

March 2023

Option Selection Report

Executive Summary



Carrick-on-Shannon to Dromod



An Roinn Iompair
Department of Transport



Tionscadal Éireann
Project Ireland
2040



Comhairle Chontae Leitrim
Leitrim County Council



Comhairle Contae
Ros Comáin
Roscommon
County Council



TIIV
Bonneagar Iompair Éireann
Transport Infrastructure Ireland



ARUP

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1. Introduction

1.1 Overview

Leitrim County Council, Roscommon County Council and Transport Infrastructure Ireland are collaborating in developing a sustainable solution for the transportation issues that exist on the N4 national primary road which passes through the urban areas of Carrick-on-Shannon and Cortober and extends as far south as the existing Dromod-Roosky Bypass.

TII projects are broken into phases as illustrated in Plate 1.1 below.

Planning & Design	Phase 0	Scope and Pre-Appraisal
	Phase 1	Concept & Feasibility
	Phase 2	Options Selection
	Phase 3	Design & Environmental Evaluation
	Phase 4	Statutory Processes
Construct / Implement	Phase 5	Enabling & Procurement
	Phase 6	Construction & Implementation
	Phase 7	Close out & Review

Plate 1.1 TII Project Phases

During Phase 1 (Concept and Feasibility) of the project the existing N4 and travel patterns around Carrick-on-Shannon and Cortober were examined, the need for intervention was identified and project objectives set. The N4 Carrick-on-Shannon to Dromod Project is currently in Phase 2, Options Selection and this report presents the findings of the Constraints and Option Selection process which culminates in the selection of a preferred transport solution. On commencement of Phase 2, a Constraints Study was undertaken to identify the nature and extent of known and potential key constraints which must be considered as part of the development of an appropriate solution for the project. Public Consultation No. 1 on the findings of the constraints study was held from 5 October 2020 to 23 October 2020. Following the completion of the Constraints Study feasible solutions were developed and again these were presented to the public (Public Consultation No. 2) from 19 May 2021 to 25 June 2021. Potential solutions investigated and tested against the project objectives included alternative transport modes such as bus, rail and active travel modes, and different road options including an upgrade of the existing road.

The Option Selection Report is split in four volumes, Volume 1 contains this Executive Summary, Volume 2 contains the main report text (split into four parts), Volume 3 contains the figures (split into two parts) and Volume 4 contains the accompanying appendices.

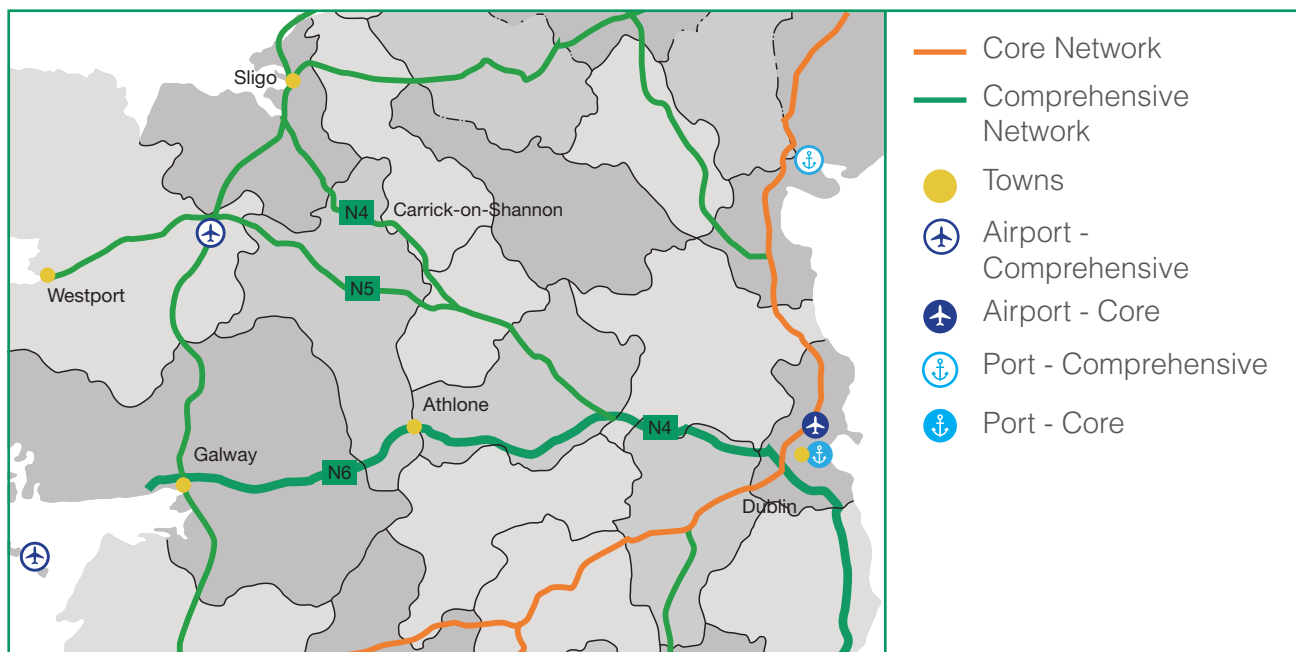


Plate 1.2 TEN-T network connecting Dublin to the West and Northwest

1.2 Existing N4 Corridor and Project Need

The national primary route N4, Dublin to Sligo is a strategic corridor from Dublin to the northwest and is approximately 198km in length. It is recognised as being of particular importance in enhancing accessibility to some of the most peripheral areas in the northwest (including Leitrim / Roscommon / Sligo and Donegal) and west of the River Shannon. It also provides regional connections to the towns of Leitrim (R280), Elphin (R368), Frenchpark (R370) and Manorhamilton (R280).

The N4 also forms part of the EU TEN-T comprehensive network providing a strategic link between Dublin and Sligo, with Sligo being identified as a regional centre in the 2021-2030 National Development Plan¹ and the National Planning Framework (NPF)². The N4 connects directly with the N5 and N6 national primary routes which also form part of the EU TEN-T comprehensive network connecting Dublin to the west and northwest of the country as shown in Plate 1.2. It is recognised as critical to achieving regional connectivity,

balanced regional development and will enable unrealised potential– which aligns with National Strategic Outcome 2 (NSO) namely Enhanced Regional Accessibility and thereby supports the objectives of the National Planning Framework.

Accessibility and mobility have a direct effect on the region's economic competitiveness as well as the attractiveness of the region. Transport has a major impact on the quality of life, the level of community interaction, the economic prosperity, and the environmental quality of the region. Effective regional development is dependent on having high-quality inter-regional and intra-regional connectivity to places and markets, including international accessibility.

International connectivity via ports and airports, which are connected via the N4 to the other regions, play an important role in enablers of economic growth and improve the attractiveness of the region and in turn enables economic growth.

The TEN-T designation carries a requirement to be a high-quality road to deliver on its role in providing connectivity to the peripheral regions as well as interconnecting economic centres.

¹Department of public Expenditure and Reform. 2021. National Development Plan 2021-2030. Available from: <https://www.gov.ie/en/publication/774e2-national-development-plan-2021-2030/>

²Department of Housing Planning and Local Government, 2018. Project Ireland 2040, National Planning Framework. Available from: <https://nfp.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf>

The section of the N4 under consideration is approximately 20km long, comprising both rural sections (approx. 16km combined length) and urban sections (4.2km combined length). The proposed project will commence at an appropriate tie-in point on the existing N4 west of Carrick-on-Shannon and continue southeast to the existing Dromod-Roosky Bypass. The main towns and villages along the route are Cortober, Carrick-on-Shannon, Drumsna and Aghamore with the River Shannon separating the town of Carrick-on-Shannon on the east and the town of Cortober on the west. Initial studies on this corridor commenced in 2001 with a focus only on the N4 Carrick-on-Shannon Bypass Project. A subsequent study commenced in 2009 on the N4 Carrick-on-Shannon to Dromod Project but this was suspended in 2012. Despite previous studies in the area, this current study is a new commission and started at Phase 0.

The overriding need for the upgrade to this section of the N4 national primary road is to remove existing deficiencies which impose significant restrictions on the efficiency and safety of the existing transport network, with the congestion within Carrick-on-Shannon and the sub-optimal infrastructure provision for the TEN-T network being the most significant deficiencies.

1.2.1 Urban Area

The settlement of Carrick-on-Shannon and Cortober grew out from the river crossing point, which was mapped as early as 1777, as the river was synonymous with trading routes and access to the transport network. The settlement grew in a linear fashion along the principal Dublin to Sligo Road, with all eventually leading back to the original crossing point of the river, before then expanding either side of this principal axis. The original bridge was replaced with a narrow masonry arch bridge in 1846 which remains in place today.

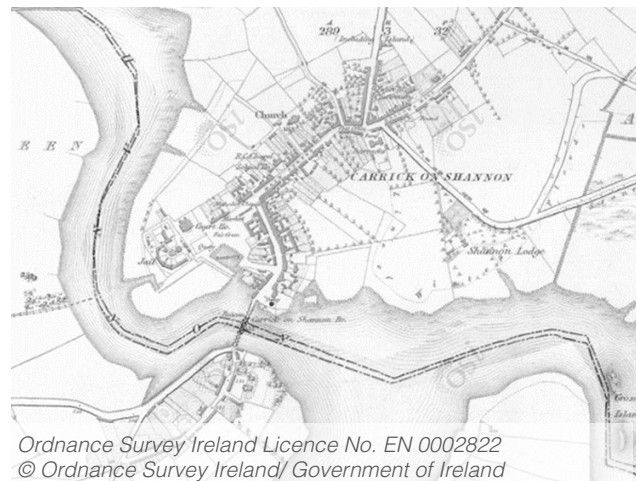


Plate 1.3 Extract from First Edition Six Inch Maps (1829 to 1842)

In 1984, the Inner Relief Road was constructed in Carrick-on-Shannon and essentially provided an alternative road to the Main Street adjacent to the River Shannon, but it converged back to the single river crossing again.

Since 1995, the town has turned to embrace the River Shannon with various businesses and enterprises developing along the Inner Relief Road. This was followed by the relocation of retail from the Main Street to large retail centres off the N4 in Cortober to the west and in Carrick-on-Shannon to the east of the river. Furthermore, large residential estates have been constructed in Carrick-on-Shannon since 2000 with direct access onto the N4 and regional roads which are the radials entering the town from the northeast and southwest.

The implications of continuing to build around the principal axis of the N4 is that most of the internal journeys in Carrick-on-Shannon today require passage along this single link making it pivotal for internal circulation within the town, with virtually every trip either for education or retail purposes having to travel on the N4 as shown on Plate 1.4 This is compounded by the fact that the N4 link across the river comprises a bridge dating from 1846, almost 200 years old, which is sub-standard to meet either the strategic requirements or for use by all modes in a local context. The available carriageway width varies between 5.45m and 5.8m for the extent of the river crossing, which is extremely sub-standard and which is totally out of proportion to the urban streetscape and level of pedestrian activity at this bridge crossing today.

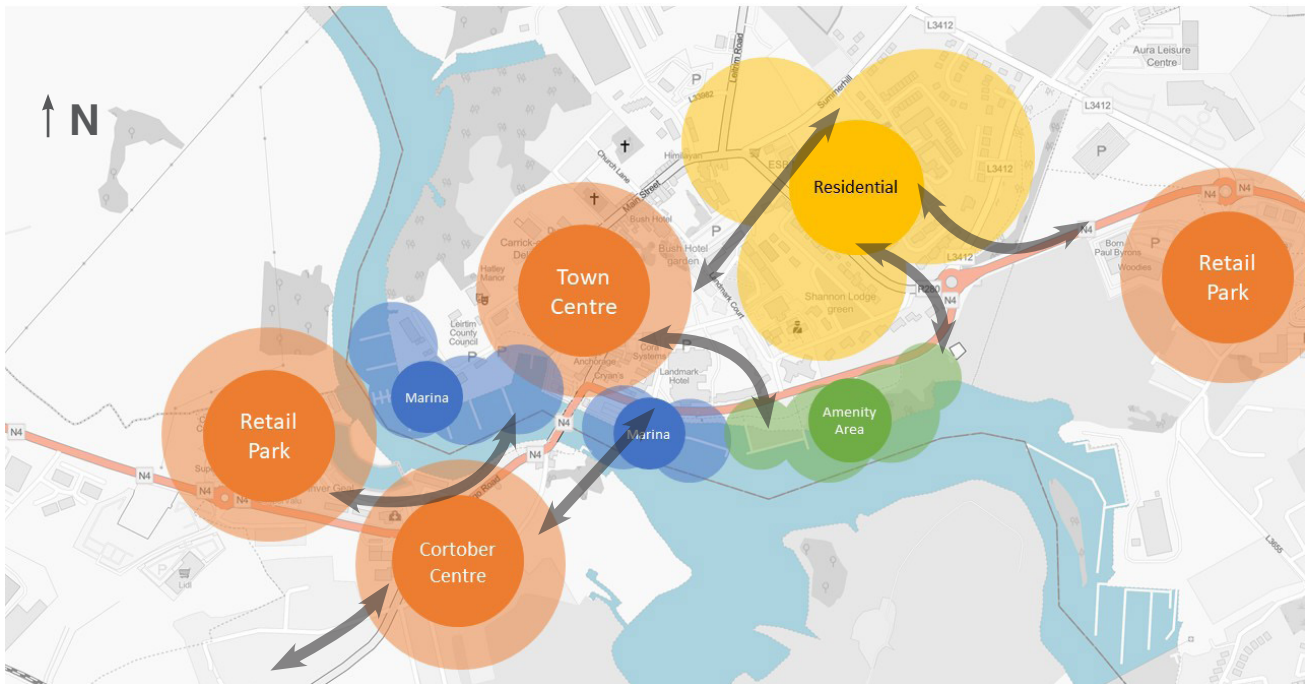


Plate 1.4 Existing Road and Street Layout

Furthermore, there is no backup and no resilience in the network as evidenced when this bridge is blocked due to an incident or accident. The diversion route in such cases is extensive adding approximately 20km to the westbound journey and approximately 12km to the eastbound journey, see plate below.



Plate 1.5 2017 Diversion Route

There are currently six roundabouts over a 2.2km length of the N4 within the Carrick-on-Shannon/Cortober 50km/h speed limit. This is compounded by on-street parking and local access in an area with significant vulnerable road users which is a safety issue. Collision statistics indicate pedestrian involvement in 21% of all collisions within the study area.

Carrick-on-Shannon/Cortober has become a bottleneck for long distance, bypassable and regional traffic and remains the only regional strategic centre through which the N4 passes on the route between Dublin and Sligo. Furthermore, the N4 crosses the River Shannon on the only bridge connecting east to west in this urban area, which is further compounded by the fact that the bridge is almost 200 years old.

1.2.2 Rural Area

Outside of the urban area, the 7km length of the Jamestown Bypass was constructed in 1996 as a wide single carriageway and the remainder is a standard single carriageway to the Dromod-Roosky Bypass. There is a proliferation of direct accesses and junctions accessing onto the N4 national primary road which must be rationalised to eliminate safety issues. There are 197 direct accesses on the N4 mainline which included 113 farm accesses, 58 domestic accesses, 24 commercial accesses and 2 pedestrian/cycle accesses. A total of 150 of these accesses occur outside of the urban area. In total, 52 junctions were identified along the N4 mainline within the area under consideration. These direct

Accesses directly on to the N4

- ✚ Commercial Access
- ✚ Farm Access
- ✚ Domestic Access
- ✚ Pedestrian / Cycling Access

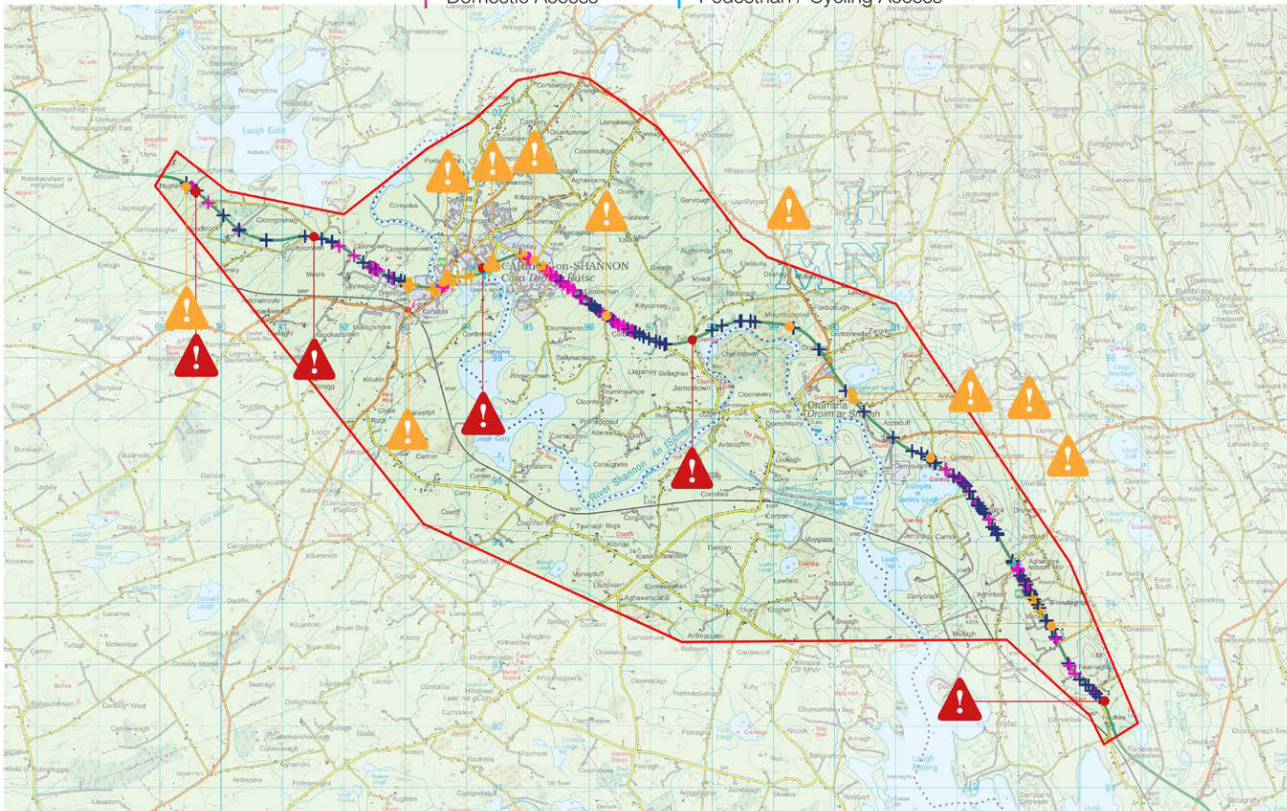


Plate 1.6 What is the problem?

Severity of Collisions 2015-2021

- ⚠ Serious Injury
- ⚠ Non-Serious Injury

accesses and junctions reduce the efficiency of the N4 as a strategic corridor in addition to presenting potential collision risks.

The changing cross-section on the N4 is a safety issue. At the eastern tie-in to the Dromod-Rosky Bypass, the N4 changes from dual carriageway to two-way single carriageway without the provision of a junction to demark the change in cross-section. To the west of this, direct access is provided from Annaduff GAA club grounds and the adjacent Leitrim GAA Centre of Excellence to the N4 on the 100km/h speed limit. The N4 then passes through Aghamore with a 50km/h speed limit and associated traffic calming measures before then joining the wide single carriageway on the Jamestown Bypass.

The N4 is compromised by frequent junctions with local roads and direct frontage accesses which leads to driver frustration as overtaking opportunities are limited.

1.3 What is the problem?

Following detailed examination of conditions on the existing national route, the following transportation issues were identified:

- The N4 forms part of the EU TEN-T comprehensive network providing a strategic link between Dublin and Sligo. The N4 is defined as part of the TEN-T comprehensive network for reasons of national and international importance. Such a designation carries a requirement to be a high-quality road to serve an important role in long-distance freight and passenger traffic. It is also required to integrate the main urban and economic centres, interconnect with other transport modes and connect peripheral regions, which it is currently not doing effectively.

- In the period 1999 to 2017, traffic flow and the serviceability of the N4 along the section under consideration was seriously affected for extended durations. Flooding has led to the closure and associated diversion of the route on three separate occasions, with the N4 being closed for a period of 19 days in November 2009. Due to flooding in December 2017, eastbound traffic was subjected to a 12km diversion (see plate 1.5).
- The N4 EU TEN-T road currently passes through Carrick-on-Shannon and crosses the River Shannon on the only bridge crossing in Carrick-on-Shannon. Should anything happen on this River Shannon bridge and a diversion be required, there is no alternative route within a reasonable distance. This leaves little resiliency in the network at this location.
- The River Shannon bridge is over 200 years old and its cross-section is extremely sub-standard being narrow and with sharp bends at either end. To avoid mounting the footpath HGVs turning onto the bridge cross into the opposite carriageway, forcing oncoming traffic to give way. This results in considerable congestion and safety issues in the town.
- The average daily traffic across the bridge is up to 17,000. However only 850 people walk across the bridge per day. The existing environment is not conducive to undertaking short trips by walking and cycling.
- Circa 650 HCVs cross the singular bridge over the River Shannon in the town on a daily basis. This bridge crossing also accommodates all other modes such as public transport, cycling, and walking. This bridge and approach streets are also a place at the heart of the amenity and attraction of this town, and traffic volumes at this level with this proportion of HCVs detracts totally from the sense of place. This in turn is having a negative impact on business and tourism due to traffic congestion, noise and air pollution.
- There are safety issues with the existing N4 in the study area resulting in three significant collision locations. Safety issues are caused by change in carriageway cross-section without a junction to demark the change, 197 direct accesses on to the national road in the 20km long length of the N4 under consideration, six roundabouts in 2.2km, numerous 50km/h limits along the national route in the study area, on street parking, controlled crossings and substandard carriageway width.
- A relatively low demand for rail at stations along the Sligo-Dublin corridor within, and close to, the study area which is likely reflective of the limited number of services and dispersed population within the study area.
- There are a very limited number of bus services available in the study area with only one route serving the entire section of the N4 under consideration (BÉ route 23).
- Empirical journey time measurements recorded average journey speeds within the section of the N4 under consideration at 65km/h for weekday peak and inter peak periods, dropping to 57km/h during the Friday PM peak. These journey speeds are significantly below the National Planning Framework target of 90km/h for strategic traffic on inter-urban roads.
- Local access for private dwellings with frontage onto the N4 and farming operations with direct accesses onto the N4.
- The N4 is expected to cater for all classes of vehicle from a simple scooter to the bus to emergency service vehicles to the farm vehicles to the HGV as well as enable trips by Active Travel, i.e. walking and cycling.

Therefore, the N4 is conflicted in that it is expected to provide for all trips by all modes by all people safely and efficiently, but this is physically impossible and also infers that the selection of intervention along the N4 is dependent on many factors.

1.4 Project Objectives

After assessing the existing transportation problems in the study area, the objectives of N4 Carrick-on-Shannon to Dromod Project were defined. These are framed in accordance with the DTTaS publication Common Appraisal Framework for Transport Projects and

Programmes (October 2019)³ (V02 in effect at time of the development of the Project Objectives) and Unit 3.0 of the TII Project Appraisal Guideline (PAG)⁴. They are outlined in Plate 1.7 below:



Plate 1.7 N4 Project Objectives

³Department of Transport, Tourism and Sport, 2019. Common Appraisal Framework for Transport Projects and Programmes, March 2016 Updated October 2019. Available from: <https://www.gov.ie/en/organisation-information/800ea3-common-appraisal-framework/>

⁴TII, 2016. Project Appraisal Guidelines for National Roads Unit 3.0 – Project Brief PE-PAG-02012, October 2016. Available from: <https://www.tiipublications.ie/library/PE-PAG-02012-01.pdf>

1.5 National Policy

1.5.1 National Policy

The N4 Carrick-on-Shannon to Dromod Project demonstrates compliance with transport and planning policies in the various policy documents set out below. At a national level, the following policy documents have relevance to the project. Project Ireland 2040 is the government's long-term overarching strategy to make Ireland a better country for all and to build a more resilient and sustainable future. The National Investment Framework for Transport in Ireland (NIFTI) provides the following graphic to demonstrate the hierarchy of Project Ireland 2040 strategies and plans.

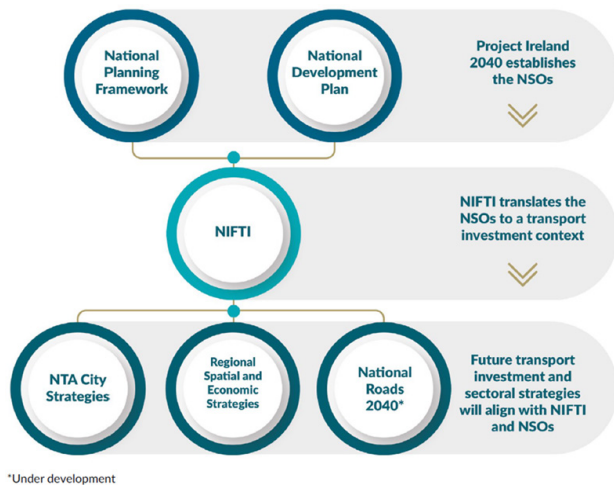


Plate 1.8 NIFTI Hierarchy of Project Ireland 2040 Strategies and Plans

The National Planning Framework (NPF) was published by the Government on 16 February 2018. It sets out a strategic planning and development strategy for Ireland and all its regions up to 2040 to create a single vision with a shared set of goals for every community across the country. These goals are expressed in the Framework as 'National Strategic Outcomes' (NSOs). Whilst all ten NSOs are applicable to this project in so far as they are interlinked and achievable once linked, of note in this instance is NSO 2 which seeks 'Enhanced Regional Connectivity' with an objective to maintain the national road network to enhance accessibility to all regions.

The **National Development Plan 2021–2030 (NDP)** will drive Ireland's long term economic, environmental, and social progress across all parts of the country over the next decade. The NDP is fully aligned with the successful implementation of each of the National Strategic Outcomes in the NPF. With respect to National Strategic Outcome 2 (i.e. Enhanced Regional Accessibility), the NDP outlines "a number of the major road developments to be delivered under the National Development Plan". Within this list, the NDP includes the N4 Carrick-on-Shannon to Dromod Project as one of the schemes identified in the previous NDP that will be subject to further approval.

The **National Investment Framework for Transport in Ireland (NIFTI)** is the Department of Transport's high-level, strategic framework for future investment in the land transport network to support the delivery of the NPF. The NIFTI states that "future transport investment will have to demonstrate alignment with NIFTI and, by extension, support the delivery of the NPF and the National Strategic Outcomes (NSOs)." To deliver future investment in a sustainable manner, NIFTI promotes the most appropriate solution to a given problem or opportunity whether it is support for compact growth in the urban areas or beyond the urban areas by enhancing regional and rural connectivity across the network by addressing priority bottlenecks and constraints. The four NIFTI Investment Priorities are shown in Plate 1.9 below:



Plate 1.9 National Investment Framework for Transport in Ireland Investment Priorities

The N4 Carrick-on-Shannon to Dromod Project contributes to all of these priorities, particularly those of enhancing regional and rural connectivity and mobility of people in urban areas.

These priorities are supplemented by Modal and Intervention Hierarchies which set out how we approach our projects, with the initial focus being on alternative modes such as Active Travel and public transport before provision for private vehicles as per the modal hierarchy, and thereafter ensuring that the maximum use is achieved with the existing asset before building new infrastructure – in line with the intervention hierarchy below.

National Investment Framework for Transport in Ireland Modal Hierarchy

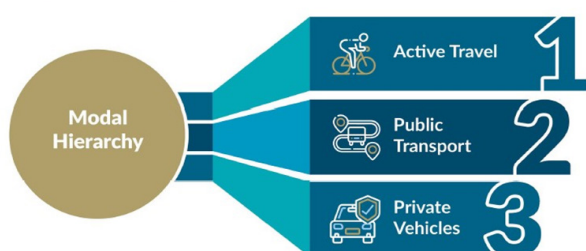


Plate 1.10 National Investment Framework for Transport in Ireland Modal Hierarchy

National Investment Framework for Transport in Ireland Intervention Hierarchy



Plate 1.11 National Investment Framework for Transport in Ireland Intervention Hierarchy

NIFTI is aligned with the **Climate Action Plan, 2023** which presents a roadmap for the actions required to halve emissions by 2030 and to reach net zero by 2050. The Plan calls for a significant cut in transport emissions by 2030 through a series of measures including significant additional extra walking, cycling and public transport journeys per day by 2030 and increased rollout of rural public transport. In terms of N4 Carrick-on-Shannon to Dromod Project, the alternatives being considered as part of the option selection process seek to develop a better-connected transportation

network for all users, and improvement in safety which could serve to encourage a shift towards more sustainable travel. Furthermore, through reduction in vehicle numbers within settlement areas the proposed project will support the plan by reducing transportation impacts on localised air quality in towns and villages.

Our Rural Future Rural Development Policy 2021-2025 (Our Rural Future) was published in March 2021 by the Department of Rural and Community Development to provide “a framework for the development of rural Ireland over the next five years” to achieve the “vision of transforming the quality of life and opportunity for people living in rural areas”. It recognises the opportunities presented by Covid-19 as “we transition to a climate-neutral society” for people to return to rural communities to live, work / be educated and socialise. This will help “sustain and increase the population of rural areas, revitalise town centres, reduce commuting times, lower transport emissions and improve the quality of life of our people.” The project objectives are to deliver a reliable and sustainable transport solution for this section of the N4 corridor to provide efficient connectivity between Dublin and Sligo. This will encourage local, regional, national and international development to balance regional development and improve the quality of life of residents in the corridor, all of which are in keeping with the objectives of the Our Rural Future Policy.

Town Centre First – A Policy Approach for Irish Towns was published in February 2022 by the Department of Rural and Community Development as part of the implementation of Our Rural Future and is central to the vision set out by the department in the Our Rural Future policy. *It sets out the structures and funding that we will put in place at a national level and at a local level to support our towns to design, deliver and implement a plan that can reimagine each town.*



Currently the N4 currently passes through Carrick-on-Shannon with circa 650 HCVs crossing the singular bridge over the River Shannon in the town on a daily basis. This bridge and approach streets are also a place at the heart of the amenity and attraction of this town, and traffic volumes at this level with this proportion of HCVs detracts totally from the sense of place. This in turn is having a negative impact on business and tourism due to traffic congestion, noise and air pollution. The project aligns with Town Centre First as it seeks to address these issues within Carrick-on-Shannon.

The **National Sustainability Mobility Policy** was published by the Department of Transport in April 2022. It sets out a strategic framework for the improvement of active travel and public transport measures to encourage the modal shift to more sustainable modes. The N4 project objectives align with this policy.

The **Road Safety Authority (RSA) Road Safety Strategy 2021 – 2030**, sets targets to reduce the number of deaths and serious injuries on Irish roads by 50% over the next 10 years. The plan sets out priority areas which include safe roads and safe speeds as well as safe and healthy modes of travel among others. The advancement of the N4 Carrick-on-Shannon to Dromod Project fundamentally aligns with this RSA strategy.

1.5.2 Regional

The **Regional Spatial and Economic Strategy (RSES) for the Northern and Western Regional Assembly** was adopted in 2020 and sets out a 12-year regional development framework to deliver effective regional development and acknowledges that it will be necessary for prioritised investment in roads and environmentally sustainable public transport to achieve connectivity and a connected region. Carrick-on-Shannon has been designated as a Key Town in the RSES and a key future priority of the RSES is the preparation of a joint Local Area Plan for Carrick-on-Shannon and Cortober.

Section 6.3.2 focuses on the region's road network stating that both the National Planning Framework and the National Development Plan strongly acknowledge that accessibility from the northern and western region will need to be significantly improved. It further states that the national road network is a critical enabler in facilitating an island-wide sustainable national transport system and that improving and maintaining the assets of all national roads is critical and must be maintained, including the requirement to safeguard the strategic links into urban centres identified as key economic drivers in the region.

Improvements to the N4 corridor strongly align with the objectives and commitments set out in the RSES. It would facilitate development in the northwest of the country and help achieve the goal of enhanced regional connectivity, particularly given that Cortober / Carrick-on-Shannon remains the only regional strategic centre on the N4 between Dublin and Sligo which has not been bypassed to date and has become a bottleneck for long distance and regional traffic.

1.5.3 Leitrim & Roscommon County Development Plans

The County Development Plans of both Roscommon and Leitrim give effect to the RSES and acknowledge that significant improvements to accessibility and sustainable modes of transport for all sections of the community is vital for the future development of the Northern and Western Region.



1.6 Need for the Project

The N4 Carrick-on-Shannon to Dromod Project is required to address the significant deficiencies which impact on the ability of the N4 to meet the functional requirements of the TEN-T designation as well as address the safety deficiencies which present collision risks, in particular in the urban areas as a result of prioritisation of the strategic traffic over and above the needs of the vulnerable road users. Even with such prioritisation of traffic through the urban area, it remains congested with poor journey time reliability, with the wholly sub-standard and outdated singular River Shannon bridge crossing contributing to considerable delay. Outside of the urban area, the project is

necessary to address the horizontal alignment which is also a significant safety concern when coupled with the proliferation of direct private accesses and junctions onto the national road within the study area.

The provision of new infrastructure will seek to enable the delivery of sustainable transport solutions that move more people more efficiently, improving journey time reliability and enabling better provision for alternative modes within the urban area. The project represents an integral component in supporting investment within the study area, and linking the northwest to other regions, by aligning the corridor with the wider policy of the TEN-T comprehensive network.



2. Transport Assessment

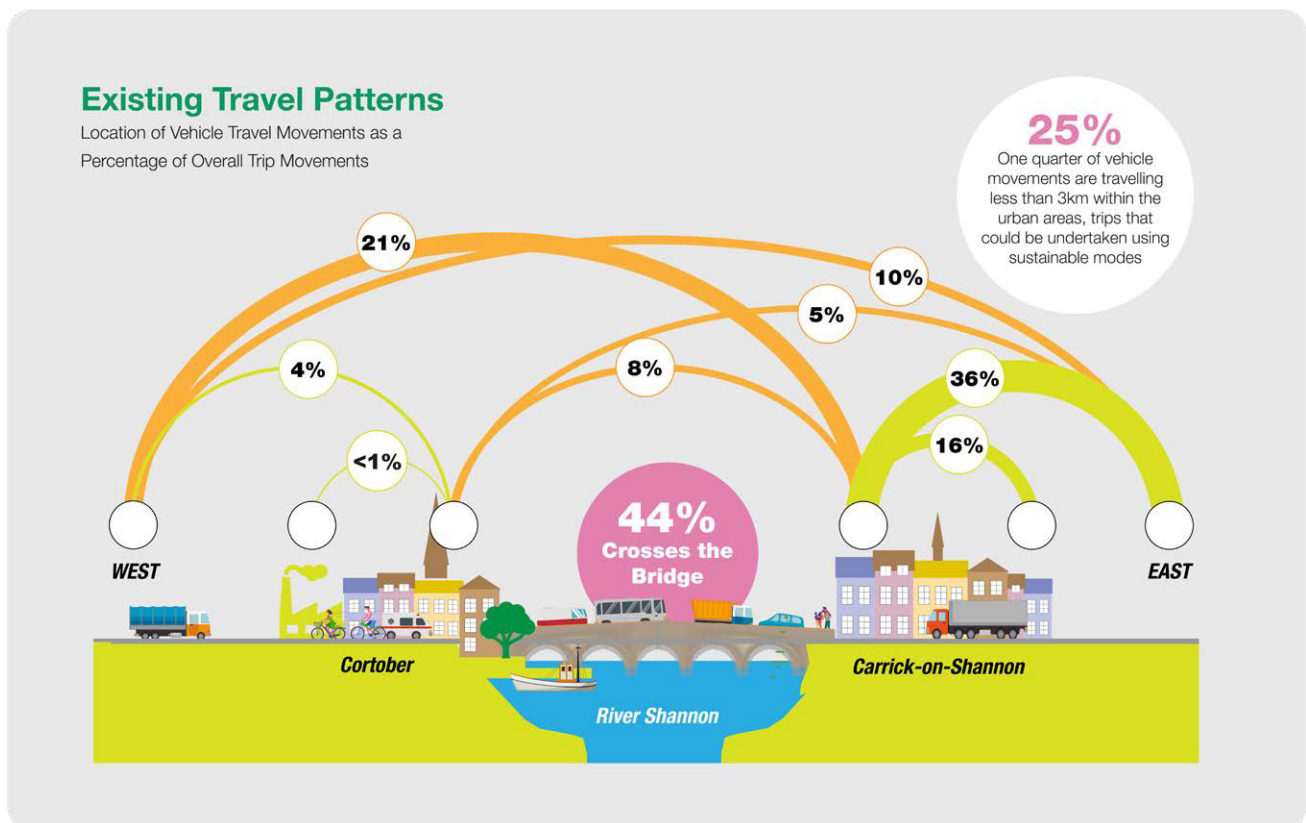


Plate 2.1 Existing Travel Patterns

Traffic volumes of close to 20,000 were observed on the N4 in the centre of Carrick-on-Shannon and on the bridge crossing in 2019. Given that the cross-section on the bridge is narrow, this results in considerable congestion and safety issues in the town.

Analysis of public transport provision and usage in the study area revealed the following:

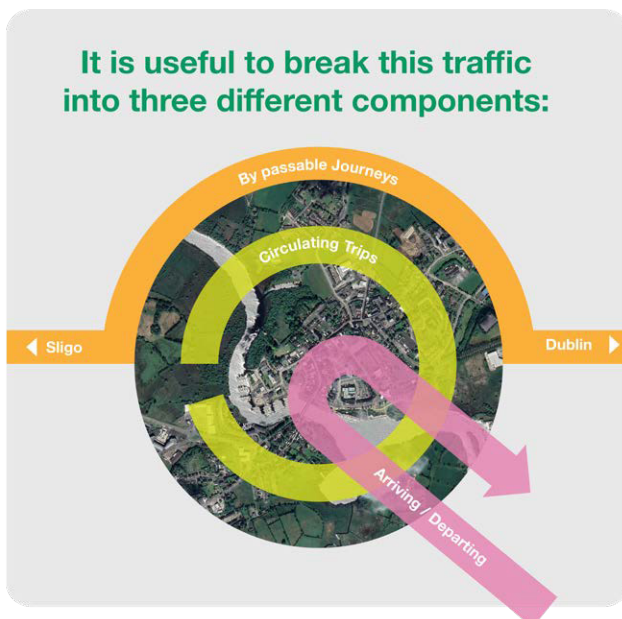
- A relatively low demand for rail at stations along the Sligo-Dublin corridor within, and close to, the study area. This is likely reflective of the limited number of rail services and the dispersed population therein.
- There are a very limited number of bus services available in the study area with only one route serving the entire section of the N4 under consideration (BÉ route 23)

A desire line analysis was undertaken to gain an understanding of existing travel patterns across the entire transport model area. Following on from this, a broad representation of strategic travel patterns in the transport model in the 2020 base year was derived, focusing on trips that cross (orange arrows) and do not cross (green arrows) the River Shannon bridge in Carrick-on-Shannon and that either travel to Carrick-on-Shannon or Cortober as their destination, or those which pass through (by passable traffic).

In total 44% of trips cross the bridge as represented by the orange arrows. The other 56% of trips in the study area do not cross the bridge see plate above.



Three components of traffic

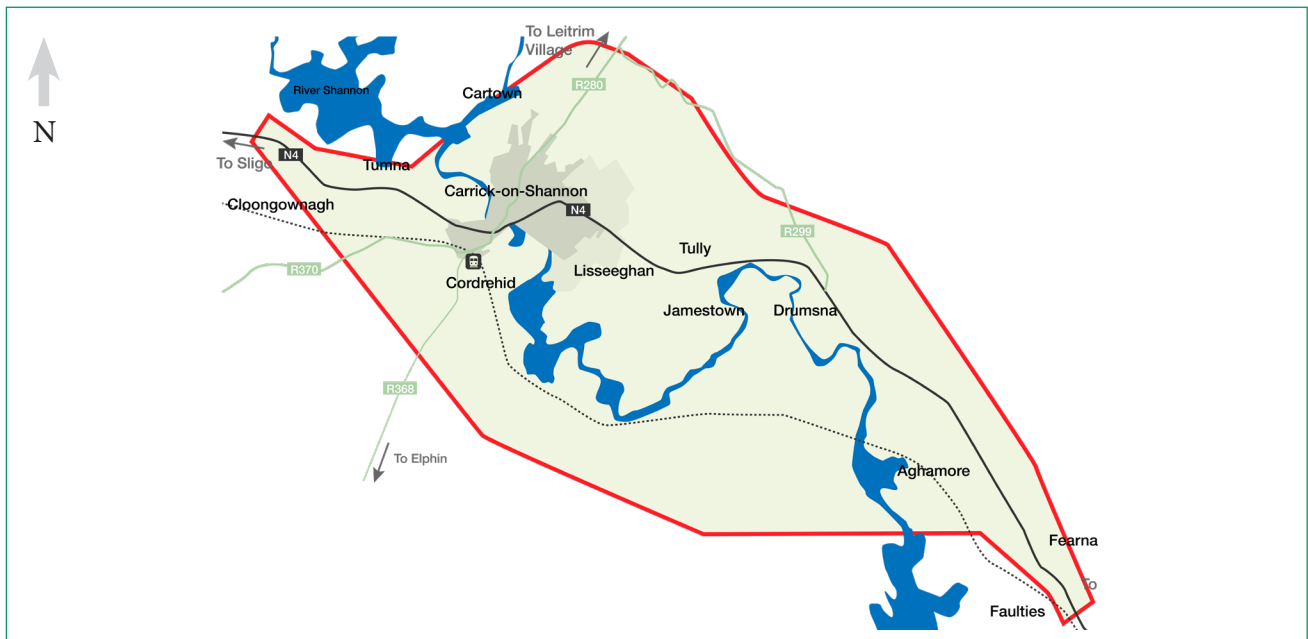


This clearly shows that there are three components to the traffic with a strong movement to and from Carrick-on-Shannon from outside the core urban area and a significant number of trips within Cortober and Carrick-on-Shannon in addition to the bypassable traffic. This analysis implies that there would be use of a bypass if one were built in proximity to the urban area, given that there is strong demand for travel across the existing bridge, and that there is potential for mode shift within the core urban area if a safe environment existed for walking

and cycling. The reduction of traffic coupled with a reallocation of the existing road for more sustainable modes would enable the provision of much improved infrastructure for walking and cycling. Currently the cycling network within the urban area is compromised by the high traffic volumes, lack of segregation from such volumes and lack of priority for active travel modes. The compounding of these circumstances disincentivises cycling and walking as a means of transport. There are various initiatives underway to provide a Blueway linking Carrick-on-Shannon and Drumshanbo which will also link in Leitrim Village and Kilclare. This will enhance tourism and attract cyclists.

However, the fact that there is no designated cycle network heading west or east from Carrick-on-Shannon leads to a fragmented level of provision and does not encourage the shift towards more sustainable transport for active travel trips.

3. Constraints Study



The study area boundary was developed with a view to ensuring a suitably sized and structured study area to allow full and extensive studies. These studies include the identification of key constraints to the project. The study area encompasses the extents of the former Emerging Preferred Corridor (EPC) identified in previous studies, while also allowing for the development of additional options. It also fully includes the portion of the existing N4 under consideration and the extents of the towns and villages along the route.

Many constraints were identified with key constraints as follows:



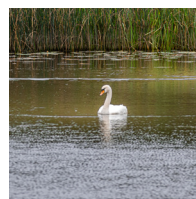
Population centres of Carrick-on-Shannon and Cortober



Regional water supply intake



Only one bridge over River Shannon



Biodiversity including the pNHA to the north of the existing bridge



Existing N4 is strategic connection to northwest



Soft ground conditions in conjunction with the drumlins



River Shannon floodplain



Amenity and tourism area

4. Option Development

Following on from the Constraints Study, a long-list of alternatives and options, ranging from doing nothing to public transport improvements to building new infrastructure, were developed and assessed against the project objectives. The development took cognisance of the hierarchy of modal intervention as set out in national policy when considering the initial level of intervention required. An assessment of the transport issues within the urban area identified the need for additional space to accommodate active travel modes, the need for additional public transport provision and the need to accommodate strategic traffic on the TEN-T network. A similar assessment in the rural area identified the need for provision for active travel modes and local traffic movements in conjunction with strategic traffic movements on the TEN-T network. Considering all of the above, various alternatives which provide for active travel and additional public transport services were developed for assessment in addition to road based solutions. As a starting point, the minimum level of intervention considered maintaining and optimising the existing N4 road, before improving certain sections of it by upgrading it to standard single carriageway before going further to providing new road infrastructure.

Discounted Options A number of other options were considered as part of the option development process, however they were discounted from further consideration.



Alternatives and options considered are as follows:



Do-Nothing

This option assumes that there will be no other investment in the transport network other than regular maintenance during the appraisal period, however a number of schemes are committed on this section of the N4 so in reality the Do-Nothing scenario is not considered.



Do-Minimum

This option involves maintaining the existing infrastructure and constructing schemes that have already been committed such as the Drumsna to Jamestown Active Travel scheme, Grey way from Roosky to Dromod etc. The Do-Minimum is the Base Case against which all other options are tested.



Alternatives – Active Travel

Active Travel means walking or cycling as part of a purposeful journey



Alternatives – Public Transport

Enhancements to existing rail and bus services within the study area to deliver modal shift from private car to public transport.



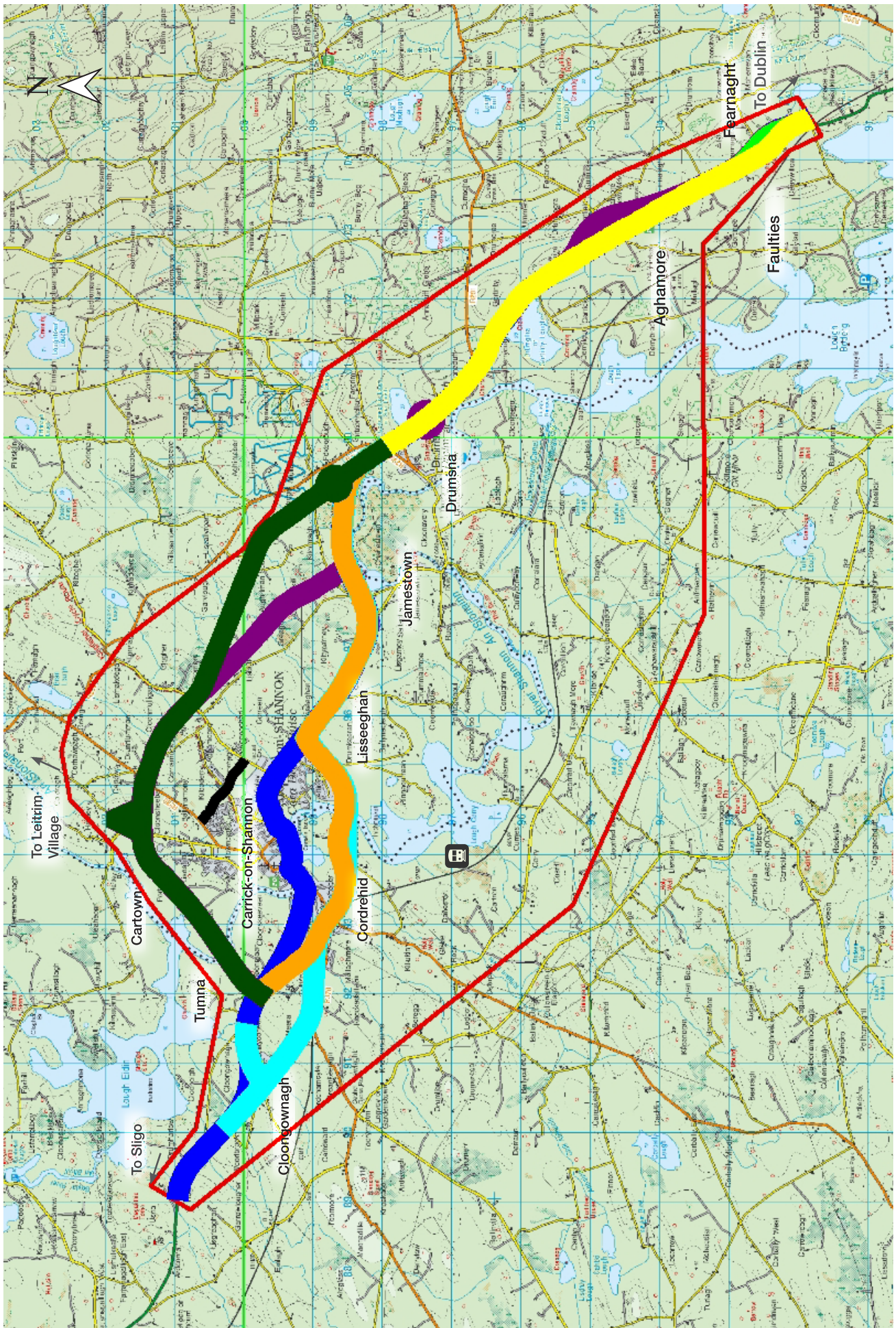
Alternatives – Demand management

Demand management includes fiscal control measures and Intelligent Transport System (ITS) measures etc.



Do-Something Options

Road based interventions starting with the upgrade of the existing N4 and including new road infrastructure



West of Drumsna Junction

Blue Option Corridor

The Blue Option Corridor comprises the Management Option which considers interventions on the existing infrastructure to address the identified transport problems.

Purple Option Corridor

The Purple Option Corridor aligns closely to the previous emerging preferred corridor that was identified in 2011. The corridor deviates from the existing N4 at Tumna. It continues north-eastwards, crossing the River Shannon at Corryolus, and meets the R280 at Cartown. It continues south-eastwards and rejoins the existing N4 at Tully.

Dark Green Option Corridor

The Dark Green Option Corridor deviates from the existing N4 at Tumna. It continues north-eastwards, crossing the River Shannon at Corryolus, and meets the R280 at Cartown. It continues south-eastwards and rejoins the existing N4 at Mountcampbell.

Orange Option Corridor

The Orange Option Corridor deviates from the existing N4 at Meera. It continues to the rear of the West Gate Business Park, crossing the R368 to the east of the railway station. It crosses the River Shannon at Cordrehid and rejoins the existing N4 at Lisseeghan before following the existing N4 to the townland of Tully.

Cyan Option Corridor

The Cyan Option Corridor deviates from the existing N4 at Cloongownagh. It continues eastwards hugging the railway line, crossing the R368 to the east of the railway station. It crosses the River Shannon at Cordrehid and rejoins back to the existing N4 at Lisseeghan before following the existing N4 to the townland of Tully.

Black Option Corridor

The Black Option Corridor connects the R280 to the Summerhill Road and on to the Castlecara Road.

East of Drumsna Junction

The Blue Option Corridor

The Blue Option Corridor comprises the Management Option which considers interventions on the existing infrastructure to address the identified transport problems.

Green Option Corridor

From Drumsna the Green Option Corridor follows the existing N4 through Aghamore and on to Faulties.

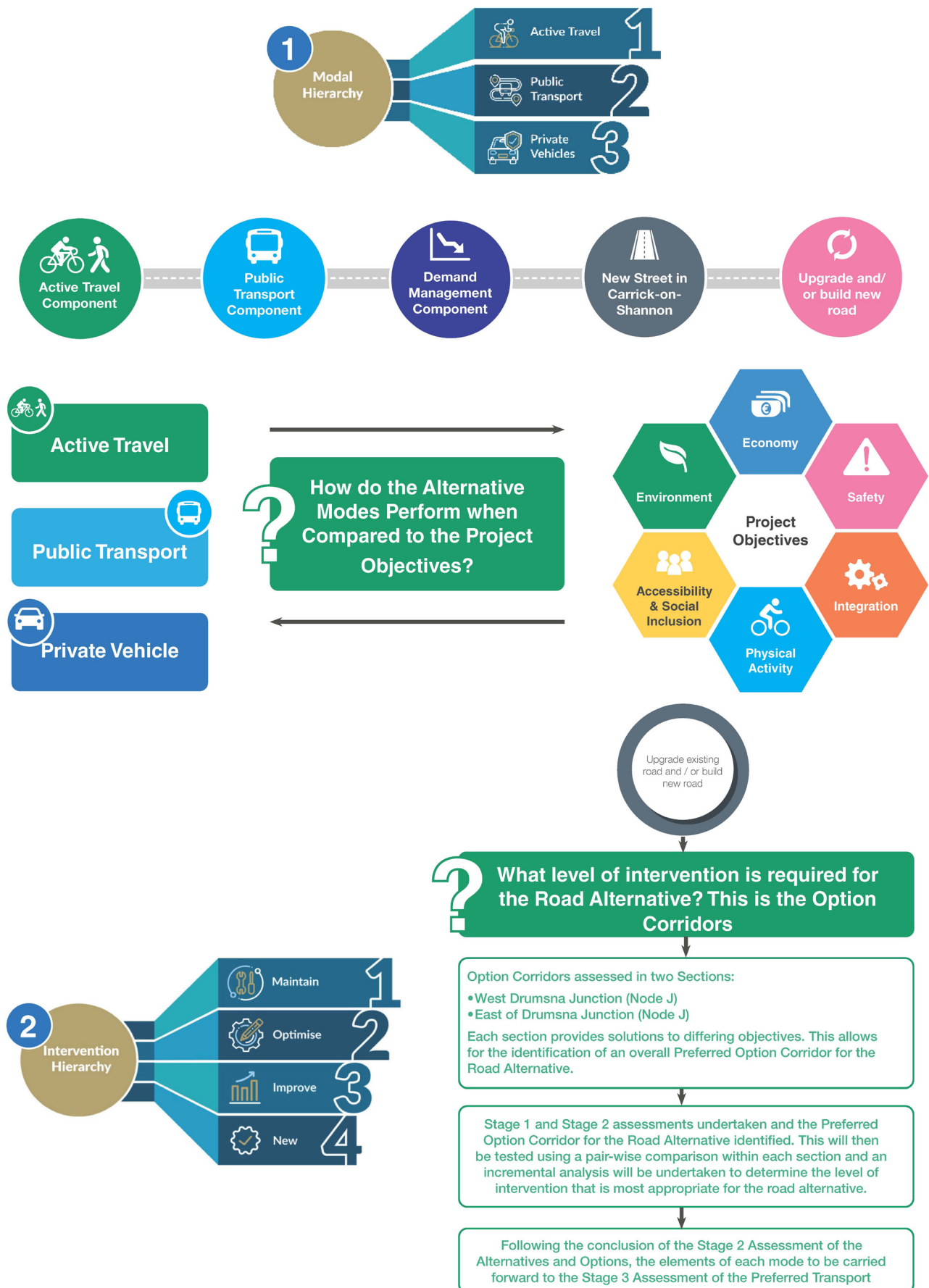
Purple Option Corridor

From Drumsna, the Purple Option Corridor follows the existing N4 corridor to Drumgildra, where a short offline deviation to the east of Aghamore is proposed. The corridor then follows the existing N4 to Faulties.

Yellow Option Corridor

From Drumsna, the Yellow Option Corridor follows the existing N4 through Aghamore and a short deviation to the west of the existing N4 is proposed in the townland of Fearnought.

Plate 4.1 Option Selection Process



5. Project Appraisal

During Phase 2 it is necessary to establish whether, at face value, a sufficient case exists for considering a project in more depth, that is, progression to Phase 3 Design and Environmental Evaluation. The appraisal of all the alternatives and options under consideration followed the standard three-stage process as depicted in Plate 5.1.

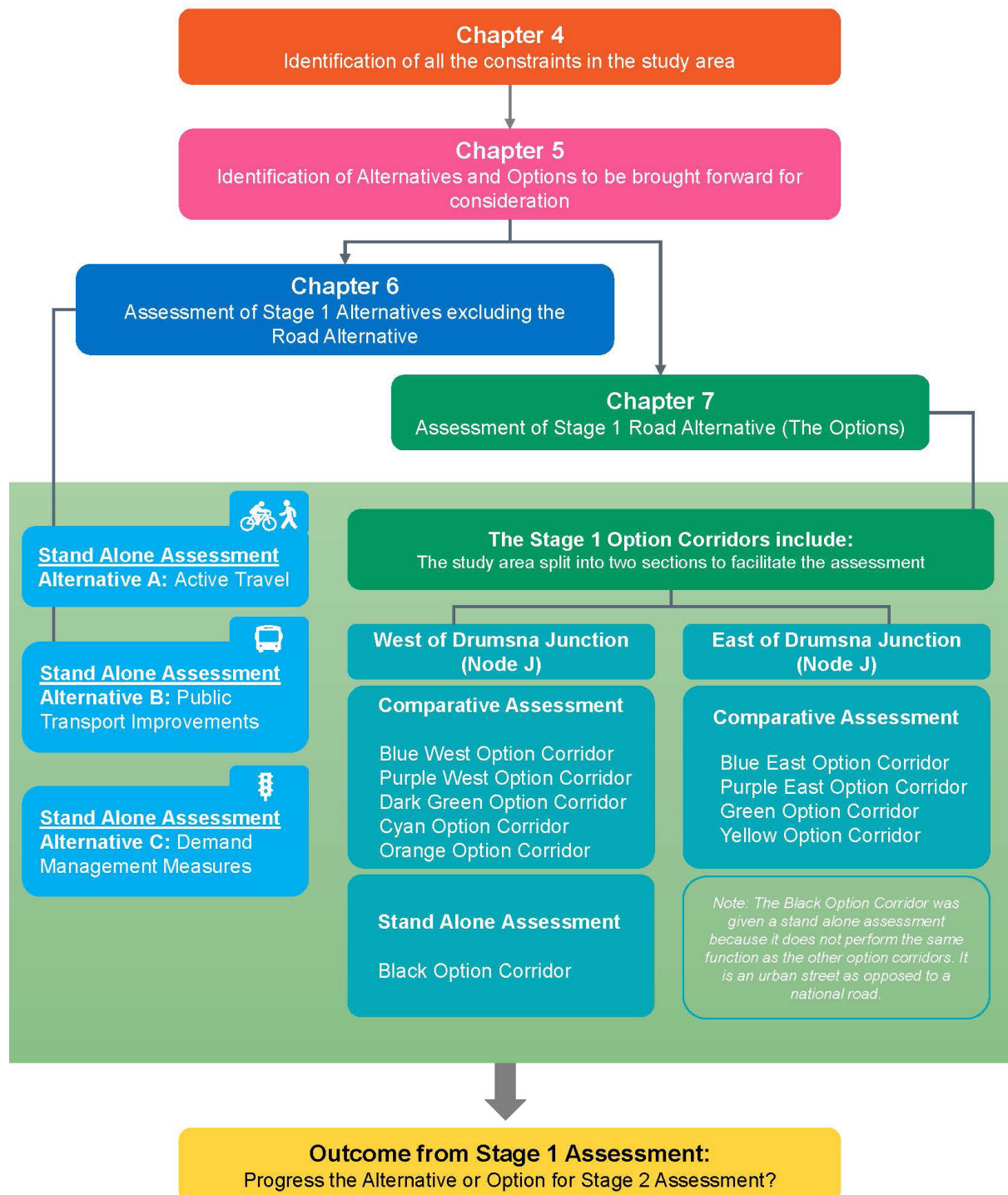


Plate 5.1 N4 Project Appraisal Process

The Preferred Option Corridor identified for the road alternative from the Stage 2 PAM is further tested by undertaking a pair-wise comparison. The purpose of the pair-wise comparison is to compare the assessment determinations of the two preferred corridors to see if anything stands out. Following this, an incremental assessment was undertaken to determine the level of intervention most appropriate for the road alternative to form part of the transport solution to be taken forward to the Stage 3.

Stage 1 – Preliminary Options Assessment

This involved a Multi-Criteria Analysis (MCA) under the assessment criteria of Engineering, Environment and Economy of the alternatives and options presented at the second public consultation. This resulted in a refinement of the number of alternatives and options as follows:

- **Alternatives:** Active Travel retained except for the additional pedestrian bridge

across the River Shannon. Public transport alternatives were retained except for the rail infrastructure improvements. Demand management measures were retained.

- **Options:** Road based options retained except for the Management Option. Addition of a connection to the R368 Elphin Road on a southern bypass option.

Stage 2 – Project Appraisal Matrix

This involved the assessment of the quantifiable and non-quantifiable impacts of these refined alternatives and options under the six criteria of Economy, Safety, Environment, Accessibility & Social Inclusion, Integration and Physical Activity. This resulted in an overall matrix for the alternatives and options whereby they were ranked and compared as shown below.

Stage 2 Project Appraisal Matrix - Alternatives Assessment

Criteria	Alternative A - Active Travel	Alternative B - Public Transport Improvements	Alternative C - Demand Management
<i>Economy</i>	Minor or Slightly Positive	Minor or Slightly Positive	Moderately Positive
<i>Environment</i>	Minor or Slightly Positive	Minor or Slightly Positive	Minor or Slightly Positive
<i>Safety</i>	Major or Highly Positive	Slightly Positive	Major or Highly Positive
<i>Accessibility & Social Inclusion</i>	Minor or Slightly Positive	Not Significant or Neutral	Minor or Slightly Positive
<i>Integration</i>	Not Significant or Neutral	Not Significant or Neutral	Minor or Slightly positive
<i>Physical Activity</i>	Major or Highly Positive	Minor or Slightly Positive	Moderately Positive
Scoring			
<i>Overall Scoring</i>	Not Significant or Neutral	Not Significant or Neutral	Minor or Slightly positive

Stage 2 Project Appraisal Matrix - Option Corridor Assessment

Criteria	West of Drumsna Junction (Node J)				
	Cyan Option Corridor	Orange Option Corridor	Purple West Option Corridor	Dark Green Option Corridor	Black Option Corridor
	Pink Design Option	Orange Design Option	Purple West Design Option	Grey Design Option	Black Design
<i>Economy</i>	Preferred	Least Preferred	Intermediate	Intermediate	N/A
<i>Environment</i>	Intermediate	Least Preferred	Intermediate	Preferred	N/A
<i>Safety</i>	Preferred	Preferred	Preferred	Preferred	N/A
<i>Accessibility & Social Inclusion</i>	Preferred	Preferred	Preferred	Preferred	N/A
<i>Physical Activity</i>	Preferred	Intermediate	Intermediate	Intermediate	N/A
<i>Integration</i>	Preferred	Preferred	Preferred	Preferred	N/A
Scoring					
<i>Overall Ranking</i>	Preferred	Least Preferred	Intermediate	Intermediate	N/A

Criteria	East of Drumsna Junction (Node J)		
	Yellow Option Corridor	Green Option Corridor	Purple East Option Corridor
	Yellow Design Option	Green Design Option	Purple East Design Option
<i>Economy</i>	Intermediate	Preferred	Least Preferred
<i>Environment</i>	Intermediate	Preferred	Least Preferred
<i>Safety</i>	Preferred	Preferred	Preferred
<i>Accessibility & Social Inclusion</i>	Intermediate	Intermediate	Intermediate
<i>Physical Activity</i>	Intermediate	Intermediate	Preferred
<i>Integration</i>	Preferred	Preferred	Preferred
Scoring			
<i>Overall Ranking</i>	Intermediate	Preferred	Least Preferred

The overall PAM for the alternatives shows that they all perform well with Alternative C Demand Management performing best due to the decrease in private vehicle trips arising from their implementation.

Stage 2 – Pair-wise comparison of Preferred Option Corridor for the road alternative

The Preferred Option Corridor identified for the road alternative from the Stage 2 PAM is further tested by undertaking a pair-wise comparison. The comparison is undertaken on the two sections either side of Drumsna Junction, each of which required a decision. West of Drumsna Junction, the decision is whether to go north or south of Carrick-on-Shannon and east of Drumsna Junction the decision is whether to stay on-line or move off-line. A pair-wise comparison was undertaken to inform the decision making.

West of Drumsna – North or South?

A comparison of the best performing option to the north versus the best performing option to the south is used to inform the decision making. As shown in the overall PAM, the preferred option corridor to the north is the Dark Green Option Corridor and the preferred option to the south of Carrick-on-Shannon is the Cyan Option Corridor. Environment is a key differentiator favouring the Dark Green Option Corridor whilst Economy is a key differentiator favouring the Cyan Option Corridor.

A comparison of the key sub-criteria assessed which received a Least Preferred score identified the following:

- Material assets Non-Agricultural favoured the Dark Green Option Corridor over the Cyan Option Corridor due to the lesser number of home acquisitions. **(Dark Green Option Corridor is preferred).**
- Biodiversity ranked the Dark Green Option Corridor as Least Preferred primarily due to the interaction with the pNHA and it interacts with four internationally important sites. Conversely the Cyan Option Corridor interacts minimally with the pNHA and interacts with two internationally important sites. **(Cyan Option Corridor is preferred).**
- Hydrology favoured the Cyan Option Corridor due to the minimal risk to the Carrick-on-Shannon drinking water abstraction and potential public health concerns arising from a water quality impact on the source both during construction and operation phases by virtue of being located well downstream of the abstraction point. The Dark Green Option Corridor was ranked Least Preferred. **(Cyan Option Corridor is preferred).**
- Soils and Geology favoured the Dark Green Option Corridor over the Cyan Option Corridor due to the earthworks deficit. Whilst the Dark Green Option Corridor involves more cutting and placement of material, all this material is available within the indicative design. **(Dark Green Option Corridor is preferred).**

A comparison of the Economy criteria identified that the **Cyan Option Corridor is preferred** over the Dark Green Option Corridor as it has a better benefit to cost ratio than the Dark Green Option Corridor. In terms of affordability, the Cyan Option Corridor offers more opportunity to phase the spending than the Dark Green Option Corridor as it achieves the crossing of the River Shannon and the re-connection back to the existing N4 at a lesser cost to the Dark Green Option Corridor and achieves a better benefit to cost ratio for it. Based on this pair-wise comparison, the **Cyan Option Corridor is the preferred option to the west of Drumsna** due to the lesser risk to the water supply, lower impacts on biodiversity and the overall better economic assessment of it. However, there will be a greater impact on residential homes associated with it.

East of Drumsna – On-line or Off-line?

As shown in the PAM above, the preferred on-line option is the Green Option Corridor which is then compared with the off-line Purple East Option Corridor. A comparison of these two options identified the following:

- *Economy* – the Purple East Option Corridor is Least Preferred given the scale of the cost of it in comparison to the Green Option Corridor. **(Green Option Corridor is preferred)**



- *Environment* - the Purple East Option Corridor is Least Preferred given the environmental impacts associated with construction of a new off-line section in comparison to the on-line option. **(Green Option Corridor is preferred)**
- *Physical Activity* - the Purple East Option Corridor is Preferred as it bypasses Aghamore allowing for improved measures within the village. **((Purple East Option Corridor is preferred)**

Comparing these two options, the preferred option is the Green Option Corridor.

Stage 2 - Incremental assessment

This final part of the Stage 2 Appraisal considers the incremental build-up of the project from the Stage 2 Alternatives and Options which are under consideration, which include various cross-sections, various design speeds and various scheme extents in order to determine the most suitable combination to progress as the Preferred Transport Solution. The incremental assessment is graphically depicted on Plate 5.2.

The starting point in terms of transport infrastructure provision is prioritisation of walking and cycling measures and improvements to public transport, followed by optimisation of the

existing infrastructure before advancing to new infrastructure. The first step in the incremental build-up is to test the alternatives in isolation. Following on from this, the Stage 2 Option Corridors are assessed incrementally utilising the principle of incremental build-up. The minimal intervention of all the Stage 2 Option Corridors is the Black Option Corridor; however, it does not solve the transportation issues in isolation but similar to the alternatives, it is retained for consideration in combination with other elements as part of the overall transport solution. Following on from this, the shortest of all the option corridors which achieves a crossing of the River Shannon is assessed initially before then incrementally adding further additional sections of the proposed option corridors with each incremental addition based on it adding value. The recommendation of the incremental assessment is that the Preferred Transport Solution comprises active travel and demand management measures in the centre of Carrick-on-Shannon and Cortober coupled with the Cyan Option Corridor and the Black Option Corridor on the west of Drumsna and the Green Option Corridor from Drumsna to the tie-in to the Roosky bypass.

Incremental Assessment

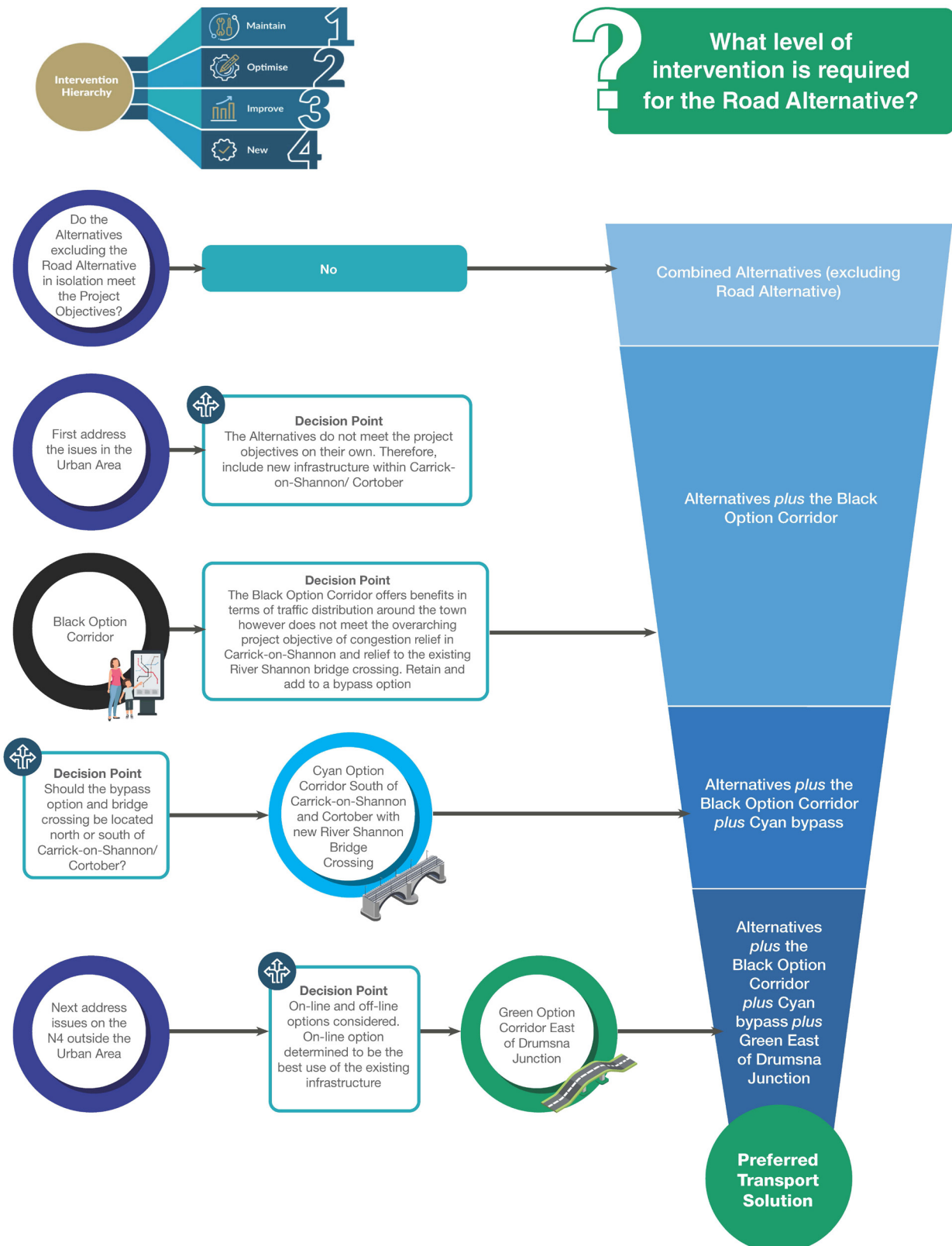
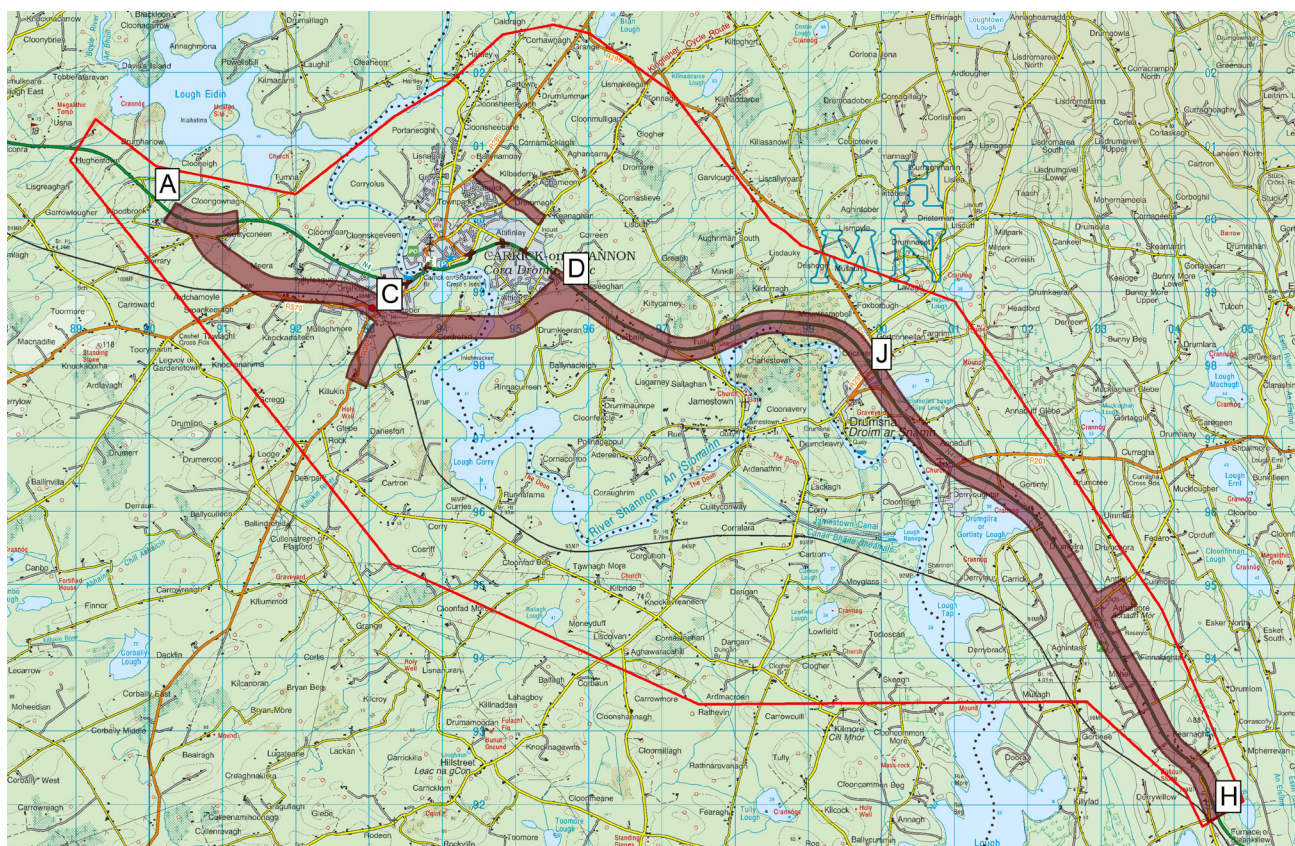


Plate 5.2 Incremental Assessment

Stage 3 – Preferred Option

This is selected after the completion of Stage 2 which includes an incremental assessment of the project. Following this, a Project Appraisal Balance Sheet (PABS) was prepared to summarise the impact of the Preferred Transport Solution.

6. Conclusion



An examination of the issues contributing to existing transport deficiencies across all modes on the N4 corridor within the study area was necessary to identify appropriate and successful interventions. Furthermore, it is imperative that the objectives of the project of enhancing inter-regional and intra-regional connectivity to places and markets, including international accessibility, are at the forefront so that the N4 corridor can play its part as an enabler of economic growth and improve the attractiveness of the region. This in turn will enable the promotion of active travel, in particular in and around the Carrick-on-Shannon urban area, so that a sustainable transport solution is achieved.

Preferred Transport Solution

The recommendations of this Option Selection Report are:

1. Progress the active travel and demand management measures with the Black Option Corridor plus the Cyan Option Corridor to the west of Drumsna plus the Green Option Corridor to the east of Drumsna to align with the project objectives outlined earlier
2. Review the extent of provision of road infrastructure necessary within the preferred option corridor in conjunction with the wider transport strategy for Carrick-on-Shannon and Cortober which identifies the level of service requirements for each mode of transport, including walking, cycling, public transport and private vehicle

The identification of this preferred transport solution will ensure delivery of an overall sustainable transport solution which caters for all modes. This aligns with the hierarchy of intervention whereby every effort is utilised to reduce trip demand initially, which in turn promotes an uptake on active travel modes, before progressing to new infrastructure, noting that the new infrastructure also includes for active travel and caters for public transport. Furthermore, this enables the placemaking of Carrick-on-Shannon and Cortober, whilst also delivering on NSO 2 of the National Planning Framework connecting the regions, which aligns with the core project objectives.