

N2 Rath Roundabout to Kilmoon Cross

Option Selection Report

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1. Introduction

1.1 Scheme Overview

Meath County Council (MCC) is working in partnership with Fingal County Council (FCC) and in association with Transport Infrastructure Ireland (TII), to develop a scheme along a section of the N2 between Rath Roundabout and Kilmoon Cross.

Roughan & O'Donovan – AECOM Alliance (ROD-AECOM) have been appointed by Meath County Council to progress the scheme development through Phases 1 to 4 of the TII Project Management Guidelines 2020 (PMGs).

1.2 Scheme Background

The N2 Rath Roundabout to Kilmoon Cross scheme is compatible with several studies that have been carried out by Meath County Council along with other regional and national studies.

It is referenced in a number of policy documents including the National Planning Framework (Ireland 2040), the National Development Plan (2021-2030), the National Transport Authority's Transport Strategy for the Greater Dublin Area (2016 – 2035), as well as the Draft Transport Strategy for the Greater Dublin Area 2022-2042. Moreover, the scheme is referenced in the now superseded Meath County Development Plan 2013-2019, the recently adopted Meath County Development Plan (2021-2027), as well as the adopted Fingal County Development Plan (2017-2023).

ROD-AECOM were commissioned to begin work on the N2 Rath Roundabout to Kilmoon Cross scheme in September 2019. The scheme has been progressed by ROD-AECOM through Phase 1 (Concept and Feasibility) of the TII Project Management Guidelines 2020. During this phase, the feasibility of the project was developed and investigated in further detail and the project management structure was implemented. The main deliverables from this phase included the Project Execution Plan, Feasibility Working Costs and Project Brief.

Approval to proceed to Phase 2 (Options Selection) of the TII Project Management Guidelines 2020 was obtained from TII in January 2020. Phase 2 consists of an examination of alternative options in order to determine a preferred option. This forms the basis of this Option Selection Report which is the main deliverable of this phase.

1.3 Scheme Location

The proposed scheme is located immediately north of Ashbourne, County Meath and forms part of the N2 National Primary route which links Dublin to Derry. This section of the N2 falls largely within County Meath under the administration of Meath County Council, however approximately 1km of the existing road is located within County Dublin under the administration of Fingal County Council.

The location of the scheme is shown in a regional context in Figure 1-1 overleaf, with the study area demarcated by the red dashed line.

Rath Roundabout is located at the southern end of the study area, to the north of Ashbourne where the M2 Motorway (Ashbourne Bypass) terminates and connects with the N2 and the R135 (the former N2 alignment prior to the construction of the Ashbourne Bypass).

Kilmoon Cross is located at the northern end of the study area, at the intersection between the N2 and the R152 (which connects to Drogheda and the M1 Motorway via Duleek).

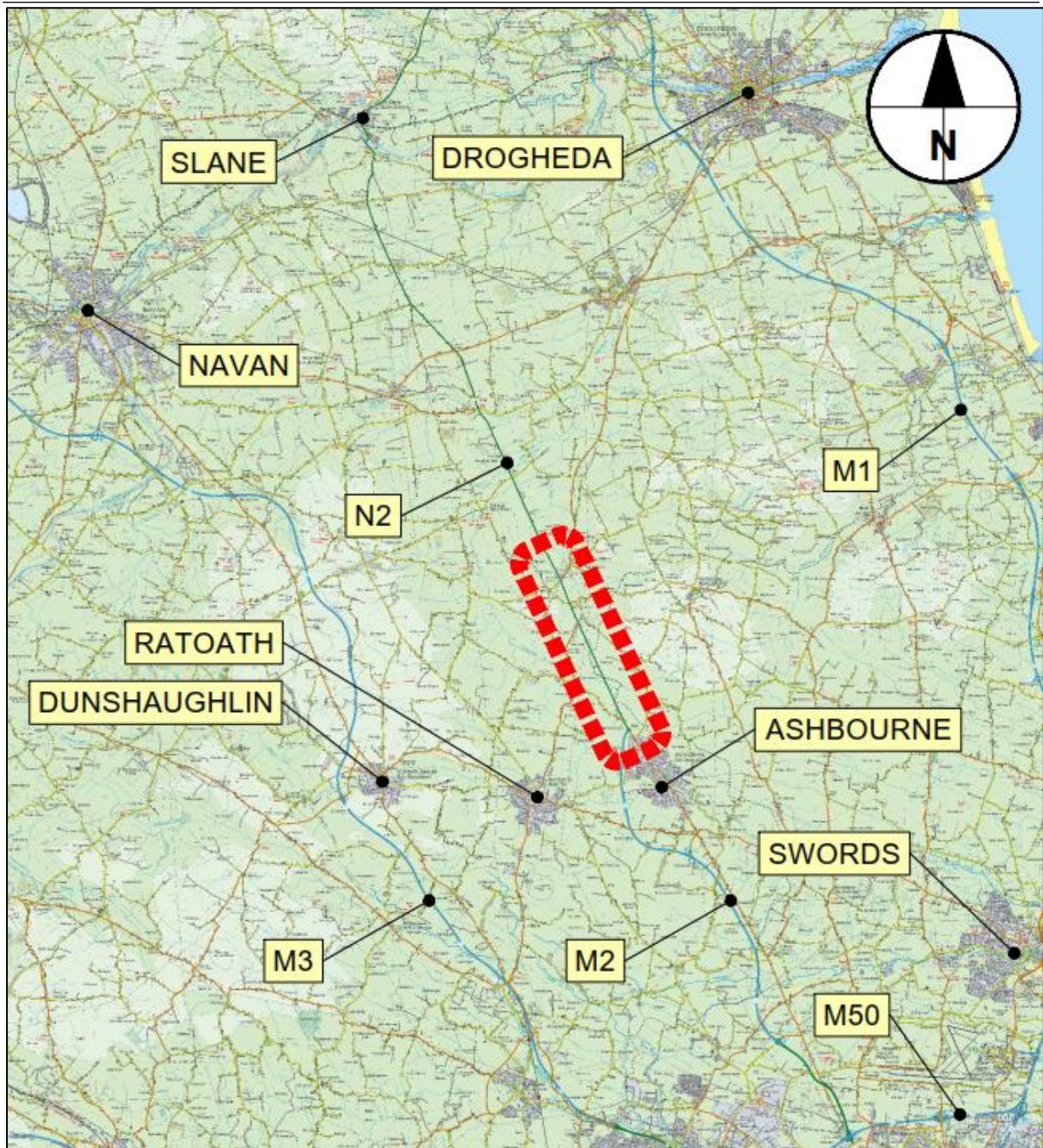


Figure 1-1 - Location of the Scheme in a Regional Context

1.4 Previous Studies

1.4.1 N2 Rath to Kilmoon Junction Upgrade Study, 2015

Meath County Council in partnership with TII undertook the N2 Rath to Kilmoon junction upgrade study in 2015 to identify whether there were any interim measures which could improve the capacity and safety at 5 junctions along the N2 between Rath Roundabout and Kilmoon Cross. This was undertaken by Arup who reviewed existing traffic information and carried out a junction modelling exercise to determine a preferred upgrade option for each junction which would improve the operation and safety of the junctions in the short term. Whilst it was noted that the upgrade proposals would improve the capacity, safety and increase throughput at the junctions the report concluded that:

'.....it is important to note that for all options (except the N2/L5007 junction), the upgraded junctions would be operating at or close to capacity under existing traffic conditions, with no reserve capacity available to accommodate additional growth on the N2 and adjoining roads. The proposed improvements noted in this report would therefore have a short design life and the N2 requires a full upgrade to accommodate the projected increase in traffic along the route.'

1.4.2 N2 Ashbourne to Ardee Feasibility Report, 2008

A strategic review of a route improvement on the N2 between Ashbourne and Ardee was undertaken in 2008 by Roughan & O'Donovan.

This high-level review recommended consideration of an upgrade to dual carriageway standard along the route extending between the end of the N2/M2, north of Ashbourne to the N33, east of Ardee. The future traffic needs for the N2 route between Ashbourne and Ardee were assessed in line with the NRA Leinster Roads Need Study, which was a strategic study undertaken by the Roughan & O'Donovan – Faber Maunsell Alliance to forecast the requirements for the future road network within the Leinster area. Whilst this traffic model was a useful tool to assess the required cross section, the consultant team recommended that a more refined traffic model would be required to provide more detailed and robust future traffic projections for the N2 study area between Ashbourne and Ardee.

The report noted that the southern 11km length of the N2 from Ashbourne to the R153 junction at Balrath could consist of an on-line widening scheme to dual carriageway standard. Work on a Constraints Study was initiated but this was halted as the scheme was suspended.

At the time of writing, the National Development Plan, 2021-2030 (NDP 2021-2030) does not include an overall strategy to upgrade the N2 corridor between Ashbourne and Ardee. However, two road improvement schemes along this corridor, N2 Slane Bypass and Public Realm Enhancement Scheme and N2 Rath Roundabout to Kilmoon Cross, are included in the NDP 2021-2030. These road improvement schemes aim to address specific capacity constraints and road safety issues on the N2 corridor between Ashbourne and Ardee.

1.5 Purpose of the Option Selection Report

The purpose of this report is to outline the works undertaken within Phase 2 (Options Selection) of the TII Project Management Guidelines 2020. These include the definition of a suitable study area, the identification of key natural and artificial constraints within that study area as well as external parameters, the development of feasible options, and finally the completion of systematic assessment of these options leading to the selection of a preferred option for the scheme. The report also describes the non-statutory public consultations that were held during each stage of assessment and following the identification of an emerging preferred option.

1.6 Option Selection Methodology

The methodology used for the Option Selection was based on the guidance set out in both the TII Project Management Guidelines 2020 and the TII Project Manager's Manual 2020 (*PE-PMG-02041* and *PE-PMG-02042* respectively). Option selection is a process which seeks to identify a preferred option through a structured appraisal process which can be referred to as a narrowing of options. This process is set out in the suite of TII Project Appraisal Guidelines and is set out in Figure 1-2.

A number of feasible options were developed within the study area based on the available constraints information, in accordance with *PE-PAG-02012-01 Unit 4.0 - Consideration of Alternatives and Options*. These options were then presented during the first period of non-statutory public consultation. The feedback received was considered during the Stage 1 Preliminary Options Assessment, where the options were assessed under three criteria; Engineering, Environment and Economy, in accordance with *PE-PAG-02031-01 Unit 7.0 - Multi Criteria Analysis*.

Following the Stage 1 Preliminary Options Assessment, the options which performed the most favourably were selected to proceed to the Stage 2 Project Appraisal. These options were refined further and presented again during the second period of non-statutory public consultation. This feedback was considered during the Stage 2 Project Appraisal, where the options were subject to a more detailed appraisal under the six criteria of Economy, Safety, Environment, Accessibility & Social Inclusion, Integration and Physical Activity, in accordance with the Common Appraisal Framework 2016.

Following the Stage 2 Project Appraisal, an emerging preferred option was identified. This emerging preferred option was presented during the third period of non-statutory public consultation. This feedback was then considered during the refinement of the emerging preferred option before it was finalised during the Stage 3 Selection of a Preferred Option.

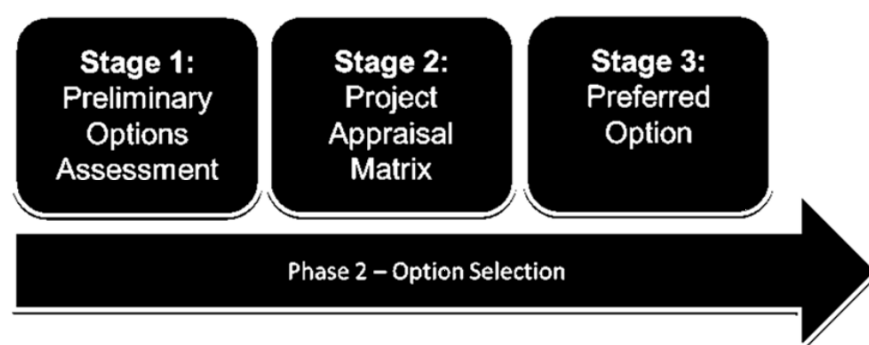


Figure 1-2 - TII Phase 2 Option Selection Stages (TII PAG Unit 4.0)

In terms of the overall N2 corridor, two sections have been upgraded in recent years as listed below:

- N2 Finglas to Ashbourne: This section has been upgraded with approximately 17km of dual 3 lane carriageway and dual 2 lane motorway and includes a bypass of Ashbourne town.
- N2 Castleblayney and Clontibret: This 16km section has been upgraded to a Type 3 Dual Carriageway cross-section as one of the pilot schemes for the 2+1 road type and includes a bypass of Castleblayney.

Several other road improvement schemes are identified along the overall N2 corridor in the National Development Plan, 2021-2030 (NDP 2021-2030). These include the following:

- N2 Slane Bypass and Public Realm Enhancement Scheme: A Preferred Option has been published for this scheme. At the time of writing, the latest publicly available information indicates that this scheme will consist of an offline route to the east of Slane village with a Type 1 Single Carriageway cross-section.
- N2 Ardee to Castleblayney: A Preferred Option has been published for this scheme. At the time of writing, the latest publicly available information indicates that this scheme will consist of mainly online upgrades with a Type 2 Dual Carriageway cross-section
- N2 Clontibret to Border: A Preferred Option has been published for this scheme. At the time of writing, the latest publicly available information indicates that this scheme will consist of a mostly offline route to the east of Monaghan town with a Type 2 Dual Carriageway cross-section.

The improvements along the N2 corridor as set out in the National Development Plan, 2021-2030 are illustrated in Figure 2-2.

Other road improvement schemes along the wider N2 / A5 corridor between Dublin and Derry include the following:

- N2 Monaghan to Emyvale: Interim road safety and travel quality improvements between Monaghan town and Emyvale prior to the development of the N2 Clontibret to Border scheme.
- A5 Aughnacloy to Derry: Proposal for 85km of dual carriageway providing a high-quality strategic link from the border connecting Omagh, Strabane and Derry. This is set to be completed in several phases (1A, 1B, 2 and 3), as shown in Figure 2-3. In October 2020, the Irish Government confirmed €500 million in funding for the “shared island” initiative which is intended to support cross-Border co-operation, including joint infrastructure projects.

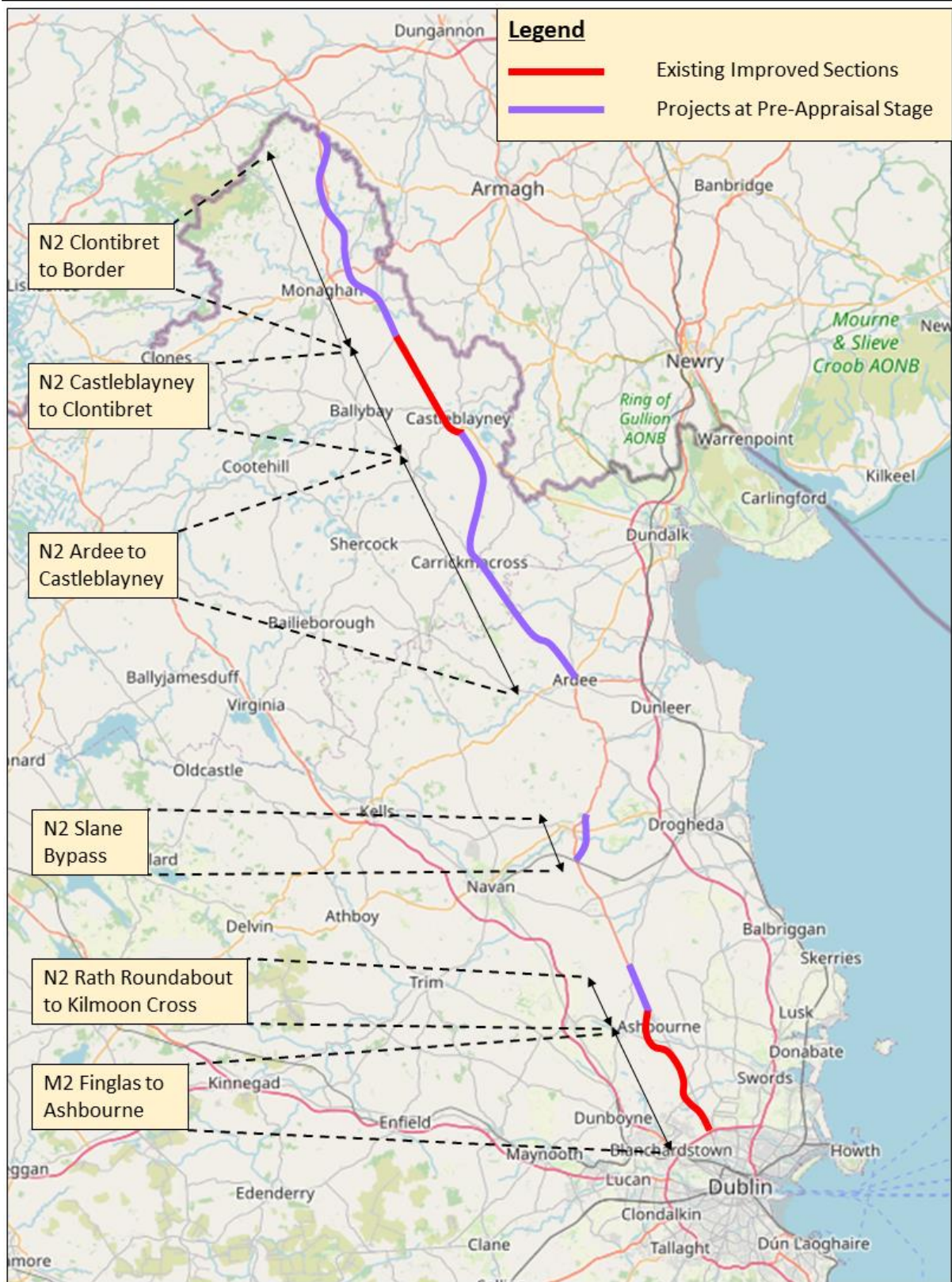


Figure 2-2 - Status of N2 Corridor (NDP 2018-2027). (Open Street Map, 2020).

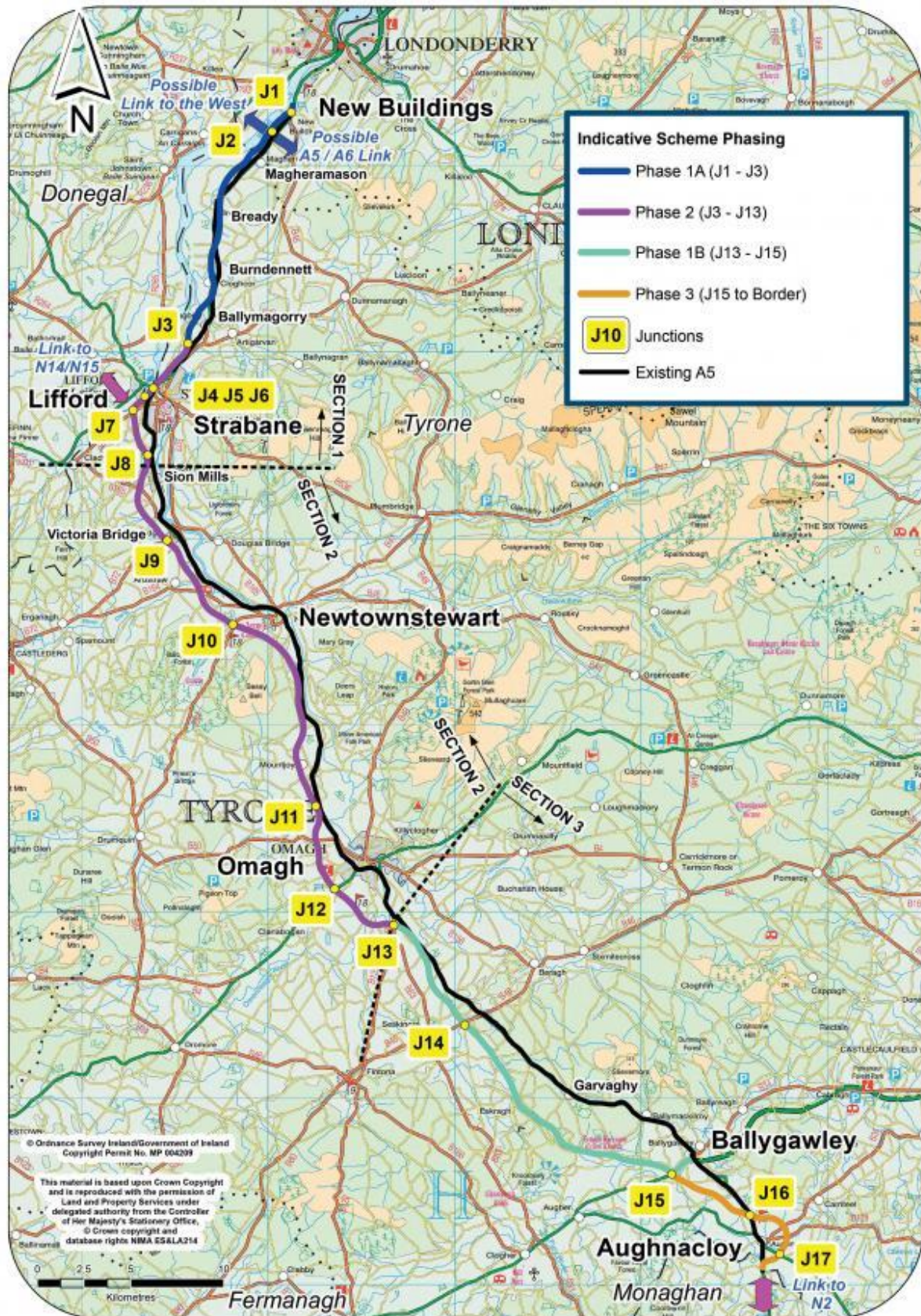


Figure 2-3 - A5 Western Transport Corridor Route Plan. (Department for Infrastructure, 2020).

2.2 National, Regional and Local Policy

2.2.1 Overview

The N2 Rath Roundabout to Kilmoon Cross scheme has been considered with regard to the pertinent national and local policies as set out in a number of policy documents and programmes. These are set out in the sections below.

The policy and legislation assessed in this section includes all relevant planning guidance on a National, Regional and Local level, specifically;

National Policy Context

- Project Ireland 2040: National Planning Framework (NPF)
- National Development Plan 2021 – 2030
- Strategic Investment Framework for Land Transport
- Road Safety Strategy 2021 – 2030
- Draft National Investment Framework for Transport In Ireland

Regional Policy Context

- Eastern Midlands Regional Spatial Economic Strategy (RSES)
- National Transport Authority (NTA) Transport Strategy for the Greater Dublin Area 2016 – 2035
- Draft National Transport Authority (NTA) Transport Strategy for the Greater Dublin Area 2022 – 2042

Local Policy Context

- Meath County Development Plan 2013 – 2019 (*now superseded*)
- Meath County Development Plan 2021 – 2027 (*recently adopted*)
- Ashbourne Local Area Plan 2009 – 2015 (*now superseded*)
- Fingal Development Plan 2017 – 2023

Further information on policies / objectives specifically relating to a local planning policy level are detailed in the Constraints Report in Appendix 5 and should be read in conjunction with this chapter.

2.2.2 National Policy Context

Project Ireland 2040, National Planning Framework

The National Planning Framework (NPF) is focused on policies, actions and investment to deliver the 10 National Strategic Outcomes, as listed below:

- NSO 1 - Compact Growth
- NSO 2 - Enhanced Regional Accessibility
- NSO 3 - Strengthened Rural Economies and Communities
- NSO 4 - Sustainable Mobility
- NSO 5 - A Strong Economy Supported by Enterprise, Innovation and Skills
- NSO 6 - High-Quality International Connectivity
- NSO 7 - Enhanced Amenity and Heritage
- NSO 8 - Transition to a Low Carbon and Climate Resilient Society
- NSO 9 - Sustainable Management of Water, Waste and other Environmental Resources
- NSO 10 - Access to Quality Childcare, Education and Health Services

In terms of balanced growth, the NPF targets a level of growth in the country's Northern, Western and Southern Regions combined, to at least match that projected in the East and Midland Region.

National Strategic Outcome 2 focuses on Enhanced Regional Accessibility. This includes improving access from the north-west to Dublin, which is identified as a critical component of the NPF in National Policy Objective 2c which states:

'Accessibility from the north-west of Ireland and between centres of scale separate from Dublin will be significantly improved, focused on cities and larger regionally distributed centres and on key east-west and north-south routes.'

It is noted that the alignment of the Stage 2 options with the 10 NSO's is detailed further in the Stage 2 – Project Appraisal Matrix chapter, and that the alignment of the Emerging Preferred Option with the 10 NSO's is detailed further in the Stage 3 – Preferred Option chapter.

Chapter 10 of the NPF expands upon how accessibility to the north-west can be improved and sets out the following aims to achieve this by:

- Upgrading access to the North-West border area, utilising existing routes (N2/N14/A5);
- Upgrading northern sections of the N4 and N5 routes and sections of the N3/M3 national primary route;
- Progressive development of the Atlantic Economic Corridor from Galway northwards by upgrading sections of the N17 northwards, where required and upgrading the N15/N13 link.

The proposed N2 Rath Roundabout to Kilmoon Cross upgrade would therefore be consistent with this objective and the target in the NPF to improve average journey times to an average inter-urban speed of 90kph.

Chapter 8 of the NPF concentrates on how Ireland will work with its neighbours to the mutual advantage of all. This includes linkages to Northern Ireland. The NPF supports North-South co-operation across a wide range of policy areas. Working together for economic advantage and co-ordination of investment in infrastructure are two of the three key categories of practical co-operation between relevant government departments and local authorities in Ireland and Northern Ireland that are highlighted in the NPF. The proposed upgrades to the N2 and the A5 are particularly relevant in this context to help maintain the seamless cross-border movement of people, goods and services. National Policy Objectives 43 and 46 reflect these aims as follows:

'Work with the relevant Departments in Northern Ireland for mutual advantage in areas such as spatial planning, economic development and promotion, co-ordination of social and physical infrastructure provision and environmental protection and management.', and;

'In co-operation with relevant Departments in Northern Ireland, enhanced transport connectivity between Ireland and Northern Ireland, to include cross-border road and rail, cycling and walking routes, as well as blueways, greenways and peatways.'

The NPF notes that the continued strengthening of the economic relationship between Dublin and Belfast can help reinforce the competitiveness of the Eastern and Midland Region, while also helping to mitigate the adverse effects of Brexit. As an island, continued investment in Ireland's port and airport connections within the State and to the UK, the EU and the rest of the world is integral to underpinning international competitiveness. It is also central to responding to the challenges as well as the opportunities arising from Brexit.

This is relevant to the N2 and the section between Rath Roundabout and Kilmoon Cross section given that it is part of a key arterial link to both the international gateways at Dublin Airport and Dublin Port.

Project Ireland 2040, National Development Plan 2021-2030

The National Development Plan (NDP) sets out the investment priorities that will underpin the successful implementation of the new NPF. The intention is that these will guide national, regional and local planning and investment decisions in Ireland over the next two decades, to cater for an expected population increase of over 1 million people.

The NDP demonstrates the Government's commitment to meeting Ireland's infrastructure and investment needs over the next ten years, through a total investment estimated at €165 billion over the period 2021-2030. It provides for investment to support the ambition for development of the border region, including the N2/A5 road, serving Meath, Louth, Monaghan and Donegal. It also states that the N2 Rath Roundabout to Kilmoon Cross was one of the national road projects proposed as part of the previous NDP and will be subject to further approvals.

The N2 Rath Roundabout to Kilmoon Cross is also part of the National Roads Programme 2018 – 2027.

Strategic Investment Framework for Land Transport

The Strategic Investment Framework for Land Transport (SIFLT) which was published by the DoT outlines the key principles against which national and regional, comprehensive, and single mode-based plans and programmes will be drawn up and assessed. The framework does not set out a list of projects to be prioritised however the following three priorities are noted in terms of investment:

- *Priority 1 – Achieve steady state maintenance;*
- *Priority 2 – Address urban congestion; and*
- *Priority 3 – Maximise the value of the road network.*

In terms of Priority 3, the report states that *"the value of the land transport networks should be maximised through targeted investments that:*

- *Improve connections to key seaports and airports;*
- *In the case of roads provide access to poorly served regions, for large scale employment proposals, to complete missing links and to address critical safety issues; and*
- *Support identified national and regional spatial planning priorities.*

The proposed improvement to the N2 is consistent with the Strategic Investment Framework for Land Transport and, in particular, the third priority in relation to improvement in efficiency and safety of existing transport networks, as well as improving accessibility and connectivity to the North-West Region.

Road Safety Strategy 2021 – 2030

This is the Government's fifth Road Safety Strategy covering the period 2021 – 2030, titled 'Our Journey Towards Vision Zero'.

The core of the strategy is a shared responsibility to prevent or reduce the impact of collisions, between those who design, build, manage, police, and use the roads.

The foundation of this strategy was laid in the 2020 Programme for Government to achieve Vision Zero - that is, zero deaths and zero serious injuries on Irish roads by 2050. This is an enormous challenge being built on sustained progress made since the first road safety strategy introduced in 1998.

At the heart of this strategy is delivering Vision Zero by 2050, where no one will be killed or seriously injured on Ireland's roads. In the first step of the journey (2021 – 2030), the strategy aims to reduce fatalities and serious injuries on the roads by 50% - that means:

- *Reducing annual fatalities from 144 to 72 or less; and*
- *Reducing annual serious injuries from 1,260 to 630 or less.*

Draft National Investment Framework for Transport in Ireland

The DoT is currently developing its new high-level strategic framework for prioritising future investment in the land transport network. It is noted that the National Investment Framework for Transport in Ireland (NIFTI) is a Draft Framework that has not yet been formally published, however this has been considered in conjunction with the consolidated Ireland 2040 National Planning Framework (NPF) and National Development Plan 2021 – 2030 (NDP). Public consultation on the draft framework commenced on 31st March 2021 and ended on the 28th May 2021. The consultation submissions are currently under review.

This draft framework aims to establish high-level investment priorities to efficiently and effectively address key transport challenges identified by the background analysis and to ensure that transport investment is aligned with and supports Government’s overarching spatial and climate change objectives. In addition, it has been developed to ensure consistency with the overarching National Strategic Outcomes (NSOs) articulated within the National Planning Framework (NPF).

The Draft National Investment Framework for Transport in Ireland has provided a variety of supporting analysis that was conducted for the framework, this analysis has been outlined in a series of background papers. This analysis considered the context, constraints and objectives of transport investment and provides the foundation for the resulting framework.

Section 4.3 of Background Paper 1 (NPF), sets out modal and intervention hierarchies, which outline how future transport investment will be undertaken in a sustainable manner. The framework encourages the use of active travel and public transport ahead of solutions reliant on private transport, as shown in Figure 2-4. Maintenance or optimisation of existing assets, including through demand management, is also preferred to extensive enhancements or outright new infrastructure, as shown in Figure 2-5.

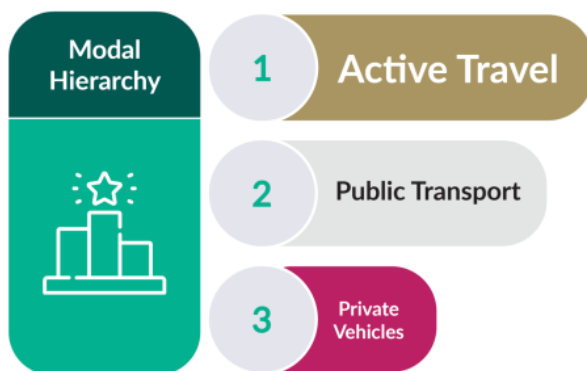


Figure 2-4 - Modal Hierarchy (NIFTI)

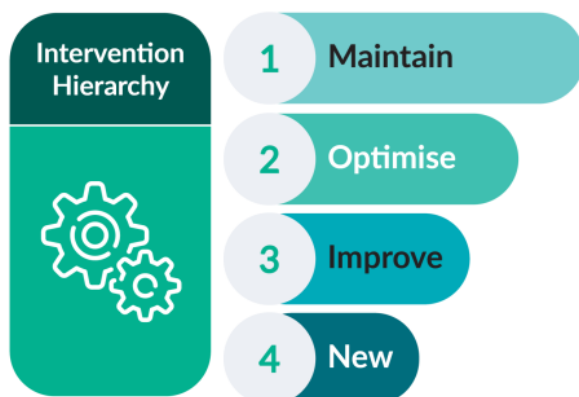


Figure 2-5 - Intervention Hierarchy (NIFTI)

Section 5.1 of Background Paper 1 (NPF), acknowledges the main implication to future transport planning is the significant population growth in Irish towns and rural areas nationwide. Further stating the importance of identifying areas where the level of accessibility is below standard.

Section 6.2 of Background Paper 11 (Interurban Connectivity) includes a section on “Assessing Interurban Network Services Levels”. The Volume/Capacity Ratio on the National Primary Network in Ireland is shown in Figure 2-6 for the Do-Minimum Scenario (2040). This scenario assumes the NPF’s population projections are achieved and that the projects committed to in the NDP have been delivered. This includes national roads projects for which funding has been allocated in the NDP, such as N2 Slane Bypass and Public Realm Enhancement Scheme, but not sections of the national road network to be progressed through pre-appraisal and early planning, such as N2 Rath Roundabout to Kilmoon Cross.

Based on this figure, a significant portion of the Dublin-Derry-Letterkenny corridor is projected, in the Do-Minimum Scenario (2040), to be at or above capacity, including the N14 between Strabane and Letterkenny and the N2 south of the border to Ashbourne. Therefore, the N2 Rath Roundabout to Kilmoon Cross scheme will contribute to addressing these capacity issues on the Dublin-Derry-Letterkenny corridor for the section of the N2 south of the border to Ashbourne.

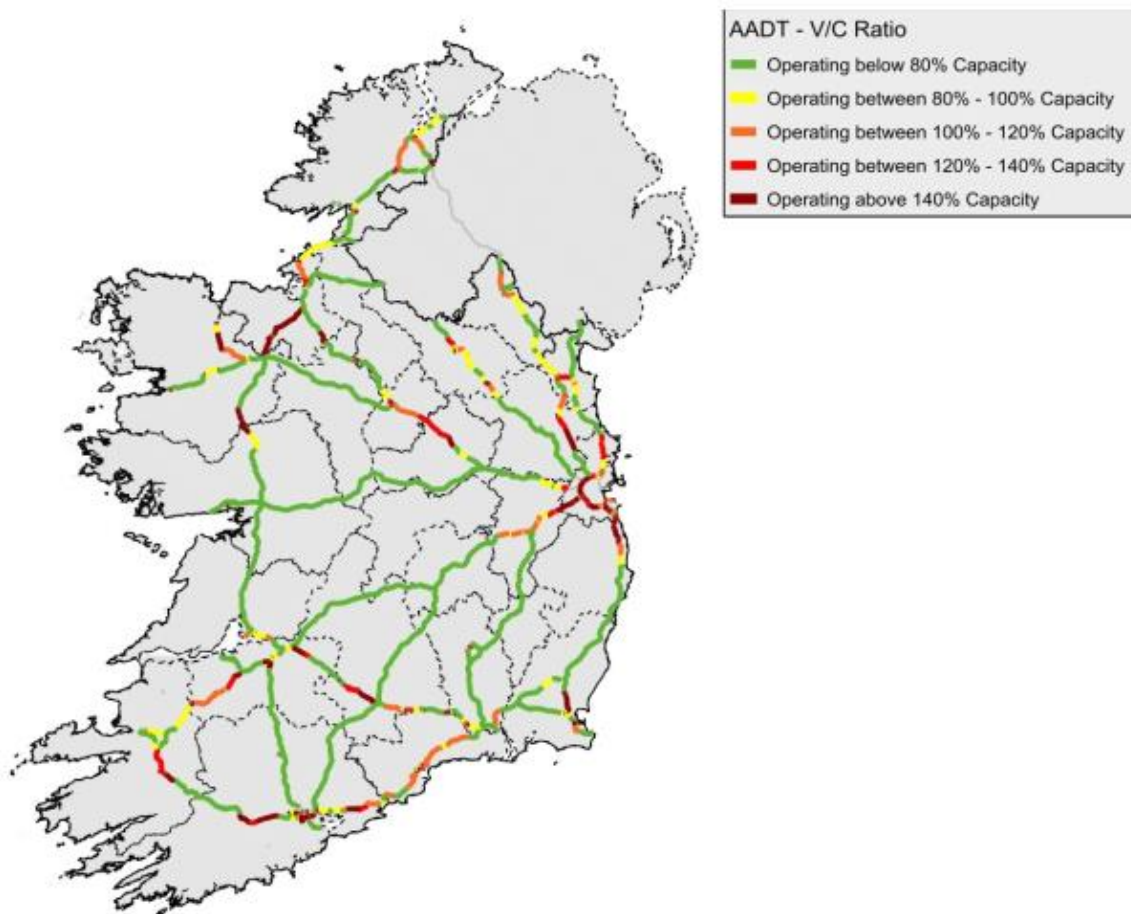


Figure 2-6 - Volume/Capacity on National Primary Network, Do-Minimum Scenario (2040) (NIFTI)

Under section 4.2 of Background Paper 12 (Rural and Regional Accessibility), it recognises the reliance on private cars and land based public transport, further stating the “*provision of suitable roads infrastructure is essential to providing accessibility for inhabitant of rural areas.*” This further highlights that the national road network serves a large part of rural Ireland but the primary purpose is connecting and enhancing accessibility of towns and cities on the interurban network. Section 4.2 also outlines that the Irish road network is amongst the densest in Europe, and so, referring to the estimated population growth projections of the NPF, maintaining accessibility in rural Ireland should involve protecting and renewing existing infrastructure.

2.2.3 Regional Policy Context

Eastern & Midland Regional Assembly Regional Spatial and Economic Strategy (RSES) 2019-2031

There are three regional assemblies in the Republic of Ireland (Figure 2-7), with a main function of identifying regional policies and coordinating initiatives that will support the delivery of national planning policy. The primary driver for these assemblies is the implementation of the Regional Spatial and Economic Strategies (RSES). The RSES provides regional level strategic planning and economic policy in support of the implementation of the NPF and provides a greater level of focus around the National Policy Objectives (NPO) and National Strategic Outcomes (NSO) of the NPF.

While the three regions may differ in some ways, they do not operate in total isolation and there are many complementing and connecting assets shared between the regions. Particularly, the Eastern and Midland and the Northern and Western Regions interaction with Northern Ireland. Due to the strategic national and regional nature of some development proposals, a consistent policy approach to regional and economic planning is an essential tool when assessing future development for Ireland.



Figure 2-7 - Map of Ireland's Regional Assemblies (housing.gov.ie)

Meath and Fingal are situated within the Eastern and Midland Regional Assembly (EMRA), which was established in 2015. This assembly covers nine counties containing twelve local authorities located within the Midland, Eastern and Dublin Regions. The EMRA RSES was published in 2019 and directly supports the NPF.

The growth strategy for this Region is underpinned by a settlement strategy and an integrated land use and transportation strategy which seeks to protect and enhance global connectivity and regional accessibility.

It is stated in the RSES, under Regional Policy Objective 8.8;

“The RSES supports appraisal and or delivery of the road projects set out in Table 8-4 subject to the outcome of appropriate environmental assessment and the planning process.” (RSES, Pg.192)

Furthermore, the N2 Rath Roundabout to Kilmoon Cross upgrade is listed in Table 8-4 as a road project for the region. With respect to RPO 8.8, the N2 Rath Roundabout to Kilmoon Cross upgrades are compliant with the objectives of the RSES.

NTA Transport Strategy for the Greater Dublin Area 2016 – 2035

The NTA has responsibility for preparing a Transport Strategy for the Greater Dublin Area (GDA), alongside the responsibility for preparing the RSES by the Regional Assembly and both must be consistent with each other.

The present Transport Strategy for the Greater Dublin Area 2016-2035 provides a framework for transport infrastructure delivery in the GDA over the next two decades.

The NTA Transport Strategy also provides a clear statement of transport planning policy for the GDA, around which other agencies involved in spatial planning, environmental protection, and delivery of other infrastructure such as housing, water and power, can align their own investment priorities.

It is an essential component, along with investment programmes in other sectors, for the orderly development of the Greater Dublin Area over the next 20 years.

In relation to the road network, the NTA Strategy contains the following objective in relation to the N2:

“Enhancements of the N2/M2 national route inclusive of a bypass of Slane, to provide for additional capacity on the non-motorway sections of this route, and to address safety issues in Slane village associated with, in particular, heavy goods vehicles;”

Given that national transport policy seeks a reduction in the growth in car travel and an increase in the use of public transport, cycling and walking the NTA's Strategy for the GDA sets out a number of guiding principles for road development.

These are to be reflected in the development of individual road projects within the Greater Dublin Area and are listed overleaf:

- That there will be no significant increase in road capacity for private vehicles on radial roads inside the M50 motorway;
- Each proposed road scheme is to be consistent with the NTA's Strategy and with Government policies related to transport;
- That the travel demand or the development needs giving rise to the road proposal are in accordance with regional and national policies related to land use and development planning;
- That the development of the road scheme does not diminish in any significant way the expected beneficial outcomes of the NTA's Strategy;
- That the road scheme, other than a motorway or an express road proposal, will be designed to provide safe and appropriate arrangements to facilitate walking, cycling and public transport provision; and
- That alternative solutions, such as public transport provision, traffic management or demand management measures, cannot effectively and satisfactorily address the particular circumstances prompting the road proposal or are not applicable or appropriate.

For bus infrastructure, the NTA Strategy contains the following objectives in relation to the N2:

“Bus services on the N2 will also be enhanced.”

“A core bus corridor will also be developed through Finglas along the N2, facilitating high frequency bus services.”

Six regional bus corridors have been identified as forming part of the Core Regional Bus Network, one of these follows the M2, via Dublin Port Tunnel, which will serve regional buses from Ashbourne and Slane.

For light rail infrastructure, the NTA Strategy contains the following objective in relation to the N2:

“It is also proposed to extend Luas Cross City further northwards, to serve the Finglas area and a strategic Park and Ride site at the N2/M50 junction.”

Draft NTA Transport Strategy for the Greater Dublin Area 2022 – 2042

The National Transport Authority (NTA) has released the Draft Transport Strategy for the Greater Dublin Area 2022-2042 for consultation. It is noted that at the time of writing this is a draft plan, but this has been considered alongside the Transport Strategy for the Greater Dublin Area 2016-2035 for completeness. The Draft Transport Strategy for the Greater Dublin Area 2022-2042 provides a framework for transport infrastructure delivery in the GDA over the next two decades.

National Roads

There is a clear need to minimise the impacts of increased congestion on the national road network and keep these vital national transport arteries operating satisfactorily at all times in so far as practicable. To facilitate the delivery of the National Planning Frameworks NSO2 (Enhanced Regional Accessibility) and NSO6 (High-Quality International Connectivity) within the GDA, improving the resilience and safety of the national road network in order to maintain its reliability and functionality will be critical.

During the period of the Strategy, it is intended to further manage, develop and enhance the national road network including the delivery of the following projects along the N2:

- N2 Slane Bypass and associated public realm and sustainable transport enhancements in Slane Village;
- N2 Upgrade from the M2 Rath Roundabout to Kilmoon Cross to address safety issues;

This relates to Measure ROAD3 – National Roads Projects:

“It is the intention of the NTA and TII to deliver the national road schemes listed in the Transport Strategy, subject to their appraisal against national and regional policies and objectives.”

Regional Bus Corridors

In relation to bus travel originating outside the Metropolitan Area, it is an aim of the NTA to ensure that the reliability and efficiency of regional bus services is maximised. In order to do so, a degree of bus priority will be sought on the national routes where traffic congestion does or could cause delays to bus/coach services, including on approaches to the M50 and the built-up area of the city. On certain corridors, the priority will then tie-in to that proposed as part of the BusConnects Dublin corridor programme and its expansion.

Seven regional bus corridors have been identified as forming part of the Core Bus Network. One of these is the M2, via Finglas Road, serving regional bus from Ashbourne and Slane plus other locations to the north and north-west.

This relates to Measure BUS11 – Regional Core Bus Corridors:

“It is the intention of the NTA, in collaboration with TII and the relevant local authorities, to continue to provide enhanced levels of bus priority on the Regional Core Bus Corridors, in particular addressing sections where bus delays are caused, or will be caused in the future, by traffic congestion.”

Park and Ride

There is a substantial number of people in regional towns, the rural hinterland and to a lesser extent in the metropolitan area, who do not have ease of access to high quality public transport by walking or cycling.

Appropriately located and designed Park & Ride facilities can enable these people to access public transport and enhance their options to reach a wide range of destinations in a sustainable manner and increase the usage of public transport, thereby maximising the value of investment in existing and new schemes.

Park & Ride can intercept car trips where people are reliant on private car at an early point in their journey thereby reducing the distances travelled by private car with a corresponding reduction in carbon emissions and congestion.

In relation to the N2 corridor, a new bus-based Park & Ride with approx. 350 spaces is proposed south of Ashbourne off Junction 3. This site would be serviced by the existing Ashbourne and Ratoath bus services. Also, a 600 space Luas based Park & Ride has been proposed as part of the Luas Finglas Extension Plan. Once BusConnects has been implemented, a new bus terminus will be operational near the Charlestown shopping centre, potentially leading to a multi nodal transport hub.

These two proposed Park & Ride facilities along the N2 corridor are shown in a regional context in Figure 2-8.

This relates to Measure INT3 – Park & Ride:

“It is the intention of the NTA to secure the development of a network of regional level bus and rail based Park and Ride facilities in the GDA at appropriate locations where the national road network meets, or is in close proximity to, high capacity bus and rail services.”



Figure 2-8 - Park and Ride Strategy for the Greater Dublin Area. (GDA DCNP 2021)

2.2.4 Local Policy Context

The scheme passes through both Meath County Council and Fingal County Council areas, the lead Roads Authority for the project is Meath County Council and the Section 85 agreement allows Meath County Council to exercise all the powers, duties and functions of Fingal County Council in relation to the Project in the functional area of Fingal County Council in accordance with Section 85 of the Local Government Act, 2001 and Section 14 of the Roads Act 1993.

The relevant county development plans (CDP) are highlighted below, for further information relating to a local planning policy level, legislation guidance and land use are detailed in the Constraints Report in Appendix 5 and should be read in conjunction with this document.

It is noted that the compilation of this report straddled the period between the completion of the new Meath County Development Plan review process and the new plan taking effect. Therefore, both the superseded Meath County Development Plan 2013-2019 and the recently adopted Meath County Development Plan 2021-2027 are referenced in this report.

Meath County Development Plan 2013 – 2019 (now superseded)

It is noted that the Meath County Development Plan 2013-2019 (MCDP 2013-2019) is now superseded, but this has been considered in conjunction with the recently adopted Meath County Development Plan 2021-2027 (MCDP 2021-2027).

The overall goal of the transport policy within the MCDP 2013-2019 is:

“To promote and facilitate the provision of the necessary transport infrastructure to fully accommodate existing and future population needs as well as the demand for economic development in an environmentally sustainable manner.”

The relevant references to policies and objectives contained in the MCDP 2013-2019 relating to national road scheme upgrades, including the N2, are summarised below.

TRAN POL 29 - To provide for and carry out improvements to sections of national, regional and county roads that are deficient in respect of alignment, structural condition or capacity, where resources permit, and to maintain that standard thereafter.

TRAN OBJ 10 - To develop and implement, in consultation with the NRA, a programme for the upgrading, improvement and maintenance of the national road network within the county.

TRAN OBJ 14 - To facilitate and secure the provision of the proposed national road schemes in County Meath as set out in the Annual Roadwork's Programme and for which funding is provided by the NRA.

TRAN OBJ 17 - To support, where appropriate, major road improvements, bypasses of local towns and villages and proposed national road schemes by reserving the corridors of any such proposed routes free of developments, which would interfere with the provision of such proposals. Such road schemes include the N2 Rath Roundabout to Kilmoon Cross upgrades.

TRAN OBJ 18 - To upgrade, improve, strengthen and re-align the road network in the County as set out in the Annual Roads Programme for each year of the Development Plan.

TRAN POL 32 - To ensure that all road plans and project proposals in the County which could, either individually or in combination with other plans and projects, have a significant effect on a Natura 2000 site, undergo an Appropriate Assessment in accordance with Article 6 (3) of the EC Habitats Directive.

ED POL 37 - To promote Tayto Park in Curraghera as a flagship family visitor attraction in the county, subject to the normal development management standards. Meath County Council will support and encourage further appropriate development of the integrated tourism product at Tayto Park subject to the provision or upgrade of the requisite physical infrastructure.

FP OBJ 3 - (Framework Plan Area 3) This relates to lands off the N2 and L5018 to the northwest of the Ashbourne Business Park. These lands extend to 30.46ha in area and are identified as one of the 5 key strategic sites for economic development within County Meath with the Economic Development Strategy for County Meath 2014-2022. This area is well located along the route of the main Eirgrid east/west inter-connector between Ireland and the UK, the site is also bisected by both the Aurora Telecom National Network and An Bord Gáis pipeline providing excellent fibre based broadband and power connections.

This Framework Plan Area is shown in Figure 2-9 below. This incorporates land zoned for employment opportunities shaded in pink, as well as land zoned to provide for necessary community, social and educational facilities shaded in red.

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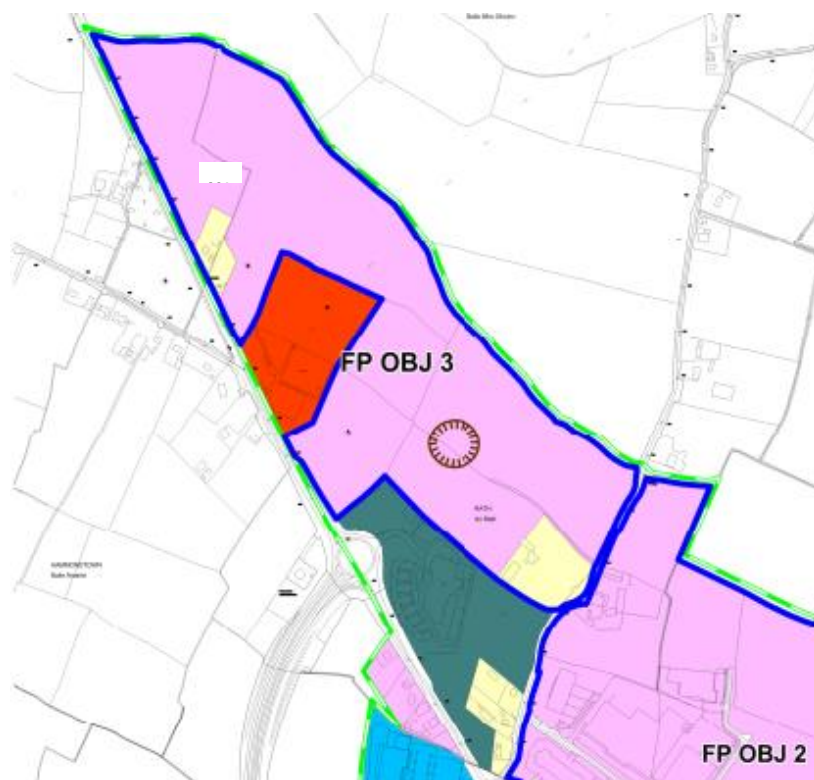


Figure 2-9 - Framework Plan Area (FP OBJ 3). (Meath CDP, 2013-2019)

Meath County Development Plan 2021-2027 (recently adopted)

The Meath County Development Plan 2021-2027 (MCDP 2021-2027) was adopted at a Special Planning Meeting on 22nd September 2021. The MCDP 2021-2027 came into effect on the 3rd November 2021. The recently adopted MCDP 2021-2027 has been considered in conjunction with the now superseded Meath County Development Plan 2013-2019 (MCDP 2013-2019).

The MCDP 2021-2027 states as follows with regards to the N2:

'The N2 corridor functions as a vital cross border economic artery which is essential to facilitate strategic traffic movement and to maintain and improve accessibility to employment areas. The importance of this North-South route and its role in maintaining an "open all island" economy post Brexit is recognised within both the National Development Plan 2018-2027 and the NPF.'

The relevant references to policies and objectives from Volume 1 Written Statement relating to national road scheme upgrades, including the N2, are summarised below.

Chapter 5 Movement Strategy

MOV POL 9 *'To ensure that the design and planning of transport infrastructure and services accords with the principles of sustainable safety, in order that the widest spectrum of needs, including pedestrians, cyclists, the ageing population and those with mobility impairments are taken into account.'*

MOV POL 25 *'To implement the actions of the Meath Road Safety Strategy and promote road and traffic safety measures in conjunction with Government Departments, the Road Safety Authority and other agencies'*

MOV POL 26 *'To provide for and carry out improvements to sections of national, regional and county roads that are deficient in terms of alignment, structural condition or capacity, where resources permit, and to seek to maintain that standard thereafter. To ensure that, where possible, any maintenance and improvement strategies have regard to future climates.'*

Mov OBJ 38 *'To continue to support and facilitate TII, Fingal County Council, Louth County Council and Monaghan County Council in the planning and delivery of upgrades to the N2, as appropriate and to reserve route corridor free from development which would interfere with the delivery of identified schemes, when finalised.'*

Mov OBJ 39 *'To facilitate the delivery of all of the roads projects outlined in the National Development Plan 2018-2027 and National Transport Authority's Transport Strategy for the GDA 2016-2035, in conjunction with the NTA, TII, Department of Transport and other stakeholders. Development of these road projects will be subject to the outcome of the Appropriate Assessment process.'*

Mov OBJ 49 *'To support essential public road infrastructure including, bypasses of local towns and villages and proposed national road schemes and where necessary reserve the corridors of any such proposed routes free of development, which would interfere with the provision of such proposals. Such road schemes include those specified in the non-exhaustive list in Table 5.1: Each of these projects will subject to the outcome of the Appropriate Assessment process.'* An extract from Table 5.1 is shown in Table 2-1.

Table 2-1 - Extract from Table 5.1. (Meath CDP, 2021-2027).

Scheme Name	Description of Works
Slane By-pass (N2)	To deliver key strategic infrastructure including Slane Bypass incorporating new bridge over the River Boyne.
N2 Rath Roundabout to Kilmoon Cross	Improvements of road and junctions to address current capacity constraints.

MOV OBJ 50 'To continue to deliver targeted capacity road upgrades within the County to eliminate congestion blackspots.'

MOV POL 33 'To avoid the creation of any additional access point from new development/intensification of traffic from existing entrance onto national roads outside the 60 kph speed limit, except at the following locations:

N2 at Rath Roundabout to junction of Curragha Road (Map 5.3.7).' Map 5.3.7 is shown in Figure 2-10.

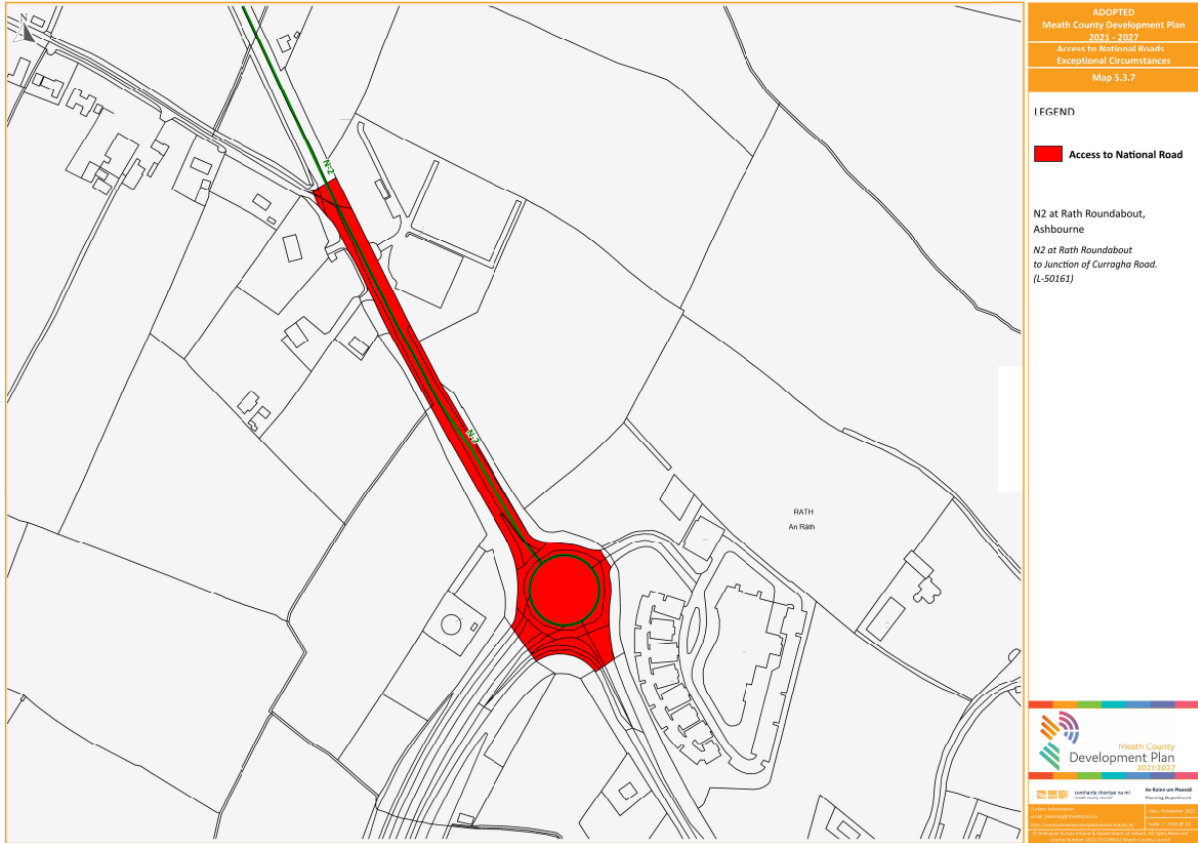


Figure 2-10 - Map 5.3.7. (Meath CDP, 2021-2027).

Ashbourne Local Area Plan 2009 – 2015 (now superseded)

The MCDP 2021-2027 has replaced the Ashbourne Local Area Plan (LAP) 2009-2015, pending the preparation of a new LAP. An extract from Section 5.2 (Economy and Employment) of Volume 2 of the MCDP 2021-2027 has been included below:

'The employment lands to the north of the Rath Roundabout have been identified as one of five strategically important sites for employment in the Meath Economic Development Strategy. These lands benefit from a location along the route of the Eirgrid east/west interconnector in addition to access to an excellent fibre based broadband connection. A Framework Plan has been prepared for these lands. Any planning application shall be developed in accordance with this Framework Plan or a revised/updated Master Plan.'

Master Plan 19 relates to employment and tourism zoned lands with an area of c.30.5ha located off the N2 to the north west of Ashbourne Business Park, as shown in Figure 2-11. This master plan is awaiting preparation.

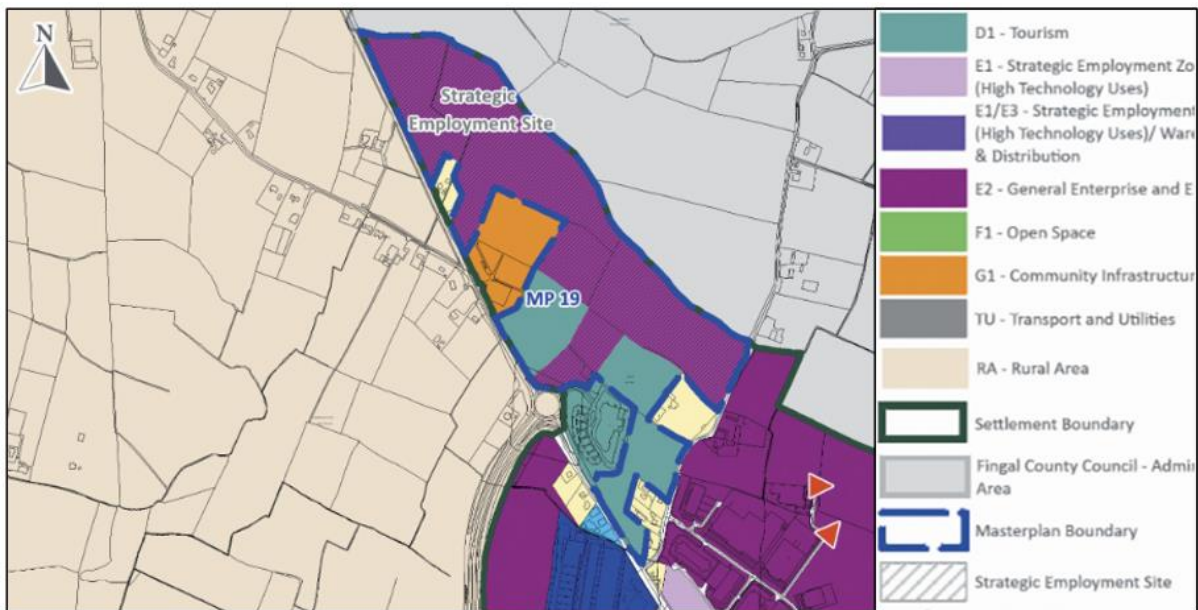


Figure 2-11 - Master Plan 19 (MP 19). (Meath CDP, 2021-2027).

Fingal County Development Plan 2017 – 2023

The Fingal County Development Plan 2017 – 2023 contains the following specific objective in relation to the N2:

Objective MT43 - Support and facilitate the TII, Meath County Council and Kildare County Council in the planning and delivery of the N2 Upgrade north of Ashbourne and a possible link between the M3 and M4.

Further to the objective above, there are also a series of masterplan areas to assist in achieving quality developments across the county. Within these plans there are a number of designated land areas set out. Objective ED90 in the Development Plan states the intention to prepare and/or implement the masterplans in various locations during the lifetime of the plan.

The wider scheme study area sits among several plans which are shown in Figure 2-12 and Figure 2-13 below. There is an area zoned 'High Amenity' (Green) to the west of Garristown and east of the N2. This is shown as an extract in Figure 2-12 below. The zoning objective for this green shaded area is to 'Protect and enhance high amenity areas' and the Zoning Objective Vision seeks to protect such areas from inappropriate development. Lands in this area are designated a highly sensitive landscape and there are a number of objectives to preserve views to the north, south and west of Garristown.

The cyan colour indicates a rural zoning objective to protect and promote in a balanced way, the development of agriculture and rural-related enterprise, biodiversity, the rural landscape, and the built and cultural heritage.

Figure 2-13 is an extract from the Fingal Central Map and includes a purple area zoned 'General Employment', the Zoning Objective Vision for which seeks 'Facilitate opportunities for compatible industry and general employment uses, logistics and warehousing activity in a good quality physical environment. General Employment areas should be highly accessible, well designed, permeable and legible'. This area is identified as a Masterplan Area, requiring a masterplan to be prepared and/or implemented for these lands (MP 3.A). This ties in with the Meath Development Plan extract shown in Figure 2-9 and Figure 2-11.

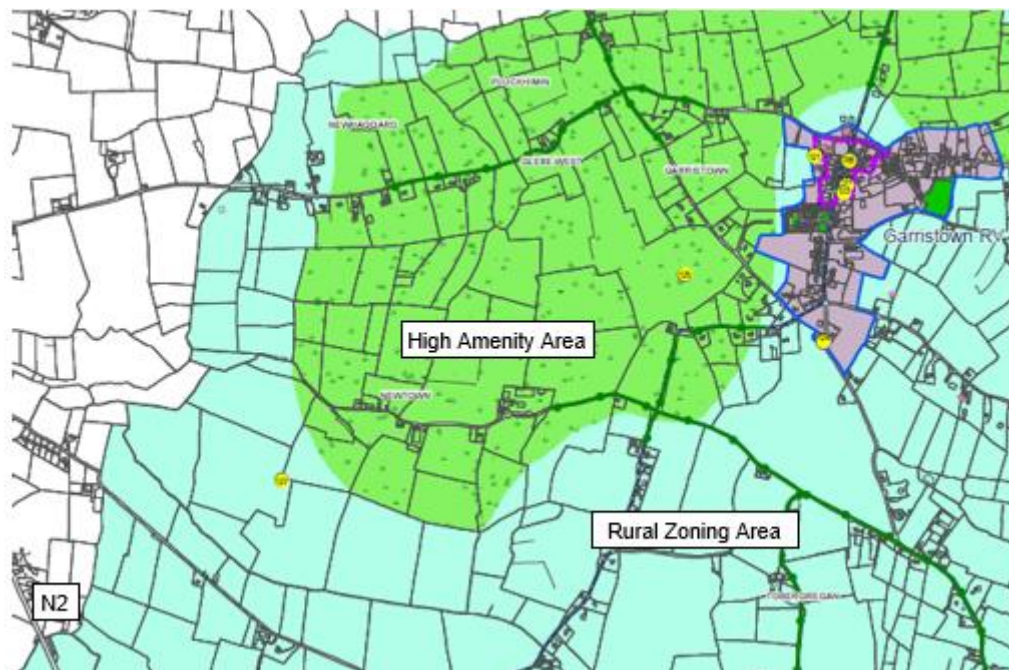


Figure 2-12 - High Amenity Area, Fingal North. (Fingal CDP, 2017-2023)

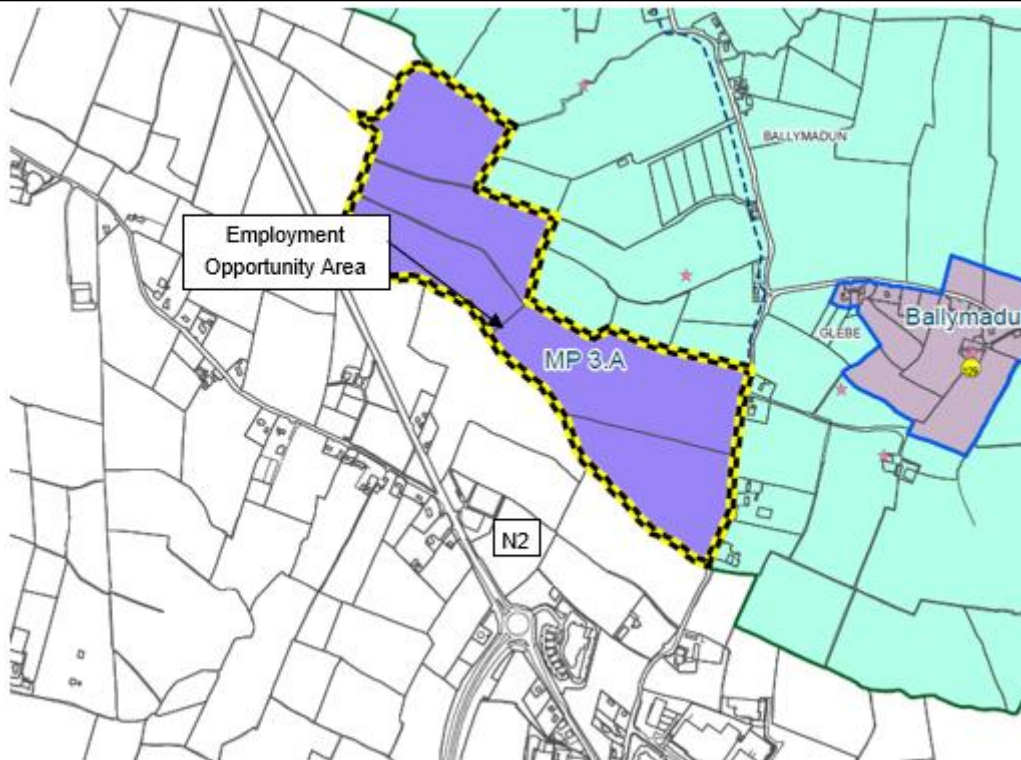


Figure 2-13 - Masterplan Area (MP 3.A), Fingal Central. (Fingal CDP, 2017-2023)

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Dublin Airport Local Area Plan 2020 – 2026

In the Dublin Airport Local Area Plan 2020 – 2026, a Western Access from the M2/N2 corridor is recommended in the context of provision of additional long-term parking facilities expansion in the west, regardless of where any possible future third terminal is provided. This is shown in Figure 2-14.

The relevant objective relating to the Western Access is summarised below.

OBJECTIVE EA05- Provide for a Western Access route to Dublin Airport from the N2 corridor, with consideration being given to the future capacity requirements and development layout of Dublin Airport.

The Fingal County Development Plan 2017 – 2023 also contains the following objective relating to the Western Access as summarised below

Objective SWORDS 13- Facilitate the development of the Swords Western Ring Road (SWRR) linking the R132 (east of the M1 and north of the Lissenhall interchange) to the N2 via the proposed 'Dublin Airport Box' road network.

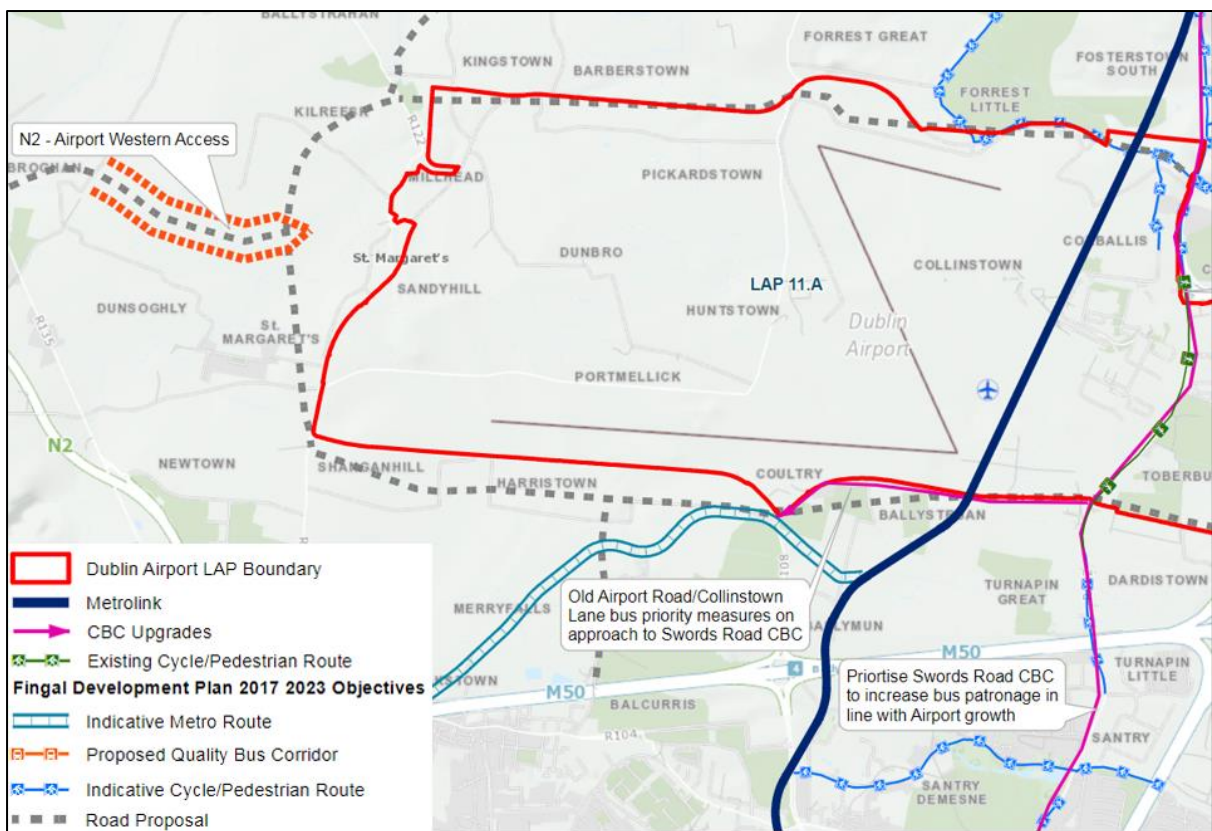


Figure 2-14 - Dublin Airport Surface Access. (Draft Dublin Airport LAP 2020 – 2026).

2.3 Sustainable Development & Climate Change

Sustainable Development is defined by the Brundtland Commission as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

With the expected growth in population, the need to reduce carbon emissions is only going to become more challenging. In 2017, transport contributed to almost a fifth of Ireland’s greenhouse gases. On top of this, air pollution emitted from transportation impacts local air quality and can be harmful to human health. Changes to transport will play an important part in addressing the challenges of climate change.

The most comprehensive and long-term goals for Ireland are contained in the National Planning Framework as part of Project Ireland 2040. The 10 National Strategic Outcomes of the National Planning Framework are aligned with the United Nations (UN) Sustainable Development Goals. There is also a strong link to Ireland’s National Implementation Plan (2018-2020) which is the vehicle driving the implementation of the Sustainable Development Goals across the Irish Government.

United Nations Sustainable Development Goals

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. It has established 17 Sustainable Development Goals (SDGs) illustrated in Figure 2-15.

The SDGs are a call for action by all countries – poor, rich and middle-income – to promote prosperity while protecting the planet. They recognize that ending poverty must go hand-in-hand with strategies that build economic growth and address a range of social needs including education, health, social protection, and job opportunities, while tackling climate change and environmental protection.



Figure 2-15 - Sustainable Development Goals. (United Nations).

TII Sustainability Implementation Plan – Our Future

It is noted that the TII Sustainability Implementation Plan – Our Future is currently a Draft Plan; however, this plan has been considered in relation to the proposed scheme as it outlines TII’s vision towards sustainability. This incorporates leading in the delivery and operation of sustainable transport, enabling networks to drive inclusive growth, create job opportunities, enhance the well-being of all persons including vulnerable groups, strengthen resilience to address climate change, maintain commitment to the environment and continue to prioritise safety.

Six key TII Sustainability Principles have been developed which focus on key priority areas for the sustainable development agenda, these are outlined below. The alignment of the TII Sustainability Principles with the United Nations Sustainable Development Goals is shown in Figure 2-16.

1. Provide effective, efficient and equitable mobility.

Enable compact urban growth and regional accessibility through networks and services that support more efficient journeys, more effective connectivity and increased accessibility.

2. Enable safe and resilient networks and services

Enable safe, secure, accessible and inclusive travel through the provision of transport networks, systems and services that are resilient to future change.

3. Collaborate for a holistic approach

Develop smart and sustainable assets and services through innovating and improving the planning, design, construction, operation and maintenance of the transport network, increasing collaboration and systems-thinking to seek mutual gains and mitigate negative externalities.

4. Deliver end-to-end improvements

Deliver enhanced whole life-cycle value through impact and influence on stakeholders, partners and suppliers.

5. Transition to net zero

Reduce the carbon impact of construction, operation and use of the transport network through responsible use of resources, reuse and repurposing, as well as driving the net-zero transition and enabling customers to make more sustainable choices.

6. Create total value for society

Maintain and enhance the balanced delivery of economic, environmental and social value through robust planning, rigorous appraisal and decisions that prioritise sustainability.



Figure 2-16 - TII Sustainability Principles & SDGs. (Transport Infrastructure Ireland).

Climate Action Plan 2021

The latest *Climate Action Plan (Securing Our Future)* was published by the Government of Ireland in 2021. The objective of the plan is to reduce Ireland's greenhouse gas emissions by 2030 across a number of key areas including Electricity, Buildings, Transport, Agriculture, Enterprise and Services and Waste and the Circular Economy.

The Plan outlines actions that need to be taken across all the key sectors. In Section 15.2 of the Plan, a number of actions are outlined to meet the required level of emissions reduction in relation to the transport sector by 2030, the key measures are summarised below:

- *Provide for an additional 500,000 daily public transport and active travel journeys*
- *Develop the required infrastructural, regulatory, engagement, planning, innovation and financial supports for improved system, travel, vehicle and demand efficiencies*
- *Increase the fleet of EVs and low emitting vehicles (LEVs) on the road to 945,000, comprising of:*
 - *845,000 electric passenger cars*
 - *95,000 electric vans*
 - *3,500 low emitting trucks*
 - *1,500 electric buses*
 - *an expanded electrified rail network*
- *Raise the blend proportion of biofuels to B20 in diesel and E10 in petrol*
- *Reduce internal combustion engine (ICE) kilometres by c. 10% compared to present day levels*
- *Undertake a programme of work which will review progress and further refine measures that will seek to deliver the additional c. 0.9 MtCO₂ reduction by 2030 in a fair and equitable manner*

In addition to reducing GHG emissions, the Climate Action Plan (CAP) also highlights the importance of considering future climate change in the design and assessment of new development, including flood risk and drainage design. This includes increases in severe weather events, increased incidence of flooding and building climate change resilience into new development.

The CAP is fully supportive of the implementation of the NPF and its objectives for regional development and urban growth. In addition, the CAP states that it will continue to deliver on the 10 shared NSO as part of Project Ireland 2040 which includes *Enhancing Regional Accessibility to the North-West*.

Key policies to make growth in Ireland less transport intensive include:

- *The successful execution of the NPF in terms of enhanced designed to promote compact, connected, and sustainable living;*
- *Expansion of walking, cycling and public transport to promote modal shift; and*
- *Better use of market mechanisms to support modal shift.*

In terms of the proposed scheme, a better-connected network for all road users and the eradication of congestion and improvement in safety will deliver on policy to support compact growth, with a focus to encourage a modal shift towards greener travel as well as reducing the amount of greenhouse gases emitted by idling vehicles.

Climate Action and Low Carbon Development (Amendment) Bill 2021

The Climate Action and Low Carbon Development (Amendment) Bill 2021 was enacted in July 2021, the adoption of this bill will support Ireland's transition to reach a climate neutral economy no later than 2050.

The Climate Action and Low Carbon Development (Amendment) Bill 2021 establishes a 2050 net-zero emissions target for Ireland, with the introduction of 5-year, economy-wide carbon budgets starting in 2021. This bill also introduces a requirement to annually revise the Climate Action Plan.

The alignment of the proposed scheme and its associated objectives with future revisions of the Climate Action Plan will therefore be undertaken as the scheme progresses through the next phases of the planning and development process.

2.5 Existing Road Network

The existing N2 between Rath Roundabout and Kilmoon Cross is a 5.5km stretch of National Primary Road, which consists of a single carriageway cross-section with hard shoulders of varying width. A typical cross-section is shown in Figure 2-18.



Figure 2-18 - Typical cross-section along this section of the N2

The existing cross-section of the N2 cannot safely accommodate the volume of traffic that currently uses it. This is further compromised by direct frontage development along the road, including a hotel, a cemetery, service stations, local businesses and numerous residential and agricultural accesses.

The existing road network in the environs of the N2 scheme is illustrated in Figure 2-19. Key roads of interest along with the existing N2 are as follows;

1. R152 towards Duleek, Drogheda and the M1 (Kilmoon Cross Junction)
2. L5038 towards Painestown Hill
3. L5007 towards Garristown
4. R155 towards Curragha and Ratoath (Primatestown Junction)
5. L50161 towards Curragha
6. M2 / R135 towards Ashbourne and Dublin (Rath Roundabout)

The junctions between the existing N2 and the roads listed above are mostly substandard in terms of current geometric design standards.

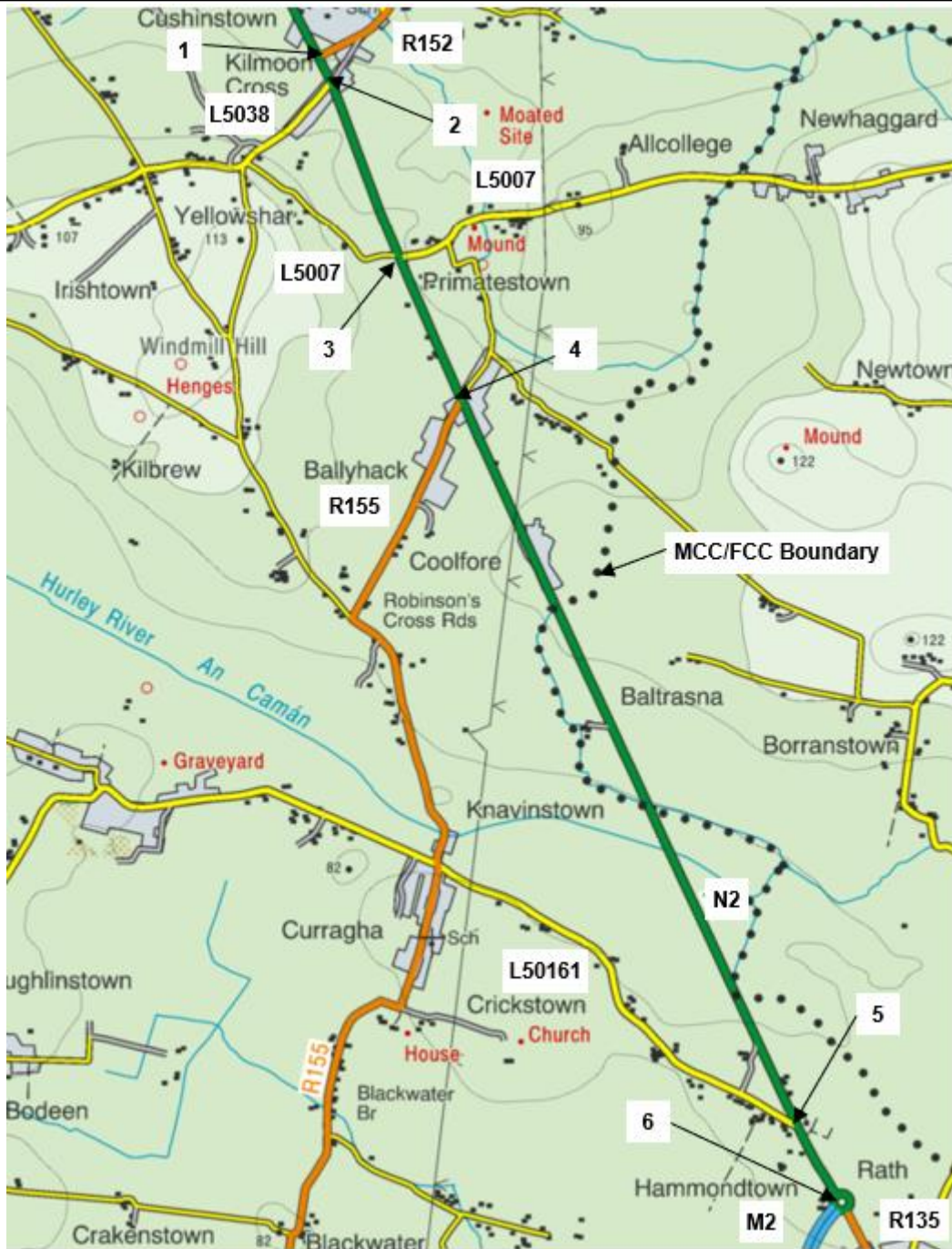


Figure 2-19 - Key existing junctions along the N2

The Rath Roundabout provides a connection between the N2 and the M2 Motorway, which bypasses the satellite town of Ashbourne and provides a direct connection towards Dublin. The current M2 Motorway was originally part of the N2 Finglas to Ashbourne dual carriageway scheme that was completed in May 2006. This is shown under construction in Figure 2-20. The section from Killshane to Ashbourne was later re-designated as a Motorway in 2009.



Figure 2-20 - Rath Roundabout and N2 Finglas to Ashbourne Road under construction

Since 2006, works along this section of the N2 have been relatively minor. The most significant of these has been the introduction of traffic signals at the junction of the N2, R155 and L5008 at Primatestown. These signals came into operation on 16th December 2009 following a safety review of the junction operation and driver behaviour. The location and layout of this junction can be seen in Figure 2-21 and Figure 2-22.

The significant demand on the R155 coupled with the high traffic volumes on the N2 have resulted in this junction adding to the overall delays and contributing to the inability of the N2 to deliver the level of service required for a national primary road. During peak times there are long tailbacks from Primatestown which extend north of Kilmoon Cross and along the R152 in the morning peak, and on to the M2 motorway in the evening peak period. These can result in delays of up to 20 minutes.



Figure 2-21 - Existing Primarestown Junction Location.



Figure 2-22 - Existing Primarestown Junction Layout. (Facing North towards Slane).

2.6 Existing Traffic Conditions

2.6.1 Private Cars & Heavy Goods Vehicles

The functionality of this section of the N2 is compromised as the volume of traffic using it is well in excess of its capacity during peak hours. The National Traffic Model shows that there is a steady increase in traffic along the N2 as it moves south towards Dublin from Slane. Most of this traffic joins the N2 at the intersections with regional roads including the R153, R150 and R152 which bring traffic from Navan, Duleek and Drogheda respectively.

Information from the Transport Infrastructure Ireland (TII) traffic counter located on the N2 between the Rath Roundabout and the Primatestown junction (at Crickstown) also demonstrates that current traffic flows are significantly beyond the recommended level for a road of this type.

This stretch of single carriageway saw circa 16,250 AADT² in 2019, with 8.4% Heavy Goods Vehicles (HGVs) as shown in Figure 2-23. The average annual workday 24hr traffic flow in 2019 was approximately 17,700 with maximum daily flow reaching 19,970 in June 2019. The proportion of HGV traffic is high in comparison to other roads with similar cross section, thereby creating concerns with regards to the safety of other road users. HGVs have slower acceleration and turning movements which can create a hazard for other vehicles when merging or diverging at a junction. HGVs also have stopping distances of up to 50% further than a car in similar conditions. Blind spots directly in front of the vehicle, on the sides and the rear also create significant risks for vulnerable road users in particular, such as pedestrians and cyclists.

As per the TII Standard DN-GEO-03031 Rural Road Link Design Table 6.1, the capacity guidance for a single carriageway road is 11,600 AADT³. The TII National Road Network Indicators 2019 (NRNI 2019) show that the road operated at between 100-120% of its capacity.

Analysis of available traffic turning counts (TII study from June 2018) at the Kilmoon Cross junction between the N2 and the R152 at the northern end of the study area indicate that approximately 50% of the circa 1,700 vehicles/hour travelling on the N2 during AM and PM peak hours enter / exit the N2 at this junction.

Weekend traffic was typically in the region of 10,000 to 14,500 AADT along this section of the N2 in 2019 (TII Traffic Data), with Saturdays the busiest day. During the summer months (May-September) weekend traffic flows rose as high as 15,741 AADT. A large proportion of these figures at the weekend can be attributed to visitors to Tayto Park which illustrates the popularity of the facility as a major attraction in the region.

Figure 2-24 illustrates the annual average hourly flows along this section of the N2 on weekdays (Monday to Friday) in 2019 (TII Traffic Data). This figure clearly shows well defined morning and evening traffic peaks, particularly in a southbound direction at the AM Peak, and in a northbound direction at the PM Peak. This corresponds roughly with commuter traffic heading to and from Ashbourne and the Greater Dublin Area over the course of an average weekday.

² Annual Average Daily Traffic (2-way flow)

³ General Guidance for Type 1 Single Carriageway as per DN-GE0-03031

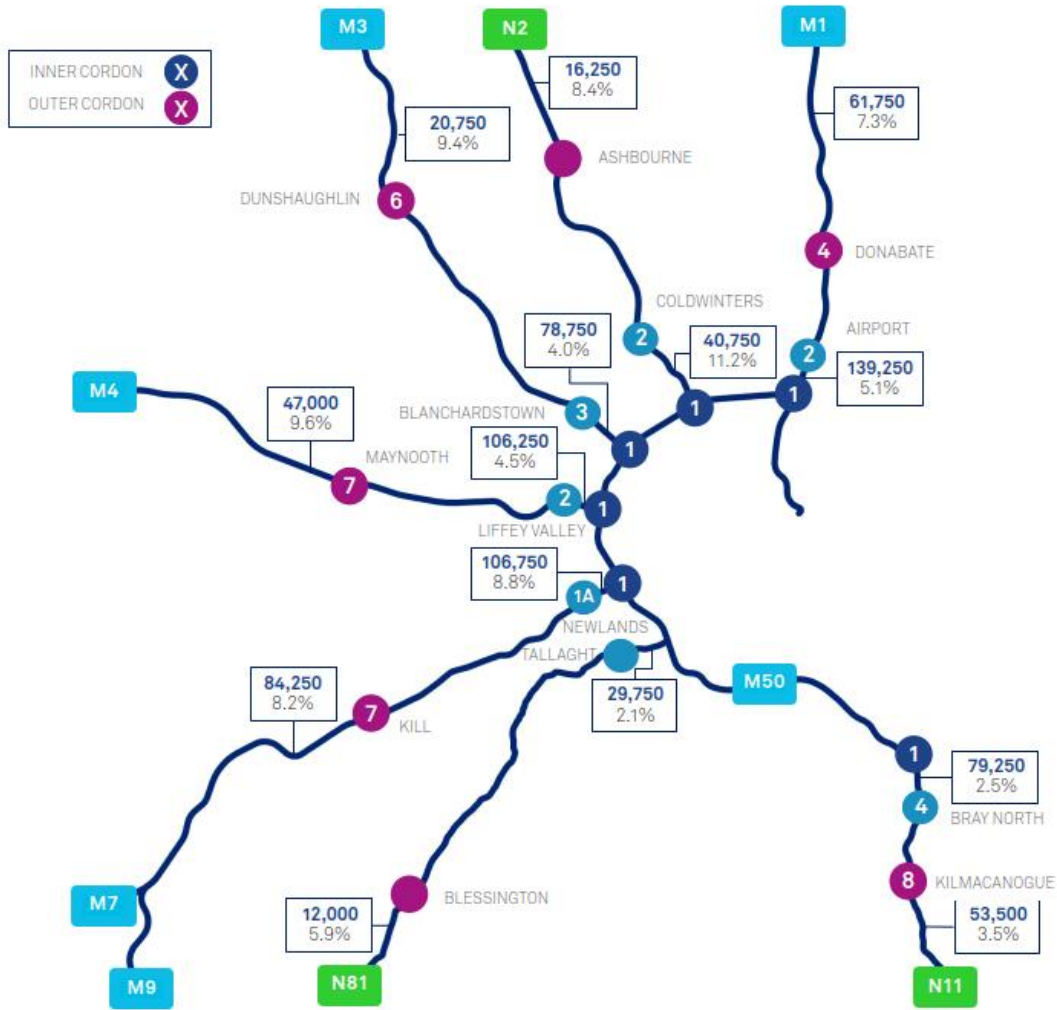


Figure 2-23 - 2019 Annual Average Daily Traffic (%HGV) on Dublin Radials. (TII National Road Network Indicators 2019).

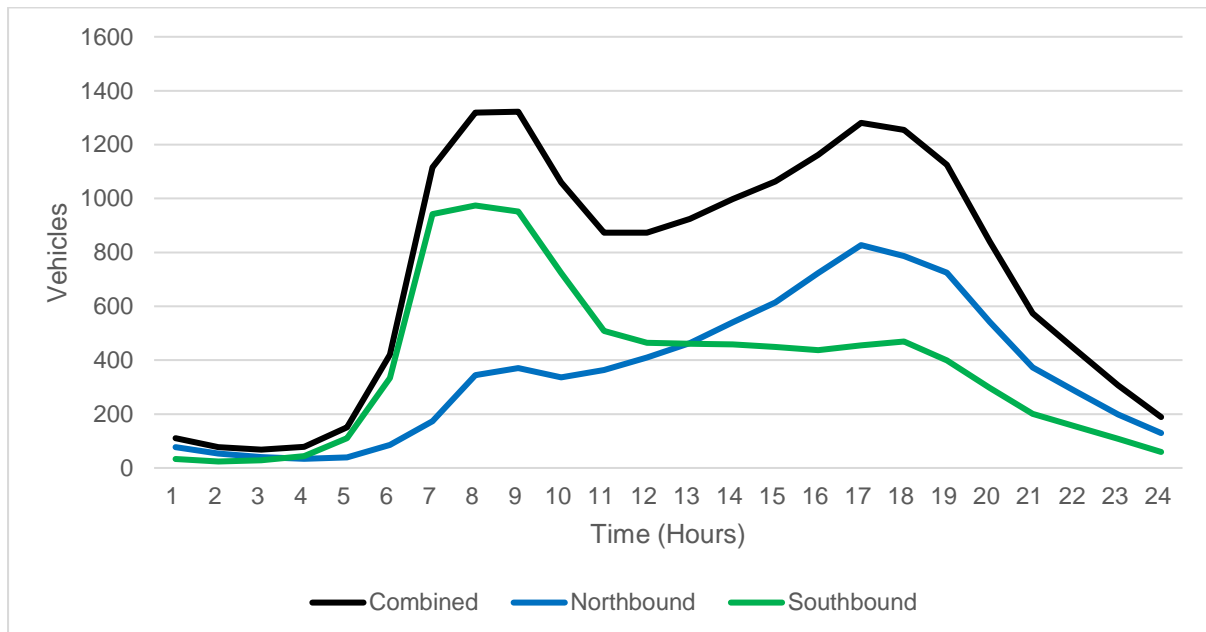


Figure 2-24 - Weekday Average Traffic Flows by Hour, 2019. (TII Traffic Data)

2.6.2 Public Transport

Efficient road based public transport services are dependent on high-functioning National Roads to meet growing customer requirements. Nationally, bus patronage has increased from 141 million trips in 2013 to 177 million in 2018, an increase of 25%. Development of the National Road network has facilitated this growth in road based public transport operations and improved service levels.

Table 2-2 below shows the number of inbound bus and coach services using the N2/M2 corridor on a typical weekday based on data from the National Transport Authority (NTA).

Table 2-2 – Average Weekday Number of Inbound Bus and Coach Services in 2018 (NTA)

Corridor	Dublin Bus	Bus Eireann	Commercial*	Total
M2	0	83	32	115

*Includes Bus Eireann and Dublin Bus Commercial services such as Airlink (No Public Subsidy)

In passenger terms these bus services cater for nearly 1.2 million bus passenger trips per annum (2018 values). In comparison, the M1 caters for nearly 8 million bus passenger trips per annum largely due to the higher population living along the M1 corridor. This is also due to the connectivity the M1 provides between the two largest cities on the island of Ireland, Dublin and Belfast, as well as the busiest international airport in Ireland just north of Dublin. The M3 on the other hand caters for nearly 2 million bus passenger trips per annum.

However, improvements to the journey times and reliability of the N2 corridor would likely lead to an increased mode share for buses along the corridor, thereby encouraging the use of sustainable more environmentally friendly modes of transport. Bus occupancy surveys were carried out on this section of the N2 in December 2019, the number of bus passengers from these surveys are shown in hourly groupings in both a northbound and southbound direction in Figure 2-25.

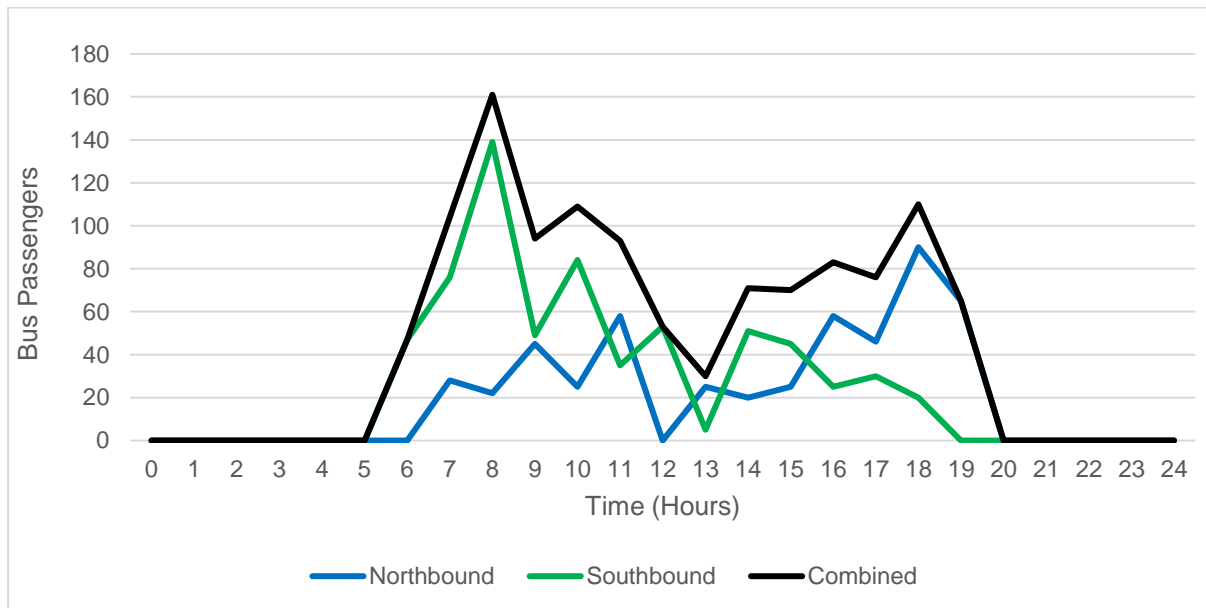


Figure 2-25 – Number of Bus Passengers. (Surveys undertaken in December 2019.)

2.6.3 Vulnerable Road Users

Traffic surveys undertaken as part of the scheme provided levels of traffic for 2-wheeled vehicles, which included both cyclists and motorcyclists. Figure 2-26 illustrates the annual average hourly flows for Motorcycles / Bicycles along this section of the N2 on weekdays (Monday to Friday) in 2019.

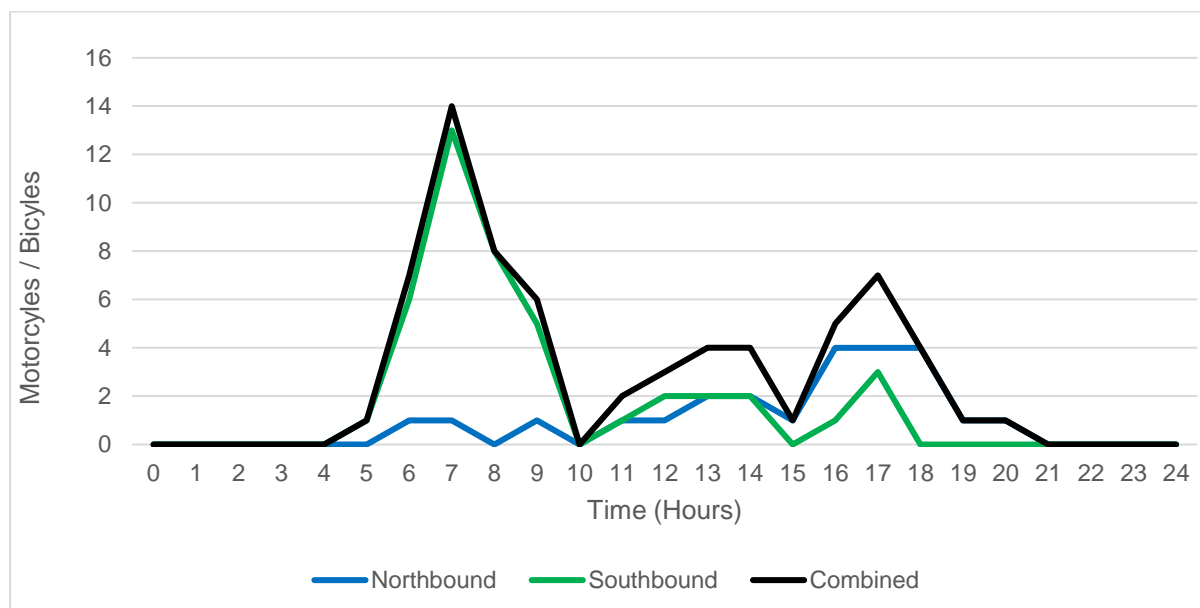


Figure 2-26 - Weekday Average Traffic Flows for Motorcycles / Bicycles, 2019. (Surveys undertaken in December 2019.)

It is noted that motorcyclists, whilst being vulnerable in their own way, use the road differently and have different needs to cyclists. However, due to the nature of the ATC surveys which were undertaken, this data does not differentiate between different types of 2-wheeled vehicles.

In terms of the hourly flows presented in Figure 2-26, these should be carefully considered for cyclists in particular. This is because there is likely to be a suppressed demand due to a lack of cycling facilities and high vehicle flows, including a high proportion of HGVs, along the existing N2. Overall, this creates a poor ambience and significant safety risks for cyclists, particularly for beginner and recreational cyclists.

It should be noted that no data was collected for pedestrian movements as part of these surveys, although due to the lack of existing infrastructure, pedestrian movements along this section of the existing N2 are relatively uncommon.

It is noted that significant traffic volumes use the surrounding local road network during peak periods to avoid congestion on the existing N2, particularly around the signalised junction at Primetown Cross. This, combined with the narrow road cross-section of these local roads, also presents a safety risk to both pedestrians and cyclists and likely further suppresses demand for these sustainable travel modes.

Overall, a lack of facilities for pedestrians and cyclists is inhibiting the modal choice of local people in the study area. Sustainable travel modes, particularly walking and cycling, are not viewed as safe options for short journeys due to the safety risks associated with these travel modes, including high traffic volumes on the existing N2 and surrounding local roads. This can lead to significant accessibility issues for local people in the area who do not have access to a private car, particularly for children accessing the local schools, such as Scoil Naomh Cianain in Cushinstown.

In summary, the suppressed demand for sustainable travel modes results in an overreliance on the private car for short journeys. The combination of both long distance and short distance trips by private car on this section of the existing N2 further exacerbates congestion during the peak periods, particularly at the junction locations along this section of the National Primary route.

2.6.4 Historical Growth of Traffic

Traffic levels along this section of the N2 have been steadily increasing over the last decade, in part due to population and economic growth in County Meath as well as the Greater Dublin Area. This is summarised in Figure 2-27. This trend is set to continue with future growth forecasted in the region, as a result the existing congestion issues along this section of the N2 will be exacerbated in years to come in a Do-Nothing scenario.

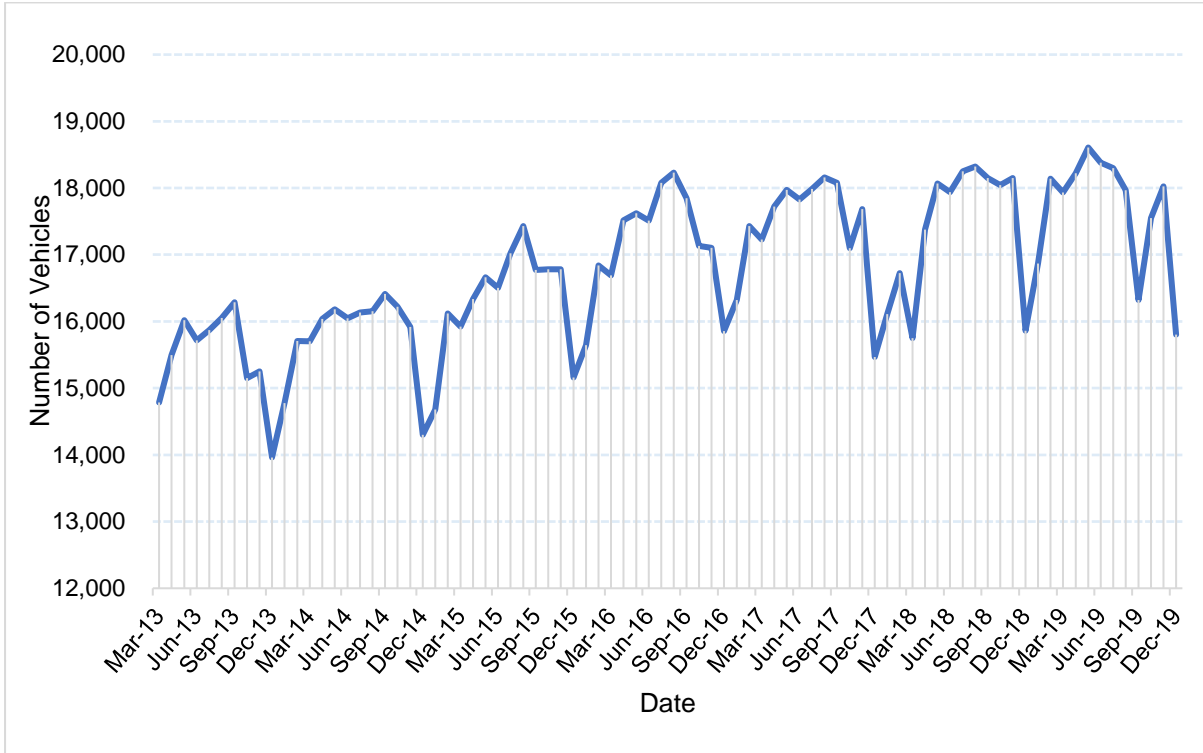


Figure 2-27 - Weekday Average Traffic Flows, 2013-2019. (TII Traffic Data).

2.7 Existing Congestion

2.7.1 Journey Time Reliability

The result of the high volumes of traffic is significant congestion during peak hours as drivers experience increasingly long delays. In the morning peak, queues of traffic from the N2/R155 junction can extend north of the N2/R152 junction at Kilmoon. Meanwhile in the evening peak, long slow-moving tailbacks can extend from the N2/R155 junction at Primatestown, for approximately 4km as far back as the main carriageway of the M2 motorway south of the Rath Roundabout.

Google API data was used in December 2019 to estimate the average journey times across a typical weekday northbound and southbound along this section of the N2. API data was used as it helped demonstrate the variation in journey times on any given day on this section of the road. Traffic Survey data only gave journey times for a specific day. API data provided an improved set of journey time data. The data was divided across different time periods as shown in Table 2-3 to see how journey times were affected at peak times.

Table 2-3 – Study Time Periods (Google API)

Interval	Time - From	Time - To
AM Peak	07:15:00	08:15:00
Inter-peak	12:00:00	14:00:00
PM Peak	16:45:00	17:45:00
Off Peak	00:00:00	04:00:00

The Google API data was then analysed based on these time intervals to estimate the journey times from Rath Roundabout to Kilmoon Cross in a northbound direction and then from Kilmoon Cross to Rath Roundabout in a southbound direction.

The results of this are shown in Figure 2-28. From this the delays to journey times in a southbound direction at the AM Peak, and in a northbound direction at the PM Peak are clearly defined. The journey times for these peak tidal flows along this 6km section of the existing N2 are generally in excess of 12 minutes. Following initial assessments, these delays equate to an average speed of less than 30km/h along this section of the N2 at peak times.

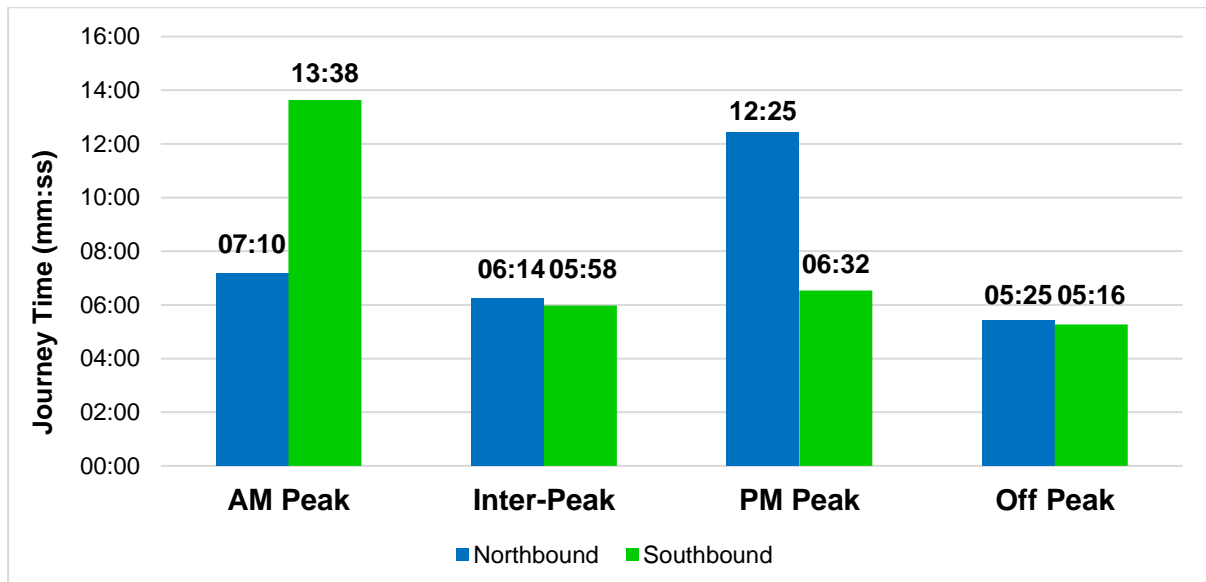


Figure 2-28 - Weekday Journey Times along the N2, December 2019. (Google API Data).

2.7.2 Impacts of Congestion

The significant levels of congestion along this section of the N2 result in a multitude of negative socio-economic and environmental impacts.

Air pollution and noise from vehicles can lead to the deterioration of health and wellbeing. Congestion results in longer journey times and poor journey time reliability, which can lead to a reduction in accessibility to employment, education and healthcare facilities. This ultimately leads to social exclusion as well as a reduction in potential investment and growth opportunities for the surrounding area and wider region.

Traffic congestion on roads not only increases the fuel consumption but consequently leads to an increase in carbon dioxide emissions, air pollution as well as an increase in the exposure time of the passengers. The provision of a more efficient transport network will assist in greater operational efficiencies as the regional population increases and improves economically, thereby facilitating the sustainable development of the region.

On this basis, improvements along this section of the N2 will be compatible with the Climate Action Plan 2021 (and Climate Action and Low Carbon Development (Amendment) Bill 2021) through the removal of existing delays and congestion and by supporting more efficient transport generally in the surrounding region.

In terms of modal share, high traffic levels can increase the risk of collisions for pedestrians and cyclists which subsequently reduces the uptake of active travel modes and levels of physical activity. Moreover, road based public transport requires high quality roads to deliver an attractive service. The existing N2 is causing significant reliability issues for bus services and additional operational costs due to congestion related delays. This is reducing the attractiveness of buses for existing car users.

2.8 Existing Road Safety

This section of the N2 has not been built to current TII Design Standards and there are a significant number of roadside hazards lining the route, with numerous utility poles, trees, boundary walls and drainage ditches located immediately adjacent to the carriageway.

The collision rates for 2014-2016 from the Road Safety Authority (RSA) are shown in Figure 2-29. These are the latest datasets that have been released by the RSA at the time of writing. As can be seen, the collision rates vary along this section of the route. Between just south of the Primatestown junction and Kilmoon Cross junction, the road is either above or twice above the expected collision rate. The remainder of the southern section of the route is below or twice below the expected rate.



Figure 2-29 - Collision Rates 2014-2016. (Road Safety Authority)

A breakdown of collisions along this section of the existing N2 from the Road Safety Authority (RSA) for the wider 2008-2016 period is shown in Figure 2-30. The current M2 Motorway was originally part of the N2 Finglas to Ashbourne dual carriageway scheme that was completed in May 2006, so this has been in place during the entirety of the period shown.

During this 2008-2016 period, works along this section of the N2 have been relatively minor, the most significant of these has been the introduction of traffic signals at the junction of the N2, R155 and L5008 at Primatestown. These signals came into operation on 16th December 2009 following a safety review of the junction operation and driver behaviour. This introduction of traffic signals can be identified in Figure 2-30, from the years 2008 to 2010, where there has been a notable reduction in the frequency and severity of collisions.

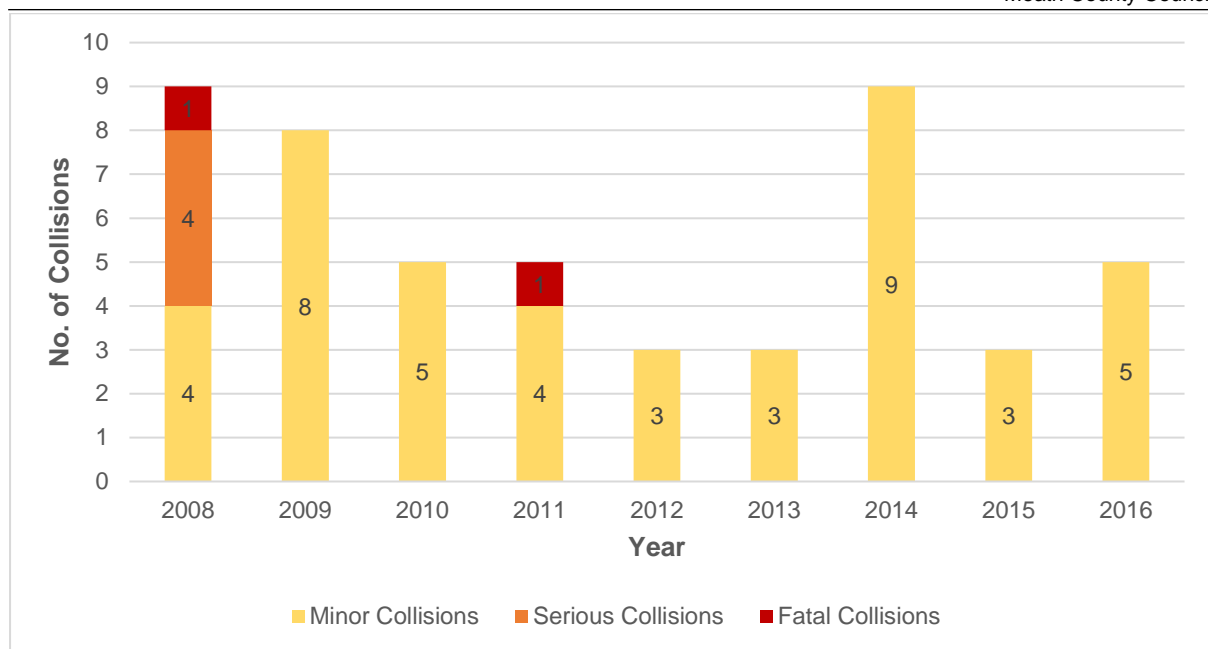


Figure 2-30 - Collision Data Breakdown 2008-2016. (Road Safety Authority)

The locations for the collisions over the 2008-2016 period from the Road Safety Authority (RSA) are shown in Figure 2-31. As can be seen, the collision locations vary along this section of the route, with a higher frequency and severity of collisions along the section of the N2 between Primatestown Cross and Kilmoon Cross. This particular section appears to be more dangerous from a road safety perspective in comparison to the section south of Primatestown.

The two fatal collisions which occurred on this section of the N2 during this period were located within proximity to the Primatestown Cross and Kilmoon Cross junctions. The serious collisions during this period occurred at Kilmoon Cross, as well as other minor junctions including the intersections with the L5007 (Phibblestown Wood) and the L50161 (Old Curragha Road).

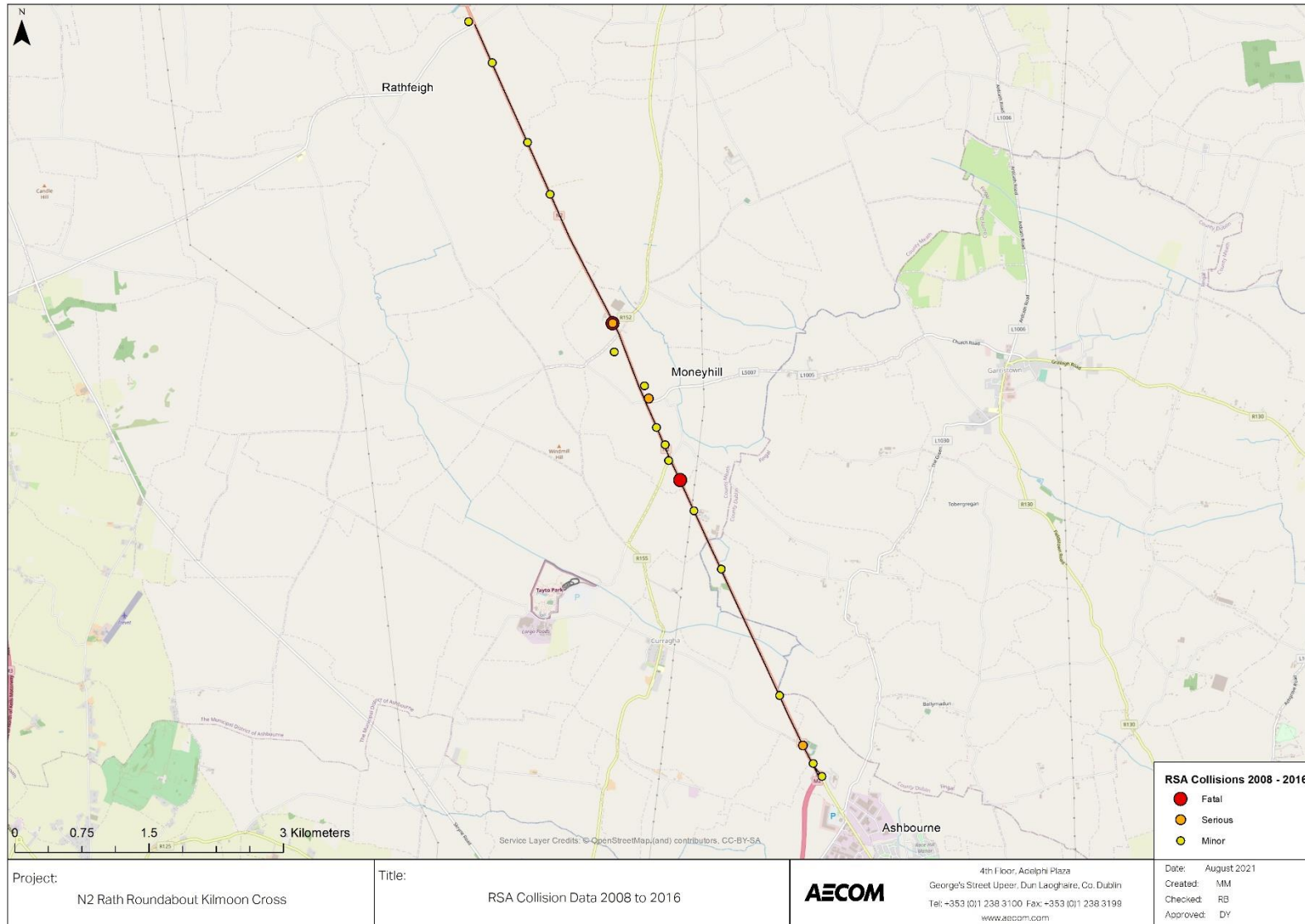


Figure 2-31 - Collision Data Locations 2008-2016. (Road Safety Authority)

Two high collision locations have been identified along this section of the N2 as per the TII Network Safety Analysis Guidance (GE-STY-01022):

- N02MH_021.2 Primatestown – Majority of collisions appear to involve rear-end straight collisions on the N2 approaches to the Traffic Lights, particularly the northbound approach. It is thought that the approach speeds to the signalised junction may be too high.
- N02MH_023.0 Cushinstown – Collisions appear to be associated with drivers waiting to exit or enter the N2 at the junctions misjudging the speed of approaching vehicles or taking chances to take a gap in the heavily trafficked N2 at this location.

It is noted that the national parameters in the TII Project Appraisal Guidelines Unit 6.11, Table 23 for a single carriageway road with a speed limit greater than 60 kph has a collision rate of **0.08 PIC/mvkm**⁴. Furthermore, looking at the collision data from 2020, over 70% of fatal road collisions occur on rural roads where the speed limit is greater than 80 kph. The RSA Road Collision Fact Book 2012 indicates that County Meath has **0.07 PIC/mvkm** and that the N2 average collision rate nationally is **0.10 PIC/mvkm**.

Based on the RSA data from 2005 – 2013 the collision rate for this section of the N2 is **0.15 PIC/mvkm**. This is 50% higher than the national average value for the N2 route, 88% higher than the value given for a 2 Lane Single Carriageway with speed limit greater than 60 kph in the TII Project Appraisal Guidelines Unit 6.11 and 114% higher than the average value for County Meath.

There are currently no provisions for Non-Motorised Users on this section of the N2, which offers poor security for vulnerable road users. RSA data shows only one collision since 2005 involving a bicycle. Rather than indicating a low risk for pedestrians and cyclists, this is more reflective of a suppressed demand for active travel modes along this section of the N2 due to the lack of segregated facilities, as cyclists are unlikely to use the existing road due to safety concerns.

This suppressed demand for active travel modes is also apparent in the traffic survey data where NMU counts were very low along the route. Survey numbers also show that HGV numbers are also high (8.4% in 2019) on this road which is likely to further discourage NMUs from using the route.

⁴ *Personal Injury Collision per 1 million vehicle kilometres*

2.9 Project Objectives

The objectives of the scheme are based on multiple criteria headings outlined by the Department of Transport, Tourism and Sport's 'Common Appraisal Framework for Transport Projects and Programmes (March 2016)'.

The multi-criteria heading are as follows:

- Economy.
- Safety.
- Environment.
- Accessibility & Social Inclusion.
- Integration.
- Physical Activity.

2.9.1 Economy

The N2 is a strategically important National Primary Road providing links between Dublin and Derry/the northwest and to Dublin Airport and Dublin Port. The section of the N2 between the Rath roundabout to Kilmoon Cross is a single carriageway which is currently above capacity during peak periods on this corridor with circa 16,250 annual average daily traffic. Approximately 8% of this traffic is classified as Heavy Goods Vehicles.

The key economic objectives for this scheme include:

- To reduce journey times, improve journey time reliability and to improve the efficiency on the N2 corridor for all road users, including road based public transport.
- To support the economic performance of the wider region through the provision of improved transport infrastructure for all road users, including road based public transport which will reduce the cost of travel for communities, businesses, visitors and tourists and assist in reducing the overall cost of production thereby improving competitiveness.

2.9.2 Safety

As noted previously the section of the N2 between the Rath roundabout to Kilmoon Cross is an un-engineered road and there are a significant number of road side hazards and a higher than expected collision rate as identified in 2 high collision locations as per the TII Network Safety Analysis Guidance (GE-STY-01022) within the 5.5km length of the existing route under review.

The key safety objectives for this scheme include:

- To reduce the collision rate along the National Road network between Rath roundabout and Kilmoon Cross to below the national average rate.
- To reduce the severity of collisions along the National Road network between Rath roundabout and Kilmoon Cross.
- To improve safety for all road users, including pedestrians, cyclists and public transport users along both the National Road network, and on the surrounding road network between Rath roundabout and Kilmoon Cross.
- To support the RSA Road Safety Strategy 2021 – 2030.

2.9.3 Environment

Previous journey time reviews carried out on the existing section of the N2 under consideration identified significant capacity issues at peak times as a common impact on journey times along the route. In addition, the number of closely spaced junctions causes vehicles to travel at low speeds, queue and

start/stop regularly. All these impacts culminate in reduced driving efficiency generating higher emissions, inefficient fuel usage and poorer air quality.

The key environmental objectives of the scheme include:

- To minimise the impact of greenhouse gas emissions.
- To improve air quality in the various settlements along the corridor.
- To reduce the level of noise in the various settlements along the corridor.
- To minimise the impacts on the significant positive landscape and visual quality of the surrounding area.
- To minimise the potential impacts on local watercourses.
- To support the delivery of the Climate Action Plan.
- Preserve the vibrancy of existing local communities.

2.9.4 Accessibility & Social Inclusion

The scheme will upgrade a vital link between Dublin and the northwest of the country, including Northern Ireland. The upgrade of this section of the N2 is identified as being a key part of achieving a Strategic Outcome of the National Planning Framework in relation to Enhanced Regional Accessibility and the upgrade of this section of the route will enhance accessibility to Dublin Port and the International Gateway at Dublin Airport.

The key objectives of the scheme in relation to accessibility and social inclusion are:

- To improve accessibility to key facilities, such as employment, education and healthcare for all N2 road users, but in particular vulnerable groups.
- To reduce travel costs in the region and thereby encourage and support investment and employment in the wider region.
- To support the accessibility and social inclusion objectives of national, regional and local planning policy.
- To improve road based public transport journey time and journey time reliability.
- To improve connectivity to Dublin Airport.

2.9.5 Integration

The planning for the scheme will take cognisance of other elements of government policy and infrastructure investment to ensure that the scheme is integrated towards achieving a common goal. The key integration objectives include:

- To improve connectivity on the national road network.
- To be compatible with adopted land use objectives.
- To support the integration objectives set out in European, National, Regional and Local Planning policy.
- To support the NTA Strategy for the Greater Dublin area, which aims to enhance bus services on the N2 corridor through improvements to the N2 Core Regional Bus Network serving Ashbourne and Slane.
- To consider the potential for bus-based park and ride locations close to the N2 corridor.

2.9.6 Physical Activity

To enable the National Strategic Outcomes from the National Planning Framework, particularly around decarbonising the transport system and delivering compact growth, a significant shift from low-occupancy private vehicles to more sustainable modes of travel will be required. As part of the scheme, facilities for pedestrians and cyclists will be implemented to increase the uptake of active travel modes for short journeys within the study area. As well as delivering benefits in terms of carbon reduction, the associated physical activity will generate an array of social benefits in terms of improved physical health and mental wellbeing. The key physical activity objectives include:

- To deliver infrastructure that supports low-carbon transport systems and emission reductions.
- To provide segregated facilities for pedestrians and cyclists to link local areas to Ashbourne and beyond.
- To improve the amenity value of the existing N2 corridor and provide a safe environment for vulnerable road users.
- To facilitate the uptake of active travel modes and reduce the overreliance on private cars for short journeys.

2.10 Summary

2.10.1 Strategic Fit and Priority

In a regional context, the road between Rath Roundabout and Kilmoon Cross forms part of the N2 National Primary route from Dublin (including the port and airport) to the north-west border area via counties; Meath, Louth, and Monaghan.

Several other road improvement schemes are identified along the overall N2 corridor in the National Development Plan 2021-2030 (NDP 2021-2030). These include the following:

- N2 Slane Bypass and Public Realm Enhancement Scheme
- N2 Ardee to Castleblayney
- N2 Clontibret to Border

2.10.2 National, Regional and Local Policy

From the policy documents set out in Section 2.2 above, the following conclusions can be drawn:

- The upgrade of this section of the N2 would support the Strategic Outcome of the National Planning Framework in relation to Enhanced Regional Accessibility;
- The upgrade of this section of the N2 is identified as being a Strategic Investment Priority in the National Development Plan;
- The upgrade of this section of the N2 is an objective of the now superseded Meath County Development Plan 2013 - 2019, the recently adopted Meath County Development Plan 2021 – 2027 and the Fingal County Development Plan 2017 - 2023;
- The upgrade will help to reduce the number of dangerous collisions along this section of road which in turn will reduce the amount of serious injuries along the road;
- Improved connectivity for non-motorised road users will encourage a modal shift towards active travel for short distance trips, this in combination with reduced queueing times for all road users will reduce the operational greenhouse gases emitted by vehicles along this section of road;
- The upgrade will result in enhanced capacity along this non-motorway section of N2.

2.10.3 Sustainable Development & Climate Change

The proposed scheme will align with the six key TII Sustainability Principles, these are outlined below.

1. Provide effective, efficient and equitable mobility.
2. Enable safe and resilient networks and services
3. Collaborate for a holistic approach
4. Deliver end-to-end improvements
5. Transition to net zero
6. Create total value for society

The proposed scheme will also align with the measures in relation to the Climate Action Plan 2021. The alignment of the proposed scheme and its associated objectives with future annual revisions of the Action Plan will also be undertaken as the scheme progresses through the next phases of the planning and development process, in accordance with the Climate Action and Low Carbon Development (Amendment) Bill 2021.

2.10.4 History of the Road Network

This section of the N2 was originally constructed as part of a Turnpike Road in the late 18th century, as a means of charging people travelling to and from Slane and Dublin.

2.10.5 Existing Road Network

The existing N2 between Rath Roundabout and Kilmoon Cross is a 5.5km stretch of National Primary Road, which consists of a single carriageway cross-section with hard shoulders of varying width.

The existing cross-section of the N2 cannot safely accommodate the volume of traffic that currently uses it. This is further compromised by direct frontage development along the road, including a hotel, a cemetery, service stations, local businesses and numerous residential and agricultural accesses.

2.10.6 Existing Traffic Conditions

This stretch of single carriageway saw circa 16,250 AADT in 2019, with 8.4% HGVs based on the TII Traffic Counter. This proportion of HGV traffic is high in comparison to other roads with similar cross section, thereby creating concerns with regards to the safety of road users.

As per the TII Standard DN-GEO-03031 Rural Road Link Design Table 6.1, the capacity guidance for a single carriageway road is 11,600 AADT. The TII National Road Network Indicators 2019 (NRNI 2019) show that the road operated at between 100-120% of its capacity.

Traffic levels along this section of the N2 have been steadily increasing over the last decade, in part due to population and economic growth in County Meath as well as the Greater Dublin Area.

2.10.7 Existing Congestion

The result of the high volumes of traffic is significant congestion during peak hours as drivers experience increasingly long delays of up to 20 minutes, this contributes to the inability of the N2 to deliver the level of service required for a national primary road. The existing N2 is causing significant reliability issues for bus services and additional operational costs due to congestion related delays, this is reducing the attractiveness of buses for existing car users.

The provision of a more efficient transport network will assist in greater operational efficiencies as the regional population increases and improves economically, thereby facilitating the sustainable development of the region. Improvements to the journey times and reliability of the N2 corridor would likely lead to an increased mode share for buses along the corridor, thereby encouraging the use of sustainable more environmentally friendly modes of transport.

2.10.8 Existing Road Safety

There are a significant number of roadside hazards along this section of the N2, with numerous utility poles, trees, boundary walls and drainage ditches located immediately adjacent to the carriageway. Between the Primatestown junction and Kilmoon Cross junction, the road is either above or twice above the expected collision rate, based on data from the Road Safety Authority (RSA).

Traffic flows at peak hours are also well above the recommended levels for single carriageway roads. This further increase the safety issues for this section of road. Furthermore, based on the 2020 figures from the RSA, many road traffic collisions occur during these peak hours.

No provisions have been made for Non-Motorised Users (NMUs) on this section of road. This has resulted in only a very small number of vulnerable road users using this section of road with no segregation from the main traffic that uses the road which increases the chance of collisions.

2.10.9 Project Objectives

The objectives of the scheme are based on multiple criteria headings outlined by the Common Appraisal Framework 2016, these headings are as follows:

- Economy;
- Safety;
- Environment;
- Accessibility & Social Inclusion;
- Integration.
- Physical Activity

3. Traffic Assessment

3.1 Introduction

This chapter provides an overview of the transport surveys conducted for this project and summarises the subsequent development of the Local Area Model (LAM). This LAM is required to assess the traffic impact of the proposed options for the N2 Rath Roundabout to Kilmoon Cross scheme and to provide inputs to the economic appraisal process. The key model development processes are discussed under the following headings:

- Transport Model Study Area
- Transport Data Collection
- Transport Survey Results
- Network Development

This chapter also presents the key findings of the survey, model development, calibration process and high-level economic outcomes. More detailed information on the traffic assessment outcomes, journey times, and detailed modelling results will be presented in an accompanying Transport Modelling Report, in Appendix 10.

3.2 Transport Model Study Area

The transport model of the N2 project was required to evaluate the potential impacts of the proposed options for the N2 from Rath Roundabout to Kilmoon Cross and assessing prospective changes on the regional and local roads.

The LAM was developed from the Transport Infrastructure Ireland (TII) National Transport Model (NTpM) initially. The NTpM covers the national and regional road network and is used by TII as a tool in the appraisal of road schemes, land-use, and policy changes.

The LAM was defined with a wide extent to consider the potential scheme impacts on the N2, as well as the M1 and M3 corridors which run approximately parallel with the N2. The southern extent of the model is bounded approximately by the M50, while the northern extent is bounded by Ardee, Dunleer and Kells. Figure 3-1 illustrates the study area for the transport model.

Early analysis, using a cordon of the NTpM and traffic counts, indicated an approximately equal split of traffic north of the Kilmoon Cross junction compared to the section under assessment (Rath Roundabout to Kilmoon Cross). The almost equal split of traffic is between the N2 north of the Kilmoon junction, and north-east on the R152 towards Drogheda. From this observation, the N2 scheme is considered appropriate to be over the section of Rath Roundabout to Kilmoon Cross junction.



Figure 3-1 – Transport Model Study Area.

3.3 Transport Data Collection

In developing the LAM, a significant volume of data was required to ensure that the model could replicate existing transport patterns and volumes. A series of detailed transport surveys were therefore undertaken to inform the development of the base year (2019) LAM. The surveys are as follows:

- Automatic Traffic Counts
- Junction Turning Counts
- Origin-Destination Surveys
- Journey Time Evaluation

The following sections describe the collation of data for the construction of the LAM model.

3.3.1 Data Collection Period

At the outset, an assessment was undertaken to identify the preferred time period for data collection. Permanent TII Traffic Monitoring Unit (TMU) data was used to evaluate the average workday flow on the N2 between January and December (week 3) 2019, results are presented in Figure 3-2. The first three weeks of December 2019 have been provided individually to gain better insight into the variation in average workday flow.

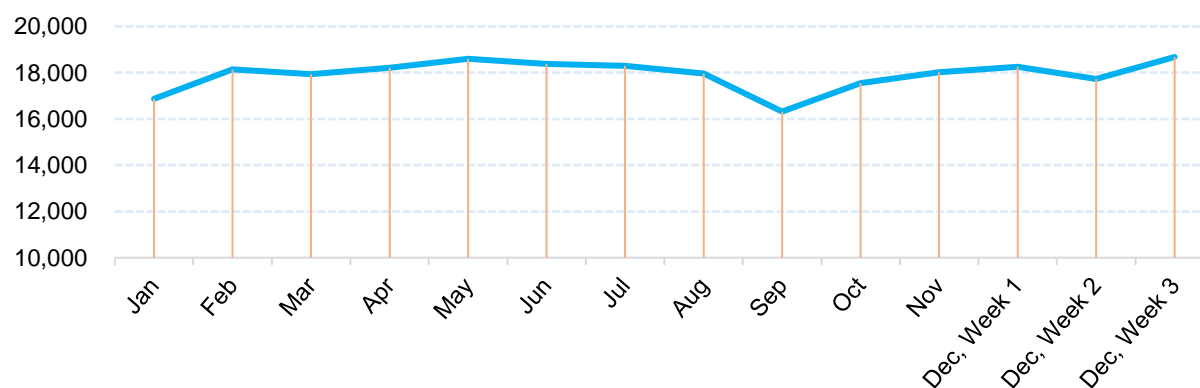


Figure 3-2 - 2019 Workday Average Flow on N2, TII TMU on N2

Based on Figure 3-2, the N2 experienced its highest average workday traffic flows in late December (week 3) and lowest average workday traffic flows in September. Neutral periods for data collection are typically Monday to Thursdays from March to May and September to November, with some exceptions⁵.

The project programme required surveys to be undertaken in Q4 2019. To examine the validity of this period the average workday flows for the first and second week of December were compared to neutral months to ensure traffic flows remained broadly in-line with neutral periods. TMU data, as presented, indicates that flows in December week 1 represent typical volumes of neutral months, and therefore the undertaking of ATC and other surveys were permissible between the 2nd and 8th December 2019.

⁵ TII Project Appraisal Guidelines for National Roads Unit 5.2 - Data Collection

3.3.2 Automatic Traffic Counts

An Automatic Traffic Count (ATC) captures the traffic flow passing a given point on the road and classifies each vehicle – for the LAM development, classifications included cars, light goods vehicles (LGV) and heavy goods vehicles (HGV). ATC surveys were carried out at 26 sites which are shown in Figure 3-3.

For safety and access reasons, Sites 1, 2, 23, and 24 employed cameras instead of on-road ATC equipment but delivered the same classification of data.

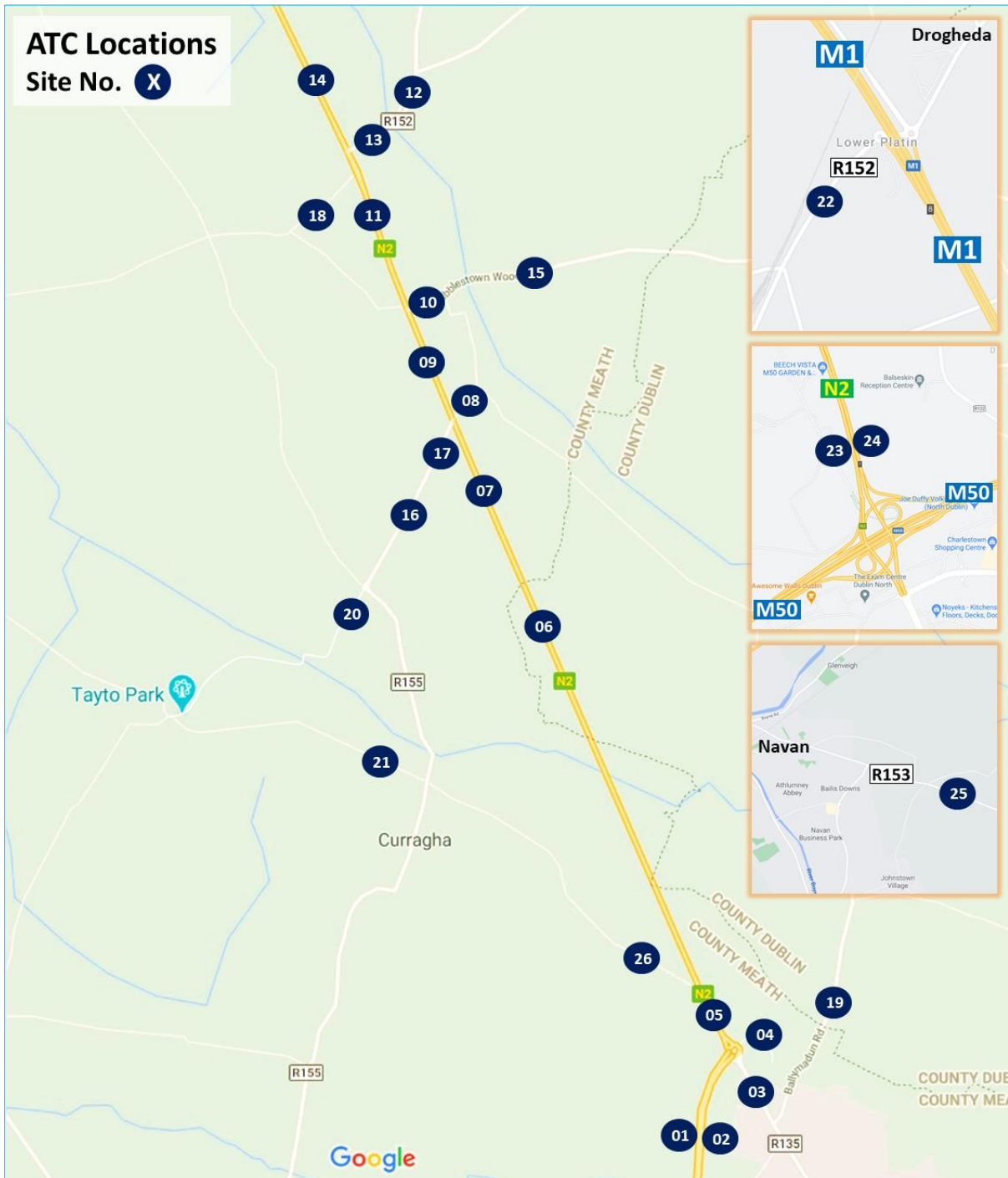


Figure 3-3 - Overview of ATC Survey Locations.

3.3.3 Traffic Monitoring Units

In addition to the ATC counts, traffic data was acquired from several TMUs in the study area. TMU counters provide information on the volume of traffic by hour of day and vehicle class, i.e., motorcycle, car, goods vehicles distinguished by number of axles (up to twelve vehicle classes being identified). Additionally, TMUs are permanently installed to record traffic flows at all times, providing a continuous record of traffic flows. Figure 3-4 displays the location of the permanent TMUs within the transport model study area.

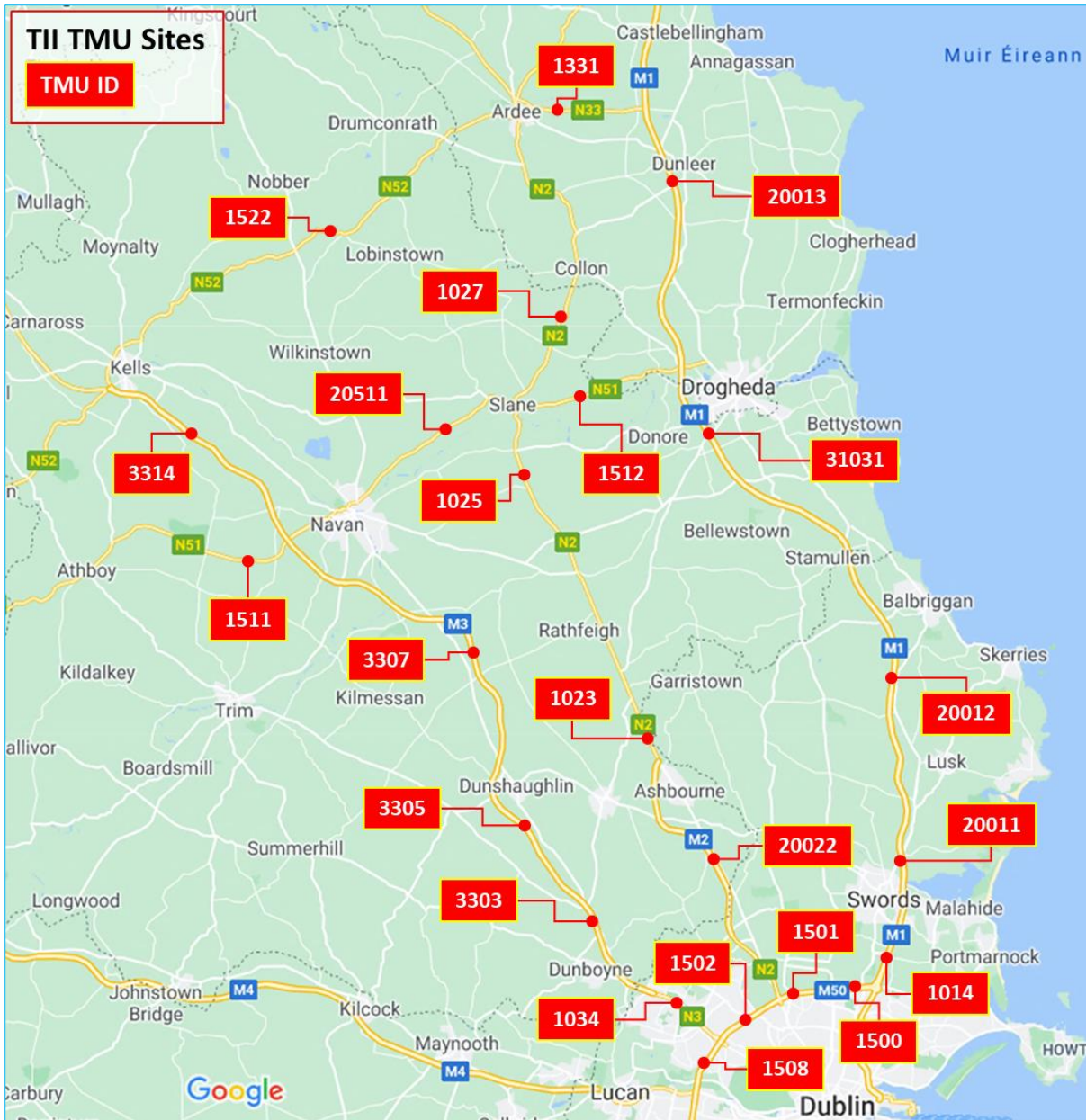


Figure 3-4 - TII TMUs within the Transport Model Study Area.

3.3.4 Junction Turning Counts

A Junction Turning Count (JTC) captures the number and direction of vehicles passing through at a junction. Like ATCs, JTCs also classify the traffic into different vehicle categories⁶.

JTCs were installed at key junctions within the relevant section of the N2 to assess traffic movements in the N2 study area, by vehicle class. JTC surveys were undertaken at 17 junctions on Tuesday 3rd December 2019 between 06:00 – 10:00 and 16:00 – 19:00, with data recorded in 15-minute time intervals. The JTC survey locations are illustrated in Figure 3-5.

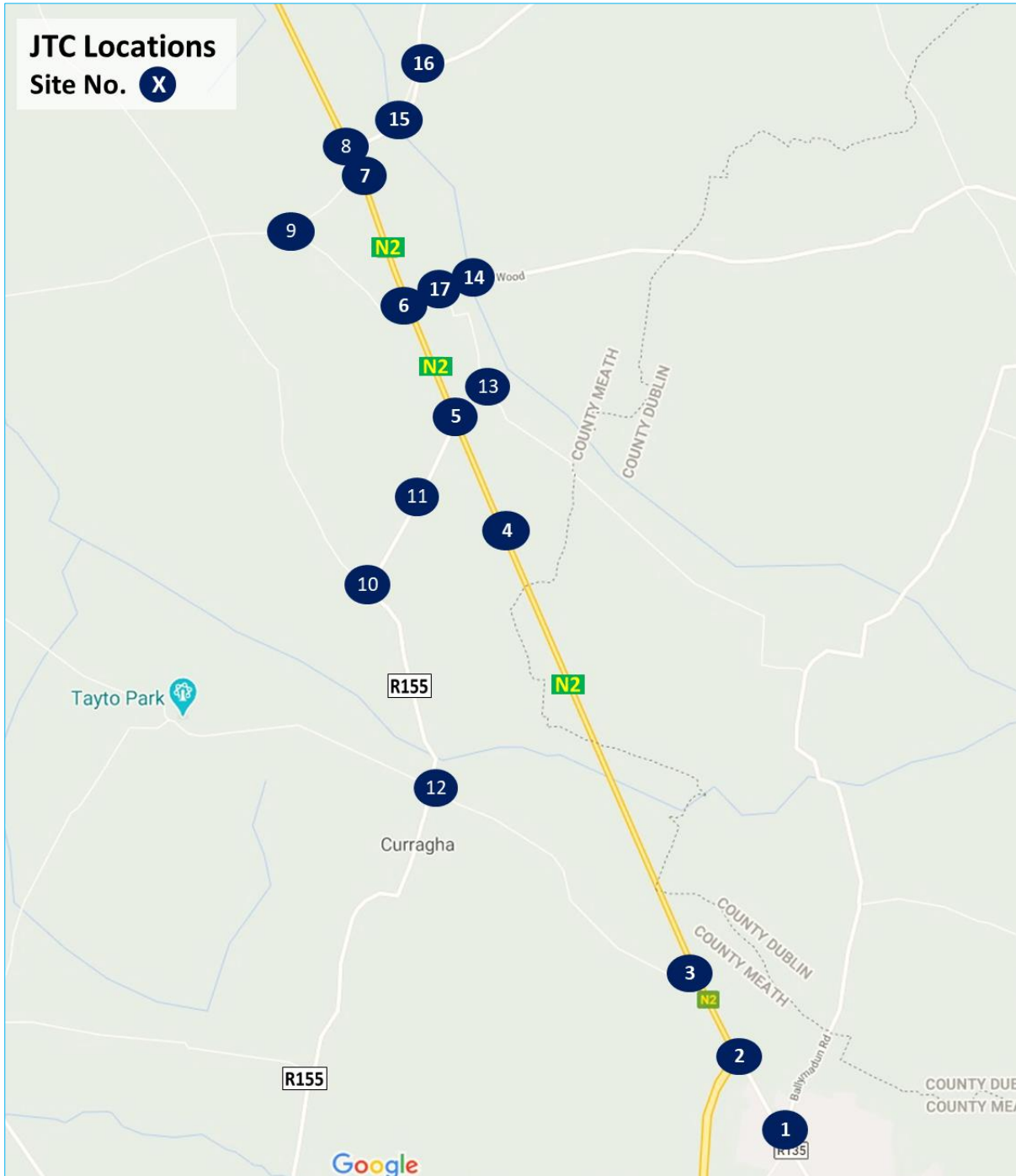


Figure 3-5 - Overview of JTC Survey Locations.

⁶ Pedal Cycle, Motorcycle, Car, LGV, OGV1, OGV2, Bus

3.3.5 Origin-Destination Surveys

Origin-Destination (OD) surveys were conducted using Automatic Number Plate Recognition (ANPR) cameras at 15 sites, as identified in Figure 3-6. The surveys were carried out on Tuesday 3rd December 2019 between 06:00 – 20:00.

The OD data collected from 15 sites produced a 28 × 28 matrix accounting for bi-directional data (at most locations, where unsegregated).

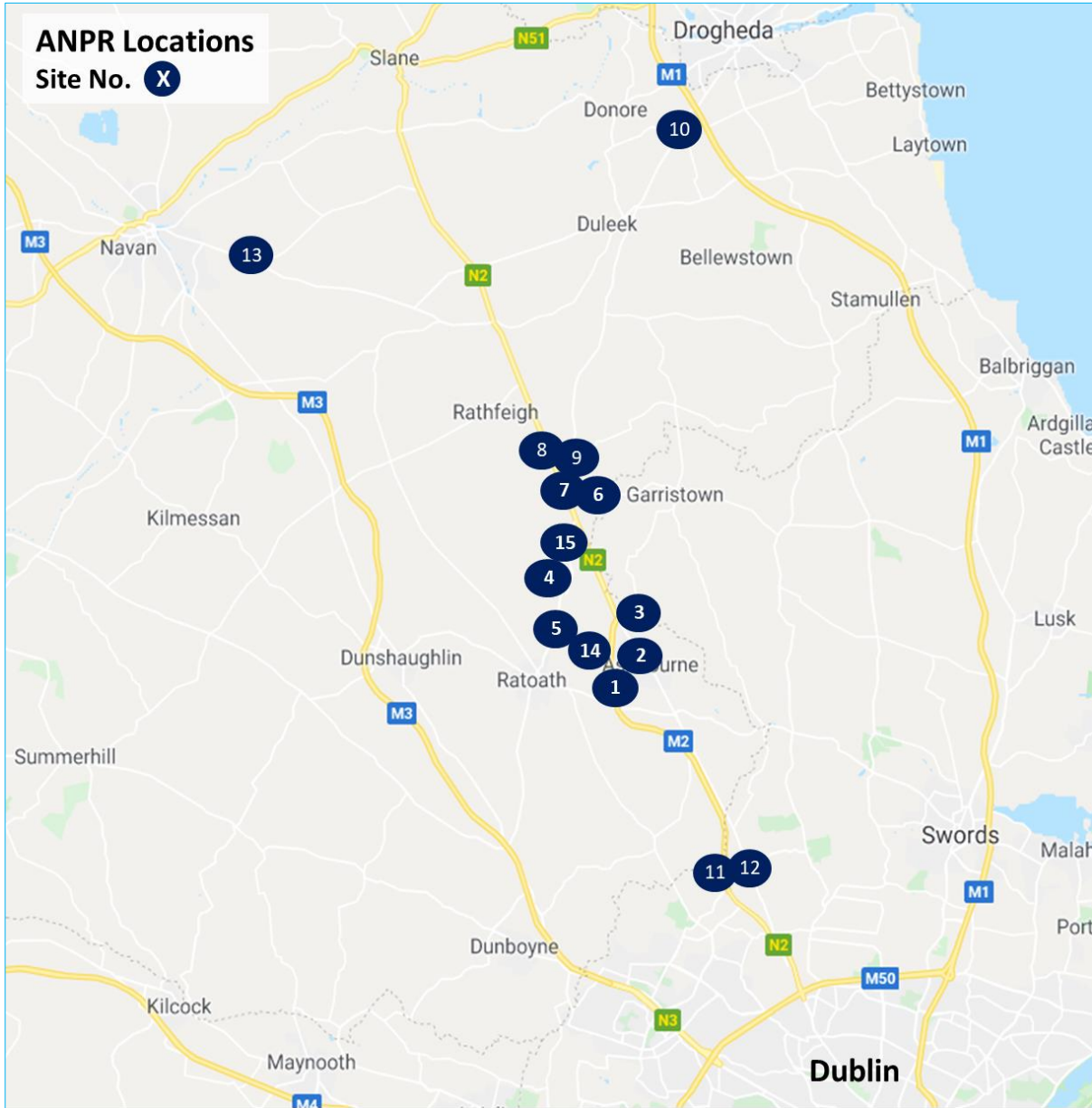


Figure 3-6 - Overview of ANPR Survey Locations.

3.3.6 Journey Time Evaluation

Due to the wide extent of the study area, it was deemed necessary to assess the modelled journey times over longer distances, where it would not be feasible for an ANPR survey to cover (i.e. where sample rates would be expected to be too low). For this purpose, journey times were sourced from Google for route sections of the broader study area. Figure 3-7 illustrates the journey time locations defined for this purpose. The locations shown in this figure represent key junctions and links that permit travel between M1 and N2.

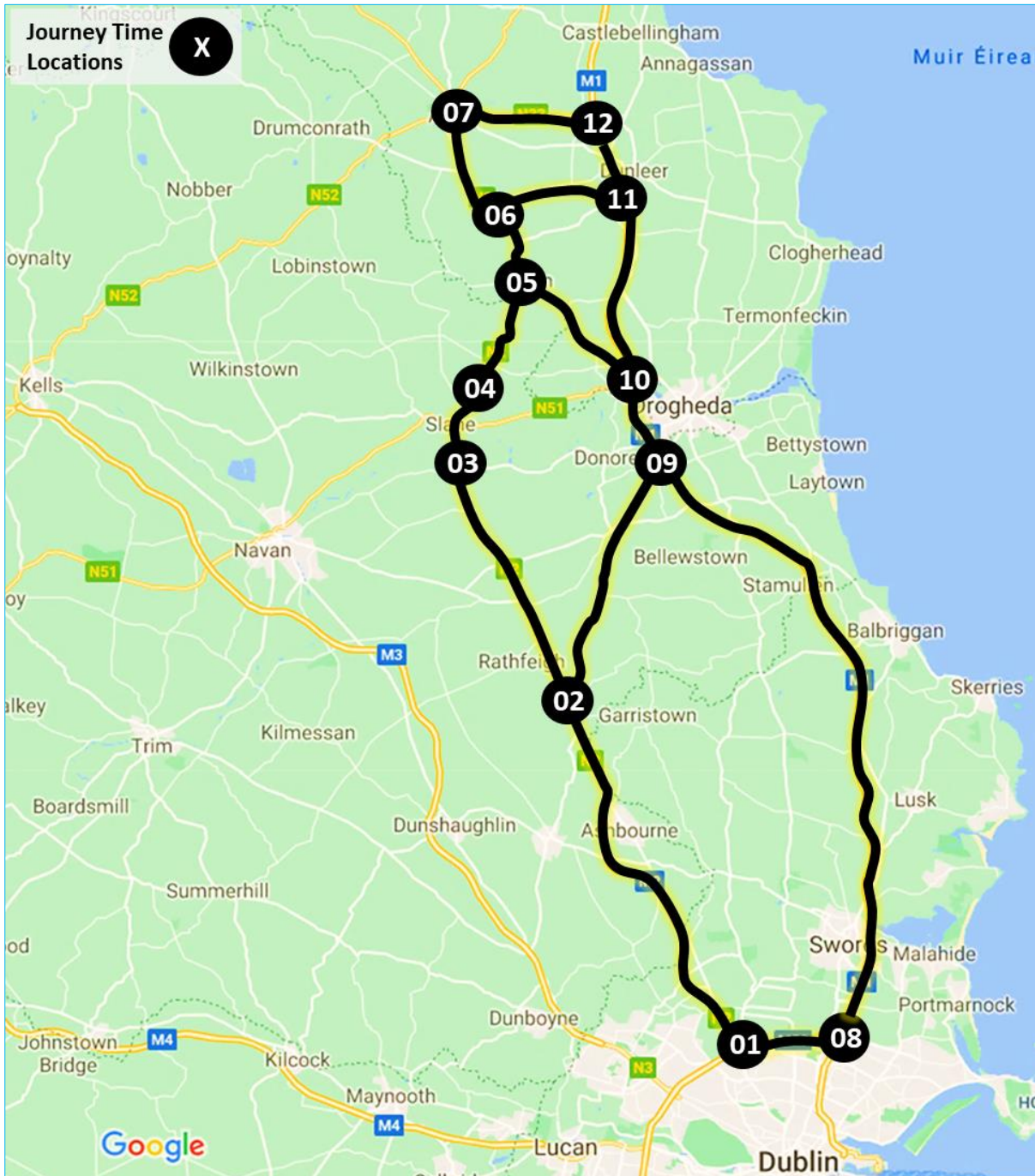


Figure 3-7 - Journey Time Locations and Paths for Long-distance Trips. (Google Maps, 2020).

3.4 Traffic Survey Results

This section briefly presents the results of the surveys undertaken over one week in December 2019. The peak hours were defined following an assessment of ATCs on the N2 within the study area. Traffic flows at N2 ATCs were aggregated together to provide the workday average traffic flow and peak hour flow profiles; these are presented in Figure 3-8.

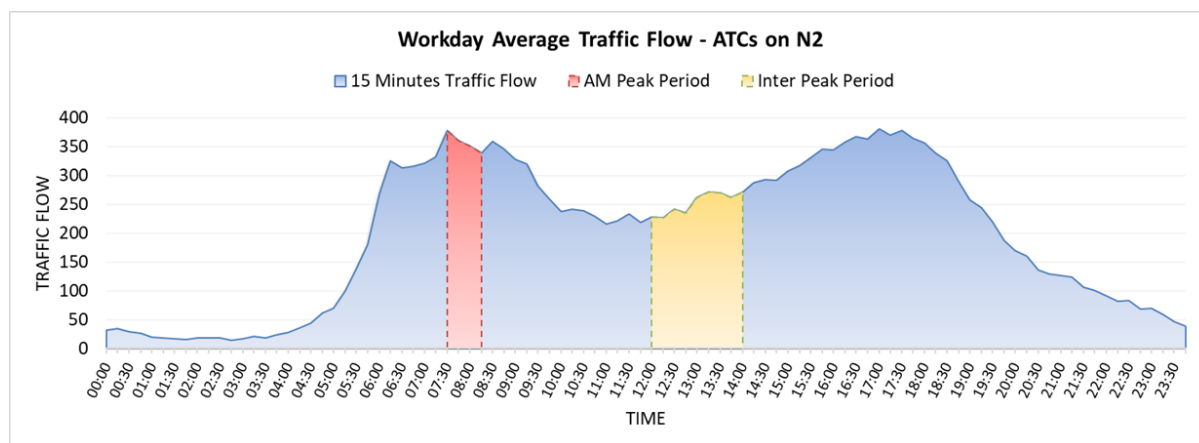


Figure 3-8 - Peak Hour Flow – Average of N2 ATCs

The following time intervals have been determined as the AM and Inter peak periods within the N2 study area:

- AM Peak Hour: 07:30 – 08:30
- Average Inter Peak Hour: 12:00 – 14:00

The AM and Inter Peak models developed for the N2 scheme are sufficient, noting that a specific PM model is not developed. The two peaks (AM and Interpeak) allow for assessment across the full day, where the PM peak is acknowledged to be broadly similar to AM in terms of flows, delays, congestion etc., but in the reverse direction. The estimation of traffic levels (AADTs) and growth over time can also be carried out from the AM and Inter Peak models along and in the vicinity of the N2, noting that that same principle of two-peak models is brought forward from the Irish NTpM. Therefore, the AM and IP periods were found to be sufficient for application in the LAM as they will remain comparable with the NTpM. In order to estimate the 2019 Weekly Average Daily Traffic (WADT) and Annual Average Daily Traffic (AADT), conversion factors were applied. The conversion factors developed from the TII Traffic Monitoring Units (TMUs) within the study area and were applied to the survey data.

Figure 3-9 and Figure 3-10 illustrate the Annual Average Daily Traffic (AADT) estimates, including their percentage HGV for ATC and TII TMU sites, respectively. It is noted that the proportion of HGV traffic is high in comparison to other roads with similar cross section, thereby creating concerns with regards to the safety of other road users.

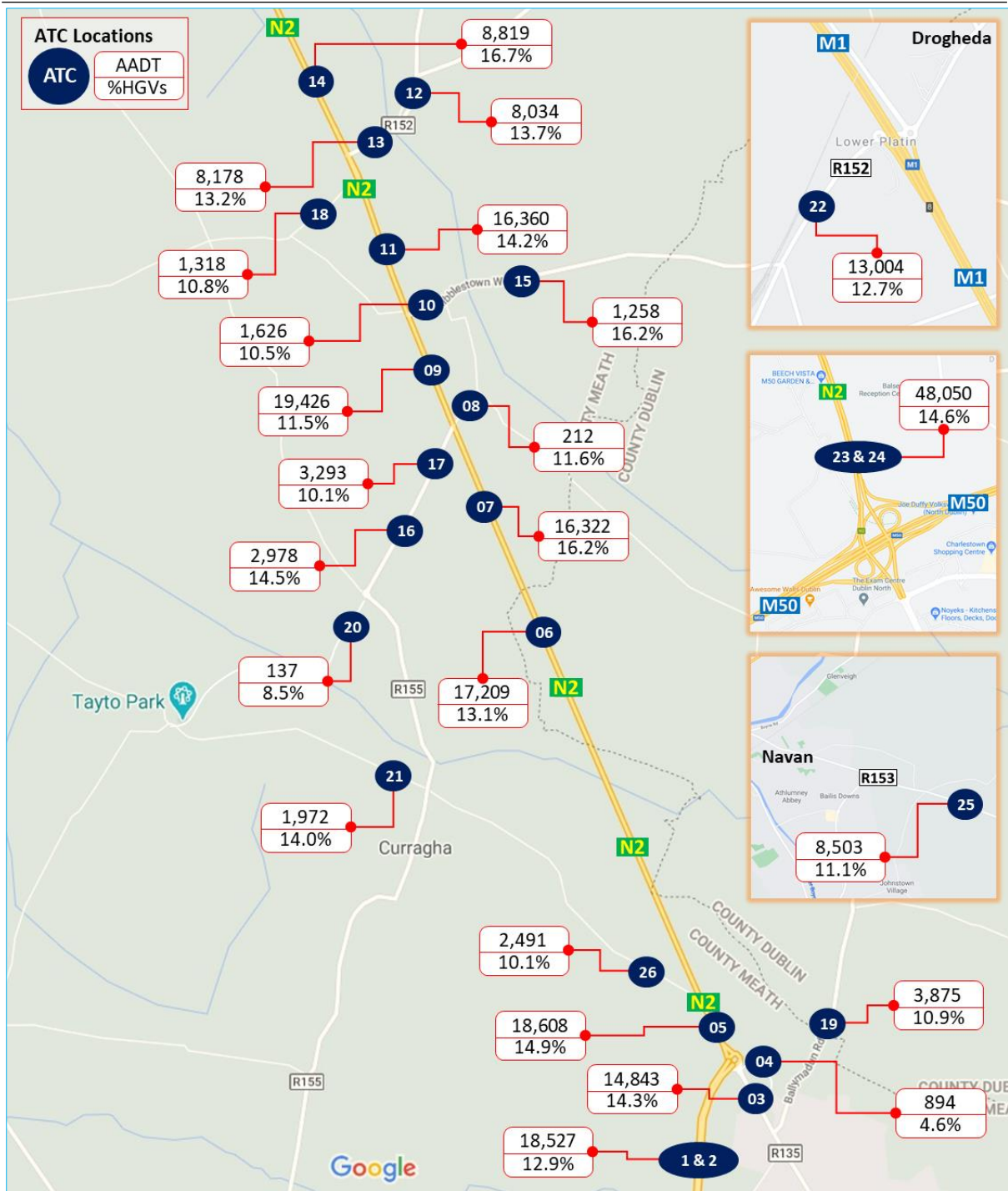


Figure 3-9 - 2019 AADT & HGV Percentage Summary.

N2 South of Study Area

The values presented in Figure 3-9 show that the section of the N2 to the south of the study area, near the M50 (ATCs 23 and 24), carries the highest traffic volume of all surveyed locations with two-way AADT of around 48,000 vehicles.

N2 Within Study Area

The section of the N2 with the next highest traffic volume is within the study area for the proposed scheme, immediately to the north of Primatestown junction at the location of ATC 9, with an AADT of 19,426. North of this junction sees areas of heavy traffic (high AADTs) feeding from Drogheda and the M1 motorway, Slane, and Navan into the study area and vice versa.

N2 North of Study Area

It is noted that at the Kilmoon Cross junction, the traffic volumes on the N2 split at roughly a 50:50 ratio northward. To the south of this junction (at ATC 11 on the N2) an AADT of 16,360 was recorded. North of the junction at ATC 14 on the N2 towards Slane an AADT of 8,819 was recorded, and to the northeast of the junction at ATC 13 on the R152 towards Drogheda an AADT of 8,178 was recorded.

At the time of writing, the National Development Plan, 2021-2030 (NDP 2021-2030) does not include an overall strategy to upgrade the N2 corridor between Ashbourne and Ardee. However, two road improvement schemes along this corridor, N2 Slane Bypass and Public Realm Enhancement Scheme and N2 Rath Roundabout to Kilmoon Cross, are included in the NDP 2021-2030. These road improvement schemes aim to address specific capacity constraints and road safety issues on the N2 corridor between Ashbourne and Ardee.

Therefore, at a strategic level, the section of the N2 to the north of the study area between Kilmoon Cross and Slane is not currently included in the NDP 2021-2030. The existing N2 has a reasonably straight alignment along this section with hard shoulders of varying width, the cross-section generally sits somewhere between a Type 1 and a Type 2 Single Carriageway, in accordance with TII Publication DN-GEO-03036. The capacities of these Single Carriageway cross-sections for Level of Service D, in terms of Annual Average Daily Traffic (AADT), are listed below as per TII Publication DN-GEO-03031:

- Type 2 Single Carriageway - 8,600 AADT
- Type 1 Single Carriageway - 11,600 AADT

Based solely on the current AADTs north of the study area, the section of the N2 between Kilmoon Cross and Slane does not currently warrant a significant intervention, such as the implementation of a Dual Carriageway cross-section. Therefore, the junction between the N2 and the R152 at Kilmoon Cross represents a suitable northern tie-in point for the proposed scheme.

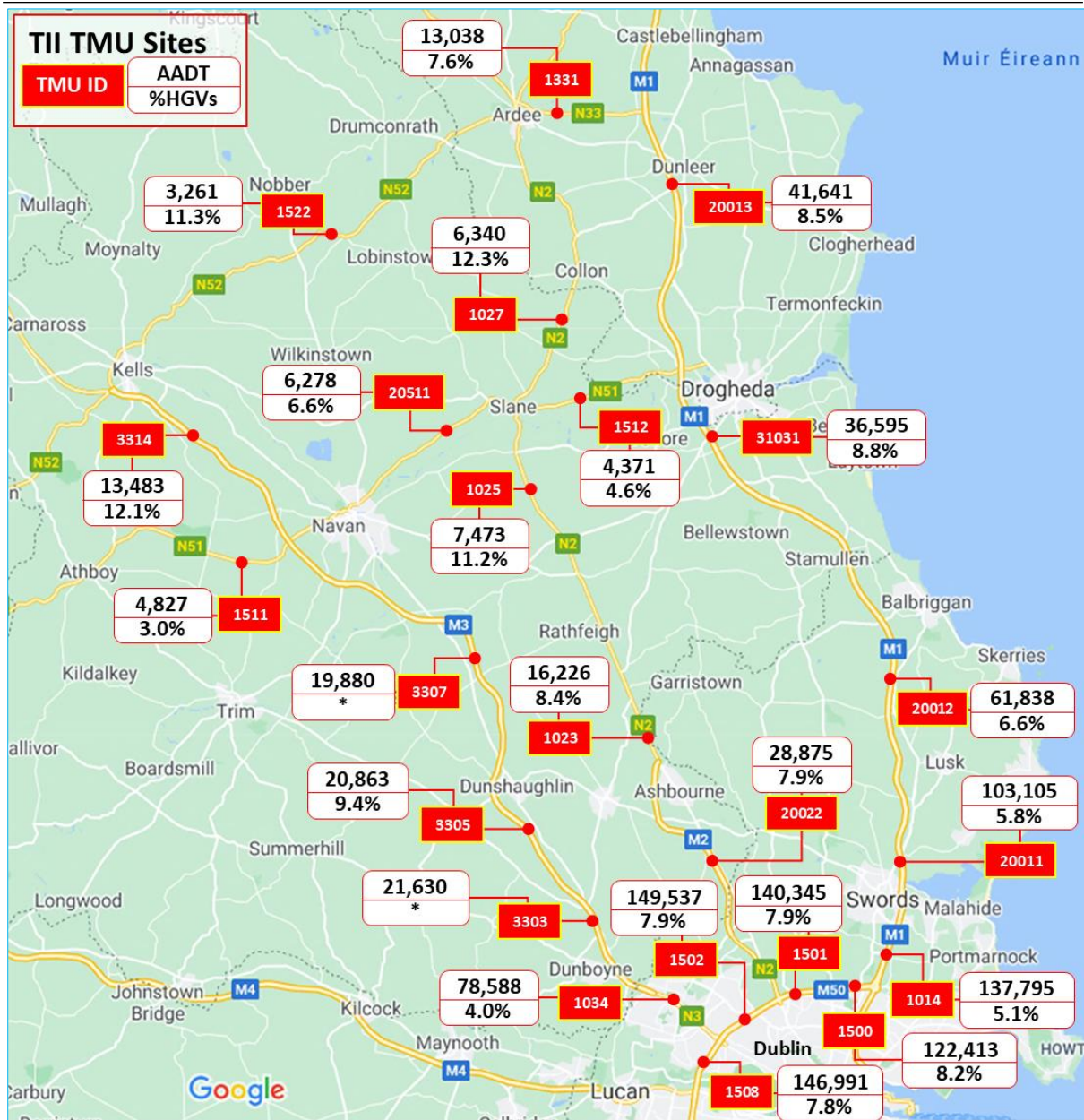


Figure 3-10 - 2019 AADT & Percentage HGV Summary of the TII TMU Sites.

* in line with their adjacent route sections

As shown in Figure 3-10, after the M50 the M1 carries the highest volume of traffic in the wider study area. The peak period capacity constraints, associated congestion and the presence of a toll on the M1 also has the potential to affect the N2 corridor, particularly the Primatestown junction, via the R152⁷.

Specifically, during the peak period, due to the previously mentioned traffic conditions on the M1, the phenomenon of variable route choice ('rat-running') is keenly observed. Drivers may choose to follow a regional or local road aiming to avoid congestion on the M1 which occurs, particularly on approach to the M50. The R152 is an alternative regional route which may be used as a detour, resulting in an increased demand on the R152 (AADT of 8,178 at ATC 13 prior to Kilmoon Cross junction) and N2. Road users avoiding the M1 would contribute to higher volumes along the R152 and N2 (Rath Roundabout to Kilmoon section).

⁷ The most notable interaction between the M1 and N2 may be observed when a collision, road closure or significant congestion causes rerouting between the corridors.

West of the N2, several linkages provide access to local settlements and towards the M3. The R155 (at the Primatestown junction) and Phibblestown Wood act as westward links from the N2 along the scheme's section, as well as the L1002 a short distance north of the N2's scheme section. Each of these links provide an alternative for traffic to transfer between the N2 and M3, though the volume of traffic transferring between these corridors will be less than that between N2 and M1.

Figure 3-11 shows the journey times and Figure 3-12 shows the average speeds for the key routes within the study area, with a focus on N2 corridor. As the traffic on the M1 interacts with the N2 via the R152 and other links, the M1 has also been included in the journey time evaluation to obtain more insight into the potential impacts and interaction between the two corridors.

The results of the journey time evaluation, shown in Figure 3-11, demonstrate longer journey times in the southbound direction, during the AM peak period, compared to that of the northbound direction e.g. route sections 03-02 and 02-01. Also, based on the results shown in Figure 3-12, the route section 3-2 has an average speed of 60 kph during the AM peak period, 28% slower than in the northbound direction (84 kph). Such a decrease in speed in the southbound direction also confirms site observations regarding delays and congestion at the Primatestown junction. The same applies to several other route sections within the study area – route 09-02 from Drogheda to the N2 observes a similar drop in speed in the AM peak. In most cases, the Inter Peak period demonstrates a similar journey time and speed for both directions. More information in this regard is presented in the Transport Modelling Report, in Appendix 10.

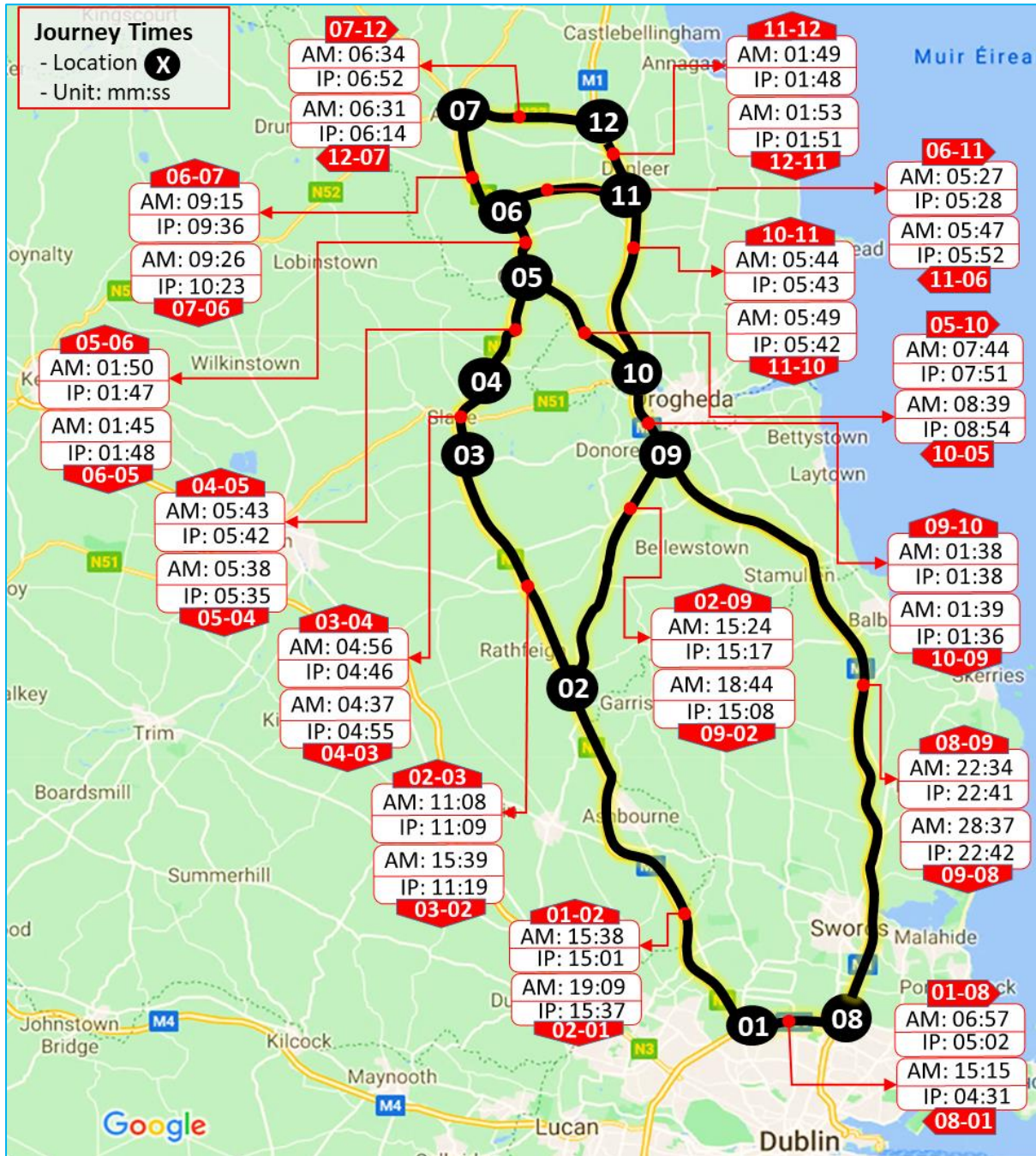


Figure 3-11 - Journey Times during the AM and IP Periods (Google API, 2020).

3.5 Network Development

3.5.1 Definition of the Model Study Area and Do-Min Network

Future year models were developed for the Opening Year (2030) and Design Years (2040 and 2050). The Design Year 2050 model was used to provide some insight into the potential area of influence of any intervention on this section of the N2 in the long term.

Figure 3-13 illustrates the extent to which M1, M3 and other key roads might be affected as a result of an intervention on the N2 to resolve the existing congestion issues. The figure presents an indicative intervention only, and for the determinations of the area of influence (not a specific scheme option being in place).

In terms of cross-linkages between the N2 and the M3, the R155 and R125 via Ratoath are projected to have a decrease in traffic as a result of an intervention on the N2. This could potentially be due to a decrease in rat-running along these regional roads following a reduction in congestion issues along the N2. The R153 from Navan is projected to have a slight increase in traffic, as some traffic travelling from Navan to Dublin (and vice versa) may be attracted onto the scheme. No change in traffic is anticipated between Junction 9 (Navan North) and Junction 8 (Navan South) of the M3, which indicates that the additional traffic on the R153 originates in Navan rather than long-distance traffic from further along the M3 corridor.

In terms of cross-linkages between the N2 and the M3, the R152 from Drogheda via Duleek is projected to have a slight increase in traffic, as some traffic travelling from Drogheda to Dublin (and vice versa) may be attracted onto the scheme. It is noted that for southbound traffic on the M1, there is a toll on the exit slip road of Junction 9 (Drogheda) which has a link road connecting onto the R152. This indicates that the additional traffic on the R152 originates in Drogheda and Duleek rather than long-distance traffic from further along the M1 corridor, which would have to exit the M1 at Junction 10 (Drogheda North) and then take a circuitous route through Drogheda town centre and back out again to avoid the toll.

The concession period for the toll on the M1 is set to run until 2034, whilst the concession period for the toll on the M3 is set to run until 2052. Beyond this period, the motorways will be handed back to public ownership, but the toll could remain in place like the Eastlink Bridge and the M50 where the tolls were retained beyond the concession period. Therefore, it is a reasonable assumption that these tolls will remain in place in the absence of any further information.

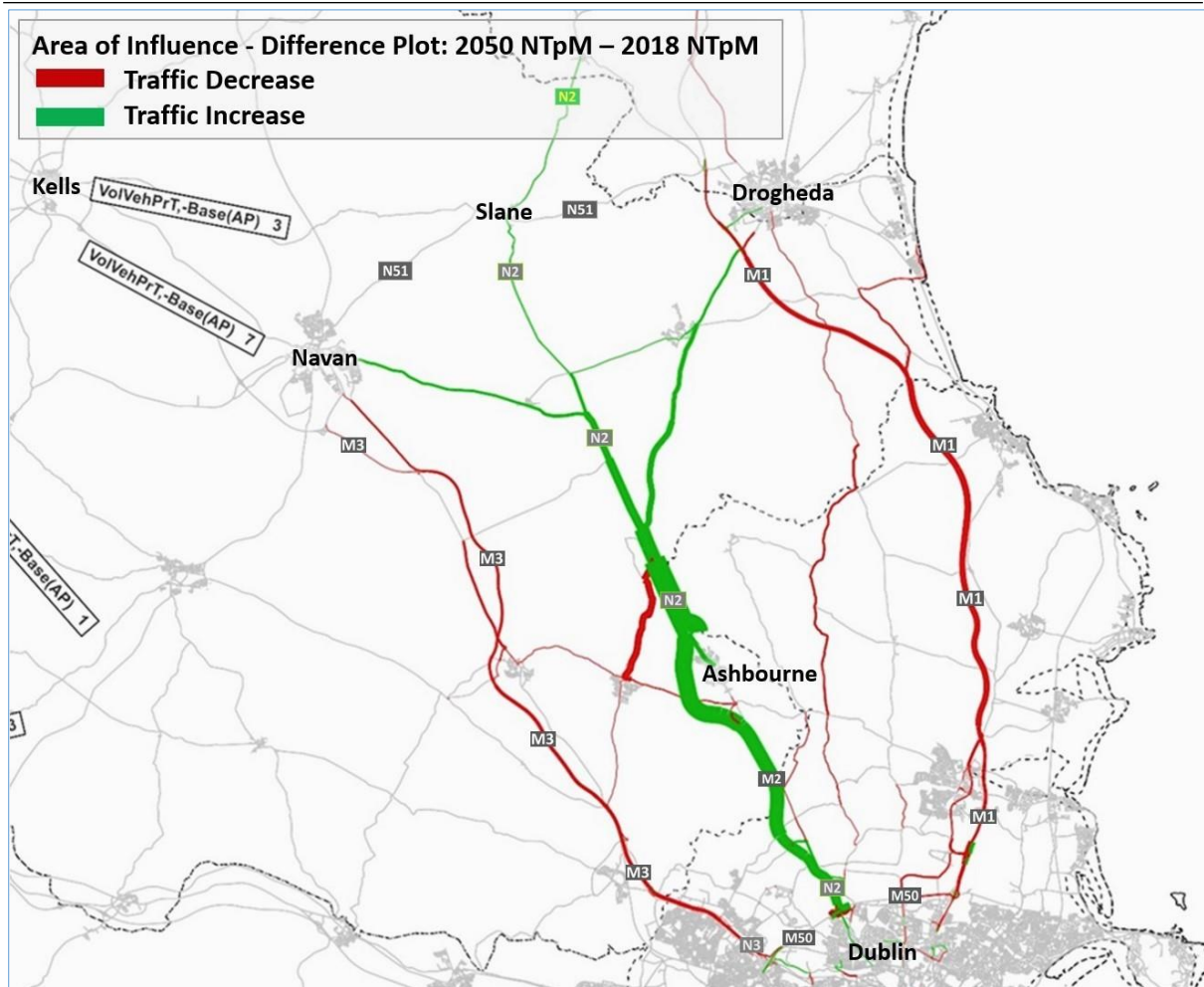


Figure 3-13 - Area of Influence in NTpM 2050

Given the extent of the potential area of influence it was deemed prudent to include both the M1 and M3 within the extent of the transport model to ensure the full impact of any intervention on the N2 was captured. The transport model extended from the M50 northward to Ardee, west as far as Kells and east to the coastline. Having identified the extent of the study area, a traffic model area of influence was initially 'cordoned' out of the 2018 NTpM base model, and this model was used as a starting point for developing the 2019 LAM, which is shown in Figure 3-14.

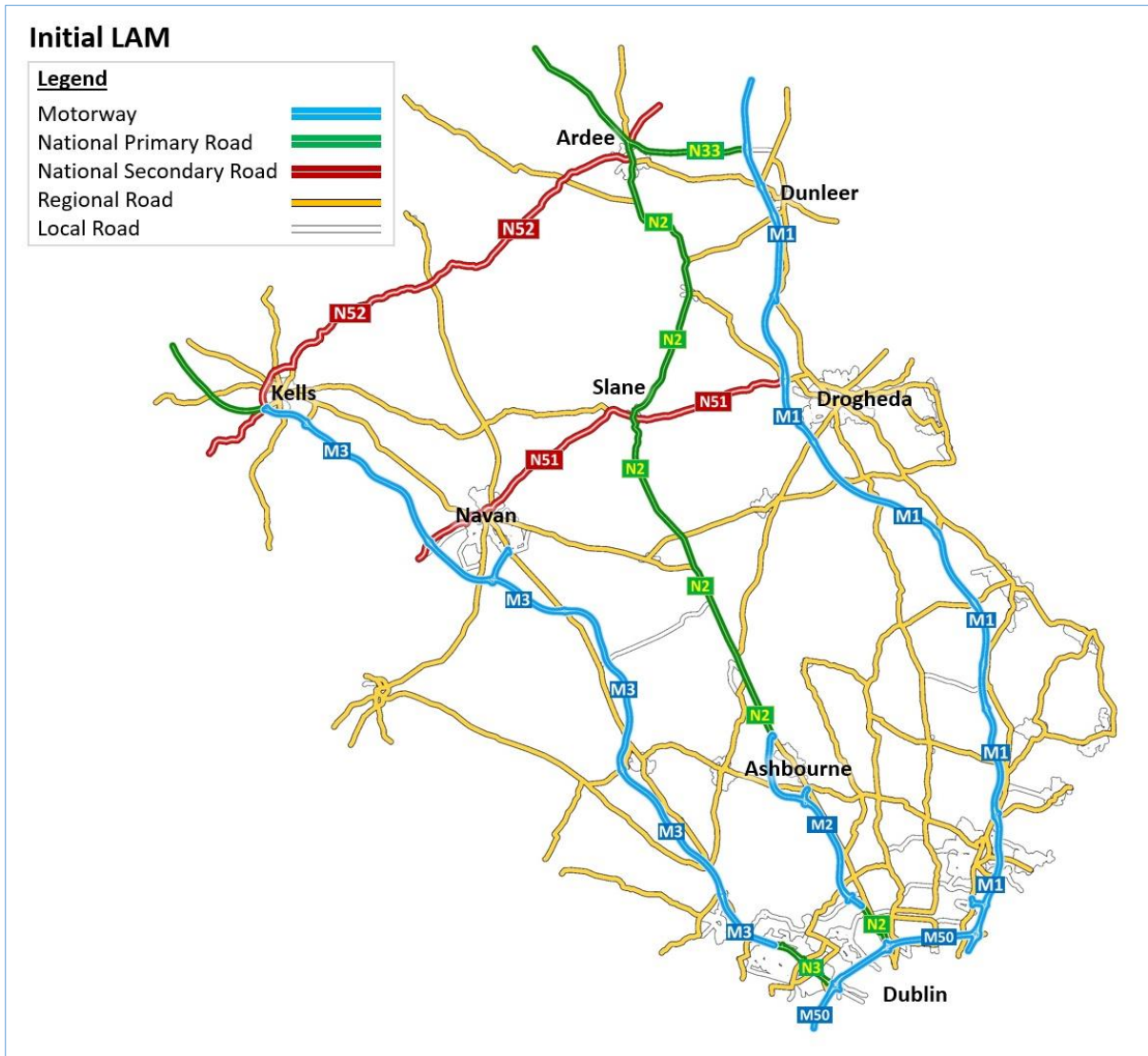


Figure 3-14 - Initial 2019 N2 LAM Network, Cordoned from NTpM 2018

The 2018 NTpM which formed the basis for the cordon includes all schemes in place as of 2018 and includes all key elements of the road network. However, for the purposes of a localised transport model, significant revisions were made to include minor roads in the vicinity of the study area. This information was collected through site observations and aerial mapping. The updated network, as refined to reflect the 2019 road network conditions, is illustrated in Figure 3-15.

Given that there are no committed projects in the modelling area the network presented in Figure 3-15 also represents the future year Do Minimum network for the purpose of assessing N2 interventions, including route option testing.

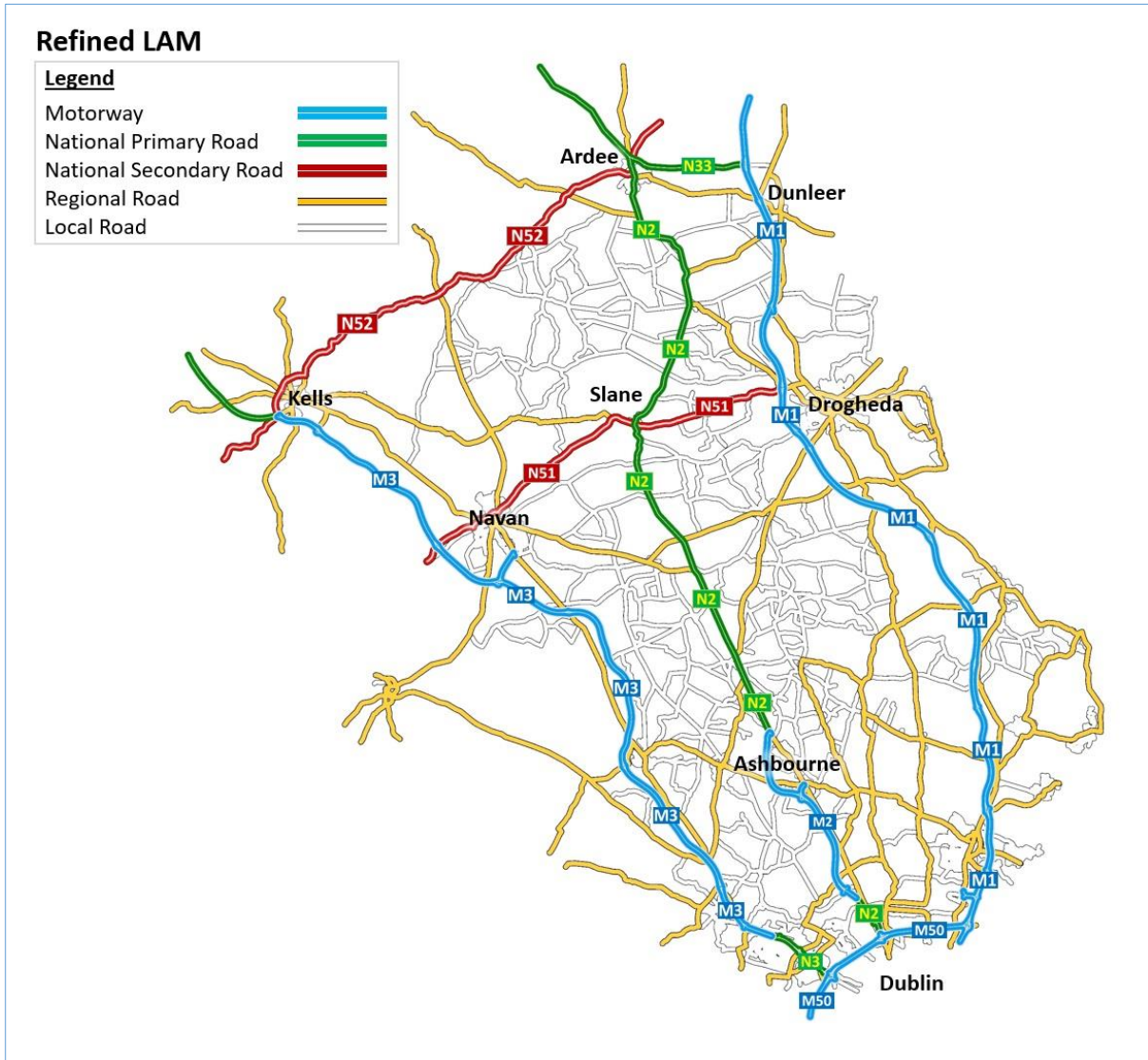


Figure 3-15 - Refined 2019 LAM Road Network

3.5.2 NTpM Zoning Structure

Figure 3-16 presents the NTpM zoning structure within the N2 study area. The N2 LAM is centred along the N2 scheme (Rath Roundabout to Kilmoon Cross junction), with Ashbourne town to the south and Navan Ardee and Drogheda Kells to the north, including several surrounding suburban areas. Figure 3-16 presents the NTpM zoning structure within the N2 LAM

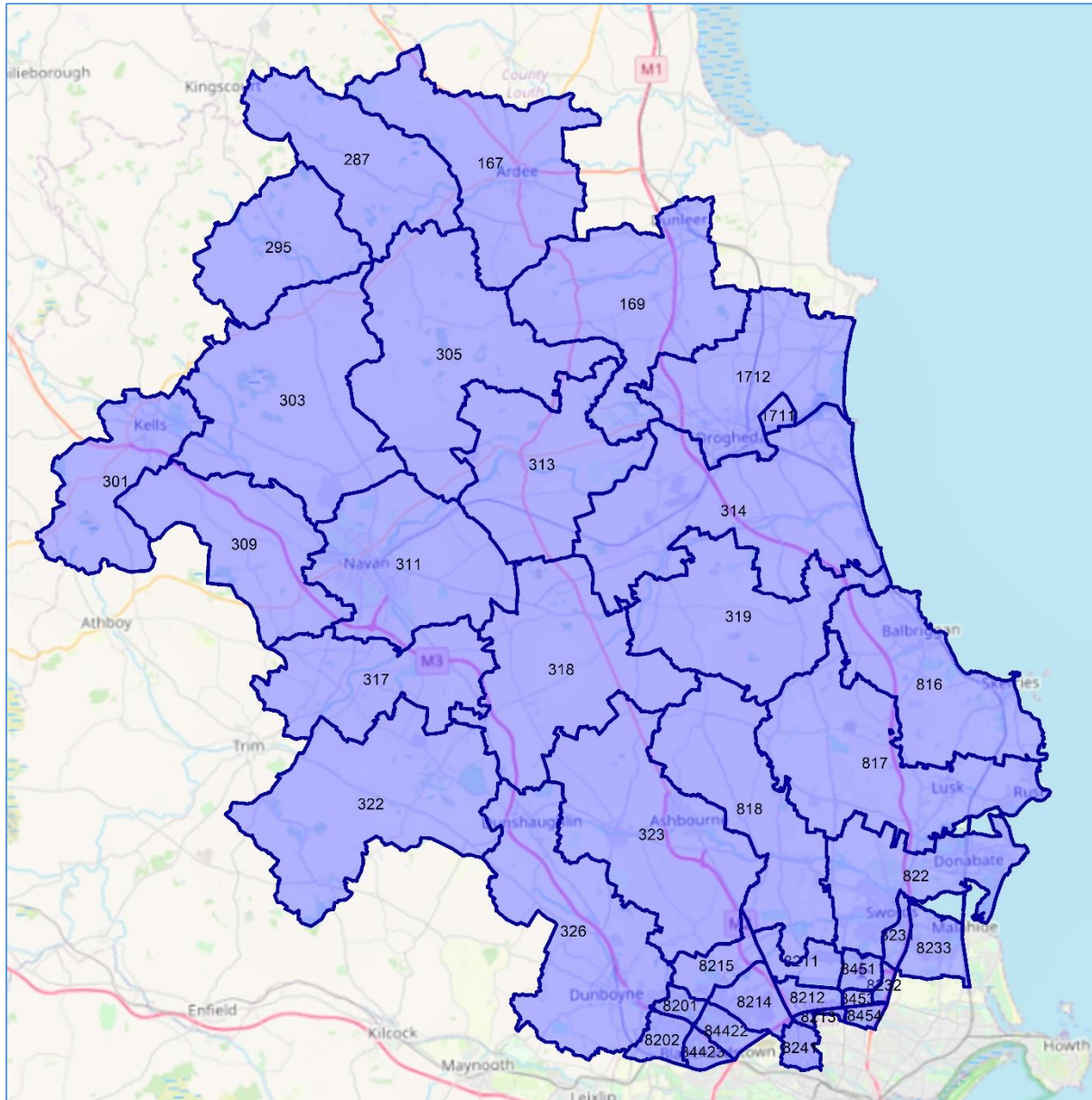


Figure 3-16 - NTpM Zoning Structure within N2 Study Area.

3.5.3 Refinement of the NTpM Zoning Structure

To obtain greater detail and to ensure the LAM reflects existing traffic flows and patterns in key areas, a more detailed zone structure was required than that contained in the NTpM 2018. The zoning system in the NTpM is based on the aggregation of Electoral Divisions (EDs), which is suitable for most zones in the LAM, with the exception of urban areas and large zones in close proximity to the proposed N2 scheme. Examples of the urban areas that needed further refinement were Ashbourne, Navan, Duleek, and several other settlements within the study area. The majority of zones were split within ED boundaries where possible.

The zone splitting process also considered An Post geocoding information. This data provides the location of postal address points (both residential and commercial) and formed the basis for the allocation of the trip-ends for larger zones into relevant subzones. It should also be noted that the trips from the split zones were allocated to the new subzones based on the proportion of residential and commercial addresses located within the subzone.

The model cordoned from the NTpM contained 83 zones in total: 38 internal zones and 45 external zones. To ensure the LAM reflected existing traffic patterns in the key areas the NTpM zones were disaggregated into several sub-zones. As a result, the disaggregation of the various zones produced a model containing a total of 128 zones; 83 internal zones and 45 external zones. Figure 3-17 illustrates the refined NTpM zoning structure, which is used in the LAM for this study.

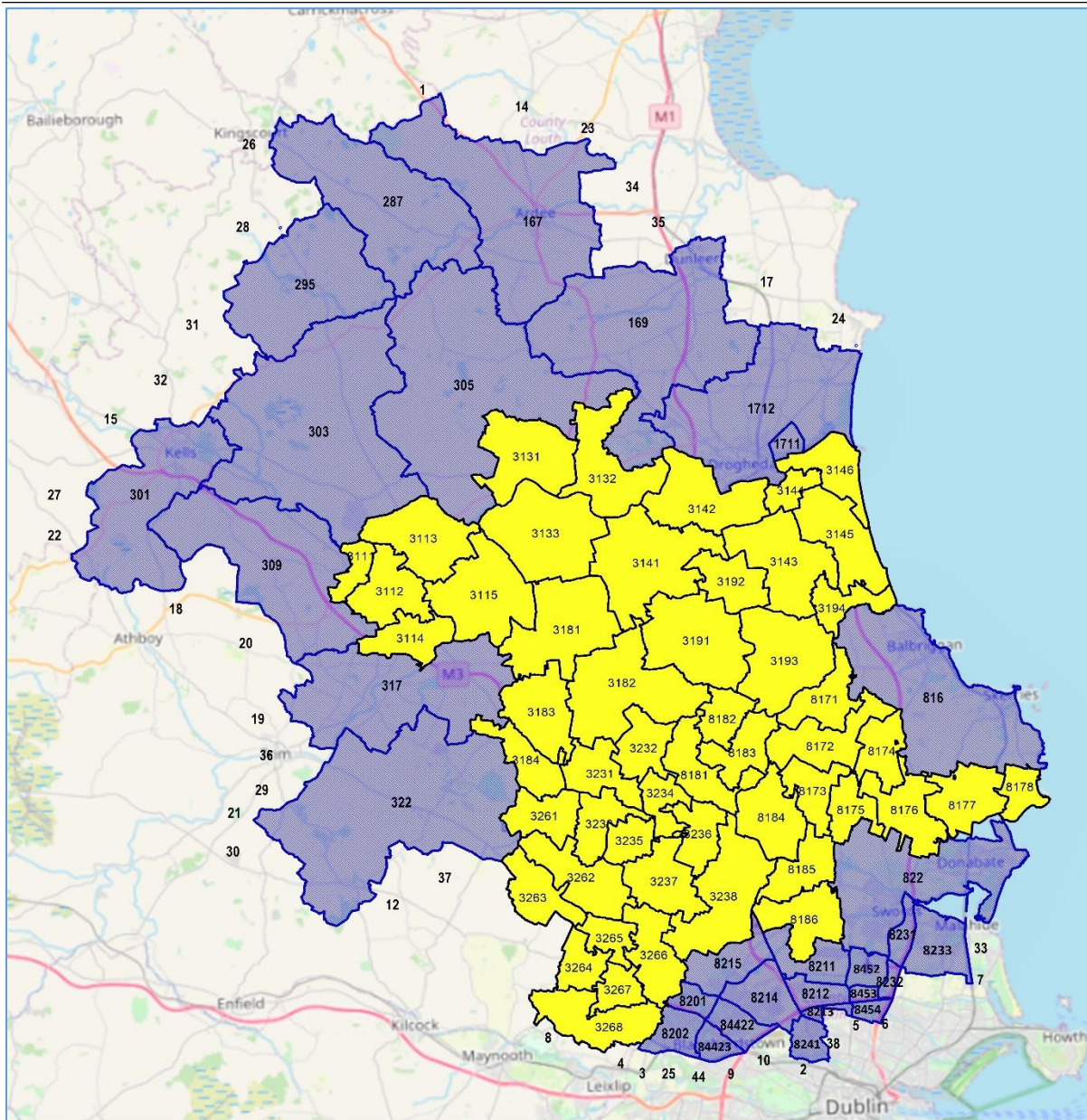


Figure 3-17 - Refined NTpM Zoning Structure.

3.5.4 Calibration and Validation

The purpose of model calibration and validation is to ensure that the model assignments reflect the existing travel situation in terms of demand, behaviours and patterns. Calibration is an iterative process, whereby the model is continually revised to ensure that the most accurate replication of the base year conditions is represented. Following calibration, a validation process was conducted, which compared the model outputs to observed data to ensure accurate representation of traffic with an independent dataset (i.e. not used for calibrating the model).

Calibration and validation were undertaken using 2019 survey data and in-line with the requirements of TII PAG Unit 5.1: Construction of Traffic Models and with reference to the calibration criteria outlined in Table 5.1.3 of that document.

A total of 68 links flows were used in the link calibration process, the results of which are summarised in Table 3-1. Further detailed information is available in the Transport Modelling Report.

Table 3-1 - Link Calibration Results

% of Calibration Sites Meeting Individual Flow Criteria				
Peak Period	Link Flows			Required
	Lights	Heavies	Total	
AM	100%	100%	97%	> 85%
Inter	99%	100%	97%	> 85%
% of Calibration Sites with GEH < 5				
AM	99%	96%	96%	> 85%
Inter	96%	100%	96%	> 85%

The validation process compared the modelled flow outputs after the calibration process against a set of observed data that was not previously used in the calibration process. A total of 22 link flows were used in the link validation process, the results of which are summarised in Table 3-2, and journey time validation results are summarised in Table 3-3.

Table 3-2 - Link Validation Results

% of Validation Sites Meeting Individual Flow Criteria				
Peak Period	Link Flows			Required
	Lights	Heavies	Total	
AM	100%	91%	95%	> 85%
Inter	100%	100%	100%	> 85%
% of Validation Sites with GEH < 5				
AM	100%	95%	100%	> 85%
Inter	100%	100%	100%	> 85%

Table 3-3 - Journey Time Validation Results

Route	Number of Assessed Sections	AM Validation	IP Validation	Overall Average Validation	Required
Along N2	6	100%	100%	100%	> 85%
Along M1	4	100%	100%	100%	> 85%
Laterals	10	90%	80%	85%	> 85%
Total	20	95%	90%	93%	> 85%

The comparison against the calibration and validation counts for individual link-flows showed that the AM and Inter Peak period models all exceeded the PAG requirements for the validation of traffic flow on links. Likewise, all models exceeded the criteria of 85% on links with GEH < 5. The results, therefore, demonstrated that the calibration and validation criteria as set out by the PAG requirements were successfully achieved by all models for all time periods.

The results of the journey time validation also demonstrate that both AM and Inter Peak models satisfy the PAG requirement that 85% of all modelled journey times are within 15% of observed data or less than 60 seconds. As such, the base year models are considered validated to the requirements of PAG Unit 5.1.

3.5.5 Future Demand Forecast Totals

Traffic growth rates were estimated for the TII Central Traffic Growth scenario based on the TII PAG. The Central Traffic Growth scenario is used to inform the appraisal and design of the proposed road development. The total growth in traffic between the 2019 base year and the forecast years is presented in Table 3-4.

As noted in Section 3.4, only AM and Inter Peak models have been developed for this scheme, noting that a specific PM model is not developed. The two peaks (AM and Interpeak), allow for assessment across the full day, where the PM peak is acknowledged to be broadly similar to AM in terms of flows, delays, congestion etc., but in the reverse direction.

Table 3-4 - Future Year Total Traffic Growth - Central Growth Scenario

Demand	TII Central Growth		
	2019 - 2030	2019 - 2040	2019 - 2050
AM Peak Car	22.19%	30.57%	38.11%
AM Peak HGV	37.97%	59.55%	88.32%
Inter Peak Car	17.81%	24.98%	31.10%
Inter Peak HGV	38.68%	60.43%	90.55%

The resultant 2030, 2040 and 2050 matrix totals based on the TII growth rates (as outlined above), are provided in Table 3-5. For clarity it is noted that these values are for the total traffic model matrix rather than any one link.

Table 3-5 - Trip Matrix Total Comparison - Central Growth Scenario

Demand	Base Year 2019	TII Central Growth		
		2030	2040	2050
AM Peak Car	73,760	90,128	96,312	101,873
AM Peak HGV	4,111	5,672	6,559	7,742
Inter Peak Car	60,316	71,060	75,381	79,073
Inter Peak HGV	4,561	6,325	7,317	8,691

3.6 Public Transport

As noted in Chapter 2 (*Identification of Need*), there were 115 inbound bus and coach services using the N2/M2 corridor on a typical weekday in 2018, based on data from the National Transport Authority (NTA). In passenger terms these bus services cater for nearly 1.2 million bus passenger trips per annum (2018 values). Bus occupancy surveys were carried out on this section of the N2 in December 2019 to supplement this data from the NTA.

3.7 Vulnerable Road Users

As noted in Chapter 2 (*Identification of Need*), traffic surveys undertaken as part of the scheme in December 2019 also provided levels of traffic for 2-wheeled vehicles, which included both cyclists and motorcyclists.

There is likely to be a suppressed demand for cycling due to a lack of segregated facilities and high vehicle flows, including a high proportion of HGVs, along the existing N2. Overall, this creates a poor ambience and significant safety risks for cyclists along the existing N2, particularly for beginner and recreational cyclists.

It should be noted that no data was collected for pedestrian movements as part of these surveys, although due to the lack of existing infrastructure, pedestrian movements along this section of the existing N2 are relatively uncommon.

3.8 Covid-19 Traffic Impacts

It is acknowledged that the transport surveys for the scheme were undertaken over one week in December 2019, prior to the implementation of any Covid-19 restrictions. The impacts of the pandemic on traffic numbers have been continually monitored by the Project Team as the Irish Government have implemented measures to control the pandemic, it is noted that the likely long-term scenarios are continuing to develop at the time of writing.

As shown in Figure 3-18, the traffic numbers on the existing N2, at the TII TMU at Crickstown, decreased sharply following the initial introduction of Covid-19 restrictions in Spring 2020. Traffic numbers then increased as restrictions were eased, reaching pre-Covid 19 levels by September 2020.

Following the implementation of further Covid-19 restrictions in Winter 2020, traffic numbers decreased once more, and have since been slowly increasing throughout 2021 with the gradual easing of restrictions. At the time of writing, in Autumn 2021, these traffic numbers have now returned to pre-Covid 19 levels.

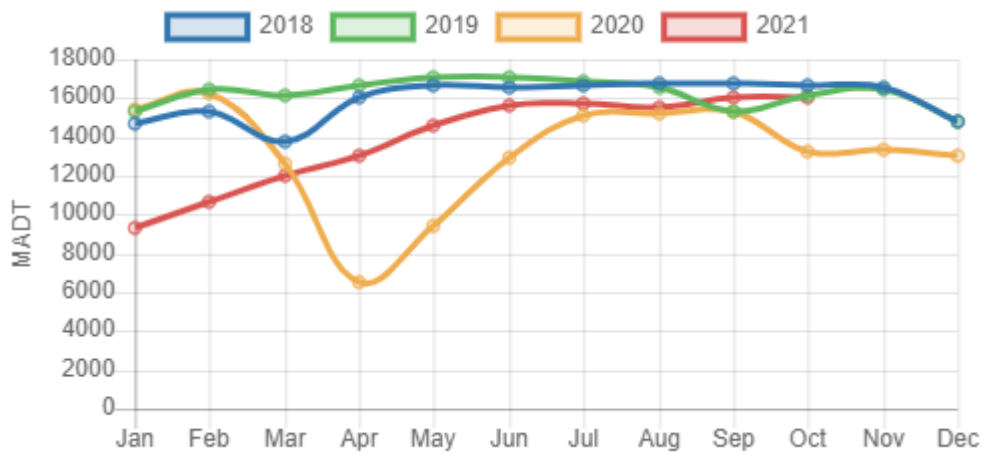


Figure 3-18 – Monthly Average Daily Traffic (MADT) on the Existing N2. (TII Traffic Data).

As we emerge from the most significant effects of Covid-19, i.e. the easing of national ‘lockdown’ restrictions, the strategic case for investment, particularly in maintenance, connectivity and network resilience, will remain strong. The N2 and other national roads may seek to reassess their relative importance in addressing wider objectives through infrastructure investment, such as reducing social inequality and/or carbon emissions.

Tracking trends in peak travel demand, as well as new ways of working and shopping, will help focus investment where and when it is most needed. Generated solutions may seek to provide new transport connections to disadvantaged areas or enabling enhancing digital infrastructure to meet changing communication and remote working needs.

3.9 Conclusion

This chapter provided an overview of the methods undertaken in developing the Local Area Model (LAM) for the N2 Rath Roundabout to Kilmoon Cross project. Traffic modelling has been essential for the analysis of potential traffic impacts under varying scenarios (proposed route and junction options) for the N2 Rath Roundabout to Kilmoon Cross project.

The model provides an understanding of potential implications of proposed route options on the national, regional and local road networks as a result of the N2 project. Traffic survey data (consisting of ATC, JTC, ANPR and Journey Time data) was used in the setup (calibration and validation) of the LAM, along with the GeoDirectory data. This ensured that the LAM delivers a suitable level of accurate detail within the specific area being studied on the N2. In addition, the TII NTpM was employed to assess the likely area of influence of any improvements along the N2. The analysis showed that the unique location of the N2 may act as a traffic source or link to and from the M1 and M3 (depending on the option). A number of regional and local roads in the area around the N2 may facilitate the transfer of the traffic to and from the M1 and M3.

The study area was subsequently cordoned from the NTpM 2018, the road network was refined to include all key elements and an increasing level of detail for minor roads in the vicinity of the study area. The zoning system was also developed with a more detailed structure locally. The developed 2019 model was considered as the base year model for the AM and Inter peak periods (two peaks are used within the NTpM and are generally suitable for modelling of National Roads projects). To ensure accuracy of the model a period of calibration and validation was undertaken – this ensures on-site traffic movements are suitably reflected in the software model.

With the development of the LAM finalised, the development of the future year traffic models was undertaken for the proposed scheme Opening Year (2030), and Design Years (2040 and 2050). The development of traffic growth forecasts for the Opening Year and Design Year N2 LAMs is based on the methodology set out in TII PAG Unit 5.3 Travel Demand Projections, May 2019. Scheme options were developed and tested through consultation with stakeholders and following an assessment of constraints.

4. Summary of Constraints Report

4.1 Aims, Objectives & Scope

The initial step in the Option Selection process is to identify the nature and extent of significant constraints within a defined study area. A constraint is a natural or artificial consideration that could affect, restrict, limit or constrain the location or an aspect of a project within the identified study area.

The TII Project Management Manual 2019 divides the constraints into three categories: natural constraints, artificial constraints and external parameters. Natural constraints are considered naturally occurring landscapes and features, artificial constraints are those that form part of the built environment while external parameters include design standards, policy and procedural and legal issues.

The constraints study involves the definition of a suitable study area, following this, all artificial and natural constraints, at an appropriate level of detail, are identified therein. This process facilitates the development of feasible options, as well as the systematic assessment of the potential impacts associated with these options during Phase 2 of the TII Project Management Guidelines 2020.

A comprehensive constraints study has been undertaken for this scheme. It is noted that this chapter of the Option Selection Report is only a summary of this constraints study. An extensive Constraints Report which details the constraints study in full is included in Appendix 5 and should be read in conjunction with this chapter.

4.2 Defining the Constraints Study Area

The Constraints Study Area was identified at project inception and was amended during Phase 1. These amendments included the extension of the Constraints Study Area further north to include for potential tie-in options at the Kilmoon Cross junction, as well as the extension slightly further west to centre the Constraints Study Area around the existing N2 whilst including local roads to the west of the N2 adjacent to Tayto Park.

The Constraints Study Area is shown in a local context in Figure 4-1 overleaf, demarcated by the red dashed line, as well as in Drawing CH-0001 (GEN) in Appendix 1. This covers an area approximately 8km long from north to south, and 2km from east to west.

Consideration was given to extending the Constraints Study Area further to the east and west, however there were a number of significant constraints. These included Tayto Park to the west, an area of Highly Sensitive Landscape to the east, as well as areas of high elevation to the east and west. Based on this, the Constraints Study Area was deemed to be of a sufficient size to facilitate the development of feasible options and was carried forward for use in the Constraints Study.

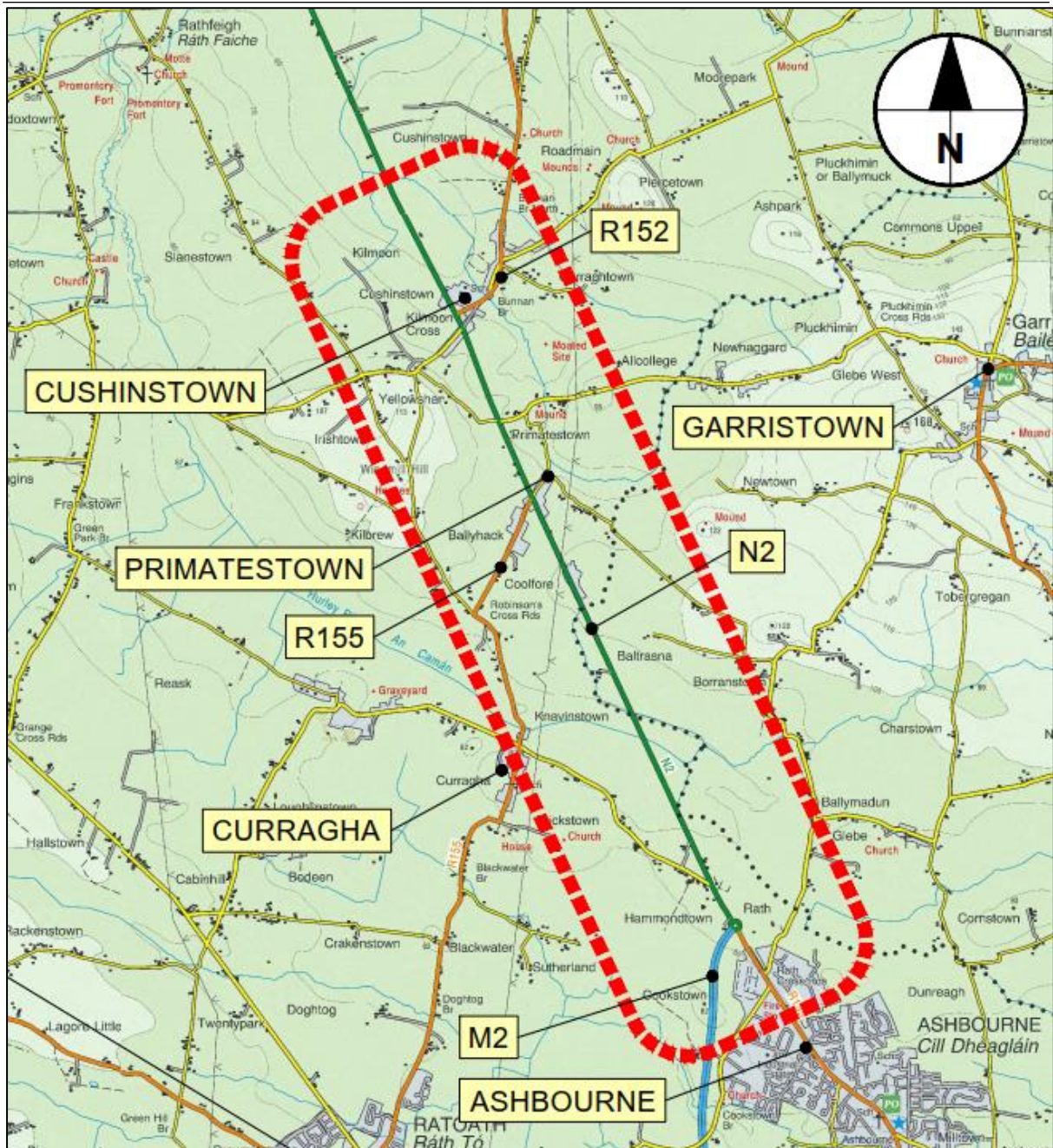


Figure 4-1 – Constraints Study Area in a Local Context

4.3 Public Consultation 01 – Study Area, Constraints and Scheme Options

The Constraints Study is the initial step in the option selection process and does not normally involve a formal public consultation. In accordance with the TII Project Manager’s Manual 2019, the first non-statutory public consultation should be held to inform stakeholders of the preliminary options developed and the findings of the constraints study.

The first non-statutory public consultation was held after the constraints study had taken place on the 12th March 2020 and is explained in more detail in the Stage 1 – Preliminary Options Assessment chapter of the Option Selection Report, and the post consultation report is included in Appendix 9. During this first public consultation period, the study area, constraints and preliminary scheme options were put on public display, this provided an opportunity for the public to contribute to the decision-making process.

A website for the Scheme (www.n2rath2kilmoon.ie) was established which went live to the public on the 12th March 2020. The website is periodically updated containing the latest information on the progress of the scheme and includes the contact details of the project team and a submission box to allow members of the public to engage with the scheme.

4.4 Topography

The topography of the study area is shown in Figure 4-2, as well as Drawing CH-0001 (VTO) in Appendix 1. The topography is typically set between 70-100 m Above Ordnance Datum (AOD), it is generally flat and drains to the north / north east with the Hurley River being the main drainage artery. There are topographic features, such as Windmill Hill on the north-eastern part of the study area in County Meath, and areas of high ground in the western part of the study area in County Dublin (Fingal).

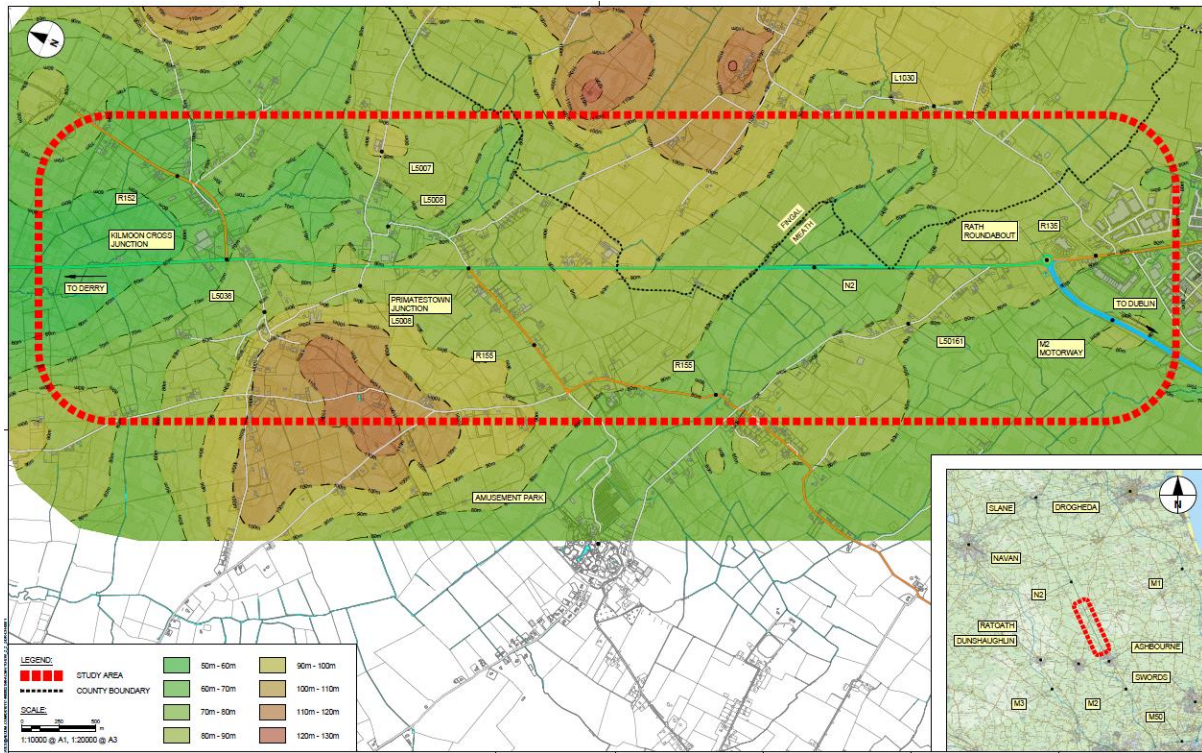


Figure 4-2 - Topography within Constraints Study Area

4.5 Land Ownership

An application was sent to the Property Registration Authority Ireland (PRAI) to obtain landownership data. The data was then used to produce a land ownership map of the study area with an associated register of the data obtained from the PRAI. An anonymised version of this map is shown in Figure 4-3, this is also included in drawing CH-0010 in Appendix 1. Each landholding is shaded in a different colour, areas with no shading are landholdings that are unregistered with the PRAI.

This data shows that land within the study area is owned by a mix of residents and companies and varies between some very large agricultural landholdings to clusters of much smaller residential landholdings, with ribbon development along some regional and local roads.

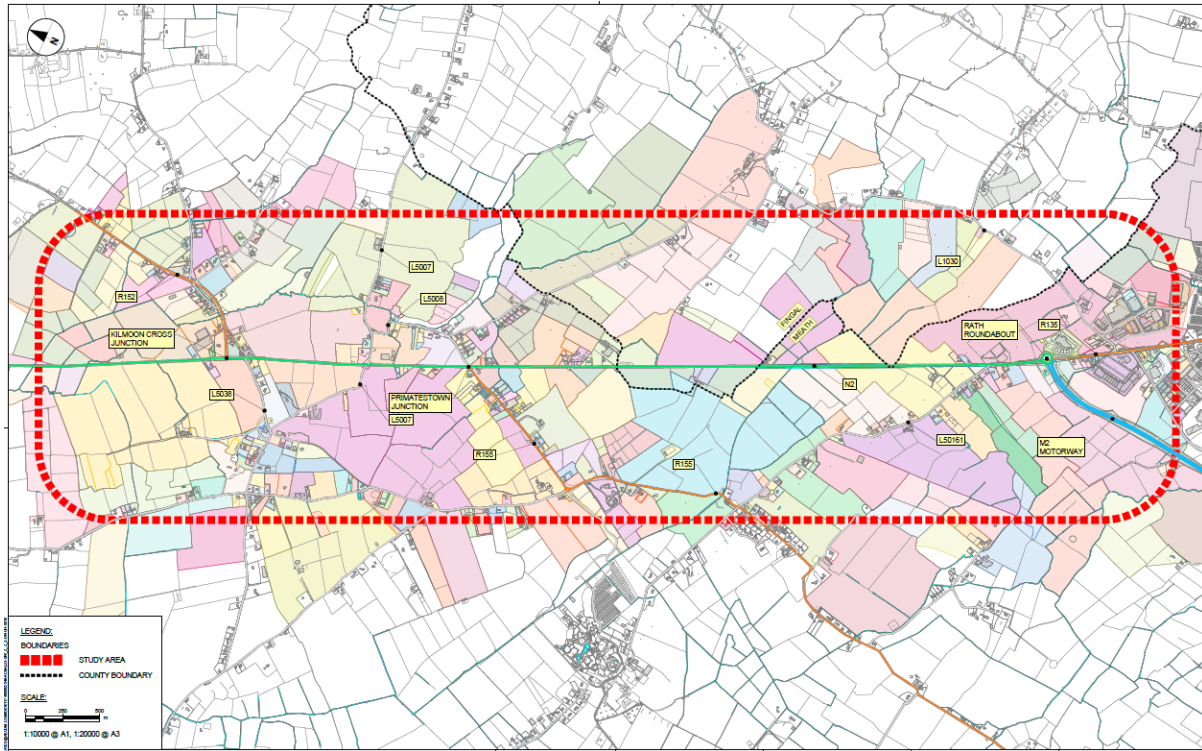


Figure 4-3 - Land Ownership within Constraints Study Area

4.6 Natural Constraints

The main natural constraints identified within the study area are summarised below:

- Biodiversity (incorporating Flora and Fauna):

The main biodiversity constraints include an area of rush dominated wet grassland located south of the Hurley River, as well as watercourses that drain into European and Nationally designated sites including the River Nanny Estuary SPA via the Hurley River and the Rogerstown Estuary SPA and SAC via a tributary of the Ballyboghill Stream.

- Water (incorporating Flood Risk and Hydrology):

The primary surface water feature in the Constraints Study Area is the Hurley River (EPA Code 08H01) as well as its tributaries and sub-tributaries. The OPW PFRA mapping identified a significant flood risk area around Hurley River, as well as flooding along the Riverstown and Curraghtown Rivers north of Kimoon Cross between the existing N2 and R152.

- Land and Soils (incorporating Soils, Geology and Hydrogeology):

Potential compressible soils were identified in areas with alluvial and estuarine subsoil deposits, some karst features were identified, as well as potential areas of differential settlement due to made ground at the Ashbourne Business Park. Two historic infilled quarries were also identified.

- Landscape and Visual:

A Highly Sensitive Landscape is located on the eastern side of the study area within the jurisdiction of Fingal County Council. On the western side of the study area, there is a locally significant protected view at Windmill Hill, which includes "Extensive views to the north east, mid distance heavily wooded. Dwellings, infrastructure and agriculture on left hand side. View to skyline with distinctive tower is locally distinctive" as stated in Meath County Development Plan 2021-2027. Numerous small clusters of houses sit along the N2 route, these receptors are highly sensitive.

4.7 Artificial Constraints

The main artificial constraints identified within the study area are summarised below:

- Engineering:

Key roads of interest along with the existing N2 include the R152 to Drogheda, the R155 to Ratoath, the R135 and M2 towards Dublin, as well as several local roads. Cycling and pedestrian facilities are currently limited, although two cycle routes are proposed at the southern end of the study area, including rural route M15 and urban route AS1.

- Land Use and Planning:

The main constraints consist of masterplan areas zoned for employment use to the north of Ashbourne in the Meath County Council Development Plan 2021-2027 and Fingal County Development Plan 2017-2023.

- Agronomy:

Key agronomy constraints include intensive horticulture sites, equine stud farms and a dairy farm which are all considered to be highly sensitive.

- Cultural Heritage (incorporating Architectural Heritage and Archaeology):

There are a number of cultural heritage constraints, these include recorded monuments such as mounds, enclosures, and churches at Crickstown and Kilmoon; protected structures including two houses at Kilmoon; as well as several designated landscapes. Other sites which are not subject to statutory protection but have cultural heritage significance include a former barracks at Kilmoon and the N2 national route itself which was established during the 18th century as a turnpike route.

- Utilities:

The key utilities in the study area include a Gas Networks Ireland transmission pipeline and the Eirgrid East-West Interconnector which traverse the southern end of the study area. There is a high voltage 110kV overhead ESB line which crosses the existing N2, as well as the Baltrasna 110kV substation at Knavinstown. The Irish Water reservoir at Rath is also a substantial constraint.

- Noise and Vibration:

No significant constraints have been identified in relation to noise and vibration, although a range of noise sensitive receptor types have been identified within the study area.

- Air Quality and Climate:

No significant constraints have been identified in relation to air quality and climate. However, there are overarching constraints associated with air quality such as the statutory requirement to continue to comply with the air quality standards for the protection of human health and vegetation, as well as the targets set out in the Climate Action Plan 2021.

- Population, Economy, Business and Tourism:

The main source of tourism is Tayto Park, located immediately to the west of the study area. This is listed in the top ten fee charging attractions in Ireland and generated 600,000 visits in 2018.

4.8 External Parameters

The main external parameters are the TII Standards and Guidance Documents which outline the scope of the project, as well as the required level of service, design requirements, and access control. The guidance documents also set out the design and evaluation process for the evaluation of the scheme options. This will help to ensure that any procedural and legal issues are minimised as the scheme is developed. Various European and Irish legislation in relation to the Environment as well as Safety, Health and Welfare should also be noted at the appropriate stages. Engagement with Stakeholders will also help to ensure that requirements are met.

Construction phasing of the scheme is also being considered as maintaining access of this route in some format will help all road users during any construction period. The scheme will also be considered with respect to all relevant planning policies including Capital Investment Plans, National Policy and County Development Plans.

4.9 Summary

Following the appraisal of the study area, a number of natural and artificial constraints have been identified as summarised in the sections above, these are shown in Figure 4-4 as well as in Drawing CH-0021 in Appendix 1.

The key natural constraints within the study area for the proposed scheme include the Hurley River floodplain which contains a flood zone, wet grassland habitat and compressible soils; as well as a Highly Sensitive Landscape located on the eastern side of the study area and a locally significant protected view at Windmill Hill.

The key artificial constraints within the study area for the proposed scheme include the existing M2 Motorway, N2 National Road and a number of Regional Roads; masterplan areas zoned for employment use to the north of Ashbourne; utilities including a Gas Pipeline, the East-West Interconnector and a 110kV Overhead Line; various cultural heritage assets including recorded monuments and protected structures; as well as Tayto Park which is a nationally significant tourism site.

These natural and artificial constraints are detailed in full within the Constraints Report which is included in Appendix 5 and should be read in conjunction with this chapter.

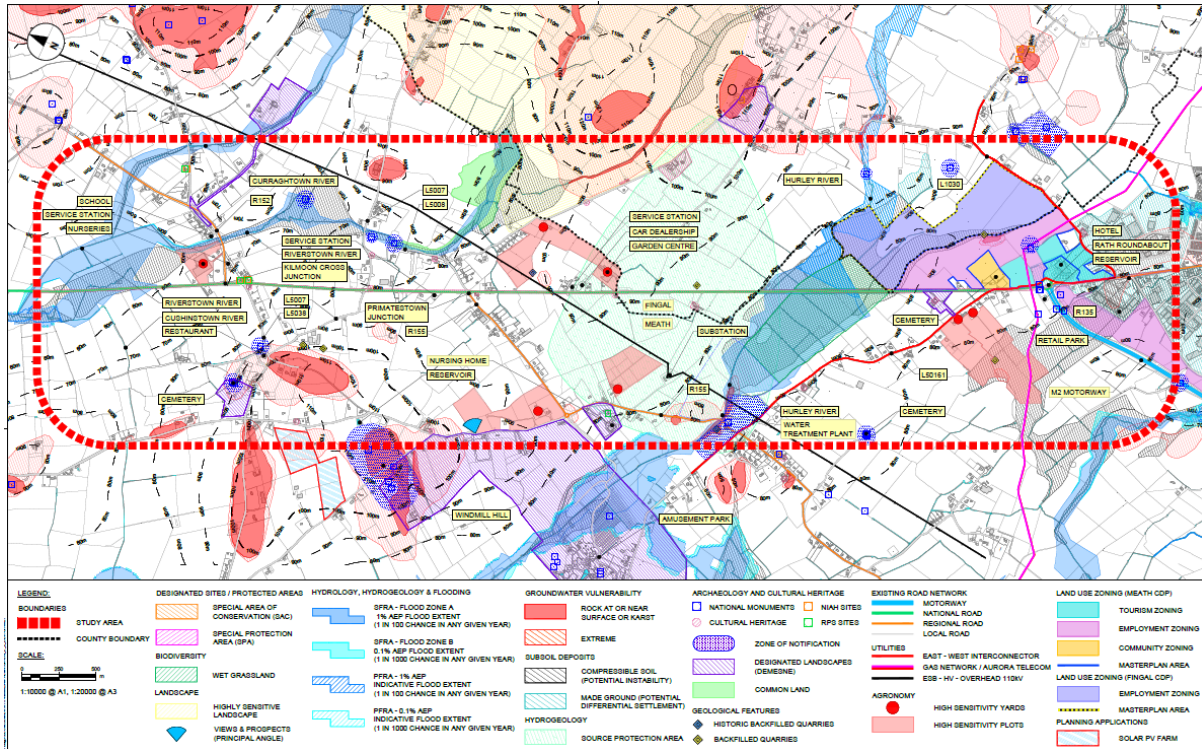


Figure 4-4 - Combined Natural and Artificial Constraints

4.10 Next Steps

The next phase of the project will be to identify suitable options for the N2 Rath Roundabout to Kilmoon Cross scheme. The subsequent study and the scheme options will be determined and assessed against the framework of constraints summarised above alongside any further constraints which come to light as part of the scheme development or public consultation processes.

5. Development of Feasible Options

The Transport Infrastructure Ireland (TII) Project Appraisal Guidelines (PAG) specify the requirements for the appraisal process for National Road projects. The overall aim of the appraisal process is to provide an assessment of whether a proposal is worthwhile and to clearly communicate conclusions and recommendations. The first step in this process is to identify whether there is need for intervention and this is followed by establishing appropriate objectives for the project. The third step involves considering possible alternatives and options to a roads project.

At an early stage in a project, all realistic ways of achieving the project objectives should be identified and examined critically. As required by the TII Guidance Document *PE-PMG-02042 – Project Manager's Manual*, a Do Nothing, Do Minimum and Do Something Options must be developed and assessed as potential options for the project. This should include an assessment of whether investment in alternative modes or management solutions would be more appropriate as a response to the problems identified. The definition of options should include descriptions of the options which allow them to be clearly differentiated from each other.

Initially, the possible options are considered in light of known issues, policies and constraints. This should lead to the elimination of some unfeasible options at an early stage, with a smaller subset of options advanced for more detailed consideration.

It should be noted that options are subject to change and development through the process of option selection and following design stages.

5.1 Do-Nothing / Do-Minimum Option

The 'Do-Nothing' consideration investigates the existing road infrastructure and its ability to meet future demands for traffic and safety without any upgrade works, other than routine maintenance.

The definition in the TII Project Appraisal Guidelines for National Roads (Unit 4.0 - Consideration of Alternatives and Options - PE-PAG-02013) is as follows:

"The Do-Nothing assumes that there will be no other investment in the transport network (other than regular maintenance) during the appraisal period beyond that being considered as part of the scheme under appraisal."

This option provides the baseline for establishing the economic, integration, safety, environmental and accessibility impacts of all options.

The Do-Minimum Option should include those transportation facilities and services that are committed within the appraisal period. The Do-Nothing Option is different from the Do Minimum as it assumes that there will be no other investment in the transport network (other than regular maintenance) during the appraisal period. A committed scheme is a scheme that has been progressed through planning and is either under construction or are programmed into the capital expenditure budget.

For both definitions listed above (Do-Nothing & Do Minimum) the option would be the same for this section of N2. There are no other committed schemes within the study area which could be considered. Therefore, the Do Nothing/Do Minimum option can be defined as the existing corridor with only normal regular maintenance to be accounted for.

5.2 Do Something – Do Managed Option

A Do Something option can utilise the existing asset where feasible through on-line improvements, bottleneck removals, road safety works, traffic management measures or Intelligent Transport Systems. This is referred to as the Do Managed option.

A number of Do Managed components were considered initially. These were then sifted to remove all components that were unfeasible as several potential components identified were not suitable or compatible with the existing infrastructure available, required further construction or land take was required for the component to be implemented. If the component was feasible, it was then evaluated at a high level against the project objectives. This assessment is set out in Table 5-1.

Based on this assessment process, the Do Managed option for the scheme is to be considered as an amalgamation of several of the components set out in Table 5-1. This ensures that the proposed option is not only feasible but supports as many of the project objectives as possible.

The Do Managed Option has been developed to include the following components:

- Increased Capacity at junctions through the provision of extra lanes where there is available space & improvement of those junctions
- Access control at junctions
- Provision of further bus services along this corridor to encourage a modal shift to public transport
- Demand Management of some form to help reduce the traffic numbers, such as distance-based tolling along the N2.
- It is noted that whilst the Do Managed Option is being considered as a combination of the aforementioned components (minor junction improvements, further bus services and tolling) for the purposes of the assessment process, some individual components of the Do Managed Option may also be considered as standalone complementary measures to be incorporated with another Do Something Option at the Emerging Preferred Option stage.
-

Table 5-1 – Do Managed Option Components

Mode	Type	Potential Component	Feasible	Supports Project Objectives	Some Justification
Roads	Road Capacity	Reversible lanes during peak times	No	-	This existing section of N2 is single carriageway and the hard shoulders do not provide the necessary width for additional lanes, so road widening would be required to provide the necessary carriageway width to implement this component.
		Hard shoulder running at peak times	No	-	This existing section of N2 is single carriageway and the hard shoulders do not provide the necessary width for additional lanes, so road widening would be required to provide the necessary carriageway width to implement this component.
		Increased Capacity at junctions	Yes	Yes	Where this available space, specific capacity increases on approaches to junctions will reduce the amount of queuing during peak times. This supports certain project objectives through improved journey times.
		Access control at junctions to manage access	Yes	Yes	Access control at certain junctions may support certain project objective through allowing more streamlined traffic flows during peak times. However, access control in the form of traffic lights has already been implemented at the Primatetown crossroads and this results in large tailbacks at peak times. Access control will not be suitable at every junction due to the close proximity of junctions along this section of N2.
		High occupancy lanes on hard shoulder	No	-	High occupancy lanes could potentially reduce the number of cars on the N2. However, there is not sufficient width on the existing N2 to allow for further lanes. Widening would be required for a high occupancy lane to be implemented.
	Road Priority	Freight and HGV lanes on hard shoulder	No	-	Freight lanes would improve journey times and speed for freight travel. However, there is not sufficient width on the existing N2 to allow for further lanes. Widening would be required for a freight/HGV lane to be implemented.
		Combined high occupancy and freight/HGV lanes on hard shoulder	No	-	High occupancy lanes could potentially reduce the number of cars on the N2. However, as mentioned previously there is not sufficient width on the existing N2 to allow for further lanes. Widening would be required for a combined high occupancy lane to be implemented.
		Banning of HGVs during certain times	No	-	The banning of HGVs would contribute to a significant reduction in the amount of traffic along this section of road. It would also improve road safety. However, the banning would not be feasible as there are no suitable alternative routes where HGVs could be redirected between Rath Roundabout and Kilmoon Cross.

Mode	Type	Potential Component	Feasible	Supports Project Objectives	Some Justification	
Sustainable Modes	demand	Single point tolling between M50 and Rath Roundabout/Kilmoon Cross	Yes	Yes	A single point toll would reduce traffic flows on the M2/N2 as the toll would reduce the amount of traffic using the R152/N2/M2 as a toll evasion for M1. Although the traffic levels would still be likely to be above that which a single carriageway cross-section can safely accommodate.	
		Fiscal management	Distance tolling on M2/N2 corridor (Short distances discouraged)	Yes	No	Tolling to discourage shorter trips could potentially encourage a shift to public transport in the local region. However, it would not reduce the demand for longer distance journeys between Dublin and the M50 through to Meath and further north towards Louth and Monaghan.
	Transport Systems		Incident detection	Yes	No	Incident detection would reduce the negative impact of collisions/events on traffic flow, but it would not resolve capacity issues unless viable alternative routes were provided after incidents.
		Intelligent Systems	Variable speed limits	Yes	No	Variable speed limits would result in more consistent journey times, less collisions and smoother traffic flow but it would not alleviate capacity issues. Significant infrastructure would need to be installed including overhead gantries and ducting for this to be implemented.
	Active Modes		Segregated cycleway on hard shoulders	Yes	No	Improved active mode infrastructure could cater for shorter trips but it would not alleviate the longer distance journey demand through this region. Furthermore, widening would be required to incorporate the cycleway with the existing N2. This could also be considered as a complimentary measure to be reconsidered in phase 3 prelim design once an emerging preferred option is selected.
			Off road cycleway following similar route as N2 corridor between Rath Roundabout and Kilmoon Cross	Yes	No	Improved active mode infrastructure could cater for shorter trips but it would not alleviate the longer distance journey demand through this region. Furthermore, additional land take adjacent to the N2 would be required for construction. This will be difficult due to the number of commercial and residential properties that are situated adjacent to the N2. This could also be considered as a complimentary measure to be reconsidered in phase 3 prelim design once an emerging preferred option is selected.
		Bus		Improved bus services running along the M2/N2 corridor	Yes	Yes

Mode	Type	Potential Component	Feasible	Supports Project Objectives	Some Justification
Policy	Planning Policy	Travel planning by nearby businesses and commercial enterprises to reduce car use	Yes	No	The small reduction in the number of trips resulting from local travel planning would be unlikely to resolve the extensive capacity issues on this section of M2/N2 corridor. A large proportion of vehicles are making longer distance journeys through the area
		Strategic land-use planning to reduce high intensity development near N2 corridor between Rath Roundabout and Kilmoon Cross	Yes	No	This would not provide an immediate solution to the capacity issues on this section of the N2. Furthermore, it would only result in a minor reduction of traffic as a large proportion of vehicles are making longer journeys through the area

5.3 Do Something – Public Transport Alternative Option

Do Something Options can also incorporate solutions which go beyond the utilisation of existing infrastructure, with additional land take possible to help facilitate these options. Solutions involving the implementation of Public Transport infrastructure which goes beyond the Do Managed Option are referred to as the Public Transport Alternative Option.

A number of Public Transport components were considered. These were then sifted to remove all components that were unfeasible as several potential components identified were unlikely to provide value for money from an economic perspective, such as an extension of the LUAS or a new heavy rail corridor. If the component was feasible, it was then evaluated at a high level against the project objectives. This assessment is set out in Table 5-2.

Based on this assessment process, the Public Transport Alternative Option for the scheme is to be considered as an amalgamation of several of the components set out in Table 5-2. This ensures that the proposed option is not only feasible but supports as many of the project objectives as possible.

The Public Transport Alternative Option has been developed to include the following components:

- Bus Lanes from Kilmoon Cross towards Dublin city centre with improved services running along the M2/N2 corridor. Due to the existing cross section of the N2, the introduction of bus lanes would likely require widening of the existing carriageway for the full length of the scheme depending on the proposed bus corridor design.
- Park & Ride facility located at Kilmoon Cross, with buses travelling towards the proposed Finglas Luas site at Charlestown (near the M50/N2 junction) and on towards Dublin city centre.
- It is noted that whilst the Public Transport Option is being considered as a combination of the aforementioned components (Bus Lanes and Park & Ride facility) for the purposes of the assessment process, some individual components of the Public Transport Option may also be considered as standalone complementary measures to be incorporated with another Do Something Option at the Emerging Preferred Option stage.

Table 5-2 - Public Transport Alternative Option Components

Mode	Type	Potential Component	Feasible	Supports Project Objectives	Some Justification
Sustainable Modes	Bus	Bus lanes from Kilmoon Cross towards Dublin city centre with improved services running along the M2/N2 corridor	Yes	Yes	<p>Improved bus priority could be facilitated through additional land take. There are existing bus services that operate along the existing N2, the journey time reliability of these services could be improved through the implementation of bus lanes.</p> <p>This may contribute towards a modal shift from private to public transport for some of the shorter distance radial trips along the N2 corridor to and from Dublin. However, this would be unlikely to generate a significant modal shift for some of the longer distance journeys that use this existing section of N2.</p> <p>This could also be considered as a complimentary measure to be reconsidered in phase 3 prelim design once an emerging preferred option is selected.</p>
		Park & Ride facility located at Kilmoon Cross, with buses travelling towards the proposed Finglas Luas site at Charlestown (near the M50/N2 junction) and on towards Dublin city centre.	Yes	Yes	<p>Whilst this alone would not alleviate the capacity issues along this stretch of the N2, a Park & Ride located at Kilmoon cross could create mode transfer from car to bus for radial trips from Kilmoon Cross/Ashbourne to Dublin.</p> <p>There is evidence of people parking their vehicles around the existing Kilmoon Cross junction and continuing their journey towards Dublin by bus. A designated parking area and well-designed bus stop facilities would improve safety conditions.</p> <p>This is likely to be a complimentary measure rather than a replacement for increasing capacity on the N2, which should be reconsidered in phase 3 prelim design once an emerging preferred option is selected.</p>
	Light Rail	Extension of proposed Finglas LUAS to Kilmoon	No	-	<p>This would provide fast and reliable access into Dublin and potentially encourage a modal shift from car to tram. However, it is unlikely to be feasible from an economic perspective to extend the Finglas LUAS all the way to Kilmoon as the construction of a new light rail line would carry a significantly greater cost compared to making changes to this section of N2.</p>

Heavy Rail

Construct rail line that offers a service running from the wider region No
within Meath via Ashbourne and into Dublin City centre

-

This would provide fast and reliable access into Dublin and potentially encourage a modal shift from car to rail for city centre trips. However, there is no existing rail line or historical rail corridor in this area. The construction of a new heavy rail line would carry a significantly greater cost compared to making changes to this section of N2.

5.4 Do Something – Online Widening and Offline Options

Online widening and offline options allow for solutions that use the available space within the Project Study area. These options can propose new infrastructure as well as utilising any existing infrastructure within the area.

A series of initial feasible route corridors were developed, these corridors were 200m in width. This was to account for all possible carriageway cross-section arrangements and to offer flexibility when developing road alignments within these corridors. However, some further flexibility was retained to potentially widen the corridors in places at a later stage if it was beneficial in terms of developing a more suitable alignment in order to avoid key constraints.

The horizontal geometry of the route corridors complied with the requirements for a design speed of 120 kph in accordance with TII Publications DN-GEO-03031 (*Rural Road Link Design*), which is the maximum permitted design speed in the Republic of Ireland. These route corridors therefore provided the flexibility for road alignments to be developed within these corridors later in the scheme development based on the horizontal geometry requirements of any potential carriageway cross-section selected from TII Publications DN-GEO-03031.

5.4.1 Initial Sifting of Do Something Options

Route Options at Windmill Hill

Some initial sifting of route corridors was undertaken based on the available constraints information prior to the Stage 1 assessment. Route corridors that traversed an area of high ground at Windmill Hill to the north-west of the study area were sifted out due to potential adverse environmental, landscape and archaeological impacts.

Southern Tie-In of Route Options

The southern tie-in of most route corridors was with the existing M2 at the existing roundabout at Rath, or slightly further to the south of the existing M2 at Cookstown.

Consideration was given to potential new junctions at the intersections between the existing M2 and existing roads further to the south as part of the N2 Rath Roundabout to Kilmoon Cross scheme. In particular, the crossing with the Ballybin Road at Ballybin, and the crossing with the R125 (Ratoath Road) at Harlockstown. These potential new junctions would have the benefit of improving connectivity between the town of Ratoath and the existing M2 Motorway.

The current M2 Motorway was originally part of the N2 Finglas to Ashbourne dual carriageway scheme that was completed in May 2006. Reference has been made to the Route Selection Report for the N2 Finglas to Ashbourne scheme to examine the rationale for the junction strategy at these two crossings of existing roads.

Potential Junction at R125

A key consideration for the N2 Finglas to Ashbourne scheme was to attract south-bound traffic flows emanating from the south side of Ashbourne in order to obtain optimum use. Furthermore, it was considered beneficial to minimise the number of junction accesses to the N2 Finglas to Ashbourne scheme to a practical amount whilst locating them to suit local access to the best advantage.

A possible junction on the R125 was first considered using a grade separated roundabout. Such a junction would have needed a supplementary link connecting to Nine Mile Stone on the south side of the existing R125 Ratoath Road because the existing road is sub-standard and contains ribbon development. Although this junction usefully provided a connection for traffic between R125 (east) and the N2 (south) the diversion route for traffic from the south side of Ashbourne would have not been attractive and there would have continued to use the existing N2 until it reached saturation.

Therefore, the preferred site of the South Ashbourne Interchange was at Fleenstown Little. The layout of the interchange was developed as a free flow junction of the “trumpet” layout type with a link road connecting to a new roundabout at Nine Mile Stone. This roundabout included arms from North Road (north & south) and the R125 (east & west).

A new junction at the intersection between the existing M2 Motorway and the R125 (Ratoath Road) as part of the N2 Rath Roundabout to Kilmoon Cross scheme was therefore discounted from further consideration. There would not be sufficient junction spacing due to the proximity to the existing South Ashbourne Interchange, and it would represent a significant detour for south-bound traffic flows emanating from the south side of Ashbourne if it was the only junction in the area.

Potential Junction at Ballybin Road

For the N2 Finglas to Ashbourne scheme, it was recognised from the traffic studies that the junction at the northern tie-in with the existing N2 should be located as close to Ashbourne as practicable. The preferred site of the northern tie-in was to the south of the existing water tower at Rath.

It was considered beneficial to minimise the number of junction accesses to the N2 Finglas to Ashbourne scheme to a practical amount whilst locating them to suit local access to the best advantage. It was also intended that most of the existing roads severed by the route will be bridged over the route of the N2 Finglas to Ashbourne scheme to avoid severance.

A new junction at the intersection between the existing M2 Motorway and the Ballybin Road as part of the N2 Rath Roundabout to Kilmoon Cross scheme was therefore discounted from further consideration. There would not be sufficient junction spacing due to the proximity to the existing Rath Roundabout. Such a junction would also need a supplementary link connecting to the R125 (Ratoath Road), possibly at the existing Ballybin Roundabout to the east of Ratoath, because the existing Ballybin Road is sub-standard and contains ribbon development.

5.4.2 Do Something – Online Widening Option (Route A)

The online widening option considered the widening of the existing N2 mainline between Rath Roundabout and Kilmoon Cross. This would extend beyond the existing footprint of the road and would require additional land take to facilitate the widening. This online widening option was referred to as Option A. The corridor for the online widening option, as previously mentioned, was 200m in width with an assumed cross-section of a Type 1 Dual Carriageway. This would likely require the acquisition of some areas of front gardens and curtilage, as well as realigned side roads, new accesses to dwellings and fields, and upgraded junctions.

A further option considered was the middle-ground between the Do-Managed option and the online widening option mentioned above. This option consisted of a single carriageway cross-section with some areas of widening for upgraded junctions beyond the existing public road boundary. However, after appraising the results of the previous Junction Upgrade Study undertaken by ARUP in 2015, it was decided to sift out this option. This was because localised junction upgrades would be operating at or close to capacity under existing traffic conditions, with no reserve capacity available to accommodate additional growth on the N2 and adjoining roads.

5.4.3 Do Something – Offline Route Options

The offline route options considered the construction of new sections of road which will require additional land take to facilitate these options, although some of these options involved sections of online widening of the existing N2. The corridors for the offline route options were 200m in width.

Overall, there were **7 main corridors** including the online widening option (Option A). When link variations were accounted for this gave a total of **13 Route Options** to be assessed. These route corridors are shown in Figure 5-1 as well as in Drawings CH-0007 and CH-0008 in Appendix 2. The route corridors in these drawings are connected by a series of nodes which are represented by circled numbers. These nodes illustrate where the route corridors intersected with one another and were used to amalgamate the route corridors to create a range of possible combinations.

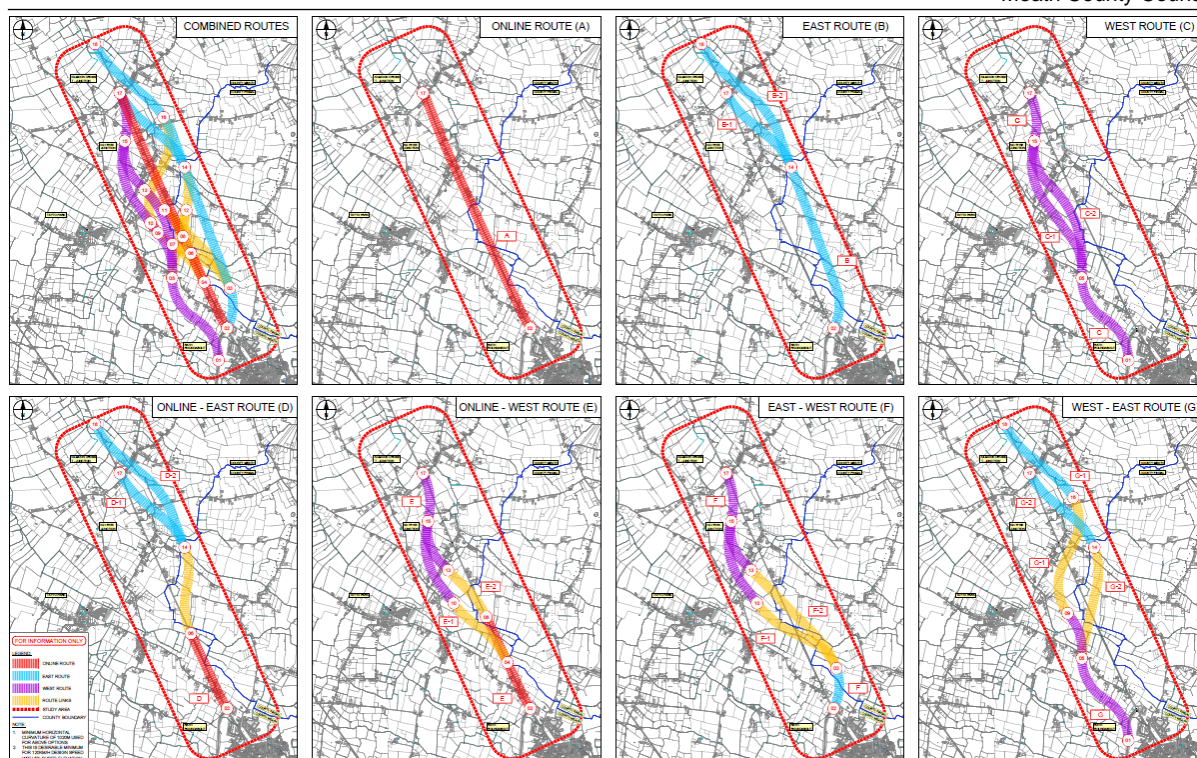


Figure 5-1 – Development of Initial Route Corridors

There were 3 overarching geographic zones of the various routes based on division of the study area:

- Online Route – (Red) – Online widening of the existing N2
- East Route – (Light Blue) – Offline route to the east of the existing N2
- West Route – (Purple) – Offline route to the west of the existing N2

Connecting these main route corridors were a series of Route Links (Yellow). The main route corridors and route links were then amalgamated to create a range of possible combinations, as listed below:

- Route A - (Online Route)
- Route B - (East Route)
- Route C - (West Route)
- Route D - (Online Route – Link – East Route)
- Route E - (Online Route – Link – West Route)
- Route F - (East Route – Link – West Route)
- Route G - (West Route – Link – East Route)

Within some of these route corridors were sub-options, for example Route C-1 and Route C-2 which provided further alternatives to be assessed at a local route level.

For each option, consideration was given for additional tie-in links to the R152 near Kilmoon as well as the M2 near Rath. However, in order to simplify the Preliminary Options Assessment, these would not be assessed at this stage, as these additional links were common to each of the route options. Instead, these additional links would be considered at a later stage following further refinement and understanding of the junction strategy and traffic issues.

Another option which was considered was the realignment of the R152 with a new single carriageway link road connecting with the existing N2 to the south of the Primtestown junction. This would result in two parallel single carriageway roads, a new road link carrying traffic towards Duleek and the existing N2 carrying traffic towards Slane. However, this option was sifted out as it would not satisfy all the objectives. There were concerns regarding safety as the existing N2 between the Primtestown and

Kilmoon junctions has a collision rate twice above the normal rate due to several junctions in close proximity as well as direct frontage of properties and farm accesses.

Prior to the first non-statutory public consultation, the route corridors that had been developed were simplified with a uniform colour for each route and the nodes were removed. These simplified route corridors are shown in Figure 5-2 as well as in Drawings CH-0005 and CH-0006 in Appendix 2

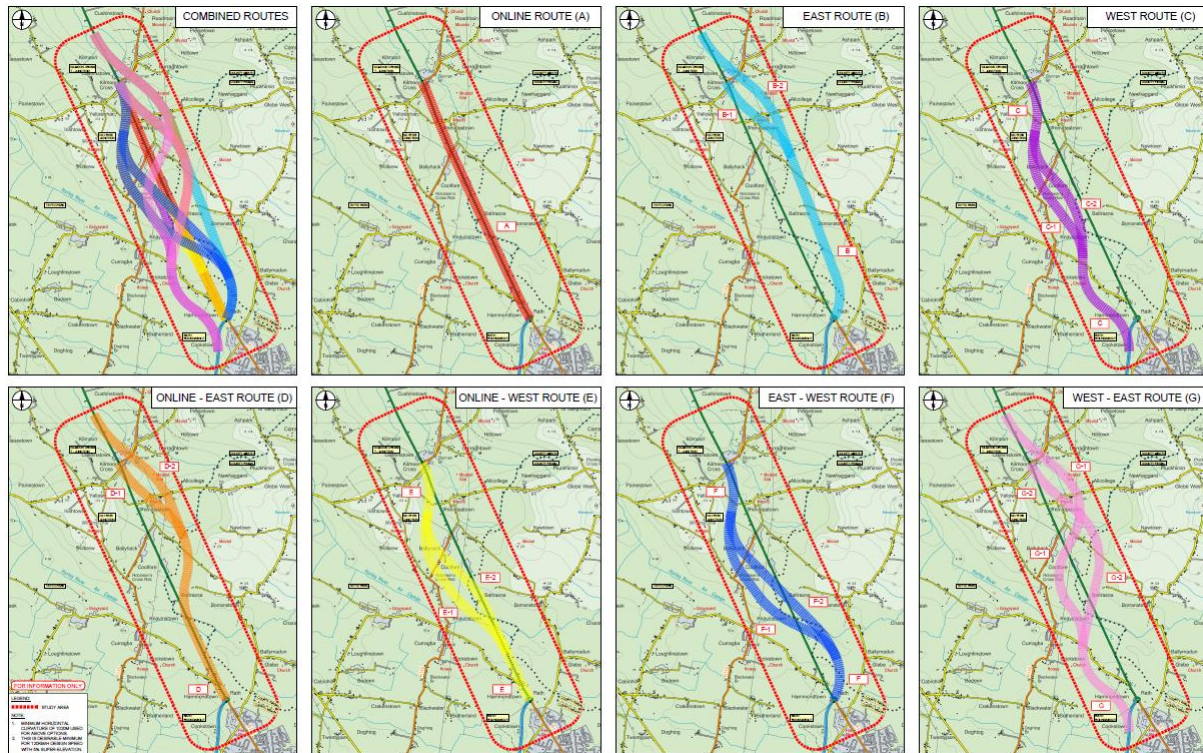


Figure 5-2 - Simplified Initial Route Corridors (For Public Consultation 1)

The **13 Route Options** are outlined in more detail in Table 5-3.

Table 5-3 – Initial Route Corridor Descriptions

Route Option	Route Colour	Route Description
Route A	Red	Online widening of the existing N2 mainline.
Route B-1	Light Blue	Offline route to the east of the existing N2 mainline, northern tie-in location with the existing N2 mainline at Kilmoon Cross.
Route B-2	Light Blue	Offline route to the east of the existing N2 mainline, northern tie-in location with the existing N2 mainline north of Kilmoon Cross. Route passes through gap between Kilmoon Cross Nurseries and Scoil Naomh Cianain.
Route C-1	Purple	Offline route to the west of the existing N2 mainline, northern tie-in location with the existing N2 mainline at Kilmoon Cross. Route passes through high sensitivity plots adjacent to R155.
Route C-2	Purple	Offline route to the west of the existing N2 mainline, northern tie-in location with the existing N2 mainline at Kilmoon Cross. Route passes through existing property adjacent to R155.
Route D-1	Orange	Online widening of the existing N2 mainline then linking with offline route to the east of the existing N2 mainline, northern tie-in location with the existing N2 mainline at Kilmoon Cross.
Route D-2	Orange	Online widening of the existing N2 mainline then linking with offline route to the east of the existing N2 mainline, northern tie-in location with the existing N2 mainline north of Kilmoon Cross. Route passes through gap between Kilmoon Cross Nurseries and Scoil Naomh Cianain.
Route E-1	Yellow	Online widening of the existing N2 mainline then linking with offline route to the west of the existing N2 mainline, northern tie-in location with the existing N2 mainline at Kilmoon Cross. Route passes through high sensitivity plots adjacent to R155.
Route E-2	Yellow	Online widening of the existing N2 mainline then linking with offline route to the west of the existing N2 mainline, northern tie-in location with the existing N2 mainline at Kilmoon Cross. Route passes through existing property adjacent to R155.
Route F-1	Dark Blue	Offline route to the east of the existing N2 mainline then linking with offline route to the west of the existing N2 mainline, northern tie-in location with the existing N2 mainline at Kilmoon Cross. Route passes through high sensitivity plots adjacent to R155.
Route F-2	Dark Blue	Offline route to the east of the existing N2 mainline then linking with offline route to the west of the existing N2 mainline, northern tie-in location with the existing N2 mainline at Kilmoon Cross. Route passes through existing property adjacent to R155.

Route Option	Route Colour	Route Description
Route G-1	Pink	Offline route to the west of the existing N2 mainline then linking with offline route to the east of the existing N2 mainline, northern tie-in location with the existing N2 mainline north of Kilmoon Cross. Route passes through gap between Kilmoon Cross Nurseries and Scoil Naomh Cianain.
Route G-2	Pink	Offline route to the west of the existing N2 mainline then linking with offline route to the east of the existing N2 mainline, northern tie-in location with the existing N2 mainline at Kilmoon Cross.

6. Stage 1 – Preliminary Options Assessment

The option assessment process seeks to identify a preferred option through a structured appraisal process. The assessment process will narrow down the number options to identify the preferred option, across the following three stages:

7. Preliminary Option Assessment;
8. Project Appraisal Matrix;
9. Selection of a preferred option;

This section of the report presents the Stage 1 – Preliminary Options Assessment.

6.1 Multi Criteria Analysis Approach

Each of the initial feasible options, were subjected to a multi-criteria analysis (MCA) under the assessment criteria of Engineering, Environment and Economy, in accordance with the TII Project Management Guidelines 2019 and the TII Project Appraisal Guidelines 2016. The options to be assessed included the Do Nothing/Do Minimum option (DN/DM), the Do Managed option (DMan), the Public Transport Alternative option (PTA), as well as the online and offline route options (A-G). The purpose of the Stage 1 assessment is to reduce the number of initial feasible route options to a minimum of four options to progress through a more detailed and refined assessment of the options as part of the Stage 2 – Project Appraisal Matrix.

The scoring procedure to assess the options follows the TII Guidance Document *PE-PAG-02031 Multi Criteria Analysis*. The amount of information available at this stage of the project did not allow for a comprehensive quantitative assessment and so the 7-point scoring method set out in the guidance document was simplified to a 4-point method for use in the Stage 1 assessment. This methodology ensured that a fair and reasonable assessment of the options could be undertaken based on the amount of information available, thereby reducing the amount of subjective variation in assessment.

All options identified were assessed in terms of High, Medium and Low Preference against the other options under the main headings of Engineering, Environment and Economy.

Low Preference 1 has also been introduced as part of the Stage 1 assessment scoring system; this denotes Option Sub Criterion with a Low Preference that has **constraints which will have a significant adverse impact on the deliverability of the option/project**.

The overall hierarchy of preferences are colour coded as shown in Table 6-1.

Table 6-1 – Stage 1 Multi-Criteria Analysis Scoring System

Scoring System	Colour Code
High Preference	Significant advantages over other options
Medium Preference	Comparable to other options
Low Preference	Significant disadvantage over other options
Low Preference 1	Significant adverse impact on deliverability of the option

At Stage 2, more information will become available and quantitative tools will have been developed for use at that stage. Therefore, the Stage 2 assessment will make use of the full 7-point scoring method set out in the TII Guidance document *PE-PAG-02031 Multi Criteria Analysis*.

For each main category, a number of sub-criteria were assessed at Stage 1:

Engineering:

- Compliance with Design Standards
- Earthworks
- Road Safety Impact Assessment
- Ease of Construction/ Constructability
- Service Conflicts
- Junction Strategy
- Structures
- Drainage
- Land and Property
- Traffic Assessment
- Groundwater – This is dealt with under the Environment sub-criteria
- Geology – This is dealt with under the Environment sub-criteria

Economic:

- Option Comparison Estimates

Environment:

- Biodiversity
- Water / Hydrology
- Land and Soil
- Geology, Geomorphology and Ground
- Groundwater / Hydrogeology
- Landscape and Visual
- Noise and Vibration
- Air Quality
- Climate
- Population and Human Health (Human Beings)
- Cultural Heritage
- Material Assets – Agriculture
- Material Assets – Non-Agriculture

6.2 Engineering Assessment

The Stage 1 Preliminary Options Appraisal process looked at the Engineering assessment under the sub-headings as detailed in the section above. The engineering assessment is shown in Table 6-2.

6.2.1 Compliance with Technical Standards

All the Do Something Route Options including the online widening option (Route A) were considered High Preference Options as they would be designed and constructed in accordance with the current TII standards. This would likely involve the alteration of existing direct accesses onto the mainline for the options involving sections of online widening (Routes D1, D2, E1 and E2) as well as the full online widening option (Route A). A Do Something/Do Managed Option and the Do Something Public Transport Alternative will not be entirely compliant with the current TII Standards, resulting in a Medium Preference score. The Do Nothing/Do Minimum Option was considered Low Preference as the current road does not meet the current TII technical standards in relation to junction type and layout.

6.2.2 Earthworks

Minimal to no earthworks are required for the Online Widening, Do Nothing/Do Minimum, Do Managed and Public Transport Alternative Options, resulting in a High Preference. Routes C2 & D2 were considered Low Preference as sections of the routes pass through areas of high ground.

6.2.3 Road Safety

All Offline Routes Options were considered as High Preference as they would be designed and constructed in accordance with current TII standards. The number of junctions and direct accesses would also be reduced, thereby improving safety.

Route Option A consists of online widening, which would bring the current carriageway up to current TII standards and reduce congestion on the route which would improve safety. Direct accesses would still cause concern for safety, but these would be removed where possible through the provision of side access roads. Overall, Route Option A was considered as medium preference.

The Do Nothing/Do Minimum Do Managed and the Public Transport Alternative Options were considered Low Preference due the high number of direct accesses to the N2 that would remain as well as a number of sub-standard junctions along the route.

The safety implications of the options were considered in further detail in the Road Safety Impact Assessment, this is included in Appendix 8.

6.2.4 Ease of Construction/ Constructability

The Do Nothing/Do Minimum Option was considered as High Preference as there is no construction required. Routes that were fully offline were considered as High Preference due to the minimal impact during construction on the existing traffic network. Routes which were partially offline and partially online were considered as Medium Preference. The Do Managed, Public Transport Alternative and Route Option A were all considered as Low Preference as any online improvements would have significant impact for existing traffic network during the construction period.

6.2.5 Service Conflicts

The Do Nothing/Do Minimum and the Do Managed Options were considered High Preference Options as they have no/minimal impact on services. The Public Transport Alternative and Route Option A were considered Low Preference as there will likely be an impact on utilities under the existing N2 as well as those which traverse the road such as the East-West Interconnector. Certain utilities may need to be relocated to account for the bus lane/online widening. The Offline Route Options were considered as Medium Preference as diversions may be required for utilities which traverse the study area such as the East-West Interconnector.

6.2.6 Junction Strategy

All the Offline Route Options were considered High Preference as the proposed routes will have a junction strategy that will ensure appropriate access control whilst maintaining links to the rest of the wider road network. The Do Nothing/Do Minimum, Public Transport Alternative and Route Option A were considered Low Preference as there will either be no change to the existing junction layout for the first 2 options and there will still be a number of direct accesses that will constrict flow along the route for the latter.

6.2.7 Structures

No/minimal change to existing structures for the Do Nothing/Minimum and Do Managed Options result in a High Preference score. All other Options were considered Medium Preference as new or improved structures would be required in order to implement the option

6.2.8 Drainage

Most of the Offline Options were considered High Preference as they would allow for all drainage to be built in accordance with TII guidance and standards. The C & G Route Options are considered medium preference as they pass through the flood plain of the Hurley River. The existing section of N2 has largely over the edge drainage which outfalls to adjacent watercourses, with limited attenuation provided. As a result, the existing drainage system is unlikely to be able to handle future storm events, so the Do Nothing/Do Minimum Option received a Low Preference score. Route Option A was considered as medium preference as there may be difficulties associated with bringing the existing stretch of the N2 up to the latest drainage standards, as well as limited space available to provide the required attenuation measures.

6.2.9 Land and Property

The Do Nothing/Do Minimum and the Do Managed Options were considered High Preference as both required no land take beyond the existing highway boundary. Route Options A, C and G all require extensive land take, especially of agricultural lands, which resulted in a Low Preference Score. Route Options B & F received a Very Low Preference score due to their extensive land take as well as passing through a large area of land zoned for employment/industrial use to the north of Ashbourne on both Fingal and Meath sides of the border. Options D and E received a Medium Preference score as the partial online widening sections would reduce the amount of severance compared to the fully offline options. Route Option A was considered as Low Preference as the land take would likely include numerous properties and associated curtilage that are located adjacent to the existing road, particularly around Primatestown.

6.2.10 Traffic Assessment

Route Options C, E and F were considered High Preference as they are all reasonably direct so offer good end to end journey times. The highest amount of traffic originates from the west of the existing N2, so in a scenario with a mid-link junction these options would also attract and distribute this traffic. Route Options B, D and G were considered as medium preference as they are all reasonably direct, however these options would not offer the same benefits in a scenario with a mid-link junction as less traffic is picked up on the east side of the existing N2. Route Option A was considered as Low Preference due to the negative impacts associated with closing existing online accesses where users would need to travel significant distances to access the N2. The Do Nothing/Do Minimum Option as well as the Do Managed and Public Transport Alternative Options were all considered Low Preference Options as these would not resolve the congestion and safety issues along the road as standalone options.

Table 6-2 - Stage 1 Engineering Assessment

Engineering	DN/DM	DMan	PTA	A	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2
Compliance with Technical Standards	L	M	M	H	H	H	H	H	H	H	H	H	H	H	H	H
Earthworks	H	H	H	H	M	M	M	L	M	L	M	M	M	M	M	M
Road Safety	L	L	L	M	H	H	H	H	H	H	H	H	H	H	H	H
Ease of Construction / Constructability	H	L	L	L	H	H	H	H	M	M	M	M	H	H	H	H
Service Conflicts	H	H	L	L	M	M	M	M	M	M	M	M	M	M	M	M
Junction Strategy	L	M	L	L	H	H	H	H	H	H	H	H	H	H	H	H
Structures	H	H	M	M	M	M	M	M	M	M	M	M	M	M	M	M
Drainage	L	M	M	M	H	H	M	M	H	H	H	H	H	H	M	M
Land and Property	H	H	M	L	L 1	L 1	L	L	M	M	M	M	L 1	L 1	L	L
Traffic Assessment	L	L	L	L	M	M	H	H	M	M	H	H	H	H	M	M

6.3 Economy Assessment

The Economy Assessment comprised of the preparation of Option Comparison Estimates in accordance with the requirements of the *TII CMM* and *PAG Unit: 6.2 Preparation of Scheme Costs*. In terms of the alternative options, no OCEs have been prepared for these options given they each assume the continued use of existing N2. It should be noted that these are Phase 2, Stage 1 Outline Option Comparison Estimates which will be subject to revision as the assessment process progresses.

This outline estimate provides a cost for each of the Route Options, summing the following 7 Base Costs (Includes VAT & Project Specific Risk Contingencies) to find a subtotal for each Option:

- Main Contract Construction
- Main Contract Supervision
- Archaeology
- Advance Works & Other Contracts
- Residual Network
- Land & Property
- Planning & Design

This Outline Estimate accounted for a 1% Inflation Allowance and a 10% TII Programme Risk. Each base cost had a project specific risk added. The Option Comparison Estimates (OCEs) can be seen below in Table 6-3. It should be noted that this estimate was only undertaken for the route options including the online widening option.

Preference scores were applied to the route options as set out in Table 6-4 according to a quantitative analysis of the OCEs. The banding of the preference ratings to be applied to the route options was based on a percentage threshold about the median OCE value which was calculated as €80 million. The median was considered rather than the mean as some route options such as G1 had much higher OCE values, this would distort the mean value which is sensitive to outliers.

As the OCE values of most of the route options were closely grouped together, a small threshold of 2.5% above and below the median value was used to determine the upper and lower bounds of the “Medium Preference” rating, this worked out as €82 million and €78 million respectively. These bounds were introduced to ensure a reasonable spread of scores to allow for a comparative assessment.

Based on these bounds, those route options with an OCE under €78 million were considered “High Preference”, and those above €82 million were considered “Low Preference”. The banding of the preference ratings for the route options are summarised below:

- High Preference – OCE under €78 million
- Medium Preference – OCE between €78 million and €82 million
- Low Preference – OCE over €82 million

This banding system resulted in a reasonable spread of Low, Medium, and High Preference ratings across the route options as part of the comparative assessment.

Route Options D1, E1 & E2 were considered High Preference Options as the OCEs for these options were under €78 million. The southern section of each of these options involved online widening of the existing N2 which reduced the main construction costs, but the northern section of these options would still require full offline construction and associated land acquisition costs. Some property acquisition costs were also included for these options.

Route Options A, B1, C1, C2, F1 and F2 were considered Medium Preference Options as the OCEs for these options were between €78 million and €82 million. Route Option A involved online widening of the existing N2 for the entire length, so additional property acquisition costs were included to account for the more densely populated area around the Primarestown junction. Route Options B1, C1, C2, F2 and F2 involved full offline construction and associated land acquisition costs along their entire length.

Route Options B2, D1, G1 & G2 were considered Low Preference Options as the OCEs for these options were over €82 million. Route Options B2, G1 & G2 were longer than most of the other routes and involved full offline construction and associated land acquisition costs along their entire length. Route Option G1 in particular had a very high OCE of over €100 million. Route Option D2 involved a section of online widening of the existing N2 which reduced the construction cost, but this option included an offline link across the R152 and the Riverstown River adjacent to the Kilmoon Cross Nurseries, which resulted in an overall higher OCE value. Route options B2 and G1 also included this link which contributed to the high OCE value of these options.

Preference scores were applied to the alternative options as set out in Table 6-4 according to a qualitative assessment as no OCEs had been developed for these options.

The Do Nothing / Do Minimum option would have no costs associated with it apart from the ongoing maintenance for this section of road so is considered as a High Preference Option.

The Do Managed Option would have minimal costs as the option would only include minor improvements within the existing public road boundary. Maintenance costs would increase marginally to account for the minor changes, so it is still a High Preference Option.

There are some costs associated with the Public Transport Alternative option. These include potential modifications to existing junctions within the public road boundary to facilitate the provision of bus priority, as well as the potential acquisition of small areas of additional non-agricultural land to facilitate the construction of bus lanes along the existing N2. However, these costs would likely be relatively minor in comparison to the route options, so this is also considered as a High Preference Option.

Table 6-3 - Stage 1 Outline Option Comparison Estimate

Base Costs (€ million) (2019 / 2020 Values)	A	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2
Main Contract Construction	42	48	56	51	50	47	55	47	44	49	48	63	55
Main Contract Supervision	1	2	2	2	2	2	2	2	1	2	2	2	2
Archaeology	4	5	6	5	5	5	6	5	5	5	5	7	6
Advance Works & Other Contracts	1	2	2	2	2	2	2	2	2	2	2	2	2
Residual Network	2	3	3	3	3	3	3	3	3	3	3	4	3
Land & Property	15	6	6	4	5	7	7	6	7	6	6	5	4
Planning & Design	3	3	4	3	3	3	3	3	3	3	3	4	3
Subtotal	69	68	79	69	70	67	77	66	64	69	68	87	75
<i>Total Inflation Allowance</i>	4	4	5	4	4	4	5	4	4	4	4	5	4
<i>TII Programme Risk</i>	7	7	8	7	7	7	8	7	6	7	7	9	8
PH2-Stage 1 – Outline Option Comparison Estimate (OCE)	80	79	91	80	81	77	90	76	74	79	78	101	87

Table 6-4 - Stage 1 Economy Assessment

Economy	DN/DM	DMan	PTA	A	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2
OCE	H	H	H	M	M	L	M	M	H	L	H	H	M	M	L	L

6.4 Environmental Assessment

The Stage 1 Preliminary Options Appraisal process also looked at the Environmental assessment under the appropriate sub-headings. The environmental assessment is shown in Table 6-5. A summary of the environmental assessment is provided below, further information on each of the environmental assessments is available in Appendix 6.

6.4.1 Biodiversity

The Do-Nothing / Do-Minimum and the Do-Management online options are all rated as 'High Preference' as they will have minimal habitat loss in comparison to other options, will not require any new watercourse crossings and will not impact the area of wet grassland that drains into the Hurley River. Route Option A is considered 'High Preference' as it is fully online, whilst this option may lead to some habitat loss along the existing N2, it will not require any new watercourse crossings and will not impact the area of wet grassland that drains into the Hurley River.

Route Options E-2 and F-2 were considered 'Medium Preference'. Route Option E-2 is partly online, which reduces the amount of habitat loss, no new watercourse crossings are required, although it is likely that the Hurley River Crossing would need to be widened, and this option will avoid the area of wet grassland. Although most of Route Option F-2 is offline, it will avoid the area of wet grassland as well as the Commons at Primatestown, and the new crossing point required over the Hurley River is upstream of the wet grassland area.

The remaining Route Options (B-1, B-2, C-1, C-2, D-1, D-2, E-1, F-1, G-1 and G-2) were all considered 'Low Preference' as they would result in significant impacts either the wet grassland and/or the commons area, and would require a number of new river crossings. These options would therefore result in higher levels of habitat loss.

The preferred option should seek to avoid the seminatural habitats, namely the area of wet grassland which drains into the River Hurley and a European Site and the Commons area near Kilmoon. These are the most natural areas in the study area and are likely to support species not commonly found elsewhere.

6.4.2 Water / Hydrology

Both Route Option B-1 and Route Option F-2 are considered of 'High Preference' as minor impacts on flooding have been identified for both options. Flooding on Route Option B-1 relates to crossings of the Hurley and Riverstown Rivers and flooding on Route Option F-2 relates to the Hurley River as the route skirts the edge of the floodplain.

The Do-Nothing / Do-Minimum and the Do-Management online options are all rated as 'Medium Preference' as the existing drainage is not in line with current TII best practice. These route options would have limited impacts on hydrology due to limited proposed works. There is potential for Route Option A to have a minor impact on the Hurley River flood plain located north of Ashbourne resulting from the widening of the existing road corridor. Offline Route Options D-1, and E-2 are also rated as 'Medium Preference' as there is potential for these route options to have a minor impact on the flood plain of Hurley River due to widening of the existing road corridor. Route Option D-1 has the potential to have a minor impact on the Riverstown River, however this is expected to be limited to crossings locations

The remaining C and G Route Options and Route Options B-2, D-2, E-1, and F-1 are rated 'Low Preference'. Route Options B-2 and D-2 will potentially have a major impact on Riverstown River to east of Kilmoon Cross, while Route Options C-1, C-2, E-1 and F-1 are all considered to potentially have a major impact on the Hurley River and flood plain to north of Ashbourne. Both Route Options G-1 and G-2 would potentially have a major impact on the Hurley River and flood plain to north of Ashbourne and on Riverstown River to east of Kilmoon Cross.

6.4.3 Land and Soil

The Do-Nothing / Do-Minimum and the Do-Something, Do-Public Transport Alternatives are considered 'High Preference' as these route options are not anticipated to impact soil through the loss or destruction

of agricultural soils as much as other routes. Route Option A is rated as 'Medium Preference' as it is expected to have limited impact on soils through loss and destruction of agricultural lands. All other route options (all offline options) are considered 'Medium Preference' as they will require more land take and the loss or destruction of agricultural soils. It is considered preferable from a land and soils perspective to adopt the route which takes as little land as possible.

6.4.4 Geology, Geomorphology and Ground

The Do-Nothing / Do-Minimum and the Do-Something, Do-Public Transport Alternatives are considered 'High Preference' as no constraints associated with ground conditions are anticipated based upon published drift and solid geology mapping. Route Options A, C and D Route Options, Route Option E-2 and Route Option F-2 are all rated as 'Medium Preference' as a limited number of constraints associated with ground conditions are anticipated. The remaining Route Options B, E-1, F-1 and G are rated as 'Low Preference' as there are a medium to high number of constraints associated with ground conditions anticipated based on published drift and solid geology mapping.

6.4.5 Groundwater / Hydrogeology

The Do-Nothing / Do-Minimum and the Do-Something, Do-Public Transport Alternatives are considered 'High Preference' as no impact on groundwater is anticipated. Route Options A, B-1, C-2, D-1, and E-2 and F-2 are rated 'Medium Preference' as limited impact to groundwater is anticipated based on hydrogeological and groundwater vulnerability mapping. Route Options B-2, C-1, D-2, E-1, F-1, and both G route options are considered of 'Low Preference' as a medium to high impact to groundwater is anticipated based on hydrogeological and groundwater vulnerability mapping.

6.4.6 Landscape and Visual

The Do-Nothing / Do-Minimum and the Do-Something, Do-Public Transport Alternatives are rated 'High Preference' as these route options are not anticipated to significantly differ from the existing baseline scenario for landscape and visual impacts.

Route Options A, D, and E are considered to be of 'Medium Preference'. Route Option A will use the majority of the existing road corridor and will therefore least affect the landscape character of the study area. Visual effects will arise mainly due to the slight realignment of the N2 and the proposed widening of the existing road with associated vegetation and boundary impacts. Visual effects along Route Options D-1 and D-2 are considered high as sections of the route will be located adjacent to community facilities and a school, which are considered highly sensitive receptors. However, Options D-1 and D-2 use considerable lengths of the existing N2 alignment and have therefore less offline road development. As Route Options E-1 and E-2 contain significant sections of online widening, the proposed new offline sections will result in higher effects on the landscape character as they cross open green fields and run in close proximity to residential properties located along a section of the R155. Option E is also located outside of a 'High Landscape Sensitivity' designated area.

Route Options C and F are rated 'Low Preference'. Route Options C-1 and C-2 are amongst the longest offline routes which result in higher effects on the landscape character. Route Option C is located outside of a 'High Landscape Sensitivity', area however, is located in close proximity to residences and community facilities located along the R155. The proposed road alignment for Route Option C will result in an intensification of road infrastructure in an otherwise rural and greenfield setting. Route C-2, F1 and F2 passes through an existing property adjacent to the R155. Route Options F-1 and F-2 contain long sections of offline road development, resulting in high effects on the landscape character due to the introduction of extended offline road infrastructure both east and west of the existing N2.

Route Options B and G are the least preferred from a landscape and visual point of view. B and G Route Options contain long sections of offline road development resulting in high effects on the landscape character due to the introduction of extended offline road infrastructure and associated embankments. B Route Options are also located in a Landscape Character Area of 'High Sensitivity' and are in close proximity to many sensitive historic points of interest and will result in higher visual changes than Option A. Route Option B-2 passes through a gap between a commercial premises and a primary school. Route Options G-1 and G-2 have the longest extent of offline sections and will have the highest impact on existing stands of trees and hedgerows when compared to all other route options. These route options are also close to many highly sensitive visual receptors including a primary school and several residential properties.

6.4.7 Noise and Vibration

The assessment has indicated that the Route Options B-2, C-1, C-2, F-1, and F-2, are of 'High Preference' as they have the lowest potential noise impacts due to having the lowest number of affected properties along their routes. They will also have a resulting positive impact on properties along the existing N2.

All Do-Nothing / Do-Minimum and Do-Management route options as well as Route Options B-1, D-2, E-1 and both of the G route options have been assigned a 'Medium Preference' in terms of the potential noise impacts. Route Option A would likely have a slight negative impact as baseline noise levels are predominant from road traffic noise from the existing N2. The impacts will depend on the actual alignment, in some instance the centre line may move further from properties resulting in a positive impact or in instances where the route moves closer the impact will be negative.

Route Options D-1 and E-2 have a 'Low Preference' as these routes will result in highest potential noise impacts to noise sensitive properties in the area.

6.4.8 Air Quality

The offline routes with the lowest potential to impact sensitive receptors and therefore have are considered of 'Highest Preference' with respect to air quality are Route Options C-1 and F-1. However, none of the offline routes have significant numbers of sensitive receptors and all have less than the current alignment, therefore are all considered minor or slight positive.

Along the current alignment, improvements in traffic management which have the potential to improve car emissions and encouraging a migration to public transport are considered preferable to a do-minimum scenario. The Do-Management Option and the Public Transport Alternative are rated 'Medium Preference'. Route Option B-1, C-2, E-1, F-2 and both G route options are also rated 'Medium Preference' based on the number of sensitive receptors likely to experience an increase in pollutant concentrations as a result of the Route Option.

The existing national routes are considered the primary sources of air pollution in the area and the existing alignment impacts 22 sensitive residential receptors within 50 m of the road edge. The existing route and Route Option A (Online Widening Option) have the highest number of receptors within 50 m of the road edge and therefore are considered to be "Low Preference" with respect to air quality. Other Route Options considered 'Low Preference' include Route Options B-2, D-1 and D-2 and E-2 based on the higher number of sensitive receptors likely to experience an increase in pollutant concentrations as a result of the Route Option.

6.4.9 Climate

The Public Transport Alternative is considered as 'High Preference' from a climate point of view as it has the best impact on the reduction of GHG emissions.

The Do-Nothing / Do-Minimum and Do-Managed Option options is anticipated to have a neutral impact on climate and are therefore rated "Medium Preference". It is anticipated there would be less construction phase GHG emissions however emissions are expected in the long term as traffic congestion may be higher'.

With respect to Climate, all offline routes are rated 'Low Preference' for climate as there is no significant difference between route options. Longer routes will require greater amounts of material for construction and will have high GHG emissions. Longer journeys will also produce higher GHG emissions. Route Option A is also considered 'Low Preference' as construction materials will be required to facilitate road widening resulting in GHG emissions.

6.4.10 Population and Human Health

The Do-Nothing / Do-Minimum and the Do-Something / Do-Management options are rated 'High Preference' as they do not cause any direct impacts on community resources and residential properties in the study area and are not likely to lead to any significant changes in noise levels or air quality in the study area.

Route Options B-1, C-1, C-2, F-1, F-2 and G-2 are rated 'Medium Preference' as all have the potential to result in less demolitions of residential properties than the other offline route options. However, these options all have the potential to result in direct impacts on commercial properties. Route Options B-1, B-2, and G-2 will also result in direct impacts on an amenity area known locally as 'The Commons'.

Route Options A, D-1 and E-2 are rated 'Low Preference' as all have potential to result in the demolition of a considerable number of residential properties and have potential to result in impacts on commercial properties. Route Option E-1 h also has potential to result in an impact on the cemetery on the N2. Route Option D-1 will also result in direct impacts on an amenity area known locally as 'The Commons'.

Route Options B-2, D-2 and G-1 are considered to be of the lowest preference as they have potential to result in the demolition of the Scoil Naomh Cianain primary school and will result in direct impacts on an amenity area known locally as 'The Commons'.

6.4.11 Cultural Heritage

Route Option A is considered 'High Preference' from an archaeological, architectural and cultural heritage perspective. No direct impacts are predicted upon archaeological, architectural and cultural heritage sites that are subject to statutory protection. Furthermore, this route option would not require large areas of greenfield land to be taken, thus minimising impacts on previously unrecorded sites of archaeological potential.

Route Options C-1, C-2, E-1, E-2, F-1 and F-2 are all rated 'Medium Preference'. Whilst no direct impacts are predicted upon archaeological, architectural and cultural heritage sites that are subject to statutory protection, all route options will travel across previously undisturbed greenfield areas, increasing the potential for direct negative impacts upon previously unrecorded archaeological sites.

Route Options B-2, D-2 and G-1 are all rated 'Low Preference' due to a potentially profound negative impact upon a recorded monument that is subject to statutory protection. These options also travel across previously undisturbed greenfield areas, increasing the potential for direct negative impacts upon previously unrecorded archaeological sites.

Route Options B-1, D-1 and G-2 are all considered to be the lowest preference of the Route Options, with a rating of 'Low Preference 1'. This is due to potential profound impacts on one recorded monument and two protected structures, all of which are subject to statutory protection and they travel across previously undisturbed greenfield areas.

6.4.12 Material Assets – Agriculture

The Do-Nothing / Do-Minimum and the Do-Something / Do-Management options are all rated 'High Preference' as they have the shortest footprint through agricultural land and will therefore cause the least loss of agricultural land and least effect from severance. Many of the potential impacts along the existing N2 can be effectively mitigated.

Route Options B-1, D-1, E-2, and F-2 are considered 'Medium Preference'. Route Options D-1 and E-2 will have relatively lower land-take and severance impacts on individual farms. Route Option D-1 has 3 farmyards within its 100m wide footprint, one of which is high sensitivity and Route Option E-2 has 4 farmyards within its 100m wide footprint, one of which is high sensitivity. Route Options B-1 and F-2 have higher land-take and severance impacts on individual farms. Both Route Options B-1 and F-2 have 2 farmyards within its 100m wide footprint, one of which is high sensitivity.

Route Options C, E-1, F-1 and G-2 are rated as 'Low Preference'. Route Options C-1 and C-2 have a relatively high impact on farmyards and high sensitivity plots and will require significant land-take and severance impacts on individual farms. Route Option C has 4 farmyards within its 100m wide footprint one of which is high sensitivity and crosses a dairy farm and a stud farm. Route Options E-1 and F-1 are anticipated to have a high impact on highly sensitive land. Route Option E-1 has 4 farmyards within its 100m wide footprint, one of which is high sensitivity, while Route Option F-1 has 3 farmyards within its 100m wide footprint, one of which is high sensitivity. Route Option G-2 is anticipated to have a high impact on sensitive land and high land-take and severance impacts. Route Option G-2 has 3 farmyards within its 100m wide footprint, one of which is high sensitivity. It crosses a dairy farm and a stud farm.

Route Options B-2, D-2 and G-1 are the lowest preference when compared to the other Route Options. These options have a potentially profound impact on Kilmoon Cross Nursery, a very high sensitivity horticultural enterprise.

6.4.13 Material Assets – Non-Agriculture

The Do Nothing / Do Minimum Option and Do Something - Do Management Options are rated 'High Preference' as impacts on existing material assets are likely to be neutral.

The Do Something - Public Transport Alternative Option, and Route Option A are rated 'Medium Preference' as these options will potentially require the acquisition of additional non-agricultural land to facilitate the construction of the scheme. Route Options Route Options E-1, E-2, F-1, G-2 also rated 'Medium Preference' as they may require the acquisition of residential and commercial lands.

Route Options B, C and D, and Route Options F-2 and G-1 are all rated 'Low Preference' as they could potentially require the acquisition of a number of residential and commercial properties and / or lands.

Table 6-5 - Stage 1 Environmental Assessment

Environment	DN/DM	DMan	PTA	A	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2
Biodiversity	H	H	H	H	L	L	L	L	L	L	L	M	L	M	L	L
Water	M	M	M	M	H	L	L	L	M	L	L	M	L	H	L	L
Land and Soil	H	H	H	M	M	M	M	M	M	M	M	M	M	M	M	M
Geology, Geomorphology and Ground Conditions	H	H	H	M	L	L	M	M	M	M	L	M	L	M	L	L
Groundwater	H	H	H	M	M	L	L	M	M	L	L	M	L	M	L	L
Landscape & Visual	H	H	H	M	L 1	L 1	L	L	M	M	M	M	L	L	L 1	L 1
Noise and Vibration	M	M	M	M	M	H	H	H	L	M	M	L	H	H	M	M
Air Quality	L	M	M	L	M	L	H	M	L	L	M	L	H	M	M	M
Climate	M	M	H	L	L	L	L	L	L	L	L	L	L	L	L	L
Population and Human Health	H	H	H	L 1	M	L 1	M	M	L	L 1	L	L	M	M	L 1	M
Cultural Heritage	H	H	H	H	L 1	L	M	M	L 1	L	M	M	M	M	L	L 1
Material Assets - Agriculture	H	H	H	H	M	L 1	L	L	M	L 1	L	M	L	M	L 1	L
Material Assets - Non-Agriculture	H	H	M	M	L	L	L	L	L	L	M	M	M	L	L	M

6.5 Public Consultation 01 – Study Area, Constraints and Scheme Options

In conjunction with the Stage 1 Assessment, the schemes first Public Consultation (PC1) was held on the 12th March 2020 between 4pm to 8pm at the Pillo Hotel in Ashbourne, County Meath. This event was arranged with the purpose of seeking feedback on the on the study area, constraints and scheme options. The design team had produced multiple drawings including the Artificial and Natural Constraints, Study Area and the Route Options. There were separate drawings for each of the Corridor Options alongside a combined drawing showing all Corridor Options. These drawings were displayed in addition to a poster detailing some of the other Stage 1 Options such as the Traffic Management Options and Public Transport Alternative Options.

Approximately 75 people attended the event, including landowners from within the study area, commuters from the wider area who use the route each day, councillors, TDs, and local business owners. Members of the design team as well as representatives from both Meath County Council and Fingal County Council were present to answer questions and inform attendees about the scheme, emphasising the importance of public feedback for the scheme via the questionnaire. Information Brochures and Questionnaires were made available both at the event and online.

The consultation period in which feedback could be submitted ran from March 12th to April 9th. During this period 54 submissions were received. Feedback from this non-statutory public consultation was reviewed by the design team and relevant feedback was used to assist the assessment of Stage 1 options. A summary of the feedback from Public Consultation 1 is presented below, and the post consultation report is included in Appendix 9.

The questionnaire asked whether the respondent owned/rented/occupied a property on/adjacent to any of the scheme options, which included the route options and the traffic management option. Typically, respondents stated they were affected by multiple routes. A breakdown by property type (not mutually exclusive) can be seen below in Table 6-6. The total number of respondents affected by each of the Scheme Options can be seen in Figure 6-1.

Table 6-6 - Property Types affected by each Scheme Option

Property Type	A	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2	TMO
Residential	12	9	8	24	21	10	10	17	17	18	17	26	16	2
Farm	10	6	8	10	9	7	8	9	9	9	9	13	8	3
Commercial	8	5	7	7	7	6	8	7	8	7	8	10	5	3

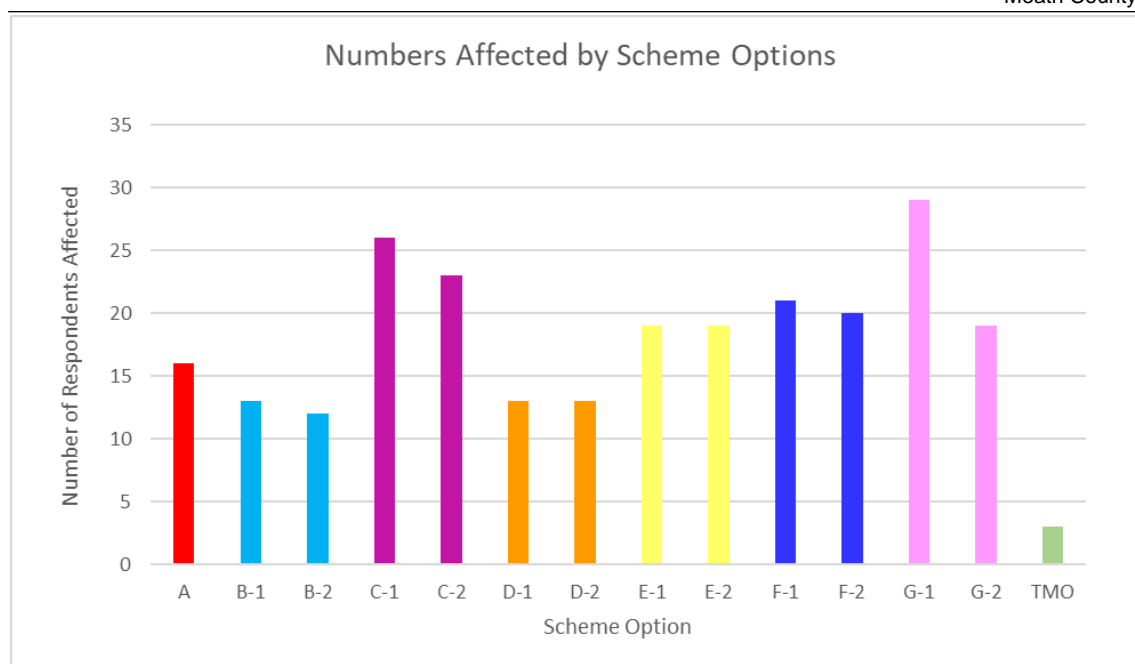


Figure 6-1 - Numbers affected by Each Scheme Option

There was a section at the end of the Questionnaire which allowed respondents to share feedback about the existing road and the implications of the scheme options. A summary of the main issues raised is included below:

6.5.1 Traffic, Road Safety and the need for the Scheme

- Many respondents discussed the current traffic problems and the resultant use of the minor roads as a way of avoiding congestion on the N2. The safety issues that result from this include risky driving by those using these roads as a “rat run” and locals being unable to walk on these roads for fear of an accident.
- The increase in traffic due to Tayto Park is a recurring comment from many respondents, claiming that the volume of traffic during the Summer months and weekends due to Tayto Park in combination with the high speed of motorists using these roads has made them much more dangerous.
- The traffic lights at the Primatestown Junction are cited by several respondents as a main factor contributing to the existing traffic problems. The tolls on the M1 and M3 are also seen as a core reason for the traffic problems on this stretch of the N2.

6.5.2 Community Issues

- Many residents of the study area are concerned about the effect the scheme will have on the rural nature of the area and the communities within.
- Also highlighted by residents was the potential division of lands as a result of the scheme.

6.5.3 Environmental & Noise Issues

- Many respondents commented on how some of the proposed routes go through a flood plain.
- The noise of cars on the new route was a major concern for many landowners in the area.
- Many respondents are concerned the scheme will damage the natural landscape of the area and the wildlife within the area.

6.5.4 Archaeological & Historical Issues

- Issues regarding Archaeological and Historical sites within the study area and surrounding area were raised by a large portion of respondents.
- One respondent gave an overview of the historic sites in the wider Meath area which included three National Monuments at Windmill Hill, Fourknocks Passage Tomb at Stamullen, and finally the proximity of the site to Newgrange and the Hill of Tara.
- Some respondents highlighted the importance of the Crickstown Graveyard and Castle.
- One respondent highlighted the commons area at Primatestown.

6.5.5 Farm and Commercial Properties

- Approximately a third of the submissions were from those who owned a farm or agricultural lands within the study area, resulting in a lot of submissions from respondents who were worried about the future of their farm. Many respondents claimed the current traffic situation was not bad enough to justify the destruction of their lands.
- It was noted by several respondents associated with a large local family run business that the local businesses which relied on passing trade would be negatively affected by scheme.
- The lands zoned for employment use to the east of the existing N2 adjacent to the Rath Roundabout were mentioned by some respondents, highlighting the importance of these lands for the future development of the Ashbourne area.

6.5.6 Other Comments

- The improvement of the public transport options in the study area was mentioned by several respondents as an alternative to an offline route option.
- One respondent gave a detailed recommendation of what they believed to be the best scheme option, paying particular attention to access to the industrial/employment lands at Rath Roundabout.
- A Meath County Councillor praised the scheme in their submission, emphasising the need for the scheme and its importance for connectivity to Dublin.
- A current TD and minister stated concerns for local businesses, farms and residents of the area in their submission.

6.6 Analysis of Stage 1 Assessment

Following the Stage 1 Preliminary Options Assessment, the results were analysed in order to determine which of the options should progress to the Stage 2 Project Appraisal Matrix. The number of preference ratings for each option was used to determine an overall score for each of the main criteria, as shown for Engineering in Table 6-7, for Economy in Table 6-8 and for Environment in Table 6-9.

To determine an overall score for each option, each of the preference types was assigned a numerical score. A numerical score of 3 was assigned for those with High Preference, which reduced consecutively down to a numerical score of 1 for those with Low Preference.

A negative numerical score of -1 was assigned for those with Low Preference 1, this reflects its usage for those that have **constraints which will have a significant adverse impact on the deliverability of the option/project**.

These numerical scores are summarised below:

- High Preference – 3
- Medium Preference – 2
- Low Preference – 1
- Low Preference 1 – -1

The total score for each option was determined by multiplying the number of preferences with their corresponding numerical score and summing the total score of each preference type. The overall average score for each option was then determined for each of the main criteria of Engineering, Economy and Environment, by dividing the total score by the number of sub-criteria within each of the main criteria.

Following this process, the total overall score was determined for each option by summing the overall scores for each of the main criteria, as shown in Table 6-10. This enabled the ranking of each of the options based on their overall performance against each of the main criteria.

It is noted that Unit 7.0 - Multi Criteria Analysis of the TII Project Appraisal Guidelines states that “*the preference scores for each of the main criterion is equal to the sum of the scores for each sub criterion*”. However, this approach of summing the preference scores would have resulted in the comparison between options becoming distorted, as the Economy criterion only had 1 sub-criterion whereas the Engineering and Environment criteria had 10 and 13 sub-criteria respectively.

The approach taken in terms of averaging the scores for each of the main criteria as opposed to summing them therefore ensured that all three of the main criteria had equal weighting as part of the analysis, with no bias towards any one of the three main criteria. Hence, the approach taken provided a more reasonable basis for comparison between the options.

The highest-ranking options shown in Table 6-10 represent those which performed the most favourably overall in the Stage 1 Preliminary Options Assessment in terms of engineering, economy and environment.

Table 6-7 - Stage 1 Engineering Preference Summary

Engineering	DN/DM	DMan	PTA	A	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2
No. of High Preference	5	4	1	2	5	5	5	5	4	4	5	5	6	6	4	4
No. of Medium Preference	0	3	4	3	4	4	4	3	6	5	5	5	3	3	5	5
No. of Low Preference	5	3	5	5	0	0	1	2	0	1	0	0	0	0	1	1
No. of Low Preference 1	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0
Total Engineering Score (Across 10 Sub-Criteria)	20	21	16	17	22	22	24	23	24	23	25	25	23	23	23	23
Overall Average Score (Engineering Criteria)	2.0	2.1	1.6	1.7	2.2	2.2	2.4	2.3	2.4	2.3	2.5	2.5	2.3	2.3	2.3	2.3

Table 6-8 - Stage 1 Economy Preference Summary

Economy	DN/DM	DMan	PTA	A	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2
No. of High Preference	1	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0
No. of Medium Preference	0	0	0	1	1	0	1	1	0	0	0	0	1	1	0	0
No. of Low Preference	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1	1
No. of Low Preference 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Economy Score (Across 1 Sub-Criterion)	3	3	3	2	2	1	2	2	3	1	3	3	2	2	1	1
Overall Average Score (Economy Criteria)	3	3	3	2	2	1	2	2	3	1	3	3	2	2	1	1

Table 6-9 - Stage 1 Environment Preference Summary

Environment	DN/DM	DMan	PTA	A	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2
No. of High Preference	9	9	9	3	1	1	2	1	0	0	0	0	2	2	0	0
No. of Medium Preference	3	4	4	7	6	1	4	6	6	4	6	9	4	8	3	5
No. of Low Preference	1	0	0	2	4	8	7	6	6	7	7	4	7	3	7	6
No. of Low Preference 1	0	0	0	1	2	3	0	0	1	2	0	0	0	0	3	2
Total Environmental Score (Across 13 Sub-Criteria)	34	35	35	24	17	10	21	21	17	13	19	22	21	25	10	14
Overall Average Score (Environment Criteria)	2.6	2.7	2.7	1.8	1.3	0.8	1.6	1.6	1.3	1.0	1.5	1.7	1.6	1.9	0.8	1.1

Table 6-10 - Stage 1 Preliminary Assessment Summary

Overall	DN/DM	DMan	PTA	A	B1	B2	C1	C2	D1	D2	E1	E2	F1	F2	G1	G2
Overall Engineering Score	2.0	2.1	1.6	1.7	2.2	2.2	2.4	2.3	2.4	2.3	2.5	2.5	2.3	2.3	2.3	2.3
Overall Economy	3.0	3.0	3.0	2.0	2.0	1.0	2.0	2.0	3.0	1.0	3.0	3.0	2.0	2.0	1.0	1.0
Overall Environment Score	2.6	2.7	2.7	1.8	1.3	0.8	1.6	1.6	1.3	1.0	1.5	1.7	1.6	1.9	0.8	1.1
Total Overall Score (Sum)	7.6	7.8	7.3	5.5	5.5	4.0	6.0	5.9	6.7	4.3	7.0	7.2	5.9	6.2	4.1	4.4
Ranking	2	1	3	11	12	16	8	9	6	14	5	4	9	7	15	13
Options Taken to Stage 2	YES	YES	YES	NO	NO	NO	NO	NO	YES	NO	YES	YES	NO	YES	NO	NO

6.7 Options Recommended for Stage 2

After analysing these results, seven of the options were chosen to progress to the Stage 2 as they performed the most favourably in all aspects of the assessment. These included the following:

Route Options

- Route Option D1
- Route Option E1
- Route Option E2
- Route Option F2

Alternative Options

- Do-Nothing Option
- Do-Managed Option
- Public Transport Option

In terms of the route options, Routes D1, E1 and E2 performed favourably overall so were carried forward to the next stage of the assessment process, these options had short mainline lengths and involved sections of online widening so were more economical compared to the fully offline options.

It is acknowledged that Route D1 was considered to be one of the lowest preferences out of the Route Options in terms of cultural heritage, with a rating of 'Low Preference 1'. This is due to potential profound impacts on one recorded monument and two protected structures, all of which are subject to statutory protection. Whilst these sites are within the overall corridor for this option, there exists the potential to develop an alignment within the corridor which minimises impacts on these sites. Therefore, it was considered appropriate to carry Route D1 forward.

Route D2 also involved sections of online widening, however this option was discounted as it was less economical despite the section of online widening due to its longer mainline length. This option also had significant negative environmental impacts at Cushinstown.

Route A was also discounted despite consisting entirely of online widening with the shortest mainline length, this is due to the significant land and property costs associated with this option as well as the negative environmental impact on dwellings surrounding the existing N2 corridor around the Primatestown junction.

The only fully offline route option to be carried forward was Route F2. This option performed similarly to Routes C1, C2 and F1 in terms of engineering and economy, however in terms of environment, Route F2 performed more favourably as it avoided the Hurley river floodplain. As a result of this, Route F2 scored higher in terms of water due to this option avoiding the associated flood zone and scored higher in terms of biodiversity and land & soil due to this option avoiding the wet grassland and compressible ground in this area. Therefore, Routes C1, C2 and F1 were discounted. Routes B1, B2, G1 and G2 meanwhile were all discounted as these options performed unfavourably overall.

It is acknowledged that the three alternative options may not necessarily satisfy all the scheme specific objectives, which are aligned with the six Common Appraisal Framework (CAF) criteria of: Environment, Safety, Physical Activity, Economy, Accessibility & Social Inclusion, and Integration. Therefore, these alternative options are unlikely to be an optimum for solution for the scheme as a direct replacement for increasing capacity along this section of the N2. However, these alternative options have been selected to progress to Stage 2 as they performed favourably against the Environmental and Economic criteria in the Stage 1 assessment and for the additional reasons outlined below.

In terms of the Do-Nothing alternative option, this will provide the baseline for establishing the economic, integration, safety, environmental and accessibility impacts of all options during the Stage 2 assessment. The biggest opportunities to reduce the carbon emissions associated with the proposed scheme and to build in resilience are during the planning phase. Therefore, as shown in Figure 6-2, the Do-Nothing option provides an opportunity to challenge the root cause of the need and to explore alternative ways to achieve the desired outcome.

In terms of the Do Managed and Public Transport alternative options, these will be considered as a combination of components which are both feasible and satisfy some of the scheme specific objectives for the purposes of the Stage 2 assessment. As shown in Figure 6-2, the Do Managed and Public Transport alternative options provide an opportunity to maximise use of existing assets and optimise asset operation, resilience and management to reduce the extent of new construction required. It is noted that some individual components of the Do Managed and Public Transport alternative options may also be considered as standalone complementary measures to be incorporated with another Do Something Option following the identification of an Emerging Preferred Option for the scheme at the conclusion of the Stage 2 assessment.

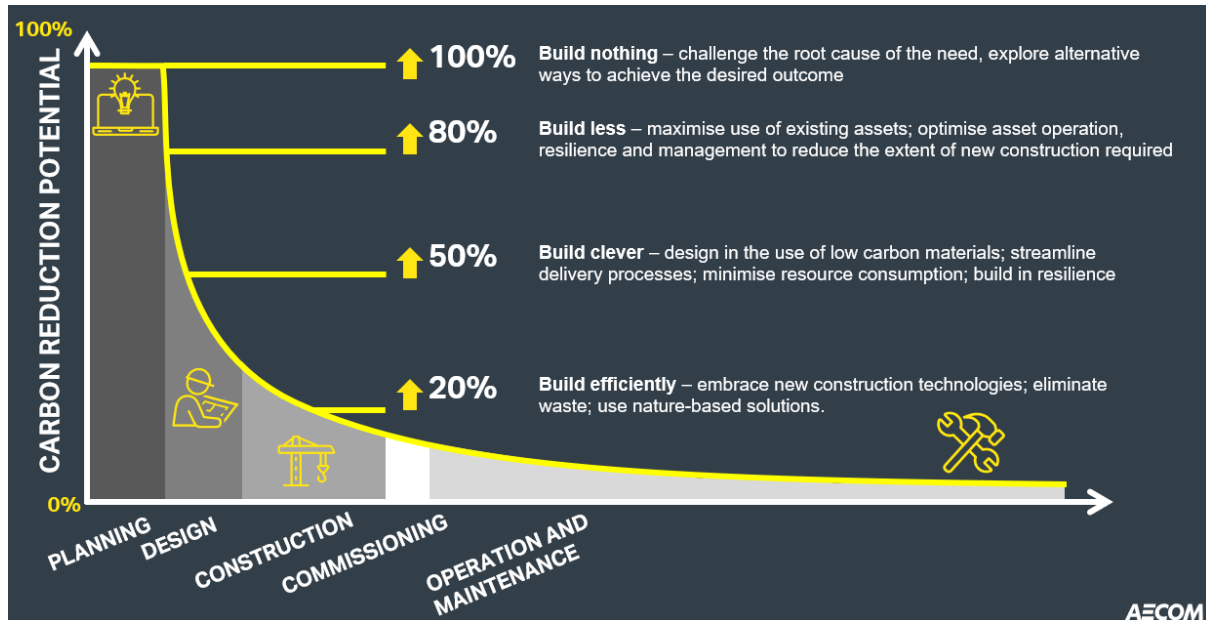


Figure 6-2 - Tackle carbon early. Adapted from: HM Treasury (2013) and Green Construction Board (2013)

7. Stage 2 Project Appraisal of Scheme Options

The option assessment process seeks to narrow down the number of options through a structured appraisal process across the following three stages:

1. Preliminary Option Assessment;
2. Project Appraisal Matrix;
3. Selection of a preferred option;

Following on from the Preliminary Option Assessment, this section of the report presents the Stage 2 – Project Appraisal Matrix.

7.1 Description of Stage 2 Options

7.1.1 Route Corridor Options

7.1.1.1 Route Corridors

Four 200m wide route corridor options were under consideration as part of the Stage 2 assessment, these are shown in Drawing CH-0022 in Appendix 3. These four route corridors included:

- Route D-1
- Route E-1
- Route E-2
- Route F-2

For each of these options, the 200m corridor does not represent the actual width of the road scheme or the lands to be acquired – the corridor indicates the lands within which a potential road alignment could be developed. It should be noted that the boundary of the route corridor may be subject to change as the project develops to address any new or previously unidentified constraints emerging during the design process or as part of the development of more detailed route alignments.

7.1.1.2 Preliminary Alignments

Initial mainline alignments were developed within the corridors of each route option to provide an early indication of the likely cross-section width including the extent of earthwork footprint and an estimate of resulting material cut/fill for consideration in the Stage 2 assessment. Whilst the initial alignments will be considered, the overall corridors will be assessed, as these initial alignments will continue to be adjusted and optimised within the corridors.

7.1.1.3 Preliminary Carriageway Cross-Section

The capacity (Level of Service) is determined by the Annual Average Daily Traffic (AADT). The vehicle flows in terms of AADT represent the approximate two-way flows corresponding to Level of Service D in reasonably level terrain. At Level of Service D speeds begin to decline slightly with slight increase of flows and density begins to increase somewhat more quickly. Freedom to manoeuvre within the traffic stream is more noticeably limited, and the driver experiences reduced comfort levels.

Based on the values of average daily traffic from the Automatic Traffic Count (ATC) data obtained during the traffic survey, undertaken specifically for this project in late 2019, and the AADT capacity outlined for level of Service D in TII Publications DN-GEO-03031, the two cross sections under consideration for the preliminary mainline alignments were as follows:

- Type 2 Dual Carriageway - Capacity: 20,000 AADT
- Type 1 Dual Carriageway - Capacity: 42,000 AADT

To select an appropriate cross-section for the Stage 2 assessment, the future year traffic flows were estimated using TII Central Growth Factors for Meath. These estimations assumed an opening year of 2030 and calculated the traffic flows for the opening year plus 15 years, so the traffic flows for 2045.

These future year traffic estimates were comfortably over the 20,000 AADT capacity for Level of Service D for a Type 2 Dual Carriageway cross-section from TII Publications DN-GEO-03031. Therefore, the assumed cross-section for the preliminary mainline alignments to be developed within the corridors of each route option was a Type 1 Dual Carriageway cross-section as shown in Figure 7-1.

Based on this assumed cross-section from TII Publications DN-GEO-03031, the design speed for the preliminary mainline alignments to be developed within the corridors of each route option was 100km/h. This design speed determined the geometric parameters for the design of the preliminary mainline alignments in the form of acceptable horizontal and vertical alignment geometry.

It should be noted that TII Publications DN-GEO-03031 states that the capacity figures are indicative for general guidance, and that the appropriate cross section shall be selected with reference to the TII Project Appraisal Guidelines. In line with this guidance a full incremental analysis will therefore be undertaken to identify the optimum cross section later in the scheme development.

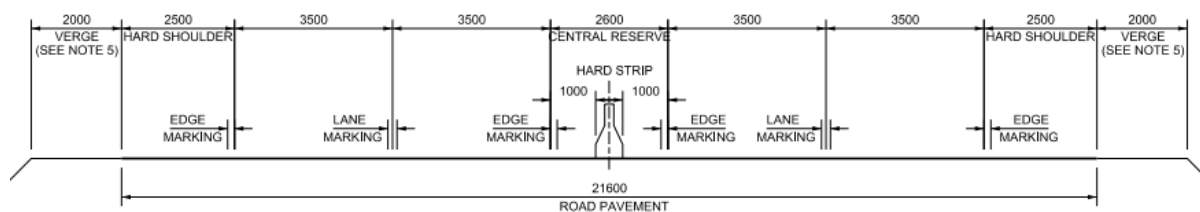


Figure 7-1 - Type 1 Dual Carriageway Cross-Section (TII Publications CC-SCD-00006)

7.1.1.4 Preliminary Junction Strategy

For the Stage 2 assessment the assumption was that for each route option there will be only two junctions, one at the southern tie-in at Rath and another at the northern tie-in at Kilmoon. There would be no intermediate junctions for any of the options, and all local and regional roads will be bridged over or under the mainline of the road. It should be noted that this preliminary junction strategy may be revisited later in the scheme development. Where it is demonstratable that an intermediate junction is beneficial then this will be considered by the project team as a potential option, however, this has not been addressed in detail at this point of the scheme development.

The assumed junction type, for the purposes of the stage 2 assessment, for the southern tie in with the M2 motorway at Rath was a grade separated junction. The provision of grade separation to segregate the through trips on the M2 / N2 from the local trips is a likely benefit of this junction form. It is noted that the tie into an improvement of the existing roundabout junction may also provide a solution at this location, however for the purposes of the assessment a grade separated junction was considered.

The assumed junction type, for the purposes of the stage 2 assessment, for the northern tie-in with the existing N2 and the R152 at Kilmoon was an at-grade roundabout junction. There is roughly a 50/50 split in traffic flows at the interchange between N2 and R152 based on the Junction Turning Count (JTC) data obtained during the traffic survey. Both roads are single carriageway up towards Slane and the M1 respectively. Therefore, a roundabout junction would likely be a safe and appropriate junction type for the termination of a dual-carriageway cross-section and connection with two single carriageways.

7.1.1.5 Junction Corridors

As there were several potential junction options still under consideration at Rath and Kilmoon, junction corridors were developed at the northern and southern tie-ins of each route option. The junction corridors covered roughly the same extent for all route options. At Rath the junction corridor was developed to allow for potential realignment of the N2 and M2, and at Kilmoon the junction corridor was developed to allow for potential realignment of the N2 and R152.

The junction corridors have been separated out as a separate option for appraisal at the Stage 2 assessment. These junction corridors are common to each route option, therefore by separating these areas out, this will allow for a more comparative assessment to be carried out on the remaining sections of the route options to inform the selection of an emerging preferred option. An appraisal of the entire junction corridors will be required so that the impact of all potential junction types can be established.

It is noted that these junction corridors may be subject to further refinement and amendment as the design development progresses.

7.1.1.6 Route Option D-1

Route D-1 is shown in Figure 7-2 as well as in Drawing CH-0024 in Appendix 3.

This option consists of a section of online widening of the existing N2 from the tie in with the M2 motorway at the southern junction corridor at Rath. This option then diverges from the existing N2 and bypasses the Primatestown junction in an offline section to the east of the existing N2. The offline section then ties in with the existing N2 and the R152 at the northern junction corridor at Kilmoon.

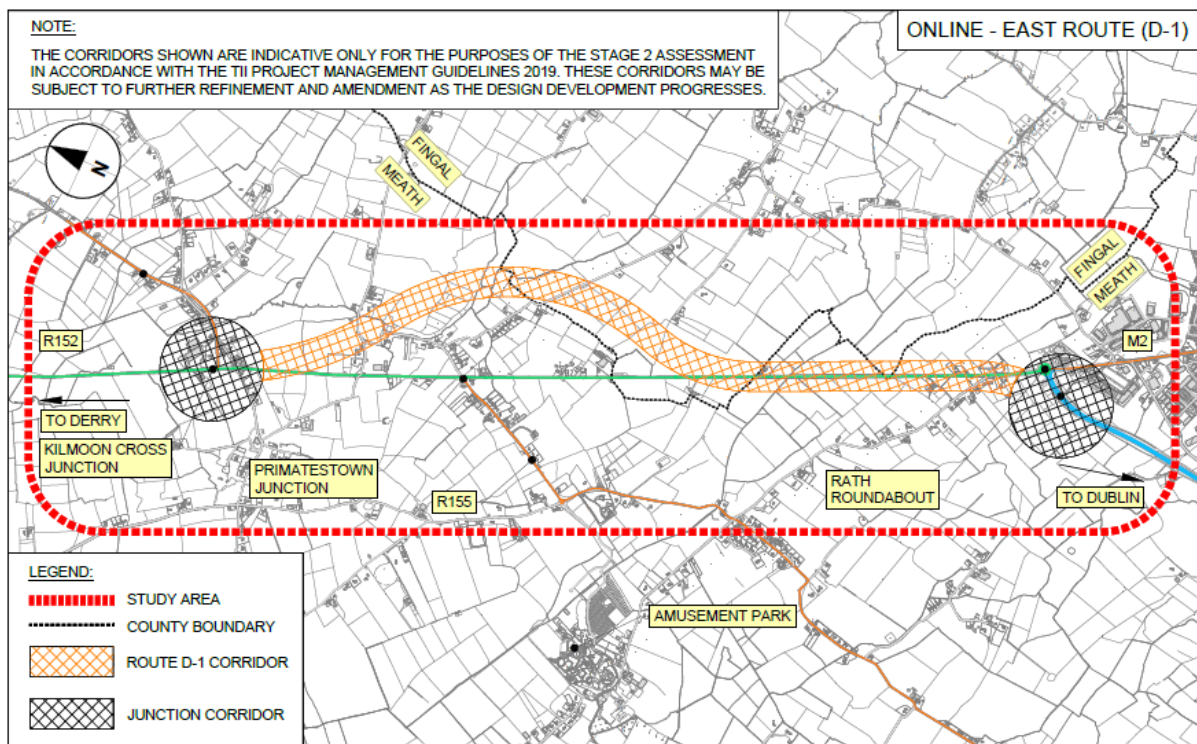


Figure 7-2 - Route Option D-1

7.1.1.7 Route Option E-1

Route E-1 is shown in Figure 7-3 as well as in Drawing CH-0025 in Appendix 3.

This option consists of a section of online widening of the existing N2 from the tie in with the M2 motorway at the southern junction corridor at Rath. This option then diverges from the existing N2 at the Hurley River Floodplain and bypasses the Primatestown junction in an offline section to the west of the existing N2. The offline section crosses the R155 and then ties in with the existing N2 and the R152 at the northern junction corridor at Kilmoon.

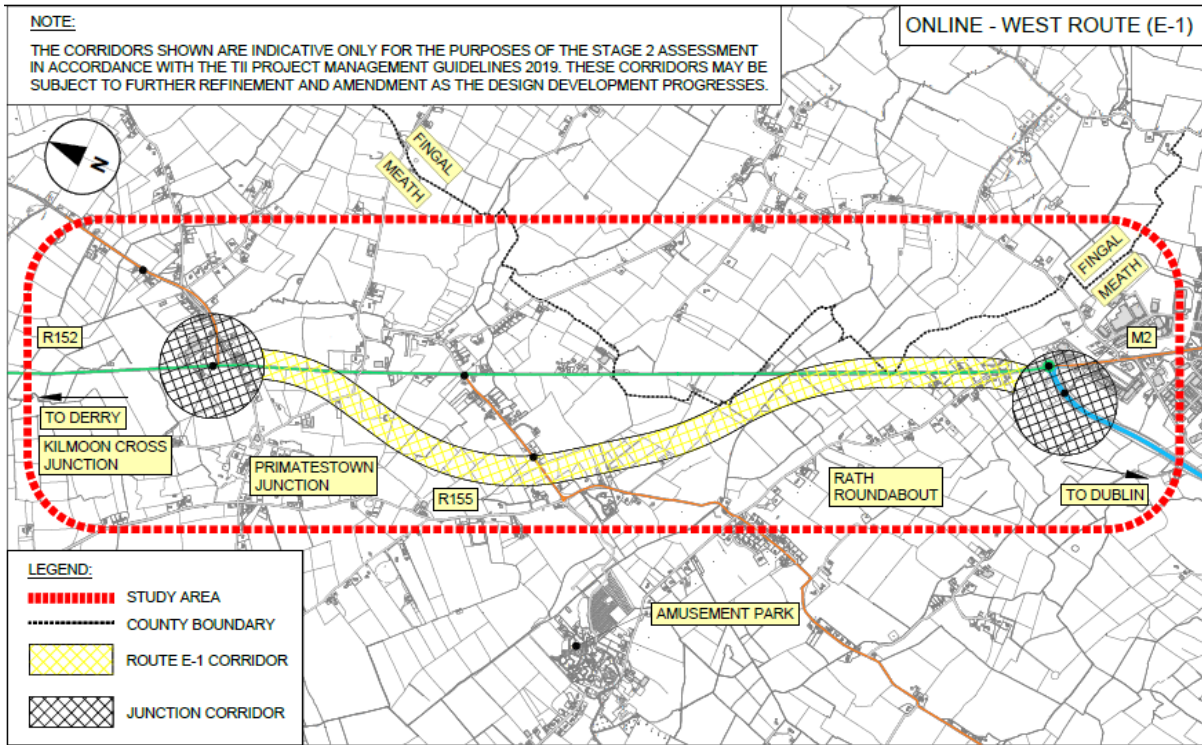


Figure 7-3 - Route Option E-1

7.1.1.8 Route Option E-2

Route E-2 is shown in Figure 7-4 as well as in Drawing CH-0026 in Appendix 3.

This option consists of a section of online widening of the existing N2 from the tie in with the M2 motorway at the southern junction corridor at Rath, this section of online widening is longer in comparison to Route E-1. This option then diverges from the existing N2 and bypasses the Primatetown junction in an offline section to the west of the existing N2. The offline section crosses the R155 but at a different location to the crossing point of Route E-1. The offline section then ties in with the existing N2 and the R152 at the northern junction corridor at Kilmoon.

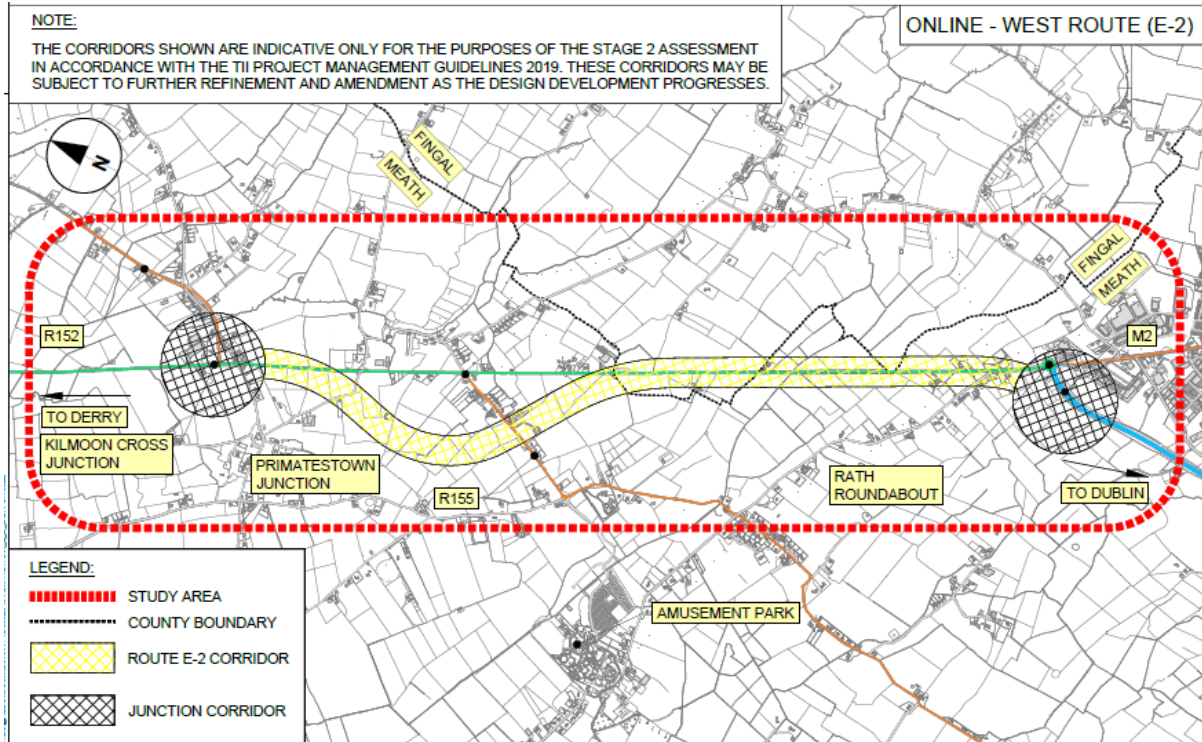


Figure 7-4 - Route Option E-2

7.1.1.9 Route Option F-2

Route F-2 is shown in Figure 7-5 as well as in Drawing CH-0027 in Appendix 3.

This option consists of a fully offline route which crosses the existing N2 and passes to the east from the tie in with the M2 motorway at the southern junction corridor at Rath. This option then changes direction and crosses back over the existing N2 and then bypasses the Primatestown junction to the west of the existing N2. This option crosses the R155 at the same location as the crossing point of Route E-2. The offline route then ties in with the existing N2 and the R152 at the northern junction corridor at Kilmoon.

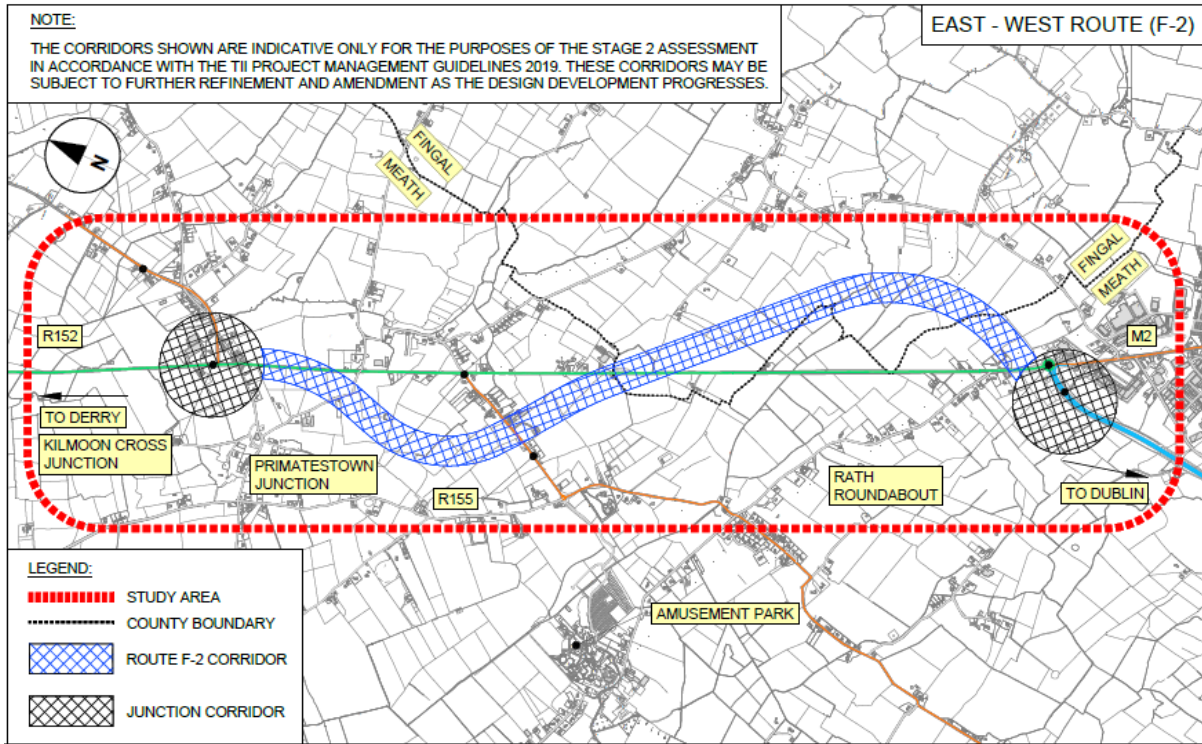


Figure 7-5 - Route Option F-2

7.1.2 Alternative Options

As well as the four route corridor options and the junction corridors, three alternative options were also under consideration as part of the Stage 2 assessment, these included:

- Do Nothing / Do Minimum
- Do Managed
- Public Transport

7.1.2.1 Do Nothing / Do Minimum

The definition of the Do-Nothing Option in the TII Project Appraisal Guidelines for National Roads (Unit 4.0 - Consideration of Alternatives and Options - PE-PAG-02013) is as follows:

“The Do-Nothing assumes that there will be no other investment in the transport network (other than regular maintenance) during the appraisal period beyond that being considered as part of the scheme under appraisal.”

The Do-Minimum Option should include those transportation facilities and services that are committed within the appraisal period.

For both definitions listed above (Do-Nothing & Do Minimum) this option is the same for this section of N2, as there are no other committed schemes within the study area. Therefore, the Do Nothing/Do Minimum option can be defined as the existing corridor with only normal regular maintenance to be accounted for.

This option provides the baseline for establishing the economic, integration, safety, environmental and accessibility impacts of all options.

7.1.2.2 Do Managed

The Do Managed option consisted of several different components which were both feasible and supported the project objectives, including the following:

- Increased capacity at junctions through the provision of revised layouts/additional lanes where there is available space.
- Bus Priority and Access control at junctions.
- Enabling the provision of further bus services along this corridor to encourage a modal shift to public transport.
- Demand management of some form to help control road usage patterns and reflect approaches on other similar national radial routes.

7.1.2.3 Public Transport

The Public Transport option again consisted of several components which were both feasible and supported the project objectives, including the following:

- Bus Lanes along the existing N2.
- Bus Priority improvements at Rath junction to reduce delays at peak times.
- Park & Ride facility along the existing N2.

For the Stage 2 assessment further information was available to allow refinement of the public transport option.

Bus occupancy surveys conducted on the N2 as part of this project showed significant residual passenger capacity on the existing buses on the N2, both public and private. On the day of the survey

in late 2019 a total of 41 buses travelled along the N2 (06:00 – 20:00) with an average passenger occupancy of only 11 people per bus. It should be noted that one private bus operator, specifically serving connecting locations along the N2 corridor to Dublin City, has a maximum occupancy of only 34 passengers. In total, a maximum of 1,000 – 1,500 people per day likely use the bus on this section of the N2 corridor.

Passenger trips observed on Public Service Obligation bus routes (PSO), i.e. those services operated by Dublin Bus and Bus Éireann, along the radial motorway corridors of the Greater Dublin Area are shown in Figure 7-6 below. This illustrates that the N2/M2 currently facilitates the lowest number of passenger trips. This is reflective of the population served by each corridor however it suggests some potential for growth on the corridor. In the context of the 20,000 – 25,000 car drivers and passengers currently using the N2, bus usage represents a share of 4-7% currently.

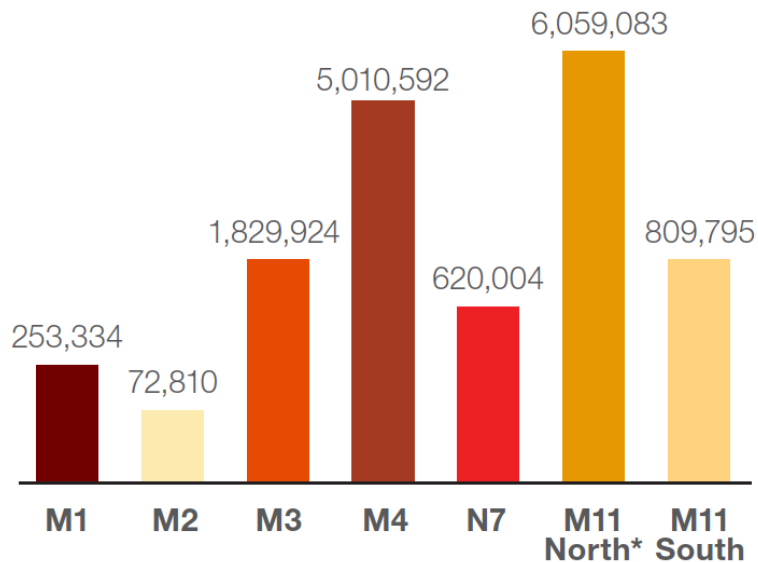


Figure 7-6 - Total PSO Passenger Trips by Corridor 2018

** Includes services from N11 South*

The consideration of options for this scheme has indicated that there is scope to increase bus patronage on the N2. The scope for investment in buses alone to fully address the project objectives is however limited for a number of reasons as outlined below.

- Buses need high quality roads to deliver an attractive service. The existing N2 is causing significant reliability issues for bus services and additional operational costs due to congestion related delays. This is reducing the attractiveness of buses for existing car users.
- High numbers of HGV's and buses travelling at lower speeds impacts all N2 users. The existing single carriageway offers limited safe overtaking opportunities which compounds this issue.
- Buses will be unlikely to reduce car demand sufficiently to resolve the existing congestion issues, therefore sole investment in bus would likely lead to continued congestion with associated safety issues for all road users.

Overall, it is recognised that investment in public transport is needed, as such this option is being considered in detail as part of the options selection process. However, due to the issues listed above, it is anticipated that improvements to bus services and frequency will be included as important complimentary measures, rather than as a direct replacement for investment in the safety and quality of the road along this section of the N2 which benefits all modes and all users, and in particular will facilitate the provision of improved and more attractive bus services and the improvement of the existing modal split of 4-7% as outlined above.

7.2 Multi Criteria Analysis Approach

The Common Appraisal Framework (CAF) published by the Department of Transport (DoT), March 2016, requires schemes to undergo a Multi Criteria Assessment (MCA) using the following criteria, where they are applicable:

- Environment
- Safety
- Economy
- Accessibility and Social Inclusion
- Integration
- Physical Activity.

The TII Project Appraisal Guidelines (PAG) adopts the above and sets out guidance for the appraisal of major road schemes which the N2 Rath Roundabout to Kilmoon Cross scheme is classified as. The adopted methodology for the Stage 2 Project Appraisal is in-line with the guidance set out in TII Document *PE-PMG-02042-01-Project Manager's Manual* (PMMs) and the TII PAG (notably *PE-PAG-02031-01_Unit7.0_Multi Criteria Analysis*).

Following this guidance, each of the assessment criteria is further divided into a number of different sub-criteria detailed below. It should be noted that whilst most of the environmental sub-criteria used in the Stage 2 assessment are aligned with the guidance in TII PAG Unit 7.0, there are some minor differences. As this scheme is of relatively short length, Hydrology and Hydrogeology have been combined into a single sub-criterion (Water), Archaeological and Cultural Heritage and Architectural Heritage have also been combined into a single sub-criterion (Cultural Heritage).

An additional sub-criterion has also been used in the Stage 2 assessment (Population and Human Health). This is not included in the guidance in TII PAG Unit 7.0, but this will be covered as a standalone chapter in the Environmental Impact Assessment Report (EIAR), if required at Phase 3, as per Environmental Protection Agency (EPA) guidance.

Environment

- Biodiversity
- Water
- Land and Soil
- Landscape & Visual
- Noise and Vibration
- Air Quality
- Climate
- Population and Human Health
- Cultural Heritage
- Material Assets - Agriculture
- Material Assets - Non-Agriculture
- Waste (This is a standalone sub criterion for Stage 2)

Safety

- Collision Reduction
- Security

Economy

- Efficiency and Effectiveness
- Wider Economic Impacts
- Transport Quality and Reliability
- Funding Impacts

Accessibility and Social Inclusion

- Deprived Geographical Areas
- Vulnerable Groups

Integration

- Transport Integration
- Land use Integration
- Geographical Integration
- Other Government Policy Integration

Physical Activity

- Ambience
- Absenteeism
- Reduced Health Risk

The scoring procedure used to assess the options follows the TII Guidance document *PE-PAG-02031 - Unit 7.0 - Multi Criteria Analysis*. The guideline sets out a 7-point scoring method with an integer to be assigned according to the impact level as set out in Table 7-1. The assessment carried out in Stage 2 will ultimately feed into further detailed analysis of a preferred option in Stage 3.

Table 7-1 - Stage 2 Multi-Criteria Analysis Scoring System

Impact of Option	Score
Major or Highly Positive	7
Moderately Positive	6
Minor or Slightly Positive	5
Not Significant or Neutral	4
Minor or Slightly Negative	3
Moderately Negative	2
Major or Highly Negative	1

The ranking of the proposed options based on the above scoring procedure will provide an indication of how each option performs against the objectives by showing their relative strengths and weaknesses. Whilst the high-level ranking of options will provide a guide to the impact of options, the overall impact will depend on the strength of individual impacts which will be considered as part of the assessment process.

7.3 Economic Appraisal

7.3.1 Objectives

The N2 is a strategically important National Primary Road providing links between Dublin and Derry/the northwest and to Dublin Airport and Dublin Port. The section of the N2 between the Rath roundabout to Kilmoon Cross is a single carriageway which is currently above capacity during peak periods on this corridor with circa 16,250 annual average daily traffic. Approximately 8% of this traffic is classified as Heavy Goods Vehicles.

The key economic objectives for this scheme include:

- To reduce journey times, improve journey time reliability and to improve the efficiency on the N2 corridor for all road users, including road based public transport.
- To support the economic performance of the wider region through the provision of improved transport infrastructure for all road users, including road based public transport which will reduce the cost of travel for communities, businesses, visitors and tourists and assist in reducing the overall cost of production thereby improving competitiveness.

7.3.2 Methodology

The Economic Appraisal element aims to ensure that the economic costs associated with investment in transport infrastructure are considered against the potential economic benefits generated by this investment. The Economy Appraisal was undertaken in accordance with TII's PAG Unit 6.0: Cost Benefit Analysis Overview, PAG Unit 6.1: Guidance on Conducting CBA, PAG Unit 6.2: Preparation of Scheme Costs, AG Unit 6.3 Guidance on Using TUBA, PAG Unit 6.4: Guidance on Using COBALT, PAG Unit 6.9 Wider Impacts, PAG unit 6.10 Reliability and Quality, PAG Unit 6.11 National Parameters Values Sheet and PAG Unit 7.0: Multi-Criteria Analysis. This section includes four types of economic appraisals to ensure that the economic costs and benefits associated with investment in transport infrastructure are fully evaluated. These consist of the following:

- Efficiency and Effectiveness
- Wider Economic Impacts
- Transport Quality and Reliability
- Funding Impacts.

7.3.3 Efficiency and Effectiveness

7.3.3.1 Do-Something Options

Following the development of the Transport Model for the scheme as detailed in earlier sections of this report, the four route options under consideration as part of the Stage 2 option selection process (Route Options D-1, E-1, E-2 & F-2) were input into the Transport Model, as shown in Figure 7-7.

The following sections provide a summary of the indicative impacts of each of the four route options in terms of traffic demand and other indicators such as travel time, average speed and vehicle kilometres travelled (vkm). Further details on the modelling of these options and the relevant outcomes are available in the accompanying Traffic Modelling Report (TMR).

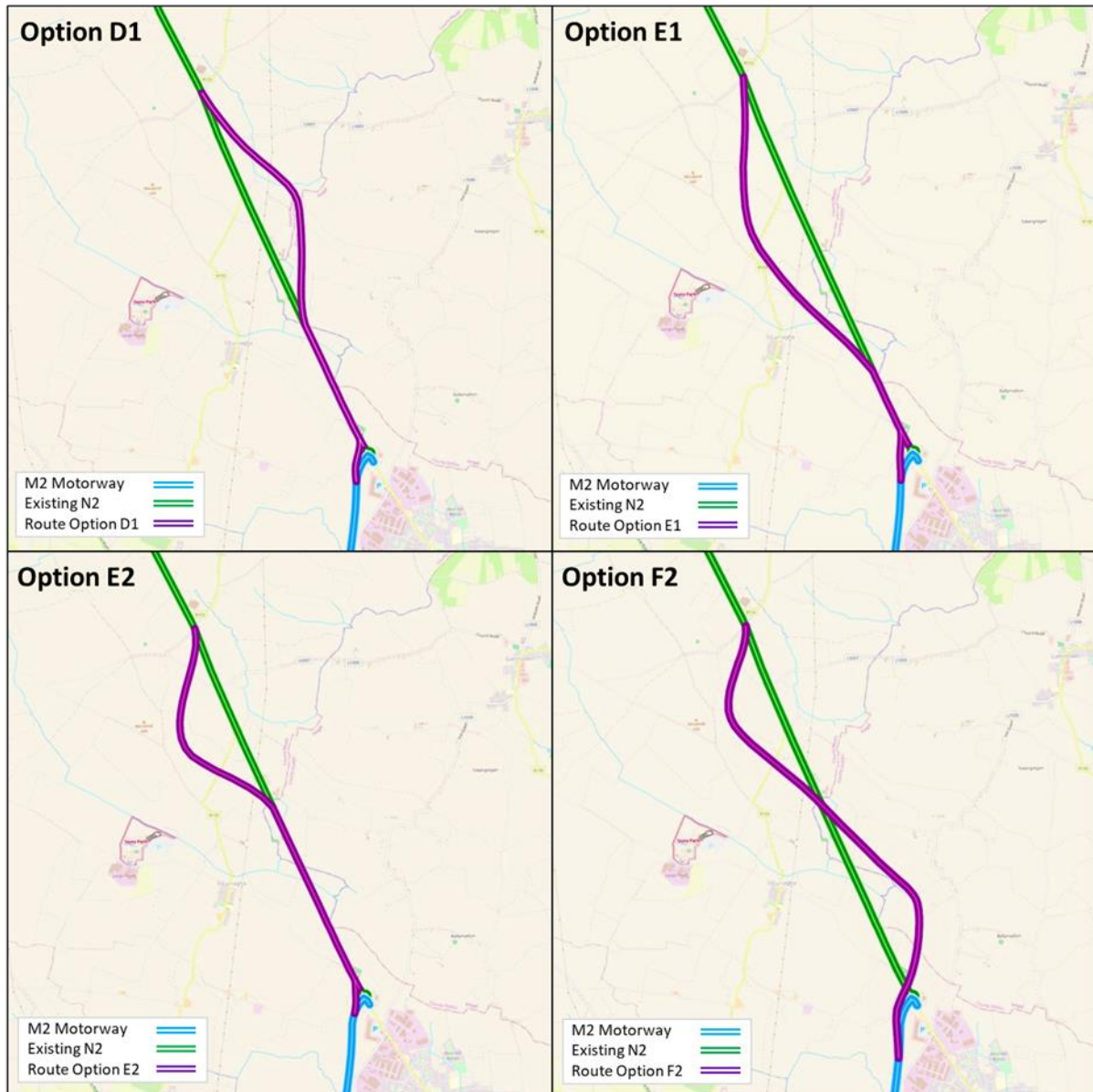


Figure 7-7 - Stage 2 Route Options in the Transport Model. (OpenStreetMap, 2020).

7.3.3.2 Traffic Benefits – Key Performance Indicators

Key performance indicators (KPI's) were extracted from the traffic models for the Do-Something Stage 2 route options and a comparison was made against the Do-Minimum Option.

The KPI's are as set out below;

- Total Network Travel Time (hrs) for all vehicles
- Total Network Travel Distance (vkms) for all vehicles
- Average Vehicle Speed (kph)

The KPI's are presented, in Table 7-2 and Table 7-3, for the DM and DS route options for AM and IP travel periods for the 2040 Design year TII Central Traffic Growth scenario. The average vehicle speeds shown are for the network as a whole and include all modelled roads (urban, regional and local roads as well as the national network).

The overall KPI's (shown in Table 7-2 and Table 7-3) demonstrate that there is a decrease in total network travel time and a subsequent increase in average speeds between the DM and DS scenarios. The percentages are low due to the vast extent of the model, with significant positive impacts at a local level being 'lost' when the overall travel times are considered over the wider region covered by the model. In this regard, the proposed DS Stage 2 route options demonstrated a substantial reduction in travel time in comparison with the DM scenario when measured locally on the N2 between Rath Roundabout and Kilmoon Cross. Table 7-4 represents the % change in travel time of a random journey during the AM and Inter Peak periods between Rath roundabout and Kilmoon Cross for each proposed route options compared to the DM scenario.

Table 7-2 - Network Statistics - AM Peak 2040 Design year, TII Central Traffic Growth

2040 Model*	% Diff. in Total Vehicle km**	% Diff. in Total Network Travel Time***	% Diff. in Average Network Vehicle Speed****
D1 vs DM	-0.02%	-0.57%	0.56%
E1 vs DM	0.01%	-0.68%	0.69%
E2 vs DM	0.03%	-0.67%	0.61%
F2 vs DM	0.07%	-0.64%	0.61%

* Total Network Trips: 102,871

** DM Total Vehicle Km: 1,806,366

*** DM Total Network Travel Time: 38,019

**** DM Average Speed: 47.51 kph

Table 7-3 - Network Statistics – Inter Peak 2040 Design year, TII Central Traffic Growth

2040 Model*	% Diff. in Total Vehicle km**	% Diff. in Total Network Travel Time***	% Diff. in Average Network Vehicle Speed****
D1 vs DM	-0.09%	-0.39%	0.31%
E1 vs DM	-0.10%	-0.51%	0.41%
E2 vs DM	-0.08%	-0.49%	0.42%
F2 vs DM	-0.01%	-0.46%	0.45%

* Total Network Trips: 82,697

** DM Total Vehicle Km: 1,293,633

*** DM Total Network Travel Time: 24,899 hrs

**** DM Average Speed: 51.95 kph

Table 7-4 - Travel Time for each Route Option – 2040 Design year

Route Option	% Change in Average Travel Time	
	AM Peak*	Inter Peak**
D1 vs DM	-36.46%	-52.27%
E1 vs DM	-46.35%	-61.52%
E2 vs DM	-45.31%	-60.80%
F2 vs DM	-42.19%	-58.80%

* DM AM Peak Travel Time: 06:24 (mm:ss)

** DM Inter Peak Travel Time: 09:11 (mm:ss)

As shown in Table 7-4, the route option E1 presented the highest reduction in average travel time followed closely by route option E2.

7.3.3.3 Future Year AADT

An overview of the forecast AADT and percentage of HGVs along the proposed mainline for each option between Rath and Kilmoon for the 2040 Do-Minimum and Do-Something scenarios are presented in Table 7-5.

In the Do Minimum scenario, an AADT of 18,700 is forecast in 2040 along the existing N2. This is significantly lower than the AADT estimates forecast in 2040 for the route options which are between 28,000 and 30,500. Despite a forecast increase in overall travel demand in the region in 2040, the forecast increase in AADT along the existing N2 in the Do Minimum scenario is limited by long delays and congestion along this section of the N2, particularly around Primatestown Junction. This would change the travel patterns in the area as a significant proportion of traffic would likely take alternative routes with reduced journey times, including “rat-running” along local roads in the area.

More detailed information on the AADTs and HGV percentages of all route sections within the LAM model is available are illustrated in Figure 7-8, Figure 7-9, Figure 7-10, Figure 7-11 and Figure 7-12.

At the time of writing, traffic levels on the existing N2 in the figures for the Do-Something scenarios are presented based on a scenario with no through-access from north to south on the residual sections of the existing N2. The modelled options propose a situation where the existing, ‘old N2’ section is effectively closed to through-traffic at the scheme extents (Rath roundabout and Kilmoon Cross). Only slight flows of local access traffic will remain. The majority of traffic flows will reroute to the proposed (new) section of the N2.

Table 7-5 - AADT and HGV percentage for the Stage 2 Route Options

Parameter	2040 Scenario *			
	D1	E1	E2	F2
AADT	28,090	30,326	29,960	28,064
% HGV	12.4%	12.5%	12.5%	12.4%

* Refer to Figure 7-9 - Figure 7-12 for more detailed information on various routes AADTs.

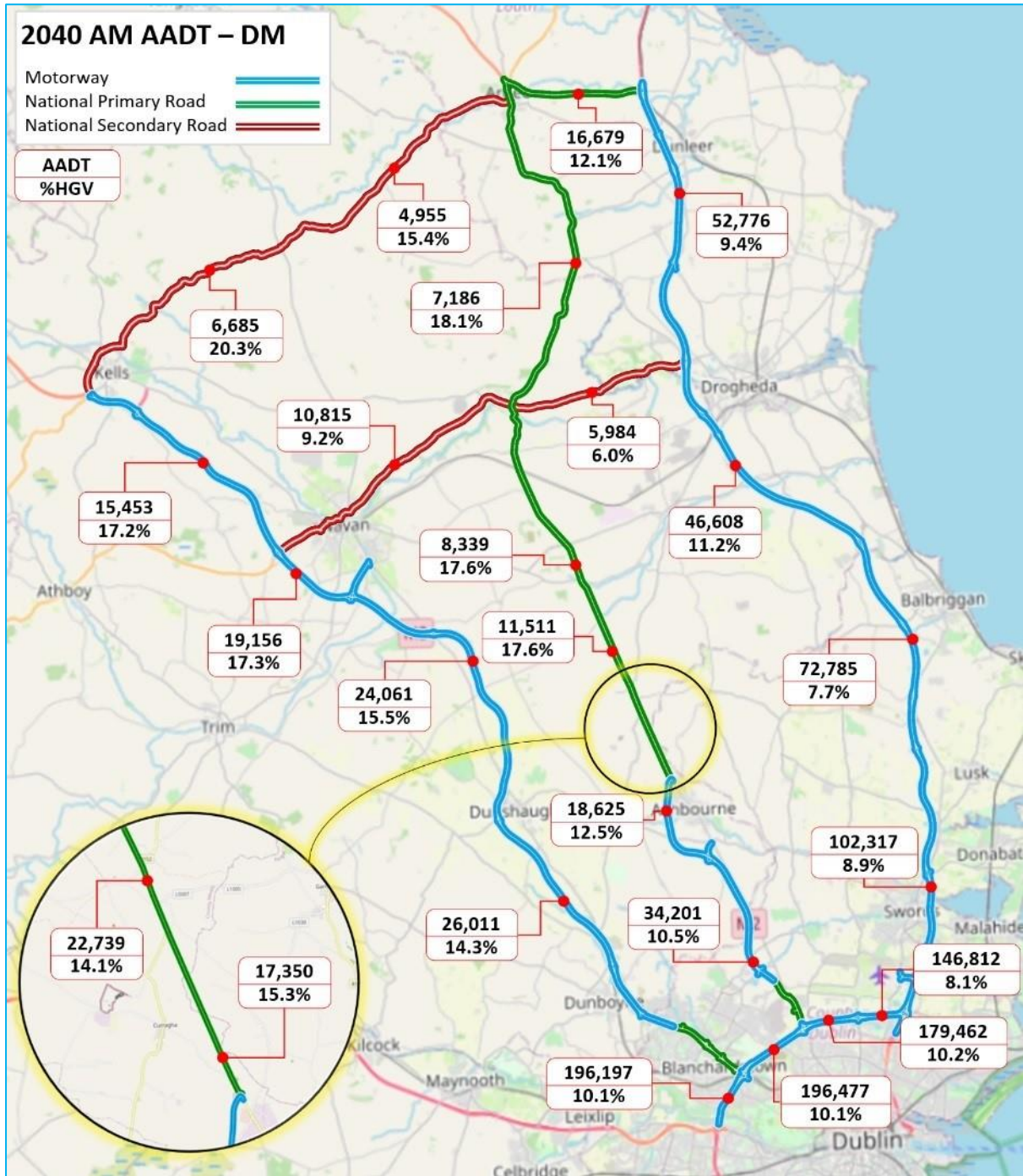


Figure 7-8 - 2040 AM AADT – Route Option DM. (OpenStreetMap, 2021).

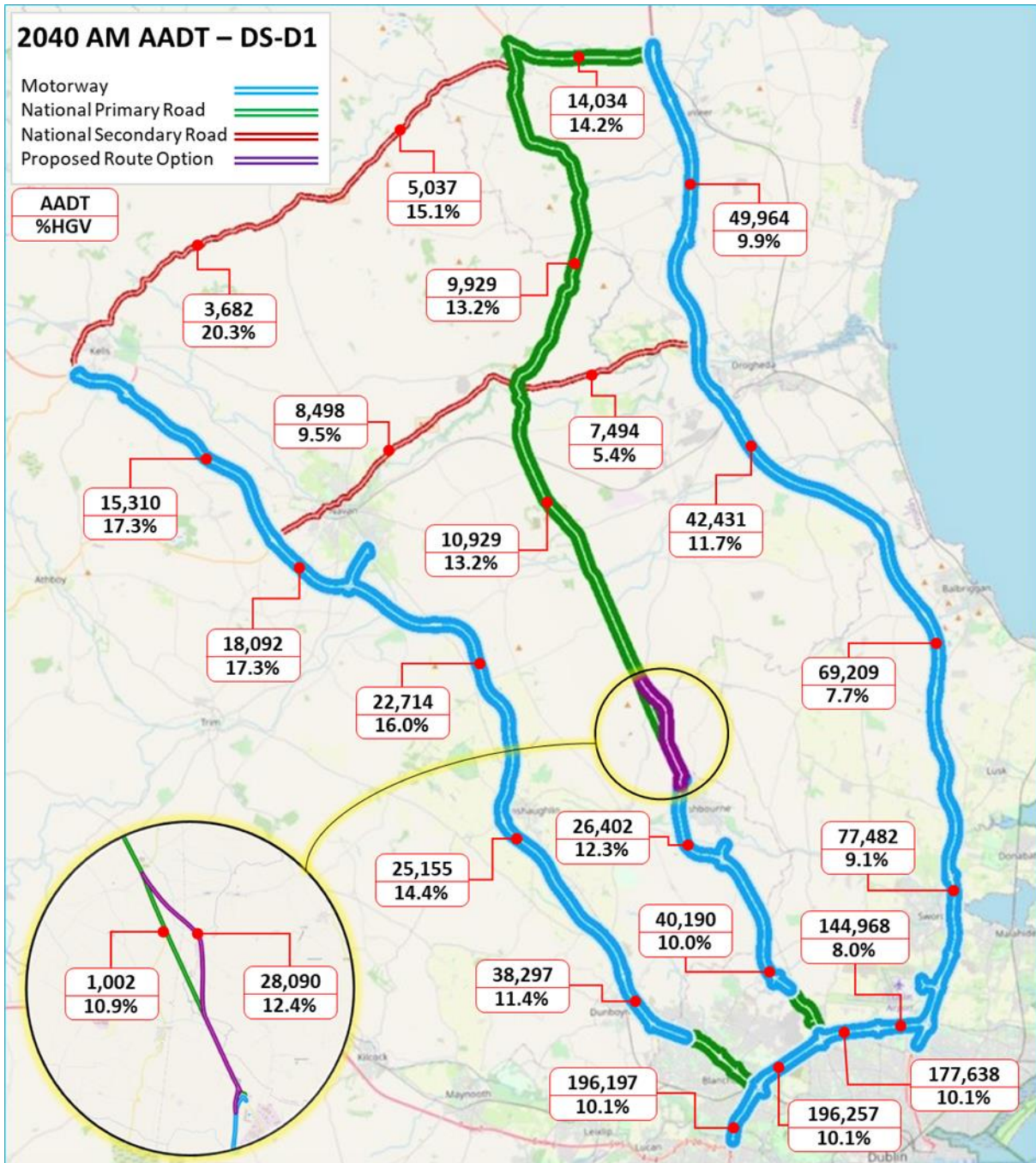


Figure 7-9 - 2040 AM AADT – Route Option D1. (OpenStreetMap, 2021).

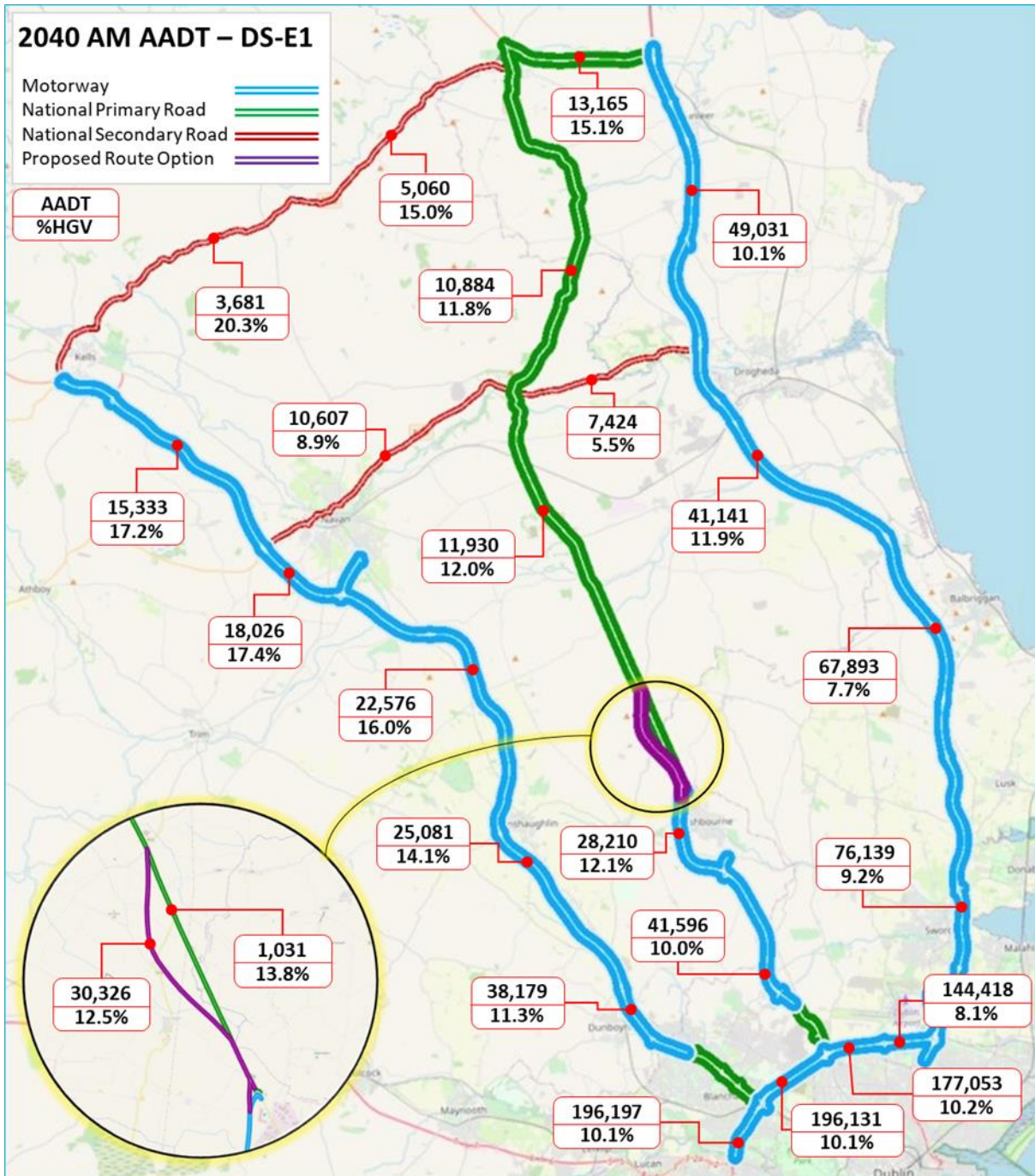


Figure 7-10 - 2040 AM AADT – Route Option E1. (OpenStreetMap, 2021).

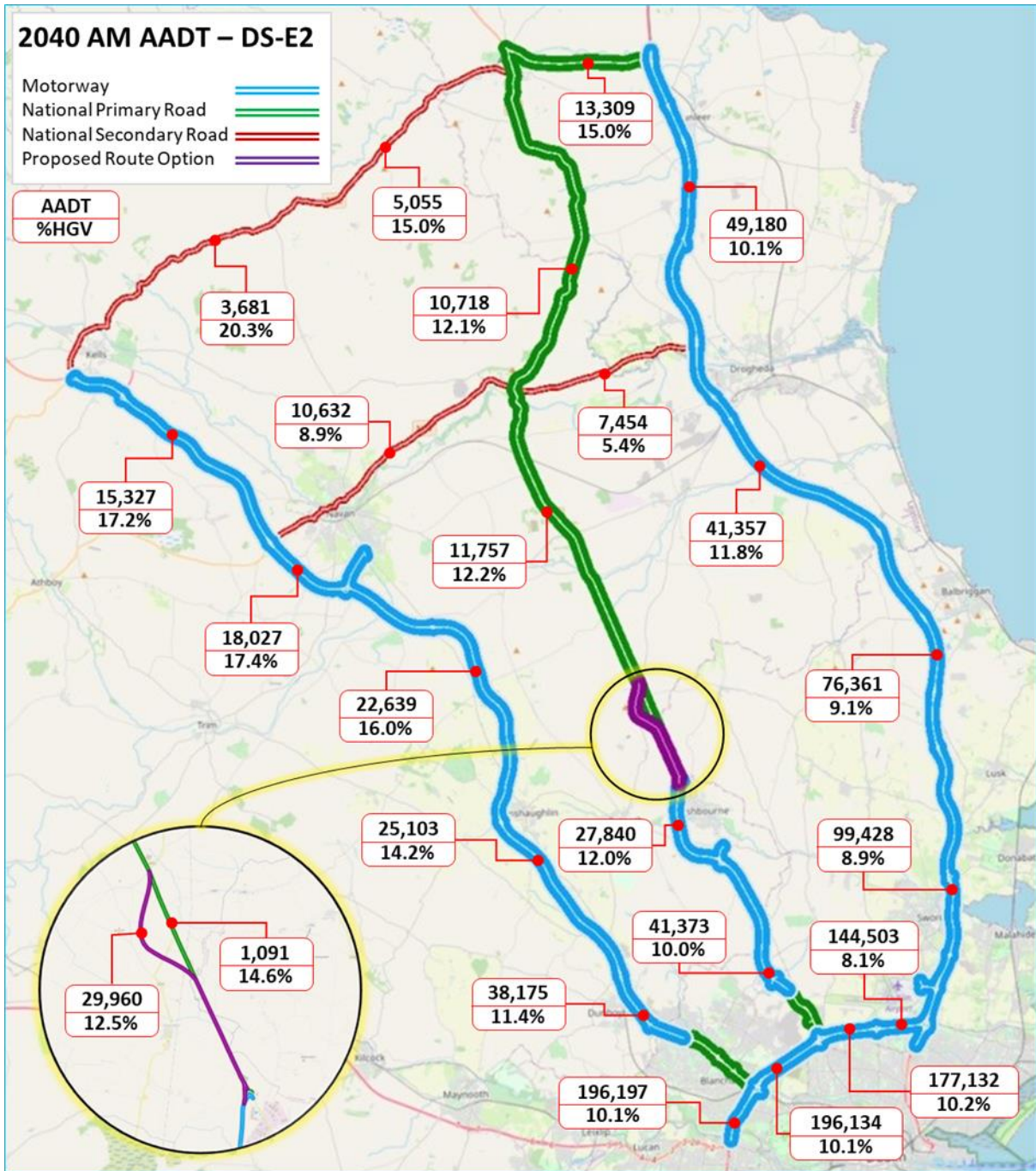


Figure 7-11 - 2040 AM AADT – Route Option E2. (OpenStreetMap, 2021).

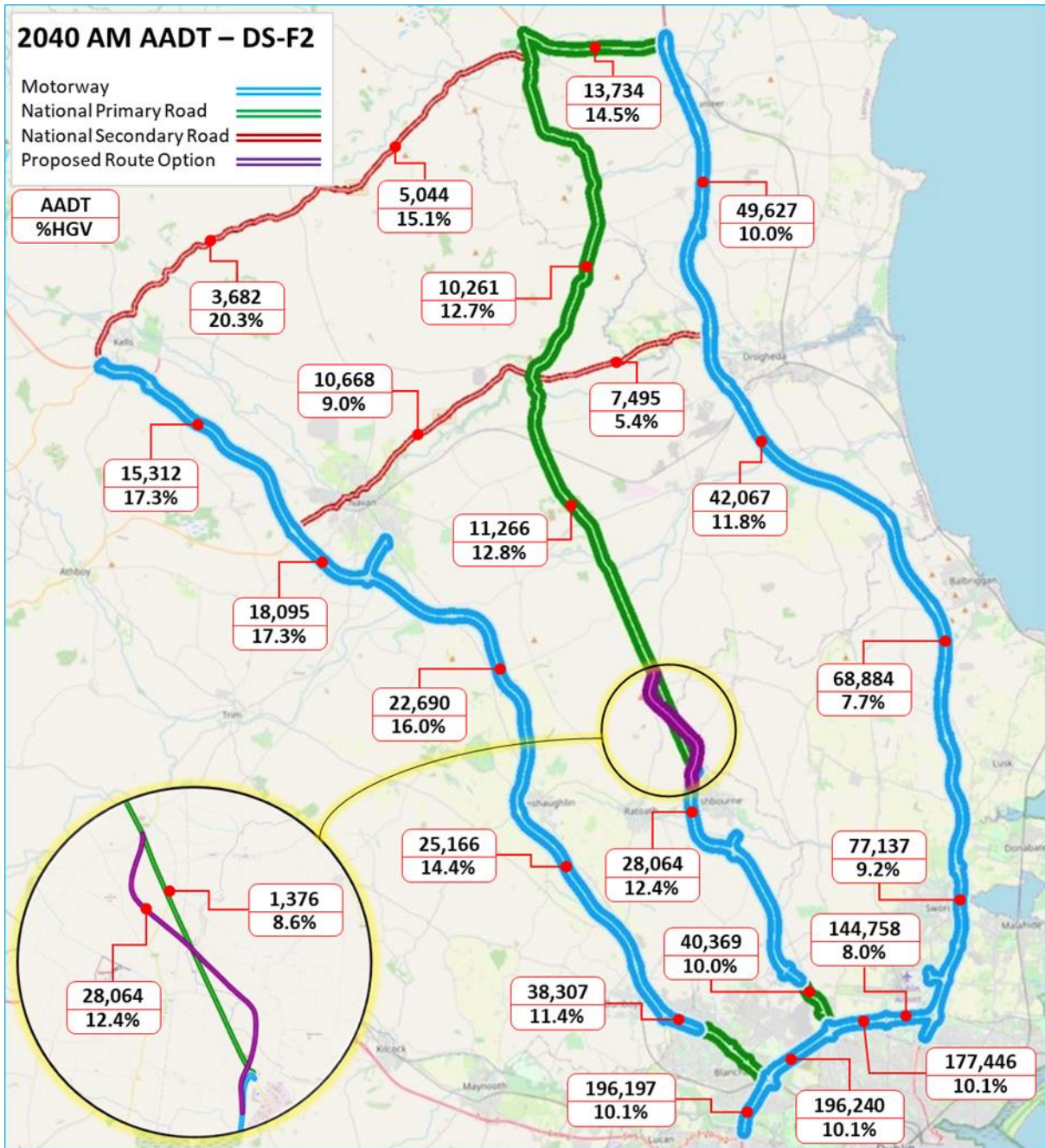


Figure 7-12 - 2040 AM AADT – Route Option F2. (OpenStreetMap, 2021).

7.3.3.4 Option Comparison Estimates

The outline Stage 1 Option Comparison Estimates (OCEs) were revisited for the route options which had progressed to the Stage 2 assessment. These were again developed in accordance with the requirements of the TII Cost Management Manual and PAG Unit: 6.2 Preparation of Scheme Costs. In terms of the alternative options, no OCEs have been prepared for these options given they each assume the continued use of existing N2.

This outline estimate provides a cost for each of the Route Options, from the subtotal of the following 7 Base Costs:

- Main Contract Construction
- Main Contract Supervision
- Archaeology
- Advance Works & Other Contracts
- Residual Network
- Land & Property
- Planning & Design

The OCEs were further developed based on the additional information available for each of the route options at this stage. Project Specific Risk Contingencies and Value Added Tax (VAT) were applied to each of the seven base cost elements.

The Total Inflation Allowance and Programme Risk were also included in the total costs. The OCEs are presented in Table 7-6 for each of the route options, the OCEs are also included in Appendix 10. All monetary values are based on 2020 values and are shown in (€ million). It is noted that all base costs have been rounded to the nearest €1 million so may not add up exactly the total OCE value.

Table 7-6 - Stage 2 Option Comparison Estimates

Base Costs (€ million) (2020 values)	Route D-1	Route E-1	Route E-2	Route F-2
Main Contract Construction	56	58	57	81
Main Contract Supervision	1	1	1	2
Archaeology	3	4	3	5
Advance Works & Other Contracts	2	2	2	3
Residual Network	1	1	1	2
Land & Property	7	7	7	8
Planning & Design	5	5	5	7
Subtotal	75	79	77	107
<i>Total Inflation Allowance</i>	17	17	17	23
<i>TII Programme Risk</i>	4	4	4	5
PH2-Stage 2 – Option Comparison Estimate (OCE)	96	100	98	136

7.3.3.5 Cost Benefit Analysis

In accordance with TII PAG Unit 7.0 (*Multi Criteria Analysis*), the key measure of Efficiency and Effectiveness is the transport user related Present Value of Benefits (PVB). The monetised benefits relating to the economy, safety and environment impacts are combined as part of the overall economic assessment to identify the overall Benefit to Cost Ratio (BCR). The quantification of these benefits is based on outputs from the transport models which provides insights into the travel time savings provided by the proposed scheme options. Historical safety data and PAG safety parameters are applied to transport model outputs to ascertain monetised safety impacts of the scheme options using Cost and Benefit to Accidents – Light Touch (COBALT) software.

The Transport Users Benefit Appraisal (TUBA) was undertaken for each of the four route options, in accordance with TII PAG Unit 6.3 (*Guidance on using TUBA*). A base year of 2011 was defined for the economic parameters, this is specified by the Department of Transport (DoT) to ensure that all projects can be compared on a like for like basis irrespective of the opening year, in accordance with the Common Appraisal Framework (CAF), 2016.

Before the TUBA appraisal was undertaken, the Stage 2 OCEs were adjusted, with VAT excluded from each of the base cost elements. It is noted that TUBA excludes the Total Inflation Allowance and Programme Risk from the total costs, but these inputs are considered as part of the overall TUBA process. The OCEs were also adjusted from 2020 values to 2011 values in order to determine the Present Value of Costs (PVC). The TUBA appraisal was then used to estimate the Present Value of Benefits (PVB) of each option, again in 2011 values.

Assumed Cross-Section

All four route options were modelled in TUBA with a motorway cross section in order to generate the Present Value of Benefits (PVB). A motorway cross section provided the lowest level of impedance to traffic and therefore enabled the fairest, comparative assessment of route corridors at Stage 2.

The Present Value of Cost (PVC) was the same for both a Type 1 Dual Carriageway and a Motorway, as the cross-section and applicable junctions are essentially the same. However, the Motorway cross-section will provide slightly higher Present Value of Benefits (PVB) than a Type 1 Dual Carriageway, as there are more economic benefits due to the 120kph speed limit of a Motorway.

It is noted that wider considerations will determine the eventual final cross section for the proposed scheme, including design parameters, land-take, speed profiles, junction separation and environmental emissions. This will be considered in more detail at the next phase of the planning and design process.

Benefit to Cost Ratio (BCR)

From this the Net Present Value (NPV) was determined which represents the Present Value of Benefits (PVB) minus the Present Value of Cost (PVC), the Benefit to Cost Ratio (BCR) was also determined which represents the Present Value of Benefits (PVB) divided by the Present Value of Cost (PVC).

The Cost Benefit Analysis (CBA) results from TUBA are presented in Table 7-7 for each of the route options, all monetary values are based on 2011 values and are shown in (€ thousand). It is noted that some of the numbers may not be exact due to rounding. The Cost Benefit Analysis report and associated appendices are included in Appendix 10.

In terms of the costs, only the initial investment costs to construct the scheme are considered at this stage of the appraisal process, these represent the Present Value of Cost (PVC) over the whole appraisal period (Year 1-60). In terms of the benefits, most of these impacts are shown over the 30-year appraisal period (Year 1-30), with the residual value representing the residual appraisal period (Year 31-60). These two values are combined to provide the Present Value of Benefits (PVB) over the whole appraisal period (Year 1-60).

Table 7-7 - Cost Benefit Analysis Results from TUBA (Motorway Cross Section)

30-Year Appraisal + Residual Value	Phase 2 – Stage 2			
	Discount Rate 4% (Year 1-30) and 3.5% (Year 31-60)			
	Route D-1	Route E-1	Route E-2	Route F-2
Impact				
Consumer	23,000	28,000	27,000	25,000
Other	28,000	34,000	33,000	31,000
Business	44,000	53,000	52,000	49,000
Indirect Taxation Revenues	-800	-700	-400	-100
Greenhouse Gases	0	0	0	0
Safety	2,000	1,000	1,000	1,000
Residual	74,000	89,000	87,000	82,000
Present Value of Benefits (PVB)	171,000	204,000	200,000	187,000
Costs				
Investment Costs	53,000	56,000	54,000	75,000
Operating Cost (Maintenance)	-	-	-	-
Revenues	-	-	-	-
Present Value of Cost (PVC)	53,000	56,000	54,000	75,000
Net Present Value (NPV)	118,000	148,000	146,000	112,000
Benefit to Cost Ratio (BCR)	3.2	3.7	3.7	2.5

7.3.3.6 Sensitivity Analysis of a Parallel Link on the Existing N2

Route Options D-1, E-1 and E-2 involve sections of online widening of the existing N2. For completeness, a sensitivity analysis was undertaken to determine the effect of preserving a through-traffic parallel link along this section of the existing N2. This parallel link will have the effect of discouraging most through-trips, which would instead use the proposed Dual Carriageway, yet allowing improved local access and enabling active modes. (See Section 7.8.4 for more information on active travel strategy).

This parallel link could either be in the form of a parallel access road to provide local connectivity, or alternatively the proposed Dual Carriageway mainline could be constructed parallel to the existing N2 which could be retained to provide local connectivity with an intentionally reduced cross-section for motorised vehicles.

The additional costs associated with the implementation of a parallel link with segregated pedestrian and cycle facilities along this section of the existing N2 were quantified for all four route options (D-1, E-1, E-2 and F-2). These additional costs were then used to determine updated Present Value of Cost (PVC) for each option. It was assumed that similar Present Value of Benefits (PVB) would be applicable to the updated sensitivity analysis options. Updated Benefit to Cost Ratios (BCR) were then determined for each of the updated sensitivity analysis options.

Whilst the BCR had reduced slightly for the route options which involved sections of online widening (D-1, E-1, and E-2) based on the additional costs resulting from the changes made as part of the sensitivity analysis, the BCR for the fully offline route option (F-2) also reduced slightly based on the additional costs resulting from improvements to the residual road network and cycle facilities that would also be applicable to this option.

Overall, despite the reduction in BCR for all four route options (D-1, E-1, E-2 and F-2), no changes to the option ratings for Efficiency & Effectiveness were required as a result of the changes put forward as part of the Sensitivity Analysis. The route options which involved sections of online widening (D-1, E-1, and E-2) were still considered to have a Highly Positive Impact for Efficiency & Effectiveness, and the fully offline route option (F-2) was still considered to have a Moderately Positive Impact for Efficiency & Effectiveness.

7.3.3.7 Analysis

Transport modelling of all four route options suggests improved and heightened vehicular traffic flows on the N2 corridor as traffic reroutes from less safe local roads, while pedestrians and cyclists (referred to as non-motorised users) will experience improved accessibility. Route Options D-1, E-1 and E-2 were all scored as Highly Positive as they had a Total Value BCR of between 3.0 and 4.0. Meanwhile Route Option F-2 was scored as Moderately Positive as it had a Total Value BCR of between 2.0 and 3.0.

It is noted that a Sensitivity Analysis has been undertaken to determine the effect of including a parallel link on the existing N2 for the route options which involved sections of online widening (D-1, E-1, and E-2). The conclusion from this analysis indicated that the introduction of a parallel link for local connectivity would have no impact on the scores given for Efficiency & Effectiveness.

In terms of the Junctions / Tie-Ins, a quantitative assessment was not undertaken at this stage as the junction strategy is still being developed. However, these will be required to facilitate the implementation of the route options where they tie into the existing N2, and the associated benefits of these, so have been scored as Highly Positive.

In terms of the Alternative options, no BCR has been prepared for these options given they each assume the continued use of existing N2. The Public Transport option would deliver some efficiencies for the public transport users on the corridor and onward travel movements (for example, to Dublin city centre), but would be less than that of the route options given the impact of bus priority at the junction is likely to be localised and negatively impact upon other modes.

The improvements associated with the Do Managed option may deliver minor efficiency and effectiveness benefits, but the comparative level of service for road users (vehicular and non-motorised) continuing to use the existing N2 may be comparably poorer than a scenario with any of the route options in place.

Neither of these alternative options on their own will meet the key economic objectives for the scheme. Improvements associated with the Public Transport and Do Managed options would be unlikely to reduce car demand sufficiently to resolve the existing congestion issues. Therefore, sole investment in these measures would likely lead to continued congestion on the N2 corridor, with associated issues in terms of journey times and journey time reliability for all road users, including road based public transport. Overall, the Do Managed option was scored as Moderately Negative, and the Public Transport option as Slightly Negative under this criterion.

Comparatively, the Do-Nothing option would not be efficient and effective for road users (motorised or non-motorised). This option has been scored as Highly Negative as it will fail to meet the project objectives.

7.3.3.8 Summary

The overall scores for Efficiency and Effectiveness are shown in Table 7-8.

Table 7-8 - Overall Scores for Efficiency and Effectiveness

Scheme Option	Score
Do Nothing / Do Minimum	Major or Highly Negative (1)
Do Something - Do Managed	Moderately Negative (2)
Do Something - Public Transport	Minor or Slightly Negative (3)
Do Something - Route D1	Major or Highly Positive (7)
Do Something - Route E1	Major or Highly Positive (7)
Do Something - Route E2	Major or Highly Positive (7)
Do Something - Route F2	Moderately Positive (6)
Junction / Tie-Ins	Major or Highly Positive (7)

7.3.4 Wider Economic Impacts

In accordance with TII PAG Unit 7.0 (Multi Criteria Analysis), not all the economic benefits of a project are encompassed within the transport user benefits. Wider Economic Benefits (WEB) can include:

- Competition in the market
- Agglomeration
- Inward Investment
- Labour Supply
- Urban Regeneration

7.3.4.1 Analysis

All four route options are expected to contribute to positive wider economic impacts albeit on a low scale given the relatively localised nature of the scheme which improves an existing route rather than opening a new route. As such all four route options have been scored as Slightly Positive as the scheme is not of a scale to result in significant wider economic impacts.

For Route Options E-1, E-2 and F-2, comparatively more impacts might reasonably be expected with this realignment to the west (at the northern extent) with the potential to tie into more community areas, regional road and walking and cycling connections. The existing N2 would be better suited to active modes, increasing the level of sustainable travel. For Route Option D-1, comparatively less impacts might reasonably be expected with the realignment to the east (at the northern extents) which limits its potential for tie-in other community facilities and transport links such as regional roads.

In terms of the Junctions / Tie-Ins, these will be required to facilitate the implementation of the route options, and the associated benefits of these, so have been scored as Slightly Positive.

The Public Transport option was scored as Neutral, as public transport improvements will improve connectivity along the corridor however these will likely be balanced out by dis-improvements in connectivity for other modes.

The Do Managed option was scored as Slightly Negative, as connectivity would likely worsen in this scenario as demand increases which would likely result in slight negative wider economic impacts.

The Do Nothing option will worsen connectivity so was scored as Moderately Negative.

7.3.4.2 Summary

The overall scores for Wider Economic Impacts are shown in Table 7-9.

Table 7-9 - Overall Scores for Wider Economic Impacts

Scheme Option	Score
Do Nothing / Do Minimum	Moderately Negative (2)
Do Something - Do Managed	Minor or Slightly Negative (3)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Minor or Slightly Positive (5)
Do Something - Route E1	Minor or Slightly Positive (5)
Do Something - Route E2	Minor or Slightly Positive (5)
Do Something - Route F2	Minor or Slightly Positive (5)
Junction / Tie-Ins	Minor or Slightly Positive (5)

7.3.5 Transport Quality and Reliability

Transport quality is determined by the level of service that transport infrastructure can provide, with the aim of satisfying both objectively and subjectively the needs and expectations of users and the status afforded of the road scheme based on its role as part of the National Roads network. Transport reliability, for road-based transport, is determined by variability in travel time. High quality transport links are essential to unlock the economic potential of an area, however variability in travel times due to congestion, slow moving vehicles or high likelihood of incidents can have an adverse impact on this.

7.3.5.1 Analysis

Transport quality and reliability will be improved with a new high-quality route delivered to modern design standards affording overtaking opportunities, improved alignment and increased sightlines which combined reduce the likelihood of incidents. A high level of service for the new route options would be anticipated, with similar positives expected for active mode users on the existing N2. Therefore, all route options were scored as highly positive.

The Junctions / Tie-Ins will be required to facilitate the implementation of the route options, and the associated benefits of these, so have also been scored as Highly Positive.

The Public Transport option was scored as Slightly Negative. The implementation of public transport improvements will deliver some improvements in transport quality and reliability for bus users, particularly where priority measures may be incorporated into the scheme. These will be beneficial, but comparably weak compared to the route options across all users of the N2.

The Do Managed option was also scored as Slightly Negative. Transport quality and reliability will be somewhat improved, particularly where peak-time congestion on the existing N2 and rat-running on the surrounding local roads are reduced. However, congestion issues are likely to persist on this section of the N2 unless there is a higher level of intervention.

The Do Managed option was scored as Highly Negative, as the quality and reliability of travel (for example, smoothness, alignment and journey time reliability), will remain relatively weak.

7.3.5.2 Summary

The overall scores for Transport Quality and Reliability are shown in Table 7-10.

Table 7-10 - Overall Scores for Transport Quality and Reliability

Scheme Option	Score
Do Nothing / Do Minimum	Major or Highly Negative (1)
Do Something - Do Managed	Minor or Slightly Negative (3)
Do Something - Public Transport	Minor or Slightly Negative (3)
Do Something - Route D1	Major or Highly Positive (7)
Do Something - Route E1	Major or Highly Positive (7)
Do Something - Route E2	Major or Highly Positive (7)
Do Something - Route F2	Major or Highly Positive (7)
Junction / Tie-Ins	Major or Highly Positive (7)

7.3.6 Funding Impacts

7.3.6.1 Summary

In accordance with TII PAG Unit 7.0 (Multi Criteria Analysis), schemes without non-exchequer funding should be ranked as Neutral. Given that there is currently no non-exchequer funding (i.e. EU funding) available for the project, each of the options have been scored as Neutral with an intermediate preference for all the options.

The overall scores for Funding Impacts are shown in Table 7-11.

Table 7-11 - Overall Scores for Funding Impacts

Scheme Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Not Significant or Neutral (4)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Not Significant or Neutral (4)
Do Something - Route E1	Not Significant or Neutral (4)
Do Something - Route E2	Not Significant or Neutral (4)
Do Something - Route F2	Not Significant or Neutral (4)
Junction / Tie-Ins	Not Significant or Neutral (4)

7.3.7 Summary

The overall scores for economy are summarised in Table 7-12.

Table 7-12 - Total Scores for Economy

	Do Nothing	Do Managed	Public Transport	Route D-1	Route E-1	Route E-2	Route F-2	Junctions
Efficiency and Effectiveness	1	2	3	7	7	7	6	7
Wider Economic Impacts	2	3	4	5	5	5	5	5
Transport Quality and Reliability	1	3	3	7	7	7	7	7
Funding Impacts	4	4	4	4	4	4	4	4

7.4 Environmental Assessment

7.4.1 Objectives

Previous journey time reviews carried out on the existing section of the N2 under consideration identified significant capacity issues at peak times as a common impact on journey times along the route. In addition, the number of closely spaced junctions causes vehicles to travel at low speeds, queue and start/stop regularly. All these impacts culminate in reduced driving efficiency generating higher emissions, inefficient fuel usage and poorer air quality.

The key environmental objectives of the scheme include:

- To minimise the impact of greenhouse gas emissions.
- To improve air quality in the various settlements along the corridor.
- To reduce the level of noise in the various settlements along the corridor.
- To minimise the impacts on the significant positive landscape and visual quality of the surrounding area.
- To minimise the potential impacts on local watercourses.
- To support the delivery of the Climate Action Plan.
- Preserve the vibrancy of existing local communities.

7.4.2 Methodology

This section of the report summarises the environmental assessment of the route options carried forward from Stage 1. The full details of the Stage 2 environmental assessment including the methodology used and information on the existing environment is available in Appendix 6 and should be read in conjunction with this summary. The information contained within this section builds upon the Constraints Study (Appendix 5) and the Stage 1 assessment.

Environmental assessments were carried out under a number of environmental sub-categories as outlined below.

- Biodiversity
- Hydrology and Hydrogeology
- Land and Soils
- Landscape and Visual
- Noise and Vibration
- Air Quality
- Climate
- Population and Human Health
- Cultural Heritage
- Material Assets – Agriculture
- Material Assets – Non-Agriculture
- Material Assets – Waste

The multi criteria analysis methodology used is outlined in Section 7.2. Where additional methodologies have been considered these have been detailed within the Stage 1 & 2 Environmental Report (see Appendix 6).

It is noted that some of the scores given to the options against each of the environmental sub-criteria may be comparatively different to those given during the Stage 1 Preliminary Options Assessment. This is primarily as a result of the additional information available at this stage of the assessment process, following the further refinement of the options as well as the development of mainline alignments for each of the route options.

7.4.3 Biodiversity

A detailed biodiversity assessment is available in Section 3.3.1 of the environmental assessment report, Appendix 6, which includes the methodology used and a detailed section on the existing environment. Information on designated sites is available within the Constraints Report (see Appendix 5). The below is a summary of the Stage 2 impact assessment.

This input comprises the identification of ecological constraints, the comparative assessment of the four route options and the Do-Nothing, Do-Minimum, Do-Something-Managed and Do-Something-Public Transport Options under consideration in Stage 2, in relation to the impacts on Biodiversity. A desk study was followed by field surveys in May and June 2020. The desk study included data requests to the NPWS and NBDC, and a review of the County Meath Biodiversity Action Plan 2015-2020⁸ and the Meath Wetlands and Coastal Survey (2010)⁹. A drive through survey with site visits at the River Hurley and the Primarestown Common's was conducted in May 2020. The four routes were walked on three separate occasions in June 2020.

7.4.3.1 Impact Assessment

Three Key Ecological Receptors (KER) were selected and used to carry out the comparative analysis of the four offline route options, the Do-Nothing, Do-Managed and Do-Public Transport.

The KER identified were

- Hurley River and Curraghtown / Riverstown Stream
- Wet Grassland south of the Hurley River
- Primarestown Common

The four offline route options are similar in length and so outside of the KERs described, the total habitat loss and loss of linear habitats, including the loss of habitats for protected species such as badger, bats and otter, is considered similar across all route options. Therefore, these impacts were omitted for the Stage 2 Route Options Assessment.

Do Nothing / Do Minimum, Do Managed and Do Public Transport

These route options range from doing nothing (other than routine maintenance), management including introducing lights and tolls and other controls, and a public transport option. By their nature, these route options will have a lower impact on biodiversity than the new off-line alignments and could even have a positive impact by reducing traffic levels which would reduce noise and air pollution. **The Do Nothing/Do Minimum Option was rated as 'Not Significant or Neutral' impact level. The Do Managed and Do Public Transport Options were assigned a 'Minor or Slight Positive' impact level.**

⁸ <https://www.meath.ie/council/council-services/heritage-architectural-conservation/heritage/natural-heritage/biodiversity-plans/meath-biodiversity-action-plan>

⁹ County Meath Wetlands and Coastal Habitats Survey. Meath County Council & The Heritage Council.

Route Option D-1

Route Option D-1 will involve online widening from the Rath Roundabout to the Hurley River floodplain. The route travels offline where it travels east across agricultural grassland. The route bisects Primatestown Common and the Curraghtown / Riverstown Stream before crossing agricultural grassland and re-joining the existing N2 close to Kilmoon Cross. This route option will involve significant and irreversible habitat loss on Primatestown Common and could lead to impacts outside the alignment because of changes in the hydrology of the area as well as noise related impacts. **This route option is rated as 'Major or Highly Negative' as it will involve the loss and degradation of seminatural habitat in the Primatestown Common considered to be of County Importance.**

Route Option E-1

Route Option E-1 will involve online widening at the start of the route from Rath Roundabout northbound. The Route Option E-1 moves offline south of the Hurley River, where it crosses an area of wet grassland and the Hurley River. The route then crosses agricultural land before re-joining the existing N2 between Phibblestown Wood and Kilmoon Cross. This route option will impact the wet grassland along the Hurley River and the Hurley River itself. **This route option is rated 'Moderately Negative' as it will involve the loss of wet grassland habitat which could lead to indirect hydrological impacts on the Hurley River and the habitats downstream.**

Route Option E-2

Route Option E-2 is similar to E-1 but leaves the existing N2 further north, and therefore this route option does not impact the area of wet grassland along the Hurley River. The route then crosses agricultural land on an alignment north of E-1 before re-joining the existing N2 between Phibblestown Wood and Kilmoon Cross. This route option has the least impact on the KERs. **This route option is rated as 'Minor or Slight Negative' as it will involve the loss of linear habitats of Local Importance (Higher Value).**

Route Option F-2

Route Option F-2 leaves the Rath Roundabout and crosses agricultural land. The route crosses the Hurley River in the fields east of the existing N2. The route then crosses the N2 where it follows the same alignment as Route Option E-2 to Kilmoon Cross. This route option will result in the biggest area of habitat loss outside the curtilage of the existing N2 and will require a new crossing over the Hurley River. **This route option is assigned a rating of 'Minor or Slight Negative' as it will require the longest section of offline road construction and will therefore lead to the greatest amount of habitat loss and disturbance, although these habitats are considered to be of Local Importance (Higher Value).**

7.4.3.2 Summary

Primatestown Common and the wet grassland south of the Hurley River are considered to be the most significant ecological features in the study area. The Do Nothing / Do Minimum, Do Something-Managed, Do Something - Public Transport and Route Options E-2 and F-2 avoid both of these areas and therefore have the lowest impact rating of the route options. The impact rating of the Junction / Tie in elements are similar for the four offline route options.

The overall scores for Biodiversity are shown in Table 7-13.

Table 7-13 - Overall Scores for Biodiversity

Route Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Minor or Slightly Positive (5)
Do Something - Public Transport	Minor or Slightly Positive (5)
Do Something - Route D1	Major or Highly Negative (1)
Do Something - Route E1	Moderately Negative (2)
Do Something - Route E2	Minor or Slightly Negative (3)
Do Something - Route F2	Minor or Slightly Negative (3)
Junction / Tie-Ins	Minor or Slightly Negative (3)

7.4.4 Water

A detailed hydrology and hydrogeology assessment is available in Section 3.3.2 of the environmental assessment report, Appendix 6. The below is a summary of the impact assessment. Drawing HF-0004 in Appendix 3 shows the Stage 2 Route Options against the various Drainage and Flooding constraints.

The primary surface water feature in the study area is the Hurley River along with more minor tributaries and sub-tributaries including Riverstown, Curraghtown and Cushinstown Rivers. An overview on catchments, surface water features and water quality, and drainage in the environs surrounding the route options is included in the Constraints Report (see Appendix 5).

No additional flood modelling has been undertaken at this stage.

7.4.4.1 Impact Assessment

All route options traverse a Public Supply Source Protection Area located approximately at the centre of the scheme. As this area is linked to the bedrock aquifer at depth, it is anticipated that there will be no significant impacts to groundwater along any of the route options.

All route options will also involve the development of some sections of offline roads above the 'Locally Important Aquifer – Lm'. The groundwater vulnerability beneath all offline options is predominantly 'Low', with localised areas in all route options being 'Moderate' to 'Extreme'. Sections of Route Options E-1, D-2 and F-2 also overlie a 'Poor Aquifer – Pl'.

Do Nothing / Do Minimum, Do Managed and Do Public Transport

The Do Nothing / Do Minimum Option is rated as 'Not Significant or Neutral' due to limited impacts expected from limited realignment works. No change in water quality impact, or to impacts on flooding or aquatic ecological sites or groundwater are expected.

The Do Something - Do Managed Option and the Do Something - Public Transport Alternative Options have been rated as 'Minor or Slightly Positive'. These route options are expected to have limited impacts due to limited works. It is anticipated the water quality impact will remain as it currently stands for the most part but would be expected to improve slightly through localised upgrading of drainage in line with current standards. No change is expected to impact on flooding or aquatic ecological sites. It is anticipated that this route option will have a low impact on the underlying groundwater.

The majority of Do Nothing / Do Minimum, Do Something - Do Managed and Do Something - Public Transport Alternative Options are located above areas of predominately 'Low' groundwater vulnerability.

Route Option D-1

There is potential for Route Option D-1 to result in a positive impact on water quality where new surface water drainage would be constructed in line with current standards. There would likely be a negative impact on the flood plain of Hurley River north of Ashbourne due to online widening and a minor impact on flooding limited to crossings Riverstown River. Therefore, Route Option D-1 is rated as a 'Moderately Negative' option.

Route Options D-1 and E-2 have the least sections of offline construction; therefore, it is anticipated that these corridors will have the least impact to groundwater compared to the other offline route options.

Route Option E-1

Overall Route Option E-1 is considered to be a 'Major or Highly Negative' option. While Route Option E-1 would potentially have a positive impact on water quality resulting from the construction of new surface water drainage in line with current design standards, there is potential for a Major impact on the Hurley River and its flood plain from this route option.

Route Option E-2

Route Option E-2 has been scored as 'Minor or Slightly Negative'. As with Route Option E-1 there is potential Route Option E-2 could have a positive impact on water quality resulting from the construction of new surface water drainage in line with current design standards. However, there is also potential for a minor impact on the flood plain of the Hurley River north of Ashbourne to occur due to online widening.

Route Options D-1 and E-2 have the least sections of offline construction; therefore, it is anticipated that these corridors will have the least impact to groundwater compared to the other offline route options.

Route Option F-2

Route Option F-2 has the potential to positively impact on water quality resulting from the construction of new surface water drainage in line with current design standards. However, there is also the potential for a Minor impact on flooding at the Hurley River to occur as this option skirts the edge of floodplain. Overall Route Option F-2 is considered to be a 'Moderately Negative' option.

Junction / Tie in Element

The Junction Tie-In Option has been scored as 'Not Significant or Neutral' as there is potential for this route option to have a positive impact on water quality resulting from the construction of new surface water drainage in line with current design standards and no flooding impacts are expected from the southern tie-in location near Rath roundabout. A minor impact is anticipated where the corridor follows the existing R152 at the northern end of the route option at river crossing locations. However, a major impact is anticipated at the most northerly junction section of the northern junction tie-in (north of Kilmoon Cross Junction) resulting from the crossing of the Riverstown River floodplain.

7.4.4.2 Summary

The route options considered to have the least negative impacts on water are the Do Nothing / Do Minimum, Do Something - Do Managed, Do Something - Public Transport Alternative and the Junction / Tie-In Options.

The overall scores for Water are shown in Table 7-14.

Table 7-14 - Overall Scores for Water

Route Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Minor or Slightly Positive (5)
Do Something - Public Transport	Minor or Slightly Positive (5)
Do Something - Route D1	Moderately Negative (2)
Do Something - Route E1	Major or Highly Negative (1)
Do Something - Route E2	Minor or Slightly Negative (3)
Do Something - Route F2	Moderately Negative (2)
Junction / Tie-Ins	Not Significant or Neutral (4)

7.4.5 Land and Soil

A detailed land and soils assessment is available in Section 3.3.3 of the environmental assessment report Appendix 6, which includes the methodology used and a detailed section on the existing environment. The below is a summary of the impact assessment.

The Study Area comprised an area extending 1 km on either side of the existing N2 route alignment, which ensured a minimum distance of 250 m from the centre line of each route option. The Preliminary Sources Study Report (PSSR) provided information in relation to the underlying soils and geology that would be affected by the route options. This stage 2 assessment included a walk-over survey of the study area by a senior geologist, to confirm anticipated geological composition. This confirmed the presence of expected geological units of alluvial and glacial origin and did not indicate the presence of any unusual features.

Drawings GS-0012, GS-0013, GS-0014, GS-0015, and GS-0016 in Appendix 3 show the Stage 2 Route Options against the various Land and Soil constraints.

7.4.5.1 Impact Assessment

All offline route options cross through an area of soft / compressible ground (alluvium and lacustrine deposits) associated with the Hurley River. As there are no pits, quarries or mines in the vicinity of any of the route options, there will be no impacts from any of the route options to economic geology attributes. There are no Geological Heritage sites within or close to any of the route options.

The EPA maps note a Flood Zone associated with the Hurley River that is present to the north of Ashbourne. Areas of wet grassland habitat have been identified in this area, encompassed by the flood zone limits. Route Options D-1, E-1 and E-2 all cross this area. In addition, there is a wet grassland area crossed by the northern third of Route Option D-1. Both of these areas of wet grassland are avoided by Route Option F-2.

Do Nothing / Do Minimum, Do Managed and Do Public Transport

The majority of Do Nothing / Do Minimum, Do Something - Do Managed and Do Something - Public Transport Alternative Options are located above areas of predominately 'Low' groundwater vulnerability.

The Do Nothing / Do Minimum and Do Something - Do Managed Options will utilise the existing N2 line. It is anticipated that these options will have the least impact on the underlying geology and soils compared to the other offline / partially offline route options. The Do Something - Public Transport Alternative Option features some offline development adjacent to the N2; it is anticipated that this route option will have a low impact on the underlying geology with some loss / destruction of agricultural soils.

Route Option D-1

As mentioned previously, all offline route options cross through an area of soft / compressible ground (alluvium and lacustrine deposits) associated with the Hurley River. The offline section of Route Option D-1 crosses through an additional area of compressible ground associated with the Riverstown River at the northern end of the scheme.

Route Option D-1 features the least amount of earthworks compared to other offline route options; however, the majority of these earthworks will overlie soft ground associated with nearby watercourses and thus require earthworks side slopes that likely require slackening and thus lead to additional loss of agricultural soils from construction of the road.

Route Option E-1

Route Options E-1 and E-2 have approximately the same amount of earthworks and embankments over areas of soft ground at the Hurley River Crossing. Route Options E-1 and F-2 have the most sections of offline construction, predominately in open green fields, compared to the other route options.

Route Options E-1 and E-2 have approximately the same amount of earthworks and embankments over areas of soft ground at the Hurley River Crossing.

Route Option F-2

Route Option F-2 features the most amount of earthworks as the route is predominantly offline therefore will have the largest impact to the underlying geology and soils from the other route options. Route Options E-1 and F-2 have the most sections of offline construction, predominately in open green fields, compared to the other route options.

Junction / Tie in Element

The Junction Tie in Element was ranked as 'Minor or Slight Negative' as although part of the Junction Tie in corridors are on developed ground of the original highways, some new ground lies under the footprints. All impacts are considered similar within the Junction Tie in corridors and the underlying geology impacts will likely be similar.

7.4.5.2 Summary

The Do Nothing / Do Minimum and Do Something - Do Managed Options were ranked as 'Not Significant or Neutral' as they will utilise the existing N2 line; it is anticipated that these route options will have the least impact to the underlying geology and soils compared to the other route options.

The Do Something - Public Transport Alternative Option was ranked as 'Not Significant or Neutral' as it features some offline development adjacent to the N2. It is anticipated that this route option will have a low impact to the underlying geology and soils and.

Route Options E-1 and E-2 were ranked as 'Moderately Negative' and 'Minor or Slightly Negative' respectively. Both route options feature the same degree of earthworks and thus similar impact to the underlying geology and soils however Route Option E-1 has more sections of offline construction overlying a 'Locally Important Aquifer – Lm'.

Route Option D-1 was ranked as 'Moderately Negative'. It features the least amount of earthworks compared to other offline route options however the majority of these earthworks will overlie soft ground associated with nearby watercourses with earthworks side slopes likely to require slackening and thus additional loss of agricultural soils.

Route Option F-2 was ranked as 'Major or Highly Negative' as it features the most amount of earthworks as the route is predominantly offline therefore will have the largest impact to the underlying geology and soils compared to other route options. It also features the most sections of offline construction overlying a 'Locally Important Aquifer – Lm'.

The Junction Tie in Element was ranked as 'Minor or Slight Negative' as although part of the Junction Tie in corridors are on developed ground of the original highways, some new ground lies under the footprints. All impacts are considered similar within the Junction Tie in corridors and the underlying geology impacts will likely be similar

The overall scores for Land and Soil are shown in Table 7-15.

Table 7-15 - Overall Scores for Land and Soil

Route Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Not Significant or Neutral (4)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Moderately Negative (2)
Do Something - Route E1	Moderately Negative (2)
Do Something - Route E2	Minor or Slightly Negative (3)
Do Something - Route F2	Major or Highly Negative (1)
Junction / Tie-Ins	Minor or Slightly Negative (3)

7.4.6 Landscape and Visual

This section examines the landscape types within the study area, the potential effects of Route Option D-1, Route Option E-1 and E-2 and Route Option F-2 on these landscape types, and the potential effect on views that receptors currently experience.

A detailed landscape and visual assessment is available in Section 3.3.4 of the environmental assessment report Appendix 6, which includes the methodology used and a section on the existing environment. The existing environment is discussed within the Constraints Study Appendix 5 and in Section 2.3.4 of the environmental assessment report Appendix 6, a summary of the baseline environment is included in Section 3.3.4 of the environmental assessment report Appendix 6.

The principal objective of the Landscape and Visual Impact Assessment at this stage is to undertake sufficient assessment to identify the landscape and visual factors, and the significance of effects upon them, in order to develop and select a preferred option.

Below is a summary of the Stage 2 impact assessment. The 'Significance of effects' has been evaluated based on the magnitude of change and the sensitivity of the landscape character or visual amenity. The criteria adopted in the assessment of the predicted magnitude of change is described in Section 3.3.4 of the environmental assessment report Appendix 6.

7.4.6.1 Impact Assessment

Route Option D-1

The landscape effects in this section are considered Very High and the significance of landscape effects is considered Highly Significant Adverse as the landscape character will alter considerably with the introduction of the route alignment. A number of streams in the highly sensitive area will require bridging or culverting, which will alter further the landscape character and the landscape value of this section of the study area. The effects on the landscape character in the remaining study area is considered Medium. The significance of landscape effects is considered to range from Significant to Very Significant Adverse.

The offline section to the northeast of the existing N2 corridor passes in close proximity to clusters of residential properties along the L5007 and L5008, which will alter the local visual amenity in the area considerably resulting in High to Very High visual change. Otherwise, the overall route corridor is well screened by existing intervening vegetation along the existing road network and due to its location on lower contours. The significance of visual change is considered to range between Significant and Very Significant Adverse.

Route Option D-1 has been scored at 1 'Major or Highly Negative'.

Route Option E-1

The landscape effects in this section are considered Medium and the significance of landscape effects is considered Moderate to Significant Adverse.

In terms of visual effects, the route alignment of this option is located in mostly flat or gently undulating terrain. Existing intervening vegetation will be able to provide considerable screening from the surrounding road network or other publicly accessible locations. This route option contains short sections of online widening and traverses large amounts of open countryside including the viewshed of the locally significant protected View 73 (County Road between Robinson's Crossroads on R108 and Windmill Hill), which includes "*Extensive views to the north east, mid distance heavily wooded. Dwellings, infrastructure and agriculture on left hand side. View to skyline with distinctive tower is locally distinctive*" as stated in the Meath County Development Plan 2021-2027. The proposed route option will pass through the viewshed of this protected view. While existing road-side vegetation can obscure partially or fully a number of views along the L5003, partial views towards the route alignment of Route Option E-1 will become visible due to required vegetation removal. The magnitude of visual effects is considered High. The significance of visual effects will be Significant Adverse. The visual effects on residential properties located along the R155 and adjacent to this route option will be High and localised. The offline route section to the west avoids the majority of residential properties in the area apart from a cluster of residences located along the R155, which will be located adjacent to the proposed route

alignment of this option resulting in High to Very High visual change to the existing surrounding visual amenity locally. Otherwise, the overall route corridor is well screened by existing intervening vegetation along the existing road network due to the overall flat or gently undulating nature of the area.

Route Option E-1 has been scored at 2 – Moderately Negative.

Route Option E-2

This route option follows the route of Option E-1 in the southeast but contains a much longer section of online widening along the existing N2 corridor before going offline crossing open fields, the R155 and in between residential properties before turning north again and re-joining the existing N2 road corridor and reaching Kilmoon Cross. The longer online widening section will be beneficial and reduce landscape and visual effects in the study area as it confines these to the existing N2 road corridor. The western offline section is shorter and closer to the existing N2 corridor and will affect a slightly higher number of residential properties along the R155 to either side of the route alignment. While the route will still pass through the viewshed of protected View 73, the alignment will be located further east and further away, thus reducing the visual effects slightly. The landscape effects are considered Medium and the significance of landscape effects is considered Moderate Adverse and overall slightly less than Route Option E-1 due to the longer section of online widening. The magnitude of visual effects is considered High to Very High along the offline sections, particularly due to the proximity to a slightly larger number of residential receptors when compared to route Option E-1. The significance of visual effects will be Significant Adverse.

Route Option E-2 has been scored at 2 – Moderately Negative.

Route Option F-2

The majority of this route is an offline alignment. It avoids areas of Highly Sensitive Landscapes in Fingal County. The offline nature of the alignment will increase the effects on the landscape character considerably. The magnitude of landscape change is considered to be High. The significance of landscape effects will range between Significant and Very Significant Adverse.

In terms of visual effects, the route alignment of this option is located in mostly flat or gently undulating terrain. Existing intervening vegetation will be able to provide considerable screening from the surrounding road network or other publicly accessible locations. The impact on residential properties will be concentrated along the R155, where the proposed route alignment will cross. The western offline section of this route alignment (west of the existing N2 corridor) passes through the viewshed of the locally significant protected View 73 (County Road between Robinson's Crossroads on R108 and Windmill Hill). While existing road-side vegetation can obscure partially or fully a number of views along the L5003, partial views towards the route alignment of Route Option F-2 will become visible due to required vegetation removal. The magnitude of visual effects is considered High. The visual impact on residential properties located along the R155 and adjacent to this route option will be High to Very High. The significance of visual effects will be Significant Adverse.

Route Option F-2 has been scored at Scale 1 – Major or Highly Negative.

Do Nothing / Do Minimum and Do Something / Do Managed

The Do Nothing / Do Minimum and Do Something / Do Managed Options will utilise the existing N2 corridor. It is anticipated that these options will have the least effect on the landscape character and visual amenity within the study area. While changes to the road layout and roadside vegetation will be clearly recognisable along the existing road corridor, the effects will remain localised and confined to the immediate environs of the existing N2.

The Do Nothing / Do Minimum, Do Something / Do Managed Options have been scored at Scale 4 – Not Significant or Neutral.

Do Something / Do Public Transport

The Do Something / Public Transport Alternative Option features some offline development adjacent to the N2; it is anticipated that this route option will have a low impact on the landscape character. It will visually intensify prevailing road infrastructure in available views.

The Do Something / Do Public Transport Option has been scored at Scale 3 – Minor or Slightly Negative.

Junction / Tie in Element

The Junction Tie in corridors are mainly on developed ground, however some of the junction footprint lies adjacent to the existing N2 corridor. The change in landscape character will be Low resulting in a landscape significance of Slight Adverse due to the increase in footprint. The overall development will not change the landscape character as it replaces an existing similar development in close proximity. Visually, the Junction Tie in corridors will intensify the prevailing road infrastructure in available views. The magnitude of visual change is considered Slight to Medium. The significance of visual effects is considered Moderate Adverse.

Junction / Tie in Element has been scored at Scale 3 – Minor or Slightly Negative.

7.4.6.2 Summary

The Do Nothing / Do Minimum, Do Something / Do Managed options and will have the least effect on the landscape character and the visual amenity as the existing N2 road corridor will be utilised. The Do Something / Public Transport option will increase mainly the visual effects due to offline sections.

Route Options F-2 and D-1 will result in the highest landscape effects due to the offline nature of Route Option F-2 and the landscape effects of Route Option D-1 on highly sensitive and valued landscapes as well as visual effects on residents. Route Options E-1 and E-2 are similar in impact, however, Route Option E-2 is the preferred route option as it contains a longer online widening section. While visual effects on residences will be slightly higher, the overall landscape and visual effects on the area including protected View 73 is less than in Route Option E-1 due to the shorter offline section and its location further east and away from View 73. Based on the above, Route Option E-2 is the preferred route option from a landscape and visual point of view.

The overall scores for Landscape and Visual are shown in Table 7-16.

Table 7-16 - Overall Scores for Landscape and Visual

Route Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Not Significant or Neutral (4)
Do Something - Public Transport	Minor or Slightly Negative (3)
Do Something - Route D1	Major or Highly Negative (1)
Do Something - Route E1	Moderately Negative (2)
Do Something - Route E2	Moderately Negative (2)
Do Something - Route F2	Major or Highly Negative (1)
Junction / Tie-Ins	Minor or Slightly Negative (3)

7.4.7 Noise and Vibration

This section presents a summary of the assessment of the route options in terms of the potential noise impacts on sensitive receptors within the study area. A detailed noise and vibration assessment is available in Section 3.3.5 of the environmental assessment report, Appendix 6, which includes a detailed section on the methodology used. The information provided below is a summary of the impact assessment.

The existing noise environment is expected to be dominated by road traffic from the N2, with background noise including local traffic along minor roads, farmyard activities and general environmental sources including bird song and rustling foliage. The EPA round 3 road traffic noise maps indicate that road traffic noise levels are typically greater than 60 dB L_{den} within 50 m from the edge of existing carriageway of the N2.

The four route corridor options have been assessed with reference to their Potential Impact Rating (PIR) which is based on:

- Property counts of Noise Sensitive Receptors (NSR's) in proximity to the corridor;
- The potential change in traffic noise levels at affected NSR's in the study area; and
- The likely need for noise mitigation.

PIR calculations for each route option are available in Section 3.3.5 of the environmental assessment report Appendix 6.

The magnitude of impacts has been assessed by comparing the change in predicted noise level to the DMRB classifications as reproduced in Table 7-17.

Table 7-17 Classification of magnitude of traffic noise impacts in long term (DMRB 2020)

Long-term Magnitude	Long-term noise change, dB
Major	Greater than or equal to 10.0
Moderate	5.0 to 9.9
Minor	3 to 4.9
Negligible	Less than 3.0

7.4.7.1 Impact Assessment

Table 7-18 presents the calculated magnitude of change in noise level at the assessment locations for each route option when compared to the Do Nothing / Do Minimum scenario for the year 2040. Traffic data obtained for the opening year of 2030 and design year of 2040 has been used in the model as per the TII guidance (2011).

The number of properties calculated to experience a moderate negative (+5 to +9.9 dB) and major negative (+10 dB) change in noise level above the Do Nothing / Do Minimum scenario represents a potential significant negative impact. The number of properties calculated to experience a moderate (-5 to -9.9 dB) and major (-10 dB) reduction in noise level has also been calculated to determine a potentially significant positive impacts when compared to the Do Nothing / Do Minimum scenario.

Table 7-18 Number of Properties with Moderate and Major Changes in Noise Levels

Route Option	No. of Properties Likely to Experience a Change in Noise Level			
	Major Negative	Moderate Negative	Moderate Positive	Major Positive
Route Option D-1	3	17	13	5
Route Option E-1	9	21	13	5
Route Option E-2	6	21	9	2
Route Option F-2	4	23	23	5

The assessment indicates that both the major and moderate positive and negative impacts are broadly similar across all route options, there is not one route which stands out as having a significantly greater negative or positive impact on balance. Route Options F-2 and D-1 have similar positive and negative impacts, while Route Options E-1 and E-2 have slightly more negative impacts associated.

Route Option D-1

The highest PIR rating of 158 is associated with Route Option D-1. The number of properties to potentially require noise mitigation is highest for Route Option D-1 at 34.

Route Option E-1

The third highest PIR rating is associated with Route Option E-1 with a PIR score of 125. The number of properties to potentially require noise mitigation is similar for Route Option E-1 and Route Option F-2 with 22 and 24 identified respectively.

Route Option E-2

The second highest PIR rating is associated with Route Option E-2, with a PIR rating of 140. The second highest number of properties to potentially require noise mitigation is Route Option E-2 at 29.

Route Option F-2

Route Option F-2 is an offline route corridor and has the lowest PIR score at 95. The number of properties to potentially require noise mitigation is similar for Route Option E-1 and Route Option F-2 with 22 and 24 identified respectively.

Junction / Tie in element

The junction strategy for the route options is still being developed, at this stage of the assessment it is assumed that there will be two junctions, one at the southern tie-in and another at the northern tie-in. The indicative junction corridors cover roughly the same extent for all of the route options, they cannot be assessed in detail at this stage, but the entire junction corridor have been considered in each route within this appraisal.

7.4.7.2 Summary

The impact rating score and associated qualitative assessment for each route option are summarised in Table 7-19 with the impact scores outlined in Table 7-20.

Table 7-19 Assessment Summary

Assessment Criteria	Route Option			
	D-1	E-1	E-2	F-2
PIR	158	125	140	95
No. of Properties Likely to Require Noise Mitigation	34	22	29	24
No of Properties likely to experience a Major Negative Impact	3	9	6	4
No of Properties likely to experience a Moderate Negative Impact	17	21	21	23
No of Properties likely to experience a Major Positive Impact	5	5	2	5
No of Properties likely to experience a Moderate Positive Impact	13	13	9	23
Preference	Intermediate	Preferred	Intermediate	Preferred

Table 7-20 - Overall Scores for Noise and Vibration

Route Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Not Significant or Neutral (4)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Moderately Negative (2)
Do Something - Route E1	Minor or Slightly Negative (3)
Do Something - Route E2	Moderately Negative (2)
Do Something - Route F2	Minor or Slightly Negative (3)
Junction / Tie-Ins	Minor or Slightly Negative (3)

7.4.8 Air Quality

This section presents an appraisal of route options for the Rath to Kilmoon Cross road scheme in terms of their impacts on air quality in the study area. A detailed air quality assessment is available in Section 3.3.6 of the environmental assessment report, Appendix 6, which includes a section on the methodology used and the existing environment. The below is a summary of the impact assessment. A review of data from representative Zone D locations was discussed in Section 3.7 Air Quality and Climate of the constraints study (Appendix 5). The primary aspects of the assessment relate to the existing ambient air quality, proximity of sensitive locations and a review of the overall significance of potential changes in air quality.

The number of residential properties within 50 m of the carriageway of each route option have been identified. Traffic data obtained for the opening year of 2030 and design year of 2040 has been used in the air quality model as per the TII guidance (2011). A comparison of the route options has been carried out based on a calculation of the Index of the Overall Change in Exposure to NO_x and PM₁₀ resulting from each individual route option.

There are no sensitive ecological receptors in proximity to the route options with respect to air quality impacts on ecology. Hence, sensitive ecological receptors are unlikely to be impacted by changes in air quality associated with the proposed road scheme and are not considered as part of the route selection.

7.4.8.1 Impact Assessment

Do Nothing / Do Minimum, Do Managed and Do Public Transport

The Do Minimum Scenario option results in the highest exposure index for both NO_x and PM₁₀ for both 2030 and 2040. This is as a consequence of the high number of residential receptors for this alignment.

No additional information is available on the traffic impact of the two following online options:

- Traffic Management: Utilising existing junctions and improvements with the existing road boundary, and demand management and access control.
- Public Transport: The provision of bus lanes and a park & ride facility adjacent to the N2 are to be considered as standalone options and as complimentary elements of the route corridor options.

Both these options would follow the shortest route length (i.e. current alignment) making them similar to the Do-Minimum Option and impact the same receptors. Both route options have the potential to reduce emissions due to less congestion and therefore lower actual emissions, which is beneficial compare to the Do-Minimum Option. Congestion impacts are not assessed at route selection stage and no further information is available on these options.

Table 7-21. Results of Index of Overall Exposure 2030 & 2040

Route Option	AADT (2030)	Route Length (km)	No. Receptors (0 - 50m)	NO _x Exposure Index	PM ₁₀ Exposure Index
Do Minimum 2030	19,981	5.56	22	110,583	3,121
Do Minimum 2040	21,743	5.56	22	120,334	3,397

Route Option D-1

Route Options D-1 and E-2 are the least beneficial of the proposed off-line route options. All of the Route Options D-1, E-1, E-2 and F-2 have net benefit in terms of air quality exposure index compared to the Do Minimum Scenario on the current alignment. This is due to traffic being diverted away from the higher number of sensitive residential receptors on the current alignment.

Table 7-22. Results of Index of Overall Exposure 2030 & 2040

Route Option	AADT (2030)	Route (km)	Length	No. Receptors (0 - 50m)	NOx Index	Exposure	PM ₁₀ Index	Exposure
Route Option D-1 2030	23,600	6.85		12		72,299		2,021
Route Option D-1 2040	25,600	6.856		12		78,426		2,192

Route Option E-1

All of the Route Options D-1, E-1, E-2 and F-2 have net benefit in terms of air quality exposure index compared to the Do Minimum Scenario on the current alignment. This is due to traffic being diverted away from the higher number of sensitive residential receptors on the current alignment.

Table 7-23. Results of Index of Overall Exposure 2030 & 2040

Route Option	AADT (2030)	Route (km)	Length	No. Receptors (0 - 50m)	NOx Index	Exposure	PM ₁₀ Index	Exposure
Route Option E-1 2030	23,400	6.87		9		53,957		1,504
Route Option E-1 2040	25,500	6.874		9		58,800		1,639

Route Option E-2

Route Options D-1 and E-2 are the least beneficial of the proposed off-line route options. All of the Route Options D-1, E-1, E-2 and F-2 have net benefit in terms of air quality exposure index compared to the Do Minimum Scenario on the current alignment. This is due to traffic being diverted away from the higher number of sensitive residential receptors on the current alignment.

Table 7-24. Results of Index of Overall Exposure 2030 & 2040

Route Option	AADT (2030)	Route (km)	Length	No. Receptors (0 - 50m)	NOx Index	Exposure	PM ₁₀ Index	Exposure
Route Option E-2 2030	23,300	6.85		12		71,743		1,998
Route Option E-2 2040	25,300	6.857		12		77,901		2,170

Route Option F-2

Route Option F-2 has the lowest exposure index for NO_x and PM₁₀, this is due to the lowest traffic and number of receptors for any of the potential route options. All of the Route Options D-1, E-1, E-2 and F-2 have net benefit in terms of air quality exposure index compared to the Do Minimum Scenario on the current alignment. This is due to traffic being diverted away from the higher number of sensitive residential receptors on the current alignment.

Table 7-25. Results of Index of Overall Exposure 2030 & 2040

Route Option	AADT (2030)	Route (km)	Length	No. Receptors (0 - 50m)	NOx Index	Exposure	PM ₁₀ Index	Exposure
Route Option F-2 2030	21,000	7.2		5		28,181		762
Route Option F-2 2040	22,800	7.2		5		30,597		827

Junction / Tie in element

The junction strategy for the route options is still being developed, at this stage of the assessment it is assumed that there will be two junctions, one at the southern tie-in and another at the northern tie-in. The indicative junction corridors cover roughly the same extent for all of the route options. Upgrades to the junctions will be designed to reduce congestion which has the potential to improve air quality for nearby receptors.

7.4.8.2 Summary

All of the Routes Options D-1, E-1, E-2 and F-2 have net benefit in terms of air quality compared to the current alignment, as traffic is diverted away from the higher number of sensitive residential receptors on the current alignment. Route Option F-2 is considered the most preferable with respect to air quality exposure of the potential route options due to its low number of residential receptors within 50 m of the carriageway.

The Do-Something Options for traffic management, road widening, and public transport do not currently have additional information available and therefore the assessment for these are qualitative and based on the assumption that they would reduce congestion issues on the current alignment.

The overall scores for Air Quality are shown in Table 7-26.

Table 7-26 - Overall Scores for Air Quality

Route Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Minor or Slightly Positive (5)
Do Something - Public Transport	Minor or Slightly Positive (5)
Do Something - Route D1	Minor or Slightly Positive (5)
Do Something - Route E1	Minor or Slightly Positive (5)
Do Something - Route E2	Minor or Slightly Positive (5)
Do Something - Route F2	Minor or Slightly Positive (5)
Junction / Tie-Ins	Not Significant or Neutral (4)

7.4.9 Climate

This section presents an appraisal of the route options in terms of their impacts on climate in the study area. Impacts in relation to climate (accruing at a national scale) have also been considered. A detailed climate assessment is available in Section 3.3.7 of the environmental assessment report, Appendix 6. The information shown below is a summary of the impact assessment.

The route selection appraisal is conducted using the methodology proposed for regional climate impacts within the TII document 'Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes' (2011). The objective at this stage of the route option selection process is to indicate whether there are likely to be significant climate impacts associated with the Route Options D-1, E1, E-2 and F2. Traffic data obtained for the opening year of 2030 and design year of 2040 has been used in the model. Climate pollutants are considered to have a national impact rather than localised impact. Therefore, unlike with air quality impacts, the number of receptors in close proximity to the route option are not considered in the ranking. The preference for a single scheme is based on the scheme length, volumes of traffic utilising the road, traffic speed and the percentage of HGVs (heavy goods vehicles). An assessment of the CO₂ mass emissions was undertaken on each option to include both a quantitative and qualitative assessment.

The use of the TII carbon tool is limited at the option selection stage due to lack of detailed information on carbon emitting sources. These include materials for construction of the scheme and their embedded carbon, where the materials are sourced from (local quarry availability compared to distant ones), the programme of construction and whether the scheme is in surplus or deficit. This will therefore be used later in the scheme development following the selection of a preferred option.

7.4.9.1 Impact Assessment

There is minimal difference between all route options in terms of CO₂ emissions as they are all of a similar length and have similar traffic volumes. None of the route options will result in a positive impact to climate compared to the Do Minimum Scenario due to the longer length and higher projected traffic volumes. However, this assessment does not account for congestion related emissions for the Do-Minimum Scenario. Therefore, all routes options are considered of intermediate preference in terms of operational traffic emissions on climate.

Do Nothing / Do Minimum, Do Managed and Do Public Transport

No additional information is available on the traffic impact of the two following online options:

- Traffic Management: Utilising exiting junctions and improvements with the existing road boundary, and demand management and access control.
- Public Transport: The provision of bus lanes and a park & ride facility adjacent to the N2 are to be considered as standalone options and as complimentary elements of the route corridor options.

Both these options would follow the shortest route option length (i.e. current alignment) making them similar to the Do-Minimum option. The traffic management solution has the potential to reduce emissions due to less congestion. From a climate point of view, a strengthened public transport network infrastructure is considered a key target of the Climate Action Plan (CAP). Therefore, qualitatively, the Public Transport option is considered preferential with respect to climate.

Do Min/Do Nothing

Table 7-27 - Do Min/Do Nothing Climate Impact of Operational Traffic 2030 & 2040

Route Option	AADT (2030)	Route Length (km)	CO ₂ Emission Rate (tonnes/yr)
Do Minimum 2030	19,981	5.56	11,356
Do Minimum 2040	21,743	5.56	12,357

Route Option D-1**Table 7-28 - Route Option D-1 Climate Impact of Operational Traffic 2030 & 2040**

Route Option	AADT (2030)	Route Length (km)	CO ₂ Emission (tonnes/yr)	Rate
Route Option D-1 2030	23,600	6.856	16,706	
Route Option D-1 2040	25,600	6.856	18,121	

Route Option E-1**Table 7-29 - Route Option E-1 Climate Impact of Operational Traffic 2030 & 2040**

Route Option	AADT (2030)	Route Length (km)	CO ₂ Emission (tonnes/yr)	Rate
Route Option E-1 2030	23,400	6.874	16,648	
Route Option E-1 2040	25,500	6.874	18,142	

Route Option E-2**Table 7-30 - Route Option E-2 Climate Impact of Operational Traffic 2030 & 2040**

Route Option	AADT (2030)	Route Length (km)	CO ₂ Emission (tonnes/yr)	Rate
Route Option E-2 2030	23,300	6.857	16,553	
Route Option E-2 2040	25,300	6.857	17,973	

Route Option F-2**Table 7-31 - Route Option F-2 Climate Impact of Operational Traffic 2030 2040**

Route Option	AADT (2030)	Route Length (km)	CO ₂ Emission (tonnes/yr)	Rate
Route Option F-2 2030	21,000	7.2	16,156	
Route Option F-2 2040	22,800	7.2	17,541	

Junction / Tie in element

The junction strategy for the route options is still being developed, at this stage of the assessment it is assumed that there will be two junctions, one at the southern tie-in and another at the northern tie-in. The indicative junction corridors cover roughly the same extent for all of the route options and to have a similar impact. Upgrades to the junctions will be designed to reduce congestion which has the potential to reduce carbon emissions.

7.4.9.2 Summary

Considering the impact on climate, no route option will result in a positive operational phase impact to climate compared to the Do Minimum Scenario on the current alignment due to the longer length and higher projected traffic volumes. However, there is no account for congestion, which has the potential to increase emissions, included in the Do Minimum Scenario.

With respect to the qualitatively assessed online Do-Something options, it is assumed that the traffic management solution would resolve congestion along the route and therefore the qualitative assessment considers this to be minor positive as the route is shorter than the offline route options. From a climate point of view, a strengthened public transport network infrastructure is considered a key target of the CAP. Therefore, qualitatively, the Public Transport option is considered to be of preference with respect to climate.

It should be noted that the assessment of the Route Options did not take any account of modal shift or improvement in bus patronage along the respective corridors at this stage. This will be covered in more detailed assessments at later stages of the project development.

The overall scores for Climate are shown in Table 7-32.

Table 7-32 - Overall Scores for Climate

Route Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Minor or Slightly Positive (5)
Do Something - Public Transport	Minor or Slightly Positive (5)
Do Something - Route D1	Not Significant or Neutral (4)
Do Something - Route E1	Not Significant or Neutral (4)
Do Something - Route E2	Not Significant or Neutral (4)
Do Something - Route F2	Not Significant or Neutral (4)
Junction / Tie-Ins	Not Significant or Neutral (4)

7.4.10 Population and Human Health

The Stage 2 assessment of the route options selection process involved undertaking a comparative evaluation of the route options, having regard to multiple factors in order to identify an Emerging Preferred Option. A detailed population and human health assessment is available in Section 3.3.8 of the environmental assessment report Appendix 6. The existing environment is as described within the Constraints Study (Appendix 5). The information below is a summary of the impact assessment and considers all potential impacts which may arise as a result of the route options.

Property counts are approximate at this stage of the assessment as the exact route is unknown and counts are based upon aerial photography only.

7.4.10.1 Impact Assessment

All of the offline elements of these three route options would be built mostly on farmland; however commercial properties may also be affected near Cushinstown including: Cherry Picker Ltd., Kilmoon Cross Nurseries and Top Oil Petrol Station. There is potential for noise and air quality effects to be experienced by residents in Cushinstown and students at Scoil Naomh Cianain due to construction works and / or by traffic on the new elements once completed. Construction traffic and additional traffic generated by the scheme during construction may lead to severance effects on Scoil Naomh Cianain, Cushinstown Athletic Club and the Pillo Hotel as users find them more difficult to access.

Overall, all of the offline Route Options D-1, E-1, E-2 and F-2 and junction tie-in options have been assigned a score of 2 'Moderately Negative'; meaning they have the potential to lead to moderately negative effects on population and human health.

Do Nothing / Do Minimum, Do Managed and Do Public Transport

Neither the Do Nothing / Do Minimum Option or the Do Something – Do Managed options require any additional land beyond the existing alignment of the N2. The options therefore do not cause any direct impacts on community resources and residential properties in the study area. They are also unlikely to lead to any considerable changes in noise or air quality in the study area. Overall, the effects resulting from these options are expected to be negligible, therefore these options received a score of 4 'Not Significant or Neutral'.

The Do Something – Public Transport option will require some additional land adjacent to the existing N2 alignment. However, this is expected to be limited to curtilage and front gardens. There is also some potential for air quality and noise effects as a result of construction works though these are not expected to be significant. A score of 3 'Minor or Slightly Negative' has been assigned to these options since effects on population and human health are expected to be minor adverse.

Route Option D-1

Route Option D-1 has the potential to require the acquisition and demolition of four residential properties due to the route alignment. Where the wider route corridor is considered Route Option D-1 has the potential to directly effect a total of 41 residential properties.

Route Option D-1 also has the potential for additional noise and air quality effects to be experienced by residents in Moneyhill. Route Option D-1 also has the potential for direct impacts on an amenity area known locally as 'The Commons'.

These impacts are offset to some degree by the positive health effects anticipated during the operational phase resulting from a reduction in congestion along the existing N2. Route Option D-1 has been assigned a score of 2 'Moderately Negative'.

Route Option E-1

Route Option E-1 has the potential to require the acquisition and demolition of three residential properties. Where the wider route corridor is considered Route Option E-1 has the potential to directly effect a total of 41 residential properties. Route Option E-1 also has potential for direct impacts on St Declan's Cemetery.

These impacts are offset to some degree by the positive health effects anticipated during the operational phase resulting from a reduction in congestion along the existing N2. Route Option E-1 has been assigned a score of 2 'Moderately Negative'.

Route Option E-2

Route Option E-2 has the potential to require the acquisition and demolition of four residential properties due to the route alignment. Where the wider route corridor is considered Route Option E-2 has the potential to directly effect a total of 41 residential properties. Route Option E-2 also has potential for direct impacts on St Declan's Cemetery.

These impacts are offset to some degree by the positive health effects anticipated during the operational phase resulting from a reduction in congestion along the existing N2. Route Option E-2 has been assigned a score of 2 'Moderately Negative'.

Route Option F-2

Route Option F-2 has the potential to require the acquisition and demolition of one residential property due to the route alignment. This option has the potential for direct impacts on a total of 34 residential properties, either partially or wholly, within the wider route corridor. Route Option F-2 also has potential for direct impacts on St Declan's Cemetery.

These impacts are offset to some degree by the positive health effects anticipated during the operational phase resulting from a reduction in congestion along the existing N2. Route Option F-2 has been assigned a score of 2 'Moderately Negative'.

Junction / Tie in element

The Junction Tie in Elements have the potential for direct impacts on twelve residential properties within the corridor, a cemetery, commercial properties in Cushinstown and the Pillo Hotel in Ashbourne. There is also potential for impacts on the amenity of residents in Cushinstown due to noise and / or air quality effects.

Construction works and traffic on the R152 have the potential to create severance impacts for Scoil Naomh Cianain and Cushinstown Athletic Clu) due to their users not being able to access the resources easily. Construction works and traffic on the N2 Rath Roundabout have the potential to create severance impacts on the Pillo Hotel due to users not being able to access the resource.

These impacts are offset to some degree by the positive health effects anticipated during the operational phase resulting from a reduction in congestion along the existing N2. The junction corridors have been assigned a score of 2 'Moderately Negative'.

7.4.10.2 Summary

The overall effect on population and health for all scenarios has been assessed based on the impact of land use and health effects generated by each route option. The Do Nothing / Do Minimum Option and the Do Something – Management Option are both assessed to have the potential for only negligible impacts on population and health and have therefore received a score of 4 – not significant or neutral. The Do Something – Public Transport Alternative has potential for minor adverse impacts due to the requirement for land adjacent to the existing N2 having potential to impact resources here, such as curtilage and front gardens.

Route Options D-1, E-1, E-2, and F-2, as well as the junction corridors all have potential to result in the demolition of a number of residential properties and direct impacts on community resources and commercial properties. They are also all likely to lead to amenity impacts on local residents and severance impacts on community resources.

It is noted that during the operational phase, all offline options (Route Options D-1, E-1, E-2 and F-2), including the junction corridors which are common to all route options, will lead to a considerable reduction in congestion along the N2 in the study area. The N2 is the primary road used by local residents to travel between communities in the study area. This has potential to lead to positive health effects due to potential increases in accessibility between residents and the resources which they use within the study area.

Overall, Route Options D-1, E-1, E-2, and F-2, as well as the junction corridors, have all been assessed to have potential for a moderately adverse impact on population and human health and have received a score of 2 - moderately negative. The overall scores for Population and Human Health are shown in Table 7-33.

Table 7-33 - Overall Scores for Population and Human Health

Route Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Not Significant or Neutral (4)
Do Something - Public Transport	Minor or Slightly Negative (3)
Do Something - Route D1	Moderately Negative (2)
Do Something - Route E1	Moderately Negative (2)
Do Something - Route E2	Moderately Negative (2)
Do Something - Route F2	Moderately Negative (2)
Junction / Tie-Ins	Moderately Negative (2)

7.4.11 Cultural Heritage

This section assesses the potential impacts on the archaeological, architectural and cultural heritage resource arising from the proposed N2 Rath to Kilmoon Cross Road Scheme. A detailed archaeological and historical background has been produced as part of the Constraints Study (Appendix 5) and is not repeated here. A detailed archaeological, architectural and cultural heritage assessment is available in Section 3.3.9 of the environmental assessment report, Appendix 6, which includes a detailed section on the methodology used, the existing environment and appendices outlining the archaeology, architectural and cultural heritage sites within the receiving environment of Route Option D-1. The below is a summary of the impact assessment only and should be read in conjunction with the environmental assessment report, Appendix 6.

The study involved detailed interrogation of the archaeological, historical and architectural background of the receiving environment containing the route options, with specific assessment of a 500 m corridor width in each case (250 m either side of the edge of the proposed alignments). All measurements referenced in this section are taken from the edge of the road footprint to the upstanding remains of the recorded site (or to the centre of the site, where no upstanding remains occur). The northern and southern junction option areas are considered separately to the route options, as these are common to all options.

Recorded archaeological sites are listed as Archaeological Heritage sites (AH). Recorded built heritage sites are listed as Built Heritage sites (BH). Demesne landscapes are listed as Designed Landscapes (DL). Sites and structures of potential archaeological or built heritage significance are listed as Cultural Heritage sites (CH) or Areas of Archaeological Potential (AAP).

Research has been undertaken in two phases. The first phase comprised a documentary survey of all available archaeological, architectural, historical and cartographic sources. The second phase involved a drive-over of the study area containing the route options in an attempt to assess the current state of any recorded archaeological and built heritage sites that were accessible from the existing road network. A windshield survey was carried out on July 23rd 2020 and aimed to assess the location and condition of the archaeology, architectural and cultural heritage assets located within the receiving environments of the four route options. This was carried out from publicly accessible roads across the area. Note was also made of the topography and land use across the landscape.

The quality and type of an impact are as per NRA's Guidelines for the Assessment of Archaeological / Architectural Heritage Impacts of National Road Schemes (TII 2005a, 25/54) (a detailed breakdown is available in Section 3.3.9 of the environmental assessment report, Appendix 6. Impact Definitions are as outlined in the Guidelines for the Assessment of Archaeological / Architectural Heritage Impacts of National Road Schemes (NRA, 2005a / 2005b, p. 54 / 33). These have been supplemented with the additional impact definitions as per the most recent EPA guidelines (2017).

The TII Project Appraisal Guidelines for National Roads Unit 7.0 - Multi Criteria Analysis was also used as a basis for the assessment of potential impacts on the archaeological, architectural and cultural heritage resource. Impacts were assessed on a scale of 1 – 7 and are aligned to the EPA / NRA guidelines (a detailed breakdown is available in Section 3.3.9 of the environmental assessment report, Appendix 6).

7.4.11.1 Impact Assessment

Route Option D-1

Details of the cultural heritage features for Route Option D-1 are outlined in Table 7-34 and in Section 3.3.9 of the environmental assessment report, Appendix 6, these are also shown in Drawing AG-0006 in Appendix 3.

One recorded monument, AH 5 (enclosure), will potentially be subject to a significant direct impact, while one recorded monument (AH 4) and three cultural heritage sites (CH 6, 10, and 17) will potentially be subject to moderate indirect impacts. These indirect impacts would result from changes to the setting of this monument and these structures.

This route will potentially have a moderate direct impact on one area of archaeological potential, AAP 6 on the county boundary between Dublin and Meath, and on portions of six separate townland boundaries (TB 5, 15, 16, 18, 21, and 23).

The level of potential direct impacts to three AAPs (AAP 3, 7, and 10) has been assessed as potentially ranging from moderate to profound negative. This is due to current uncertainty relating to the presence and extent of archaeological features in these areas.

Potential slight direct negative impacts have been identified to one demesne landscape (DL 5) and one cultural heritage asset (CH 18 – the route of the 18th century N2 toll road).

There are no predicted impacts, either direct or indirect, to any of remaining identified archaeological, architectural or cultural heritage sites within the proposed route or its receiving environment.

Route Option D-1 will impact on previously undisturbed greenfield land which has the potential to contain previously unrecorded archaeological remains. Impacts to any such remains could range from moderate to profound negative.

Route Option E-1

Details of the cultural heritage features for Route Option E-1 are outlined in Table 7-34 and in Section 3.3.9 of the environmental assessment report, Appendix 6, these are also shown in Drawing AG-0007 in Appendix 3.

The site of a vernacular structure (CH 59) and the site of a lime kiln (CH 65) will potentially be subject to significant direct negative impacts, while these structures do not survive above ground, associated below ground remains are likely to survive. These structures are not subject to statutory protection and were identified as cultural heritage constraints during the course of this assessment.

This route will potentially have a moderate direct impact on three areas of archaeological potential, AAP 6, 8 and 12, and on portions of five separate townland boundaries (TB 2, 13, 18, 21, and 23).

The level of potential direct impacts to three AAPs (AAP 2, 7, and 14) has been assessed as potentially ranging from moderate to profound negative. This is due to current uncertainty relating to the presence and extent of archaeological features in these areas.

Potential slight direct negative impacts have been identified to one demesne landscape (DL 5) and one cultural heritage asset (CH 18 – the route of the 18th century N2 toll road). Potential indirect impacts to the setting of one recorded monument (AH 25), one protected structure (BH 5) and two cultural heritage assets (CH 1 and 6) have been assessed as imperceptible. There are no predicted impacts, either direct or indirect to any of the remaining identified archaeological, architectural or cultural heritage sites within the proposed route or its receiving environment.

Route Option E-1 will impact on previously undisturbed greenfield land which has the potential to contain previously unrecorded archaeological remains. Impacts to any such remains could range from moderate to profound negative.

Route Option E-2

Details of the cultural heritage features for Route Option E-2 are outlined in Table 7-34 and in Section 3.3.9 of the environmental assessment report, Appendix 6, these are also shown in Drawing AG-0008 in Appendix 3.

The site of a lime kiln (CH 65) will potentially be subject to significant direct negative impacts, while this structure does not survive above ground, associated below ground remains are likely to survive. The structure is not subject to statutory protection and were identified as cultural heritage constraints during the course of this assessment.

This route will have a potentially moderate direct impact on two areas of archaeological potential, AAP 6 and 8, and on portions of seven separate townland boundaries (TB 2, 14, 15, 16, 18, 21, and 23).

The level of potential direct impacts to AAP 7 has been assessed as potentially ranging from moderate to profound negative. This is due to current uncertainty relating to the presence and extent of archaeological features in these areas.

Potential slight direct negative impacts have been identified to one demesne landscape (DL 5) and one cultural heritage asset (CH 18 – the route of the 18th century N2 toll toad). Indirect impacts to the setting of one cultural heritage asset (CH 1) has been assessed as imperceptible. There are no predicted impacts, either direct or indirect, to the remaining identified archaeological, architectural or cultural heritage sites within the proposed route or its receiving environment.

Route Option E-2 will impact previously undisturbed greenfield land which has the potential to contain previously unrecorded archaeological remains. Impacts to any such remains could range from moderate to profound negative.

Route Option F-2

Details of the cultural heritage features for Route Option F-2 are outlined in Table 7-34 and in Section 3.3.9 of the environmental assessment report, Appendix 6, these are also shown in Drawing AG-0009 in Appendix 3.

A vernacular cottage in ruins (CH 9) and the site of a lime kiln (CH 65) will potentially be subject to significant direct negative impacts. While lime kiln does not survive above ground, associated below ground remains are likely to survive. These structures are not subject to statutory protection and were identified as cultural heritage constraints during the course of this assessment.

This route will potentially have a moderate direct impact on three areas of archaeological potential, AAP 6, 8, and 11 and on portions of four separate townland boundaries (TB 2, 14, 20, and 22).

The level of potential direct impacts to two AAPs (AAP 2 and 7) has been assessed as potentially ranging from moderate to profound negative. This is due to current uncertainty relating to the presence and extent of archaeological features in these areas.

Potential slight direct negative impacts have been identified to one cultural heritage asset (CH 18 – the route of the 18th century N2 toll toad). Indirect impacts to the setting of one recorded monument (AH 16) and two cultural heritage assets (CH 1 and 8) have been assessed as imperceptible. There are no predicted impacts, either direct or indirect, to the remaining identified archaeological, architectural or cultural heritage sites within the proposed route or its receiving environment.

The Route Option F-2 will impact previously undisturbed greenfield land which has the potential to contain previously unrecorded archaeological remains. Impacts to any such remains could range from moderate to profound negative. This route has the largest impact to previously undisturbed greenfield land, and therefore has the highest potential to encounter previously unrecorded archaeological features.

Northern Junction

Details of the cultural heritage features for the Northern Junction are outlined in Table 7-34 and in Section 3.3.9 of the environmental assessment report, Appendix 6.

Works associated with the Northern Junction have the potential to have a very significant direct impact on one protected structure (BH 2 – Toll House) and a moderate impact on a second (BH 3 – Kilmoon House). However, design is on-going, and every effort should be made to avoid direct impacts to these structures.

Potential significant direct impacts have been identified to 14 cultural heritage sites located across the northern junction area (CH12, 19, 57, 68-71, 73-79).

Potential moderate direct impacts have been identified to one townland boundary across the junction area (TB 30).

The level of potential direct impacts to two AAPs (AAP 16 and 17) has been assessed as potentially ranging from moderate to profound negative. This is due to current uncertainty relating to the presence and extent of archaeological features in these areas.

Slight direct negative impacts have been identified to one demesne landscape (DL 1) and one cultural heritage asset (CH 18 – the route of the 18th century N2 toll toad).

Southern Junction

Details of the cultural heritage features for the Southern Junction are outlined in Table 7-34 and in Section 3.3.9 of the environmental assessment report, Appendix 6.

Potential significant direct impacts have been identified to three cultural heritage sites located across the southern junction area (CH41, 42 and 67).

The level of potential direct impacts to AAP 2 has been assessed as potentially ranging from moderate to profound negative. This is due to current uncertainty relating to the presence and extent of archaeological features in these areas.

Potential moderate direct impacts have been identified to four townland boundaries across the junction area (TB 23, 25-27).

Slight direct negative impacts have been identified to one demesne landscape (DL 5) and one cultural heritage asset (CH 18 – the route of the 18th century N2 toll toad).

7.4.11.2 Summary

Table 7-34 Summary Table

Impact Level	Option D1	Option E1	Option E2	Option F2	Northern Junction	Southern Junction
Profound negative	-	-	-	-	-	-
Very Significant negative	-	-	-	-	BH 2 (Toll House)	-
Significant negative	AH 5 (Enclosure)	CH 59 (Site of vernacular structure) CH 65 (Site of lime kiln)	CH 65 (Site of lime kiln)	CH 9 (vernacular cottage in ruins) CH 65 (Site of lime kiln)	CH 12 (Former Constabulary Barracks) CH 19 (Site of group of vernacular structures) CH 57 (Site of group of vernacular structures) CH 68 (Bunnan Bridge) CH 69 (Site of group of vernacular structures) CH 70 (Site of group of vernacular structures) CH 71 (Site of 2 of vernacular structures) CH 73 (Vernacular structures) CH 74 (Bunnan Bridge North) CH 75 (Site of 2 of vernacular structures) CH 76 (Site of 2 of vernacular structures) CH 77 (Site of possible lodge to Meadesbrook House) CH 78 (Site of 2 of vernacular structures) CH 79 (Cushenstown School)	CH 41 (Site of vernacular structure) CH 42 (Site of group of vernacular structures) CH 67 (Site of vernacular structure)
Moderate negative	AH 4 (mound) AAP 6 (County boundary between Dublin and Meath) CH 6 (vernacular house and outbuildings)	AAP 6 (County boundary between Dublin and Meath) AAP 8 (Possible field system) AAP 12 (Anomaly seen on LiDAR) TB 2, TB 13, TB 18, TB 21, TB 23,	AAP 6 (County boundary between Dublin and Meath) AAP 8 (Possible field system) CH 10 (Former smithy) CH 17 (ruined vernacular structure)	AAP 6 (County boundary between Dublin and Meath) AAP 8 (Possible field system) AAP 11 (Mound seen on LiDAR) TB 2, TB 14, TB 20, TB 22	BH 3 (Kilmoon House) TB 30	TB 23, TB 25, TB 26, TB 27

Impact Level	Option D1	Option E1	Option E2	Option F2	Northern Junction	Southern Junction
	CH 10 (Former smithy) CH 17 (ruined vernacular structure)		TB 2, TB 14, TB 15, TB 16, TB 18, TB 21, TB 23			
	TB 5, TB 15, TB 16, TB 18, TB 21, TB 23,					
Moderate to Profound negative	AAP 3 (Possible medieval settlement) AAP 7 (Marginal ground) AAP 10 (Riverstown River and tributary environs) Greenfield areas with the potential to contain previously unrecorded archaeological remains	AAP 7 (Marginal ground) AAP 14 (Possible location of Knavinstown House) Greenfield areas with the potential to contain previously unrecorded archaeological remains	AAP 7 (Marginal ground) Greenfield areas with the potential to contain previously unrecorded archaeological remains	AAP 2 (Adjacent to significant archaeological remains) AAP 7 (Marginal ground) Greenfield areas with the potential to contain previously unrecorded archaeological remains	AAP 16 (Riverstown River and environs) AAP 17 (Curraghtown River and environs)	AAP 2 (Adjacent to significant excavated archaeological remains)
Slight negative	DL 5 (Unnamed demesne) CH 18 (N2 – 18th century turnpike road)	DL 5 (Unnamed demesne) CH 18 (N2 – 18th century turnpike road)	DL 5 (Unnamed demesne) CH 18 (N2 – 18th century turnpike road)	CH 18 (N2 – 18th century turnpike road)	DL 1 (Meadesbrook Demesne) CH 18 (N2 – 18th century turnpike road)	CH 18 (N2 – 18th century turnpike road) DL 5 (Unnamed demesne)
Imperceptible/ Not Significant	CH 1 (Vernacular building) TB 25	AH 25 (Enclosure) BH 5 (Kilbrew House)	CH 1 (Vernacular building)	AH 16 (Enclosure) CH 1 (Vernacular building)	CH 72 (Site of group of vernacular structures) CH 80 (Site of Cushenstown Dispensary)	TB 24

Impact Level	Option D1	Option E1	Option E2	Option F2	Northern Junction	Southern Junction
		CH 1 (Vernacular building) CH 6 (Vernacular house and outbuildings) TB 9, TB 25	CH 6 (vernacular house and outbuildings) CH 8 (19th century house and farmyard) TB 9, TB 25	CH 8 (19th century house and farmyard) TB 9, TB 25	TB 1, TB 28, TB 29	
Neutral	AAP 4, AAP 11, AAP 13 CH 8, CH 16, CH 20-41, CH 43, CH 57, CH 58, CH 62, CH 63, CH 67 TB 3, TB 4, TB 6, TB 7, TB 14, TB 17, TB 19, TB 22, TB 24,	AAP 1, AAP 13, AAP 15 DL 2, DL 6 CH 8, CH 20, CH 21, CH 40, CH 44-55, CH 60, CH 61, CH 62, CH 67 TB 7, TB 8, TB 10, TB 11, TB 12, TB 15, TB 16, TB 17, TB 19, TB 22, TB 24,	AAP 1, AAP 10, AAP 11, AAP 13 CH 9, CH 20-21, CH 40, CH 44, CH 45, CH 55, CH 56, CH 58, CH 62, CH 64, CH 66, CH 67 TB 7, TB 8, TB 13, TB 17, TB 19, TB 22, TB 24	AH 12, AH 17, AH 18, AH 19, AH 20 AAP 1, AAP 10 CH 20, CH 21, CH 42, CH 44, CH 45, CH 56, CH 58, CH 64, CH 66, CH 67 TB 7, TB 8, TB 13, TB 15, TB 16, TB 17, TB 19		AH 17, AH 18, AH 19, AH 20, AH 21, AH 22, AH 23

Route Option D-1 will potentially result in a direct negative significant impact on a recorded enclosure site – AH 5 and an indirect moderate impact on the setting of a second recorded monument (AH 4 – mound). It will also have the third largest area of previously undisturbed greenfield land. This route is considered to be the **least preferred option** and has been assigned a score of **2 – Moderately Negative** as per the PE-PAG-02031 guidance.

Route Option F-2 will impact on the largest area of previously undisturbed greenfield land and has the potential to have a direct impact on two identified cultural heritage sites (CH 9 and 65). This is considered the **third preferred route** and has been assigned a score of **2 – Moderately Negative** as per the PE-PAG-02031 guidance.

Route Option E-1 will impact on the second largest previously undisturbed greenfield area and has the potential to have a direct impact on two identified cultural heritage sites (CH 59 and 65). This Route is considered to be the **second preference** and has been assigned a score of **2 – Moderately Negative** as per the PE-PAG-02031 guidance.

Route Option E-2 will impact on the least amount of previously undisturbed greenfield land and has the potential to have a direct impact on only one identified cultural heritage site (CH 65). This Route is considered to be the **preferred option** and has been assigned a score of **2 – Moderately Negative** as per the PE-PAG-02031 guidance.

The Northern Junction has the potential to have a very significant direct negative impact on one protected structure (BH 2) and a moderate direct negative impact on the remains of a second protected structure (BH 3), both of which are subject to statutory protection. Therefore, should any proposed junction in this area impact on these structures, the potential rating as per the PE-PAG-02031 guidance would be **1 – Majorly Negative**. The Southern Junction has the potential to have a significant direct negative impact on three cultural heritage sites (CH 41, 42 and 67). Therefore, should any proposed junction in this area impact on these structures, the potential rating as per the PE-PAG-02031 guidance would be **2 – Moderately Negative**. Overall the combined potential impact rating of the two junction corridors would be **1 – Majorly Negative**.

The overall scores for Cultural Heritage are shown in Table 7-35.

Table 7-35 - Overall Scores for Cultural Heritage

Route Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Not Significant or Neutral (4)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D-1	Moderately Negative (2)
Do Something - Route E-1	Moderately Negative (2)
Do Something - Route E-2	Moderately Negative (2)
Do Something - Route F-2	Moderately Negative (2)
Junction / Tie-Ins	Major or Highly Negative (1)

7.4.12 Material Assets - Agriculture

This section assesses the potential agricultural impacts of a number of options and indicative routes relative to the baseline for the proposed road development between Rath Roundabout (just north of Ashbourne) and Kilmoon Cross. A detailed assessment is available in Section 3.3.10 of the environmental assessment report Appendix 6, which includes a detailed section on the methodology used and information on the existing environment. Agriculture within the study area is described in Section 3.3 of the Constraints Report Appendix 5 and in the Stage 1 assessment. The information provided below is a summary of the impact assessment.

Of particular note along the corridors in this stage 2 assessment are two horticultural enterprises (Ashbrook Garden Centre and Kilmoon Cross Nurseries) which are very high sensitivity, a high sensitivity dairy farm (in the south of the study area) and four high sensitivity equine holdings. Within the study area there are 43 farmyards of which 8 are categorised as high or very high sensitivity.

This route corridor options assessment is a combination of a desktop assessment of available data sources combined with the on-site windshield survey conducted in December 2019 to identify farm yards, farm types, land use and cropping and quality of land. .

For each route corridor option, the 200 m wide corridor, the indicative route footprint and the northern and southern junction corridors have been assessed.

7.4.12.1 Impact Assessment

All offline route corridors affect a very highly sensitive horticultural enterprise near Kilmoon Cross. The impacts due to loss of circa 36 ha hectares of agricultural land are not significant because this represents less than 1% of the agricultural area of either County Meath or County Dublin (171,082 ha and 38,985 ha respectively according to Table 1 of the 2010 Agricultural Census).

Do Nothing / Do Minimum, Do Managed and Do Public Transport

The Do-Nothing option would not significantly change the baseline agricultural environment.

The Do Something option 'Traffic Management' will involve utilising exiting junctions and improvements with the existing road boundary, and demand management and access control. This will not significantly change the baseline agricultural environment. The Do Something - Public Transport Alternative Options may require additional agricultural land to provide bus lanes and park and ride facilities adjacent to the N2. This may require additional agricultural land-take which may result in a very low number of agricultural effects, and therefore is considered, not-significant or neutral.

Route Option D-1

The indicative Route footprint of Option D-1 affects 33 relatively small land-parcels. It has a low percentage of agricultural land within the total footprint and has the lowest land-take. It avoids impacts on highly sensitive land parcels. It has the second lowest off-line length. There are no farmyards within the footprint. It has a high number of severed land parcels but a relatively low number of high severance impacts. It has a mid-range impact on farm viability based on the total area of land affected.

Wider Route Option D-1 corridor affects a high number of smaller land parcels (No 62). There are two highly sensitivity land parcels within the footprint (1 horticultural and 1 dairy). It has a relatively low percentage of agricultural land within the footprint and a low land-take of agricultural land. There are nine farmyards within the footprint, one of which is a highly sensitive dairy enterprise (low potential impact) and one of which is a horticultural enterprise (high potential impact). It has a low severance impact. It also has a low impact on farm viability based on the total area of land affected.

Route Option E-1

The indicative footprint of Route Option E-1 affects 31 relatively large land-parcels. It has a mid-range percentage of the total footprint which is agricultural, and a mid-range land-take compared to the other options. It affects three high sensitivity equine land parcels. It has a high off-line length. There is one highly sensitive farmyard within the footprint. It has the highest severance impact and a low to mid-range impact on farm viability based on the total area of land affected.

The wider Route Option E-1 corridor affects a low number of larger land parcels (No 58). There are three high sensitivity land parcels within the footprint. It has a relatively high percentage of agricultural land within the footprint and a mid-range land-take of agricultural land. There are ten farmyards within the footprint, four of which are highly sensitive. It has a low severance impact. It has a high impact on farm viability based on the total area of land affected.

Route Option E-2

The indicative Route footprint of Option E-2 affects 32 relatively larger land-parcels. It has a low percentage of agricultural land within the total footprint and has the lowest land-take (along with indicative Route Option D-1). It avoids impacts on highly sensitive land parcels. It has the lowest off-line length and land-take would be expected to be lower, but the on-line sections of the footprint are wide. There are no farmyards within the footprint. It has a low severance impact and a low to mid-range impact on farm viability based on the total area of land affected.

The wider Route Option E-2 corridor potentially affects a high number of larger land parcels (No 62). There are three high sensitivity land parcels within the footprint (2 horticultural). It has a high percentage of agricultural land within the footprint and a mid-range land-take of agricultural land. There are nine farmyards within the footprint, three of which are high sensitivity dairy enterprises. It has a low severance impact. It has a high impact on farm viability based on the total area of land affected.

Route Option F-2

The indicative footprint of the Route Option F-2 affects 30 relatively larger land-parcels. It has a high percentage of agricultural land within the total footprint and has the highest land-take. It avoids impacts on high sensitivity land parcels. It has the highest off-line length. There are no farmyards within the footprint. It has the highest severance impact and a high impact on farm viability based on the total area of land affected.

The wider route Option F-2 corridor affects a high number of larger land parcels (No 62). There are two high sensitivity land parcels within the footprint (2 horticultural and 1 dairy). It has the highest percentage of agricultural land within the footprint and the highest land-take of agricultural land. There are six farmyards within the footprint, two of which is a highly sensitive dairy enterprise. It has a low severance impact. It has a high impact on farm viability based on the total area of land affected.

Junction / Tie in element

The southern tie-in affects 11 land parcels with an average size of 14.5 ha. It affects a dairy enterprise (high sensitivity) which it will affect the edge of this land parcel. It will affect 2 farmyards (1 of which is high – dairy) and 75% of the footprint (62.2 ha) is agricultural land. There are no severed agricultural land-parcels.

The Northern junction tie-in option affects 23 land parcels with an average size of 8.8 ha. It affects a horticultural enterprise (very high sensitivity). It will affect 4 farmyards (1 of which is very high – horticultural) and 81% of the footprint (54.5 ha) is agricultural land. There is one severed agricultural land-parcel.

7.4.12.2 Summary

Indicative Route Option E-2 is predicted to have the lowest impact overall. It has a low land-take and severance impact. While the indicative route does not impact on farmyards, the wider corridor impacts show that there is the potential to impact on highly sensitive enterprises and farmyards within the wider corridor. Affecting relatively larger land parcels it will take circa 5% of affected area which represents a minor or slightly negative impact. This option is a preferred option.

Indicative Route Option D-1 is predicted to have the second lowest impact. It has the lowest land-take however in comparison the Route Option E-2 it has a higher severance impact and higher length off-line. The severance impacts are generally smaller in magnitude. The impacts within the wider corridor indicate that the potential is lowest along this route option for impact on high sensitivity enterprises and on farmyards. Smaller land parcels comprise circa 5% of affected area which represents a minor or slightly negative impact. This option is a preferred option.

Indicative Route Option E-1 is predicted to have the second highest impact. It has mid-range land-take (slightly higher than Route Option E-2) as it has a higher severance impact and a longer off-line length. The indicative route affects 1 farmyard – which is highly sensitive. The numbers severed are similar to Route Option D-1 but individual impacts are generally higher. The impacts within the wider corridor indicate that the potential is high for impacts on highly sensitive enterprises and on farmyards. Larger land parcels comprise circa 6% of affected area which represents a minor or slightly negative impact. This option is considered an intermediate preference. It should be noted that the differences between these routes are minimal when the 1-7 scoring is considered.

Indicative Route Option F-2 is predicted to have the most impact. It has the greatest land-take (nearly 30% higher than Route Option E-1). It also has the worst severance impact and longest length off-line. The impacts within the wider corridor indicate similarly high impacts. Larger land parcels comprise circa 8% of affected area, which represents a minor or slightly negative impact, but tending towards moderate adverse. This option is considered to be the least preferred option.

In terms of the Junction tie-in options the impacts of the southern tie in option will be similar for all route options. It has a higher agricultural footprint than the northern option. It will have a not significant to slight adverse effect on one high sensitivity dairy enterprise. The northern tie-in option impacts on a very high sensitivity horticultural enterprise.

The overall scores for Material Assets - Agriculture are shown in Table 7-36.

Table 7-36 - Overall Scores for Material Assets - Agriculture

Route Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Not Significant or Neutral (4)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Minor or Slightly Negative (3)
Do Something - Route E1	Minor or Slightly Negative(3)
Do Something - Route E2	Minor or Slightly Negative (3)
Do Something - Route F2	Minor or Slightly Negative (3)
Junction / Tie-Ins	Minor or Slightly Negative (3)

7.4.13 Material Assets - Non-Agriculture

This section presents an appraisal of route options for the Rath to Kilmoon Cross road scheme in terms of their impacts on non-agricultural material assets in the study area. A detailed assessment is available in Section 3.3.11 of the environmental assessment report, Appendix 6. This includes a section on the methodology used. Information on utilities can be found in the Constraints Study Appendix 5. The information below contains a summary of the impact assessment.

Material assets evaluates the following economic assets of the site and environs:

- Utilities infrastructure including:
 - Electricity Network;
 - Telecommunications (including phone and broadband);
 - Gas Distribution Networks;
 - Water supply networks; and
 - Drainage networks.
- Land Use and Properties¹⁰ (non-agricultural): an assessment of impacts on non-agricultural properties/buildings, severance and potential land take, loss or rights of way or amenities, or other changes likely to alter the character and use of the surroundings.

Property counts are approximate at this stage of the assessment as the exact route is unknown and counts are based upon aerial photography only.

7.4.13.1 Impact Assessment

During the construction phase of any of the proposed offline route options, some realignment, or replacement of services and utilities may be required in conjunction with or to accommodate the proposed works; these works could potentially result in suspension of services during the construction and diversion works, which could likely result in a temporary and negative impact to the existing network.

No commercial properties occur within the alignments of the route options; however, a number of commercial properties do occur within the wider route corridors, such as Cherry Picker Ltd., Kilmoon Cross Nurseries and Top Oil Petrol Station. All Do-Something options have the potential to impact residential properties; for example, through the full and / or partial acquisition of land and properties. As a result, any impact is likely to result in a permanent, negative, and significant effect to the impacted properties. All four Route Options D-1, E-1, E-2 and F-2 have the potential to result in the full acquisition and demolition of two NIAH buildings to the south of Kilmoon Cross junction, one of which has been identified as a residential property whereas the other is currently in a ruinous state. Another residential property, which has been identified as a cultural heritage asset (former barracks), could also be impacted due to the partial acquisition of curtilage adjacent to the existing N2.

Do Nothing / Do Minimum, Do Managed and Do Public Transport

No impacts on existing utilities from the Do-Nothing / Do-Minimum option are anticipated as no work is proposed outside the existing public road boundary of the existing N2. No impacts on existing properties and land use from the Do-Nothing / Do-Minimum option or Do Something - Do Managed option are anticipated as no work is proposed the outside the footprint of the current N2.

The Do-Something- Public Transport Option may result in negative impacts to existing services in the area as certain utilities may need to be relocated to account for the bus lane. The Do-Something - Public Transport Alternative option could result in partial acquisition of curtilage adjacent to the existing N2. However, the full acquisition and demolition of properties is not anticipated for this option.

All offline route options, as well as the southern junction / tie in elements, traverse over the East-West interconnector, a high-pressure Gas Network Ireland (GNI) pipeline and an Aurora telecommunications

¹⁰ Properties located outside of the footprint of each of the route alignments (within 100 m) are also considered within this assessment as the route alignments may change within the route corridor at a later stage, which could result in a direct impact to these properties.

pipeline. All offline route options could also potentially require the diversion of an existing overhead Electrical Supply Board (ESB) 110 kV powerline.

Route Options D-1, E-1, E-2 and F-2

In addition to the full acquisition and demolition of two NIAH buildings outlined above the route alignment for Route Options D-1 and E-2 have the potential to acquire and demolish a residential property located on the western side of the existing N2 to the north of Rath roundabout, a residential property on the eastern side of the existing N2 to the north of St Declan's cemetery, and a residential property close to the Fingal and Meath county border on the eastern side of the existing N2. Route Option E-1 will also potentially require the acquisition and demolition of the residential property located on the western side of the existing N2 to the north of Rath roundabout, and the residential property on the eastern side of the existing N2 to the north of St Declan's cemetery.

Partial acquisition of curtilage which could alter access points to properties may also occur along route alignment for Route Options D-1, E-1 and E-2. Along the sections of online widening of the existing N2, these route options may potentially require the partial acquisition of further residential properties, three of which are located to the north of the Rath Roundabout and a further property located close to the Fingal and Meath county border.

The route alignment for Route Options E-2 and F-2 could result in the partial acquisition of a significant area of a landholding associated with a residential property to the south of the R155. The current route alignments for these options avoid directly impacting this property, instead passing adjacent to it. However, these route options may result in the realignment of the property access road from the R155.

The wider route corridors for each of the route options include higher numbers of residential and commercial property; however, the final route option will not be the width of the route corridors and it is likely that the final design will avoid properties where possible. Where route corridors are considered, the wider corridors for D-1, E-1 and E-2 could potentially directly or indirectly impact circa 41 (including junction / tie in elements) residential properties, as well as a number of commercial properties near Cushinstown including: Cherry Picker Ltd., Kilmoon Cross Nurseries and Top Oil Petrol Station. They could also potentially impact St. Declan's Cemetery and Rath Reservoir which supplies drinking water to the town of Ashbourne. Route Option D-1 also has the potential for direct impacts on an amenity area known locally as 'The Commons'. The wider corridor for Route Option F-2 includes circa 34 (including junction / tie in elements) residential properties which may be impacted directly or indirectly.

There is potential for negative impacts to unknown utilities infrastructure from the Do Something-Do Managed option, Do-Something Public Transport Alternative Options, all four Do Something - Offline Route Options, as well as the junction tie in elements.

Junction / Tie in element

The junction / tie in elements has the potential for direct impacts on circa 33 residential properties (23 in the northern junction / tie in and 10 in the southern junction / tie in) within the corridor and commercial properties including, a Top Oil petrol station, Kilmoon Cross Nurseries, Arch Woodworking, Cherrypicker limited and the Pillo Hotel in Ashbourne. Scoil Naomh Cianain could also be potentially impacted. Potential impacts include partial and full acquisition of land, demolition and realignment of property access roads.

The southern junction of the F-2 corridor could potentially impact circa 5 residential properties, in addition to commercial properties including the Pillo Hotel Ashbourne, the Ashbourne Retail Park and also to St. Declan's Cemetery..

7.4.13.2 Summary

The Do-Nothing / Do-Minimum option and Do Managed option received a score of 4 'Not significant or neutral' as no works are proposed outside the footprint of the current N2, and therefore no / minimal impact on services are anticipated.

The Do Something-Public Transport Alternative Options received a score of 3 'Minor or Slightly Negative' as it will likely create a negative impact on utilities under the existing N2 as well as those which traverse the road such as the East-West Interconnector. Certain utilities may need to be relocated

to account for the bus lane. This option could also result in partial land acquisition of residential properties in the study area.

Route Options D-1, E-1 and E-2 received a score of 1 'Major or Highly Negative' as diversions may be required for utilities which traverse the study area such as the East-West Interconnector. In addition to this, a number of residential properties could be fully acquired and demolished to facilitate the scheme, as well as the partial acquisition of residential properties, which may result in changes to the property access road. The wider corridors for D-1, E-1 and E-2 could potentially directly or indirectly impact circa 41 residential properties (including junction / tie in elements), as well as a number of commercial properties.

Route Option F-2 received a score of 1 'Major or Highly Negative' as one residential property could be fully acquired and demolished to facilitate the route option, as well as the partial acquisition of residential properties, resulting in access restrictions to the property and the realignment of the property access road. The wider corridor for Route Option F-2 includes circa 34 (including junction / tie in elements) residential properties which may be impacted directly or indirectly.

The junction / tie in elements received a score of 1 'Major or Highly negative' as this option has the potential for direct impacts on 33 residential properties within the corridor, as well as a number of commercial properties including, the Pillo Hotel in Ashbourne. Diversions may also be required for utilities which traverse the study area.

The overall scores for Material Assets - Non-Agriculture are shown in Table 7-37.

Table 7-37 - Overall Scores for Material Assets – Non-Agriculture

Route Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Not Significant or Neutral (4)
Do Something - Public Transport	Minor or Slightly Negative (3)
Do Something - Route D1	Major or Highly Negative (1)
Do Something - Route E1	Major or Highly Negative (1)
Do Something - Route E2	Major or Highly Negative (1)
Do Something - Route F2	Major or Highly Negative (1)
Junction / Tie-Ins	Major or Highly Negative (1)

7.4.14 Waste

A detailed assessment is available in Section 3.3.12 of the environmental assessment report, Appendix 6, which includes a section on the methodology used. The information below is a summary of the impact assessment carried out for waste.

A site walkover was undertaken as part of the Preliminary Sources Study Report which identified potential constraints including areas of potentially soft saturated ground, upland areas and backfilled quarries

Areas of soft ground have been assessed separately under soils and geology (see Section 1.4.3, the environmental assessment report Appendix 6 and the Constraints Report Appendix 5). The risk of historical contamination is considered 'Low' to 'Moderate' within all route options, as a result of the historical agricultural nature of each route option.

The following elements have been considered in the route options stage 2 waste assessment:

- Quantities of material to be disposed off-site (unsuitable and suitable material) as defined in TII Series 600 Earthworks, Volume 1 Specification for Road Works (TII, 2016).
- Any contaminated land/hazardous material to be left in situ.

7.4.14.1 Impact Assessment

Whilst the exact types and quantities of waste are not available at this stage, alignments have been developed within the corridors to a sufficient level of detail to enable preliminary cut / fill requirements to be established for each option. A further detailed consideration of impacts from waste and the potential requirement for mitigation measures will be completed during Phase 3 'Design and Environmental Evaluation' of the Emerging Preferred Option.

Do Nothing / Do Minimum, Do Managed and Do Public Transport

In terms of the impacts of alternative options, minimal waste impacts are expected to arise from the Do-Nothing / Do-Minimum Option as minimal alteration works would be proposed on the scheme. Minimal waste impacts are also anticipated for the Do-Managed Option as no work is proposed outside the footprint of the current N2. For the Public Transport Alternative Option, only a small amount of earthworks would likely be anticipated for the widening of the existing N2 to facilitate bus priority.

Route Options D-1, E-1, E-2 and F-2

For each of the route options, a preliminary vertical alignment was designed based on the available constraints' information as well as crossings over or under the existing road network. From this a preliminary cut / fill analysis was undertaken which indicated a substantial requirement of fill material to be brought in for all four of the route options, therefore none of the route options will generate a cut volume for disposal as waste. The preliminary cut / fill volumes for each of the route options are shown in Table 7-38. Route Option F-2 which has the largest requirement of fill material and Route Option D-1 has the smallest requirement of fill material. It should be noted that these volumes are indicative only and will be subject to further refinement and optimisation over the course of the design development.

Table 7-38 – Cut / Fill Requirements for Route Options

Route Option	Cut/Fill Volumes (m ³)
Do Something - Route Option D1	Overall requirement of fill material to be brought in - 400,000 m ³
Do Something - Route Option Route E-1	Overall requirement of fill material to be brought in - 600,000 m ³
Do Something - Route Option Route E-2	Overall requirement of fill material to be brought in - 550,000 m ³
Do Something - Route Option Route F-2	Overall requirement of fill material to be brought in - 1,200,000 m ³

Given the scale of the route options, and the overall requirement for fill material associated with these, no major impacts from the generation and management of waste arising from any of the route options are anticipated in the context of the existing local and national resource and waste management environment. However, there will still be a negative environmental impact for all four route options associated with the extraction and transportation of fill material to the site. This impact will be greater for Route Option F-2 which has a much larger requirement of fill material compared to the other route options.

In terms of soft ground, Route Options D-1, E-1 and E-2 all traverse the alluvial deposits and lacustrine sediments at the Hurley river floodplain, some of which may have to be disposed of as waste, whereas Route Option F-2 avoids most of this area. Route Option D-1 also traverses the alluvial deposits and lacustrine sediments at the Riverstown river floodplain, some of this soft ground may also have to be disposed of.

As stated under soils and geology (Section 3.3.3 Appendix 6), engineered fill is likely along the existing road network. Engineered fill may be a source of contamination due to fuel / oil spillages relevant to road usage. For this reason, contaminated material is more likely to be encountered and will have to be disposed of as waste for the route options which involve sections of online widening of the existing N2 (Routes Options D-1, E1- and E-2) compared to the fully offline route option (Route Option F-2).

In terms of other potential sources of contamination, Route Options D-1, E-2 and F-2 pass near to backfilled quarries identified from the site walkover, Route Options E-2 and F-2 pass close to a haulage firm, and Route Option E-1 passes close to and ESB substation. All four route options pass near to St Declan's cemetery and will require the acquisition of agricultural land. Moreover, all four route options may also require the demolition of buildings (pre 2004) which may contain asbestos building materials.

All routes contain an online section where the existing top layer of the road surface will be removed and could generate potentially contaminated waste. The extent of contamination and the quantity of waste was unknown at the time of writing.

Within the wider junction corridors, at the southern end of the scheme there is an area of soft ground in the form of lacustrine sediments around the existing M2, and at the northern end of the scheme there is an area of soft ground in the form of alluvial deposits at the Riverstown river floodplain. In terms of potential sources of contamination, at the southern end of the scheme there is a water reservoir structure as well as water treatment facilities. At the northern end of the scheme there is an equipment hire firm, nurseries, as well as a service station.

Junction / Tie in element

The junction designs have not been developed to a high enough level of detail at this stage to quantify the impacts in terms of waste, however it is not anticipated that these will generate substantial volumes of cut material to be disposed of. Any junction proposals at these locations would likely involve some form of realignment of the existing road network, which may lead to contaminated material being encountered and having to be disposed of as waste.

7.4.14.2 Summary

Overall, none of the four route options will generate a cut volume for disposal as waste. However, there may be areas of unsuitable material to be disposed of in the form of soft ground surrounding watercourses and contaminated engineering fill along the existing road network as well as other potential sources of contamination. All four of these route options will also have a minor negative environmental impact associated with the transportation of fill material to the site.

In this sense, Route Option F-2 is the most preferred out of the route options as it generally avoids these areas of soft ground and contaminated engineering fill along the existing road network, although this is offset somewhat by the greater environmental impact associated with transporting a larger quantity of fill material to the site. Meanwhile Route Options D-1, E-1 and E-2 are scored comparatively lower as they involve sections of online widening along the existing N2 and traverse the soft ground at the Hurley river floodplain. Route Option D-1 is the least preferred out of the route options as it also traverses the soft ground at the Riverstown river floodplain. All four route options may also be affected by other potential sources of contamination.

The alternative options are all anticipated to have a non-significant impact in terms of waste. The overall scores are shown in Table 7-39.

Table 7-39 - Overall Scores for Waste

Route Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Not Significant or Neutral (4)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Moderately Negative (2)
Do Something - Route E1	Moderately Negative (2)
Do Something - Route E2	Moderately Negative (2)
Do Something - Route F2	Minor or Slightly Negative (3)
Junction / Tie-Ins	Moderately Negative (2)

7.4.15 Summary

The overall scores for environment are summarised in Table 7-40.

Table 7-40 - Total Scores for Environment

	Do Nothing	Do Managed	Public Transport	Route D-1	Route E-1	Route E-2	Route F-2	Junctions
Biodiversity	4	5	5	1	2	3	3	3
Water	4	5	5	2	1	3	2	4
Land and Soil	4	4	4	2	2	3	1	3
Landscape and Visual	4	4	3	1	2	2	1	3
Noise and Vibration	4	4	4	2	3	2	3	3
Air Quality	4	5	5	5	5	5	5	4
Climate	4	5	5	4	4	4	4	4
Population and Human Health	4	4	3	2	2	2	2	2
Cultural Heritage	4	4	4	2	2	2	2	1
Material Assets - Agriculture	4	4	4	3	3	3	3	3
Material Assets – Non-Agriculture	4	4	3	1	1	1	1	1
Waste	4	4	4	2	2	2	3	2

7.5 Safety Appraisal

7.5.1 Objectives

As noted previously the section of the N2 between the Rath roundabout to Kilmoon Cross is an un-engineered road and there are a significant number of road side hazards and a higher than expected collision rate as identified in 2 high collision locations as per the TII Network Safety Analysis Guidance (GE-STY-01022) within the 5.5km length of the existing route under review.

The key safety objectives for this scheme include:

- To reduce the collision rate along the National Road network between Rath roundabout and Kilmoon Cross to below the national average rate.
- To reduce the severity of collisions along the National Road network between Rath roundabout and Kilmoon Cross.
- To improve safety for all road users, including pedestrians, cyclists and public transport users along both the National Road network, and on the surrounding road network between Rath roundabout and Kilmoon Cross.
- To support the RSA Road Safety Strategy 2021 – 2030.

7.5.2 Methodology

TII Project Appraisal Guidelines Unit 7.0 (Multi Criteria Analysis) proposes that two principal road safety criteria be considered through the appraisal process; collision reduction and security of road users.

The existing N2 between Rath Roundabout and the R152 junction at Kilmoon Cross has a number of safety concerns due to the number of sub-standard road junctions between the N2 and local roads as well as the number of direct accesses (both residential and commercial).

A Road Safety Impact Assessment (carried out in accordance with TII document, PE-PMG-02001 (formally NRA HD 18) and a Stage F Road Safety Audit (Phase 1) (carried out in accordance with TII Publication GE-STY-01024 (NRA Standard HD 19) have been completed for the project. The assessment and the audit look at both the existing road safety concerns as well as any road safety concerns that will arise from the proposed options.

In order to assess against the criteria, several methods were used and are set out below:

- Consideration of both the Road Safety Impact Assessment and the Stage F Road Safety Audit (Phase 1) and the ranking of options proposed by them.
- An estimation of the Collision reduction using the COBALT Assessment as provided by TII and set out in guidance document PE-PAG-02023 – Guidance on using COBALT. This software looks to assess and quantify the number of collisions as a direct result of a new road scheme. It uses accident rate models and the traffic model data for the proposed option to produce predicted accident statistics which can then be monetised.
- Qualitative assessment of the Security Impacts for all road users. This includes all non-motorised users. This assessment looks at how vulnerable road users feel of both themselves and their property when using the proposed option.

7.5.3 Safety Benefits Analysis

7.5.3.1 Road Safety Impact Assessment

The Road Safety Impact Assessment looked at all options and recommendations stated that a new road scheme offline option would provide the most improved amount of safety as a new offline route would remove the number of direct accesses and junctions with local roads. Other options such as improved Public Transport Options would also improve safety as there would be a reduction in traffic volumes through added public transport. The assessment is a high-level assessment and should be refined as the project design develops so understand the safety benefits of the proposed options.

7.5.3.2 Stage F Road Safety Audit (Phase 1)

The Stage F Road Safety Audit (Phase 1) is a comparative assessment from a Road Safety perspective for the route options under consideration as part of the Stage 2 assessment. The assessment was carried out in accordance with the TII guidance document GE-STY-01024 Road Safety Audit. This is included in Appendix 8. The assessment used available traffic flow information and collision statistics to help inform the assessment.

General Hazards

The main issues/hazards identified during this assessment for all options are set out below:

- High levels of congestion at Kilmoon Cross Junction. The junction has high approach speed levels, and this can lead to collisions such as rear end shunts.
- There are several Commercial properties situated very close to the proposed Kilmoon Cross junction. Vehicles accessing these properties have the potential to cause collisions as vehicles fail to anticipate slowing vehicles accessing these properties.
- Local Road L5008 has a substandard alignment reduced visibility. It may not have the sufficient capacity to handle the additional traffic following the removal of the R155 junction with the N2.

Specific Hazards

In terms of the specific options, the notable hazards were for the options that included online widening and the removal of access routes from the proposed N2. This has safety implications for the surrounding roads as set out below:

- The capacity of local road L50161 (Old Currgaha Road) may not be sufficient to handle the additional traffic caused by the new route. Furthermore, it does not have the required geometric standards to handle increased levels of traffic.
- The junction between L50161 and the R155 is currently a priority T-junction. The L50161 is the minor road at this junction. Due to the current vertical and horizontal geometry of the L50161, there is limited forward visibility of the T-junction on the northbound approach to the R155. An increase in traffic volumes at this approach may further exacerbate the problem with forward visibilities restricted by vehicle volumes.

Cyclists & Pedestrians

There are currently no provisions for Non-Motorised Users on this section of the N2, which offers poor security for vulnerable road users. RSA data shows only one collision since 2005 involving a bicycle. Rather than indicating a low risk for pedestrians and cyclists, this is more reflective of a suppressed demand for active travel modes along this section of the N2 due to the lack of segregated facilities, as cyclists are unlikely to use the existing road due to safety concerns.

This suppressed demand for active travel modes is also apparent in the traffic survey data where NMU counts were very low along the route. Survey numbers also show that HGV numbers are also high (8.4% in 2019) on this road which is likely to further discourage NMUs from using the route.

All route options will reduce traffic volumes on the existing N2 and therefore create a safer environment for pedestrians and cyclists.

Ranking

The Audit Team used all relevant drawings and documents when reviewing the proposed options. Safety considerations for the routes at this stage included tie-in arrangements, impact on local road network and junctions, and connection to existing accesses and services. Whilst all route options would bring safety benefits compared with the existing scenario, the review allowed the team to rank the options in terms of safety and this is set out in Table 7-41 below.

Table 7-41 - Safety Ranking of the Route Options

Route Option	Ranking
Route D-1	1
Route E-1	1
Route E-2	3
Route F-2	4

Based on the assumption that all direct accesses onto the existing N2 would be closed off as part of the options involving sections of online widening, Routes D-1 and E-2 were ranked as the joint first preference in terms of safety. These options had the shortest length and a minimum horizontal radius of 1020m. Route E-2 was ranked as third despite the same short length as it had a minimum horizontal radius of 720m. Route F-2 meanwhile was ranked least preference as it had the longest length and a minimum horizontal radius of 720m.

7.5.3.3 Summary

Overall, comparatively, high level risks can only be highlighted at this stage due to the level of detail in the design of each options. However, further audits will be carried out as the design develops and will be used to develop improved safety for this section of the N2 and the surrounding road network.

7.5.4 Collision Reduction

7.5.4.1 COBALT Assessment

The Cost and Benefit to Accidents – Light Touch (COBALT) Assessment was undertaken in accordance with TII PAG Unit 6.4 (*Guidance on using COBALT*). This was used, in combination with transport model outputs, to assess and quantify the change in the number of collisions and casualties as a direct result of the proposed route option. The projected change in collisions from the COBALT assessment are shown in Table 7-42 for each of the route options, all monetary values are based on 2011 values and are shown in (€ thousand (k)).

Table 7-42 - Projected Change in Collisions from COBALT

Summary			Route D-1	Route E-1	Route E-2	Route F-2	
Economic Summary	Total Collision Cost (€ k)	Without Scheme	907,579	907,579	907,579	907,579	
		With Scheme	905,332	906,813	906,639	906,433	
	Total Collision Cost Saved by Scheme (€ k)		2,247	767	940	1,146	
Collision Summary	Total Collisions	Without Scheme	20,625	20,625	20,625	20,625	
		With Scheme	20,561	20,580	20,579	20,584	
	Total Collisions Saved by Scheme		64.1	45.1	46.6	41.6	
Causality Summary	Total Casualties	Without Scheme	Fatal	400	400	400	400
			Serious	1211	1211	1211	1211
			Slight	28993	28993	28993	28993
		With Scheme	Fatal	400	400	400	400
			Serious	1206	1209	1208	1208
			Slight	28904	28933	28931	28936
	Total Casualties Saved by Scheme		Fatal	0.8	0.0	0.1	0.3
			Serious	4.1	1.9	2.3	2.6
			Slight	88.5	60.0	62.3	56.5

7.5.4.2 Analysis

For route options E-1, E-2 and F-2, the COBALT analysis projected around the same number of fatal collisions as the existing scenario, but a reduction of serious (approx. 2) and minor collisions (approx. 60) across the three route options, resulting in a Slightly Positive score. For route option D-1, the COBALT analysis projected a reduction in fatal (approx. 1), serious (approx. 4) and minor (approx. 89) collisions. Whilst it appears that there is a greater improvement for route option D-1 than that of the other route options, in real terms this represents a Slightly Positive impact across all options.

All four route options would therefore provide improvements in safety over the existing N2, largely due to routing a significant proportion of the traffic on the existing N2 to a new road designed in accordance with the latest TII standards. A Type 1 Dual Carriageway cross-section has been proposed for all route options which provides continuous safe overtaking opportunities and minimises potential vehicle conflicts with a safety barrier between the opposing traffic flows. All route options will also have a reduced quantity of junctions in comparison to the existing N2 and no direct accesses to agricultural or residential properties which will reduce the number of potential conflict points significantly.

For all four route options, safety will require ongoing monitoring at a regional level where there may be increased flows on regional and local roads. Improved safety would be expected where traffic rerouting from the M1 and M3 is minimised.

The Junctions / Tie-Ins will be required to facilitate the implementation of the route options, and the associated benefits of these, so have been also been scored as Slightly Positive.

The Public Transport and Do Managed options were scored as Neutral, as the current safety risks on the existing N2 such as the junctions and direct accesses will remain. A minor decrease in private vehicles may result as an outcome of improved public transport but would not be expected to be of a magnitude to differentiate from the Do Managed scenario.

The Do-Nothing option was scored as Slightly Negative, this will not improve the safety of the corridor and will fail to meet the objectives of the scheme. Regionally, safety is expected to be approximately neutral with some increased long-distance traffic using regional and local roads.

7.5.4.3 Summary

The overall scores for Collision Reduction are shown in Table 7-43.

Table 7-43 - Overall Scores for Collision Reduction

Scheme Option	Score
Do Nothing / Do Minimum	Minor or Slightly Negative (3)
Do Something - Do Managed	Not Significant or Neutral (4)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Minor or Slightly Positive (5)
Do Something - Route E1	Minor or Slightly Positive (5)
Do Something - Route E2	Minor or Slightly Positive (5)
Do Something - Route F2	Minor or Slightly Positive (5)
Junction / Tie-Ins	Minor or Slightly Positive (5)

7.5.5 Security

7.5.5.1 Qualitative Assessment

This criterion is concerned with improving the personal security of travellers and their property. Security also specifically considers non-motorised users such as pedestrians and cyclists. This criterion is assessed qualitatively at this stage of the design process and looks across all options.

All four route options for the Stage 2 Assessment will improve the security of road users. Drivers will experience increased security with the introduction of a Dual Carriageway cross-section providing increased road space. The removal of direct accesses and sub-standard junctions will reduce the numbers of collisions and improve security through a consistent driver road environment. In terms of non-motorised users, security will also be improved as the existing reclassified N2 and local roads will have significantly reduced levels of traffic due to the introduction of the proposed route options. This will help users feel more secure from vehicles and encourage more cycling and walking within the wider local area.

Moderate benefits are anticipated for all four route options in terms of personal security, perception of risk and journey ambience, resulting in a Moderately Positive score for all options. The eastward realignment of Route Option D-1 brings the option further away from built up areas resulting in a slight decrease in passive surveillance, although the impact on security is not enough to warrant a lower score.

The Junctions / Tie-Ins will be required to facilitate the implementation of the route options, and the associated benefits of these, so have been also been scored as Moderately Positive.

The Public Transport and Do Managed options were scored as Slightly Negative. Users are unlikely to experience improved personal security, perception of risk and journey ambience with only minor improvements to the existing N2 or public transport. Non-motorised users are also unlikely to experience improved security with only minor changes being made to road layout and increasing volumes of traffic.

The Do Nothing attains no improvement in personal security, perception of risk or journey ambience. Over time, with increasing traffic, the likelihood of personal travel anxiety may increase, resulting in a Moderately negative score.

7.5.5.2 Summary

The overall scores for Security are shown in Table 7-44.

Table 7-44 - Overall Scores for Security

Scheme Option	Score
Do Nothing / Do Minimum	Moderately Negative (2)
Do Something - Do Managed	Minor or Slightly Negative (3)
Do Something - Public Transport	Minor or Slightly Negative (3)
Do Something - Route D1	Moderately Positive (6)
Do Something - Route E1	Moderately Positive (6)
Do Something - Route E2	Moderately Positive (6)
Do Something - Route F2	Moderately Positive (6)
Junction / Tie-Ins	Moderately Positive (6)

7.5.6 Summary

The overall scores for safety are summarised in Table 7-45.

Table 7-45 - Total Scores for Safety

	Do Nothing	Do Managed	Public Transport	Route D-1	Route E-1	Route E-2	Route F-2	Junctions
Collision reduction	3	4	4	5	5	5	5	5
Security	2	3	3	6	6	6	6	6

7.6 Integration

7.6.1 Objectives

The planning for the scheme will take cognisance of other elements of government policy and infrastructure investment to ensure that the scheme is integrated towards achieving a common goal. The key integration objectives include:

- To improve connectivity on the national road network.
- To be compatible with adopted land use objectives.
- To support the integration objectives set out in European, National, Regional and Local Planning policy.
- To support the NTA Strategy for the Greater Dublin area, which aims to enhance bus services on the N2 corridor through improvements to the N2 Core Regional Bus Network serving Ashbourne and Slane.
- To consider the potential for bus-based park and ride locations close to the N2 corridor.

7.6.2 Methodology

The integration element aims to ensure planning for transport infrastructure takes account of other elements of government policy and infrastructure investment. The appraisal methods have been based in conjunction with the Transport Infrastructure Ireland (TII) Project Appraisal Guidelines for National Roads Unit 7.0 (PAG,7.0) - Multi Criteria Analysis (MCA). This section includes four types of integration appraisals to ensure that investment across the transportation portfolio is integrated towards achieving a common goal. These consist of the following:

- Transport Integration
- Land Use Integration
- Geographical Integration
- Other Government Policy Integration

7.6.3 Transport Integration

This section promotes the integration of transport infrastructure and services by focusing on the existing network and highlighting potential opportunities for an interchange between modes. The MCA considers the impact of the project on integrating transport services as well as infrastructure. Furthermore, the MCA should rank the proposed project based on;

- Connectivity of the strategic road network
- Connectivity between transport modes
- Support for sustainable transport modes
- Access to other transport infrastructure such as ports and airports

7.6.3.1 Connectivity of the Strategic Road Network

The Do-Nothing option will have a highly negative impact on the connectivity to the strategic road network, as the existing issues with congestion and journey time reliability will worsen with traffic volumes set to increase. The Do-Managed and Public Transport Alternative options will have a moderately negative impact on the connectivity to the strategic road network, as any limited improvements relating to these options are likely to be offset by persisting congestion issues on the N2.

Route options D-1, E-1, E-2 and F-2 will have a highly positive impact as a result of improving connectivity to the strategic road network including the M50, M3 and M1. The junction corridors will be required to facilitate the implementation of the route options, and the associated benefits of these, so will have a highly positive impact on same.

7.6.3.2 Connectivity Between Transport Modes

The Do-Nothing option will have a highly negative impact on the connectivity between transport modes, as the existing issues with congestion and journey time reliability will worsen with traffic volumes set to increase. The Do-Managed option will have a moderately negative impact, as any limited improvements are likely to be offset by persisting congestion issues on the N2.

The Public transport alternative option will have a slightly positive impact on connectivity between transport modes as a result of improvements to public transport options (e.g. improved bus links to Dublin and the other major towns in Meath). Although journey time reliability of road based public transport is likely to be impacted by persisting congestion issues on the N2.

Route options D-1, E-1, E-2 and F-2 will have a highly positive impact on connectivity between transport modes. Connectivity to park and ride services will be improved, including the proposed Finglas Luas park and ride at Charlestown, which will assist with reducing congestion and provide more options to commuters, thereby encouraging modal shift away from private car usage for whole trips. The junction corridors will be required to facilitate the implementation of the route options, and the associated benefits of these, so will have a highly positive impact on same.

7.6.3.3 Support for Sustainable Transport Modes

The Do-Nothing option and Do-Managed option will have a moderately negative impact on supporting sustainable transport modes as conditions for pedestrians and cyclists will likely worsen with vehicular traffic set to increase along this section of the N2. The public transport option will have a slightly positive impact on supporting sustainable transport modes through improvements to public transport options, although journey time reliability of road based public transport is likely to be impacted by persisting congestion issues on the N2.

Route options D-1, E-1, E-2 and F-2 are expected to incorporate improvements to walking and cycling facilities on the residual road network as part of the implementation of the respective routes and will have a moderately positive impact on supporting sustainable transport modes. These route options will also facilitate improvements to the reliability and attractiveness of road based public transport options, thereby reinforcing the N2 Core Regional Bus Network serving Ashbourne and Slane. This aligns with the NTA Strategy for the Greater Dublin Area. The junction corridors will be required to facilitate the implementation of the route options, and the associated benefits of these, so will have a moderately positive impact on same.

7.6.3.4 Access to Other Transport Infrastructure Such as Ports and Airports

The Do-Nothing option will have a highly negative impact on access to ports and airports, as the existing issues with congestion and journey time reliability will worsen with traffic volumes set to increase. The Do-Managed and Public Transport Alternative options will have a moderately negative impact on access to ports and airports, as any limited improvements relating to these options are likely to be offset by persisting congestion issues on the N2.

Route options D-1, E-1, E-2 and F-2 will have a highly positive impact on access to key airport destinations including Dublin Airport, and Belfast City and International Airports, by improving road transport links to Ireland's motorway network. All route options will also improve connectivity to a potential Dublin Airport Western Access as referenced in Objective EA05 in the Dublin Airport Local Area Plan 2020 – 2026.

Route options D-1, E-2, E-2 and F-2 will also have a highly positive impact on access to key port destinations including Dublin Port, and major ports in Belfast and Larne, by improving road transport links to Ireland's motorway network. These options will also contribute towards the potential for growth in eastern seaboard ports. The junction corridors will be required to facilitate the implementation of the route options, and the associated benefits of these, so will have a highly positive impact on same.

7.6.3.5 Summary

The overall scores for Transport Integration are shown in Table 7-46.

Table 7-46 - Overall Scores for Transport Integration

Scheme Option	Score
Do Nothing / Do Minimum	Major or Highly Negative (1)
Do Something - Do Managed	Moderately Negative (2)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Major or Highly Positive (7)
Do Something - Route E1	Major or Highly Positive (7)
Do Something - Route E2	Major or Highly Positive (7)
Do Something - Route F2	Major or Highly Positive (7)
Junction / Tie-Ins	Major or Highly Positive (7)

7.6.4 Land Use Integration

The compatibility between land use integration objectives and the proposed scheme options are investigated within this section.

7.6.4.1 Support for Local Development Plans

Planning History

A desktop planning history search using publicly available data from www.myplan.ie's National Planning Application Database, Meath County Council (MCC), Fingal County Council (FCC) and An Bord Pleanála's online databases on the 10/07/2020, produced a summary of all finalised and relevant planning applications within the last 10 years of the selected Study Area for the N2 Rath Roundabout to Kilmoon Cross.

An extended planning search was also conducted for relevant Large-Scale Developments in proximity to study area, Part 8 applications proposed by Meath County Council and Fingal County Council and relevant Pending and Decided Strategic Housing Development (SHD) applications by An Bord Pleanála. The detailed planning history can be found in Appendix 7.

One significant development in the area is at lands northwest of the R155 at Windmill Hill. These lands have a 10-year permission approved in 2018 "Ref. No AA180383", for the construction of an 8.7 MW solar PV farm comprising approximately 27,800 no. photovoltaic panels on ground mounted frames within a site area of 10.82 hectares and associated ancillary development. It is noted that the corridors of Route Options E-1, E-2 and F-2 pass close to this development (less than 1km away), however none of these Route Options will directly impact this proposed development.

County Development Plans

The study area traverses the county boundary between County Meath and County Dublin. Most of the existing N2 within the study area is within the administrative boundaries of Meath County Council, although a small section of the existing N2 is within the administrative boundaries of Fingal County Council. The relevant County Development Plans (CDP) are listed below:

- Meath County Development Plan 2013 – 2019 (*now superseded*)
- Meath County Development Plan 2021 – 2027 (recently adopted)
- Ashbourne Local Area Plan 2009 – 2015 (*now superseded*)
- Fingal County Development Plan 2017 – 2023

It is noted that the compilation of this report straddled the period between the completion of the new Meath County Development Plan review process and the new plan taking effect. Therefore, both the superseded Meath County Development Plan 2013-2019 and the recently adopted Meath County Development Plan 2021-2027 are referenced in this report.

Meath County Development Plan 2013 – 2019 (now superseded)

It is noted that the Meath County Development Plan 2013-2019 (MCDP 2013-2019) is now superseded, but this has been considered in conjunction with the recently adopted Meath County Development Plan 2021-2027 (MCDP 2021-2027). The now superseded Meath County Development Plan 2013 – 2019 is fully supportive of the scheme and contains several policies and objectives in relation to same.

The Do-Nothing and Do-Managed options will have a moderately negative impact on achieving the aims of the policies and objectives of the Meath County Development Plan 2013 – 2019. These options will restrict the development of the masterplan area zoned for employment use to the north of Ashbourne. The existing issues with congestion and journey time reliability will worsen with traffic volumes set to increase, thereby limiting the potential benefits of this planned expansion.

Whilst improvements to public transport will be beneficial for future expansion in accordance with the Development Plan, journey time reliability of road based public transport is likely to be impacted by persisting congestion issues on the N2. Therefore, the public transport option will have a slightly negative impact on the Meath County Development Plan 2013 – 2019.

Route Option F-2 will have a major negative impact on achieving the policies and objectives of the planning policy as it bisects a substantial portion of lands designated as a Masterplan Area for employment generating land uses in the Meath County Development Plan 2013 – 2019.

Route Option D-1 will have a slightly negative impact on achieving the policies and objectives of the planning policy as there are 2 no. recorded monuments within the route corridor. Route options E-1 and E-2 are supported by the policies and objectives of the adopted Meath County Development Plan 2013 - 2019 and will have a moderately positive impact on this.

The junction corridors are required to facilitate the implementation of the route corridors; however, they may have a moderately negative impact on this plan as there are 2 no. protected structures within the northern junction corridor and 7 no. recorded monuments within the southern junction corridor as well as an area of land zoned for employment use near Ashbourne Retail Park.

Meath County Development Plan 2021-2027 (recently adopted)

The Meath County Development Plan 2021-2027 (MCDP 2021-2027) was adopted at a Special Planning Meeting on 22nd September 2021. The MCDP 2021-2027 came into effect on the 3rd November 2021. The recently adopted MCDP 2021-2027 has been considered in conjunction with the now superseded Meath County Development Plan 2013-2019 (MCDP 2013-2019).

The policies and objectives of the DMCDP 2021-2027 are fully supportive of the N2 Rath Roundabout to Kilmoon Cross scheme. The scheme is situated on a National Road which provides a strategic route from Dublin to Ashbourne, Slane and Northern Ireland, as shown in Figure 7-13.

The Do-Nothing and Do-Managed options will have a moderately negative impact on achieving the aims of the policies and objectives of the Meath County Development Plan 2021 - 2027 and the public transport alternative option will have a slightly negative impact on same.

Route options D-1, E-1, E-2 and F-2 are supported by the policies and objectives of the Meath County Development Plan 2021 - 2027 and will have a moderately positive impact on achieving the aims and objectives included within this plan.

The junction corridors are required to facilitate the implementation of the route corridors so will have a slightly positive impact on achieving the aims of the Meath County Development Plan 2021 - 2027.

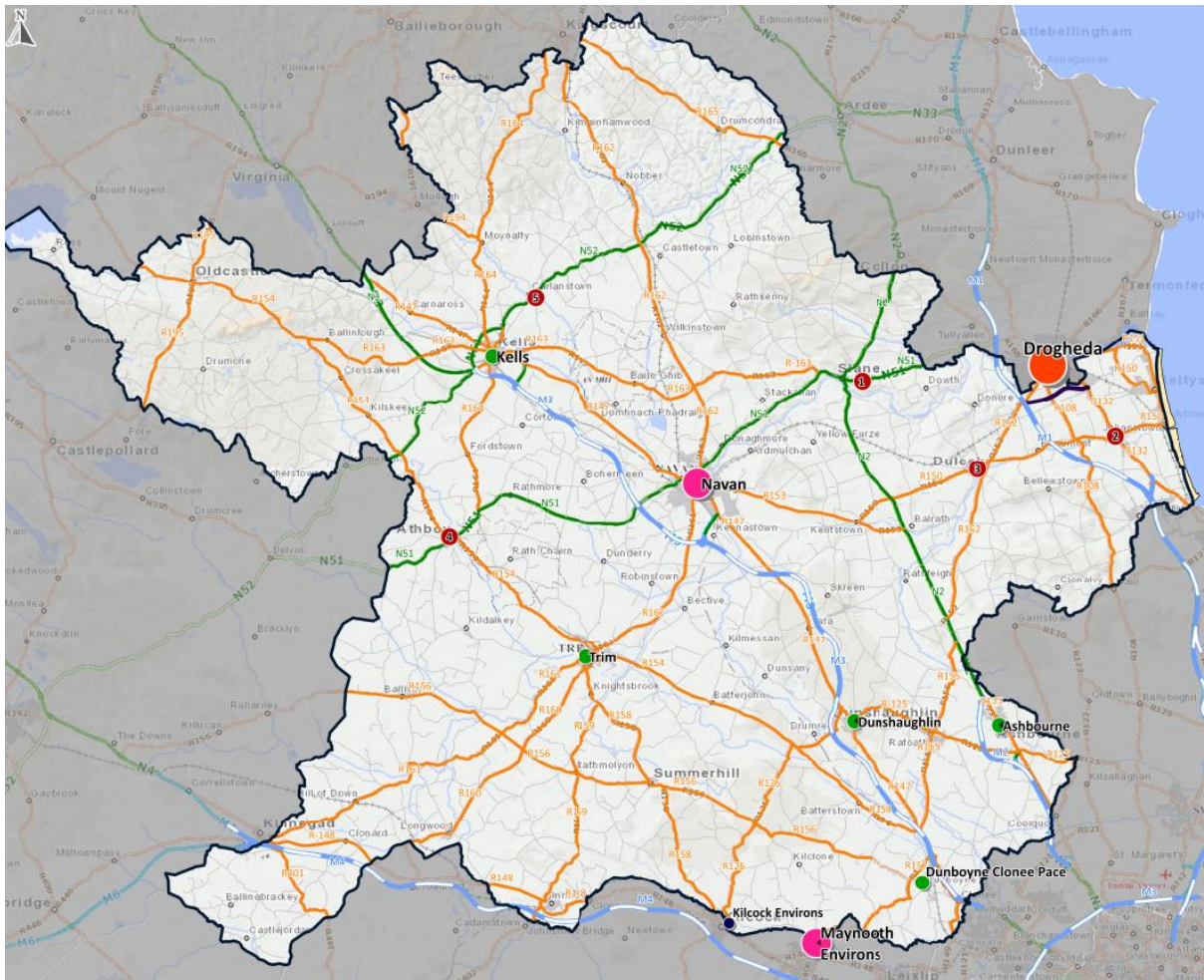


Figure 7-13 - National & Regional Road Network. (Meath CDP 2021-2027).

Ashbourne Local Area Plan 2009 – 2015 (now superseded)

The MCDP 2021-2027 has replaced the Ashbourne Local Area Plan (LAP) 2009-2015, pending the preparation of a new LAP.

Fingal County Development Plan 2017 - 2023

The Fingal County Development Plan 2017 – 2023 is supportive of the scheme and it is an objective of the Fingal County Development Plan to support and facilitate TII, Meath County Council and Kildare County Council in the planning and delivery of the N2 Upgrade north of Ashbourne and a possible link between the M3 and M4 as part of a potential future Leinster Orbital Route.

The Do-Nothing and Do-Managed options will have a moderately negative impact on achieving the aims of the policies and objectives of the Fingal County Development Plan 2017 - 2023. These options will restrict the development of the masterplan area zoned for employment use to the north of Ashbourne. The existing issues with congestion and journey time reliability will worsen with traffic volumes set to increase, thereby limiting the potential benefits of this planned expansion.

Whilst improvements to public transport will be beneficial for future expansion in accordance with the development plan, journey time reliability of road based public transport is likely to be impacted by persisting congestion issues on the N2. Therefore, the public transport option will have a slightly negative impact on the Fingal County Development Plan.

Route options E-1 and E-2 are supported by the policies and objectives of the Fingal County Development Plan 2017 - 2023 and will have a moderately positive impact on this.

Route Option D-1 will have a slightly negative impact on achieving the policies and objectives of the Fingal County Development Plan 2017 – 2023 as it traverses lands which are designated as a Highly Sensitive Landscape. Route Option F-2 will have a major negative impact on planning policy as it bisects a Masterplan Area which is zoned for employment generating uses.

The junction corridors are required to facilitate the implementation of the route corridors so will have a slightly positive impact on achieving the aims of this plan.

7.6.4.2 Strategic Connectivity for Long Distance Trips

The Do-Nothing and Do-Managed options will have a moderately negative impact on the provision of strategic connectivity for long distance routes, as a high proportion of local traffic will continue to use existing N2, thereby reducing strategic connectivity for long distance trips. The public transport option will have a minor negative impact on same as improvements to long distance road based public transport routes will be offset by persisting congestion issues on the N2.

Route Options D-1, E-1, E-2 and F-2 will have a moderately positive impact on the provision of strategic connectivity for long distance routes. Route option F-2 will be most preferable in this regard as the fully offline route will cater for a very low proportion of local trips. Whereas route options D-1, E-1 and E-2 involve sections of online widening along the existing N2, so will likely cater for a slightly greater proportion of local trips compared to route option F-2, although this is still anticipated to be a small proportion of overall trips.

The junction corridors will be required to facilitate the implementation of the route options, and the associated benefits of these. Therefore, the junction corridors will have a moderately positive impact on the provision of strategic connectivity for long distance routes.

7.6.4.3 Mitigate Risks of Urban Sprawl

All options are considered to have a neutral impact with regards to mitigating the risks of urban sprawl. This is due to the difficulties associated with ascertaining the future implications of the proposed development in relation to urban sprawl.

7.6.4.4 Summary

The overall scores for Land Use Integration are shown in Table 7-47.

Table 7-47 - Overall Scores for Land Use Integration

Scheme Option	Score
Do Nothing / Do Minimum	Moderately Negative (2)
Do Something - Do Managed	Moderately Negative (2)
Do Something - Public Transport	Minor or Slightly Negative (3)
Do Something - Route D1	Not Significant or Neutral (4)
Do Something - Route E1	Moderately Positive (6)
Do Something - Route E2	Moderately Positive (6)
Do Something - Route F2	Moderately Negative (2)
Junction / Tie-Ins	Not Significant or Neutral (4)

7.6.5 Geographical Integration

7.6.5.1 Ireland 2040 National Planning Framework

The National Planning Framework (NPF) is the Government's high-level strategic plan for shaping the future growth and development of Ireland to the year 2040, released in tandem with the National Development Plan 2021-2030 which sets out the budget for national infrastructure investment for the next 10 years. The NPF emphasizes shared goals for the country, these goals aim to improve connectivity within the whole island of Ireland and to other parts of the world, particularly through National Strategic Outcomes (NSO). A selection of NSOs that are particularly relevant to the options under consideration as part of the Stage 2 Project Appraisal Matrix are outlined below.

National Strategic Outcome 2: Enhanced Regional Accessibility

A priority is to enhance accessibility between key urban centres of population and their regions. This means ensuring all regions and urban areas in the country have a high degree of accessibility to economic drivers such as cities.

National Strategic Outcome 3: Strengthened Rural Economies and Communities

Rural areas play a key role in driving the economy and must be a major part of our country's strategic development to 2040. In addition, improved connectivity and rural economic development opportunities which offer the potential to strengthen the countryside as a living and working community.

National Strategic Outcome 4: Sustainable Mobility

The provision of a well-functioning integrated public transport system will sustain economic progress and enable sustainable mobility choices for citizens.

National Strategic Outcome 6: High-Quality International Connectivity

This aims to ensure international competitiveness and addressing opportunities and challenges that may arise from Brexit, through investment in our ports and airports in line with sectoral priorities already defined through National Ports Policy and National Aviation Policy and signature projects such as the second runway for Dublin Airport.

National Strategic Outcome 7: Enhanced Amenities and Heritage

Attractive places include ease of access to amenities and services supported by integrated transport systems and green modes of movement such as pedestrian and cycling facilities.

The above shared goals highlight the importance of improving connectivity within the whole of Ireland and to other parts of the world, as a key objective of national policy. Three factors are required under the TII Project Appraisal Guidelines (PAG) for National Roads Unit 7.0 (*Multi Criteria Analysis*), these include; "integration of rural and local services, connectivity with Northern Ireland and access to links with Europe/rest of the world."

The TII PAG Unit 7.0 further states that; "projects which improve north-south transport links should be given positive recognition in the appraisal process".

7.6.5.2 National Development Plan 2021-2030

The National Development Plan 2021-2030 (NDP) sets out the investment priorities that will underpin the successful implementation of the new NPF. The intention is that these will guide national, regional and local planning and investment decisions in Ireland over the next two decades, to cater for an expected population increase of over 1 million people.

The NDP demonstrates the Government's commitment to meeting Ireland's infrastructure and investment needs over the next ten years, through a total investment estimated at €165 billion over the period 2021-2030. It provides for investment to support the ambition for development of the border region, including the N2/A5 road, serving Meath, Louth, Monaghan and Donegal. It also states that the N2 Rath Roundabout to Kilmoon Cross was one of the national road projects proposed as part of the previous NDP and will be subject to further approvals.

The N2 Rath Roundabout to Kilmoon Cross is also part of the National Roads Programme 2018 – 2027.

7.6.5.3 Draft National Investment Framework for Transport in Ireland

It is noted that the National Investment Framework for Transport in Ireland (NIFTI) is a Draft Framework that has not yet been formally published, however this has been considered in conjunction with the consolidated Ireland 2040 National Planning Framework (NPF) and National Development Plan 2021-2030 (NDP). The NIFTI was published for consultation in March 2021, with submissions closed in May 2021. It is anticipated that the final Framework will be published later this year.

To deliver future investment in a sustainable manner, NIFTI has established modal and intervention hierarchies, which set out how transport investment will be undertaken. The framework encourages the use of active travel and public transport ahead of solutions reliant on private transport. Maintenance or optimisation of existing assets, including through demand management, is also preferred to extensive enhancements or outright new infrastructure.

NIFTI Background Paper 11 (Interurban Connectivity) outlines that a significant portion of the Dublin-Derry-Letterkenny corridor is projected, in the Do-Minimum Scenario (2040), to be at or above capacity, including the N14 between Strabane and Letterkenny and the N2 south of the border to Ashbourne.

7.6.5.4 Trans-European Transport Network

The Trans-European Transport Network (TEN-T) policy addresses the implementation and development of a Europe-wide transport network which strengthens social, economic and territorial cohesion in the European Union (EU), as set out Regulation (EU) No 1315/2013. This network comprises of two layers, the Core Network and Comprehensive Network, as shown across the island of Ireland is shown in Figure 7-14.

The Core Network in Ireland consists of the most important connections between the most important nodes, including the largest cities such as Dublin, Belfast, Cork and Limerick, as well as the strategic ports. This is supported by the Comprehensive Network which includes routes covering all regions, one such route includes a connection between Junction 14 of the M1 Motorway (Core Network) to the north-west border area via the N33 and the N2 north of Ardee.

Whilst the section of the N2 between Rath Roundabout and Kilmoon Cross does not form part of the Core or Comprehensive network, it does form an important alternative route from Dublin (including the port and airport) to the north-west border area. This section of road also provides the necessary connectivity for the surrounding areas in County Meath and County Dublin to access the Core and Comprehensive network including the M1 and M50, and N2 north of Ardee.

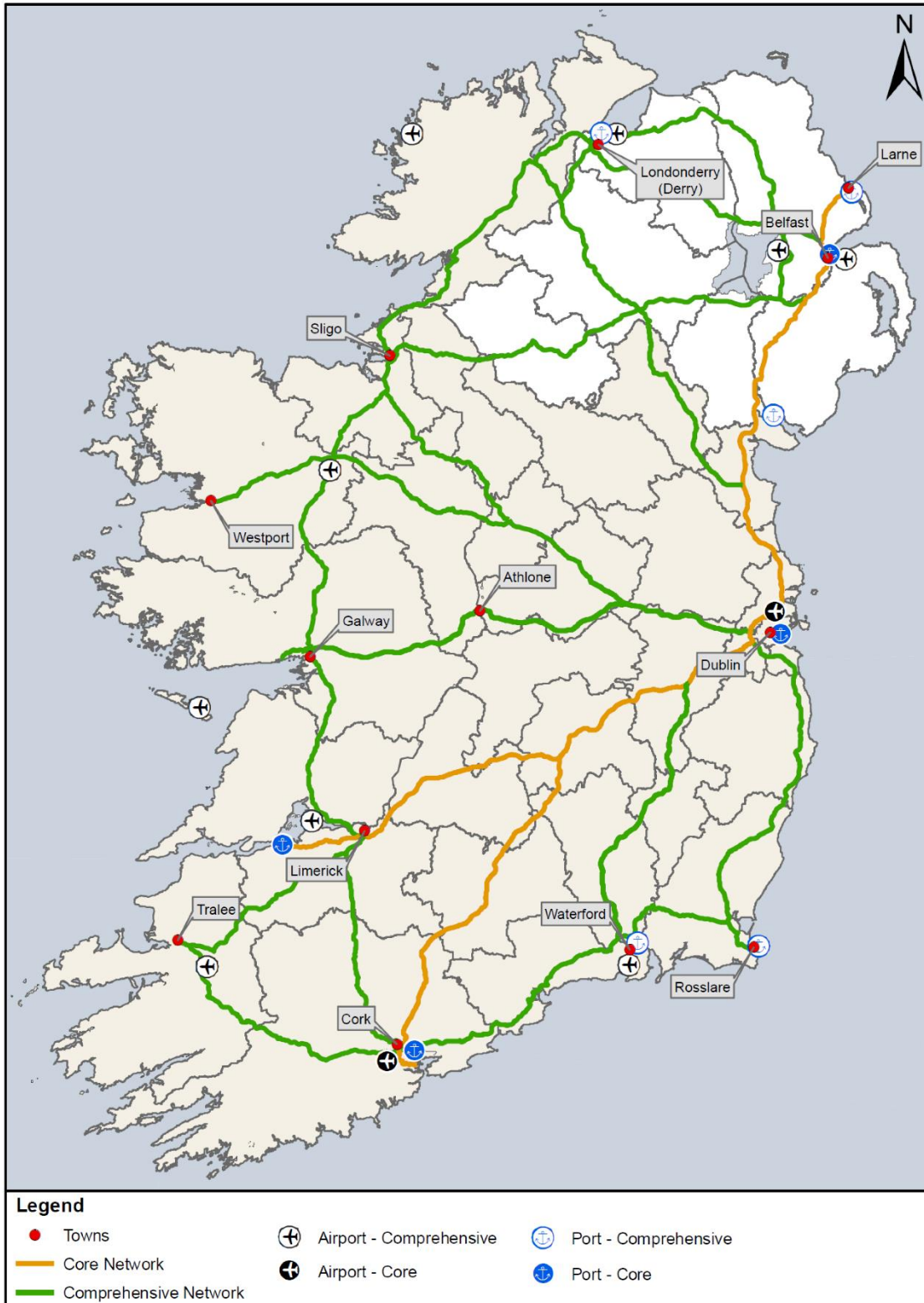


Figure 7-14 - TEN-T Core and Comprehensive Road Network across Ireland

The Do-Nothing and Do-Managed options will have a moderately negative impact on geographical integration as outlined above, as connectivity to the Greater Dublin Area, Northern Ireland and the rest of Europe via the TEN-T network is likely to worsen with traffic volumes set to increase on this section of the N2 over the coming years. It is acknowledged that in NIFTI, maintaining the existing transport network will be given first priority, followed by maximising the value of the network through optimising its use. However, investment planning will continue to be needs-based and objectives-led, and the Do-Nothing and Do-Managed options will not achieve the project objectives.

The public transport option will support National Strategic Outcome (NSO) 4 from the National Planning Framework (NPF) somewhat in terms of the provision of public transport infrastructure and services, however these services will likely fail to meet the needs of the smaller towns, villages and rural areas in the study area due to the persisting congestion issues on the N2. It is noted that in NIFTI, sustainable modes, starting with active travel and then public transport, will be encouraged over less sustainable modes such as the private car. However, investment in public transport alone will be unlikely to reduce car demand sufficiently to resolve the existing congestion issues, therefore sole investment in bus services would likely lead to continued congestion with associated safety issues for all road users. Overall, this option is considered to have a minor negative impact on geographical integration.

Route options D-1, E-1, E-2 and F2 will have a moderately positive impact on improving connectivity between regions for growth within Ireland, connectivity to Northern Ireland and connectivity key linkages to Europe and the rest of the world by improving access to major road/motorway networks, ports/airports and the TEN-T network.

It is considered that each of the four route options align with National Strategic Outcomes (NSO) 2, 3, 4, 6 and 7 from the National Planning Framework (NPF) in particular, but either support, or are consistent with, all 10 of the National Strategic Outcomes.

National Strategic Outcome 2: Enhanced Regional Accessibility

Inter-Urban Roads:

- *Maintaining the strategic capacity and safety of the national roads network.*
- *Improving average journey times targeting an average inter-urban speed of 90kph.*

Accessibility to the North-West:

- *Upgrading access to the North-West border area, utilising existing routes (N2/N14/A5).*

Public Transport:

- *To strengthen public transport connectivity between cities and large growth towns with reliable journey times.*

National Strategic Outcome 3: Strengthened Rural Economies and Communities

Rural Development:

- *Strategic road improvement projects in rural areas to ensure access to critical services such as education, healthcare & employment.*

National Strategic Outcome 4: Sustainable Mobility

Cycling: (See Section 7.8).

- *Develop a comprehensive network of safe cycling routes in towns and villages to address travel needs.*

National Strategic Outcome 6: High-Quality International Connectivity**Airports:**

- *Enhancing land-side access to airports, particularly in public transport terms.*

Ports:

- *Improve land transport connections to the major ports.*

National Strategic Outcome 7: Enhanced Amenities and Heritage**Walking & Cycling:** (See Section 7.8).

- *Major focus on improving walking and cycling routes, including continuous greenway networks.*

All four of the route options are also consistent with the target in the NPF to improve average journey times to an average inter-urban speed of 90kph. Moreover, these route options align with the National Development Plan 2021-2030, as well as the National Roads Programme 2018 – 2027.

In terms of the modal hierarchy, all four route options consist of a multi-modal intervention, with improved journey conditions for all road users. Reducing congestion on the existing N2 will improve journey times and journey time reliability of private vehicles, goods vehicles and road based public transport. The active travel facilities proposed as part of all four route options, outlined in Section 7.8, will also improve journey ambience for pedestrians and cyclists.

In terms of the intervention hierarchy, all four route options consist of the provision of “New” infrastructure, which encompasses all measures which entail significant increases to transport infrastructure capacity. However, it is noted that the application of the hierarchies is to be flexible and pragmatic to ensure that the most appropriate solution to a given problem is implemented. Investment will be needs-based and objectives-led, and where Investment Priorities cannot be addressed by maintaining or optimising existing infrastructure, appropriate improved and new infrastructure will continue to be part of future investment plans.

All four route options will contribute to addressing the aforementioned capacity issues, in the Do-Minimum Scenario (2040), on the Dublin-Derry-Letterkenny corridor for the section of the N2 south of the border to Ashbourne.

The junction corridors will be required to facilitate the implementation of the route options, and the associated benefits of these, so will have a moderately positive impact on geographical integration.

7.6.5.5 Summary

The overall scores for Geographical Integration are shown in Table 7-48.

Table 7-48 - Overall Scores for Geographical Integration

Scheme Option	Score
Do Nothing / Do Minimum	Moderately Negative (2)
Do Something - Do Managed	Moderately Negative (2)
Do Something - Public Transport	Minor or Slightly Negative (3)
Do Something - Route D1	Moderately Positive (6)
Do Something - Route E1	Moderately Positive (6)
Do Something - Route E2	Moderately Positive (6)
Do Something - Route F2	Moderately Positive (6)
Junction / Tie-Ins	Moderately Positive (6)

7.6.6 Other Government Policy Integration: Regional Balance

As the NPF sets the strategic, national context for all future planning policies with influence on regional and local planning policy level. The primary driver underpinning the implementation of the NPF, is the Regional Spatial and Economic Strategies (RSES). The RSES provides regional level strategic planning and economic policy and provides a greater level of focus around the National Policy Objectives (NPO) and NSO's of the NPF.

As per TII PAG Unit 7.0, regional balance should be promoted under this sub-criterion. The appraisal process identifies the following transport projects to be regarded positively for regional balance;

- *Transport investment within or to urban centres from peripheral regions*
- *Transport investment on links between urban centres*
- *Transport investment on routes which improve access to international ports and airports*

TII PAG Unit 7.0 further states that the following transport projects should be regarded as neutral to regional balance:

- *Links between the East and peripheral regions which do not improve international access*
- *Transport projects which will only improve mobility within the East region*

The Do-Nothing and Do-Managed options will have a **minor negative** impact on other government policy integration as outlined above, as the existing issues with congestion and journey time reliability will worsen with traffic volumes set to increase, thereby restricting balanced regional development. The implementation of public transport improvements will have a minor contribution to balanced regional development. However, journey time reliability of road based public transport is likely to be impacted by persisting congestion issues on the N2. Therefore, the public transport option will have a **neutral impact** on minor negative impact on other government policy integration.

Route options D-1, E-1, E-2 and F2 will contribute to balanced regional development transport through improved links between Ashbourne and Slane and other urban centres in County Meath and the Greater Dublin Area. All route options will improve access from County Meath to Northern Ireland, as well as access to Dublin Port and Dublin Airport. All route options will also improve connectivity to a potential Dublin Airport Western Access as referenced in Objective EA05 in the Dublin Airport Local Area Plan 2020 – 2026. These route options will therefore have a **slightly positive** impact on regional balance. The junction corridors will be required to facilitate the implementation of the route options, and the associated benefits of these, so will have a **slightly positive** impact on same.

7.6.6.1 Summary

The overall scores for Other Government Policy Integration are shown in Table 7-49.

Table 7-49 - Overall Scores for Other Government Policy Integration

Scheme Option	Score
Do Nothing / Do Minimum	Minor or Slightly Negative (3)
Do Something - Do Managed	Minor or Slightly Negative (3)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Minor or Slightly Positive (5)
Do Something - Route E1	Minor or Slightly Positive (5)
Do Something - Route E2	Minor or Slightly Positive (5)
Do Something - Route F2	Minor or Slightly Positive (5)
Junction / Tie-Ins	Minor or Slightly Positive (5)

7.6.7 Summary

The overall scores for integration are summarised in Table 7-50.

Table 7-50 - Total Scores for Integration

	Do Nothing	Do Managed	Public Transport	Route D-1	Route E-1	Route E-2	Route F-2	Junctions
Transport Integration	1	2	4	7	7	7	7	7
Land Use Integration	2	2	3	4	6	6	2	4
Geographical Integration	2	2	3	6	6	6	6	6
Other Government Policy Integration	3	3	4	5	5	5	5	5

7.7 Accessibility and Social Inclusion

7.7.1 Objectives

The scheme will upgrade a vital link between Dublin and the northwest of the country, including Northern Ireland. The upgrade of this section of the N2 is identified as being a key part of achieving a Strategic Outcome of the National Planning Framework in relation to Enhanced Regional Accessibility and the upgrade of this section of the route will enhance accessibility to Dublin Port and the International Gateway at Dublin Airport.

The key objectives of the scheme in relation to accessibility and social inclusion are:

- To improve accessibility to key facilities, such as employment, education and healthcare for all N2 road users, but in particular vulnerable groups.
- To reduce travel costs in the region and thereby encourage and support investment and employment in the wider region.
- To support the accessibility and social inclusion objectives of national, regional and local planning policy.
- To improve road based public transport journey time and journey time reliability.
- To improve connectivity to Dublin Airport.

7.7.2 Methodology

Government objectives for reducing social exclusion have been set out in the NAPSI (National Action Plan for Social Inclusion 2007-2016). The NAPSI strategy aims to reduce, and ideally, eliminate poverty and social exclusion which affects vulnerable groups. In accordance with the TII Project Appraisal Guidelines, Deprived Geographical Areas and Vulnerable Groups, form the basis of the Accessibility and Social Inclusion impact assessment.

7.7.3 Deprived Geographical Areas

Transport investment has a major role in improving access to employment, education, essential services and amenities. Therefore, options which improve accessibility for disadvantaged groups from deprived geographic areas will have a positive effect on accessibility. As part of the assessment, various datasets were considered to determine the levels of deprivation in the surrounding area. Particular consideration was also given to areas covered by certain government programmes.

With reference to the Pobal deprivation indices, all areas within the study area are classified as marginally above average. Outside of the study area, Garristown and parts of Ratoath are classified as marginally below average, meanwhile parts of Ashbourne, Dunshaughlin, Slane and Duleek are classified as disadvantaged. Further afield, some parts of Navan, Drogheda and Greater Dublin are classified as very disadvantaged.

The CLÁR programme (*Ceantair Laga Árd-Riachtanais*) provides funding for small-scale infrastructural projects in rural areas and helps to support sustainable development in identified areas by attracting people to live and work there. There are no CLÁR areas within the study area, the closest CLÁR designated areas are in the very north-west of County Meath near the border with County Cavan.

The RAPID programme (*Revitalising Areas by Planning, Investment and Development*) provides support to groups which are tackling social exclusion and helps improve the quality of life for residents in disadvantaged urban areas and provincial towns across the country. There are no RAPID areas within the study area, the closest RAPID areas are in Navan and Drogheda to the north and the areas of Ballymun, Finglas and Blanchardstown in Greater Dublin to the south.

The ABC programme (*Area Based Childhood*) provides investment in services that improve outcomes for children and families living in areas of disadvantage. There are no ABC areas within the study area, the closest ABC areas are in Drogheda to the north and the areas of Ballymun and Finglas in Greater Dublin to the south.

The RSR (*Rural Social Scheme*) provides a supplementary income for low-income farmers and fishermen or women who are unable to earn an adequate living. There are no RSS community groups in the study area, the closest RSR community groups are Walterstown Gaelic Football Club, St Marys Church in Kentstown and the Slane Community forum to the north. All of these community groups are implemented by the Meath Partnership. Further to the south there are lots of RSS community groups in the towns of Maynooth, Leixlip and Celbridge in County Kildare.

Overall, all options under consideration at the Stage 2 assessment were considered to have a neutral score as shown in Table 7-51. This is due to the fact that there are no deprived geographical areas within the study area. However, it is noted that the Do-Something options have the potential to improve accessibility for disadvantaged groups from deprived geographic areas that are further afield such as those in Navan, Slane, Drogheda and the Greater Dublin Area.

Table 7-51 - Overall Scores for Deprived Geographical Areas

Scheme Option	Score
Do Nothing / Do Minimum	Not Significant or Neutral (4)
Do Something - Do Managed	Not Significant or Neutral (4)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Not Significant or Neutral (4)
Do Something - Route E1	Not Significant or Neutral (4)
Do Something - Route E2	Not Significant or Neutral (4)
Do Something - Route F2	Not Significant or Neutral (4)
Junction / Tie-Ins	Not Significant or Neutral (4)

7.7.4 Vulnerable Groups

The term vulnerable groups can include; vulnerable women, children, young people, older people, people with disabilities, ethnic minorities, lower-income socio-economic groups and identified deprived areas. As part of the assessment, it was considered whether the options provided improved access to vital services such as health, education and employment for vulnerable groups. Particular consideration was also given to the different impacts that occur for people of varying income groups, car ownership levels and mobility or sensory impairment.

The Do-Nothing option was considered to have a moderately negative impact, with traffic volumes set to increase on this section of the N2 over the coming years, accessibility to employment, education and healthcare for vulnerable groups is likely to worsen in a Do-Nothing scenario.

The Do-Managed option was considered to have a minor negative impact. There will likely be limited improvements in accessibility to employment, education and healthcare in Ashbourne and the wider Dublin region as well as Dublin airport for all social groups, in particular vulnerable groups. However, these would likely be offset by persisting congestion issues with traffic volumes set to increase on this section of the N2 over the coming years.

The Public Transport option was considered to have a neutral impact as there will likely be improvements in accessibility to employment, education, healthcare in Ashbourne and the wider Dublin region as well as Dublin airport for those without car ownership. However, journey time reliability of road based public transport is likely to be impacted by persisting congestion issues on the N2.

Meanwhile, all four route options (D1, E1, E2, and F2) as well as the junction areas were considered to have a moderately positive impact. This is due to improvements in accessibility to employment, education, healthcare in Ashbourne and the wider Dublin region as well as Dublin airport for all social groups, in particular vulnerable groups. As a result of decreased congestion and reduced journey times, the subsequent reduction of travel costs would also encourage and support investment and employment in the wider region.

It was also noted that there would be significant benefits for those without car ownership if public transport improvements are implemented as a complementary measure with any of the four route options due to the subsequent improvements in journey time reliability of road based public transport.

The overall scores for Vulnerable Groups are shown in Table 7-52.

Table 7-52 - Overall Scores for Vulnerable Groups

Scheme Option	Score
Do Nothing / Do Minimum	Moderately Negative (2)
Do Something - Do Managed	Minor or Slightly Negative (3)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Moderately Positive (6)
Do Something - Route E1	Moderately Positive (6)
Do Something - Route E2	Moderately Positive (6)
Do Something - Route F2	Moderately Positive (6)
Junction / Tie-Ins	Moderately Positive (6)

7.7.5 Summary

The overall scores for accessibility and social inclusion are summarised in Table 7-53.

Table 7-53 - Total Scores for Accessibility and Social Inclusion

	Do Nothing	Do Managed	Public Transport	Route D-1	Route E-1	Route E-2	Route F-2	Junctions
Deprived Geographical Areas	4	4	4	4	4	4	4	4
Vulnerable Groups	2	3	4	6	6	6	6	6

7.8 Physical Activity

7.8.1 Objectives

To enable the National Strategic Outcomes from the National Planning Framework, particularly around decarbonising the transport system and delivering compact growth, a significant shift from low-occupancy private vehicles to more sustainable modes of travel will be required. As part of the scheme, facilities for pedestrians and cyclists will be implemented to increase the uptake of active travel modes for short journeys within the study area. As well as delivering benefits in terms of carbon reduction, the associated physical activity will generate an array of social benefits in terms of improved physical health and mental wellbeing. The key physical activity objectives include:

- To deliver infrastructure that supports low-carbon transport systems and emission reductions.
- To provide segregated facilities for pedestrians and cyclists to link local areas to Ashbourne and beyond.
- To improve the amenity value of the existing N2 corridor and provide a safe environment for vulnerable road users.
- To facilitate the uptake of active travel modes and reduce the overreliance on private cars for short journeys.

7.8.2 Methodology

This Physical Activity criteria involves the assessment of options based on the impact each option will have on Physical Activity. Notably this is around pedestrians, cyclists and other Non-Motorised Users (NMUs). Firstly, a review of existing and proposed pedestrian and cycle infrastructure in the study area was undertaken. This was followed by the development of an active travel strategy, which incorporated the pedestrian and cycle facilities that are proposed to be implemented alongside each option as part of the scheme. A comparative assessment was then undertaken of the options based on these pedestrian and cycle facilities proposed as part of the active travel strategy.

As this assessment was undertaken during the initial stage of the design, there was lack of accurate project-specific information on the number or frequency of existing cyclists and pedestrians within the study area. Therefore, it was not practicable to calculate the future predicted usage (other than general routes taken), nor could the associated benefits (relating to health or absenteeism) be quantitatively assessed, as outlined in TII PAG Unit 13.0 - *Pedestrian and Cyclist Facilities*.

Hence, a qualitative assessment was undertaken to evaluate each option based on the proposed enhancements for pedestrians, cyclists and other road users. This assessment was undertaken against the three Physical Activity sub-criteria in accordance with TII PAG Unit 7.0 - Multi Criteria Analysis. These sub-criteria are listed below:

- Ambience – This criterion looks at the road user's perception of reduced danger due to the enhancement in the road facilities and infrastructure. Reduced danger will encourage more pedestrian and cyclists to use the network.
- Absenteeism – This criterion considers the benefits to employers in terms of the reduction in short-term sick leave due to increased levels of physical activity, this subsequently leads to increased productivity in the economy.
- Reduced Health Risk – This criterion considers the benefits that increased levels of physical activity would have in terms of the reduction in illnesses caused by a sedentary lifestyle.

7.8.3 Review of Existing & Proposed Pedestrian & Cycle Infrastructure

7.8.3.1 Existing Pedestrian & Cycle Facilities

At present, there is a very short length of cycleway along this stretch of the N2 running for approximately 200m in each direction. This runs from the L50161 junction and continues along the N2 for a short distance to the north before ending. The cycleway is not segregated but road markings ensure a small degree of separation with the vehicle traffic on the route. As this cycleway is disconnected from any other cycle routes nearby it is unlikely to entice many potential users.

There is currently a minor network of footpaths and pedestrian facilities in the vicinity of the community facilities. However, there are currently no longer distance pedestrian facilities connecting the main settlements in the study area.

Overall, it is recognised that there is an overall poor provision of pedestrian and cycle facilities in the study area, which consequently inhibits the modal choice of local people. Sustainable travel modes, particularly walking and cycling, are not viewed as safe options for short journeys due to the safety risks associated with these travel modes, including high traffic volumes on the existing N2 and surrounding local roads. This can lead to significant accessibility issues for local people in the area who do not have access to a private car, particularly for children accessing the local schools, such as Scoil Naomh Cianain in Cushinstown.

In summary, the suppressed demand for sustainable travel modes results in an overreliance on the private car for short journeys. The combination of both long distance and short distance trips by private car on this section of the existing N2 further exacerbates congestion during the peak periods, particularly at the junction locations along this section of the National Primary route.

7.8.3.2 Proposed Pedestrian & Cycle Facilities

In terms of proposed cycle routes, a number of rural and urban cycle routes have been proposed as part of the Cycle Network Plan for the Greater Dublin Area (GDA CNP 2013). Urban route AS1 is proposed to follow the R135 through Ashbourne town up to the Rath Roundabout as shown in Figure 7-15. The section of this route from Ashbourne Main Street up to the Rath Roundabout has previously been granted part 8 approval, at the time of writing cycle network design is currently being undertaken for this section.

Rural route M15 is proposed to connect the towns of Dunshaughlin and Ratoath to Ashbourne as shown in Figure 7-16. This route will enter Ashbourne from the west via the Ballybin road which will then connect with urban route AA1. At Rath Cross junction, rural route M15 continues up the Ballymadun road towards Garristown, changing notation to rural route F11 when crossing the county border from Meath into Fingal. From Garristown, this route continues northwards towards Duleek, again changing notation to rural route M16 when crossing back over the county border from Fingal into Meath.

In terms of proposed footpaths and pedestrian routes, there are no planned works in this area, other than potential shared pedestrian and cycle facilities as part of Urban Cycle Route AS1.

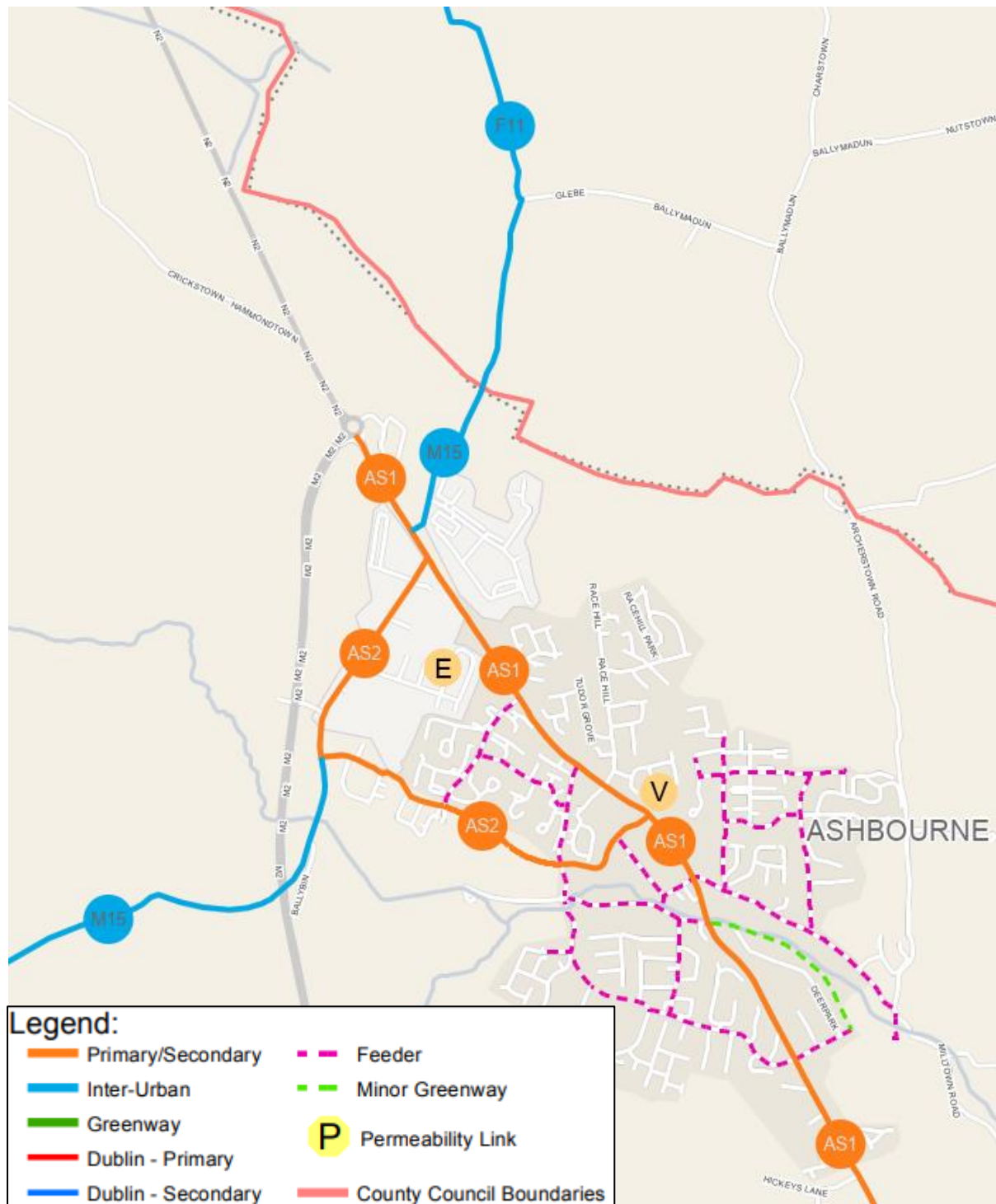


Figure 7-15 - Proposed Urban Cycle Network in Ashbourne (GDA CNP 2013)

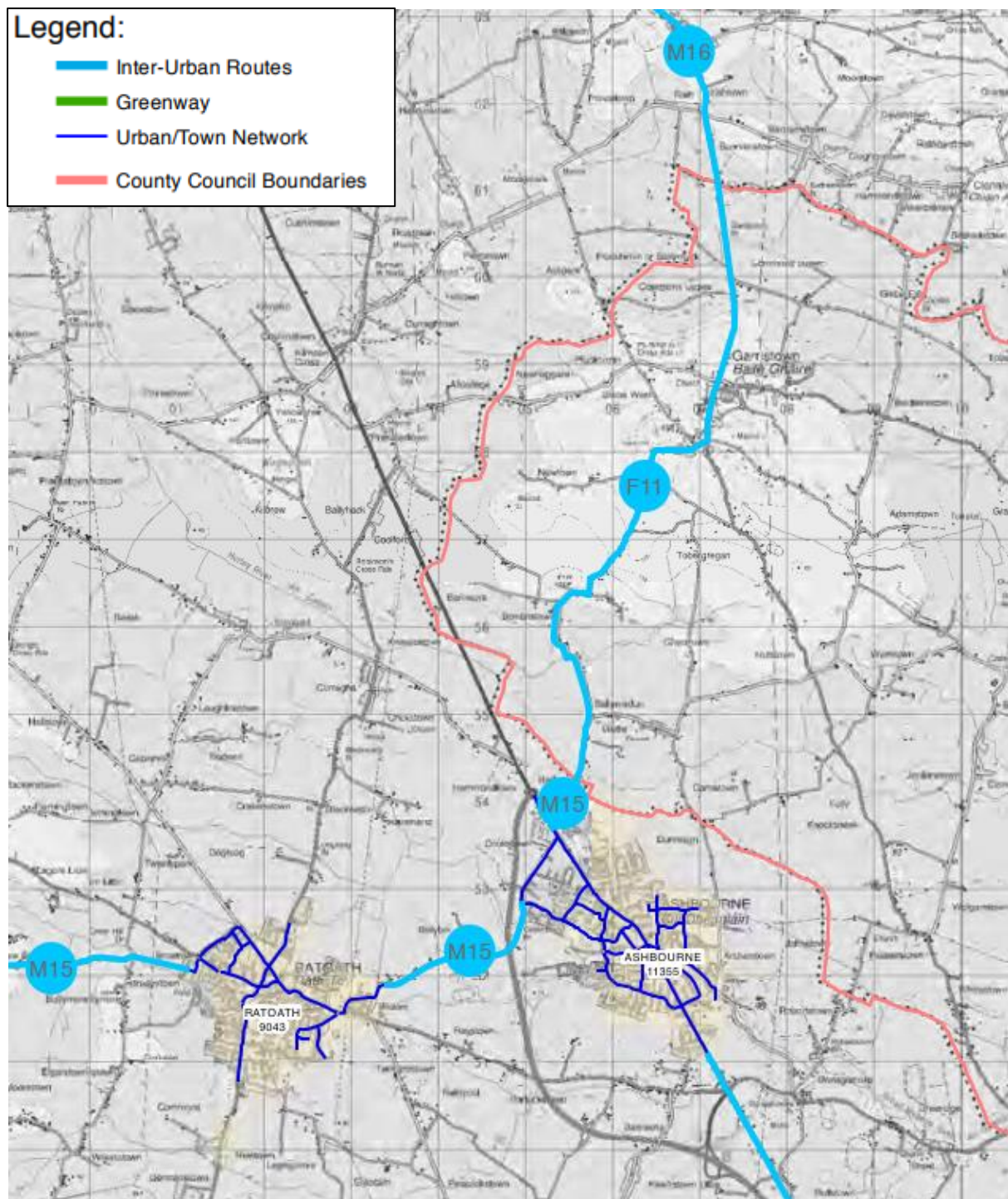


Figure 7-16 - Proposed Inter-Urban Cycle Routes in Fingal and Meath (GDA CNP 2013)

7.8.4 Active Travel Strategy

7.8.4.1 Alternative Options - Overview

For the Do-Nothing option, the active travel strategy consisted of no new active travel facilities, other than the retention of the existing limited pedestrian and cycle facilities in the study area.

For the Do-Managed option, the active travel strategy consisted of limited improvements to pedestrian and cyclist facilities within the existing road boundary where possible, for example making use of hard shoulders and verges, particularly at junctions.

For the Public Transport option, the active travel strategy consisted of the provision of bus lanes. These bus lanes would provide a safer perceived environment for cyclists as they would be separated from the existing N2 traffic except for buses. It is noted that this option does not include the provision of any facilities for pedestrians.

7.8.4.2 Route Options - Overview

For the four Route Options (D-1, E-1, E-2, F-2), the active travel strategy consisted of the extension of the planned Urban Cycle Route AS1 (GDA CNP 2013) from its proposed end point at Rath Roundabout, to Cushinstown, which is designated as a rural node in the Meath County Development Plan 2021-2027. In order to cater for pedestrian movements in the area as well as cyclists, it was proposed to implement combined pedestrian and cyclist facilities.

One further consideration is connectivity to Curragha, which is also designated as a rural node in the Meath County Development Plan 2021-2027. It is anticipated that through the implementation of a Dual Carriageway cross-section, rat-running on the surrounding local roads to avoid peak-time congestion on the existing N2 will be reduced. Therefore, the existing L50161 will become more accommodating for pedestrians and cyclists traveling between Curragha and Ashbourne, even without the implementation of segregated facilities.

In terms of the junction corridors, which are common to all four route options, potential junction options will include the provision of segregated facilities for pedestrians and cyclists where possible.

7.8.4.3 Route Options - Type of Facilities

In accordance with TII Publications DN-GEO-03031, cycle and pedestrian facilities are mandatory for a Type 2 Dual Carriageway cross-section, running parallel to the proposed mainline. However, for a Type 1 Dual Carriageway cross-section, cycle and pedestrian facilities running immediately parallel to the Dual Carriageway mainline are not permitted.

A Type 1 Dual Carriageway cross-section has been identified as the preliminary carriageway cross-section for all four route options, this is shown in Figure 7-1. Therefore, cycle and pedestrian facilities proposed as part of the scheme shall comprise of off-road cycleways or on-road cycleways along the existing road network, rather than alongside the proposed Dual Carriageway mainline.

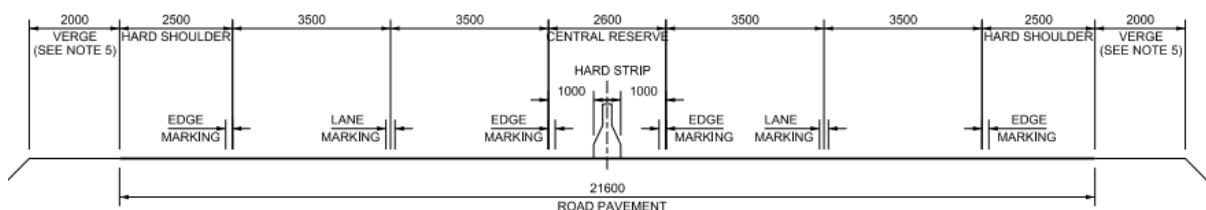


Figure 7-17 - Type 1 Dual Carriageway Cross-Section (TII Publications CC-SCD-00006)

In accordance with Section 4.17.2 of DN-GEO-03036, low volume cycle and pedestrian facilities are those considered to attract less than 1500 users per day. It is considered that the proposed facility will likely be low volume due to the rural nature of the area, as such a shared use two-way cycle facility with

pedestrians will likely be appropriate from a safety and usage perspective. Based on this, a width of 3m has been assumed as per Table 4.5 of DN-GEO-03036. Figure 7-18 illustrates an indicative cross-section for this proposed shared use two-way cycle facility with pedestrians.

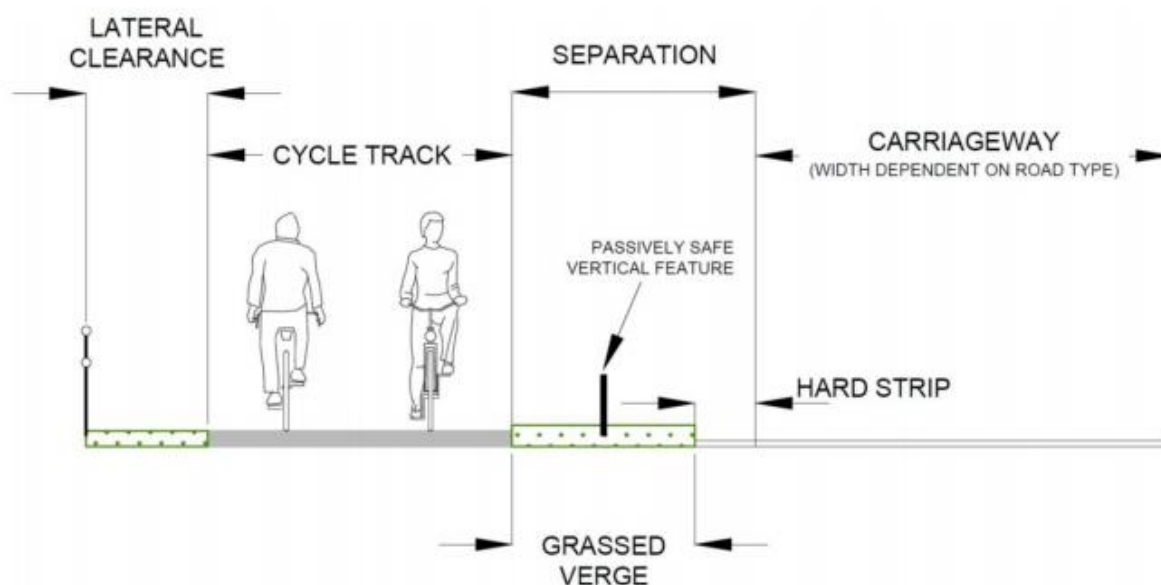


Figure 7-18 - Indicative Two-Way Cycle Facility with Pedestrians

For Route Option F-2, which is fully offline, this 3m wide shared use two-way cycle and pedestrian facility could be provided alongside the existing N2 from Rath to Cushinstown. Due to the reduced traffic flows, the current cross-section of the existing N2 may no longer be appropriate. It is likely that the existing N2 will be reclassified to a regional road with a reduced speed limit, therefore the wide shoulders along some sections may encourage speeding which creates safety risks for all road users. As such, a reduced single carriageway cross-section with slightly narrower lanes and narrower shoulders may be more appropriate. This would also provide space to implement segregated pedestrian and cycle facilities within the existing road boundary.

Route Options D-1, E-1 and E-2 involve sections of online widening; therefore, this cycle and pedestrian facility could be provided either as an off-road cycleway or alongside a potential parallel access road to provide local connectivity. Alternatively, the proposed Dual Carriageway mainline could be constructed parallel to the existing N2 within the Stage 2 corridors, in which case the proposed cycle and pedestrian facilities could be provided alongside the existing N2 from Rath to Cushinstown, similar to the facilities proposed for Route Option F-2. It is noted that the strategy for online widening and side roads will be developed further at the next stage of the planning and design process, should one of these route options be identified as the Emerging Preferred Option for the scheme.

7.8.5 Ambience

Journey Ambience Benefits lead to the increased attractiveness of active travel modes for users of the road network. In accordance with TII PAG Unit 13.0 - *Pedestrian and Cyclist Facilities*, Journey Ambience Benefits are defined as:

“The users’ perception of reduced danger (a reduced fear of potential collisions/incidents) and improved quality of journey as a result of the proposal being considered.”

The Do Nothing and Do Managed options are unlikely to enhance journey ambience for pedestrians and cyclists in the study area. Without significant enhancements, traffic levels along the existing N2 are likely to remain high which will deter pedestrians and cyclists from using this road due to the perceived dangers. Traffic levels will also remain high on the surrounding local road network due to traffic avoiding peak time congestion of the existing N2, therefore a safe environment will not be provided for pedestrians and cyclists on the surrounding local roads either. Therefore, these measures are unlikely to facilitate a significant uptake in modal shift towards active travel modes. The impact on journey ambience for the Do Nothing option is considered as highly negative, whereas the impact for the Do Managed option is considered as moderately negative.

The Public Transport option would likely facilitate a small increase in cycling through the provision of bus lanes. However, this is offset somewhat by the perceived dangers for cyclists having to share this lane with road based public transport such as buses. The high levels of traffic on the existing N2 are likely to deter cyclists, notably at junctions. This option does not include the provision of any facilities for pedestrians. Overall, the impact on journey ambience for the Public Transport option is considered as slightly negative.

Route options D-1, E-1, E-2 and F-2, as well as the junction corridors which are common to all options, will all significantly improve journey ambience for pedestrians and cyclists through the provision of segregated facilities connecting Ashbourne and Cushinstown. Furthermore, the provision of a dual carriageway to cater for through traffic will facilitate a reduction in traffic on the existing N2 and the surrounding local road network. This reduction in traffic will result in the existing N2 and surrounding local roads becoming more appealing for Non-Motorised Users (NMUs) due to the reduced danger and a safer perceived environment. Overall, these options are considered to have a highly positive impact on journey ambience.

Based on the qualitative assessment above, the overall scores for ambience are shown in Table 7-54.

Table 7-54 - Overall Scores for Ambience

Scheme Option	Score
Do Nothing / Do Minimum	Major or Highly Negative (1)
Do Something - Do Managed	Moderately Negative (2)
Do Something - Public Transport	Minor or Slightly Negative (3)
Do Something - Route D1	Major or Highly Positive (7)
Do Something - Route E1	Major or Highly Positive (7)
Do Something - Route E2	Major or Highly Positive (7)
Do Something - Route F2	Major or Highly Positive (7)
Junction / Tie-Ins	Major or Highly Positive (7)

7.8.6 Absenteeism

Absenteeism Benefits are directly correlated with the uptake of active travel modes and the resultant increase in Physical Activity. In accordance with TII PAG Unit 13.0 - *Pedestrian and Cyclist Facilities*:

“An increase in physical activity has been shown to have a beneficial effect on work absenteeism; this is an additional benefit to employers on top of the health benefits calculated above. This reduction in short-term sick leave increases productivity in the economy. [The World Health Organisation] WHO (2003) suggests that 30 minutes of exercise a day can result in a reduction in short term sick leave by between 6% and 32%.”

For the Do Nothing and Do Managed options, the suppressed demand for active travel modes such as walking and cycling will result in low levels of physical activity. As such, the impact on absenteeism for the Do Nothing option is considered as moderately negative, whereas the impact for the Do Managed option is considered as slightly negative.

For the Public Transport option, a small increase in cycling is anticipated due to the implementation of bus lanes, but no increase in walking due to the lack of pedestrian facilities. Overall, the Public Transport option is considered to have a neutral impact on absenteeism.

Route options D-1, E-1, E-2 and F-2, as well as the junction corridors which are common to all options, are anticipated to facilitate a substantial increase in active travel due to the provision of segregated facilities connecting Ashbourne and Cushinstown. The resultant increase in physical activity will result in a slightly positive impact on absenteeism.

Based on the qualitative assessment above, the overall scores for absenteeism are shown in Table 7-56.

Table 7-55 - Overall Scores for Absenteeism

Scheme Option	Score
Do Nothing / Do Minimum	Moderately Negative (2)
Do Something - Do Managed	Minor or Slightly Negative (3)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Minor or Slightly Positive (5)
Do Something - Route E1	Minor or Slightly Positive (5)
Do Something - Route E2	Minor or Slightly Positive (5)
Do Something - Route F2	Minor or Slightly Positive (5)
Junction / Tie-Ins	Minor or Slightly Positive (5)

7.8.7 Reduced Health Risk

Reduced Health Risk Benefits are directly correlated with the uptake of active travel modes and the resultant increase in Physical Activity. In accordance with TII PAG Unit 13.0 - *Pedestrian and Cyclist Facilities*:

“The benefits of regular use of a physically active form of travel compared to a more sedentary lifestyle are thought to be substantial (Andersen et al., 2000), so these benefits should be considered if an intervention causes more people to become physically active.”

For the Do Nothing and Do Managed options, the suppressed demand for active travel modes such as walking and cycling will result in low levels of physical activity. As such, the impact on reduced health risk for the Do Nothing option is considered as moderately negative, whereas the impact for the Do Managed option is considered as slightly negative.

For the Public Transport option, a small increase in cycling is anticipated due to the implementation of bus lanes, but no increase in walking due to the lack of pedestrian facilities. Overall, the Public Transport option is considered to have a neutral impact on reduced health risk.

Route options D-1, E-1, E-2 and F-2, as well as the junction corridors which are common to all options, are anticipated to facilitate a substantial increase in active travel due to the provision of segregated facilities connecting Ashbourne and Cushinstown. The resultant increase in physical activity will result in a moderately positive impact on reduced health risk.

Based on the qualitative assessment above, the overall scores for reduced health risk are shown in Table 7-56.

Table 7-56 - Overall Scores for Reduced Health Risk

Scheme Option	Score
Do Nothing / Do Minimum	Moderately Negative (2)
Do Something - Do Managed	Minor or Slightly Negative (3)
Do Something - Public Transport	Not Significant or Neutral (4)
Do Something - Route D1	Moderately Positive (6)
Do Something - Route E1	Moderately Positive (6)
Do Something - Route E2	Moderately Positive (6)
Do Something - Route F2	Moderately Positive (6)
Junction / Tie-Ins	Moderately Positive (6)

7.8.8 Summary

The overall scores for physical activity are summarised in Table 7-57.

Table 7-57 - Total Scores for Physical Activity

	Do Nothing	Do Managed	Public Transport	Route D-1	Route E-1	Route E-2	Route F-2	Junctions
Ambience	1	2	3	7	7	7	7	7
Absenteeism	2	3	4	5	5	5	5	5
Reduced Health Risk	2	3	4	6	6	6	6	6

7.9 Public Consultation 02 – Scheme Options

In conjunction with the Stage 2 Assessment, the second period of public consultation was held between 20th July and 12th August 2020.

This was the second non-statutory public consultation held by the project team and was a follow on from the first public consultation that was held in March 2020. The consultation period was arranged with the purpose of seeking feedback on the Stage 2 scheme options.

Due to the measures taken in light of the Covid-19 outbreak, it was not possible to arrange a formal event in the local area, instead all the information that would normally be displayed at such an event was published on the project website (n2rath2kilmoon.ie). This was complemented with the postal delivery of information to all those living within the study area. Awareness for the consultation was generated using a range of communication tools which ultimately lead to good public participation.

During the public consultation period, a total of 111 submissions were received. Of these, 77 were submitted using the online questionnaire, and a further 34 submissions were sent via email or post. A summary of the feedback from Public Consultation 2 is presented below, and the post consultation report is included in Appendix 9.

The questionnaire asked whether the respondent owned/rented/occupied a property on/adjacent to any of the scheme options. The numbers of respondents affected by each scheme option is shown in Figure 7-19. **It should be noted that this question in the online survey allowed respondents to select more than one option.**

Of the submission received, route option E1 affected 50 respondents which was the highest number of any option, followed closely by route options D1 and E2 which affected 48 respondents. Route option F2 affected 41 respondents which was the least out of the route options. Meanwhile the Public Transport and Traffic Management options affected a much lower number of respondents.

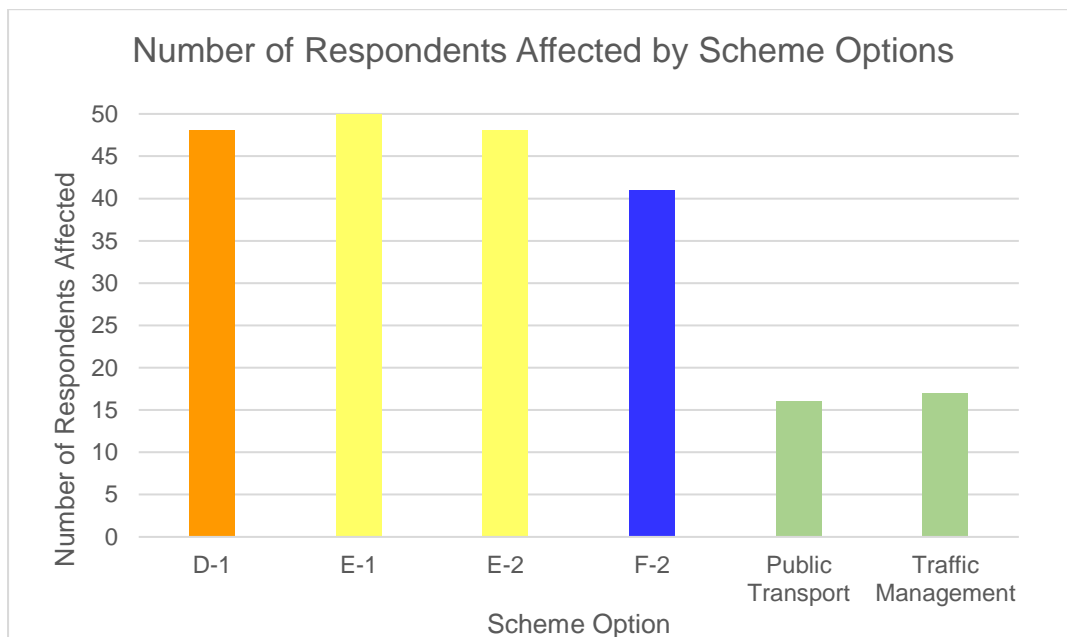


Figure 7-19 - Number of Respondents Affected by Scheme Options (from PC2 Submissions)

A breakdown by property type can be seen below in Table 7-58. **It is important to note that these figures relate to the number of submissions received and do not necessarily reflect the actual number of properties affected by each route option.**

Table 7-58 - Property Types affected by each Scheme Option (from PC2 Submissions)

Property Type	D-1	E-1	E-2	F-2	PTO	TMO
Residential	26	32	33	26	12	11
Agricultural	12	9	8	8	2	3
Commercial	1	3	1	1	0	0

The final section of the questionnaire allowed respondents to share feedback about the implications of the scheme options. The issues raised have been summarised below.

- Devaluing of residential or agricultural property;
- Severance of communities, particularly for the options crossing the ribbon development along the R155 (Routes E-1, E-2 and F-2);
- Severance of farmland and access to water supplies for livestock;
- Impacts on private homes and quality of life, including noise and visual disturbance;
- Impacts on natural wildlife flora and fauna;
- Impacts to protected archaeological mounds, particularly for Route D-1;
- Impacts to equine businesses, particularly for Route E-1;
- Impacts to a local business caused by light pollution which would impact the growth of certain plants and crops that require very specific hours of daylight.
- Flooding concerns, particularly for Route D-1 which crosses the Riverstown River;
- Impacts to schools and businesses, particularly at the northern junction corridor at Kilmoon;
- Impact on current access arrangements, particularly for the options involving sections of online widening (Routes D-1, E-1 and E-2);
- Impact on the lands zoned as a strategic employment site to the north of Ashbourne, particularly for Route F-2.
- Potential disruption to the existing N2 and the village of Curragha due to the potential diversion of HGVs onto local roads during the construction phase.
- Concern that improving the road as far as Kilmoon Cross junction will simply move the congestion issues further north along the existing N2.
-
- In terms of all the submissions received, the greatest proportion related to impacts on farms and land. These submissions were largely concerned with diminishing the value of land and property. Community severance and the removal of access routes were issues raised in a large proportion of submissions.
-
- A number of submissions were also supportive of the need for the scheme, highlighting the dangers and safety risks associated with the current situation. Residents from adjacent roads find it very difficult to access the N2, and the congestion issues on the N2 result in the use of the minor roads as a “rat run” which leads to locals being unable to walk on these roads for fear of an accident.

7.10 Project Appraisal Matrix

The assessments carried out under the six Common Appraisal Framework (CAF) criteria are compiled in the Overall Stage 2 Assessment Matrix as shown in Table 7-59. Each of the options under consideration were given an overall score based on the seven-point scale ranging from highly positive to major negative.

To determine an overall score for each option, the scores were for the Stage 2 Assessment Matrix were summarised using two different methods. Firstly, the scores of all sub-criteria were added to determine the total score for each option, as shown in Table 7-60. Secondly the overall average score of each of the main criteria was calculated by dividing the total score by the number of sub-criteria within each of the main criteria. Following this process, the total overall score was determined for each option by summing the overall scores for each of the main criteria, as shown in Table 7-61. Both methods provided a similar overall ranking of options, so were suitable for comparison.

Summary of Results

Based on Table 7-60 and Table 7-61, overall it is shown that the four route corridor options have outperformed the Do Nothing, Do Managed, and Public Transport options, across the six categories despite a number of negative impacts across the environmental sub-criteria.

Of these route corridor options, the best performing options were routes E-1 and E-2, with scores of 108 and 111 respectively, as well as the junction corridors which are common to all route options with a score of 111. The remaining route corridor options, D-1 and F-2, performed less favourably with scores of 105 and 104 respectively.

The Public Transport option was the best performing alternative option with a score of 99. Individual components of this option, such as the provision of a Park & Ride facility, may be considered later in the project development as standalone complementary measures to be incorporated with one of the route corridor options as the Emerging Preferred Option for the scheme.

The Do-Managed option on the other hand scored less favourably with a score of 93, and the Do Min / Do-Nothing option performed the least favourably with a score of 80.

Additional Localised Assessment

Under the Overall Stage 2 Assessment Matrix, options E-1 and E-2 performed the most favourably. On account of the closeness of the result it was considered that a further examination of the assessment was required for options E-1 and E-2, using the seven-point scoring system, in order to inform the selection of an Emerging Preferred Option.

Options E-1 and E-2 achieved the same total scores under the criteria of Economy, Safety, Accessibility and Social Inclusion, Physical Activity and Integration. The only areas of difference were seen in the Environmental assessment sub-criteria headings as shown in Table 7-60 and Table 7-61.

The scores presented under the Environmental criterion were based on an assessment of the various environmental sub-criteria considered over the entire length of both routes in question. It is noted that options E-1 and E-2 follow a common route apart from the sections which diverge between the Hurley river floodplain and the agricultural lands to the north-west of the R155.

In order to investigate the differences between these particular sections of the route options in more detail, a separate assessment was carried out under each of the key environmental subheadings. When comparing the diverged sections in isolation, it is anticipated that some of the environmental criteria may be scored differently in comparison to the initial appraisal during which the full route corridors were assessed.

Table 7-59 - Overall Stage 2 Assessment Matrix

	Do Nothing	Do Managed	Public Transport	Route D-1	Route E-1	Route E-2	Route F-2	Junctions
Environment								
Biodiversity	4	5	5	1	2	3	3	3
Water	4	5	5	2	1	3	2	4
Land and Soil	4	4	4	2	2	3	1	3
Landscape & Visual	4	4	3	1	2	2	1	3
Noise and Vibration	4	4	4	2	3	2	3	3
Air Quality	4	5	5	5	5	5	5	4
Climate	4	5	5	4	4	4	4	4
Population and Human Health	4	4	3	2	2	2	2	2
Cultural Heritage	4	4	4	2	2	2	2	1
Material Assets - Agriculture	4	4	4	3	3	3	3	3
Material Assets - Non-Agriculture	4	4	3	1	1	1	1	1
Waste	4	4	4	2	2	2	3	2
Sub-Total	48	52	49	26	28	31	29	32
Safety								
Collision reduction	3	4	4	5	5	5	5	5
Security	2	3	3	6	6	6	6	6
Sub-Total	5	7	7	11	11	11	11	11

	Do Nothing	Do Managed	Public Transport	Route D-1	Route E-1	Route E-2	Route F-2	Junctions
Physical Activity								
Ambience	1	2	3	7	7	7	7	7
Absenteeism	2	3	4	5	5	5	5	5
Reduced Health Risk	2	3	4	6	6	6	6	6
Sub-Total	5	8	11	18	18	18	18	18
Economy								
Efficiency and Effectiveness	1	2	3	7	7	7	6	7
Wider Economic Impacts	2	3	4	5	5	5	5	5
Transport Quality and Reliability	1	3	3	7	7	7	7	7
Funding Impacts	4	4	4	4	4	4	4	4
Sub-Total	8	12	14	23	23	23	22	23
Accessibility & Social Inclusion								
Deprived Geographical Areas	4	4	4	4	4	4	4	4
Vulnerable Groups	2	3	4	6	6	6	6	6
Sub-Total	6	7	8	10	10	10	10	10
Integration								
Transport Integration	1	2	4	7	7	7	7	7
Land Use Integration	2	2	3	4	6	6	2	4
Geographical Integration	2	2	3	6	6	6	6	6
Other Government Policy Integration	3	3	4	5	5	5	5	5
Sub-Total	8	9	14	22	24	24	20	22

Table 7-60 - Summary of Stage 2 Assessment Matrix (All Sub-Criteria)

	Do Nothing	Do Managed	Public Transport	Route D-1	Route E-1	Route E-2	Route F-2	Junctions
Summary of Scores								
Environment	48	52	49	27	29	32	30	33
Safety	5	7	7	11	11	11	11	11
Physical Activity	5	8	11	18	18	18	18	18
Economy	8	12	14	23	23	23	22	23
Accessibility & Social Inclusion	6	7	8	10	10	10	10	10
Integration	8	9	14	22	24	24	20	22
Overall	80	93	99	105	109	112	105	111

Table 7-61 - Summary of Stage 2 Assessment Matrix (Main Criteria)

	Do Nothing	Do Managed	Public Transport	Route D-1	Route E-1	Route E-2	Route F-2	Junctions
Summary of Scores								
Environment	4.00	4.33	4.08	2.25	2.42	2.67	2.50	2.75
Safety	2.50	3.50	3.50	5.50	5.50	5.50	5.50	5.50
Physical Activity	1.67	2.67	3.67	6.00	6.00	6.00	6.00	6.00
Economy	2.00	3.00	3.50	5.75	5.75	5.75	5.50	5.75
Accessibility & Social Inclusion	3.00	3.50	4.00	5.00	5.00	5.00	5.00	5.00
Integration	2.00	2.25	3.50	5.50	6.00	6.00	5.00	5.50
Overall	15.17	19.25	22.25	30.00	30.67	30.92	29.50	30.50

7.11 Localised Comparison of Options E1 & E2 – Environmental Criteria

As noted previously, an additional assessment of the diverged sections of options E-1 and E-2 was carried out under each of the key environmental subheadings. The extent of options E-1 and E-2 that were subject to additional assessment were the sections which diverge between the Hurley river floodplain and the agricultural lands to the north-west of the R155. This is shown in Figure 7-20 as well as Drawing CH-0037 in Appendix 3.

When comparing the diverged sections of options E-1 and E-2 in isolation, it is anticipated that some of the environmental criteria may be scored differently in comparison to the initial appraisal during which the full route corridors were assessed. However, it is noted that this additional localised assessment would not result in any change to the overall option scores in the Stage 2 assessment, as per Section 7.10. Any potential changes to scoring across the sub-criteria are only applicable when considering the diverged sections of the options at a local level.

The scoring procedure used to assess the options follows the approach used throughout this document and follows the 7-point scoring method as outlined within the TII Guidance document *PE-PAG-02031 - Unit 7.0 - Multi Criteria Analysis*. The aim of this assessment was to identify an emerging preferred option to be taken forward to Stage 3. The findings of this additional assessment are outlined below and the scoring for each route is shown in Table 1-44.

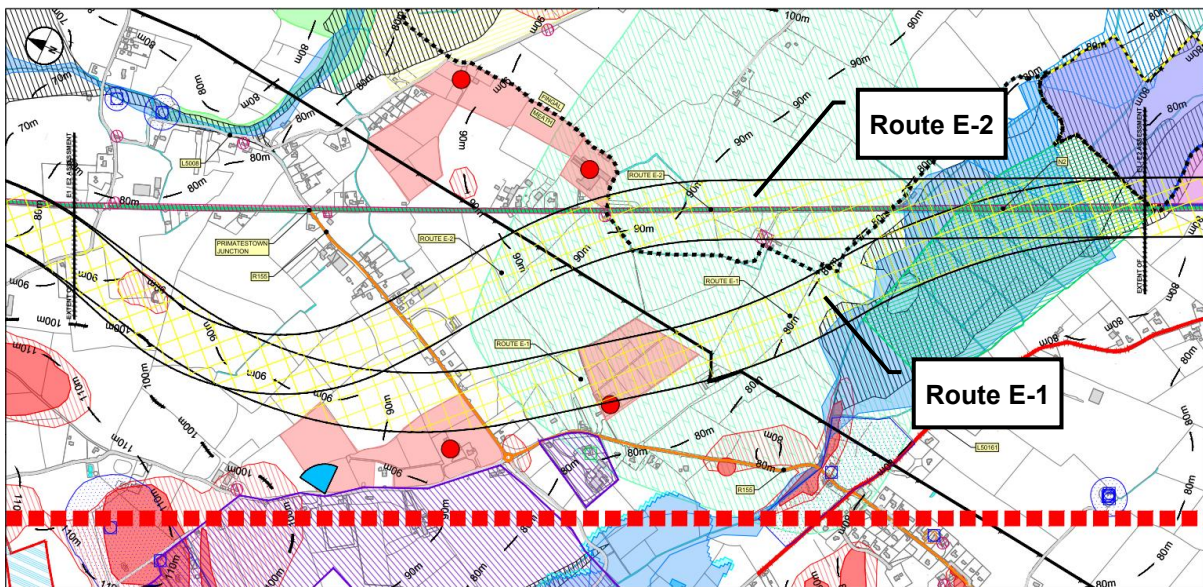


Figure 7-20 - Extent of Additional Assessment of Options E1 & E2 with Constraints Overlain

7.11.1 Biodiversity

Route Option E-2 is considered the preferred option from a biodiversity point of view as a higher proportion of Route Option E-2 follows the existing N2 corridor, as such Route Option E-2 avoids a significant impact on the Hurley River flood plain.

Three KER were identified for the consideration during the comparative assessment of route options, these were, Hurley River and Curraghtown / Riverstown Stream, Wet Grassland south of the Hurley River and Primatestown Common. Of these, Primatestown Common and the wet grassland south of the Hurley River are considered to be the most significant ecological features in the study area.

The main difference in terms of Key Ecological Receptors (KER) between the two route options is that Route Option E-1 will sever the wet grassland along the Hurley River, while the impact of Route Option E-2 on the wet grassland along the Hurley River will be limited to the area immediately surrounding the existing N2 corridor. The loss of wet grassland habitat related to Route Option E-1 could lead to indirect hydrological impacts on the Hurley River and the habitats downstream. While Route Option E-2 will involve the loss of linear habitats of Local Importance (Higher Value). However, Route Option E-2 has the least impact on the identified KERs.

7.11.2 Water

Route Option E-2 is the preferred option from a water perspective as Route Option E-2 is considered to have a potential minor impact on the Hurley River flood plain as the section of the route option which traverses the flood plain follows the existing N2 corridor, and as such would only require widening of the existing N2 within the flood plain. In addition, it is anticipated Route Option E-2 will have the least impact to groundwater.

As the section of Route Option E-1 that traverses the flood plain of the Hurley River is predominately in the offline section, there is potential for a major impact on the Hurley River and its flood plain to north of Ashbourne resulting from this route option.

Both Route Options E-1 and E-2 overly a 'Locally Important Aquifer – Lm' however Route Option E-2 is likely to require less offline construction within this area when compared to Route Option E-1 as Route Option E-2 would only require widening of the existing N2.

7.11.3 Land and Soil

Route Option E-2 is considered the preferred option from a land and soils perspective as this option will utilise a greater proportion of the existing N2 corridor and as a result will have a smaller offline section for construction.

The portion of Route Option E-2 which traverses the flood zone associated with the Hurley River occurs along the existing N2 corridor and is therefore likely to require less offline construction in the flood zone in comparison to Route Option E-1 which has an offline section in this area. As a result, Route Option E-2 is expected to have a reduced impact on the flood zone associated with the Hurley River when compared to Route Option E-1.

In addition, where Route Option E-1 diverges from Route Option E-2 it goes offline into an area of compressible soil which has the potential to be unstable. Route Option E-2 continues along the existing N2 corridor through the area of compressible soil and will only require widening within this area.

7.11.4 Landscape & Visual

Route Options E-1 and E-2 result in similar landscape and visual effects, however, Route Option E-2 is the preferred option as it contains a longer online widening section. While visual effects on residences will be slightly higher as the route will run in closer proximity to a number of residential properties located along the R155, the route will have an overall lesser effect on the landscape character and the visual amenity in the study area including protected View 73. Landscape effects are less than for Route Option E-1 due to the shorter offline section.

The north-western offline section of Route Option E-1 traverses LCA 6 – Central Lowlands, which is of medium landscape sensitivity and high landscape value. It also is located in close proximity to a viewshed of the locally significant protected View 73. The protected view comprises “*Extensive views to the north east, mid distance heavily wooded. Dwellings, infrastructure and agriculture on left hand side. View to skyline with distinctive tower is locally distinctive*” as stated in Meath County Development Plan 2021-2027.

The south-eastern offline route alignment traverses LCA 10 – The Ward Lowlands, which is of high landscape sensitivity and low landscape value. It contains open fields, retail and business parks north of Ashbourne and the M2 motorway. Both offline route sections avoid the majority of residential properties in the study area apart from a cluster of residences located along the R155, which will be located adjacent to the proposed route alignment of this option.

In comparison to Route Option E-1, Route Option E-2 utilises a longer section of the existing N2 corridor which will require online widening before going offline. The longer online widening section will reduce landscape and visual effects in the study area as it confines these to the existing N2 road corridor. The offline section is shorter and closer to the existing N2 corridor. While it will affect a slightly higher number of residential properties along the R155 to either side of the route alignment, the offline alignment will be located further east and further away from the viewshed of protected View 73, thus reducing the visual effects slightly.

7.11.5 Noise and Vibration

Route Option E-1 is considered the preferred option from a noise and vibration perspective when compared to Route Option E-2.

The highest PIR score is associated with Route Option E-2 (140) compared to Route Option E-1 (125). The high PIR associated with Route Option E-2 is likely a result of the large section of Route Option E-2 which utilises the existing N2 alignment and its closer proximity to the existing N2. The number of properties likely to require noise mitigation is also higher for Route Option E-2 when compared to Route Option E-1. The differences between Route Options E-1 and E-2 are presented in Table 7-62.

Table 7-62 – Noise & Vibration Assessment Summary

Assessment Criteria	Route Option		
	E-1	E-2	Difference between Route Options E-1 and E-2
PIR	125	140	E-2 +15
No. of Properties Likely to Require Noise Mitigation	22	29	E-2 +7
No of Properties likely to experience a Major Negative Impact	9	6	E-1 + 3
No of Properties likely to experience a Moderate Negative Impact	21	21	0
No of Properties likely to experience a Major Positive Impact	5	2	E-1 + 3
No of Properties likely to experience a Moderate Positive Impact	13	9	E-1 + 4

7.11.6 Air Quality

Route Option E-1 is considered the preferred option from an air quality perspective as the exposure index for both NO_x and PM₁₀ for both 2030 and 2040 are higher along Route Option E-2. However, the differences in assessment do not justify an increased marking and both are considered minor or slightly positive.

When the differences between Route Options E-1 and E-2 are considered, the exposure index for both NO_x and PM₁₀ for both 2030 and 2040 are higher along Route Option E-2. This is likely due to the closer proximity of Route Option E-2 to the existing N2 and the ribbon of residential properties in proximity to the existing N2. An additional 3 receptors occur within 50 m of Route Option E-2. Route Option E-2 is considered to be the least beneficial of the two options in terms of air quality exposure index. The differences between Route Options E-1 and E-2 are presented in Table 7-63 and Table 7-64.

Table 7-63 - Results of Index of Overall Exposure 2030

Route Option	AADT (2030)	Route (km)	Length	No. Receptors (0 - 50m)	NO _x Index	Exposure PM ₁₀ Index	Exposure Index
Route Option E-1	23,400	6.874		9	53,957		1,504
Route Option E-2	23,300	6.857		12	71,743		1,998
Diverged Section Between Route Options E-1 and E-2	Difference of 100 between routes	Difference of 0.017 between routes		Difference of 3 receptors between routes	Difference of 17,786 Exposure between routes	Difference of NO_x Index between routes	Difference of 494 between routes

Table 7-64 - Results of Index of Exposure 2040

Route Option	AADT (2040)	Route (km)	Length	No. Receptors (0 - 50 m)	NO _x Index	Exposure PM ₁₀ Index	Exposure Index
Route Option E-1	25,500	6.874		9	58,800		1,639
Route Option E-2	25,300	6.857		12	77,901		2,170
Diverged Section Between Route Options E-1 and E-2	Difference of 200 between routes	Difference of 0.017 between routes		Difference of 3 receptors between routes	Difference of 19,101 Exposure between routes	Difference of NO_x Index between routes	Difference of 531 between routes

7.11.7 Climate

When looking at the diverged sections of Route Options E-1 and E-2 it is apparent that there is a minimal difference in the length of the routes, the predicted AADT and the CO₂ Emission Rate (tonnes/yr). The differences between Route Options E-1 and E-2 are presented in Do Min/Do Nothing

Table 7-27 Table 7-65 and Table 7-66.

Considering the impact on climate, no route option will result in a positive operational phase impact to climate compared to the Do Minimum Scenario on the current alignment due to the longer length and higher projected traffic volumes. However, there is no account for congestion, which has the potential to increase emissions, included in the Do Minimum Scenario.

Table 7-65 - Climate Impact of Operational Traffic 2030

Route Option	AADT (2030)	Route Length (km)	CO ₂ Emission Rate (tonnes/yr)
Route Option E-1 (entire route)	23,400	6.874	16,648
Route Option E-2 (entire route)	23,300	6.857	16,553
Diverged Section Between Route Options E-1 and E-2	Difference of 100 between routes	Difference of 0.017 between routes	Difference of 95 between routes

Table 7-66 - Climate Impact of Operational Traffic 2040

Route	AADT (2030)	Route Length (km)	CO ₂ Emission Rate (tonnes/yr)
Route Option E-1 (entire route)	25,500	6.874	18,142
Route Option E-2 (entire route)	25,300	6.857	17,973
Diverged Section Between Route Options E-1 and E-2	Difference of 200 between routes	Difference of 0.017 between routes	Difference of 169 between routes

7.11.8 Population and Human Health

When focusing on the area of divergence between Route Options E-1 and E-2 in terms of the initial Stage 2 route alignments, Route Option E-1 is unlikely to require the demolition of any residential properties, whereas Route Option E-2 may potentially require the partial acquisition of a residential property. In terms of the properties located within the wider route corridors, Route Corridor E-1 will potentially require the demolition of 2 residential properties and 1 commercial property, and the partial acquisition of 5 residential properties and 1 commercial property. Route Corridor E-2 will potentially require the demolition of 10 residential properties and 1 commercial property, and the partial acquisition of 3 residential properties. However, it should be noted that the wider corridors are at least 200m in width, therefore the final alignment design will avoid the majority of these properties where possible.

Both options have the potential to lead to amenity impacts on local residents and there is potential for noise and air quality effects to be experienced by local residents.

7.11.9 Cultural Heritage

Route Option E-2 is considered the preferred route option from a cultural heritage point of view as it utilises a larger section of the existing N2 corridor, and therefore will impact on the least amount of previously undisturbed greenfield land.

Both options have the potential to have a direct impact on only one identified cultural heritage site (CH 65). Route Option E-1 will impact upon a larger area of previously undisturbed greenfield area and has the potential to have a direct impact on an additional identified cultural heritage site (CH 59). Route Option E-1 will potentially also have a moderate direct impact on AAP 12, and a moderate to profound negative impact on two AAPs (AAP 2 and 14).

7.11.10 Material Assets – Agriculture

When looking at the diverged sections of Route Options E-1 and E-2, the land take required for Route Option E-2 is less than that required for Route Option E-1 as Route Option E-2 has a shorter length requiring offline construction. In terms of the initial Stage 2 route alignments, Route Option E-2 affects 2 additional land-parcels in comparison to Route Option E-1. The initial alignment for Route Option E-2 also avoids impacts on highly sensitive land parcels whereas Route Option E-1 has an impact on 2 highly sensitive enterprises, both of which are equine holdings.

In terms of the wider route corridors, there is one highly sensitive enterprise within the Route Option Corridor for E-2, which is the Ashbrook Garden Centre. Within the corridor for Route Option E-1, there are 3 farmyards (one highly sensitive) and the corridor for Route Option Corridor E-2 affects 1 farmyard.

Route Option E-2 is therefore considered as the preferred option in terms of agronomy as it is predicted to have the lowest overall impact.

7.11.11 Material Assets - Non-Agriculture

Route Options E-1 and E-2 are considered comparatively similar for the reasons outlined below.

Utilities

In terms of utilities within the area of divergence between Route Options E-1 and E-2, the most significant constraint is the ESB 110kV Overhead Line which traverses the study area. The initial Stage 2 route alignments of both Options E-1 and E-2 cross this constraint so any diversion requirements will likely be similar. It should be noted however that Baltrasna 110kV substation is located within the wider corridor for Route Option E-1, but the final alignment design will likely avoid directly impacting this site.

In terms of other utilities, there are Eir underground telecom ducts along the existing R155 and N2, Route Option E-2 may have a greater impact on these ducts due to the longer section of online widening, although only minor diversions will likely be required. There are existing Irish Water Mains along the R155 and the N2, although not on the section of the N2 within the corridor of Route Options E-1 or E-2. There are also several ESB Medium Voltage Overhead Lines which will be impacted by both Route Options E-1 and E-2.

Residential Properties

When focusing on the area of divergence between Route Options E-1 and E-2 in terms of the initial Stage 2 route alignments, neither Route Option E-1 nor E-2 will require the demolition of any residential properties. Although it is noted that the alignment for Route Option E-2 will require the existing driveway entrance of one property to be altered.

The wider route corridor was also considered to determine potential impacts on residential properties should the current alignment be altered within the corridor at the next phase. Where the wider route corridor was considered, Route Corridor E-1 will potentially require the demolition of 2 residential properties and 1 commercial property, and the partial acquisition of 5 residential properties and 1 commercial property. Route Corridor E-2 will potentially require the demolition of 10 residential properties and 1 commercial property, and the partial acquisition of 3 residential properties. The partial acquisition of residential properties may result in changes to the property access roads.

Summary

Overall, in cognisance of the potential impacts on existing utilities, and no acquisition of residential properties within the divergent sections based on the initial Stage 2 route alignments, a score of Moderately Negative – 2 is applicable to both options.

A number of residential properties are within the wider route corridor for both options. However, it should be noted that the wider corridors are at least 200m in width, therefore the final alignment design will avoid the majority of these properties where possible.

7.11.12 Waste

Route Options E-1 and E-2 are considered comparatively similar for the reasons outlined below.

A preliminary cut / fill analysis indicated the requirement of fill material to be brought in for Route Options E-1 and E-2, both route options will generate a cut volume for disposal as waste. However, as Route Option E-2 utilises a longer section of the existing N2 alignment the fill volume required for Route Option E-2 is less than that required for Route Option E-1 (555,960 m³ and 607,972 m³ of imported material respectively).

Both Route Options E-1 and E-2 traverse alluvial deposits and lacustrine sediments at the Hurley river floodplain, some of which may have to be disposed of as waste. However, as Route Option E-2 utilises a larger section of the existing N2 corridor through this area, Route Option E-2 will potentially generate less alluvial deposits and lacustrine sediments waste.

As Route Option E-2 utilises a larger section of the existing N2 corridor, a greater quantity of engineered fill is expected along this route option. Engineered fill may be a source of contamination due to fuel / oil spillages relevant to road usage. For this reason, contaminated material is more likely to be encountered and will have to be disposed of as waste where sections of online widening occur.

7.11.13 Summary

The localised comparison of Route Options E-1 and E-2 in terms of the environmental sub-criteria is summarised in Table 7-67.

As this assessment only focused on the diverged sections in isolation, it has resulted in slightly different scoring in comparison to the initial appraisal during which the full route corridors were assessed.

Initially Route Option E-2 performed better in terms of Biodiversity, Water, and Land & Soil, whereas Route Option E-1 performed better in terms of Noise & Vibration.

After considering the diverged sections in isolation, Route Option E-2 performed better in terms of Biodiversity, Water, Land & Soil, Landscape & Visual, Cultural Heritage and Material Assets – Agriculture, whereas Route Option E-1 only performed better in terms of Noise & Vibration.

Table 7-67 - Localised Comparison of Options E1 & E2 – Environmental Criteria

	Route E-1	Route E-2
Environment		
Biodiversity	2 Moderately Negative	3 Minor or Slightly Negative
Water	1 Major or Highly Negative	3 Minor or Slightly Negative
Land and Soil	2 Moderately Negative	3 Minor or Slightly Negative
Landscape & Visual	2 Moderately Negative	3 Minor or Slightly Negative
Noise and Vibration	3 Minor or Slightly Negative	2 Moderately Negative
Air Quality	5 Minor or Slightly Positive	5 Minor or Slightly Positive
Climate	4 Not Significant or Neutral	4 Not Significant or Neutral
Population and Human Health	2 Moderately Negative	2 Moderately Negative
Cultural Heritage	2 Moderately Negative	3 Minor or Slightly Negative
Material Assets - Agriculture	2 Moderately Negative	3 Minor or Slightly Negative
Material Assets - Non-Agriculture	2 Moderately Negative	2 Moderately Negative
Waste	2 Moderately Negative	2 Moderately Negative
Sub-Total	29	35

7.12 Emerging Preferred Option Recommended for Stage 3

Based on the main stage 2 assessment as summarised in Table 7-60 and Table 7-61 above, Route Options E-1 and E-2 performed the best. Therefore, a further detailed and localised environmental assessment was undertaken to consider further refinement of their comparative impacts.

Based on the results of the localised environmental assessment as summarised in Table 7-67 above, Route Option E-2 was preferred over Route Option E-1 when the diverged sections between the Hurley river floodplain and the agricultural lands to the north-west of the R155 were examined. This is on the basis that Route Option E-2 performed better in terms of Biodiversity, Water, Land & Soil, Landscape & Visual, Cultural Heritage and Material Assets – Agriculture, whereas Route Option E-1 only performed better in terms of Noise & Vibration.

This finding, taken in conjunction with the Overall Stage 2 Assessment Matrix as shown in Table 7-60 and Table 7-61, confirms Route Option E-2 as the Emerging Preferred Option for the N2 Rath Roundabout to Kilmoon Cross Scheme. This will be considered in greater detail during Stage 3 of the Option Selection Process.

As noted previously, the individual components of the Public Transport Option, such as the provision of a Park & Ride or similar facility, may be considered later in the project development as standalone complementary measures to be incorporated with Route Option E-2 as the Emerging Preferred Option for the scheme.

8. Stage 3 – Preferred Option

The option assessment process seeks to narrow down the number of options through a structured appraisal process across the following three stages:

1. Preliminary Option Assessment;
2. Project Appraisal Matrix;
3. Selection of a Preferred Option;

Following on from the Project Appraisal Matrix, this section represents the selection and refinement of a preferred option. It should be noted that a more detailed appraisal will be carried out on the preferred option during the next phase of the project development.

8.1 Emerging Preferred Option

During Stage 2, assessments were carried out of the options under consideration against the six Common Appraisal Framework (CAF) criteria as part of the Project Appraisal Matrix. Based on the main Stage 2 assessment, Route Options E-1 and E-2 performed the most favourably. These two options were subject to a further detailed and localised environmental assessment to consider further refinement of their comparative impacts.

Route Option E-2

Based on the findings of this assessment, Route Option E-2 was preferred over Route Option E-1 when the diverged sections between the Hurley river floodplain and the agricultural lands to the north-west of the R155 were examined. Route Option E-2 was therefore confirmed as the Emerging Preferred Option for the N2 Rath Roundabout to Kilmoon Cross Scheme.

Public Transport Option

The alternative option which performed the most favourably during the Stage 2 assessment was the Public Transport option. Whilst the Public Transport Option was considered as a combination of components (bus lanes and Park & Ride facility) for the purposes of the assessment process, the individual components of the Public Transport Option were subsequently considered as standalone complementary measures to be incorporated with Route Option E-2 as the Emerging Preferred Option.

- Public Transport Elements - Bus Lanes

The M2/N2 corridor has the lowest level of daily inbound services out of the Dublin radial corridors, which is reflective of the population that is served by the corridor. As there are currently a limited number of bus services operating on the M2/N2, it is unlikely that bus lanes will be warranted on the section of the N2 between Rath Roundabout and Kilmoon Cross, or that it would result in significant behavioural change along the corridor.

It is noted that the provision of a high-quality dual carriageway connection from the M2 at Rath to the existing N2 and R152 at Kilmoon would significantly improve journey time reliability for road based public transport. The provision of bus lanes as a complementary measure to Route Option E-2 would not provide significant additional benefits and has therefore been discounted from further consideration.

- Public Transport Elements - Park & Ride / Park & Share

The provision of a Park & Ride or similar facility as a complementary measure to Route Option E-2 has the potential to offer significant additional benefits to the local communities, as well as encouraging modal shift towards environmentally sustainable transport modes. A Park & Ride or similar facility will therefore be considered in further detail during Phase 3 – Preliminary Design as a complementary measure alongside Route Option E-2. Consideration will be given to the optimum location and scale of such a facility, in cognisance of the National Transport Authority (NTA) Strategy for the Greater Dublin Area, and it will be considered in more detail if this complementary element will sit directly within this scheme or be delivered separately.

Indicative Layout of the Emerging Preferred Option

Following the conclusion of the Stage 2 Project Appraisal Matrix, a number of refinements were undertaken to the Emerging Preferred Option as part of the iterative process required by the TII PMGs. These refinements are aimed at considering the engineering elements of the option in more detail than is possible at stage 2 when comparing multiple corridors.

These refinements are outlined in more detail in Section 8.2, and include the consideration of how the proposed option will interact with the existing N2 for the section where the corridor follows the existing road, the development of the junction corridor strategy at the northern and southern tie-ins, as well as the active travel strategy for the residual road network.

A revised indicative layout of the Emerging Preferred Option was developed which incorporated these refinements, which are subject to consideration and will not be finalised until later in the next phase (Phase 3 Preliminary Design).

The refinements are illustrated in the following figures which were also used as part of the information provided at Public Consultation 3:

- Figure 8-1 - Emerging Preferred Option Layout, with OS Mapping, as well as Drawing CH-0055 in Appendix 4.
- Figure 8-2 - Emerging Preferred Option Layout, with Aerial Imagery, as well as Drawing CH-0056 in Appendix 4.
- Figure 8-3 - Emerging Preferred Option Layout, with Constraints, as well as Drawing CH-0057 in Appendix 4.

It should be noted that the environmental evaluation undertaken for Option E-2 at Stage 2 has not been revisited at this stage and further extensive environmental assessment will be undertaken as the designs develop and are finalised during Phase 3.

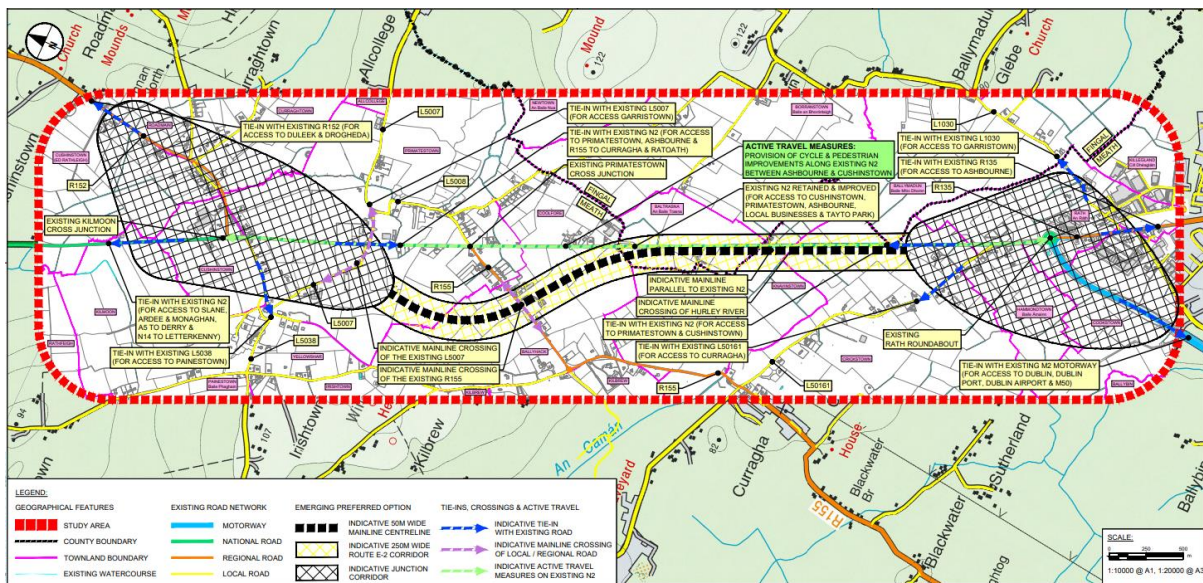


Figure 8-1 - Emerging Preferred Option Layout - OS Mapping

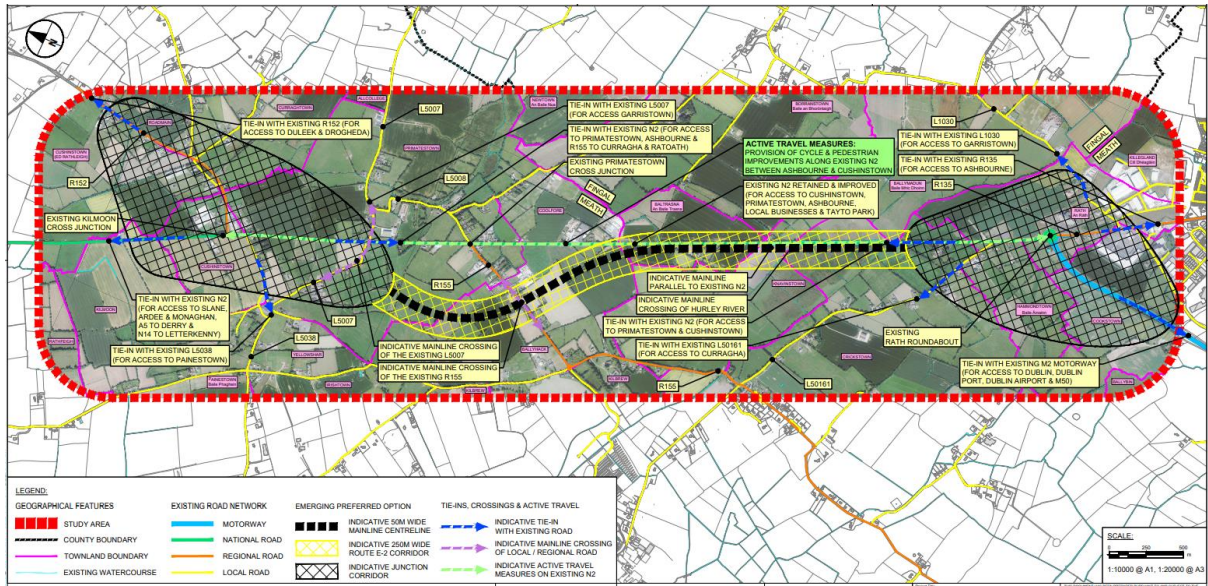


Figure 8-2 - Emerging Preferred Option Layout – Aerial Imagery

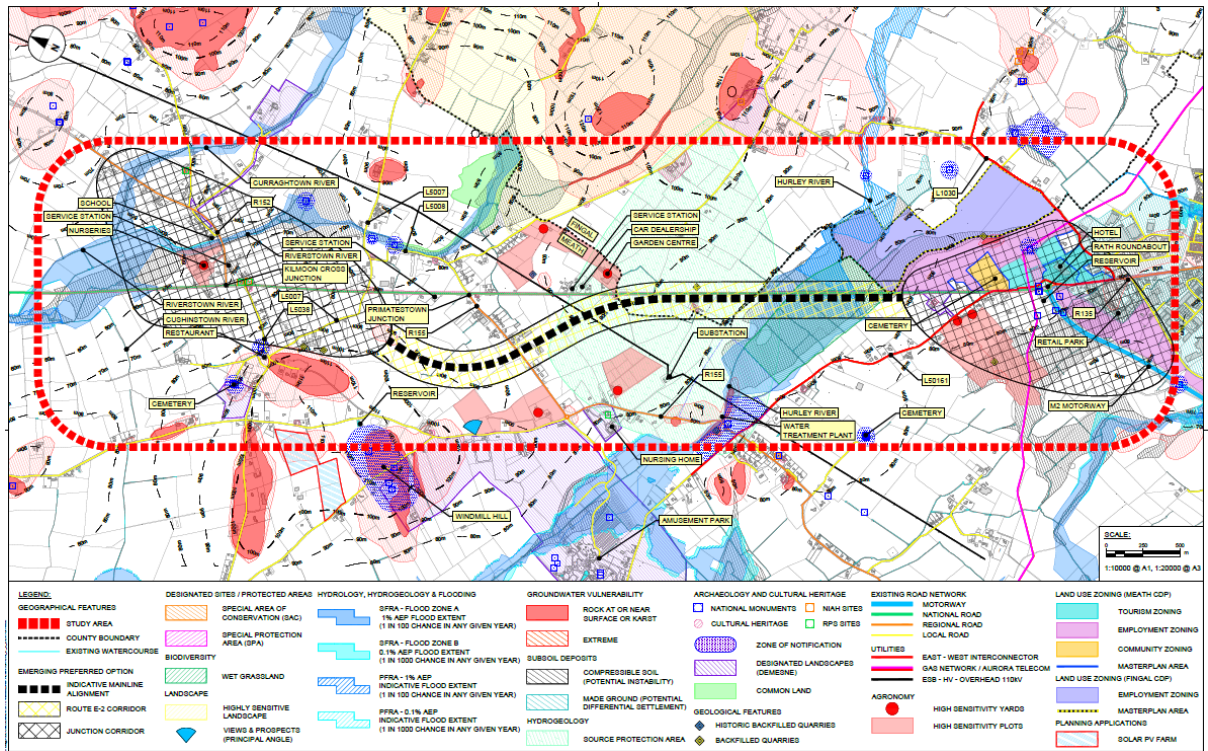


Figure 8-3 - Emerging Preferred Option Layout - Constraints

8.2 Refinements to Emerging Preferred Option

Further refinements were considered as part of the development of the emerging preferred option during Stage 3. This included the following:

- An incremental analysis of the mainline cross-section based on the updated traffic model outputs.
- An analysis of a potential intermediate junction between the southern tie-in of the scheme at Rath and the northern tie in of the scheme at Kilmoon.
- Further consideration of the type of junctions to be implemented at each location.
- Further consideration of the interaction of the Emerging Preferred Option with the existing N2.
- Review of initial side road strategy to maintain connectivity across the local road network.
- Review of initial access strategy to maintain access to residential, agricultural and commercial properties.
- Further consideration of the potential active travel strategy.
- Further optimisation of mainline alignment
- Further refinement of the corridor for the Emerging Preferred Option.

8.2.1 Cross-Section of Mainline

To select an appropriate cross-section the Stage 2 assessment, the future year traffic flows were estimated using TII Central Growth Factors for Meath. These estimations assumed an opening year of 2030 and calculated the traffic flows for the opening year plus 15 years, so the traffic flows for 2045.

These future year traffic estimates were substantially above the capacity of 20,000 AADT for a Type 2 Dual Carriageway outlined for level of Service D in TII Publications DN-GEO-03031. Therefore, the assumed cross-section for the preliminary mainline alignments developed within the corridors of each route option at Stage 2 was a Type 1 Dual Carriageway cross-section. The cross-section of a Type 1 Dual Carriageway is the same as that of a Standard Dual Carriageway Motorway, although it has a design speed of 100km/h rather than 120km/h for a Motorway.

It should be noted that TII Publications DN-GEO-03031 states that the capacity figures are indicative for general guidance, and that the appropriate cross section shall be selected with reference to the TII Project Appraisal Guidelines. In line with this guidance an incremental analysis was undertaken following the completion of the traffic model to identify the optimum cross section of the emerging preferred option.

This incremental analysis focused on the ability of the road to effectively perform its role in moving people and goods. In this regard the traffic flows have been assessed against % of HGV and buses on the corridor and the theoretical capacities that would provide a Level of Service (LOS) D based on TII standards. The traffic profile of the N2 is also taken into consideration, along with safety considerations when evaluating the junction type.

8.2.1.1 Demand Evaluation

Demand profiles are a useful means in evaluating the variation of traffic flow across the day on specific sections of the road. For the purpose of demonstrating the daily flow variation, 24 hr data from a survey (ATC11) undertaken in early December 2019 was used. The data is representative of traffic along the N2, approximately 400m south of Kilmoon Cross. Figure 8-4 demonstrates the observed daily demand profile with the highest hourly peak in the northbound direction during the PM peak.

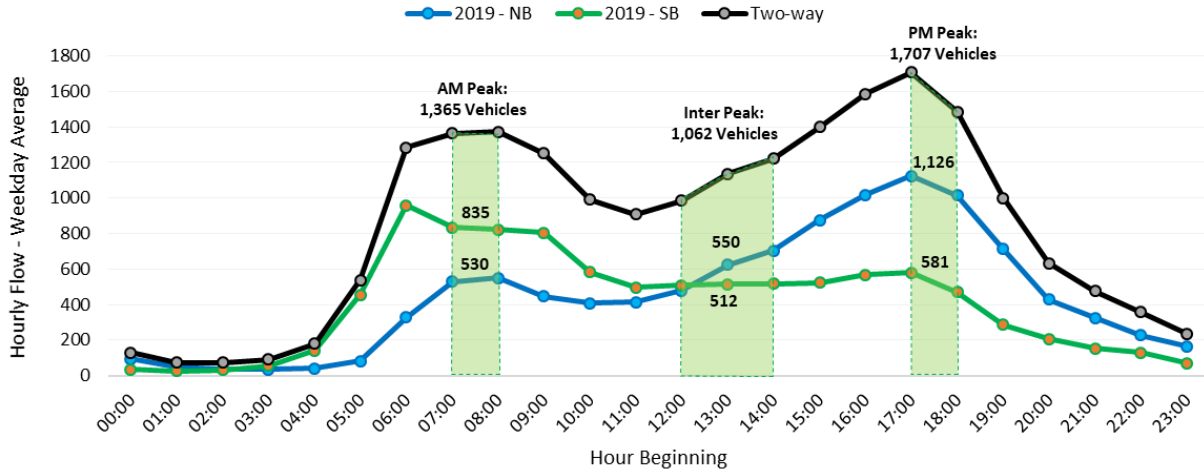


Figure 8-4 - Observed Demand on N2 – Derived from 2019 Traffic Surveys (400m south of Kilmoon)

The flow profile in the morning shows the peak hour occurring during the morning peak period between 6:00 and 9:00. It should be noted that the spread of traffic at this location could be related to delays at the signalised junction at Primatestown. Given the future year modelling focuses on two periods of the day (AM and Interpeak), it is important to understand how future AADT projections are likely to spread across the day. Figure 8-5 shows the proportional hourly demand on this section of the N2.

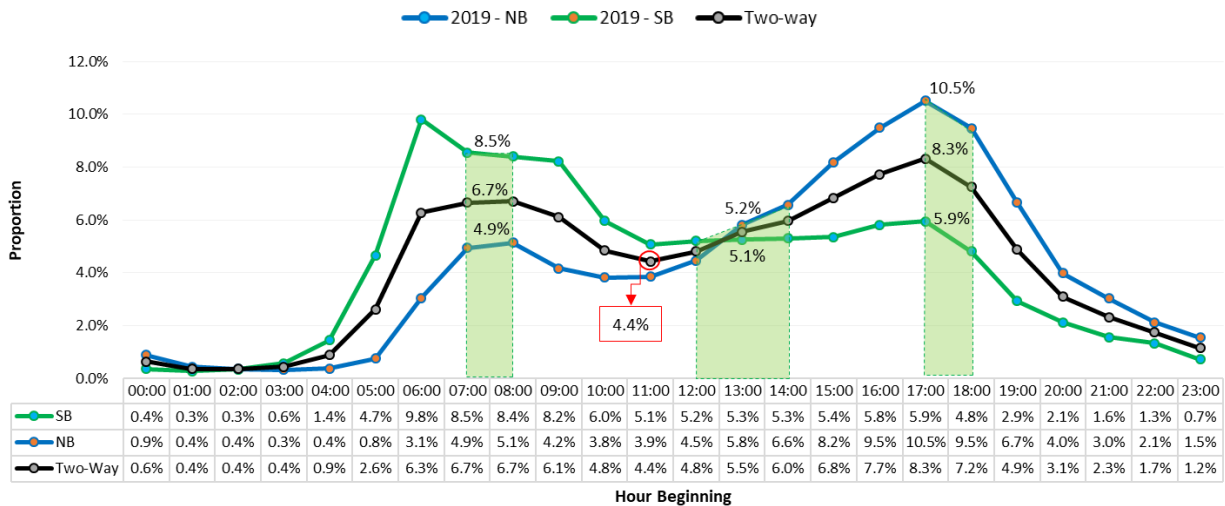


Figure 8-5 - N2 Proportion of 'Weekday Hourly Flow' to '24h Flow' - Base Year 2019

The proportion of daily two-way demand in the base year varies between 6.7% in the AM peak to 5.2% in the Inter Peak. The lowest proportion of two-way traffic (4.4% of daily total) is experienced during the 11:00 – 12:00 period. The PM peak carries some 8.3% of the daily two-way demand and over 10% of the daily demand in the northbound direction.

When this demand profile is applied to future year 2040 scenario based on the central growth demand projections, the N2 will carry some 2,400 vehicles per hour during the PM period which is above the safe operational capacity of a single carriageway (~1,850 vehicles per hour). This is shown in Figure 8-6. These high peak flows will increase the likelihood of potential breakdowns which would erode the level of service for all users including freight and buses in a single carriageway scenario.

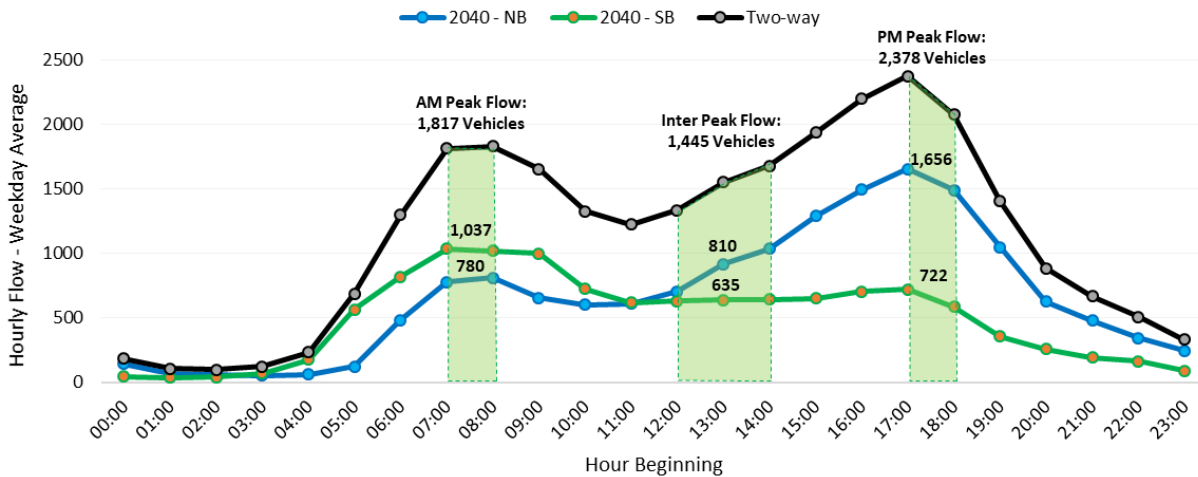


Figure 8-6 - N2 Proportion of 'Weekday Hourly Flow' to '24h Flow' – 2040 Scenario

To provide context, it should be noted that the N2 is heavily used by freight traffic currently with up to 25% of traffic being represented by HGVs in some periods, particularly before the AM peak and the interpeak period. This is shown in Figure 8-7 and explained in more detail below:

- Overnight, there are around 20 HGVs per hour in each direction. Due to the low overall traffic numbers during these periods, HGVs make up over 30% of all traffic overnight.
- There is a high number of HGVs travelling southbound between 5:00 and 7:00, with up to 180 southbound HGVs per hour, this makes up around 20% of all traffic. The HGVs likely use this section of the N2 at these times to avoid the peak congestion later in the morning.
- During the AM Peak, between 7:00 and 8:00, there are around 120 southbound HGVs and 60 northbound HGVs per hour. Due to the high overall traffic numbers during these periods, HGVs make up around 10% of all traffic.
- During the Inter Peak, between 12:00 and 14:00, there are around 120 HGVs per hour in each direction, this makes up around 25% of all traffic.
- During the PM Peak, between 17:00 and 18:00, there are around 60 southbound HGVs and 100 northbound HGVs per hour. Due to the high overall traffic numbers during these periods, HGVs make up around 10% of all traffic.

In a single carriageway scenario with limited potential for safe overtaking, this would likely result in all vehicles being held to HGV speeds which might erode some of the benefits of any intervention.

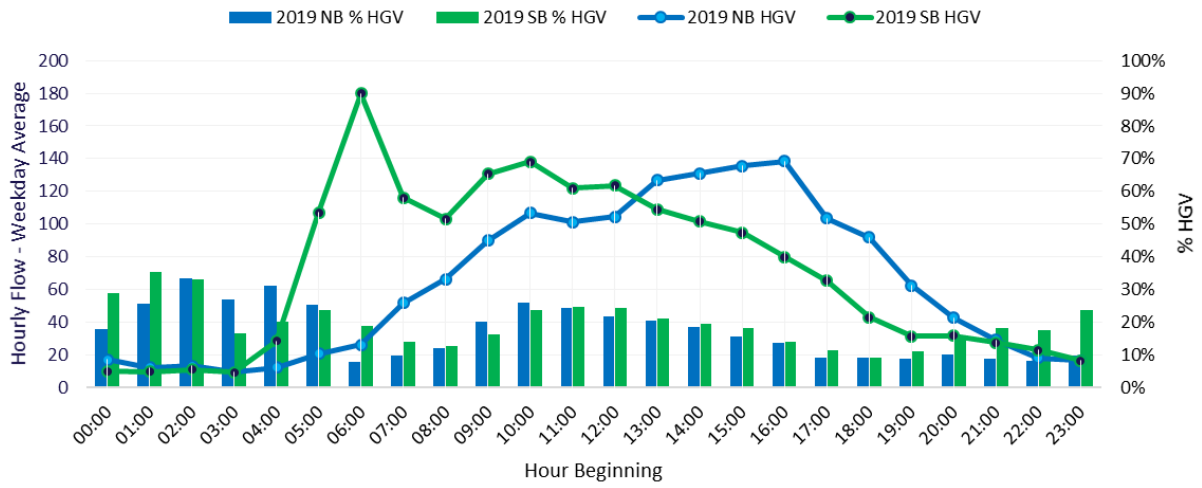


Figure 8-7 - N2 HGV Demand and % HGV - Base Year 2019

8.2.1.2 Capacity Assessment

It is acknowledged that the value of capacity indicators based on AADT varies, given that the performance of a road under this indicator is influenced by the 'peakiness' of the traffic flow profile. Table 8-1 compares the predicted traffic volumes for the emerging preferred option to the theoretical capacities at which the road will be functioning at a LOS D for different cross-section types, as well as the proportion of Volume to Capacity (V/C) for each road type.

Table 8-1 – Cross-Section Assessment on N2

Cross-Section*	Capacity* (AADT) for Level of Service D	Design Year AADT (2040 CG**)	V/C
Type 1 Single, (7.3m)	11,600		258%
Type 3 Dual, Divided 2+1 lanes (7.0m + 3.5m), Primarily for retro fit projects	14,000		214%
Type 2 Dual, Divided 2+2 Lanes (2*7.0m)	20,000	29,960	150%
Type 1 Dual, Divided 2+2 Lanes (2*7.0m)	42,000		71%
Motorway, Divided 2+2 Lanes (2*7.0m)	52,000		58%

* Retrieved from TII DN-GEO-03031 – Table 6.1: Recommended Rural Road Layouts

** Central Growth - Refer to the Traffic Assessment Chapter for further information

As shown in Table 8-1, a Type 1 single carriageway cross-section is suggested for flows of up to 11,600 AADT, above which a Dual Carriageway should be considered. For online upgrades, Type 3 and Type 2 Dual Carriageway cross-sections can also extend the capacity to 20,000 AADT, above which a Type 1 Dual Carriageway cross-section should be considered. It should be noted that roads would be capable of carrying traffic above these theoretical capacities; however, the LOS would experience a decrease corresponding to the increase in traffic volumes.

A V/C ratio of not greater than 75% would be required for the design speeds of greater than 60 km/h¹¹. Given the target in the National Planning Framework (NPF) to improve average journey times to an average inter-urban speed of 90kph, a number of cross-section options can be ruled out under this criterion – namely Types 1 Single, Type 3 Dual and Type 2 Dual as the V/C ratio for these range from 150-258% and they cannot cater for the volumes estimated AADT for 2040 and beyond.

The Type 1 Dual Carriageway cross-section provides capacity for an AADT up to 42,000 AADT that will be able to cater for the demand predicted for 2040 (29,960) and beyond. It should be noted that the Type 1 Dual Carriageway cross-section also provides resilience for lane closures or unexpected surges in the traffic demand.

The next road type considered in this note was a Standard Motorway (Divided 2+2 Lanes), which provides a theoretical capacity of 52,000. This would result in a V/C ratio of 58% under 2040 traffic conditions; it is therefore considered that this capacity would be excessive in this instance. However, as the cross-section of a Type 1 Dual Carriageway is the same as that of a Standard Dual Carriageway Motorway, a Type 1 Dual Carriageway would provide the flexibility to upgrade this section of road a Motorway in future if necessary.

In order to maintain a LOS D, provide resilience for unforeseen events, provide capacity for reliable bus journey times, serve freight movements and to facilitate a smooth traffic flow for the design year of 2040, consideration of Type 1 Dual Carriageway cross-section would be recommended based on this criterion. It should be noted that this cross-section has not been confirmed as the final design solution and will be subject to further design refinement and optioneering at Phase 3.

¹¹ TII - DN-GEO-03060, 4.2.2. Stage 2 – Consider Layout/Size of Junction Type

8.2.1.3 Costs and Benefits analysis

Costs and benefits for each cross-section type were examined and are presented in Table 8-2. The difference in benefits allows for the varying performance of each road type based on speed-flow curves and variance in safety performance.

The Motorway cross-section has the highest benefit to cost ratio from all four cross-section types, this provided a Benefit to Cost Ratio (BCR) of 3.7 which aligns with that of Route Option E-2 at Stage 2. Though Motorway attains the highest economic benefits, wider considerations such as design parameters, land-take, speed profiles, junction separation and environmental emissions may discourage this cross section in future design stages.

The Present Value of Cost (PVC) remained the same for both Type 1 Dual Carriageway and Motorway, as the cross-section and applicable junctions are essentially the same. However, the Type 1 Dual Carriageway cross-section will provide slightly lower Present Value of Benefits (PVB) than a Motorway, as there are less economic benefits due to the 100kph speed limit of a Type 1 Dual Carriageway.

The benefits from Type 1 Dual Carriageway cross-section are 25% higher than Type 2 Dual Carriageway cross-section, but due to higher costs they have relatively similar benefit to cost ratio of 3.2.

Table 8-2 – Benefits by Typical Cross-Section Type (€000's, 2011 values)

Type Considered	Type 1 Single	Type 2 Dual	Type 1 Dual	Motorway
Present Value Cost (PVC)	42,000	45,000	54,000	54,000
Benefits:				
Consumer	10,000	20,000	25,000	27,000
Other	12,000	24,000	30,000	33,000
Business	18,000	36,000	42,000	52,000
Indirect Taxation	-	-	-	-
Greenhouse Gases	-	-	-	-
Safety	4,000	2,000	250	1,000
Residual	36,000	61,000	75,000	87,000
Present Value Benefit (PVB)	80,000	143,000	172,000	200,000
Net Present Value (NPV)	38,000	98,000	118,000	146,000
Benefit-Cost Ratio (BCR)	1.9	3.2	3.2	3.7

8.2.1.4 Summary

Overall, the average workday demand profile of the N2 demonstrates relatively high traffic flow during the peak periods which will rise above safe operational capacity of a single carriageway by 2040 in the PM peak in particular.

This combined with AADT indicators suggest that the Type 1 Dual Carriageway cross-section, as shown in Figure 7-1, is preferred from a capacity point of view. A Type 1 Dual Carriageway cross-section will also provide significant benefits in relation to resilience, safety and reliability for buses and freight.

A Benefit to Cost Ratio (BCR) of 3.2 is anticipated for the project, where a Type 1 Dual cross section is proposed for this section of the N2 – this continues to deliver a strong return on investment.

It is finally noted that while a strong economic outcome is determined from the assessment, a series of wider economic benefits (WEB), including non-monetisable benefits, are also expected from the progressive scheme. It should be noted that this cross-section has not been confirmed as the final design solution and will be subject to further design refinement and optioneering at Phase 3.

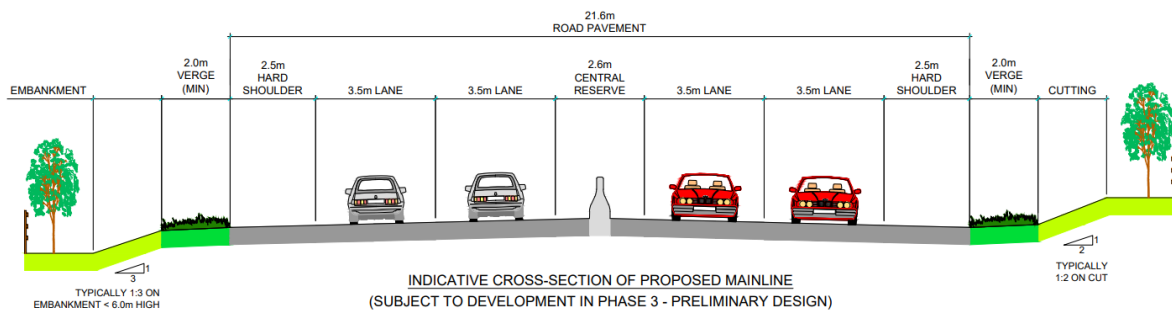


Figure 8-8 - Type 1 Dual Carriageway Cross-Section (Based on TII Publications CC-SCD-00006)

8.2.2 Junction Strategy

8.2.2.1 Number of Junctions

For the Stage 2 assessment the assumption was that for each route option there would be only two junctions, one at the southern tie-in at Rath and another at the northern tie-in at Kilmoon. There would be no intermediate junctions for any of the options, and all local and regional roads will be bridged over or under the mainline of the road. Further consideration was given to the junction strategy following the completion of the traffic model, with an analysis undertaken on a potential intermediate junction between Rath Roundabout and Kilmoon Cross. The analysis compared the emerging preferred option which proposes full grade separation throughout, to a variant of the emerging preferred option with an intermediate junction modelled as an at-grade roundabout at the intersection between the emerging preferred option and the R155.

An intermediate grade separated junction was also considered at this location. In terms of spacing required between successive junctions, the desirable minimum weaving length is 2km for Type 1 Dual Carriageway national roads, as per TII Publication DN-GEO-03060. The weaving length is measured as shown in Figure 8-9. There are other aspects to be considered such as the slip road, nose, auxiliary lane and taper for merges and diverges which necessitate additional spacing requirements. As the distance between the proposed intermediate junction at Primatestown and the Kilmoon cross junction is only approximately 2km, this was ruled out as a feasible option. A compact grade separated junction was also ruled out at this location as this is not a permitted junction type for a Type 1 Dual Carriageway cross-section, as per TII Publication DN-GEO-03060.

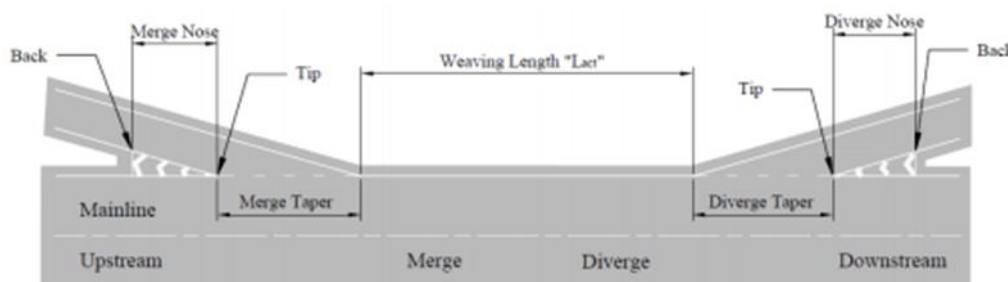


Figure 8-9 - Weaving Length for Grade Separated Junction (TII Publications DN-GEO-03060)

Modelling of the scheme with an at-grade roundabout junction at Primatestown suggested that the intermediate junction will relocate some traffic from local and regional roads west of the current N2 (in the vicinity of the R155, Curraghera, Tayto Park, and The Maples) onto the proposed scheme at an earlier opportunity. During the AM peak hour, the proposed scheme will have an additional 220 northbound vehicles and 120 southbound vehicles, respectively 42% and 5% increases. These increases would be as a result of improved accessibility for the local area, and particularly traffic moving between local areas west of the existing N2 travelling southbound towards Dublin, and via the R155 towards Duleek / Drogheda in the northbound direction.

Conversely, the intermediate junction will represent an additional 'conflict point' on the proposed scheme leading to travel time delays on the national network, increased environmental emissions (carbon & tailpipe, noise and vibration) and increased vehicle operating costs (VOC). An assessment of the intermediate junction's impedance has been undertaken by assessing the speed change cycles – the action of a vehicle slowing from the posted speed limit (100km/h), negotiating the at-grade roundabout junction (15km/h) and accelerating back up to the posted speed limit. International transport benefit guidance on speed change cycles¹² has determined that the daily impact from the intermediate junction will be the loss of around 147 hours of road users' time and an indirect VOC of almost €3,000 (representing heightened fuel costs, and wear and tear of users' vehicles). An intermediate junction will also increase public transport journey times and reduce its attractiveness.

¹² *New Zealand Transport Agency, Monetised benefits and costs manual. The fleet makeup is considered approximately similar across the jurisdictions of New Zealand and Ireland, and therefore the speed change cycle assessment should be applicable for comparative assessment purposes.*

Capacity of the surrounding network has been assessed from the model and no roads are expected to be unduly affected by the presence or absence of an intermediate junction. In relation to safety, the presence of an intermediate junction, particularly at-grade, would introduce additional conflicts locally. However, it may be put forward that the majority of the crossing or turning manoeuvres would instead take place at the proposed junction at the northern tie-in of the scheme at Kilmoon in the absence of an intermediate junction. As the scheme design progresses, in particular, development of specific junction layouts, safety aspects of these junctions will continue to be reviewed on an ongoing basis.

The specific site of Tayto Park has been considered for accessibility due to its local scale. Where no intermediate junction is provided access will continue to be maintained from the northern or southern extents of the scheme (near Rath or Kilmoon). Providing an intermediate junction would improve access to the site with a shorter journey time from the N2 to the entrance but would come at significant detriment to the significantly greater traffic flows travelling on the N2 for reasons independent of Tayto Park. To put it into context, the weekday access flow to the park is ~1,600 vehicles whereas the weekday average daily flow is forecast as approximately 30,000 for the design year (2040) on the emerging preferred option. At the weekend, the access flow at the park is ~2,200 vehicles whereas the weekend average daily flow is forecast as around 18,000 for the design year (2040) on the emerging preferred option, which remains significantly greater. The park is also a key trip generator in summer months and off-season weekends, whereas the N2 facilitates high volumes of traffic year-round. The impact of an intermediate junction is therefore applicable to many more users on the N2, compared to the substantially fewer accessing the entertainment park.

The proposed scheme length is approximately 7km. An analysis was undertaken to compare this length with other radials to (or 'outside') the M50. The respective junction spacings of the M1 and M3/N3 are 4.2km and 3.9km. However, the proposed scheme is being proposed in a rural setting, and there is therefore no specific need to connect high-density communities, as might be observed on other radials and has required the short spacing noted for the M1 and M3/N3 above. The downside of providing an intermediate junction is that the junction spacing would be reduced, such that more overtaking and weaving movements might reasonably be expected in a shorter distance, heightening the complexity of the driving experience expected by road users on this scheme and likely reducing the level of road safety along the scheme length.

Referring to the scheme objectives, the following Economy and Environment objectives are pertinent:

- To reduce journey times, improve journey time reliability and to improve the efficiency on the N2 corridor for all road users, including road based public transport
- To support the economic performance of the wider region through the provision of improved transport infrastructure for all road users, including road based public transport which will reduce the cost of travel for communities, businesses, visitors and tourists and assist in reducing the overall cost of production thereby improving competitiveness
- To minimise the impact of greenhouse gas emissions
- To improve air quality in the various settlements along the corridor
- To reduce the level of noise in the various settlements along the corridor
- To improve road based public transport journey time and journey time reliability

With consideration of these key related objectives noted and the additional analysis undertaken, it is proposed that an intermediate junction on the proposed scheme should not be progressed. The intermediate junction is anticipated to disrupt the traffic flow on the proposed scheme significantly, creating delays to public transport, goods transit and personal trips in the north-south direction. Furthermore, increases in environmental emissions would be expected with the junction, as tailpipe emissions, noise and vibration. The reduced junction spacing would increase the demands on driver attention and focus, and likely result in a reduced safety performance.

8.2.2.2 Type of Junctions

The analysis undertaken on a potential intermediate junction between Rath Roundabout and Kilmoon Cross indicated that an intermediate junction should not be progressed. Therefore, only two junctions

would be required along the mainline of the emerging preferred option, one at the southern tie-in at Rath and another at the northern tie-in at Kilmoon.

The incremental analysis undertaken on cross-section type indicated that a Type 1 Dual Carriageway cross-section is the most suitable for the emerging preferred option. In accordance with Table 6.1 of TII Publication DN-GEO-03031, at-grade roundabouts and full or compact grade separation are suitable junction types for a Type 1 Dual Carriageway. However, table 2.1 of TII Publication DN-GEO-03060 states that compact grade separated junctions are in fact not suitable for Type 1 Dual Carriageways. Therefore, the junction types under consideration were at-grade roundabouts and full grade separation.

Southern tie-in at Rath

According to TII guidance, the application of Grade Separated Junction on Type 1 Dual Carriageway cross-sections is required when the AADT is above 30,000. The AADT of the emerging preferred option is 29,960 in the 2040 scenario which is close to capacity defined by the TII for the introduction of a GSJ. Therefore, the consideration of a GSJ is warranted for the proposed junction at Rath.

Therefore, the assumed junction type for the southern tie in with the M2 motorway at Rath is a GSJ. The provision of grade separation to segregate the through trips on the M2 / N2 from the local trips is a likely benefit of this junction form, as well as further improvements to safety conditions.

It is noted that the tie into an improvement of the existing at-grade roundabout junction may also provide a solution at this location. However, the assumption of a GSJ at this stage enables an adequately sized corridor to be developed at this location to allow for further optioneering and assessment during Phase 3 to further assess and consider the final junction type and layout.

Northern tie-in at Kilmoon

According to TII guidance, at-grade roundabouts can work efficiently when vehicular flows are reasonably balanced between the arms. There is roughly a balance of traffic flows at the interchange between N2 and R152 at Kilmoon based on the Junction Traffic Count (JTC) data obtained during the traffic survey. Therefore, the consideration of an at-grade roundabout is warranted for the proposed junction at Kilmoon.

Therefore, the assumed junction type for the northern tie-in with the existing N2 and the R152 at Kilmoon is an at-grade roundabout junction. Both of these roads continue as single carriageways towards Slane and Drogheda respectively. The provision of an at-grade roundabout would likely be a safe and appropriate junction type for the termination of a dual-carriageway cross-section and connection with two single carriageways. Despite the assumption of an at-grade roundabout junction, a substantial corridor was developed at this location to allow for further optioneering and assessment during Phase 3 to further assess and consider the final junction type and layout.

8.2.3 Interaction with Existing N2

Further consideration was given to how the proposed option will interact with the existing N2 for the section where the corridor follows the existing road. The Stage 2 mainline alignment for route option E2 was indicatively shown to be widened about the centre of the carriageway of the existing N2. An access road strategy had not yet been developed at this stage, although the overall corridor for this route option was considered as part of the assessment as well as the Stage 2 mainline alignment to account for the impacts of potential access roads within the corridor.

The analysis undertaken on a potential intermediate junction between Rath Roundabout and Kilmoon Cross indicated that an intermediate junction should not be progressed. Therefore, consideration was given to access arrangements for Tayto Park which generates high traffic numbers during weekends in the summer holiday period, and for Caffrey International which generates a significant amount of HGV traffic, as well as the settlements around Primatestown.

Based on this, it was considered that directing this traffic onto local roads such as the L50161 (Old Curragha Road) may not be suitable with respect to the capacity of the existing road cross-section as well as the safety of all road users. Access could be maintained either via the existing N2 which could be retained as part of the scheme design, or alternatively via a parallel access road adjacent to the proposed mainline.

In terms of the interaction of the Emerging Preferred Option with the existing N2, a hybrid parallel widening option was developed for consideration based on a review of potential access roads. This option consisted of retaining part of the existing N2 with a reduced single carriageway cross-section to provide local access. The proposed Dual Carriageway mainline could then be constructed partially offline, parallel to the existing N2 on the western side, and partially online using the western edge of the existing N2 including the verge.

Due to the reduced traffic flows on the existing N2, the current cross-section may no longer be appropriate. It is likely that the existing N2 will be reclassified to a regional road with a reduced speed limit, therefore the wide shoulders along some sections may encourage speeding which creates safety risks for all road users. As such, a reduced single carriageway cross-section with slightly narrower lanes and narrower shoulders would be more appropriate. This would also provide the required space to implement a combined shared cycleway/footway on the eastern side of the existing N2, this is detailed further in Section 8.2.6.

Consideration was also given to the traffic management required during the construction phase. As the existing N2 is a national primary route of significant importance it is unlikely that closure of the road for long periods of time will be feasible. Potential diversion routes via the surrounding local roads such as the L50161 are unlikely to be suitable for HGVs. As a result, closures of the existing road may be restricted to overnight sequences for key pieces of construction work. The hybrid option under consideration would enable traffic to use the existing N2 during the construction phase, so is beneficial from a traffic management perspective and improved the overall buildability of the scheme.

It should be noted that the hybrid parallel widening proposals are an early assessment of issues associated with widening existing carriageways and is subject to further design refinement and optioneering during Phase 3.

8.2.4 Side Road Strategy

An initial side road strategy was developed based on the emerging preferred option. At the southern end of the scheme, connectivity would need to be provided between the proposed junction at Rath and the existing road network. Therefore, an access road was considered to link this proposed junction with the existing Rath Roundabout.

For the section of online widening of the existing N2 to the north of the proposed grade separated junction, the alignment of the emerging preferred option is proposed to remain at-grade in order to minimise the impacts on ribbon development along the existing N2 and L50161 (Old Curragha Road) as well as St Declan's Cemetery. However, this would require the existing junction between the L50161 and the N2 to be closed up. Therefore, an alternative access road was considered running parallel to the proposed mainline between the L50161 and the proposed grade separated junction at Rath in order to maintain connectivity between Curragha and Ashbourne.

As noted previously, access to settlements around Primatestown, Tayto Park and other commercial enterprises such as Caffrey International and Ashbrook Garden Centre could be maintained either via the existing N2 which could be retained as part of the scheme design, or alternatively via a parallel access road adjacent to the proposed mainline. The hybrid parallel widening proposals, referred to in Section 8.2.3, would enable access to be maintained via the existing N2 without the need for additional side roads.

For the sections of the emerging preferred option involving offline construction, it is proposed for both the R155 and L5007 roads to be bridged over or under the alignment of the emerging preferred option. As such, the local access in these areas will remain unchanged. At the northern end of the scheme, connectivity would need to be provided between the proposed at-grade junction at Kilmoon and the existing road network. Therefore, realignment to the R152 and existing N2 was considered to tie-in with this proposed junction.

It should be noted that this side road strategy has not been confirmed as the final design solution and will be subject to further design refinement and optioneering at Phase 3.

8.2.5 Existing Access Strategy

A review of all existing residential, agricultural and commercial accesses along the existing N2 was undertaken for the section of the emerging preferred option involving online widening of the existing N2. The hybrid parallel widening proposals, referred to in Section 8.2.3, would enable all accesses on the eastern side of the existing N2 to be retained.

In terms of accesses on the western side of the existing N2, for those which also have existing accesses from the L50161 consideration could be given to closing up these accesses. Whereas for those with no alternative existing access consideration could be given to the provision of a parallel access track to the west of the proposed mainline to maintain access.

For the sections of the emerging preferred option involving offline construction, access tracks will be provided where necessary to maintain connectivity to existing residential, agricultural and commercial accesses. For large, severed plots, underpasses or overpasses crossing the mainline of the emerging preferred option will be considered to maintain connectivity.

It should be noted that this access strategy has not been confirmed as the final design solution and will be subject to further design refinement and optioneering at Phase 3.

8.2.6 Active Travel Strategy

8.2.6.1 Stage 2 Strategy

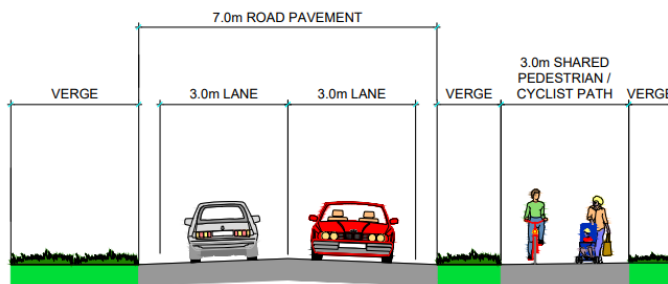
At Stage 2, an active travel strategy was developed for all four route options under consideration as part of the assessment. This consisted of the extension of the planned Urban Cycle Route AS1 (GDA CNP 2013) from its proposed end point at Rath Roundabout, to Cushinstown, which is designated as a rural node in the Meath County Development Plan 2021-2027.

In order to cater for pedestrian movements in the area as well as cyclists, it was proposed to implement combined pedestrian and cyclist facilities.

8.2.6.2 Existing N2 (Ashbourne to Cushinstown)

Based on the hybrid parallel widening proposals, referred to in Section 8.2.3, this active travel strategy was considered in more detail. Part of the existing N2 will be retained with a reduced single carriageway cross-section, this provided the required space for the implementation of a segregated 3m wide shared cycleway/footway on the eastern side of the existing N2 within the current road boundary. The eastern side of the existing N2 is further away from the proposed dual carriageway mainline, so will therefore provide a higher perceived level of safety and ambience.

These proposals provide an opportunity to connect the local communities of Primatestown and Cushinstown with Ashbourne and enhance the amenity along the existing N2 corridor, the proposed measures are shown indicatively in Figure 8-10.



INDICATIVE CROSS-SECTION OF IMPROVED EXISTING N2
(INCLUDING ACTIVE TRAVEL MEASURES)
(SUBJECT TO DEVELOPMENT IN PHASE 3 - PRELIMINARY DESIGN)

Figure 8-10 - Proposed Active Travel Measures on the Existing N2

During the third non-statutory public consultation, referred to in more detail in Section 8.3, the Emerging Preferred Option, including the proposed active travel measures on the existing N2, was published with the purpose of seeking feedback.

Following this, the National Transport Authority (NTA) released the Greater Dublin Area Draft Cycle Network Plan 2021 (GDA DCNP 2021) for consultation. It is noted that at the time of writing this is a draft plan, but this has been considered alongside the GDA CNP 2013 for completeness.

The GDA DCNP 2021 included the proposed active travel measures on the section of the existing N2 between Ashbourne and Cushinstown as part of the Secondary Strategic Cycle Network, as shown in Figure 8-11.

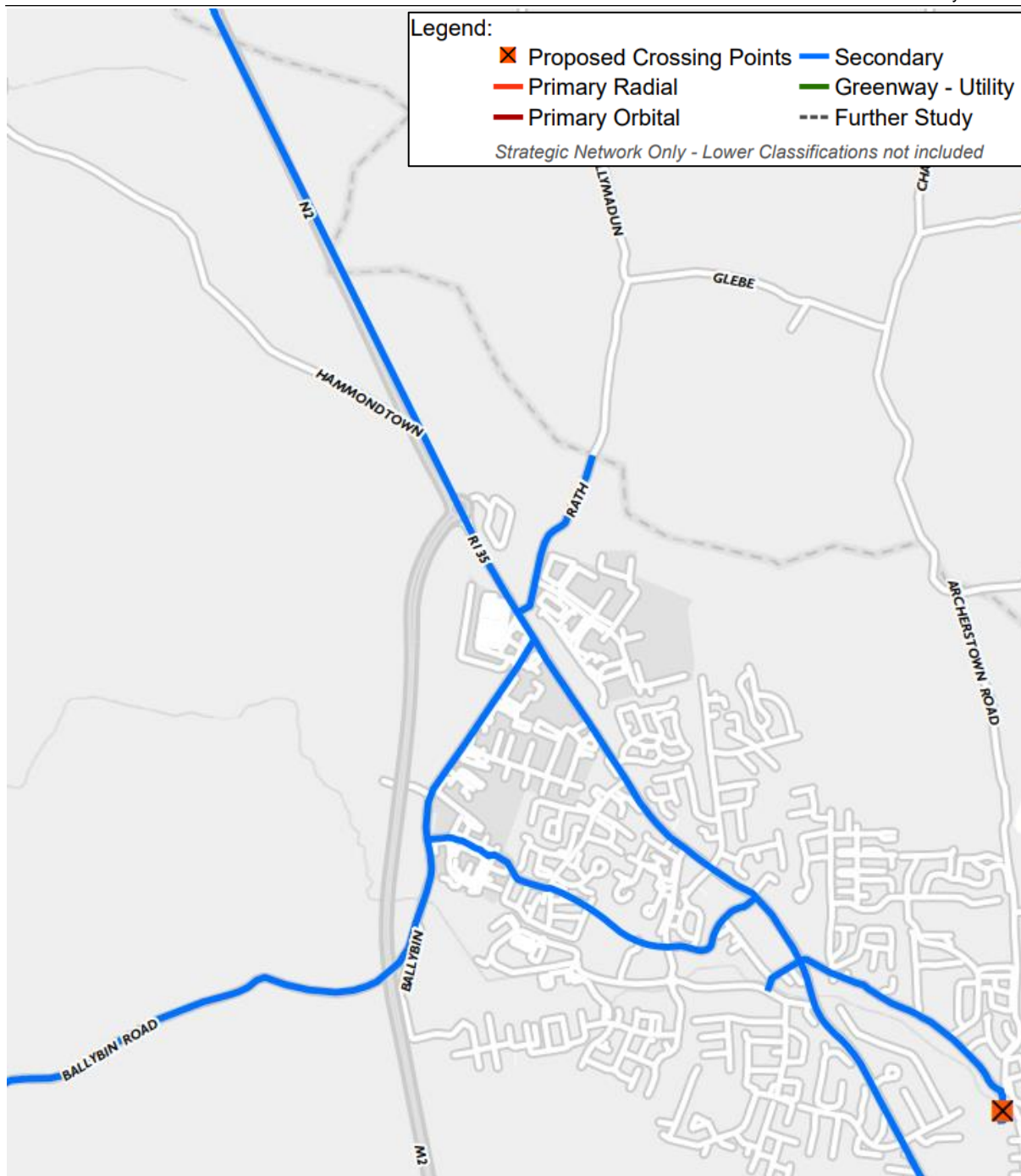


Figure 8-11 - Proposed Active Travel Measures on the Existing N2

8.2.6.3 Existing L50161 (Ashbourne to Curragha)

One further consideration is connectivity to Curragha, which is also designated as a rural node in the Meath County Development Plan 2021-2027. It is anticipated that through the implementation of a Dual Carriageway cross-section, rat-running on the surrounding local roads to avoid peak-time congestion on the existing N2 will be reduced. Therefore, the existing L50161 will become more accommodating for pedestrians and cyclists traveling between Curragha and Ashbourne, even without the implementation of segregated facilities.

As noted in Section 8.2.4, an access road was considered running parallel to the proposed mainline between the L50161 and the proposed grade separated junction at Rath in order to maintain connectivity between Curragha and Ashbourne. Whilst this access road would maintain connectivity for private cars, this would represent a significant diversion for pedestrians and cyclists, particularly for access to St Declan's Cemetery. Therefore, in order to minimise severance, a potential pedestrian and cyclist bridge was considered between the L50161 and the proposed shared cycleway/footway on eastern side of the existing N2.

It is noted that an underpass would likely be more cost effective than a bridge, however the presence of the East-West Interconnector at this location would likely rule this out as a feasible option. It is noted this has been considered at a high level only and is subject to development or adjustment in Phase 3.

8.2.6.4 Junction Corridors

In terms of the junction corridors, which are common to all four route options, potential junction options will include the provision of segregated facilities for pedestrians and cyclists where possible.

8.2.6.5 Summary

Overall, these proposals will facilitate an increase in active travel through the provision of improved journey ambience for cyclists and pedestrians, the subsequent uptake in physical activity will generate further benefits in terms of reduced health risk and absenteeism. This provides an opportunity to connect the local communities of Curragha, Primatestown, and Cushinstown with Ashbourne and enhance the amenity along the existing N2 corridor.

It should be noted that this active travel strategy is an early assessment of issues associated with pedestrian and cyclist movements and is subject to further design refinement and optioneering during Phase 3.

8.2.7 Mainline Alignment Optimisation

At Stage 2, a preliminary horizontal and vertical mainline alignment was designed within the corridors of all four route options under consideration as part of the assessment. This took cognisance of the available constraint's information as well as crossings over or under the existing road network.

As part of the refinement to the Emerging Preferred Option, Route Option E-2, the mainline alignment was optimised further to account for the hybrid parallel widening proposals, referred to in Section 8.2.3, and the side road strategy, referred to in Section 8.2.4. As part of this refinement, the mainline was offset horizontally from the existing N2 to run in parallel along the online section. Furthermore, a significant cutting was implemented at Primatestown to the north of the R155 with an overbridge crossing at the intersection with the L5007, this facilitated a better earthworks balance across the scheme in terms of cut and fill.

The preliminary cut / fill volumes are shown in Table 7-38 for Route Option E-2, based on the earthworks for the original Stage 2 alignment as well as the earthworks at Stage 3 following the optimisation of the mainline alignment. The overall fill requirement has been reduced from over half a million cubic metres of material to around 40,000 cubic metres of material. This will generate socio-economic and environmental benefits in terms of a reduction in the sourcing, extraction, and transportation of fill material to the site along the local road network.

It should be noted the current alignment design has not been confirmed as the final design solution and will be subject to further design refinement and optioneering at Phase 3. Therefore, the cut/fill volumes listed in Table 7-38 are subject to change as the design develops in the next Phase.

Table 8-3 – Cut / Fill Requirements for Emerging Preferred Option, Route Option E-2

Route Option	Cut/Fill Volumes (m ³)
Stage 2 - Route Option E-2	Overall requirement of fill material to be imported: 550,000 m ³
Stage 3 - Route Option E-2	Overall requirement of fill material to be imported: 40,000 m ³

It is also noted that geotechnical data is not available at this stage of the design, but it is assumed, at this stage of the project, that a significant proportion of the material within the cutting in question is expected to be of suitable quality for reuse given the desktop information available, provided soil has a minimum remoulded undrained shear strength of 50 kPa and significant pyrite is not present in any bedrock cuttings. A detailed acceptability assessment will be developed in later stages of the design process and would be supported by an intrusive investigation to confirm levels of acceptability.

8.2.8 Emerging Preferred Option Corridor

At Stage 2, indicative route corridors 200m in width were developed for each of the four route options under consideration as part of the assessment, as well as indicative circular junction corridors at the northern tie-in Kilmoon and the southern tie-in at Rath. It was noted in the published consultation material for Public Consultation 2 that these corridors may be subject to further refinement and amendment as the design development progressed.

In terms of the corridor for Route Option E-2, this was widened from 200m to 250m to provide the necessary space for the consideration of an alignment option with a minimum horizontal curve radius of 1020m which is the desirable minimum for 120kph design speed. This would be relevant if a Motorway cross-section is to be identified as the optimum cross-section for the scheme at the next phase of the planning and design process, following further incremental analysis.

The junction corridors were also enlarged considerably at the northern tie-in Kilmoon and the southern tie-in at Rath. This provided the necessary space for further optioneering and assessment during Phase 3 to further assess and consider the final junction type and layout at Rath and Kilmoon.

It should be noted that the corridors shown for the Emerging Preferred Option do not represent the actual width of the road scheme or the lands to be acquired - the corridors indicate the lands within which the proposed scheme could be developed. The exact details of the land take, earthworks, junction and side road design and property impacts will be developed during the next phase of the planning and design process.

8.3 Public Consultation 03 – Emerging Preferred Option

In conjunction with the Stage 3 refinement of the Emerging Preferred Option, the third period of non-statutory public consultation period was held between 4th March and 22nd April 2021.

This was a follow on from the second non-statutory public consultation that was held in July/August 2020. The consultation period was arranged with the purpose of seeking feedback on the Emerging Preferred Option.

8.3.1 Public Consultation Period

This consultation period was originally scheduled to last three weeks and come to an end on the 25th March 2021. However, upon receipt of extensive feedback from elected representatives, local residents and landowners, the consultation period was extended for a further four weeks, finishing on the 22nd April 2021. This extension of the consultation period ensured that everyone had sufficient time to consider the issues associated with the scheme and provide a submission, particularly those who may not have had easy access to the online consultation material.

Due to the measures taken in light of the Covid-19 outbreak, it was not possible to arrange a formal event in the local area, instead all the information that would normally be displayed at such an event was published on the project website (n2rath2kilmoon.ie).

This was complemented further with the postal delivery of information to all those living within the study area. Awareness for the consultation was further generated via detailed briefings for the local elected representatives in both Meath and Fingal Councils and by using a range of communication tools such as Facebook, Twitter, and traditional newspaper and radio adverts. Overall, this ultimately led to good level of public participation.

Virtual Consultation Room

To facilitate further engagement with the public, a virtual consultation room was developed using the industry leading AECOM virtual consultation tool.

This tool replicates the layout of a typical consultation that would be held in the local area prior to Covid-19 restrictions, typically in a local community hall or hotel, providing a 3D virtual space that the public could easily navigate to find out more information.

The virtual consultation room will remain live for the duration of the project, this can be accessed via the Public Consultation 3 webpage on the project website at (<https://www.n2rath2kilmoon.ie/public-consultation-3>).

- The virtual consultation room contained several virtual exhibition boards, a link to download the consultation material, as well as links to access the interactive mapping, the online questionnaire, and the individual consultation booking system. Overall, the virtual consultation room was viewed 16,000 times by 1,500 individual users.

Interactive Mapping

To enable the public to interact with the proposals for the Emerging Preferred Option, the ArcGIS Web App Builder tool was used to create interactive mapping. This contained the corridor for the Emerging Preferred Option, the indicative alignment, study area, and townland boundaries overlaid on aerial background mapping.

The interactive mapping will remain live for the duration of the project, this can be accessed via the Public Consultation 3 webpage on the project website at (<https://www.n2rath2kilmoon.ie/public-consultation-3>).

This tool enabled the public to navigate and zoom in on the proposals, there was also a function to search for an address or Eircode to quickly determine where specific properties or landholdings were located with respect to the corridor for the Emerging Preferred Option.

Individual Consultations

Throughout the consultation period, individual consultations with members of the project team and/or project liaison officer were available to those who wished to have the consultation material and information on the Emerging Preferred Option explained or to discuss any concerns or queries.

Over the course of the consultation period, a total of 42 meetings took place with affected landowners, local businesses, interested members of the public, County Councillors and Teachtaí Dála (TD's).

Elected Representatives Briefing

An Elected Representatives Briefing was held on the 24th March using a Microsoft Teams Live Event. This briefing included an overview of the Option Selection process and the Emerging Preferred Option, the rationale behind the virtual nature of the public consultation, as well as information on the four-week extension to the consultation period.

The purpose of this briefing was primarily to inform elected representatives who had expressed an interest in the scheme, this included County Councillors, Teachtaí Dála (TD's), a Senator and a Minister of State. However, this briefing was also opened to interested members of the public and affected landowners who were invited directly by their local representative.

A Question & Answer session was held at the end of the briefing to address the concerns and queries from elected representatives and local people. A total of 117 questions were submitted to the chat box, and the project team went through and answered as many questions as possible within the given time period for the briefing, with the remaining queries taken into overall consideration by the project team.

8.3.2 Feedback & Submissions

The public consultation period ran until 22nd April 2021, during this period 167 submissions were received. Of these, 105 were submitted using the online questionnaire, and a further 62 submissions were sent via email or post using the paper-based questionnaire. It is noted that numerous additional emails were also received during the consultation period in addition to the formal submissions, these were also considered by the project team. A summary of the feedback from Public Consultation 3 is presented below, and the post consultation report is included in Appendix 9.

8.3.2.1 Sustainable Transport Modes

Active Travel

Of the respondents, 69% answered 'Important' when asked 'How important is Active Travel (walking / cycling) to you and your lifestyle?'. To this same question 21% of respondents answered 'Neutral' and only 10% stated they believe it is 'Not Important' to them and their lifestyle. The breakdown of respondents' views on the importance of active travel is shown in Figure 8-12. Overall, this indicates that the majority of respondents feel that active travel is important to their lifestyle.

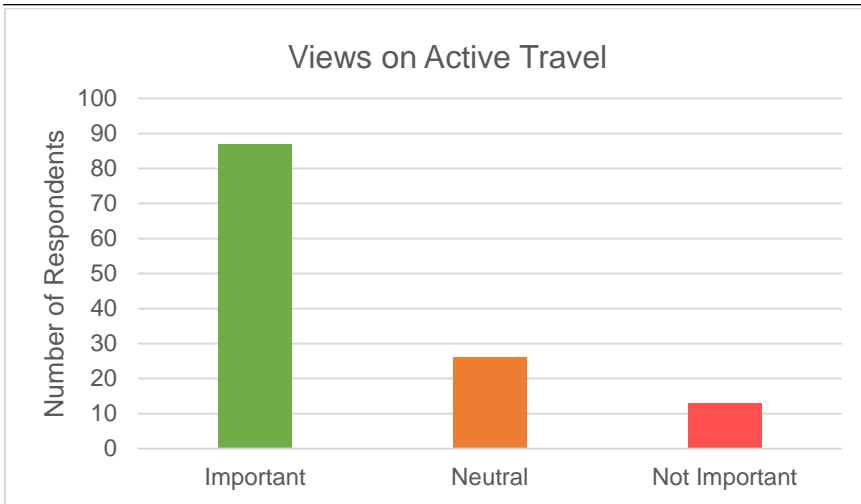


Figure 8-12: How Respondents View Active Travel

When asked whether respondents currently travel to either work, school or college by walking or cycling the majority answered 'Never'. The breakdown of respondents' answers are displayed in Figure 8-13. Overall, this indicates that there is a suppressed demand for active travel modes in the study area, despite the fact that active travel is important to the lifestyle of the majority of respondents, the majority of respondents never walk or cycle.

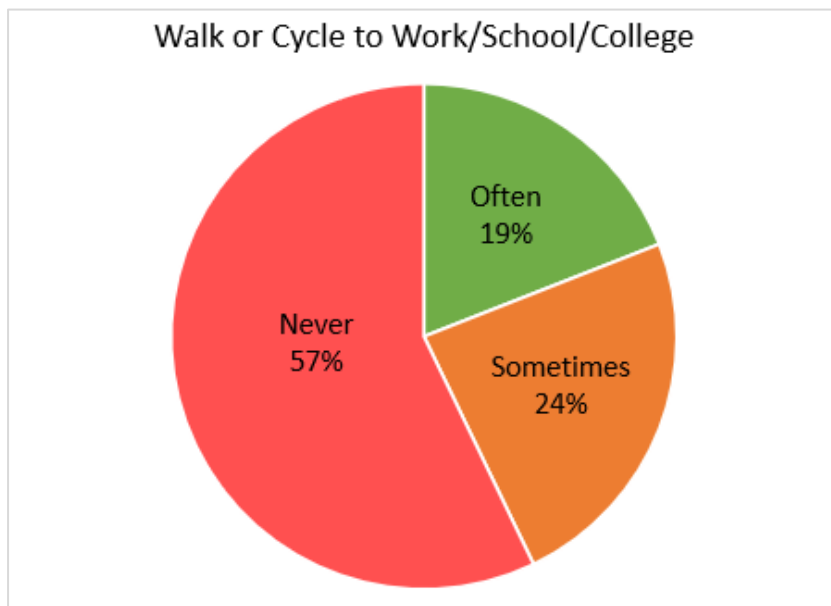


Figure 8-13: How Often Respondents Walk or Cycle to Work/School/College

The questionnaire also asked the respondents whether they would travel by walking or cycling more if better facilities existed. Of the 126 people that answered this question, 73 answered 'yes' and 53 answered 'no'. The majority of respondents would therefore use active travel modes more often if better facilities existed.

Followed by this was a question asking, 'What changes, if any, would encourage you to travel by walking/cycling more often?'. The most common answer to this was the request for safe paths/cycle lanes with the addition of safety barriers or some form of segregation from other road users.

Road Based Public Transport

Of the respondents, 63% answered 'Often' when asked 'Do you currently travel to work, school, college or shops by bus'. To this same question, 24% of respondents answered 'Sometimes' and 63% answered 'Never'. The breakdown of respondents' views on the importance of active travel is shown in Figure 8-14. Overall, the majority of respondents never travel by bus.

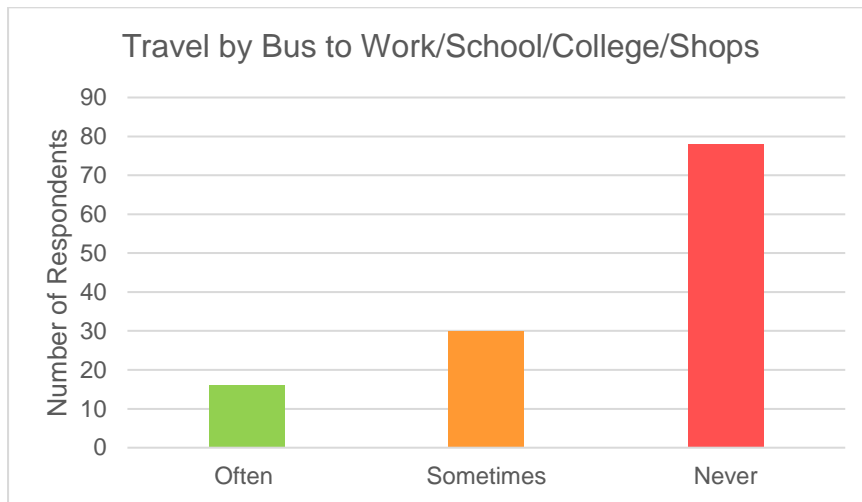


Figure 8-14: How Often Respondents Travel by Bus to Work/School/College/Shops

The questionnaire also asked the respondents whether they would travel by bus more often if a Park & Ride facility providing bus services on the N2 towards Ashbourne and Dublin existed. Of the 124 people that answered this question, 73 answered 'yes' and 51 answered 'no'. The majority of respondents would therefore use road based public transport modes more often if a Park & Ride facility existed.

8.3.2.2 Comments on the Emerging Preferred Option

The final section of the questionnaire allowed respondents to comment on the Emerging Preferred Option and provide suggestions to be considered for further development of the Emerging Preferred Option. The issues raised have been summarised below.

Traffic and Road Safety

- Respondents acknowledged the dangers and safety risks associated with the current situation and concurred with the need for the scheme.
- The traffic lights at the Primatestown Junction are cited by respondents as a significant factor contributing to the existing traffic problems. The tolls on the M1 and M3 are also seen as a core reason for the traffic problems on this stretch of the N2.
- Respondents expressed concerns with the large proportion of HGV traffic using the R152 to/from Drogheda.
- Some respondents highlighted the lack of public transport options in the study area.
- The increase in traffic due to Tayto Park was a recurring comment from respondents, with considerable volumes of traffic during the Summer months and weekends.
- Many respondents highlighted the impact on traffic numbers as a result of Covid-19 restrictions, and questioned the need for the scheme in light of changes to working patterns with remote working and hybrid working set to become more prevalent in the "new normal".

Community Issues

- Respondents highlighted potential issues to the surrounding community including road noise and air pollution.
- A number of local businesses and residents expressed concerns regarding restrictions to planning applications within the Emerging Preferred Option corridor.
- Those residents with homes within or close to the Emerging Preferred Option corridor expressed concern about a reduction in their property's value.
- Some respondents highlighted concerns over severance of large agricultural landholdings.
- Respondents expressed concern over the extent of homes and businesses affected by the scheme. In particular the communities of Cushinstown within the northern junction corridor, and Hammondstown within the southern junction corridor.
- Respondents expressed concern over the impact on the area around Cushinstown to allow for the connection with the N2 towards Slane and the R152 towards Drogheda. It was highlighted that Cushinstown has been designated as a rural node in the Meath County Development Plan 2021-2027.
- Respondents highlighted concerns over the potential impact on Baltrasna House as well as Crickstown House, particularly with regards to the cultural heritage value of both properties.

Environmental Issues

- Respondents expressed concerns over how the natural landscape would be negatively impacted by the scheme.
- Residents expressed concern over local wildlife in the area and how it will be affected by the scheme. One respondent highlighted sightings of kestrels in the study area.

Suggestions for the Emerging Preferred Option

- One respondent suggested that traffic calming, pedestrian crossing and a Garda presence on the R152 near the Athletic Club and national school at Cushinstown / Kilmoon cross would help reduce the volume of traffic and dangerous driving on this stretch of road.
- Another respondent expressed that a roundabout at Kilmoon cross would be beneficial to stop cars forcing their way onto the N2 from the R152 and allow people turn right from the R152 onto the N2 towards Navan, as they believe this is currently impossible to do when there is traffic or with the speed of cars when there is less traffic.
- Some respondents suggested an interim / alternative solution of the reconfiguration of the existing Primarestown Cross signalised junction to a roundabout.
- Some respondents highlighted an alternative option which may have less of an impact on large agricultural landholdings, this involved a longer section in parallel with the existing N2 corridor and a shorter offline section.
- Several respondents suggested the provision of a Park & Ride facility at Kilmoon.
- One respondent commented that a footpath along the R152 from around the Athletic Club to local school and shop at Kilmoon cross and safe pedestrian crossing on the R152 to access the above from the Curraghtown area.
- Many respondents agreed with the provision of walking and cycling facilities along the existing N2 as part of the scheme. Some local cycling groups suggested that a separate footpath and cycle track along the existing N2 would be better from a safety perspective rather than a shared facility.
- Some respondents also suggested the provision of walking and cycling facilities along the R155 and L50161 to Curragha.
- A respondent suggested to maintain or further enhance public transport for both employees and visitors of Tayto Park.
- Some respondents highlighted that consideration should be given to the future extension of a dual carriageway towards Slane, and that the additional impact that this may have on the residents within the northern junction corridor.

8.4 Alternative Link Assessment

8.4.1 Overview

Following the consideration of the feedback received from Public Consultation 3, an alternative proposal to a section of the EPO was identified for the scheme. This proposal diverged from the EPO at the northern county boundary between Fingal and Meath and ran parallel to the existing N2 in a northerly direction through Primatestown Junction, while tapering slightly westwards before joining back into the Kilmoon Cross junction corridor.

This proposal ran parallel to the existing N2 for a further 1250m than the EPO with a shorter offline section passing through agricultural lands before joining back up with the Kilmoon Cross junction corridor. This proposal would also necessitate the acquisition and demolition of two additional dwellings in the vicinity of the existing Primatestown Junction.

This alternative proposal was deemed to be feasible to the current section of EPO as described above and it was considered that a localised environmental assessment should be undertaken.

8.4.2 Localised Assessments

Out of the six Common Appraisal Framework criteria that were considered as part of the Stage 2 assessment, the only areas of difference between the current EPO and the alternative proposal were anticipated in the environmental assessment sub-criteria headings. A localised environmental assessment was therefore undertaken on the alternative proposal and compared with the EPO.

The Project Team weighed up the individual impacts against the key environmental sub-criteria:

- The alternative proposal would result in the acquisition and demolition of an additional two residential dwellings. This proposal would also have indirect impacts on a larger number of residential dwellings within its proximity.
- The current EPO provides the potential for the majority of fill material required as part of the scheme to be sourced from the extensive cutting; whereas the alternative proposal will require a substantial volume of fill material to be imported from alternative sites.

8.4.3 Recommendation

It was considered by the Project Team that the current EPO, Route Option E-2, performs more favourably with respect to the overall environmental impact, and should therefore remain as the EPO and be progressed to Preferred Option status for the scheme.

8.5 Project Appraisal Balance Sheet

In accordance with the Common Appraisal Framework (CAF) published by the Department of Transport (DoT), a Multi Criteria Assessment (MCA) was undertaken using the following criteria:

- Environment
- Safety
- Economy
- Accessibility and Social Inclusion
- Integration
- Physical Activity

The Project Appraisal Balance Sheet (PABS) has been completed for the emerging preferred option and is included in Appendix 10. This summarises the impacts of the emerging preferred option against each of the CAF criteria.

It should be noted that the overall impacts of the criteria are automatically generated by the spreadsheet so may not align exactly with the scale of impacts included in the Stage 2 Project Appraisal Matrix.

8.6 Economy

Economy Objectives

The performance of the emerging preferred option against the economy objectives for the scheme are summarised in Table 2-3.

Table 8-4 - Economy Objectives

Project Objectives	Forecast of Achievement	✓ / X
<p>Economy Objective 1</p> <ul style="list-style-type: none"> - To reduce journey times, improve journey time reliability and to improve the efficiency on the N2 corridor for all road users, including road based public transport 	<ul style="list-style-type: none"> - Journey times will reduce, and journey time reliability will improve on the N2 corridor. - Average time saving of approx. 3 minutes for N2 traffic in AM peak (design year). - These improvements will result in traffic diverting onto the N2 from less safe roads. - Pedestrians and cyclists will experience improved safety and accessibility on the 'old N2' corridor which will be largely retained for non-motorised traffic. 	✓
<p>Economy Objective 2</p> <ul style="list-style-type: none"> - To support the economic performance of the wider region through the provision of improved transport infrastructure for all road users, including road based public transport which will reduce the cost of travel for communities, businesses, visitors and tourists and assist in reducing the overall cost of production thereby improving competitiveness. 	<ul style="list-style-type: none"> - A contribution is expected towards positive wider economic impacts albeit on a low scale given the relatively localised nature of the scheme. - Improvements to the reliability and attractiveness of road based public transport will be facilitated. - Significant user travel time benefits resulting in a net positive. The overall positive BCR represents good value for money on investment. 	✓

TUBA

The Cost Benefit Analysis (CBA) results from TUBA are presented in Table 7-7 for the emerging preferred option, all monetary values are based on 2011 values and are shown in (€ thousand). It is noted that some of the numbers may not be exact due to rounding. The Cost Benefit Analysis report and associated appendices are included in Appendix 10.

In terms of the costs, only the initial investment costs to construct the scheme are considered at this stage of the appraisal process, these represent the Present Value of Cost (PVC) over the whole appraisal period (Year 1-60). In terms of the benefits, most of these impacts are shown over the 30-year appraisal period (Year 1-30), with the residual value representing the residual appraisal period (Year 31-60). These two values are combined to provide the Present Value of Benefits (PVB) over the whole appraisal period (Year 1-60).

Assumed Cross-Section

At Stage 2, all four route options were modelled in TUBA with a motorway cross section in order to generate the Present Value of Benefits (PVB). A motorway cross section provided the lowest level of impedance to traffic and therefore enabled the fairest, comparative assessment of route corridors at Stage 2. This provided a Benefit to Cost Ratio (BCR) of 3.7 for Route Option E-2 at Stage 2.

As noted in Section 8.2.1.3, a Type 1 Dual Carriageway cross-section is preferred from a capacity point of view. A Type 1 Dual Carriageway cross-section will also provide significant benefits in relation to resilience, safety and reliability for buses and freight.

The Present Value of Cost (PVC) remained the same for both Type 1 Dual Carriageway and Motorway, as the cross-section and applicable junctions are essentially the same. However, the Type 1 Dual Carriageway cross-section will provide slightly lower Present Value of Benefits (PVB) than a Type 1 Dual, as there are less economic benefits due to the 100kph speed limit of a Type 1 Dual Carriageway cross-section. The Benefit to Cost Ratio (BCR) for the Type 1 Dual Carriageway was 3.2, this continues to deliver a strong return on investment.

It is finally noted that while a strong economic outcome is determined from the assessment, a series of wider economic benefits (WEB), including non-monetisable benefits, are also expected from the progressive scheme. It should be noted that this cross-section has not been confirmed as the final design solution and will be subject to further design refinement and optioneering at Phase 3.

**Table 8-5 - Cost Benefit Analysis of Emerging Preferred Option from TUBA
(Type 1 Dual Carriageway Cross Section)**

30-Year Appraisal + Residual Value	Phase 2 – Stage 3
	<i>Discount Rate 4% (Year 1-30) and 3.5% (Year 31-60)</i>
	Emerging Preferred Option
Impact	
Consumer	25,000
Other	30,000
Business	42,000
Indirect Taxation Revenues	-300
Greenhouse Gases	0
Safety	250
Residual	75,000
Present Value of Benefits (PVB)	172,000
Costs	
Investment Costs	54,000
Operating Cost (Maintenance)	-
Revenues	-
Present Value of Cost (PVC)	54,000
Net Present Value (NPV)	118,000
Benefit to Cost Ratio (BCR)	3.2

8.7 Safety

Road Safety Audit (RSA) Stage F Part 2

Following the identification of the preferred option, a Road Safety Audit (RSA) Stage F Part 1 was undertaken in accordance with the TII guidance document GE-STY-01024 (Road Safety Audit). This is included in Appendix 8 and follows on from the completion of the Road Safety Audit (RSA) Stage F Part 2 on the Stage 2 Route Corridor Options.

In accordance with TII Standards, the RSA Process continues throughout the lifecycle of the project, with subsequent audits being undertaken at the completion of discrete stages of the scheme development. This will include an RSA Stage 1 at the completion of the preliminary design as part of the subsequent TII PMG Phase 3 (Design and Environmental Evaluation).

Health & Safety Risk Assessment

A Health & Safety Risk Assessment was undertaken of the preferred option in accordance with the TII guidance document PE-PMG-02042 (PMM 2019). This is included in Appendix 8.

Safety Objectives

The performance of the emerging preferred option against the safety objectives for the scheme are summarised in Table 8-6.

Table 8-6 - Safety Objectives

Project Objectives	Forecast of Achievement	✓ / X
<p>Safety Objective 1</p> <p>- To reduce the collision rate along the National Road network between Rath roundabout and Kilmoon Cross to below the national average rate.</p>	<p>- A reduction of 47 collisions is expected over 30 years. This will contribute to the reduction of the collision rate to below the national average rate.</p>	✓
<p>Safety Objective 2</p> <p>- To reduce the severity of collisions along the National Road network between Rath roundabout and Kilmoon Cross.</p>	<p>- A reduction of 0.1 fatal, 2.2 serious and 62.3 minor casualties are expected over 30 years.</p>	✓
<p>Safety Objective 3</p> <p>- To improve safety for all road users including pedestrians, cyclists and public transport users along both the National Road network and on the surrounding road network between Rath roundabout and Kilmoon Cross.</p>	<p>- The removal of direct accesses and sub-standard junctions will reduce the number of collisions and improve safety for private cars and road based public transport through a consistent driver road environment.</p> <p>- The 'old N2' and surrounding local roads will have significantly reduced levels of traffic which will improve safety for pedestrians and cyclists.</p>	✓
<p>Safety Objective 4</p> <p>- To support the RSA Road Safety Strategy 2021 – 2030.</p>	<p>- This will contribute to the provision of a safe, forgiving and efficient network of roads in Ireland.</p>	✓

COBALT

The projected change in collisions from the COBALT assessment are summarised in Table 7-42 for the emerging preferred option, all monetary values are based on 2011 values and are shown in (€ thousand).

Table 8-7 - Projected Change in Collisions from COBALT

Summary				Emerging Preferred Option
Economic Summary	Total Collision Cost	Without Scheme		907,579
		With Scheme		906,639
	Total Collision Cost Saved by Scheme			940
Collision Summary	Total Collisions	Without Scheme		20,625
		With Scheme		20,579
	Total Collisions Saved by Scheme			46.6
Causality Summary	Total Casualties	Without Scheme	Fatal	400
			Serious	1211
			Slight	28993
		With Scheme	Fatal	400
			Serious	1208
			Slight	28931
	Total Casualties Saved by Scheme		Fatal	0.1
			Serious	2.3
			Slight	62.3

8.8 Environment

The performance of the emerging preferred option against the environment objectives for the scheme are summarised in Table 8-8.

Table 8-8 - Environment Objectives

Project Objectives	Forecast of Achievement	✓ / X
<p>Environment Objective 1</p> <p>To minimise the impact of greenhouse gas emissions.</p>	<p>A full GHG assessment will be carried out using the TII carbon tool at Phase 3.</p> <p>Various mitigation methods will be considered at phase 3 to minimise the impacts to GHG emissions from the scheme (such as using local quarries / specifying low carbon materials/ analysing the uptake of Electric vehicles)</p>	Ongoing
<p>Environment Objective 2</p> <p>To improve air quality in the various settlements along the corridor.</p>	<p>NOx and PM10 are both reduced with fewer settlements observed along the proposed route. The index of NOx exposure for 2030 on the emerging preferred option is 71,743 compared to 110,583 for the Do-Minimum Option. Pm10 is 1,998 compared to 3,121.</p> <p>There are 12 identified sensitive receptors within 50m compared to 22 along the Do Minimum option.</p>	✓
<p>Environment Objective 3</p> <p>To reduce the level of noise in the various settlements along the corridor.</p>	<p>There are a number of properties adjacent the current N2 corridor. Moving the alignment further away from the N2 and onto the emerging preferred corridor, there will be a reduction in the number of properties experiencing noise levels.</p> <p>Whilst it must be noted that this brings additional noise to some properties along the emerging preferred corridor, the overall number of properties that fall within the 0-300m noise bands reduces to 56 compared to 88 on the existing N2.</p>	✓
<p>Environment Objective 4</p> <p>To minimise the impacts on the significant positive landscape and visual quality of the surrounding area.</p>	<p>The route has been designed to avoid sensitive areas where possible. The longer online widening section will be beneficial and reduce landscape and visual effects as it confines these to the existing N2 road corridor.</p> <p>The offline section is relatively short and close to the existing N2 corridor and will affect a number of residential properties along the R155 to either side of the route.</p> <p>While the route will pass through the viewshed of protected View 73, the route is located further east, thus reducing the visual effects slightly.</p> <p>Aspects of the Historic Landscape Character (HLC) will be considered in further detail as part of the EIAR during Phase 3 (Design & Environmental Evaluation) of the TII PMGs 2020.</p>	Ongoing

Project Objectives	Forecast of Achievement	✓ / X
<p>Environment Objective 5</p> <ul style="list-style-type: none"> - To minimise the potential impacts on local watercourses. 	<ul style="list-style-type: none"> - The route will require the existing crossing of the River Hurley to be updated and will require embankments either side of the stream. The design will be finalised at Phase 3 will look to limit impacts to the watercourse where possible. 	Ongoing
<p>Environment Objective 6</p> <ul style="list-style-type: none"> - To support the delivery of the Climate Action Plan. 	<ul style="list-style-type: none"> - Further assessment of CO2 emissions will occur at Phase 3 when the junctions and tie in points have been designed and when congestion related emissions for the Do-Minimum Scenario are analysed in the TII carbon tool. - Discussions on additional mitigation measures to reduce the carbon impact of the scheme have already started. The design of the route will also be cognisant of the CAP 	Ongoing
<p>Environment Objective 7</p> <ul style="list-style-type: none"> - Preserve the vibrancy of existing local communities. 	<ul style="list-style-type: none"> - Impacts upon some properties has been unavoidable however the preferred option has been designed to minimise impacts upon communities as much as is practicability possible. Severance of communities has been considered during the design of the option and further consideration to footbridges and maintaining existing road access points will be incorporated during Phase 3 with the aim of maintaining as many access / crossings points as possible. The option will consider the provision of cyclist and pedestrian facilities. - The preferred option has been designed to avoid impact on as many of the known archaeological features as possible. Geophysics surveys will be carried out to determine any additional unknown features, and the results will be incorporated into the design development during Phase 3. - In addition, architectural heritage surveys were carried out on a number of properties (which are not included within the NIAH nor the Fingal CC / Meath CC Records of Protected Structures) along the preferred option corridor, to further inform the design development during the Phase 3. 	Ongoing

8.9 Accessibility & Social Inclusion

The performance of the emerging preferred option against the accessibility and social inclusion objectives for the scheme are summarised in Table 8-9.

Whilst there are no deprived geographical areas within the study area, accessibility will be improved for all social groups, in particular vulnerable groups.

Table 8-9 – Accessibility & Social Inclusion Objectives

Project Objectives	Forecast of Achievement	✓ / X
<p>Accessibility & Social Inclusion Objective 1</p> <p>- To improve accessibility to key facilities, such as employment, education and healthcare for all N2 road users, but in particular vulnerable groups.</p>	<p>- Accessibility will be improved to employment, education, healthcare in Ashbourne and the wider Dublin region for all social groups, in particular vulnerable groups.</p>	✓
<p>Accessibility & Social Inclusion Objective 2</p> <p>- To reduce travel costs in the region and thereby encourage and support investment and employment in the wider region.</p>	<p>- As a result of decreased congestion and reduced journey times, the subsequent reduction of travel costs will encourage and support investment and employment in the wider region.</p>	✓
<p>Accessibility & Social Inclusion Objective 3</p> <p>- To support the accessibility and social inclusion objectives of national, regional and local planning policy.</p>	<p>- This aligns with the accessibility and social inclusion objectives of national, regional and local planning policy.</p>	✓
<p>Accessibility & Social Inclusion Objective 4</p> <p>- To improve road based public transport journey time and journey time reliability.</p>	<p>- As a result of decreased congestion, journey time and journey time reliability of road based public transport will be improved.</p>	✓
<p>Accessibility & Social Inclusion Objective 5</p> <p>- To improve connectivity to Dublin Airport.</p>	<p>- Accessibility will be improved to Dublin airport for all social groups, in particular vulnerable groups.</p> <p>- Connectivity will be improved to a potential Dublin Airport Western Access from the N2/M2 corridor, as referenced in Objective EA5 in the Dublin Airport Local Area Plan 2020 – 2026.</p>	✓

8.10 Integration

The performance of the emerging preferred option against the integration objectives for the scheme are summarised in Table 8-10.

Table 8-10 – Integration Objectives

Project Objectives	Forecast of Achievement	✓ / X
<p>Integration Objective 1</p> <ul style="list-style-type: none"> - To improve connectivity on the national road network. 	<ul style="list-style-type: none"> - Connectivity will be improved to the strategic road network including the M50, M3 and M1, as well as other transport modes such as the proposed Finglas LUAS park & ride. 	✓
<p>Integration Objective 2</p> <ul style="list-style-type: none"> - To be compatible with adopted land use objectives. 	<ul style="list-style-type: none"> - This is compatible with the adopted land use objectives of the Meath County Development Plan 2021 – 2027 and Fingal County Development Plan 2017 – 2023. 	✓
<p>Integration Objective 3</p> <ul style="list-style-type: none"> - To support the integration objectives set out in European, National, Regional and Local Planning policy. 	<ul style="list-style-type: none"> - This option will aligns with National Strategic Outcomes (NSO) 2, 3, 4, 6 and 7 from the National Planning Framework (NPF), particularly NSO 2 as this will enhance accessibility between key urban centres of population and their regions. - This option also has the potential to support NSO 4 by facilitating improvements to public transport as well as cycle and pedestrian facilities. 	✓
<p>Integration Objective 4</p> <ul style="list-style-type: none"> - To support the NTA Strategy for the Greater Dublin area, which aims to enhance bus services on the N2 corridor through improvements to the N2 Core Regional Bus Network serving Ashbourne and Slane. 	<ul style="list-style-type: none"> - Improvements will be facilitated to the reliability and attractiveness of road based public transport, thereby reinforcing the N2 Core Regional Bus Network serving Ashbourne and Slane. - This aligns with the NTA Strategy for the Greater Dublin Area. 	✓
<p>Integration Objective 5</p> <ul style="list-style-type: none"> - To consider the potential for bus-based park and ride locations close to the N2 corridor. 	<ul style="list-style-type: none"> - The potential for bus-based park and ride locations close to the N2 corridor will be examined in further detail later in the scheme development. 	✓

8.10.1 Ireland 2040 National Planning Framework

The National Planning Framework (NPF) succeeded the previous National Spatial Strategy and has a statutory basis. It is the Government's high-level strategic plan for shaping the future growth and development of Ireland out to the year 2040.

The NPF is focused on policies, actions and investment to deliver the 10 National Strategic Outcomes, as shown in Figure 8-15. It is considered that the Emerging Preferred Option aligns with National Strategic Outcomes (NSO) 2, 3, 4, 6 and 7 from the National Planning Framework (NPF) in particular, but either supports, or is consistent with, all 10 of the National Strategic Outcomes as detailed below.



Figure 8-15: National Strategic Outcomes (NSOs). National Planning Framework (NPF).

NSO 1 - Compact Growth

Urban Development – (Connectivity to the N2 for lands zoned for employment / industrial use to the north of Ashbourne):

- Encourage economic development and job creation, by creating conditions to attract internationally mobile investment and opportunities for indigenous enterprise growth;
- Improve accessibility to and between centres of mass and scale and better integration with their surrounding areas;
- Ensure transition to more sustainable modes of travel (walking, cycling, public transport);
- Rural Development – (Key rural settlements in the study area – Primatestown, Curragha, Cushinstown):
- Enhance the attractiveness, viability and vibrancy of rural areas as a means of achieving more sustainable patterns and forms of development;

- Ensure transition to more sustainable modes of travel (walking, cycling, public transport);

NSO 2 - Enhanced Regional Accessibility

Inter-Urban Roads:

- Maintaining the strategic capacity and safety of the national roads network.
- Improving average journey times targeting an average inter-urban speed of 90kph.

Accessibility to the North-West:

- Upgrading access to the North-West border area, utilising existing routes (N2/N14/A5).

Public Transport – (Improvements to journey times and journey time reliability of road based public transport on the N2):

- To strengthen public transport connectivity between cities and large growth towns with reliable journey times.

NSO 3 - Strengthened Rural Economies and Communities

Rural Development:

- Strategic road improvement projects in rural areas to ensure access to critical services such as education, healthcare & employment.
- Greenways – (Active travel improvements on existing N2):
- Invest in greenways as part of a nationally coordinated strategy.

NSO 4 - Sustainable Mobility

Public Transport – (Improvements to journey times and journey time reliability of road based public transport on the N2):

- Deliver the key public transport objectives of the Transport Strategy for the Greater Dublin Area 2016-2035 (including Core Bus Network – Regional Corridors)
- Provide public transport infrastructure and services to meet the needs of smaller towns, villages and rural areas.

Cycling – (Active travel improvements on existing N2):

- Develop a comprehensive network of safe cycling routes in towns and villages to address travel needs.

NSO 5 - A Strong Economy Supported by Enterprise, Innovation and Skills

- Supporting Entrepreneurialism and Building Competitive Clusters – (Connectivity to the N2 for lands zoned for employment / industrial use to the north of Ashbourne):
- Provision of competitive, innovative and resilient regional enterprise base.
- Realising a significant uplift in the performance of indigenous enterprises in terms of innovation, export potential and productivity, supporting technology-led start-ups and by attracting further investment to the regions.

NSO 6 - High-Quality International Connectivity

Airports – (Access to Dublin Airport via N2 & potential future Dublin Airport Western Access):

- Enhancing land-side access to airports, particularly in public transport terms.

Ports – (Access to Dublin Port via N2):

- Improve land transport connections to the major ports.

NSO 7 - Enhanced Amenities and Heritage

Walking & Cycling – (Active travel improvements on existing N2):

- Major focus on improving walking and cycling routes, including continuous greenway networks.

NSO 8 - Transition to a Low Carbon and Climate Resilient Society

- Carbon Emissions:
- Reduce journey lengths, improve traffic flow and create opportunities to transfer local journeys from car to active travel modes.
- Further consideration will be given to the reduction of operational and embedded carbon where possible, later in the scheme development

NSO 9 - Sustainable Management of Water, Waste and other Environmental

- Water:
- Transfer of traffic onto a road with a drainage system designed to capture and treatment surface water runoff.
- Waste:
- Support national and regional waste policy and efficient use of resources.
-

NSO - 10 Access to Quality Childcare, Education and Health Services

- Health Services:
- Improved accessibility for local people in the area who do not have access to a private car.
- Accessibility will be improved to in Ashbourne and the wider Dublin region for all social groups, in particular vulnerable groups.
- Education:
- Further consideration will be given to connectivity between segregated active travel facilities and the local school at Cushinstown, Scoil Naomh Cianain, later in the scheme development.

8.10.2 National Investment Framework for Transport in Ireland

The DoT is currently developing its new high-level strategic framework for prioritising future investment in the land transport network. It is noted that the National Investment Framework for Transport in Ireland (NIFTI) is a Draft Framework that has not yet been formally published, however this has been considered in conjunction with the consolidated Ireland 2040 National Planning Framework (NPF) and National Development Plan 2021 – 2030 (NDP). Public consultation on the draft framework commenced on 31st March 2021 and ended on the 28th May 2021. The consultation submissions are currently under review.

To deliver future investment in a sustainable manner, NIFTI has established modal and intervention hierarchies, which set out how transport investment will be undertaken. The framework encourages the use of active travel and public transport ahead of solutions reliant on private transport. Maintenance or optimisation of existing assets, including through demand management, is also preferred to extensive enhancements or outright new infrastructure.

In terms of the modal hierarchy, the Emerging Preferred Option consists of a multi-modal intervention, with improved journey conditions for all road users. Reducing congestion on the existing N2 will improve journey times and journey time reliability of private vehicles, goods vehicles and road based public transport. The segregated active travel facilities proposed along the existing N2 as part of the Emerging Preferred Option will also improve journey ambience for pedestrians and cyclists.

In terms of the intervention hierarchy, the Emerging Preferred Option consists of the provision of “New” infrastructure, which encompasses all measures which entail significant increases to transport infrastructure capacity. However, it is noted that the application of the hierarchies is to be flexible and pragmatic to ensure that the most appropriate solution to a given problem is implemented. Investment will be needs-based and objectives-led, and where Investment Priorities cannot be addressed by maintaining or optimising existing infrastructure, appropriate improved and new infrastructure will continue to be part of future investment plans.

8.11 Physical Activity

The performance of the emerging preferred option against the physical activity objectives for the scheme are summarised in Table 8-11.

Table 8-11 - Physical Activity Objectives

Project Objectives	Forecast of Achievement	✓ / X
<p>Physical Activity Objective 1</p> <p>To deliver infrastructure that supports low-carbon transport systems and emission reductions.</p>	<p>The provision of segregated active travel facilities along the existing N2 will improve the attractiveness of walking and cycling.</p> <p>Improvements will be facilitated to the reliability and attractiveness of road based public transport.</p>	✓
<p>Physical Activity Objective 2</p> <p>To provide segregated facilities for pedestrians and cyclists to link local areas to Ashbourne and beyond.</p>	<p>Segregated pedestrian and cyclist facilities are proposed along the existing N2, from Rath Roundabout (to the north of Ashbourne town), to Cushinstown, which is designated as a rural node in the Meath County Development Plan 2021-2027.</p> <p>This provides opportunity to extend the planned cycle route that is proposed to follow the R135 through Ashbourne town up to the Rath Roundabout (Urban Cycle Route AS1). This forms part of the Cycle Network Plan for the Greater Dublin Area (GDA CNP 2013).</p>	✓
<p>Physical Activity Objective 3</p> <p>To improve the amenity value of the existing N2 corridor and provide a safe environment for vulnerable road users.</p>	<p>A reduction in traffic volumes on the existing N2 as well as the surrounding local roads will encourage walking and cycling due to a safer perceived environment.</p> <p>The provision of segregated facilities for pedestrians and cyclists will improve the amenity value of the existing N2 corridor.</p>	✓
<p>Physical Activity Objective 4</p> <p>To facilitate the uptake of active travel modes and reduce the overreliance on private cars for short journeys.</p>	<p>The provision of segregated active travel facilities along the existing N2 will facilitate the uptake of walking and cycling for short journeys, thereby reducing the overreliance on private cars.</p> <p>Improved accessibility for local people in the area who do not have access to a private car.</p> <p>Further consideration will be given to connectivity between segregated active travel facilities and the local school at Cushinstown, Scoil Naomh Cianain, later in the scheme development.</p>	✓

8.12 Sustainable Development & Climate Change

8.12.1 TII Sustainability Implementation Plan – Our Future

It is noted that the TII Sustainability Implementation Plan – Our Future is currently a Draft Plan; however, this plan has been considered in relation to the proposed scheme as it outlines TII's vision towards sustainability.

The performance of the emerging preferred option against the six key TII Sustainability Principles of the TII Sustainability Implementation Plan are summarised in Table 8-12.

Table 8-12 - TII Sustainability Implementation Plan Alignment

Transport Sector Measure	Forecast of Achievement	✓ / X
TII Sustainability Principle 1 - Provide effective, efficient and equitable mobility.	- Improvements to the efficiency and effectiveness of the N2 corridor will facilitate the provision of journeys that are easier, safer, more sustainable and multi-modal. - Improvements to accessibility along the N2 corridor will lead to the provision of equal opportunities for employment, education and essential needs.	✓
TII Sustainability Principle 2 - Enable safe and resilient networks and services	- A safe user experience for all road users on the N2 corridor will ensure that the infrastructure is inclusive for all demographics and facilitates sustainable choices. - Improvements to resilience on the N2 corridor will ensure the provision of a safe, functioning and resilient service in the face of disruptive events and wider stresses.	✓
TII Sustainability Principle 3 - Collaborate for a holistic approach	- Extensive non-statutory consultation with key stakeholders and the public. - Alignment with TII Guidelines to ensure consideration of costs, benefits and impacts over the project lifecycle. - Impacts on noise, emissions, and cultural heritage considered as part of the options appraisal process.	✓
TII Sustainability Principle 4 - Deliver end-to-end improvements	- Consideration will be given to the use of sustainable materials, better design and environmental performance later in the scheme development.	Ongoing
TII Sustainability Principle 5 - Transition to net zero	- Increased journey time reliability for road based public transport and the provision of segregated cycling and pedestrian facilities will enable a modal shift towards sustainable travel modes.	✓
TII Sustainability Principle 6 - Create total value for society	- Consideration will be given to the use of land to preserve and enhance the environment, capture carbon emissions and combat climate change later in the scheme development. - The provision of segregated cycling and pedestrian facilities will connect the existing communities along the N2 corridor, improving the amenity of the local area and providing opportunities for people to socialise, and connect with each other and the environment.	Ongoing

In summary, it is considered that the emerging preferred option aligns with the six key TII Sustainability Principles of the TII Sustainability Implementation Plan. The alignment of the emerging preferred option with the final published version of the TII Sustainability Implementation Plan will also be undertaken as the scheme progresses through the next phases of the planning and development process.

8.12.2 Climate Action Plan 2021

The performance of the emerging preferred option against the measures in relation to the transport sector in the Climate Action Plan 2021 is summarised in Table 8-13.

Table 8-13 - Climate Action Plan 2021 Alignment

Transport Sector Measure	Forecast of Achievement	✓ / X
<p>Climate Action Plan Measure 1</p> <ul style="list-style-type: none"> Decarbonisation of transport – Modal shift to cycling and walking for short journeys. 	<ul style="list-style-type: none"> The existing section of N2 has no formal pedestrian and cycle facilities. The provision of continuous segregated cycle and pedestrian facilities throughout the length of the scheme along the existing N2 will encourage a modal shift to these sustainable transport modes for short journeys within the Study Area. 	✓
<p>Climate Action Plan Measure 2</p> <ul style="list-style-type: none"> Decarbonisation of transport – Modal shift to road based public transport. 	<ul style="list-style-type: none"> Through increasing capacity and improving journey time reliability on the N2 corridor, the growth of bus transportation in the Study Area will be facilitated, which will encourage a modal shift to this sustainable transport mode. The potential integration of a Park & Ride facility will be considered as part of the scheme at Phase 3, in cognisance of the National Transport Authority (NTA) Strategy for the Greater Dublin Area. 	✓
<p>Climate Action Plan Measure 3</p> <ul style="list-style-type: none"> Promote compact, connected and sustainable living. 	<ul style="list-style-type: none"> Potential impacts to the zoned Masterplan Areas to the north of Ashbourne are minimised, thereby facilitating their development for employment generating purposes. Opportunities for Ashbourne to become more self-sufficient through the creation of local jobs, reducing the need for locals to travel to Dublin for employment. 	✓
<p>Climate Action Plan Measure 4</p> <ul style="list-style-type: none"> Reduction of waste material. 	<ul style="list-style-type: none"> The re-use of waste (including earthworks) will be maximised where possible, whilst the amount of material for disposal will be minimised where possible. An Outline Construction Environmental Management Plan (CEMP) will be developed in the next phase of the scheme development. This Outline CEMP will identify measures to manage material resources, re-use non-hazardous soils and aggregates from excavation and demolition, and, where feasible, measures to minimise greenhouse gases associated with the transportation of materials at the construction stage. 	Ongoing

Transport Sector Measure	Forecast of Achievement	✓ / X
<p>Climate Action Plan Measure 5</p> <ul style="list-style-type: none"> - Accelerating the uptake of Electric Vehicles (EVs) 	<ul style="list-style-type: none"> - Electric Vehicles in particular have a number of facets, with regards to national targets and charging infrastructure. - A Park & Ride or similar facility integrated with the proposed scheme may have the potential for the provision of Electric Vehicle Rapid Charge Points, or the potential for others to utilise this location for the same in the future. 	Ongoing
<p>Climate Action Plan Measure 6</p> <ul style="list-style-type: none"> - Consideration of future climate change in the design and assessment of new development 	<ul style="list-style-type: none"> - Impacts due to extreme weather events and temperatures will be considered in the design and assessment of the scheme, including flood risk and drainage design later in the scheme development. - The proposed scheme will be designed to mitigate the impacts to the surrounding environment and to the road infrastructure itself due to these ever-increasing climatic events/conditions. 	Ongoing

In summary, it is considered that the emerging preferred option align with the Climate Action Plan 2019. This will be revisited during the next phases of the planning and development process.

8.12.3 Climate Action and Low Carbon Development (Amendment) Bill 2021

The Climate Action and Low Carbon Development (Amendment) Bill 2021 was signed in July 2021, the adoption of this bill will support Ireland's transition to reach a climate neutral economy no later than 2050.

The Climate Action and Low Carbon Development (Amendment) Bill 2021 establishes a 2050 net-zero emissions target for Ireland, with the introduction of 5-year, economy-wide carbon budgets starting in 2021. This bill also introduces a requirement to annually revise the Climate Action Plan.

The alignment of the emerging preferred option with future annual revisions of the Action Plan will also be undertaken as the scheme progresses through the next phases of the planning and development process, in accordance with the Climate Action and Low Carbon Development (Amendment) Bill 2021.

8.13 Conclusion & Recommendation

8.13.1 Performance against Project Objectives

The Emerging Preferred Option (EPO), Route Option E-2, has been demonstrated as having met the project objectives under each of the CAF criteria. It is noted that the progress towards achieving some of the environment objectives is ongoing and will be addressed further during Phase 3 once more information on the scheme design and mitigation proposals are available for consideration.

In cognisance of this, as well as the further refinements and assessments made during Stage 3, the Emerging Preferred Option, Route Option E-2, is proposed as the Preferred Option for the scheme. It is noted that a Park & Ride facility will be considered in further detail during proceed to Phase 3 (Design and Environmental Evaluation) of the TII Project Management Guidelines 2020 as a complementary measure alongside Route Option E-2.

The Preferred Option Corridor for the N2 Rath Roundabout to Kilmoon Cross Scheme is illustrated in Figure 8-16, as well as Drawing CH-0078 in Appendix 4.

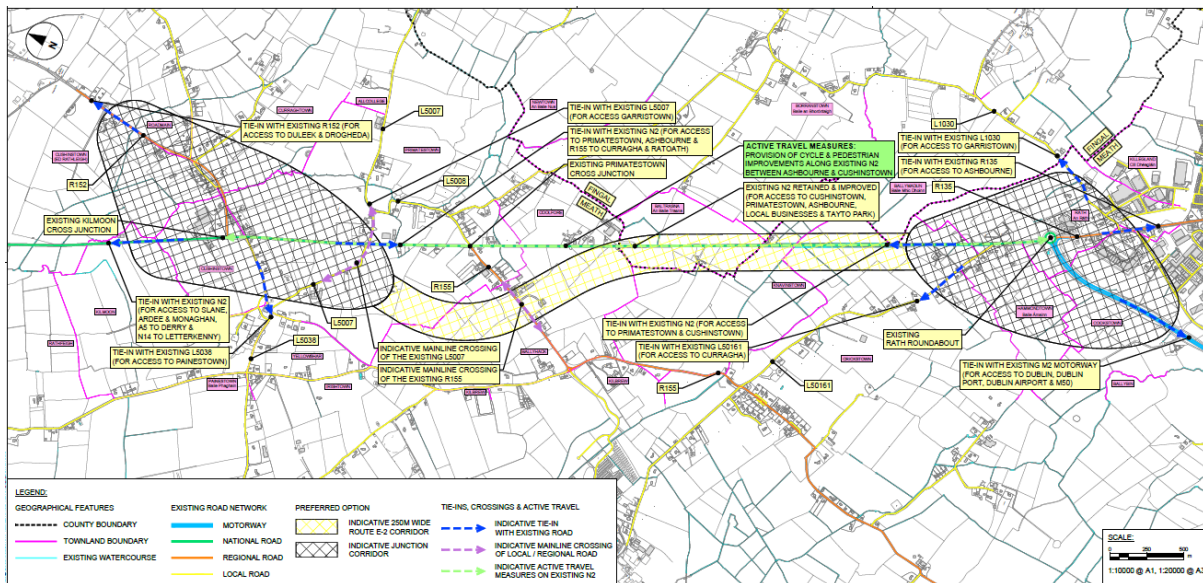


Figure 8-16 - Preferred Option Corridor

8.13.2 Performance against CAF Criteria

The proposed impacts of the preferred option against each of the CAF criteria are included below.

Economy

The section of the N2 between Rath Roundabout and Kilmoon Cross represents a major bottleneck on the national road network. High volumes of traffic create significant congestion during peak hours with increasingly long delays of up to 20 minutes, this contributes to the inability of the N2 to deliver the level of service required for a national primary road. The existing N2 is causing significant reliability issues for bus services and additional operational costs due to congestion related delays, this is reducing the attractiveness of buses for existing car users.

The preferred option will lead to the provision of a more efficient transport network. This will assist in greater operational efficiencies as the regional population increases and improves economically, thereby facilitating the sustainable development of the region. Improvements to the journey times and reliability of the N2 corridor will encourage an increased mode share for buses along the corridor, thereby encouraging the use of sustainable more environmentally friendly modes of transport.

Safety

There are a significant number of roadside hazards along this section of the N2, with numerous utility poles, trees, boundary walls and drainage ditches located immediately adjacent to the carriageway. Between the Primetestown junction and Kilmoon Cross junction, the road is either above or twice above the expected collision rate, based on data from the Road Safety Authority (RSA).

The preferred option will contribute towards a reduction in the frequency and severity of collisions through the implementation of a Dual Carriageway cross-section as well as the removal of direct accesses and sub-standard junctions. This will improve safety for private cars and road based public transport through a consistent driver road environment. The 'old N2' and surrounding local roads will have significantly reduced levels of traffic which will improve safety for pedestrians and cyclists.

Environment

The preferred option performed the most favourably under the environmental criteria in the Stage 2 Project Appraisal Matrix, and therefore represents the option that has the least impact on the surrounding environment.

The preferred option will improve air quality and reduce the level of noise in the various settlements along the corridor, as the route has less receptors compared to the existing N2. The section of online widening will reduce landscape and visual effects, limit the area of direct habitat loss in the area of wet grassland, and minimise impacts on groundwater by confining these impacts to the existing N2 corridor.

Various mitigation methods will be considered at Phase 3 to minimise the impacts to greenhouse gas emissions from the scheme and support the delivery of the Climate Action Plan. The design of the preferred option will also be further refined during Phase 3 to minimise impacts on watercourses such as the Hurley River and their associated flood zones as well as archaeological, architectural and cultural heritage sites where possible.

Whilst impacts upon some properties will likely be unavoidable, the preferred option will be further refined during Phase 3 to minimise impacts upon communities as much as is practicability possible. Further consideration will be given to minimise severance and maintain existing access points as part of the overall side road and access strategy, as well as the provision of cyclist and pedestrian facilities.

Accessibility & Social Inclusion

Whilst there are no deprived geographical areas within the study area, the preferred option will improve accessibility to employment, education, healthcare in Ashbourne and the wider Dublin region as well as Dublin Airport for all social groups, in particular vulnerable groups.

As a result of decreased congestion and reduced journey times, the subsequent reduction of travel costs will encourage and support investment and employment in the wider region and improve the journey time reliability of road based public transport.

Integration

The preferred option will improve connectivity to the strategic road network including the M50, M3 and M1, as well as other transport modes such as the proposed Finglas LUAS park & ride. Improvements to journey time reliability of road based public transport will reinforce the N2 Core Regional Bus Network serving Ashbourne and Slane, this aligns with the NTA Strategy for the Greater Dublin Area. The preferred option also presents an opportunity for the implementation of a potential bus-based park and ride close to the N2 corridor, this will be examined in further detail during Phase 3.

The preferred option is compatible with the adopted land use objectives of the Meath County Development Plan 2021 – 2027 and Fingal County Development Plan 2017 – 2023. This will also support National Strategic Outcomes (NSO) 2, 3 and 6 from the National Planning Framework (NPF), particularly NSO 2 as this will enhance accessibility between key urban centres of population and their regions. This option also has the potential to support NSO 4 by facilitating improvements to public transport as well as cycle and pedestrian facilities.

Physical Activity

The preferred option will lead to a reduction in traffic volumes on the 'old N2' and the other surrounding local roads, thereby encouraging the uptake of active travel modes such as walking and cycling due to a safer perceived environment. The resultant physical activity will help reduce health risks and the more pedestrians and cyclists, the greater the benefits.

The uptake of active travel modes will be encouraged further with provision of segregated facilities. The preferred option presents an opportunity to extend the planned cycle route that is proposed to follow the R135 through Ashbourne town up to the Rath Roundabout (Urban Cycle Route AS1) in the GDA CNP 2013. It is also noted that the GDA DCNP 2021 has included these proposed active travel measures on the section of the existing N2 between Ashbourne and Cushinstown as part of the Secondary Strategic Cycle Network. The overall active travel strategy will be considered in more detail during Phase 3.

8.13.3 Recommendation

Following the completion of the Stage 3 Process wherein the Project Appraisal Balance Sheet (PABS) was undertaken, and feedback obtained and considered as part of the Non-Statutory Public Consultation on the Emerging Preferred Option, Route Option E-2, the TII Phase 2, three stage option selection process for the proposed N2 Rath Roundabout to Kilmoon Cross scheme is now complete.

It is concluded that the Preferred Option, Route Option E-2, is the optimum solution to meet the Project specific need and the Project Objectives, as outlined in Section 2 of this Report. It is therefore recommended that the Preferred Option, Route Option E-2, proceed to Phase 3 (Design and Environmental Evaluation) of the TII Project Management Guidelines 2020.

8.13.4 Next Steps

Subject to TII approvals, the process will culminate in the publication of the Statutory Orders and applicable Environmental Report(s) in accordance with relevant legislation.

Appendix 1 - Drawings - Summary of Constraints Report

Report Reference	Document Number	Document Name
CH-0001 (GEN)	60602546-ACM-GEN-SW_Z_Z_Z-DR-CH-0001	Study Area
CH-0001 (VTO)	60602546-ACM-VTO-SW_Z_Z_Z-DR-CH-0001	Topography
CH-0010	60602546-ACM-LLO-SW_Z_Z_Z-DR-CH-0010	Land Ownership
CH-0021	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0021	Combined Constraints

Appendix 2 - Drawings – Development of Feasible Options

Report Reference	Document Number	Document Name
CH-0007	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0007	Stage 1 Route Corridors Development (1 of 2)
CH-0008	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0008	Stage 1 Route Corridors Development (2 of 2)
CH-0005	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0005	Stage 1 Route Corridors Simplified (1 of 2)
CH-0006	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0006	Stage 1 Route Corridors Simplified (2 of 2)

Appendix 3 - Drawings - Stage 2 Project Appraisal Matrix

Report Reference	Document Number	Document Name
AG-0006	60602546-ACM-EGN-SW_Z_Z_Z-DR-AG-0006	Route D1 - Heritage Constraints
AG-0007	60602546-ACM-EGN-SW_Z_Z_Z-DR-AG-0007	Route E1 - Heritage Constraints
AG-0008	60602546-ACM-EGN-SW_Z_Z_Z-DR-AG-0008	Route E2 - Heritage Constraints
AG-0009	60602546-ACM-EGN-SW_Z_Z_Z-DR-AG-0009	Route F2 - Heritage Constraints
GS-0012	60602546-ACM-EGN-SW_Z_Z_Z-DR-GS-0012	Solid Geology
GS-0013	60602546-ACM-EGN-SW_Z_Z_Z-DR-GS-0013	Subsoil Deposits
GS-0014	60602546-ACM-EGN-SW_Z_Z_Z-DR-GS-0014	Soil Deposits
GS-0015	60602546-ACM-EGN-SW_Z_Z_Z-DR-GS-0015	Aquifer & Aquifer Vulnerability
GS-0016	60602546-ACM-EGN-SW_Z_Z_Z-DR-GS-0016	Geological Features
HF-0004	60602546-ACM-EGN-SW_Z_Z_Z-DR-HF-0004	Drainage & Flooding
CH-0022	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0022	Route Corridors
CH-0024	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0024	Route D1
CH-0025	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0025	Route E1
CH-0026	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0026	Route E2
CH-0027	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0027	Route F2
CH-0037	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0037	Routes E1 & E2 Constraints

Appendix 4 - Drawings - Stage 3 Preferred Option

Report Reference	Document Number	Document Name
CH-0055	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0050	Emerging Preferred Option – OS Mapping
CH-0056	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0050	Emerging Preferred Option – Aerial Imagery
CH-0057	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0050	Emerging Preferred Option – Constraints
CH-0078	60602546-ACM-HGN-SW_Z_Z_Z-DR-CH-0078	Preferred Option Corridor

Appendix 5 - Constraints Report

Report Reference	Document Number	Document Name
RP-Z-0011	60602546-ACM-GEN-SW_Z_Z_Z-RP-Z-0011	Constraints Report

Appendix 6 - Stage 1 & 2 Environmental Report

Report Reference	Document Number	Document Name
RP-Z-0012	60602546-ACM-GEN-SW_Z_Z_Z-RP-Z-0012	Stage 1 & 2 Environmental Report

Appendix 7 - Planning History & Applications

Report Reference	Document Number	Document Name
RP-Z-0013	60602546-ACM-GEN-SW_Z_Z_Z-RP-Z-0013	Planning History & Applications

Appendix 8 - Health & Safety Deliverables

Report Reference	Document Number	Document Name
HS-CH-0001	60602546-ACM-HGN-SW_Z_Z_Z-HS-CH-0001	Road Safety Impact Assessment
HS-CH-0002	60602546-ACM-GEN-SW_Z_Z_Z-HS-CH-0002	Stage F Road Safety Audit (Part 1)
HS-CH-0003	60602546-ACM-GEN-SW_Z_Z_Z-HS-CH-0003	Stage F Road Safety Audit (Part 2)
RA-Z-0002	60602546-ACM-GEN-SW_Z_Z_Z-RA-Z-0002	H&S Risk Assessment of Preferred Option

Appendix 9 - Summary of Public Consultations Feedback

Report Reference	Document Number	Document Name
RP-CH-0001	60602546-ACM-VSS-SW_Z_Z_Z-RP-CH-0001	Post Consultation Report – PC1
RP-CH-0002	60602546-ACM-VSS-SW_Z_Z_Z-RP-CH-0002	Post Consultation Report – PC2
RP-CH-0003	60602546-ACM-VSS-SW_Z_Z_Z-RP-CH-0003	Post Consultation Report – PC3

Appendix 10 - Project Appraisal Deliverables

Report Reference	Document Number	Document Name
SH-CH-0001	60602546-ACM-GEN-SW_Z_Z_Z-SH-CH-0001	Project Appraisal Balance Sheet
CP-CH-0002	60602546-ACM-GEN-SW_Z_Z_Z-CP-CH-0002	Option Comparison Estimates
RP-TR-0001	60602546-ACM-GEN-SW_Z_Z_Z-RP-TR-0001	Cost Benefit Analysis Report
XD-TR-0001	60602546-ACM-GEN-SW_Z_Z_Z-XD-TR-0001	Cost Benefit Analysis Report Appendices
RP-TR-0002	60602546-ACM-GEN-SW_Z_Z_Z-RP-TR-0002	Traffic Modelling Report

