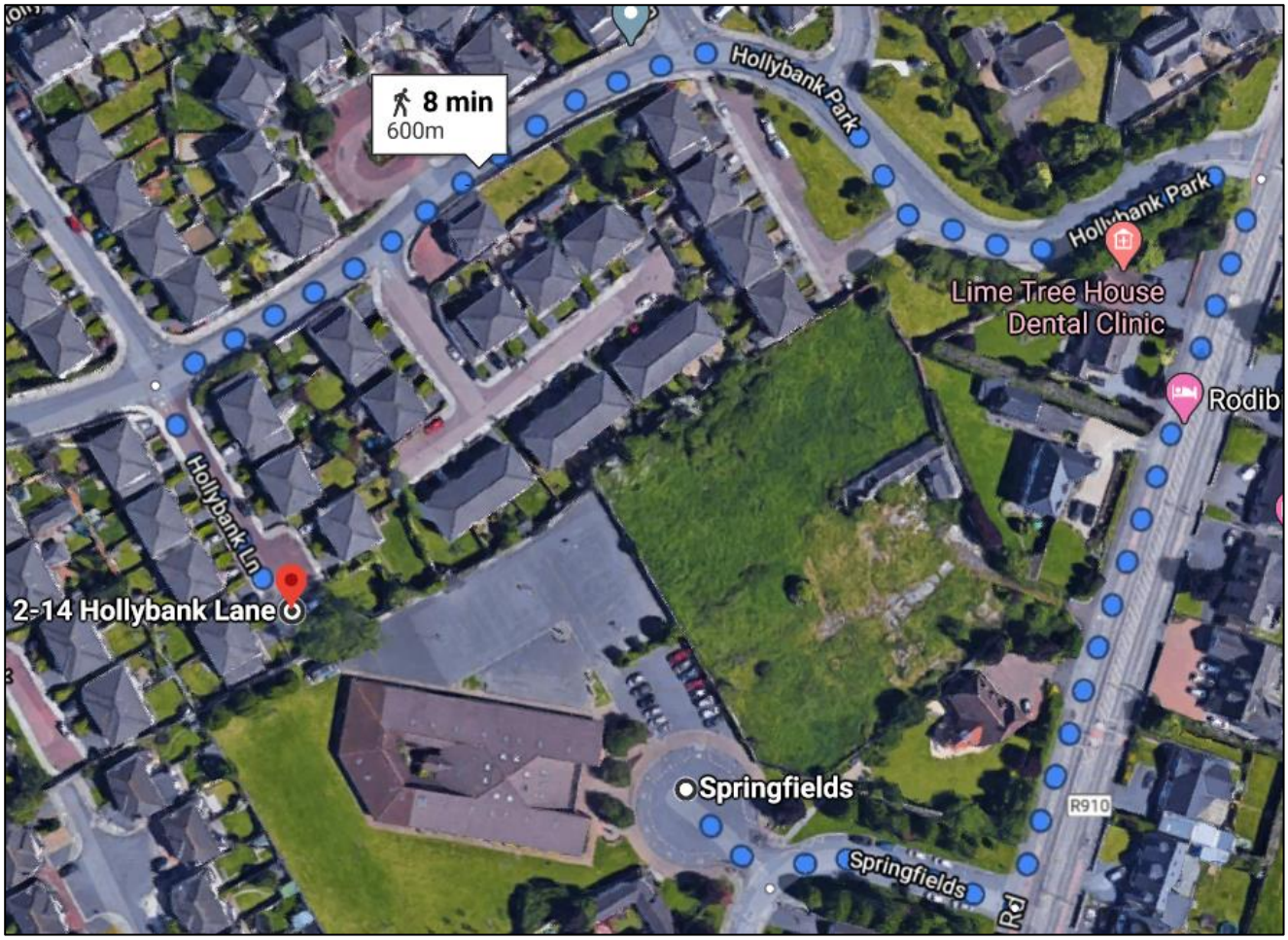

Figure 3-10 Kilkenny Project National School to Hollybank Lane. Source: Google Maps.

4. Cycle Network Plan

4.1 Introduction

This chapter sets out the refinement of the proposed Kilkenny Cycle Network Plan developed through the Network Development Report. This refinement has been informed by collaborating with members of the Kilkenny County Council's project team, a comprehensive review of baseline data, and a site visit to Kilkenny City. During the Option Development Stage, a high-level, long-term network plan for Kilkenny City and Environs was devised identifying Primary, Secondary, Feeder and Greenway Routes.

Improving cycle provision will support the Government Climate Change Action Plan as well as local initiatives to support the climate change and sustainability agenda. Cycling is a form of net zero transport and will have a crucial role in reducing greenhouse gas emissions from the transport sector. The Cycling Network Plan will require high quality cycle infrastructure which will not only encourage people to cycle but also enable those who have current barriers to cycling, particularly around safety. Cycling with the introduction of E-bikes has an increasing opportunity to enable a significant modal shift from the car which will create a range of benefits including cleaner air and improved physical activity levels.

The key output of this stage of the KLTP is the identification of priority routes (selected from primary routes) to be taken forward for further development in the short-term, and a phased implementation plan.

This chapter will present:

- Updated Network Plan, following discussions with local officers explaining key changes;
- Presentation of primary routes and their strategic rationale; and
- Implementation plan.

4.2 Kilkenny Cycle Network Plan

The long-term Kilkenny Cycle Network Plan will seek to provide high quality cycle infrastructure across the City, including enhancing existing cycle provision. The network plan will ensure that a phased implementation plan is developed which will identify priority routes as well as long term aspirational schemes. The remainder of this section presents the different route categories which make up the Kilkenny Cycle Network Plan as well as their rationale for inclusion.

4.2.1 Cycle Route Categories

A well designed cycle network will include a hierarchy of corridors that provide for different levels of cycling traffic and also offer cyclists a number of route choices. The cycle route categories within the Kilkenny Cycle Network Plan align with those set out in the National Transport Authority's (NTA) National Cycle Manual (2011). Table 4-1 defines the scope of each route category.

Table 4-1 Cycle Route Categories

Route Category	Description
Primary	Primary routes are the main cycle arteries and desire lines that cross the urban area and are forecasted to carry the most cycle traffic, often linking residential areas to key trip attractors such as the City Centre. It is recommended that all primary routes are delivered to a high standard with segregated cycle tracks.
Secondary	Secondary routes link primary routes to residential sites and trip attractors such as education and employment areas.
Feeder	Feeder routes are cycle routes that often cater for more localised and leisure cycle trips, and provide connections to primary and secondary routes.
Greenway	Greenway routes are developed predominantly for tourist, recreational and leisure purposes but may also carry elements of the utility cycle route network.
Inter-Urban	Inter-Urban routes link towns and cities across rural areas and include elements of the National Cycle Network.

4.2.2 Kilkenny Cycle Network Plan

Figure 4-1 presents a high-level map of the Kilkenny Cycle Network Plan map, which illustrates the route categories.

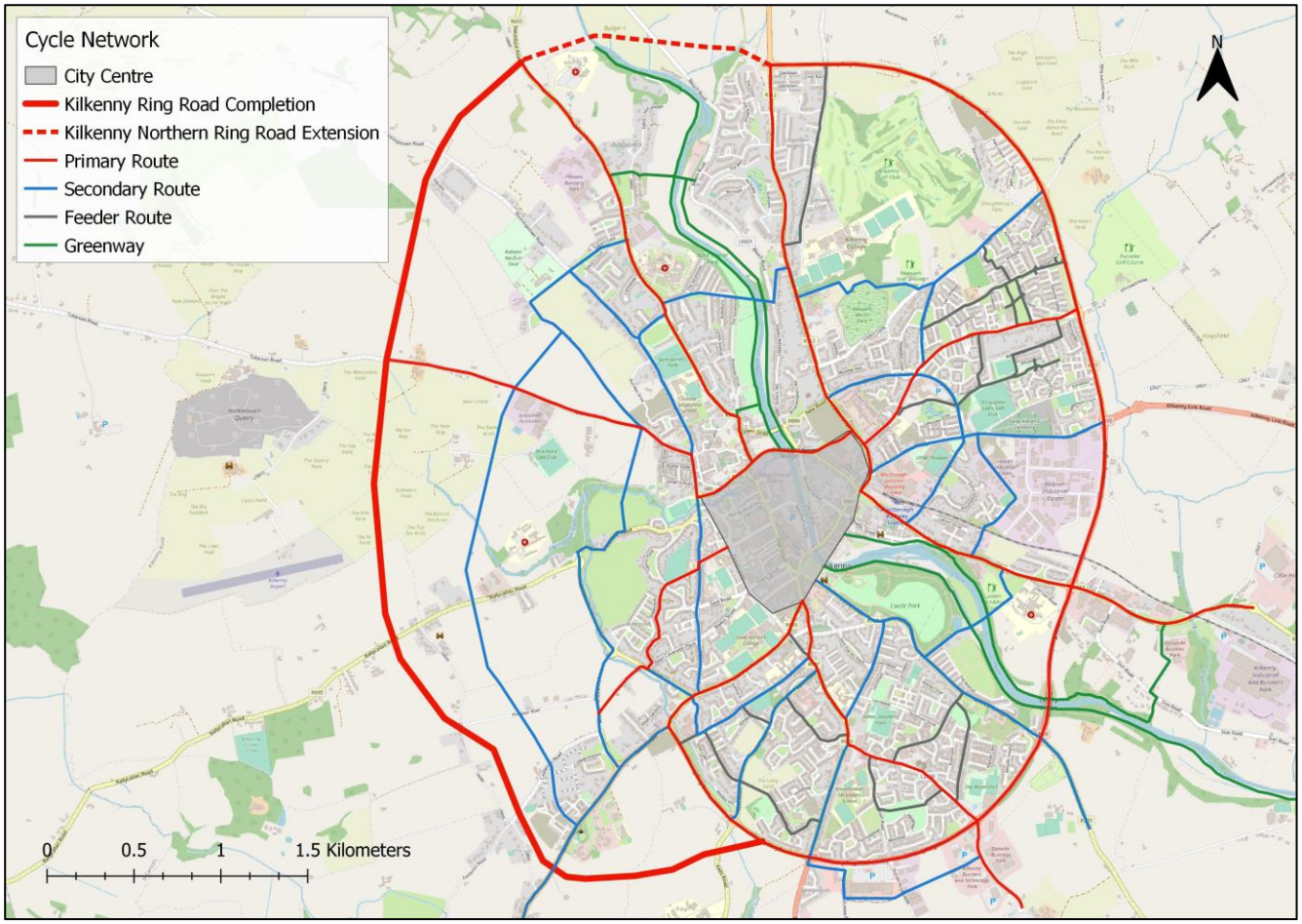

Figure 4-1: KLTP Cycle Network Map

A number of routes were amended (as shown in Figure 4-1) following workshops with Kilkenny County Council and a site visit to Kilkenny which have informed the following changes:

- Addition of two new pedestrian and cycle bridges north and one south of the City Centre, forming an orbital Greenway route and improving east-west connectivity over the River Nore;
- Amendments to the cycle network in the city core with primary radial and orbital connections as highlighted in Figure 4-2
- Addition of an orbital route through the outer residential areas;
- Improved access at key junctions along the Kilkenny Ring Road;
- Extension of routes in south out to Loughboy Business Park; and
- Outcome of Western Road Network Option Assessment, including orbital routes in the Western Environs.

4.2.3 Strategic Rationale for Primary Routes

Table 4-2 presents the primary cycle routes. Table 4-2 provides a brief description of the existing provision provided to cycle users along these routes, including identifying where no cycle infrastructure is present. The rationale for inclusion of each primary cycle route in the network is presented. The rationale for primary corridors includes the potential for modal shift based on criteria such as existing traffic flows, links to major trip attractors from residential areas and links to key services such as schools. Whilst a high-level intervention is recommended

for each primary route, it is important that all primary routes are delivered to a high standard with physical segregated cycle tracks delivered along the entirety of the route where possible.

The remainder of this chapter will focus on primary routes in line with deliverability and funding priorities in the short-term. Each primary route is assigned a Map I.D. which corresponds to Figure 4-2 for reference. The primary routes identified within the shaded area are designated as P1.

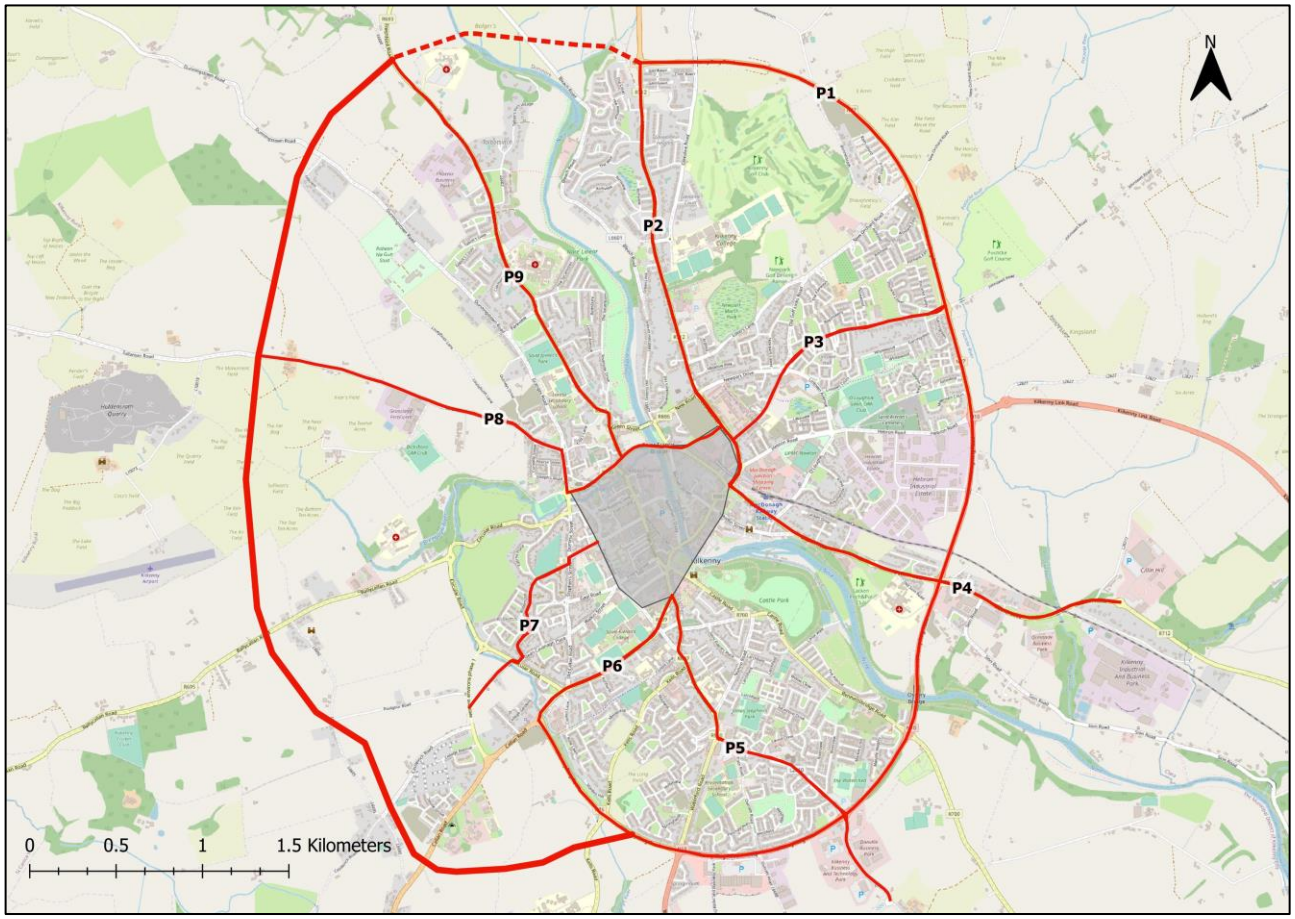

Figure 4-2: Primary Routes

Table 4-2: Proposed Primary Cycle Routes.

I.D.	Primary Route	Existing Infrastructure	Rationale	High-Level Recommendations (each route is subject to its own individual statutory scheme appraisal process)
Grey Shaded Area	**City Centre Core**	There is no existing dedicated cycle infrastructure. Speed limit is 30kph.	Improvements to the cycling environment in the City Centre will greatly benefit people cycling to and from the Centre, as well as those making cross-city journeys. While cycling numbers in Kilkenny City and its Environs are generally low overall, the highest numbers occur within the City Centre. As the existing cycling environment is poor and dominated by the private car, improvements would significantly enhance the potential for all ages and abilities. The city centre core requires improved cycle infrastructure to deter short distance car journeys. This will improve traffic flow in the city centre and support efforts to improve the environment. Evidence gathered in the UK and Ireland demonstrates that city centres/Main Streets with high quality cycle infrastructure boosts trade to local businesses as cyclists make more frequent journeys to local shops. Cycle infrastructure in the city centre core will support the tourism industry.	▪ Traffic calming / Shared Streets / junction improvements will generally be required in this location due to the tight geometry and high levels of pedestrians. ▪ With traffic calming measures in place, it is unlikely that significant cycle infrastructure is required ▪ If car speed/volume remains at similar levels and traffic calming measures are not introduced, high quality segregated cycle infrastructure would be required. ▪ Where cycle infrastructure is implemented, consideration will need to be given on the impact of pedestrians. ▪ Clear surfacing and segregation will be required to distinguish between cycle lanes and footpaths. ▪ High quality and clear signage will be required for pedestrians and cyclists to support wayfinding and safe movement within the city core.
P1	**Kilkenny Ring Road**	Limited infrastructure on the existing Kilkenny Ring Road. Shared use paths are present along the Ring Road. Minimal infrastructure is provided for cyclists along the major junctions of the Ring Road.	Providing high quality infrastructure along Kilkenny Ring Road will provide users with a convenient orbital route. This primary route will support the radial routes which connect residential areas of Kilkenny to the city centre. Improving cycle infrastructure along the Ring Road will improve safety for cyclists along major junctions. The potential introduction of Park and Ride sites outside of the Ring Road will require improved connectivity to the city centre from the Ring Road including improvements to cycle infrastructure. This primary route will provide improved cycle connections to key trip attractors such as Hebron Industrial Estate and Saint Canices Hospital	▪ Condition of existing shared use paths to be upgraded ▪ Based on the strategic function of the Kilkenny Ring Road, segregated cycle tracks are recommended. ▪ Shared use paths should be removed to provide dedicated infrastructure for cyclists ▪ Safety improvements required for cyclists at major junctions including Dublin road Roundabout, Callan Road Roundabout and Bohernatounish Road Roundabout.
P2	**Castlecomer Road** **(Castlecomer Rd Rbt - City Centre)**	There is a mixed provision of advisory on-road cycle lanes, and mixed facilities. There is a poor provision for cyclists at junctions, including roundabouts and local entrances.	This route connects the northern residential areas including Glenbawn, Glendine, The Weir and Richview to the City Centre. This primary route would provide convenient access to the city centre core by cycling. Existing traffic flows show that Castlecomer Road experiences relatively high volumes of car traffic during the AM peak hour, therefore there is potential for modal shift if high quality cycle infrastructure can be provided. This primary corridor provides a connection to Kilkenny College (916 students) and Kilkenny Model School (206 students). The route also serves the MacDonagh Junction train station, where an improved multi-modal interchange hub is proposed. This primary corridor therefore provides a direct link to a major trip attractor. Low levels of cyclists use this corridor however this is likely due to poor cycle provision and moderate levels of traffic flow acting as deterrents. Improved cycle provision would provide a link into the city centre core, encouraging short distance journeys by cycling.	▪ Condition of existing cycle lanes/tracks to be upgraded. ▪ Shared facilities are not generally recommended by the NCM therefore we would not recommend shared use facilities on this route. ▪ To meet standards, segregated cycle lane/track is recommended to provide safety for cycle users and encourage new users to travel by bike. ▪ Implementation of School Zone around the entrance to Kilkenny National School and Kilkenny College, including traffic calming measures. ▪ Junctions such as the New Road Roundabout should be reviewed and upgraded to improve safety and comfort for cyclists in line with DMURS and NCM design guidance. ▪ Corner radii to be tightened and priority for cyclists at entrance to developments and side roads.

I.D.	Primary Route	Existing Infrastructure	Rationale	High-Level Recommendations (each route is subject to its own individual statutory scheme appraisal process)
P3	**Eastern Environs Route** **(Johnswell Road Rbt - City Centre (Lady Desart Bridge))**	There is a continuous provision of shared facilities from the Johnswell Road Roundabout up to the 30kph zone on Golflinks Road. From here to the Lady Desart Bridge, there are no existing dedicated cycle facilities. There is generally a poor provision for cyclists at junctions, including roundabouts, local entrances and side roads.	This route connects outer residential areas such as Beechlawns, The Fairways and Lintown Close to the City Centre. This primary corridor provides a connection to St. John's Senior National School (322 students). This route will connect to the Western Environs route at the Lady Desart Bridge providing an east-west spine through the City Centre. This is in support of an objective (C5I) of the Draft Kilkenny City and County Development Plan 2021-2027 which is to "develop a cycle route between the Eastern Environs and Breagagh Valley". The benefit of this is the provision of a direct, legible route connecting the western and eastern neighbourhoods via the City Centre. Furthermore, it ties into the River Nore Greenway route which provides an off-road north-south corridor.	▪ NCM recommends provision of cycle track with high quality segregation. Scope to provide segregated cycle lanes, however narrow sections of the road may be challenging. ▪ Where sections are challenging to provide fully segregated cycle tracks, opportunities to implement light segregation should be considered. ▪ Implementation of Safe School Zone around the entrance to St. John's Senior National School should be considered. ▪ Junctions such as the Newpark Drive Roundabout should be reviewed and upgraded to improve safety and comfort for cyclists in line with DMURS and NCM design guidance. ▪ Corner radii to be tightened and priority for cyclists at entrance to developments and side roads. ▪ Johnswell Rd: The full road has a shared use path in both directions, side roads do not have safe crossing/priority facilities for cyclists. Opportunity to provide segregated cycle lane with priority access across side roads.
P4	**Dublin Road** **(Leggettsrath – MacDonagh Junction)**	There is an intermittent provision of existing dedicated cycle facilities on this route, especially on the outbound route, with a mix of advisory cycle lanes and shared facilities. There is a poor provision for cyclists at junctions, including roundabouts and local entrances, especially at the junction with John Street / Castlecomer Road / MacDonagh Junction train station.	This route connects a large employment hub at Leggettsrath to MacDonagh Junction where an improved multi-modal interchange hub is proposed, and the City Centre. Improving cycle infrastructure along this corridor will enable and encourage more active travel journeys to a large employment site therefore, reducing car use to improve traffic flow, journey reliability and air quality. This route also serves St. Canice's Hospital and outer residential areas. Improving cycle provision to St Canice's Hospital will help improve traffic congestion problems in close proximity to the site and provide improved sustainable transport options for employees and visitors. There are connections to the River Nore Greenway (east) from this route. This has potential to increase leisure journeys and support the cycling tourism industry.	▪ NCM recommends provision of cycle track. Scope to provide segregated cycle tracks although reallocation of road space will be required. ▪ Removal of on-street parking has the potential to provide more space to provided dedicated cycle infrastructure however, on-street parking is not present across the entire route. ▪ Existing signalised pedestrian crossing should be upgraded to be more cycle-friendly, e.g. toucan crossing. ▪ Access to MacDonagh Junction should be significantly improved for cyclists with priority provided for cyclists and dedicated provision to remove conflict with motorised vehicles. ▪ Uplift in both short-stay and long-stay cycle parking provision at MacDonagh Junction and the employment area at Leggettsrath and Cillín Hill.
P5	**Bohernatounish Road** **(Loughboy – City Centre)**	There is a mix of existing advisory cycle lanes and shared facilities present on this route. The cycle lane is of mixed quality and narrow in parts. The Bohernatounish Road Roundabout is a point of severance on the existing cycle network as it does not provide dedicated facilities for cyclists. There is a poor provision for cyclists at junctions, including roundabouts, local entrances and side roads.	This primary corridor connects the city centre to a number of residential sites as well as employment, retail and leisure zones. This corridor is likely to see significant levels of short distance journeys. This route connects a large employment hub at the IDA Business and Technology Park to the City Centre and surrounding residential areas This primary corridor has the potential to enable local employees to travel by active modes to the IDA site. This route also serves Loughboy Shopping Centre, supporting more leisure and retail journeys to be undertaken by active modes. Presentation Secondary School (781 students) and Gaelscoil Osraí (459 students) is in close proximity to this primary corridor. Improved cycle provision has the potential to increase cycle journeys and reduce pressure on the local network during school drop off and collection. The Watershed sports complex, LIDl, ALDI are in close proximity to this cycle corridor, therefore local, short distance journeys by active modes can reduce the pressure on the local network.	▪ Upgrade existing infrastructure to provide cycle infrastructure which meets standards and encourages increased cycle journeys. ▪ NCM recommends provision of a segregated cycle lane or cycle track. ▪ Junctions such as the Bohernatounish Road / Waterford Road roundabout junction should be reviewed and upgraded to improve safety and comfort for cyclists in line with DMURS and NCM design guidance. ▪ Uplift in both short-stay and long-stay cycle parking provision at Loughboy Business Park and the Loughboy Neighbourhood Centre.

I.D.	Primary Route	Existing Infrastructure	Rationale	High-Level Recommendations (each route is subject to its own individual statutory scheme appraisal process)
P6	**College Road** **(Callan Roundabout – City Centre)**	There is an intermittent provision of advisory cycle lanes and shared facilities along this route. There is a poor provision for cyclists at junctions, including roundabouts, local entrances and side roads.	This route connects residential areas to City Centre, improving cycle provision would enable and encourage more short distance journeys to the city centre by active modes Traffic flow demonstrates that College Road experiences one of the highest volumes of cars during the AM peak hour, therefore, more short distance journeys undertaken by active modes would reduce the pressure on the network and allow for improved journey reliability for those longer distance journeys. The primary corridor serves St. Kiernan's College (775 students), improving cycle provision would see increased cycle journeys to the College, reducing pressure on the local network and supporting improved air quality and physical activity of college attendees. A number of local services such as Spar, Centra, and Patrick's Catholic Church are located along this primary route Local residents are likely to access such services therefore there is the potential to enable more cycling journeys by improved provision. The route provides a link to the Kilkenny Hotel, improved cycle provision would provide convenient access into the City Centre for hotel guests and employees. This route connects to the Inter-Urban Route of the National Cycle Network to Kilkenny City Centre. This will therefore provide greater opportunities to provide improved access into the City Centre for longer distance cycle journeys, including leisure and tourism related journeys.	▪ Very limited cycle provision along the route. Significant levels of on-street parking result in an unattractive cycle journey currently. ▪ Segregated cycle lane/track is recommended to encourage increased cycle use and to remove conflict with motorised vehicles. ▪ At a minimum, upgrade the shared facility to separate pedestrians and cyclists with a kerb/tactile paving to ensure it is fully accessible and legible by all ages and abilities. ▪ Shared facilities are not generally recommended by the NCM, whilst space is limited along this route, shared use should be the last option if more high quality cycle provision cannot be provided. ▪ If a shared use provision is provided, it is important to outline why a segregated cycle lane/track is not feasible. ▪ Implementation of School Zone around the entrance to St. Kieran's College, including traffic calming measures.. ▪ Ormonde Rd: The road has a significant amount of on-street parking, this makes it difficult to provide safe cycle facilities. It would be difficult to provide segregated cycle tracks here without removing on street parking. ▪ College Rd: significant levels of on-street parking are present. Opportunity to reallocated road space which increases the opportunity to implement improved cycle provision.
P7	**Western Environs Route** **(Breagagh Valley – Robert's Hill – Father Matthew Square – Kickham Street – James's Street – Lady Desart Br.)**	There are no existing dedicated cycle facilities along this route. This route routes through the internal network of a number of residential estates and City Centre streets. There is a poor provision for cyclists at junctions, including roundabouts, local entrances and side roads.	This route will connect the proposed neighbourhood at Western Environs/Breagagh Valley with the City Centre. It will be important to provide cycle provision along this corridor to encourage and enable smarter travel choices as part of the new development. This route will link with the Eastern Environs route at the Lady Desart Bridge providing an east-west spine through the City Centre. This is in support of an objective (C5I) of the Draft Kilkenny City and County Development Plan 2021-2027 which is to "develop a cycle route between the Eastern Environs and Breagagh Valley". The benefits of developing an east-west spine include providing a direct, legible route connecting the western and eastern neighbourhoods via the City Centre. Furthermore, it ties into the River Nore Greenway route which provides an off-road north-south corridor.	▪ To promote increased cycle use within Kilkenny, it is important to provide high quality cycle infrastructure from new developments to key local services and town/city centres. ▪ It is encouraged that high quality infrastructure is provided from the Western Environs to Kilkenny City Centre through segregated cycle infrastructure and/or traffic calmed streets where appropriate ▪ Secondary links off the primary route should be developed to provide safe and convenient access to local services and other residential areas. ▪ Filtered permeability though residential estates is required to promote short distance cycle and walking journeys. ▪ As the route passes along low volume/speed residential streets, it is anticipated that a mixture of traffic calming and signage will be appropriate. ▪ Along Kickham Street and James's Street, a reduction in on-street parking could be considered to encourage more cycling and provide a safer and more pleasant connection to/from the city centre.
P8	**Loughmacask – City Centre** **(Lord Edward Street)**	There are no existing dedicated cycle facilities along this route.	This route will connect the proposed neighbourhood at Loughmacask with the City Centre. Providing high quality cycle infrastructure along this corridor will help to embed smart travel choices for residents of the new development If no or limited cycle infrastructure is provided along this corridor, it is likely that existing car dominance issues in Kilkenny will occur at the new development	▪ To promote increased cycle use within Kilkenny, it is important to provide high quality cycle infrastructure from new developments to key local services and town/city centres.

I.D.	Primary Route	Existing Infrastructure	Rationale	High-Level Recommendations (each route is subject to its own individual statutory scheme appraisal process)
			To support the sustainable ambitions of Kilkenny, it is imperative that new developments to do exasperate existing traffic congestion problems and start to achieve modal shift ambitions.	▪ The level of provision should meet national standards and help enable and encourage people to cycle; high quality segregated cycle infrastructure is recommended from the development to the city centre where feasible. ▪ Secondary links off the primary route should be developed to provide safe and convenient access to local services and other residential areas. ▪ Reallocation of space currently used for on-street parking would provide scope for cycle tracks on Dean Street ▪ Butt's Green: No infrastructure currently in place. The area is a built-up urban area with multiple housing estates. There are limited opportunities to provide segregated cycle provision without significant road space reallocation. Traffic calming could be an option to support cycle trips. ▪ Lord Edward St: Limited opportunities for segregated cycle provision without significant road space reallocation. Potential to consider traffic calming measures. ▪ Rest of the route should have sufficient space to provide segregated cycle facilities.
P9	**Freshford Road** **(Aut Even Hospital - City Centre)**	Mandatory cycle lanes begin at The Sycamores in both directions until the beginning of the 30kph zone. There is no physical segregation from vehicular traffic. There is a pinch point along Vicar Street where the road narrows. There is generally a poor provision for cyclists at junctions, including roundabouts, local entrances and side roads.	This route currently caters for a high demand of traffic, with the highest flow of traffic of any of the primary corridors, this is likely due to Freshford Road being the key route into Kilkenny City Centre from the wider north-west area. A high quality cycle facility along this route presents an opportunity to support a modal shift to active travel and reduce traffic flow on this corridor supporting local transport and environmental policies. This route serves residential areas connecting into the City Centre. It is likely that a significant number of short distance journeys along this corridor into the City Centre are undertaken by the car, improving cycle provision is likely to enable and encourage a modal shift. This corridor provides a link to key services such as Aut Even Hospital, St. Luke's General Hospital, Loreto Secondary School. Improving cycle provision will support more active travel journeys and reduce pressure on the local network at peak periods. The route also provides access to St. James Park and Kilkenny Greyhound Stadium. There is an opportunity to provide increased transport options for visitors who live a short distance from these trip attractors. This route connects to the River Nore Greenway (west) providing improved leisure and tourism opportunities. The route also provides a connection to Secondary Route along Granges Road.	▪ Opportunity to improve existing provision along this corridor however due to the nature of the route, a consistent level of provision is not possible due to width constraints. ▪ NCM recommends provision of a segregated cycle track, where possible. ▪ Upgrading infrastructure along Freshford Road to provided dedicated provision is possible and will help to remove conflict with motorised vehicles. ▪ Whilst there is potential to improve cycle provision along Freshford Road, there may be competing demand with need to widen footpaths. Further analysis required to determine suitable provision for all road users. ▪ Corner radii to be tightened and priority given to cyclists at development entrances. ▪ Difficult to provide continuous segregated cycle lanes due to width constraints. Section of route along Bishops Hill could be a mixed environment as speed limit is 30kph. Gradient is likely to be an issue for users however, the introduction of E-mobility such as E-bikes could see this route used more often. ▪ Vicar St: The street is very narrow with dwellings either side. Traffic calming measures would be suitable along this section.

4.3 Route Prioritisation Implementation Plan

To deliver the Kilkenny Cycle Network, a phased implementation plan is required which will deliver the network based on priority routes to be delivered in the short term to longer term aspirational routes. Whilst this report has identified primary routes, it is important that a dense network of cycle infrastructure is provided to enable safe and convenient cycle journeys across the city.

The implementation of the Kilkenny Cycle Network should consider the following

- **Available funding and scope of funding source** – Funding sources for cycle infrastructure often come with specific requirements on what can be delivered with the available funding. Where possible, funding should be used to deliver the primary cycle routes identified within this study. If this is not possible, routes should be delivered which align closely with the network plan and support the implementation of the primary routes.
- **Level of effectiveness** – When delivering the network plan, implementing cycle routes which have the greatest potential for modal shift is key. The network plan has identified routes which link major trip generators such as residential routes to trip attractors such as the city centre. The implementation of the network plan should also review future traffic flow projections to determine opportunities for modal shift to cycling, particularly where there are opportunities to implement segregated cycle infrastructure.
- **Ability to deliver long term sustainable travel patterns** – Delivering the Kilkenny Cycle Network Plan should also focus on embedding sustainable travel behaviour within new developments. The network plan has identified opportunities to link new developments to the city centre, ensuring that new and existing residents of the city can travel sustainably when residing in the new developments.
- **Support multi modal journeys** – Improving the link between cycling, walking and public transport is key to reducing the dominance of motor vehicles. When implementing the network plan, consideration should be given to the importance of linking nearby residential areas to MacDonagh Railway Station. Ensuring safe and convenient access between Macdonagh Junction and the city centre is also imperative to reduce short distance journeys undertaken by the car.
- **Linking primary routes to key services** – Whilst the focus of the implementation plan should be on primary routes, it is important to ensure that cyclists are able to access local services which are located off the primary (high traffic volume) corridors in Kilkenny. When delivering primary routes, detailed feasibility work on individual routes should consider secondary corridor links as part of the design process. Where possible, secondary cycle routes should be delivered as part of primary route implementation.

Based on the key considerations outlined above, we would recommend the following as part of the Implementation Plan

- **City centre core is an immediate priority for implementation –** Based on the analysis undertaken, the city centre core has been identified as the key area where many short distance journeys are taking place. The city centre core is also the biggest trip attractor within the city; therefore, it is imperative that high quality cycle infrastructure is provided to enable and encourage more cycle journeys to take place. This area is the core of the network plan with all major primary routes linking into the city centre. Delivering improvements within the core of the city centre will provide emphasis to provide links to major residential areas across the city.
- **Primary routes to be given priority** – When funding is made available, primary routes should be delivered first based on their ability to create a modal shift from the car. Whilst there is a strategic case for each primary route, priority should be given to those that have the ability to deliver high quality cycle infrastructure, link greatest to KLTP policies and link to major trip attractors. A detailed analysis of projected

cycle demand and future developments should be undertaken as part of a multi criteria analysis to determine a ranking of primary routes.

- **Improvements to cycle access to MacDonagh Junction** – Key to increasing the percentage of sustainable transport journeys in Kilkenny will be to closely align active modes with public transport. To encourage more public transport journeys, it is important to improve pedestrian and cycle journeys to/from MacDonagh Railway Station. Funding for cycle infrastructure should focus on links between the city core and the railway station as well as links from residential sites to the station along primary cycle routes P2 and P4.
- **Investment targeted at New Developments –** To increase the level of cycling journeys within Kilkenny, focusing on new developments is an ideal opportunity to promote active travel. To promote and encourage sustainable travel patterns for new residents, it will be important that cycle infrastructure is of a high standard to attract people to cycling and to discourage car journeys.

  As part of the Kilkenny Cycle Network Plan, general transport investment and/or designated cycle infrastructure is required to fund primary routes P7 and P8 as key priorities of the network plan. It is important that high quality cycle infrastructure coincides with the implementation of the new developments to reduce the risk of increasing car dependency.
- **Prioritise investment where high quality cycle infrastructure can be delivered** – Whilst all primary routes are required to be delivered to ensure a high quality cycle network, it is important that high quality infrastructure is delivered, particularly with the initial rollout of the network plan. To achieve a modal shift, it is important that the local communities recognise and support high quality cycle infrastructure.

  Primary routes where high quality infrastructure can be achieved (including road space reallocation) should be delivered first to highlight the standard of cycle provision required across Kilkenny. Detailed feasibility and design work is required across primary cycle routes to understand the specific requirements and interventions needed along each route.

5. Public Transport Network

5.1 Introduction

This chapter sets out the refinement and optimisation of the Emerging Preferred Public Transport Network which was developed during the Options Development Stage. Public transport improvements will be a key intervention to support the national objective of improving air quality and reducing greenhouse gas emissions to support the climate change agenda.

A high quality public transport network is essential to enabling modal shift from the car. Whilst active travel has a key role in modal shift, due to the accessibility benefits of public transport, it is imperative that high quality, frequent and attractive public transport services are provided to lead the 10-minute city concept in Kilkenny. As outlined in the Governments approach to climate change, public transport improvements must be at the centre of transport policy. The refinement stage of the KLTP will help to further enhance the network development during the previous option development stage.

5.2 Emerging Preferred Public Transport Network

During the Option Development stage, an Emerging Preferred Public Transport Network, illustrated in Figure 5-1, was identified following a demand analysis and route selection process. This process is set out in full in the KLTP Network Development Report.

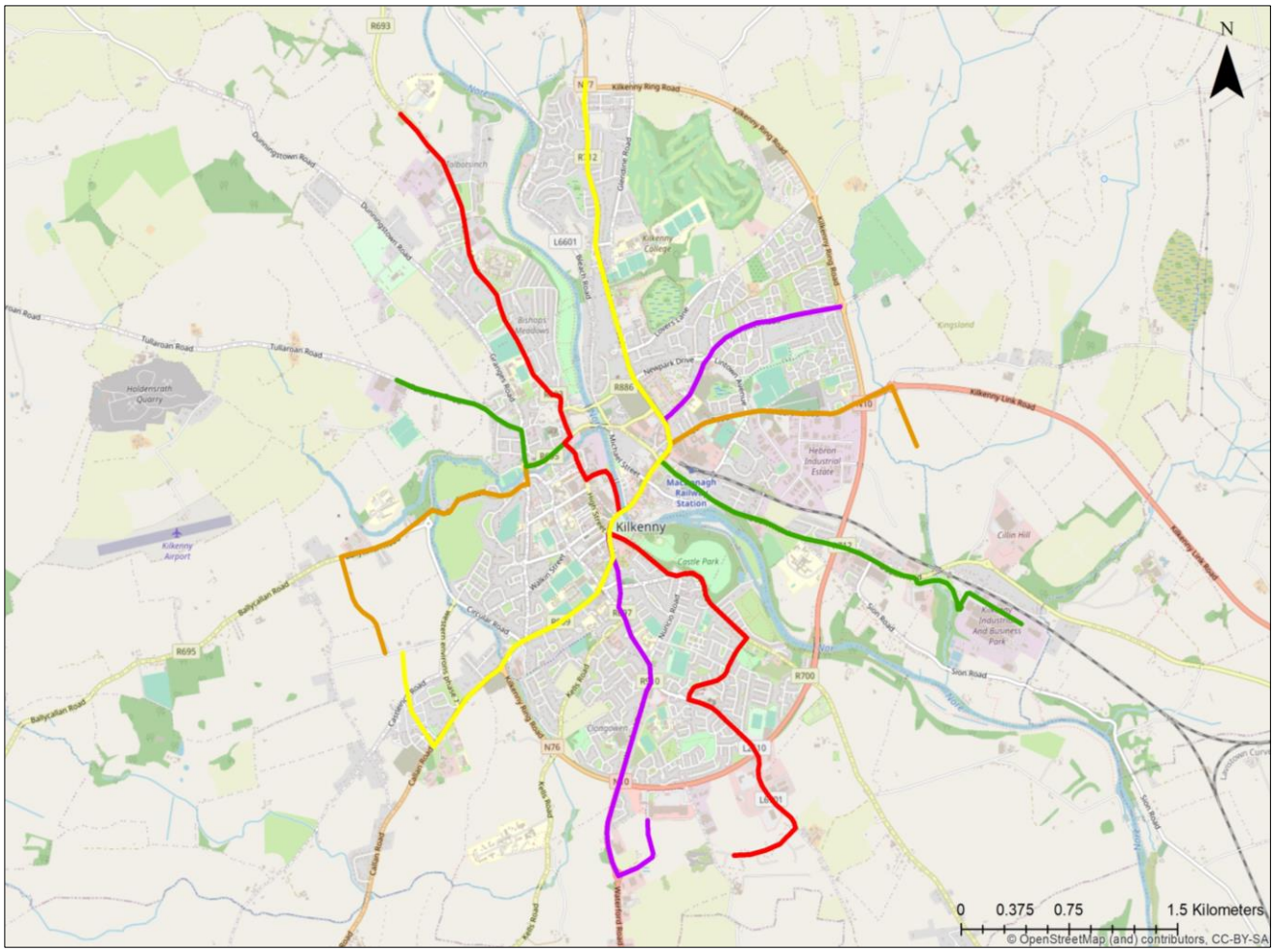

Figure 5-1 Emerging Preferred Public Transport Network. Source: KLTP Network Development Report.

Table 5-1 outlines the proposed bus routes and their associated headways. All five bus routes are proposed to have a frequency of one bus every 20 minutes, in each direction.

Table 5-1 Proposed Bus Routes

Corridor	Description	Proposed Corridor Headway (Each Direction)
Yellow Route	N77 Roundabout to Western Environs	20 min
Purple Route	Upper Newpark to Kilkenny Retail Business Park	20 min
Orange Route	Western Environs to Leggettsrath	20 min
Green Route	Loughmacask to Ormonde Business Park	20 min
Red Route	R693 to Loughboy Industrial Estate	20 min

5.3 Public Transport Priority

Through the Network Development Report, a proposed Kilkenny Public Transport Network Plan has been developed to improve public transport provision within the city. Following the identification of suitable corridors and frequency for bus routes, further interventions need to be considered to help incentivise public transport patronage.

Interventions to support the delivery of the public transport network centre on bus priority measures. Bus priority measures are low cost, highly efficient traffic management solutions that suit urban locations with high traffic congestion. They keep buses moving, boosting mobility in major trip destinations and improve the overall experience of public transport, enabling a greater level of modal shift.

The following interventions should be considered as part of the Kilkenny Public Transport Network Plan. Such interventions will need to closely align to the Traffic Management Plan (Chapter Six). Interventions to provide bus priority also have the potential to support improved cycle provision. On highly constrained corridors, the use of bus gates and bus lanes will be of benefit to cyclists where segregated cycle infrastructure is not feasible. Bus priority should be considered in relation to the Cycling Network Plan.

Bus Gates - A bus gate is a short section of road which only buses and authorised vehicles can go through, signage is generally used to clearly locate where a particular bus gate is located and who is authorised to use it. Bus gates help to provide a much more efficient journey for bus users as they can travel much quicker through areas of congestion. Whilst the focus is on bus movements, bus gates often permit use by cyclists and taxis (as seen in Manchester Oxford Road and Portland Street Bus Gate)

Based on the Traffic Management Plan presented in Chapter Six, bus gates (or a similar style of intervention) could be implemented as part of bus priority measures within the city centre core. Increasing bus priority through the city core will support the movement of people in a highly constrained area, ensuring sustainable transport is encouraged and enabled through a reduction/elimination of car use in the city core.

Bus Priority Signals - Traffic Signal Bus Priority (TSP) is widely regarded as an effective way to reduce the delay caused to buses at traffic signals and is widely used by local authorities in the UK. Bristol is a good example of where a city has a significant proportion of the city's signals being equipped for TSP. Modern traffic signal systems can utilise bias signal phasing in favour of roads with heavy bus flows. When implementing the Public Transport Network Plan, detailed analysis should be undertaken on key public transport corridors to understand the potential for upgrading signals to provide greater priority for bus users whilst ensuring a good level of service for all road users.

Bus Lanes - Bus lanes are used to separate traffic and ensure buses flow freely through cities and busy urban areas. Bus lanes are often the most popular form of bus priority measures as they require minimal construction and are relatively cost effective. Bus lanes provide a much more efficient and reliable journey for users. With less impact from general traffic congestion, bus services are closely aligned to timetables, providing greater confidence to users, significant operational benefits for bus operators and an overall better level of service. Whilst bus lanes provide benefits to users and operators, bus lanes do reduce overall traffic capacity. As part of the roll out of the KLTP, consideration should be given to aligning bus lanes with park and ride sites to encourage people not to travel into the city centre by car, reducing the overall demand on the local network.

To ensure bus priority measures are successful, it is recommended that additional improvements coincide with any bus priority measure implemented. Whilst bus priority will likely improve reliability, to improve the overall experience they should be linked to other improvements, such as improved waiting facilities, real time passenger information systems, and as previously mentioned, park-and-ride facilities. It will also be important to review the implications of any public transport measures on other road users in particular pedestrians and cyclists.

5.4 Bus Priority Analysis

To determine the potential requirement for bus priority within Kilkenny City, modelling was undertaken to determine the corridors where bus priority could be implemented due to congestion problems. After running the 2040 Do Minimum model, the results of the Road component for the AM and PM peak hours were assessed, to identify the following criteria:

- Links where the assigned volume was over 85% of the (junction) capacity;
- Junctions where the approaching volume over capacity ratio was relatively high; and
- Links where the modelled delay was greater than 10 seconds.

To achieve the full benefits of the proposed bus network, it is essential that the transport network functions to allow for a high quality and reliable bus service across the proposed routes. Based on consideration of the criteria outlined above, corridors along the proposed bus network which met the criteria were identified for bus priority. There was also a level of professional judgement deciding where to end / extend bus priority, or in the case of Hebron road to have mostly continuous bus priority rather than a gap in the middle.

For all modelled scenarios apart from the Do Minimum, bus lanes were included at the locations below (presented in Figure 5-2). Depending on high-level judgement of the road width available (based on Google Street View), bus lanes were included either as an extra lane or as replacing an existing general traffic lane or turning flare.

- Dublin Rd (crossing ring road east-west);
- Callan Rd (Bus lanes through 3 roundabouts);
- Castlecomer Rd;
- Dean Street; and
- McDonagh junction / Hebron Road.

The two locations below were also identified as having high volume to capacity ratios / high delays, but were not allocated bus lanes within the model due to lack of road space.

- R693 near accesses to St Luke's General Hospital and The Sycamores
- The stretch of Hebron Road travelling eastbound alongside St Kieran's Cemetery (bus lanes added elsewhere on Hebron Road but not on this part).

It is important to note that the model identified corridors with high traffic volumes which could hinder bus network performance. The model has helped to identify where bus lanes could be implemented to support the performance of the bus network. The model did not analyse the potential impacts of introducing bus lanes. It is recommended that a detailed analysis of various bus priority interventions is undertaken to determine the specific requirements along each of the bus routes within the proposed network. The assessment undertaken is of a high-level nature and a more detailed analysis would help to assess the potential impacts of bus priority on the overall transport network.

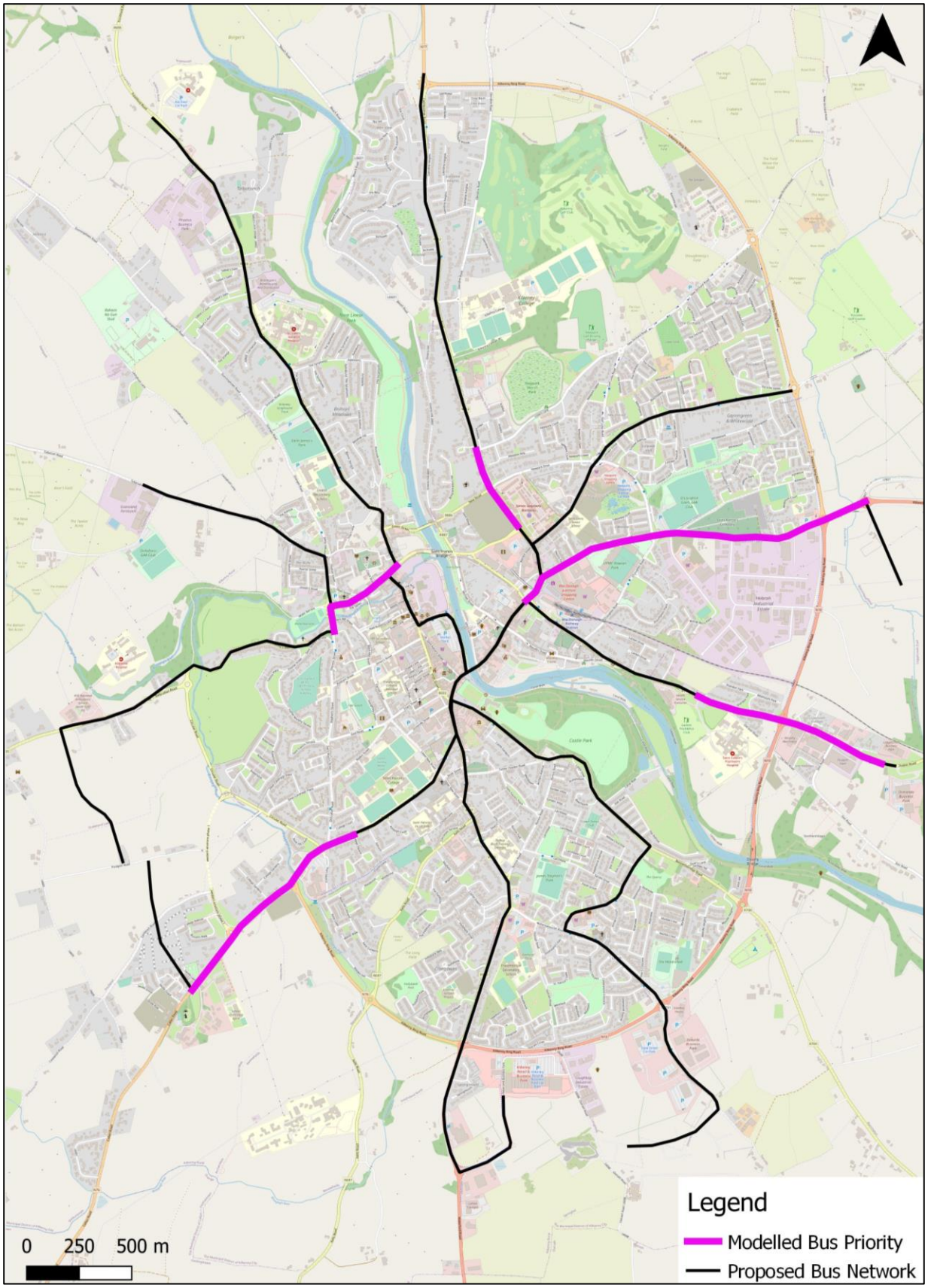

Figure 5-2 Extents of bus priority included in the options modelling

6. City Centre Traffic Management

6.1 Introduction

Kilkenny's City Street Network plays an important role linking the city centre with its inner neighbourhoods as well as strategic and amenity routes. The city is also a popular tourist destination with many attractions in the centre such as Kilkenny Castle and Park, and Medieval Mile, attracting thousands of visitors to the city each year.

Characterised by its medieval origins, the city centre contains a street network of back lanes, or 'slips' as they are known locally. Some of these back lanes serve as short cuts for pedestrians offering a good level of permeability and connectivity, such as New Building Lane, or Pennyfeather Lane. However, the medieval fabric and street pattern of the city centre also creates challenges in trying to cater for all modes of transport, alongside the varying needs of the residents and visitors.

Whilst it will be critical to provide good access into the city centre to support local businesses, residents and visitors, it is important that the objectives of the KLTP are achieved. To provide high quality access into the city centre, sustainable modes of transport should be encouraged, particularly ensuring good pedestrian and cycle access from/to Kilkenny Railway Station.

With a high proportion of local journeys into the city centre being undertaken by car, it will be important to enable a modal shift to support the national commitment of reducing greenhouse gas emissions from the transport sector (Climate Action and Low Carbon Development Bill 2021). Climate change policies align closely to transport policy around the need for increased and improved provision of sustainable modes of transport. The City Centre Traffic Management (CCTM) Plan is seen as a potential intervention to improve sustainable modes of transport, supporting more cleaner modes of transport. To enable a CCTM within Kilkenny City Centre, it is imperative that all interventions seek to support a reduction in car traffic, allowing for the benefits of the CCTM Plan to be fully realised.

A movement strategy has been developed for the KLTP that actively discourages vehicular through-traffic, reduces dependency on the private car, and improves accessibility and permeability to and within the city centre for pedestrians, cyclists and public transport users. Traffic management will be critical to achieve the principles of the movement strategy by supporting the prioritisation of sustainable modes, i.e. walking, cycling and public transport.

CCTM Options for the KLTP are developed in line with the high-level movement strategy's aims and objectives. Public transport priority is one element of this and could take a number of forms such as bus lanes, time-restricted bus gates, public transport only links and/or traffic signalling priority at junctions.

6.2 CCTM Options Assessment

During the network development stage, three CCTM options were developed. A qualitative assessment of these options was undertaken (refer to KLTP Network Development Report) and one option was identified to be taken forward as a potential option for implementation. This was Option 1 identified below: Pedestrianisation of City Centre.

For the optimisation and refinement stage, this option as well as two others that were developed in discussion with Kilkenny City Council were brought forward for consideration. These three options were included within the modelling assessment to better understand the impacts that various measures would have on the 2040 network. The outcome of this assessment demonstrates the need for a CCTM plan to be implemented, however a more detailed assessment is required to determine the exact measures required to best achieve the objectives set within the KLTP.

This section outlines the measures proposed under each option. The analysis of the modelling is outlined in Section 6.3.

6.2.1 CCTM Option 1: Pedestrianisation of City Centre

This option was identified in the network development stage to be taken forward for further assessment. It proposes the pedestrianisation of High Street and restricting St. John's Bridge and Rose Inn Street to public transport, walking and cycling only. As per the proposed public transport network, John Street Lower, John Street Upper, St. John's Bridge, Bateman Quay, Parliament Street and Rose Inn Street will cater for multiple bus route services. As the highest concentration of public transport services are within the city centre, public transport priority measures would be focused in this area.

This option attempts to achieve the principles of the KLTP movement strategy by prioritising sustainable modes, and actively discouraging through-traffic.

CCTM Option 1 is illustrated in Figure 6-1. It proposes the following:

- **High Street:** Pedestrianised from Rose Inn Street to Parliament Street. A modal filter e.g. planters and bollards would allow access for emergency services, and deliveries at certain times. Access to back lanes and local streets should be maintained and managed;
- **Parliament Street:** No change from existing traffic operation. Junction with Bateman Quay would be improved. HGV access to Market Yard car park retained. Potential for private car access to Market Yard to be relocated to James street
- **Bateman Quay:** Remains two-way. Access for vehicular traffic would be at Parliament Street only. Parallel Greenway along River Nore. Public transport only from junction with John Street and St. John's Bridge;
- **Rose Inn Street:** Access for walking, cycling, public transport and taxi only;
- **St. John's Bridge:** Sustainable transport bridge catering for walking, cycling, public transport and taxi only;
- **John Street Upper and Lower:** John Street Upper and Lower would remain two-way up to John's Bridge.
- **Friary Street:** Pedestrian priority with local access from Walkin Street to Garden's Row; and
- **Gateway and Transition Zones:** Used to demarcate a point of arrival from one place to another. They are important placemaking tools as they form the 'first impression' of a place, as well as traffic-calming tools as they can be used to slow traffic down.

Figure 6-1: CCTM Option 1: Pedestrianisation of City Centre Core.

Maintaining two-way bus services wherever possible is important to provide a quality service that can efficiently cater for the target demand and deliver the sustainable growth of Kilkenny City. However, it is noted that there are significant width constraints on Rose Inn Street that pose a challenge.

A bus gate narrowing to one-way only from each end would help to overcome this issue and allow extra scope for widening footpaths. The Design Manual for Urban Roads and Streets provides an example of the implementation of this at Blessington Road, Tallaght, shown in Figure 6-2. A self-regulating/urban design-led solution sympathetic to the urban context and Kilkenny's heritage streetscape could also be adopted.

It is envisaged that the creation of a sustainable transport corridor in this area will result in a significant reduction in traffic volumes creating a much safer, calmer and more pleasant environment overall for people walking and cycling.

Figure 6-2: Bus Gate in Tallaght, Dublin. Source: P.56, DMURS, 2019, DTTaS.

6.2.2 CCTM Option 2: One-Way System

This option is based on a reversal of the one-way system that is currently in place in response to the Covid-19 mobility measures. This option, which is illustrated in Figure 6-3, proposes the following:

- **High Street:** One-way from Parliament Street to The Parade. Increased pedestrian areas with provision of contra-flow cycle facility. Part-time pedestrianisation of High Street from Parliament Street to Friary Street could be considered as part of this proposal but would require technological solutions to permit access for emergency vehicles, residents and public transport;
- **Parliament Street:** No change from existing traffic operation;
- **Rose Inn Street:** One-way from The Parade to John's Bridge. Increased pedestrian areas with provision of contra flow cycle facility;
- **Bateman Quay:** Remains two-way. Parallel Greenway along River Nore;
- **St. John's Bridge:** One-way from Rose Inn Street to Lower John Street;
- **John Street Lower:** One-way from John's Bridge to John Street Upper. Increased pedestrian areas with provision of contra-flow cycle facility;
- **John Street Upper:** Remains two way to allow access to Maudlin Street; and
- **Friary Street:** Reversal of existing one-way to limit length of High Street used by Friary Street traffic. General access to Friary Street required for public car park, private residential car park and to Pennyfeather Lane.

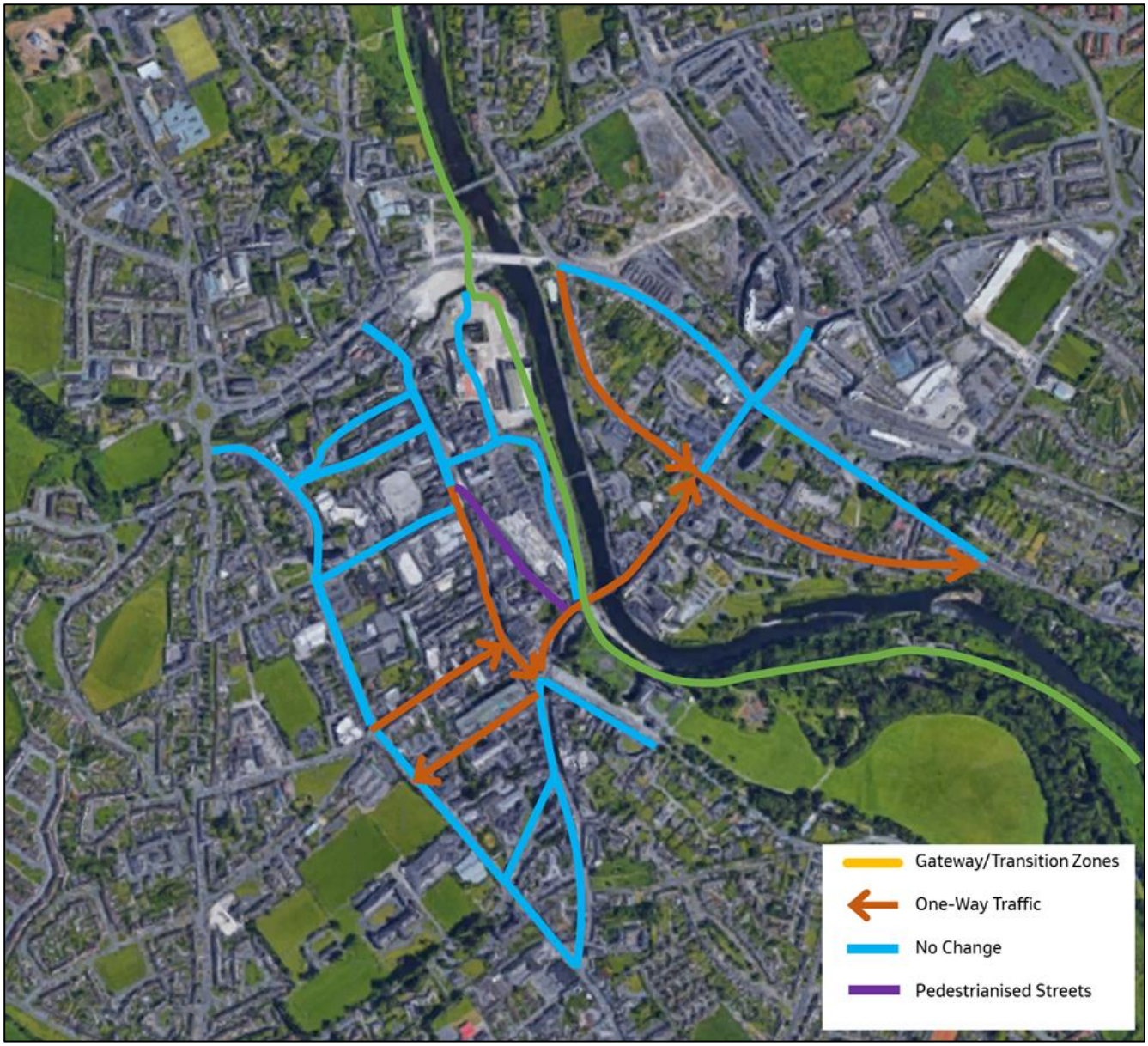

Figure 6-3: CCTM Option 2: One-Way System.

6.2.3 CCTM Option 3: Alternative One-Way System

This option is an alternative one-way system in the city centre. As illustrated in Figure 6-4, it comprises the following:

- **Parliament Street:** One-way northbound from Bateman Quay / High Street junction to Dean Street. Remove right turn lane at Parliament Street / Dean Street junction;
- **High Street:** One-way southbound from Bateman Quay / Parliament Street junction to The Parade;
- **Bateman Quay:** Remains two-way. Removal of traffic signals at Bateman Quay / Parliament Street / High Street junction;
- **New Urban Street:** One way southbound. The junction with Wolfe Tone Street would comprise of a T-Junction with a ghost island and a right turn lane;

- **Friary Street:** Reversal of existing one-way to limit length of High Street used by Friary Street traffic. General access to Friary Street required for public car park, private residential car park and access to Pennyfeather Lane;
- **Rose Inn Street / St. John's Bridge / John Street Lower:** One-way eastbound from The Parade to the John Street Lower / Maudlin Street junction; and
- **John Street Upper:** Remains two-way.

Figure 6-4: CCTM Option 3: Alternative One-Way System.

6.3 CCTM Modelling Results

Each of the three CCTM options were modelled as a 2040 scenario, and the results are analysed below. The three CCTM model scenarios also included the proposed 'Do Sustainable' network, comprising:

- The proposed high quality active network incorporating both walking and cycling infrastructure; and
- Proposed new bus routes and bus priority measures.

Individual changes were then made to the model networks to represent the different CCTM options. In the case of CCTM Option 2 and CCTM Option 3, the bus routes were adapted with diversions on several routes due to the one-way road systems. For each of the CCTM scenarios the active travel network modelled included two-way infrastructure on all key links, even where roads were one-way for general traffic.

The CCTM options were compared with the following baseline scenarios:

- Do minimum, representing the forecast 2040 scenario without any additional changes; and
- Do sustainable, consisting of the forecast 2040 scenario plus the proposed public transport and active travel networks.

The updates included in each modelled scenario are presented in Table 6-1.

Table 6-1 CCTM Options Assessment Modelled Scenarios

Scenario	Components Included				
	2040 Do Minimum Network	**Sustainable Network Updates (New Active and Bus Networks)**	**CCTM Option 1 Updates**	**CCTM Option 2 Updates**	**CCTM Option 3 Updates**
Do Minimum	✓				
Do Sustainable	✓	✓			
CCTM Option 1	✓	✓	✓		
CCTM Option 2	✓	✓		✓	
CCTM Option 3	✓	✓			✓

For the purposes of analysis, the Kilkenny study area was split into three sub-areas. The extents of these areas are show in Figure 6-5. For the purposes of the CCTM, only the Centre Area will be analysed as this is the area affected by traffic management. The other areas will be analysed in the Parking Strategy and Western Network Sections.

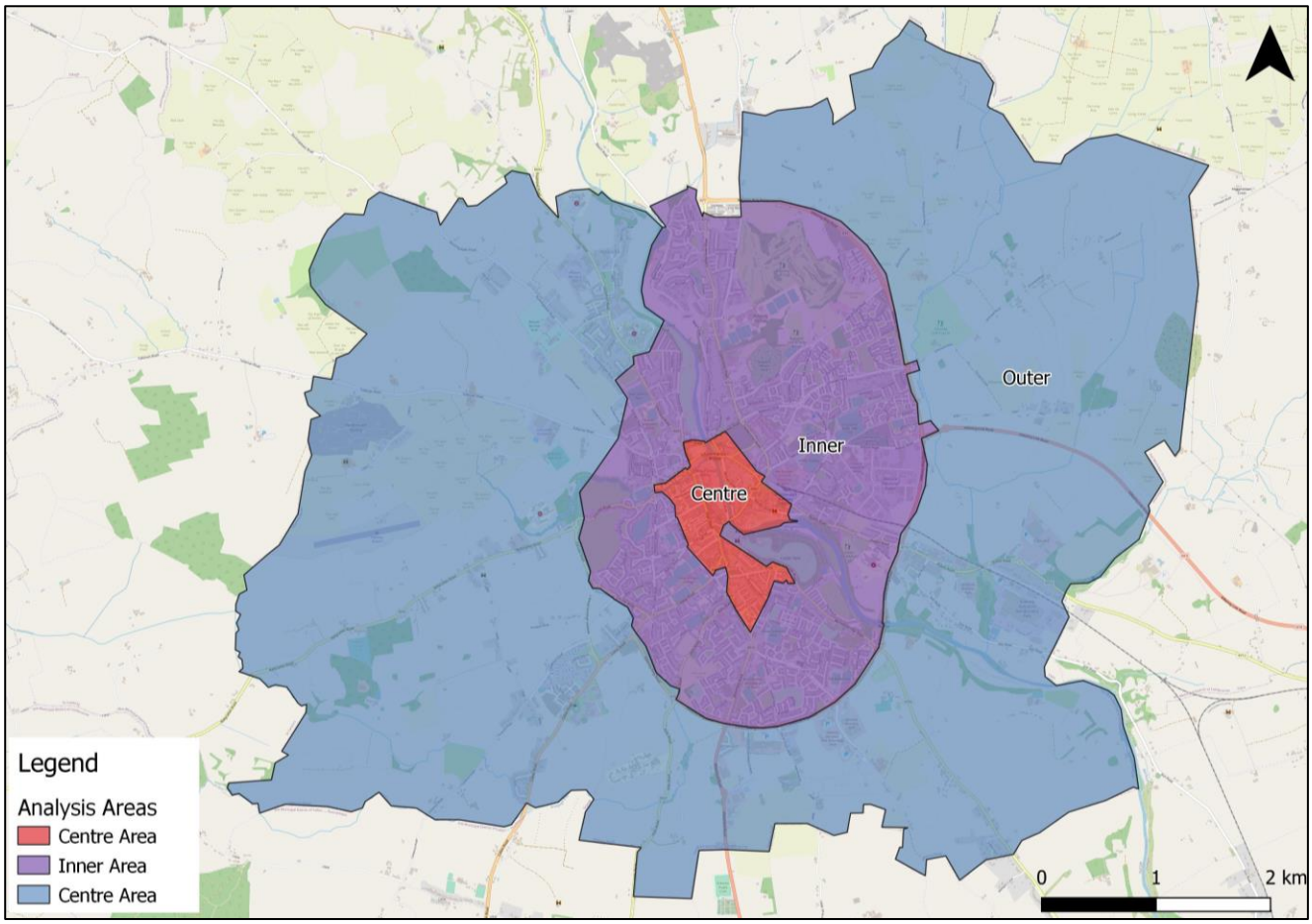

Figure 6-5 Areas used for Mode Share Analysis

The CCTM options have been modelled including the infrastructure changes implemented as part of the Do Sustainable scenario. It is important to note that the strategic nature of the model means it is not possible to capture all of the potential mode shift associated with behavioural change that is likely to occur following the introduction of high quality cycling and walking infrastructure. It is anticipated that the introduction of high quality cycling and walking infrastructure, will see a larger modal shift than can be represented within the model, with a positive increase in cycling and walking journeys.

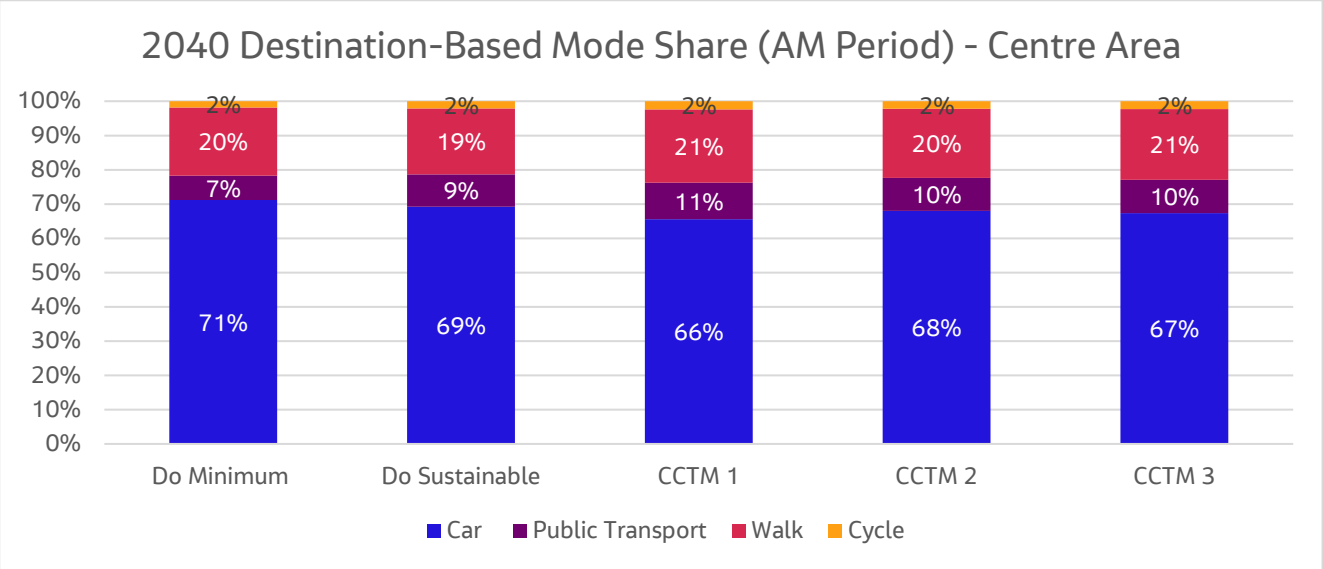

Figure 6-6 AM Mode Share for CCTM Options - Centre Area

Figure 6-6 shows the mode share for trip destination, representing travel into Kilkenny, for the Centre Area, which comprises Kilkenny City Centre. In this area, the Do Sustainable scenario showed a two percentage point decrease in car mode share compared to the Do Minimum, with a two percentage point increase in public transport trips, resulting from the increased bus usage. The walking mode share is, however, one percentage point lower in the Do Sustainable. This indicates that a higher proportion of those travelling to the central area are doing so by public transport, showing a benefit of introducing the new bus routes.

In the CCTM Option 1 scenario, the AM peak car mode share in the Centre Area decreased further from 69% to 66%; three percentage points lower than the Do Sustainable. Public transport and walking mode shares increased two percentage points each to 11% and 21% respectively, while cycle mode share remained constant at 2%. CCTM Option 1 has shown a positive impact in achieving modal shift in the city centre with a reduction in car journeys. Whilst the model has not identified an increase in modal share for cycling, experience across Europe shows that the introduction of high quality cycle infrastructure results in significant increases in cycling journeys.

Figure 6-7 shows the locations of selected key links in the city centre, with Figure 6-8 showing the model flows for each scenario on these links. The flows represent the number of people travelling on these links over 12 hours by each mode. The Do Sustainable scenario results show similar flows on the key links as in the Do Minimum scenario, with the Do Sustainable showing an increase in public transport and cycle flows on John's Bridge and Rose Inn Street.

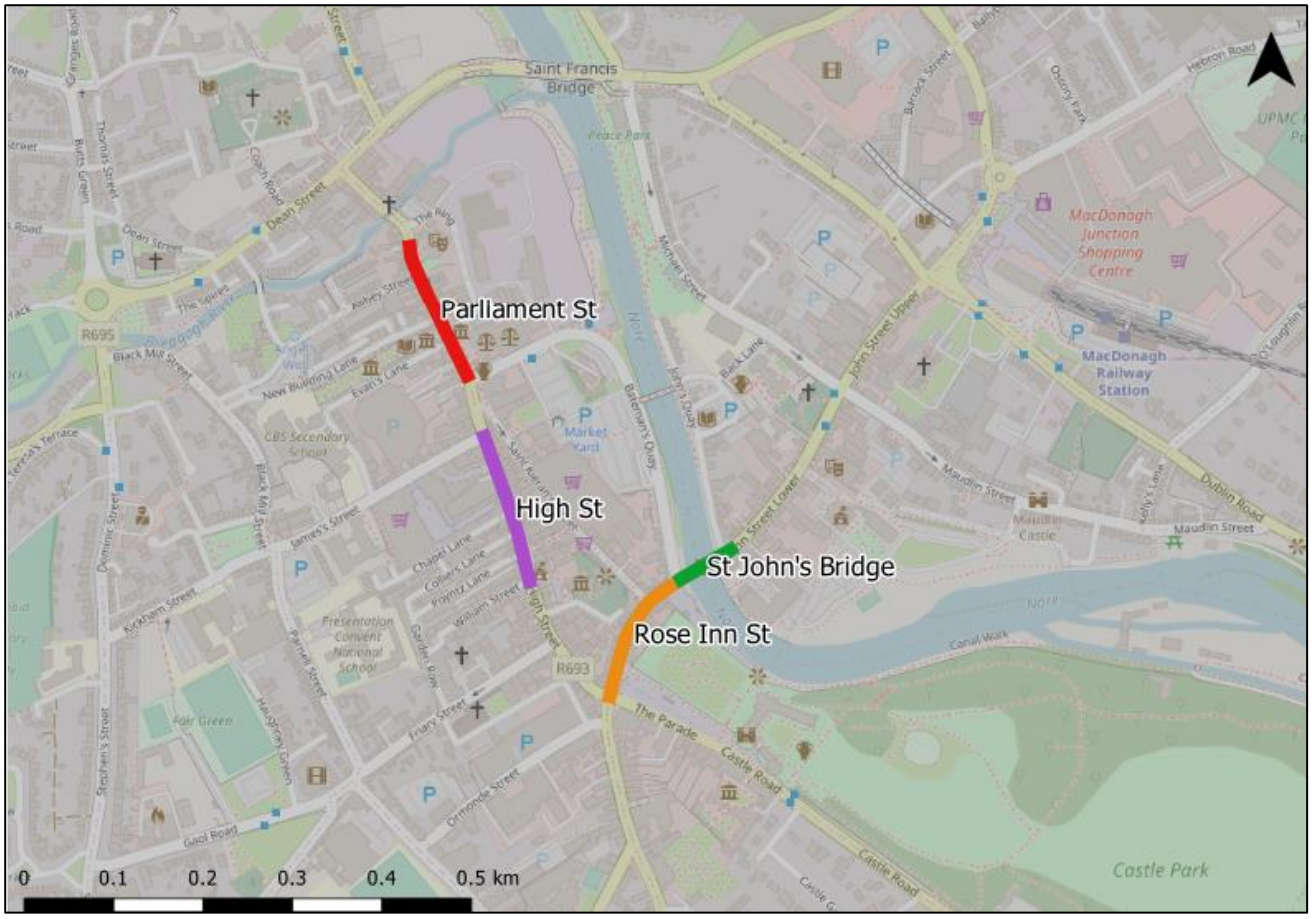

Figure 6-7 Key Link flow Locations

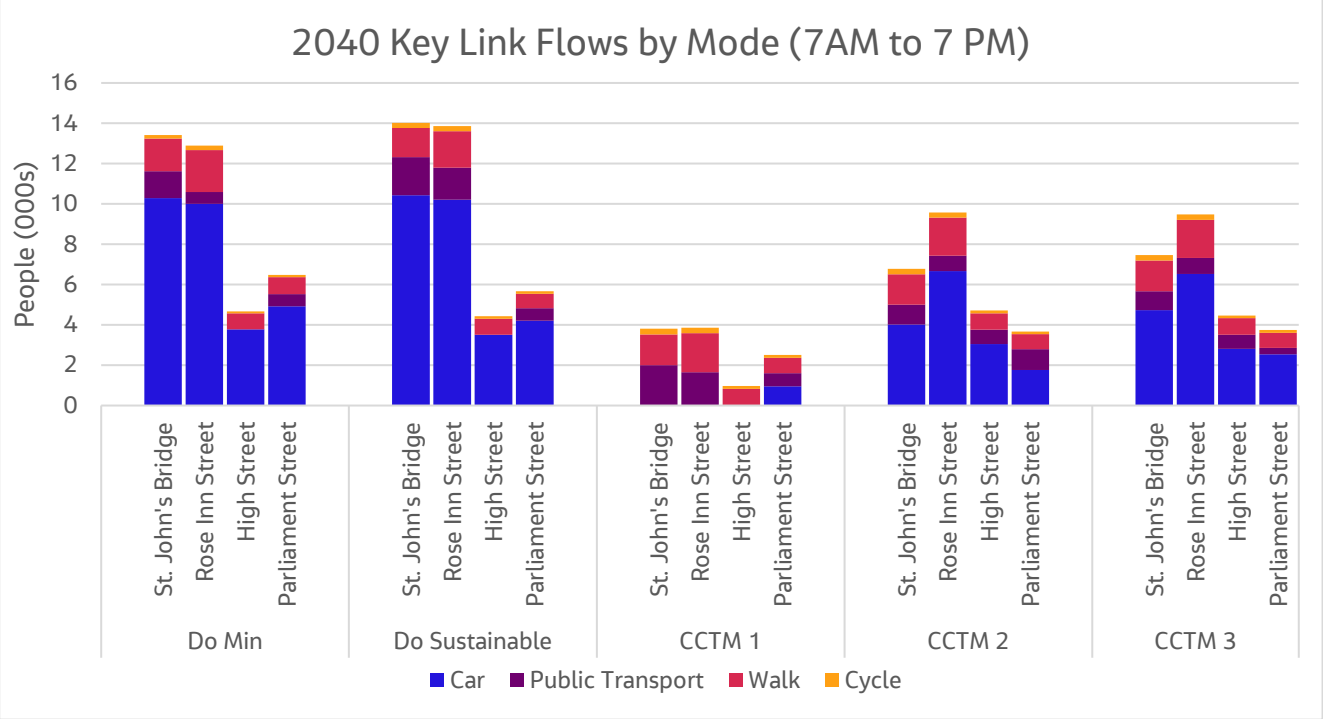

Figure 6-8 Key Link Flows (12-Hour People Flows) by Mode for CCTM Options

Each of the CCTM options result in a reduction in overall travel on the key links compared to the Do Sustainable. In CCTM Option 1, the pedestrianisation of High Street and restricting St. John's Bridge and Rose Inn Street to sustainable modes only removes car trips from these links. Traffic volumes also decrease under CCTM Option 2, compared to the Do Sustainable, on High Street, St. John's Bridge and Rose Inn Street as they are one way.

In CCTM Option 3, the resulting link flows on the reported links are similar to those in CCTM Option 2. Parliament Street has changed to being one-way northbound in CCTM Option 3, however car travel increases in comparison to CCTM Option 2, as traffic can no longer access the Abbey Quarter Zone from the north, it is required to divert via various routes to access the zone from the south via Parliament Street, increasing traffic volumes at this location. The decrease in public transport on Parliament Street in CCTM Option 3 is a result of bus routes being necessarily diverted within the one-way system.

The three CCTM options will provide a more pleasant and attractive environment for cycling and walking journeys. Whilst the model has acknowledged the introduction of high quality cycling and walking infrastructure, it is not able to fully reflect the behavioural change impact of improved active travel provision. It is anticipated that cycling and walking trips will increase across all key links and that overall journey numbers will be higher than forecasted in CCTM Option 2 and CCTM Option 3.

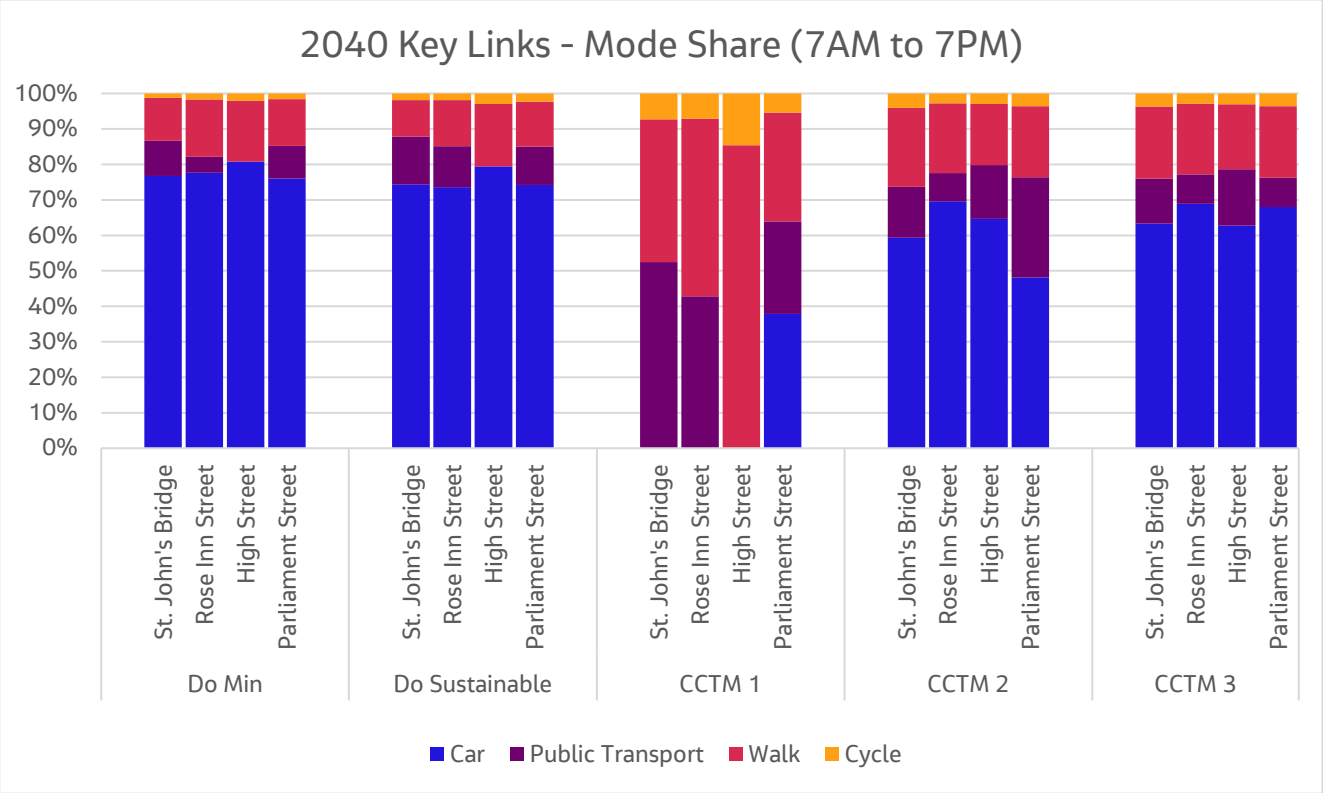

Figure 6-9 Key Link Mode Share for CCTM Options

Figure 6-9 shows an analysis of mode share in each scenario for the same key links as above. In the Do Sustainable scenario, an increase in public transport mode share is apparent on St. John's Bridge, Rose Inn Street and Parliament Street as a result of the enhanced bus network. Cycle mode share on High Street also increased from 2% in the Do Minimum to 3% in the Do Sustainable.

Compared to the Do Sustainable scenario, all three CCTM options show an increase in the proportion of travel made by sustainable modes on the reported links. In CCTM Option 1, travel on St. John's Bridge and Rose Inn

Street is predominantly by public transport and walking. The pedestrianisation of High Street in this option results in an 85% walking modal share on High Street, with the remaining 15% made up by cycle journeys.

In both CCTM Option 2 and CCTM Option 3, while the actual flows of walk and cycle traffic are similar to those in the CCTM Option 1 scenario, the inclusion of general traffic on key links means the active modes make up a smaller proportion of the mode share in these scenarios. It is also anticipated that the key links will be perceived as less desirable to walk or cycle on in these options compared to CCTM Option 1 due to the proximity to general traffic. Whilst the model does not reflect the full extent of modal shift to active travel, CCTM Option 1 is anticipated to result in a larger increase in active travel on these links than the other two options.

Based on the modelling analysis undertaken, and the need for a consistent network to base the further modelling on, CCTM Option 1 has been taken forward for use in the analysis undertaken in Chapter 7 and 8 for the following reasons:

- Supports KTLP objectives including actively discouraging vehicular through-traffic, reducing dependency on the private car and supporting the realisation of the 10-minute city;
- Supports the movement strategy objective of maximising permeability and accessibility throughout the city centre for pedestrians and cyclists;
- Biggest reduction in car modal share, supporting reduced car dependency;
- Highest sustainable transport modal share with increased public transport and walking modal share;
- Supports increased priority for pedestrians through pedestrianisation initiatives; and
- Traffic calming measures and restricted car access has the potential to increase cycle journeys.

7. Parking Strategy

7.1 Introduction

Parking management is a critical element of any transport plan that aims to achieve a modal shift toward sustainable travel and reduce car dependency. Research has concluded that there is a long established relationship between the availability and price of car parking and its impact on travel behaviour[3]. The availability and price of parking are major determinants of the relative attractiveness of the private car versus sustainable transport options.

There has been a significant step-change in thinking regarding parking standards and overall parking provision since the Kilkenny City and Environs Development Plan 2014-2020 was published. Cities have now begun to promote more walkable urban environments and a type of city living that prioritises sustainable travel. Cities across Europe are also reforming their approach to car parking as seen in the European case studies reviewed during the context stage of this project. During the development of this report, Kilkenny Council adopted the Kilkenny City and Environs Development Plan 2021-2027 which has been reviewed as part of this chapter.

During the development of the KLTP, there has been an increasing emphasis on climate change and the reduction of greenhouse gases through Government policy. It is important that all measures recommended within the KLTP support national objectives around climate change, and the key enabler to achieve this through the KLPT is modal shift. Whilst it is important to provide access for all users in the city centre, sustainable modes of transport should be encouraged to reduce greenhouse gas emissions resulting from high car usage. The KLTP therefore recommends a significantly reduced parking model, consistent with the practices outlined in the case studies, and in accordance with the direction outlined in recent national and regional policy.

This chapter presents the optimisation and refinement of the proposed Parking Strategy including a review of origin parking standards against KLTP objectives and development of other destination parking management measures as part of the KLTP. It sets out the following:

- A review of recent national and regional policy objectives in relation to parking;
- A review of existing parking provision including the Parking Options Study carried out by Kilkenny City Council;
- Analysis of the impact of implementing increased Park Charges within the city centre and the surrounding areas;
- Analysis of the impact of implementing Park and Stride sites within close proximity to the city centre;
- Analysis of the impact of implementing Park and Ride sites at various locations around the Kilkenny Ring Road; and
- Review of Electric Vehicle Charging Standards.

7.2 National and Regional Parking Policy Objectives

Recent changes to National policy in Ireland, such as the *National Planning Framework 2040* and *Sustainable Urban Housing: Design Standards for New Apartments*, support the application of low-car or car-free development in order to enable a shift toward sustainable transport and reduce dependency on the private car. This section outlines these objectives.

[3] Transport for London. 2012. Residential Parking Provision in New Developments.

7.2.1 National Planning Framework

The *National Planning Framework's* (NPF) National Policy Objective (NPO) 13 recommends that in urban areas, planning and related standards, in particular car parking, will be based on performance criteria that seek to achieve well-designed high quality outcomes in order to achieve targeted growth and sustainable mobility, with a preference for no-car and low-car developments.

7.2.2 Sustainable Urban Housing: Design Standards for New Apartments

In 2018, Section 28 ministerial guidelines *Sustainable Urban Housing: Design Standards for New Apartments* was published which contains several transport-related issues relevant to the development of car parking standards including the following:

- A default policy for car parking provision to be minimised, substantially reduced or wholly eliminated in highly accessible areas such as in or adjoining city cores or at a confluence of public transport systems such as rail and bus stations located in close proximity. Typically, these locations are within 15-minutes walking of city centres, within 10-minutes walking distance of commuter rail or bus stops or within 5-minutes walking distance of high-frequency bus services. This policy aligns with the 10-Minute City concept;

- A reduced overall parking standard and application of a maximum car parking standard for housing schemes with more than 45 dwellings per hectare net in suburban/urban locations served by public transport or close to town centres or employment areas;

- A significant uptake in the quantity and quality of cycle parking provision in relation to the location; quantity; design, and management of bicycle storage areas; and

- A requirement that cycling is fully integrated into the design and operation of all new apartment schemes.

7.2.3 Regional Spatial and Economic Strategy for the Southern Region

The RSES sets out several Regional Policy Objectives (RPOs) in relation to parking within its Transport Vision for the Southern Region.

RPO 151: Integration of Land Use and Transport:

- All non-residential development proposals will be subject to maximum parking standards as a limitation to restrict parking provision to achieve greater modal shift; and

- In locations where the highest intensity of development occurs, an approach that caps car parking on an area-wide basis will be applied.

RPO 152: Local Planning:

- Measures to facilitate the complementary use of private car, through appropriate local traffic management including the siting of destination car-parking, is central to achieving the correct balance of modal use.

7.3 KLTP Parking Locations

The quantum and location of car parking is fundamental to city centre traffic management. It is a common misconception that the provision of cheap, convenient and plentiful parking in the heart of the city centre is key to its social and economic success. It is often assumed that more parking is the answer to struggling high streets, however this is not supported by available research[4]. Studies across Europe have linked the quality of public spaces to people's perceptions of attractiveness of an area, contributing toward their quality of life, rather than parking, that influence where they shop. Studies have also found that retailers, in particular, vastly overestimate the importance of the car for customer travel.

The provision of car parking in convenient central locations encourages more people to drive into the city centre and therefore exacerbates congestion and undermines modal shift targets and investment in sustainable travel.

The following sections puts forward the KLTP proposals for parking locations under the following headings:

- On-Street Parking;
- Off-Street Parking;
  - Parking Charges;
  - Park and Strides; and
  - Park and Rides.

7.3.1 On-Street Parking

There are significant and competing demands for kerbside space in Kilkenny City Centre. The provision of on-street parking can support the economic functions of an urban centre, as well as support accessibility for those with disabilities.

However, on-street parking can also lead to large amounts of traffic circulating whilst looking for a parking space, contributing to congestion and pollution. Furthermore, on-street parking takes away valuable public space that could be used to widen footpaths, provide segregated cycle lanes, street trees or accommodate street furniture and play areas.

The KLTP recommends a reduction in on-street parking in Kilkenny City Centre to accommodate improved sustainable transport provision and public realm improvement measures. Where on-street parking is provided, the emphasis will be on providing disabled parking spaces and supporting a quick turnover of spaces to ensure that spaces are readily available. Innovative practices to better manage on-street parking spaces, dynamic parking systems and virtual loading bays should be investigated. Performance-based smart parking pricing systems are useful to ensure that spaces are used efficiently but are readily available for non-commuting purposes including shoppers. In this instance, pricing should be set to reach a target maximum of 85% occupancy to reduce search traffic, congestion and emissions.

7.3.2 Off-Street Parking

There is a significant amount of existing off-street parking in the city centre, in the form of both multi-storey and surface car parking, as presented in Figure 7-1.

[4] Living Streets. 2012. The Pedestrian Pound: The Business Case for Better Streets and Places.

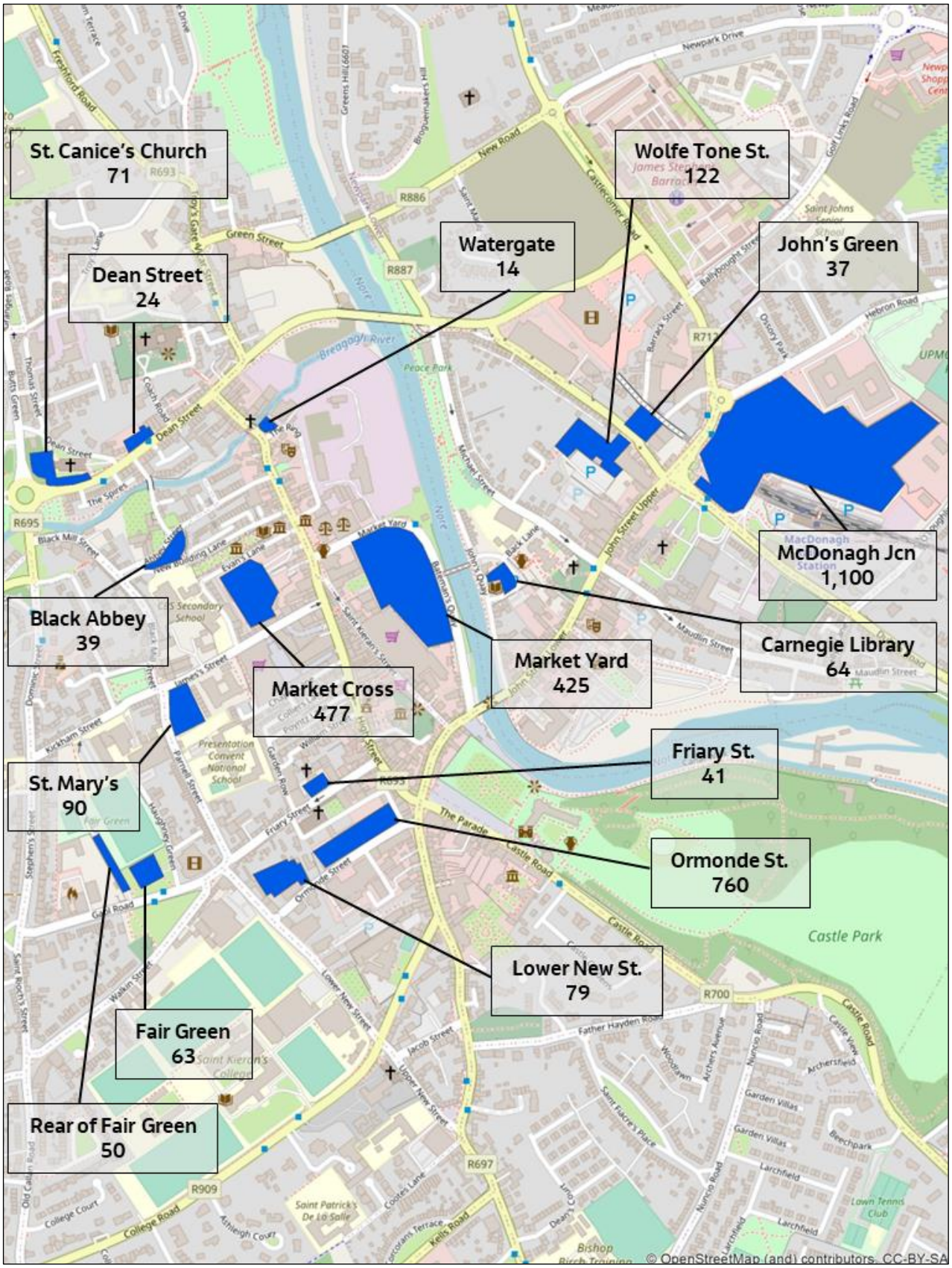

Figure 7-1: Existing Car Parks

As shown in Figure 7-1, to access two of the largest car park sites in Kilkenny (Market Cross and Market Yard) it is likely that many car drivers will travel through or in close proximity to the High Street. Additional through traffic on the High Street increases conflict between motorised users and those on foot or cycling. The location of car parks in close proximity to the city centre increases traffic flow, leading to congestion and poor air and noise quality. Through enabling parking so close to the city centre, it is unlikely that traffic flow will reduce in the city centre which further limits opportunities for outdoor hospitality and utilisation of outdoor space for local businesses.

In addition to encouraging congestion and car travel in the city centre, large car parks represent an inefficient use of developable brownfield land within the city centre. An example of this can be seen at Market Cross and at Bateman Quay, where Market Yard and St. John's Bridge car parks dominate the space. Further to the existing provision, Kilkenny County Council's *Parking Options Study 2017* made a set of recommendations in relation to additional parking to serve the projected growth in the Abbey Quarter, the Medieval Mile and the city centre more generally.

A total of 1,706 car parking spaces was recommended by the study. While it was identified that 506 spaces could be accommodated within existing car parks and 100 spaces would be designated disabled parking and set-down areas within the Abbey Quarter, the study identified a number of potential sites, illustrated in Figure 7-2, to serve the remaining requirement including: Bateman Quay, Green Street, County Hall, Kilkenny Mart and Wolfe Tone Street.

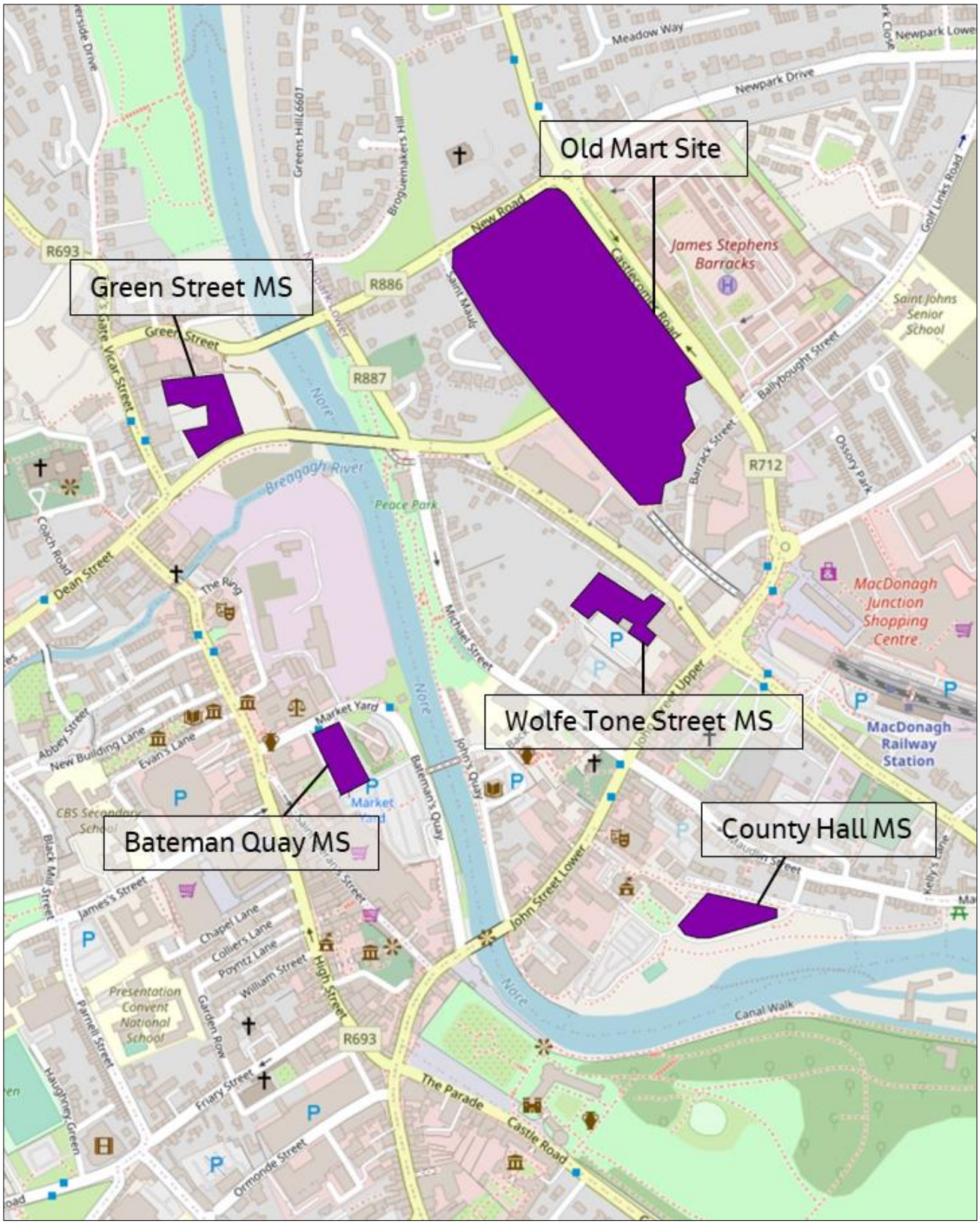

Figure 7-2 Sites identified as feasible sites for car parking. Source: Parking Study 2017.

The study undertook a high-level analysis of these sites which concluded that two new multi-storey car parks at Bateman Quay and Green Street would best serve the remaining requirements. The other sites were discounted for reasons such as land ownership and distance from the Abbey Quarter. Table 7-1 summarises the overall recommended locations of car parking spaces.

Table 7-1 Total Recommended Provision and Location of Car Parking. Source: Parking Study 2017.

Recommended Location	Total Spaces
Within the Abbey Quarter (disabled parking, set-down and deliveries)	**100**
Existing Car Parks (Market Cross and Ormonde St. MS Car Parks)	**506**
New MS Car Park (Bateman Quay)	**550**
New MS Car Park (Green Street)	**550**
	1,706

To achieve the objectives of the KLTP, it is important to consider the implications of additional parking. The KLTP would recommend a review of parking recommendations to consider significantly reducing the quantum of parking in the city centre. It is recommended that a reduction in parking provision in the city centre be offset with increased provision on the periphery in the form of Park and Stride and Park and Ride facilities. These facilities would provide the following benefits:

- Aligns with the KLTP Movement Strategy, 2040 mode share targets, national and regional policy;
- Reduces car trips to the city centre;
- Supports the prioritisation of sustainable travel in the city centre;
- Captures external demand from trips originating from outside the Study Area before entering the city centre;
- Aligns with approach taken in case studies such as Pontevedra and Winchester (see KLTP Context Report);
- Frees up valuable space in the city centre for higher value uses, including street furniture, cycle lanes, green spaces, community facilities and housing; and
- Reduces the negative impacts (e.g. congestion, pollution) of drivers searching for parking spaces in centre.

To support the objectives of the KLTP and to enable the vision of a 10-minute city, a full review of existing and future car parking provision is recommended. A review will help to determine whether alternative parking arrangements such as Park and Stride and Park and Ride support a policy of reducing car parking provision within the city centre. It is important that car parking provision within the city does not discourage local residents from travelling by sustainable modes whilst still supporting those that need to travel by car to the city centre.

The following sections outline the Park and Stride and Park and Ride proposals in greater detail.

7.3.2.1 Park and Stride

Park and Stride as a component of KLTP involves the provision of consolidated car parking on the periphery of the city centre, where people can park their car and continue the last part of their journey by foot or by bike. Figure 7-1 demonstrates that certain sections of the city centre periphery are already well catered for car parking provision including MacDonagh Junction and Ormond Street

These are also shown in Figure 7-3 and Figure 7-4.

Table 7-2 outlines existing and proposed car parking sites which could be suitable locations for major Park and Stride sites. These are also shown in Figure 7-3 and Figure 7-4.

Table 7-2 also presents the major corridor(s) which serves the car park. These are also shown in Figure 7-3 and Figure 7-4.

Table 7-2 Park and Stride Sites

Park and Stride Site	Current Status	Car Parking Spaces	Major Corridors Served
MacDonagh Junction	Existing	1,100	Dublin Road, Hebron Road
Ormonde Street	Existing	760	Upper Patrick Street, Lower New Street, Waterford Road.
Old Mart Site	Proposed	1,000 (approx.)	Castlecomer Road, Castlecomer New Road, New Park Drive
Green Street	Proposed	150 (approx.)	Bishop's Hill, Riverside Drive, Vicar Street

The impact of locating a Park and Stride site at the Old Mart Site is analysed in the following sections of this report, however this is for modelling purposes only. The identification of the exact location of a Park and Stride site will require further analysis. If a Park and Stride site is to be implemented, marketing and wayfinding are encouraged to increase the use of such car parks and to reduce the traffic flow into the city centre. Implementation of an Intelligent Transport System (ITS) parking management system to communicate availability of parking at Park and Stride facilities on approach roads is also encouraged for the full benefits to be realised.

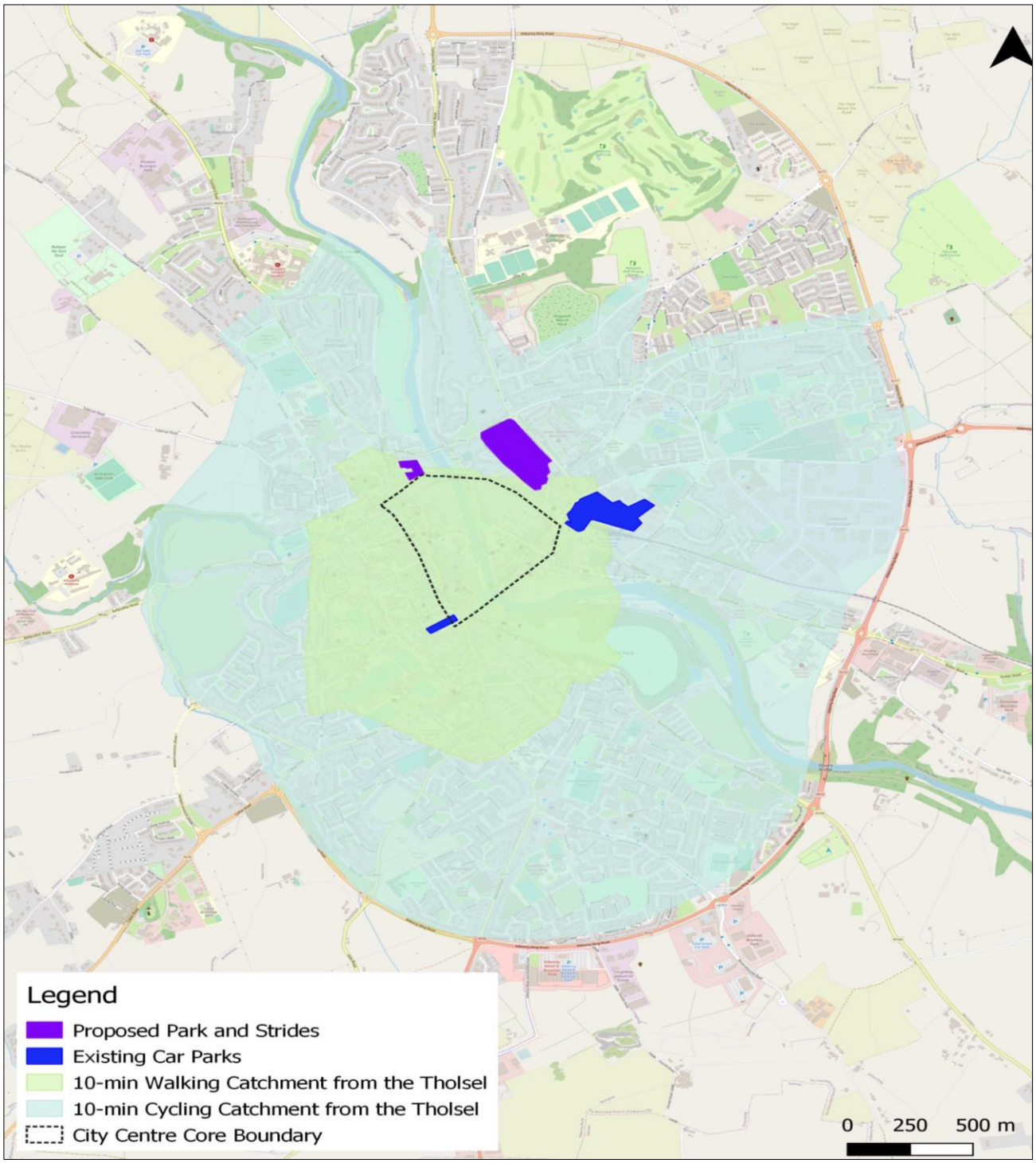

Figure 7-3 Analysis of Parking Available within 10-Minute Walk and Cycle from The Tholsel, High Street.

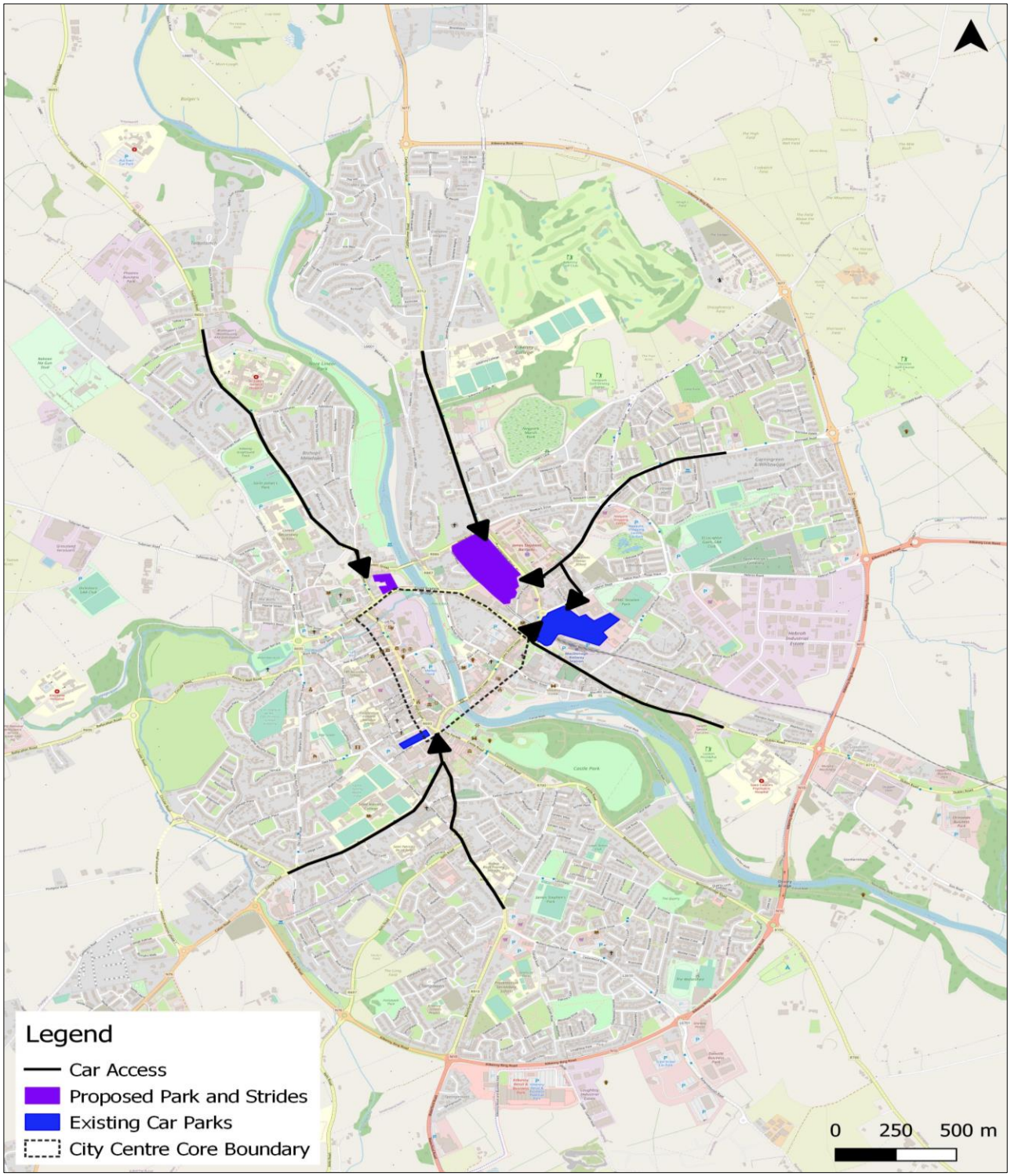

Figure 7-4: Car Access to Park and Stride Sites

7.3.2.2 Park and Ride

Park and Ride involves providing car parking spaces at public transport interchanges to provide access to the city centre and key destinations via public transport with managed secure parking. Park and Ride as a component of the KLTP could be a means of increasing the accessibility of the transport network to a population that might not otherwise access the network through modes such as walking, cycling or public transport.

Location, integration with the sustainable transport network, journey time to destination, availability of parking and the cost of parking at the Park and Ride versus other options are all important considerations to incentivise motorists to use the facility.

Location

The location of a Park and Ride site is key to achieving the desired benefits of private car reductions. Park and Ride sites are proposed at key locations around the periphery of the Kilkenny Ring Road in order to widen the catchment to capture external demand from trips originating from outside the study area and maximise the use of the proposed public transport network.

Integration

Integration with sustainable transport is crucial to ensure a seamless journey that is convenient and reliable. Public transport priority measures should also be considered along the route between the Park and Ride site and the city centre. This is critical to ensure that use of the Park and Ride has a competitive advantage over that of the private car in terms of journey time to destination. Public transport priority measures could include:

- Bus lane;
- Bus gate;
- Public transport only link; and
- Advanced bus signalling.

Cost and Availability of Parking

The cost of parking at the Park and Ride should be set at a level that is cost effective against parking within the Ring Road to provide a competitive advantage. If not, it is likely that car users will continue to utilise parking in the city centre, meaning mode shift targets are less likely to be realised. The reduction of car parking provision in the city centre is also recommended to encourage more people to use the Park and Ride service. Without these reductions within the city centre, the levels of car parking within the centre of Kilkenny are likely to encourage users to continue to travel into the city by private vehicles, bypassing the park and ride facilities.

7.3.2.3 Proposed Park and Ride Facilities

Figure 7-5 illustrates potential Park and Ride locations and their connections into the city centre. The identification of specific locations will require further analysis however, it will be important that sites are provided from different access points outside of the Kilkenny Ring Road including the N10, N76 and N77.

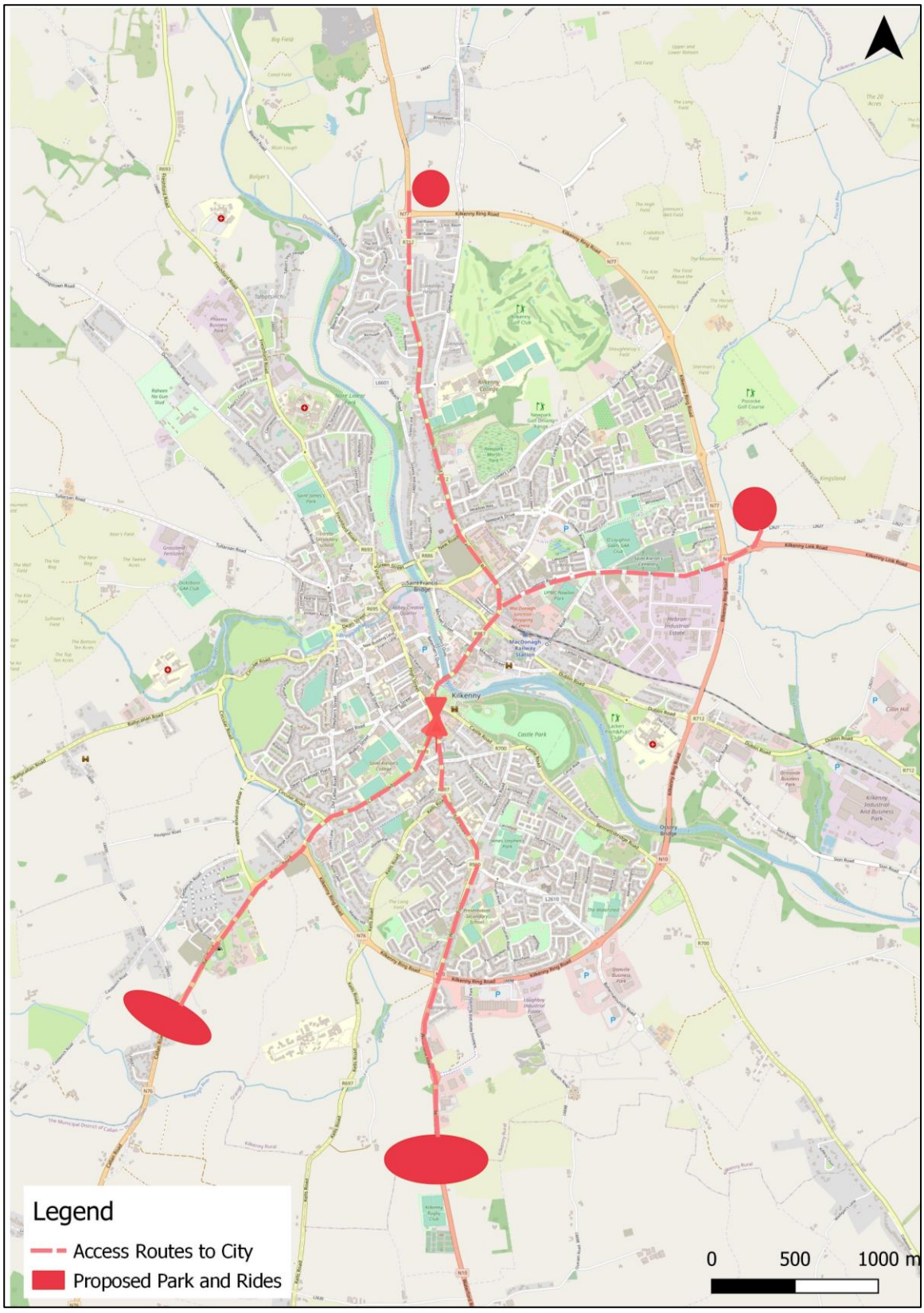

Figure 7-5 High Level Proposed Park and Ride Locations

7.4 KLTP Parking Standards

7.4.1 Review of Current Parking Standards

Parking standards set out within the Kilkenny City and County Draft Development Plan 2021-2027[5] are presented within Table 7-3. A full list of parking standards can be found within the Development Plan on the Kilkenny County Council website. The standards remain consistent with those found within the previous development plan. The most significant change is that non-residential parking standards have changed to maximum parking standards from minimum standards in the 2014-2020 Development Plan.

The parking standards set out within the Development Plan 2021-2027 apply across the entire county. While the provision of sufficient car parking is important, the council confirm within the Development Plan that parking requirements will also take into account the need to promote a shift towards more sustainable forms of transport.

Table 7-3 Current Parking Standards. Source: Kilkenny City and Environs Development Plan 2021-2027.

Land Use	Car Parking Spaces Per Unit
Dwelling House	2 per unit / 0.25 per unit for visitor parking
Apartment	1.25 per unit / 0.25 per unit for visitor parking
School	1 for every classroom plus 4 additional spaces
Churches, Theatres, Public Halls	1 per 10 seats
Hotels, Hostels, Guesthouses	1 per bedroom
Public Houses and Hotel Function	1 per 10m^2 of bar and lounge floor area
Shopping Centres, Supermarkets	1 per 25m^2 GFA
Shops, Restaurant, Cafés	1 per 20m^2 GFA
Offices	1 car space per 15 m2 of gross floor area and additional space to be determined by the Planning Authority
Industry	1 car space for every 60m2 of gross industrial floor area and operational space to be determined by the Planning Authority
Retail Warehousing	1 for every 35m^2 of net retail floor space

[5] Kilkenny City and County Draft Development Plan 2021-2027 (https://consult.kilkenny.ie/)

7.4.2 Parking Standards Case Studies

Prior to recommending changes to parking standards applicable in Kilkenny City and its environs, it is beneficial to review case studies from urban areas elsewhere in Ireland and in the UK which exhibit best practice in the setting of parking standards.

The Draft Cork City Development Plan[6] recommends that maximum origin-based residential car parking standards be applied. In the city centre, a maximum of 0.5 parking spaces per 1-2 bedroom units. For a 3+ bedroom unit, parking increases to a maximum of 1 parking space. For suburban locations and in close proximity to public transport, there is a maximum of 1 parking space for a 1-2 bedroom unit. For 3+ bedroom units, a maximum of 2 parking spaces can be provided.

In areas well-served by public transport, there would be a maximum of 0-0.15 parking spaces per residential 1 bed dwellings, and 0 – 0.3 per residential dwellings with 2 or more bedrooms. In areas with inferior transport offerings, where a greater reliance on private car can be expected, it was advised there be 0-0.25 spaces per residential 1 bed dwelling and 0 – 0.5 for residential dwellings with 2 or more bedrooms. In addition, the ABTA argues that "little or no car parking should be the default as articulated in national policy".

The South Dublin County Development Plan 2016 - 2022[7] also uses a zonal system with maximum parking standards. The plan stresses that "the number of spaces provided for any particular development should not exceed the maximum provision. The maximum provision should not be viewed as a target". The maxima set in South Dublin are low compared to most settlements in Ireland, with for example, a 3+ bed house is restricted to just 2 spaces throughout most of the county (Zone 1) and 1.5 in urban areas generally within 400m of high-quality public transport (Zone 2).

The Draft Limerick Development Plan 2022-2028[8] proposes maximum car parking spaces by dwelling type, location and size, as well as minimum bicycle parking requirements. The bicycle minimum standard in all cases either match or are greater than the car parking maximum. In Limerick's county town, Newcastle West, there is a maximum limit of 2 spaces for 3+ bed dwellings and 0.8 spaces for bed dwellings within the centre with less than 3 bedrooms. There are slightly larger allowances for parking across the rest of Newcastle West.

The City of Bristol's Local Plan[9], adopted in 2014, establishes a maximum of one space per one bed dwelling, 1.25 spaces per two bed and 1.5 spaces per three bed for new developments in the city's Central Area Plan area.

The parking standards established in the Vale of Glamorgan Local Development Plan 2011-2026[10], Wales establish a maximum number of spaces of one per bedroom, capped at 3 spaces per house/apartment. This approach is in keeping with Welsh Technical Advice Note 18 (March 2007), which pushes for the adoption of maximum parking standards and for developers to be allowed discretion in reducing parking levels where there would be no problems associated with over-spill parking.

A common theme in these case studies is the desire to move away from engraining car dependency into the planning of developments and to enable the transition to more sustainable modes of transport, particularly in areas already well-served by public transport. Kilkenny and Environs should follow their lead, and the parking standards recommended in this chapter have been designed to allow the urban area to do so.

[6] Cork City Development Plan (https://consult.corkcity.ie/)
[7] Plan 2016 - 2022 - SDCC
[8] Draft Limerick Development Plan 2022-2028 | Limerick.ie
[9] Bristol Local Plan (Bristol.gov.uk)
[10] Revised Parking Standards SPG_Final Draft 03 12 18 (valeofglamorgan.gov.uk)

7.4.3 KLTP Origin Based Parking Standards

Based on the objectives of the KLTP, it is recommended that separate parking standards are provided for Kilkenny City developments moving forward. As mentioned within the Development Plan, there is a need to promote and enable a modal shift towards more sustainable modes of transport. The 10-minute city is a key concept of the KLTP, and this can only be achieved if sustainable modes of transport are prioritised over private vehicles.

To reduce car dependency in Kilkenny, it is recommended that maximum parking standards are implemented within Kilkenny City for residential developments. For residential parking within Kilkenny City, new developments should be reviewed against existing and proposed public transport provision. Where high quality public transport provision is proposed, maximum parking standards within residential developments should be implemented and the provision should be lower than that in areas where higher car dependency can be expected due to the lack of alterative provision.

Limiting the space provided to car parking and reducing overall provision will help to encourage more sustainable travel patterns and to provide further space and opportunities for public transport and active travel infrastructure and associated facilities. If parking is not restricted within new developments, it has the potential to limit the benefits of new public transport and active travel infrastructure. Allowing high levels of parking provision within new developments will lock in car dependency within the city, leading to further congestion and associated problems.

The parking standards recommended in the Draft Cork Development Plan should be a target for Kilkenny City if proposed public transport and active travel improvements are delivered. Whilst sustainable transport improvements are required, there has to be recognition of the need for a private car to travel out of Kilkenny into the surrounding area.

It is therefore recommended that in the city centre and in areas well served by public transport, there would be a maximum of 0-0.5 parking spaces for a 1 bedroom dwelling and 0-0.75 parking spaces per 2 bedroom dwelling ,and maximum of 1 parking space per 3+bedroom units.. In areas with inferior transport offerings, where an expected greater reliance on the car can be expected, it was advised there be 0-1spaces per 1 bedroom unit. For a 2 bedroom unit there will be a maximum of 1.5 parking spaces, this increases to a maximum of 2 parking spaces for 3+ bedroom units.. These standards have been increased slightly on those proposed in Cork in recognition of the need for a private car to travel to areas outside Kilkenny City.

7.4.4 KLTP Destination Based Parking Options

Several options were considered for reducing the reliance on car trips with destination-based parking measures. These three options were modelled to investigate the model response to the measures:

- Parking Charges Option: Increased parking charges within the city;
- Park and Stride Option: In addition to Option 1, introduce a Park & Stride site with capacity constraints within the city centre; and
- Park and Ride: In addition to Option 1, introduce Park & Ride sites.

All three options were modelled assuming the implementation of CCTM Option 1 scenario, which also includes to changes included in to Do Sustainable scenario. For the purposes of modelling a specific location was selected for the Park and Stride and Park and Ride sites. These are indicative locations only to determine the impact of this type of option and further work is required to determine the exact location for these sites.

Parking Charges Option

The Parking Charges Option includes the following changes:

- Parking charges were increased to varying levels, depending on the proximity of the car park to the city centre. These charges have been included within the model to give an indication of the impact of parking charges on mode shift. A more detailed study is required to determine the parking charges that should be implemented in each area. The revised parking charges used for the modelling assessment are as follows:
  - €4/hour in city centre;
  - €2/hour elsewhere within the Kilkenny Ring Road boundary; and
  - €1/hour in the remainder of the study area outside the Ring Road.
- Capacity for Free Workplace Parking (FWPP) is limited to 40% of the existing available FWPP spaces.
- Availability of general parking in the city centre is limited to carparks, removing on-street parking.

Park and Stride Option

Parking and Stride Option includes the following changes:

- Changes to parking costs and available capacities as per Option 1, with general parking availability further limited to 40% of the off-street parking capacity within the city centre.
- Introduction of a Park & Stride facility at the Old Mart site, with capacity of 1,000 places free of charge to encourage cars out of the city centre.

Park and Ride Option

Parking and Ride Option includes the following changes:

- Changes to parking costs as per Option 1.
- Introduction of four Park & Rides sites at the locations indicated earlier in Figure 7-5, serving strategic access points to Kilkenny and connecting with the proposed bus network.

The updates included in each modelled scenario are presented in Table 7-4.

Table 7-4 Parking Options Assessment Modelled Scenarios

Scenario	Components Included					
	2040 Do Minimum Network	**Sustainable Network Updates**	**CCTM Option 1 Updates**	**Parking Charge Updates**	**Park & Stride Site**	**Park & Ride Sites**
CCTM Option 1	✓	✓	✓			
Parking Charges	✓	✓	✓	✓		
Park & Stride	✓	✓	✓	✓	✓	
Park & Ride	✓	✓	✓	✓		✓

Model Results

The 2040 AM Period destination-based mode share for each model run is presented in this section for each of the three analysis areas shown in Figure 6-5. The various parking options were modelled assuming implementation of the CCTM Option 1 scenario.

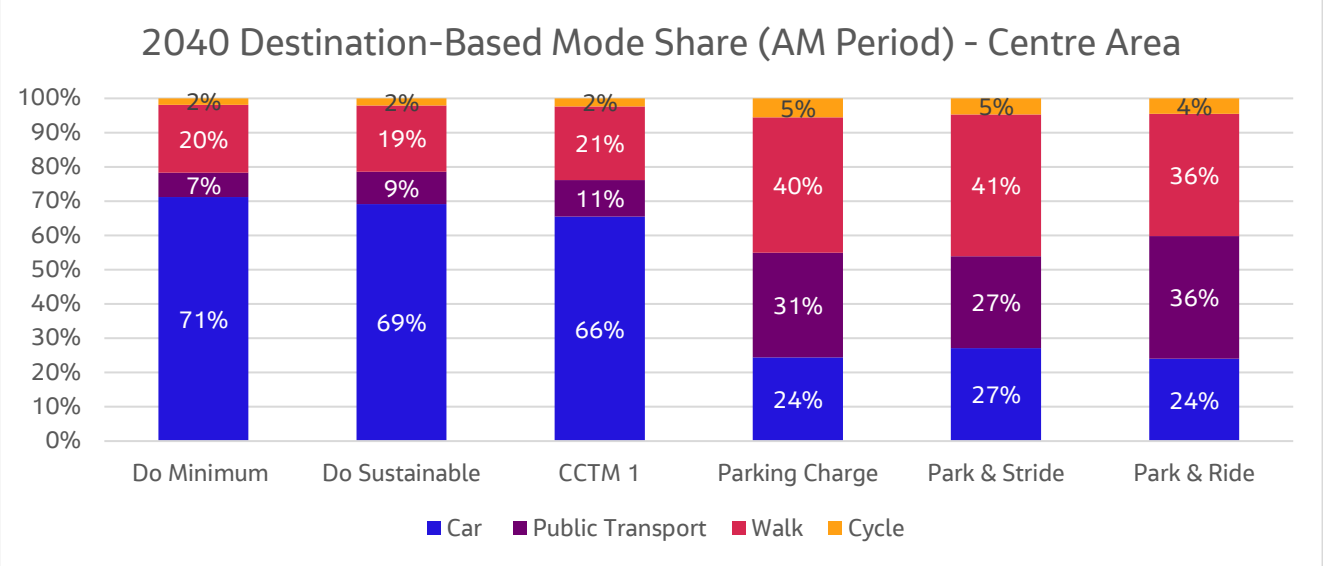

Figure 7-6 AM Mode Share for Parking Options - Centre Area

Figure 7-6 shows the 2040 AM Period origin-based mode share for each parking scenario in the Centre Area. Relative to the CCTM Option 1 scenario, introducing parking charges resulted in a 42 percentage point reduction in car mode share in the Centre Area, reducing to 24%. Walking mode share is anticipated to see an increase of 20 percentage points and public transport 19% percentage points, increasing to 31% and 40% respectively. Cycle mode share increased three percentage points to 5%. The significant reduction in car mode share is due to the relative cost of private car usage increasing compared to other modes following the introduction of parking charges. This makes more sustainable modes of travel more attractive and encourages a modal shift.

Introducing a Park and Stride site within close proximity to the city centre resulted in the mode share within the Centre Area changing, with car mode share increasing by three percentage points, and public transport mode share decreasing by four percentage points compared to the Parking Charges Option. Analysis of the model outputs for the Park and Stride Option highlighted that the site is well utilised, contributing to the one percentage point increase in walking trips in the Centre Area. However, by providing free parking close to the city centre, the Park and Stride resulted in higher car mode share in the city centre than the Parking Charges Option alone. This is a model response that is unlikely to occur in reality, with car mode share within the city centre anticipated to remain consistent with the parking charges scenario, or reduce slightly as vehicles are attracted to the Park and Stride site.

The introduction of Park and Ride sites on the periphery of the ring road, in addition to city centre parking charges, resulted in a Centre Area car mode share the same as the Parking Charges Option. Compared to the Parking Charges Option, public transport mode share in the Centre Area increased by 5 percentage points, while walking mode share reduced by four percentage points and cycling 1 percentage point. The increased public transport Mode Share is a result of the high capacity, low cost parking provision outside the ring road which is served by high quality public transport connections into the city centre, meaning a higher percentage of trips are made to the city centre than by public transport. The introduction of Park and Ride sites is unlikely to make a significant difference to car usage in the city centre, however it is anticipated to reduce mode share in the Inner Area, as show in Figure 7-7.

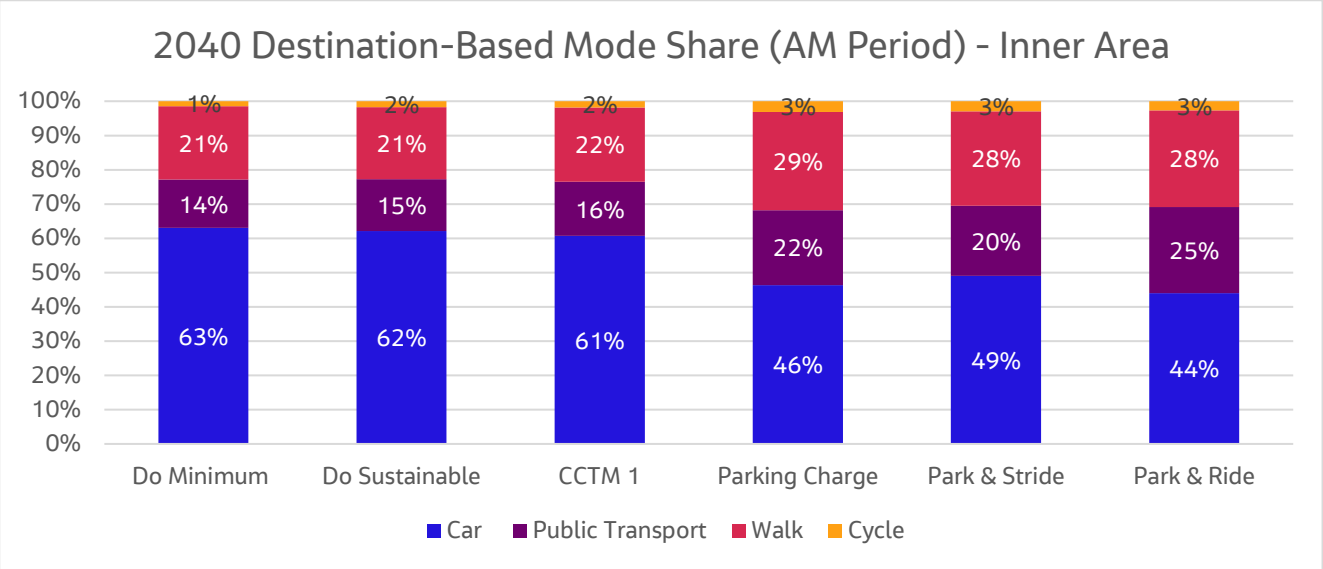

Figure 7-7 AM Mode Share for Parking Options - Inner Area

In the Inner Area, the mode share results for each modelled option are shown in Figure 7-7. While the impact of parking strategy options on mode share is less significant here than in the Centre Area, the Parking Charges option nonetheless showed a 15 percentage point decrease in car mode share in the Inner Area, decreasing from 61% in CCTM Option 1 to 46% in the Parking Charges Option. Introducing the Park & Stride site resulted in the car mode share increasing again to 49%, while the Park & Ride option resulted in the lowest car mode share of the three options at 44%. The increased car mode share in the Park and Stride scenario is a result of locating a cheap car park in this area, reducing the relative cost of car travel to this area compared to the Parking Charges option.

The modelling shows that each of the parking strategy options are likely to result in an increase in Public Transport, Walking and Cycling mode shares. This can provide confidence that a combination of these measures is likely to result in a reduction in car mode share within the ring road, increasing the percentage of trips made by sustainable modes.

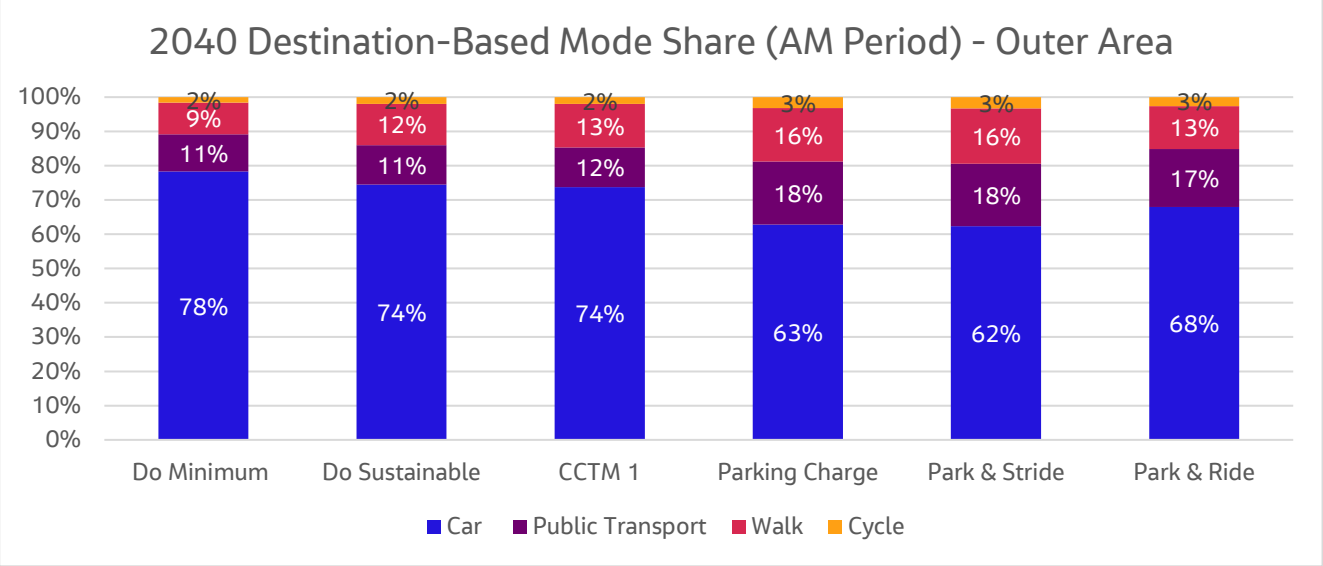

Figure 7-8 AM Mode Share for Parking Options - Outer Area

Figure 7-8 shows the destination-based AM mode share analysis for the Outer Area. This area, outside the ring road, also experienced changes in mode share in each of the three parking strategy options following the introduction of modest parking charges. Car mode share in this area increases following the introduction of Park and Ride, as the sites are located outside the ring road. This attracts car traffic to park in the area before transferring onto sustainable modes, increasing the car mode share for destination trips.

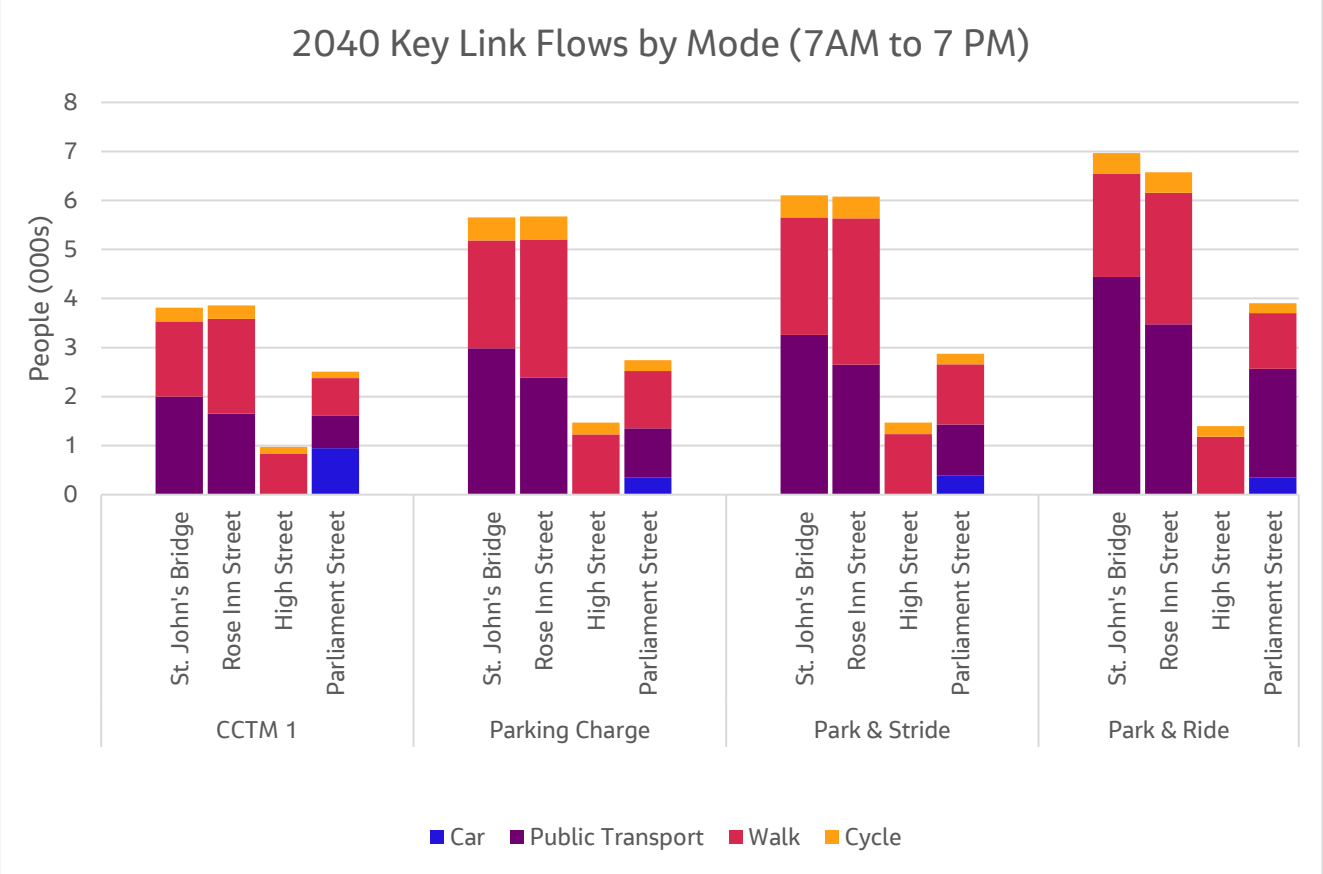

Figure 7-9 Key Link Flows (12-Hour People Flows) by Mode for Parking Options

Figure 7-9 shows the 12-hour key link flows by mode. Relative to the CCTM Option 1, the Parking Charge, Park & Ride and Park & Stride scenarios all show a significant increase in the number of people travelling by sustainable modes of the four key links analysed within the city centre. Furthermore, the number of cars travelling on Parliament Street, the only road open to traffic within the city centre that has been analysed, reduces significantly.

With St. John's Bridge, Rose Inn Street and High Street all only open to sustainable modes, car trips are 0 in all scenarios. Following the introduction of parking charges, the number of people travelling on St. John's Bridge by public transport, walking and cycling increase by 49%, 43% and 70% respectively compared to CCTM Option 1. Similarly, on Rose Inn Street, the number of people travelling by public transport, walking and cycling increases by 45%, 46% and 73% respectively, compared to CCTM Option 1. High Street can only be accessed by active modes and walking and cycling increase 47% and 71% respectively compared to CCTM Option 1. On Parliament Street, public transport, walking and cycling increase by 53%, 52% and 63% respectively, with the number of people travelling by car decreasing by 63% compared to CCTM Option 1. This indicates that the introduction of parking charges would have a significant impact on the volumes of cars using the city centre, with substantial decreases anticipated as people chose a sustainable alterative.

The modelling indicates that the introduction of a Park and Stride site in addition to parking charges is unlikely to significantly change the numbers of people travelling by any of the four modes on the links analysed; however, there is a slight increase in public transport and walking trips. The number of people travelling by public transport increases by 9%, 11% and 4% on St. John's Bridge, Rose Inn Street and Parliament Street respectively, compared to the Parking Charge Option. The number of people walking increases by 9% on St. John's Bridge, 6% on Rose Inn Street, 1% on High Street and 6% on Parliament Street following the introduction of a Park and Stride Site. There is a slight reduction in the number of cyclists across all four links, reducing by 6% or less; however, this is an absolute reduction of less than 30 cyclists across the 12-hour period on any given link. Finally, car trips increase slightly compared to the Parking Charges Option (9%); however, there remains a 59% reduction in the number of people travelling by car on Parliament Street compared to CCTM Option 1. The increase in the number of car travellers may be due to people accessing the Park and Stride Site from other areas of the city to take advantage of the free parking. As the site provides significant parking capacity, free of charge, it is anticipated to attract a high volume of vehicles from the core city centre area, improving the environment for those walking and cycling.

Introducing Park & Ride sites at locations around the ring road, in addition to parking charges, sees the most significant change in the volume of people travelling by sustainable modes on the roads analysed. Compared to introducing parking charges, public transport increase by a further 49% (122% increase compared to CCTM Option 1) on St. John's Bridge, with walking and cycling both decreasing by 4% (37% increase compared to CCTM Option 1) and 11% (51% increase compared to CCTM Option 1) respectively.

On Rose Inn Street, public transport trips increase by a further 45% (110% increase compared to CCTM Option 1), with walking and cycling both decreasing by 5% (39% increase compared to CCTM Option 1) and 12% (52% increase compared to CCTM Option 1) respectively, compared to the Parking Charge Option. High Street walking and cycling trips both decrease 4% (42% increase compared to CCTM Option 1) and 10% (53% increase compared to CCTM Option 1) respectively compared to the Parking Charge Option – however, these are small numbers in absolute terms.

On Parliament Street, public transport increased by a further 121% (239% increase compared to CCTM Option 1), walking and cycling decrease by 2% (48% increase compared to CCTM Option 1), and 8% (50% increase compared to CCTM Option 1), respectively, with the number of people travelling by car decreasing by 1%, compared to the Parking Charges Option.

As mentioned in Chapter 6, the improvement to the walking and cycling network, in addition to the removal of vehicles from the city centre following implementation of a parking strategy, would create a more pleasant and attractive environment for cycling and walking journeys. Whilst the model has acknowledged the introduction of high quality cycling and walking infrastructure, it is not able to fully reflect the behavioural change impact of improved active travel provision. It is anticipated that cycling and walking trips will increase further following the introduction of a Park and Ride, as the number of vehicles in the city centre has reduced.

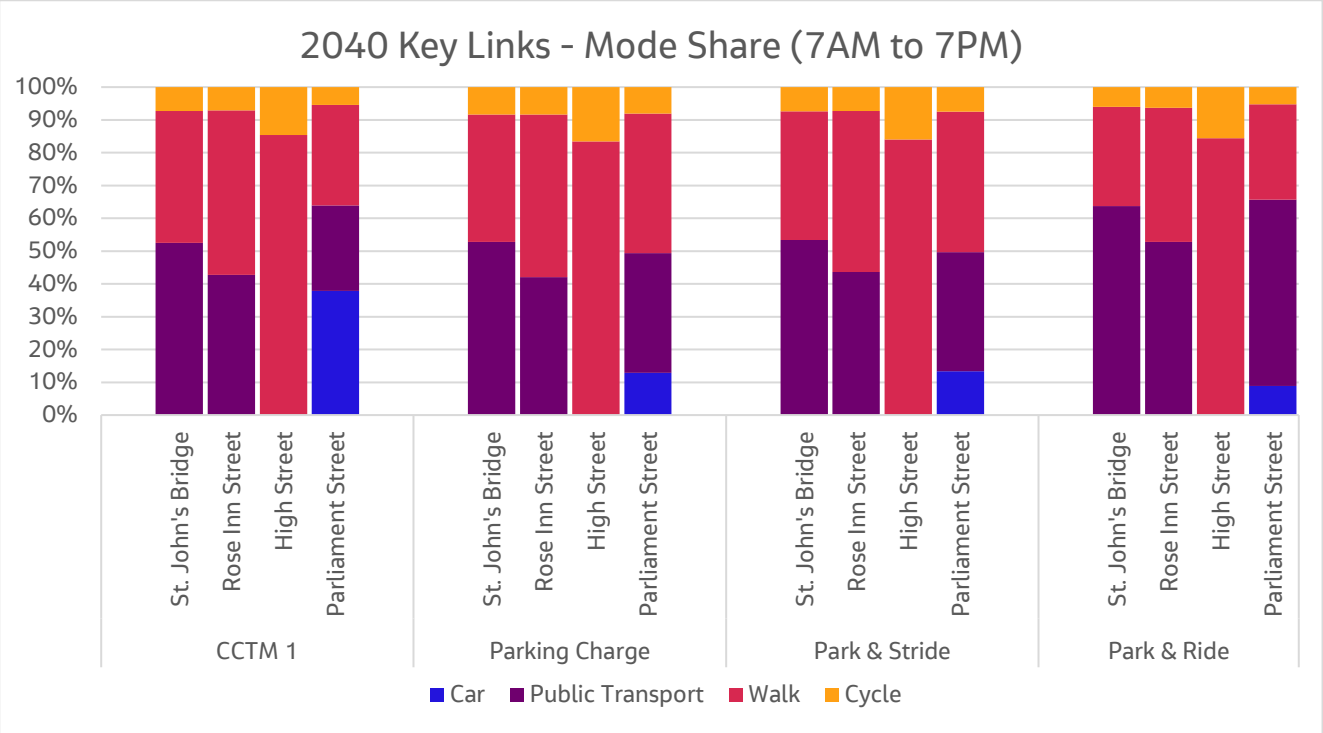

Figure 7-10 Key Link Mode Share for Parking Options

The mode share on the key links is shown in Figure 7-10. Cars are prohibited from travelling on St. John's Bridge, Rose Inn Street and High Street in CCTM Option 1 and all the parking scenarios. Relative to the CCTM Option 1 scenario, car mode share is anticipated to reduce by 25% percentage points on Parliament Street following the introduction of parking charges as the cost of travelling by car increases and encourages a model shift to public transport. Following the introduction of Park & Stride, in addition to parking charges, there is no change in car mode share compared the Parking Charges Option on Parliament Street. Introducing Park and Rides in addition to parking charges is anticipated to reduce car mode share by a further 4 percentage points, as the high capacity car park, low parking charges, and high quality public transport services attract more people to public transport.

Compared to CCTM Option 1, there is a 11 percentage-point increase in public transport trips on Parliament Street following the introduction of parking charges, reducing to 10 percentage points following the introduction of a Park & Stride, and a 31 percentage-point increase following the introduction of Park & Ride sites (20 percentage point increase on the parking charge scenario). The Park & Ride Option also sees an increase in public transport trips of 11 percentage points on both St. John's Bridge and Rose Inn Street compared to the parking charges scenario respectively. This is notable as introduction parking charges alone resulted in a negligible change in the share of public transport on both of these links compared to CCTM Option 1. This indicates that the introduction of park and ride sites increases bus patronage on the services that uses these routes as the number of people walking and cycling on these routes remains relatively stable following the introduction of the park and ride sites as shown in Figure 7-9.

7.4.5 Area-Based Maximum Parking Provision

In the context of new development areas - Loughmacask, Western Environs and Abbey Quarter - car parking provision should be capped on an area-wide basis with low-car or car-free developments being the norm, in line with the RSES and *Section 28 guidelines Sustainable Urban Housing: Design Standards for New Apartments*. The application of low-car or car-free development is an increasingly common tool to facilitate higher density development and prioritise sustainable transport.

As mentioned throughout this report, climate change is a critical element in shaping the future direction of Kilkenny City. To support a reduction in greenhouse gases, it is important that future developments seek to change the dominance of the car and reduce overall car journeys within the city centre. To reduce the high car modal share within Kilkenny City, maximum area-based parking provision should be considered to support a localised effort to enable more sustainable travel behaviour.

The KLTP is focused on delivering high quality public transport, cycling and walking infrastructure. Public transport in particular, will see significant changes proposed with more frequent services converging on the city centre. To support the introduction of upgraded public transport services, short distance car journeys should be deterred to promote and enable the delivery of improved alternatives. To maximise the benefits of public transport investment, it will be imperative that sustainable modes are seen as the most attractive form of transport within Kilkenny City.

To support the delivery of major new residential developments such as Loughmacask and Western Environs, area-based maximum parking provision should be considered to support KLTP objectives. To support long term sustainable travel behaviour, it is important that measures are introduced as part of the initial development to deter short distance car journeys and to promote public transport and active travel. If high levels of car parking are provided in residential developments, it is anticipated that existing travel patterns will be replicated in new developments which will harm KTLP objectives and local to national climate change objectives.

7.5 Electric Vehicle Charging Points Strategy

The Electric Vehicle Charging Points Strategy is presented within the Network Development Report. During the Option Refinement process, the Irish Government published Statutory Instrument 393 in 2021 in relation to the energy performance of buildings including the installation of electric vehicles. The remainder of the chapter benchmarks KLTP proposals against UK and Irish policy.

7.5.1 Benchmarking of EVCP Requirements

In 2019, the UK's Department for Transport published *Electric Vehicle Charging in Residential and Non-Residential Buildings* which sets out its policy provisions in relation to EVCP requirements for all building types. Table 7-5 provides an evaluation by comparison of the standards set out by the UK, the KLTP and recently published guidance from the Irish Government. It concludes that the KLTP's proposals align with the UK's and Ireland policy position.

Table 7-5: Benchmarking of Proposed EVCP Provision

	UK Policy[11]	KLTP Proposed	Irish Policy [12]
Residential Based EVCP	100% of new residential parking spaces should be fitted with EVCP.	60% of spaces to be fitted with EVCP, and the remaining 40% to have passive ducting provision for future conversion to EVCP, beyond 2050 as required.	100% of new residential parking spaces should be fitted with EVCP if development has over 10 car parking spaces.
Destination Based EVCP	1 in 5 new non-residential parking spaces (20%) should be fitted with EVCP.	20% of destination-based parking to be fitted with EVCP, with potential to increase to 32% beyond 2050 as required.	A building which has more than 10 car parking spaces, that is new/ under major redevelopment, shall have installed at least 20% EVCP.

7.5.2 EV Charging Considerations

Without a reduction in car traffic volume in the city centre, a shift to public transport and active travel will not be achieved. The KLTP recommends a balance of shifting petrol and diesel car journeys to public transport, active travel and, where necessary, to EVs. Electric vehicles should be encouraged where journeys by walking, cycling and public transport are not feasible. Interventions should be favoured towards public transport and active travel; however, incentives and infrastructure for EVs will need to be reviewed further.

EV charging points should be considered as part of the implementation of Park and Stride sites. The provision of charging points within each Park and Stride location would need to be determined through detailed analysis and

[11] UK Department of Transport Electric Vehicle Charging in Residential and Non-Residential Buildings
[12] http://www.irishstatutebook.ie/eli/2021/si/393/made/en/pdf

best practice examples. Park and Stride sites would be suitable locations for EV charging points due to their location outside of the city centre core.

Installing charging points in selected city centre car parks will help manage the flow of traffic and encourage cycling and walking within the city centre. The level of electric charging points within city centre parking sites will need to be reviewed on an annual basis. As the fleet of EV's increased, it will be important to increase the percentage of charging points in the city centre. Kilkenny County Council should consider allocating one in five parking spaces in the city centre to be converted into EV charge points by 2025. This increase in charging points will help to prepare for the increasing uptake of zero-emission vehicles.

8. Western Network

8.1 Introduction

Three options for the Western Network were developed in the Network Development Stage. Qualitative analysis of these was conducted as outlined in the KLTP Network Development Report, which led to Option 2 being taken forward for modelling.

This section outlines the measures proposed by this option, followed by analysis of the modelling in Section 8.3.

8.2 Western Network Option

The Western Network option taken forward for further assessment includes both additional road network and active travel infrastructure. This option includes:

- Completion of the Kilkenny Ring Road, from Castlecomer Road in the north to R680 Waterford Road in the south including a crossing of the River Nore;
- Filtered permeability measures in the Loughmacask and Breagagh Valley development lands, preventing through movement for orbital vehicular traffic; and
- An inner orbital route for sustainable modes only, with high quality walking and cycling links.

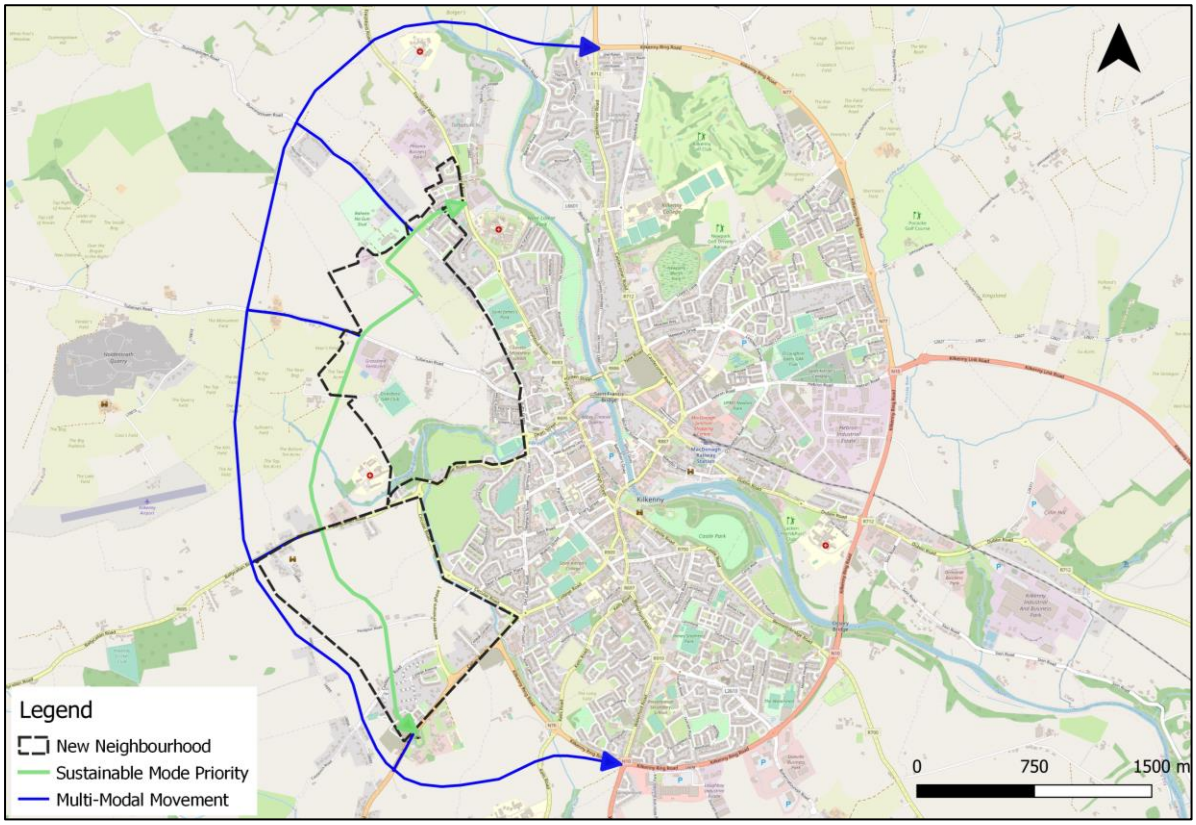

Figure 8-1: Western Road Network Option

8.3 Western Network Modelling

This Western Network Option was included as a model scenario for quantitative assessment. As per the modelling strategy, the Western Network scenario built on previous scenarios to include:

- The Do Sustainable network (consisting of a high-quality active travel network, proposed new bus routes and bus priority measures);
- A City Centre Traffic Management Option; and
- A Parking Strategy.

The CCTM option applied in the Western Network scenario was CCTM Option 1, pedestrianisation of the city centre. The parking strategy was the Park and Ride Option as this is anticipated to have the most significant impact on mode share within Kilkenny.

The updates included in each modelled scenario are presented in Table 8-1.

Table 8-1 Western Network Assessment Modelled Scenarios

Scenario	Components Included					
	2040 Do Minimum Network	**Sustainable Network Updates**	**CCTM Option 1 Updates**	**Parking Charge Updates**	**Park & Ride Sites**	**Western Road & Active Network Updates**
CCTM Option 1	✓	✓	✓			
Park & Ride	✓	✓	✓	✓	✓	
Western Network	✓	✓	✓	✓	✓	✓

The modelled mode share for a series of scenarios leading up to the implementation of the Western Network scenario is presented in Figure 8-2, Figure 8-3 and Figure 8-4. The mode share analysis represents the AM Period destination-based mode share for each area within the study area.

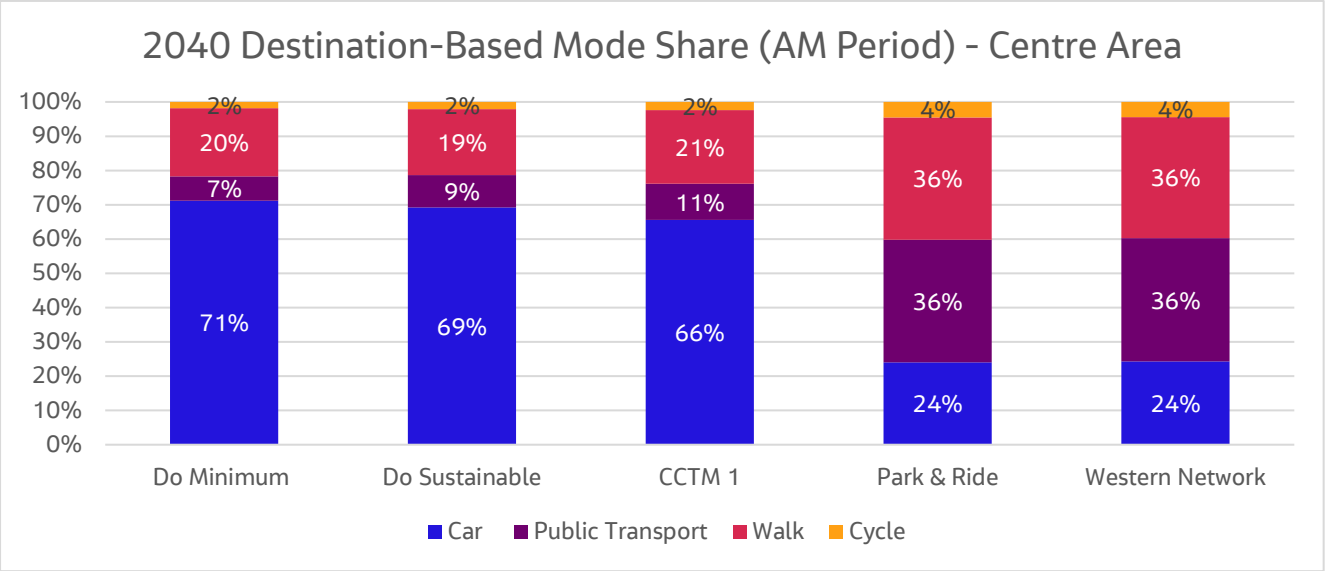

Figure 8-2 AM Mode Share for Western Network Model Run - Centre Area

Figure 8-2**Error! Reference source not found.** shows AM mode share in the Centre Area. Compared to the Park & Ride Option, the inclusion of the Western Network has no impact on mode share in the Centre Area as there is no change to the travel infrastructure within the city centre between these two scenarios.

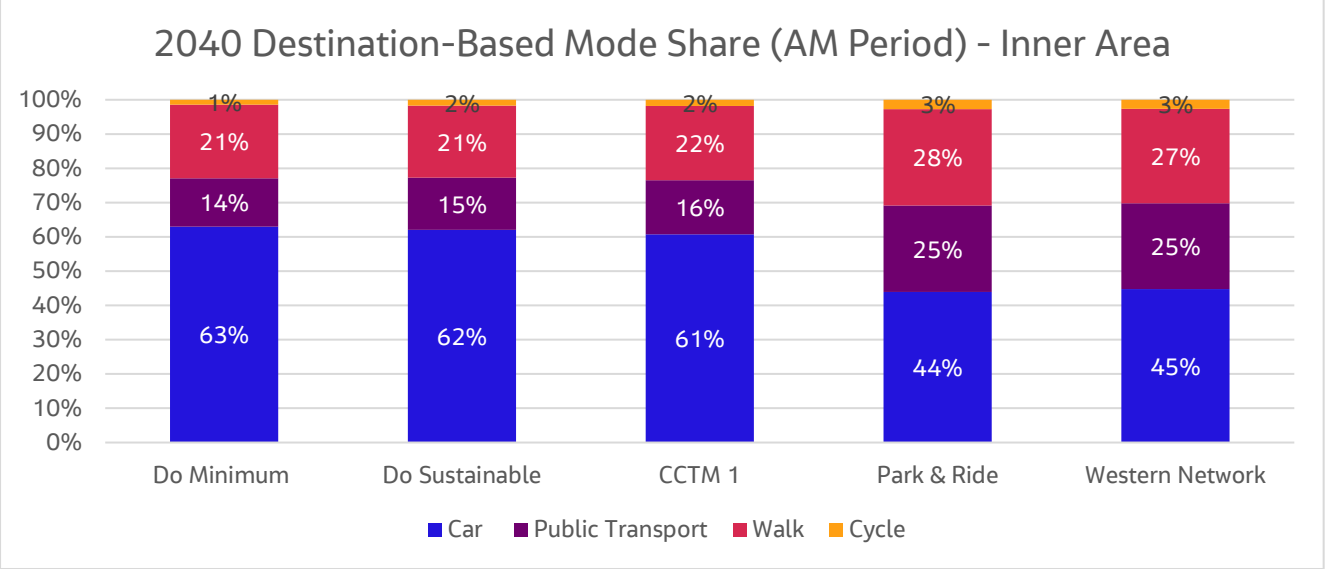

Figure 8-3 AM Mode Share for Western Network Model Run - Inner Area

In the Inner Area, the Western Network scenario resulted in a one percentage point increase in car mode share from the Park & Ride scenario, rising from 44% to 45%. Walking trips decreased by one percentage point, while the Public Transport and Cycle mode shares remained constant. The slight increase in car mode share is a result of the additional road infrastructure, which provides alternative routes for private vehicles. Providing additional capacity would help to alleviate congestion, however this reduces the perceived cost of travelling by private vehicle, disincentivising sustainable modes in the process.

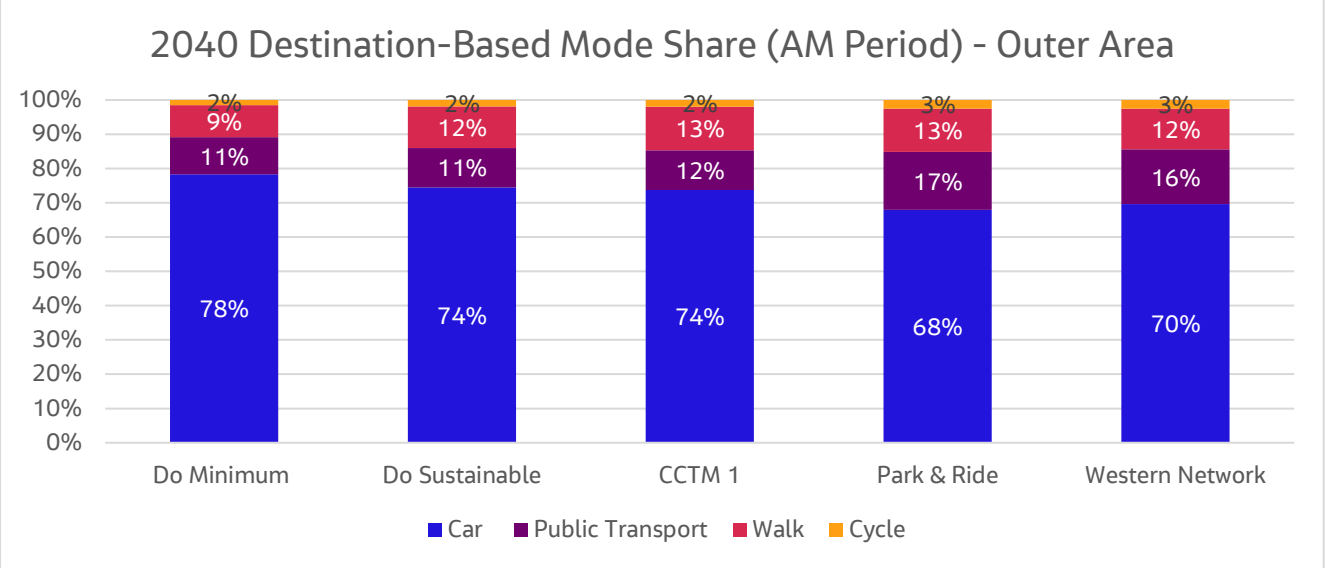

Figure 8-4 AM Mode Share for Western Network Model Run - Outer Area

As shown in Figure 8-4, the modelling showed a larger impact on mode share in the Outer Area; car mode share in this area in the Western Network scenario was 70%, a two percentage point increase from the Park & Ride scenario. Public transport and walking mode shares decreased one percentage point each, to 16% and 12% respectively, with cycle mode share remaining at 3%. These changes further reflect that introducing additional road infrastructure to the Western Environs incentivises road travel, even with the inclusion of a sustainable-travel-only orbital link in the Western Network scenario.

Figure 8-5 River Nore Bridge Crossing Locations

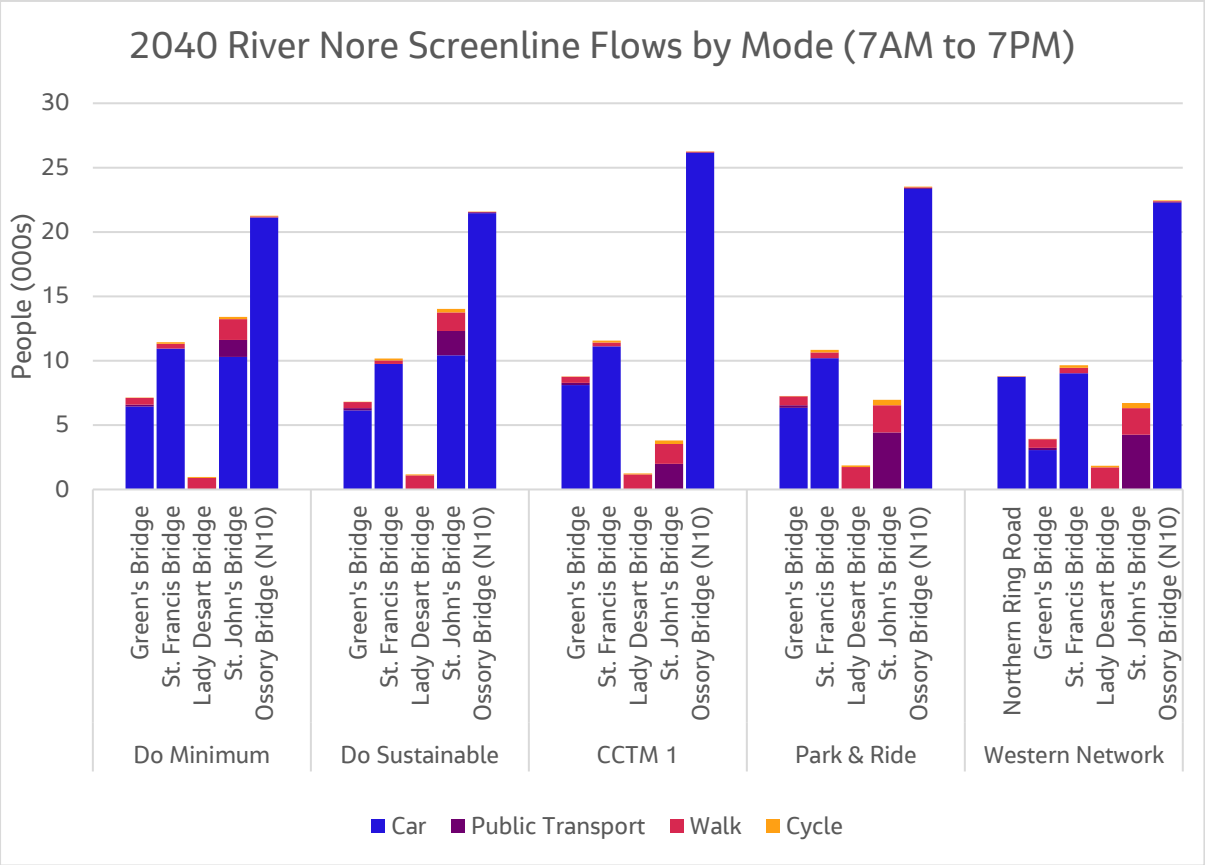

Figure 8-6 River Nore Screenline Flows (12-Hour People Flows) by Mode for Western Network Model Run

The locations of bridges crossing the River Nore within Kilkenny are shown in Figure 8-5. The model flows on each of these bridges are presented in Figure 8-6 to highlight the impact the inclusion of the new river crossing in the north would have on the number of people using the existing crossings. The results show a 12-hour volume of approximately 9,000 people using the new Northern Ring Road crossing in the Western Network scenario, with a decrease in the number of people travelling by car on Green's Bridge of 52% and St. Francis Bridge of 11%, compared to the Park and Ride Option. Public transport, walking and cycling also decrease slightly on Green's Bridge, reducing by 2%, 6% and 8% respectively, as travellers chose a different route or mode following the completion of the ring road.

Similar reductions are seen in those walking and cycling on St. Francis bridge compared to the Park and Ride Option, with reductions of 4% and 6% respectively. As Lady Desart Bridge and St. John's Bridge are restricted to sustainable modes only and are slightly further south than Green's Bridge and St. Francis Bridge, there is little change in the number of people using them, with a 2% reduction in pedestrians and cyclists on both bridges and a 4% reduction in public transport trips on St. John's Bridge.

Ossory Bridge also experiences negligible change as it is located further away from the new crossing, with car trips reducing by 5%, public transport increasing by 2% and cyclist increasing by 4%, compared to the Park and Ride Option. The number of people walking at this location remains unchanged.

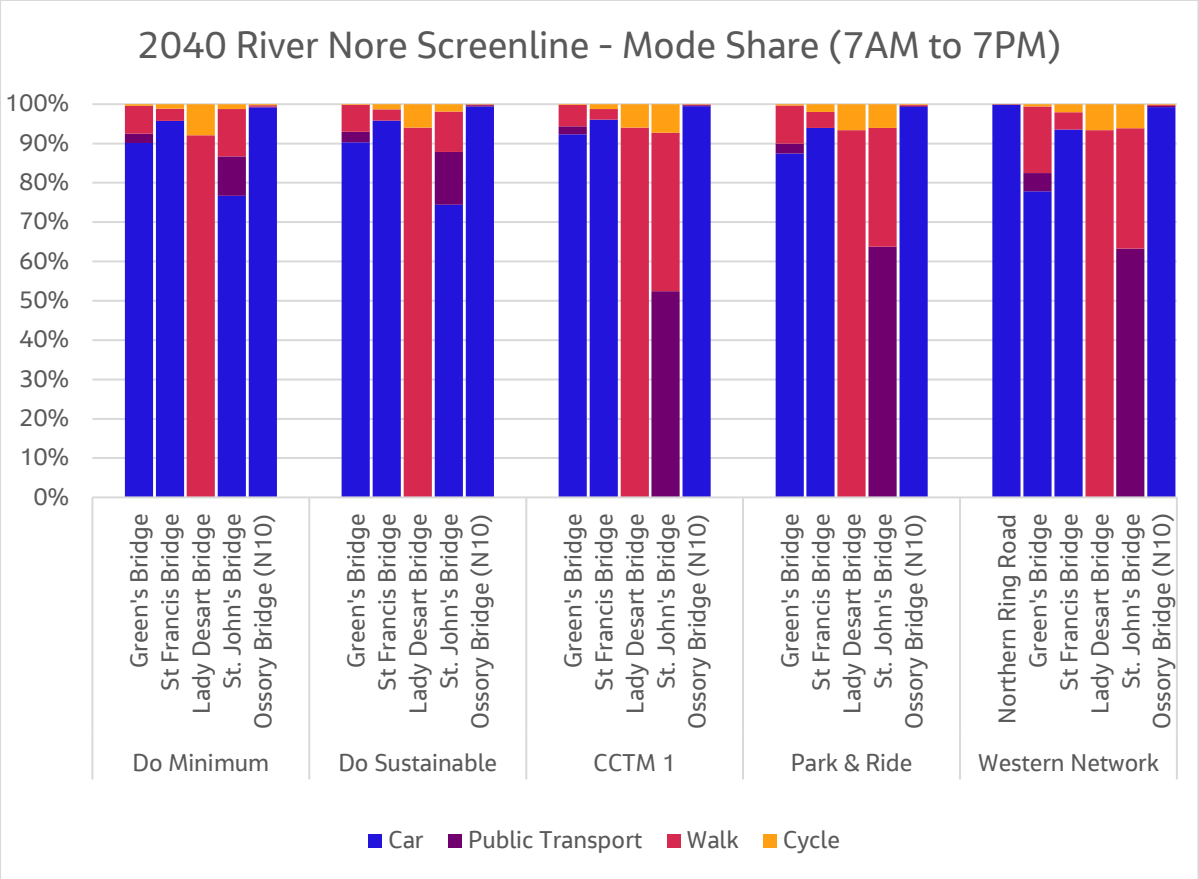

Figure 8-7 River Nore Screenline Mode Share for Western Network Model Run

The mode share on the river crossings is shown in Figure 8-7. In the Western Network scenario, the Northern Ring Road crossing has 99.9% car more share, with no public transport travel and less than 0.1% combined walk and cycle mode share, which highlights the fact the new route will only be used by cars.

Compared to the introduction of Park & Ride Option, the Western Network scenario shows an increase in sustainable mode share on Green's bridge, with the walking mode share increasing from 10% to 17%, however this is a result of the reduction in car trips as they transfer onto the new crossing. The actual number of sustainable travel trips on Green's Bridge reduces when compared to the Park and Ride Option. The other three bridges, which are further from the completed ring road, show minimal change in mode share.