Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Transport Infrastructure Ireland

National Roads Network Indicators 2023

May 2024

Contents

Introduction

Transport Infrastructure Ireland's purpose is to provide sustainable transport infrastructure and services, delivering a better quality of life, supporting economic growth and respecting the environment.

Transport Infrastructure Ireland (TII) has overall responsibility for the planning, supervision, safety, maintenance and operations of the National Roads network.

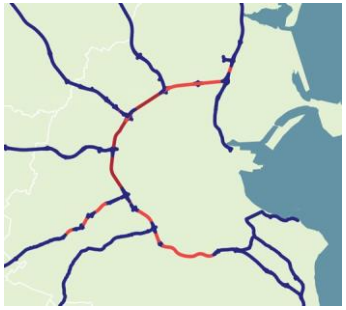
Efficient use of the National Roads network provides a variety of benefits to all road users (drivers, passengers, bus users, road freight) in the form of shorter journey times, reduced traffic congestion and lower vehicle operating costs.

When the National Roads network performs to its highest standard, road users should enjoy safe journeys with predictable travel times. This report analyses the performance and usage of the network and highlights key trends to the public.

A: Key Trends Summary

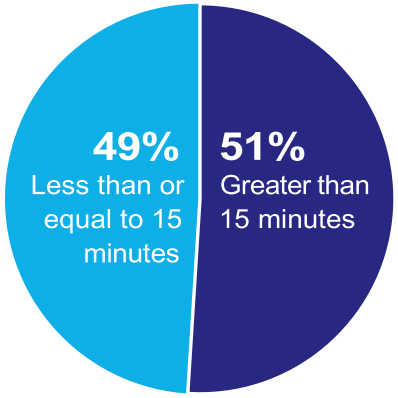
1. Road Network - Travel Hotspots

M50 Dublin area:
100,000 or more vehicles per day hotspot:

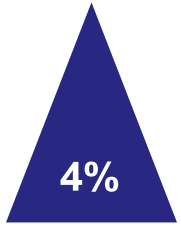


N40 Cork area:
50,000 or more vehicles per day hotspot:

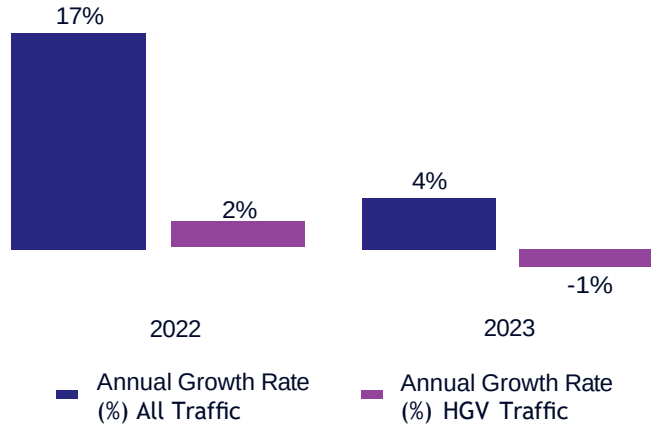
Trip Duration on National and Regional Roads - AM Peak



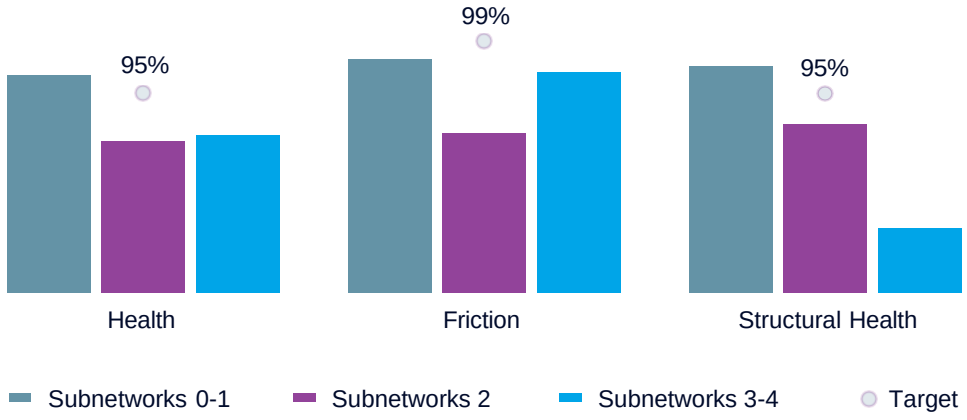
2. Economic - Traffic Growth 2022-2023



Traffic across the network increased by 4% in 2023



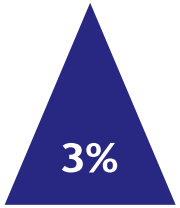
3. Road Condition - Pavement Surface

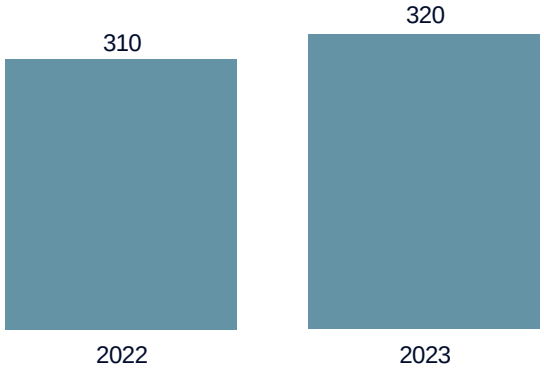


A: Key Trends Summary (Cont.)

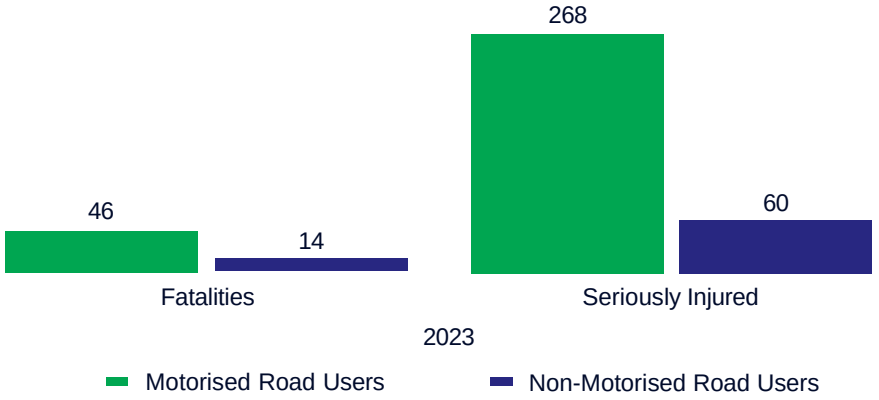
4. Safety - Fatal and Serious Injury Collisions

In 2023, 320 Fatal and Serious Injury Collisions resulted in 60 fatalities and 328 serious injuries on the National Roads Network. This represents a 3% increase from 2022.

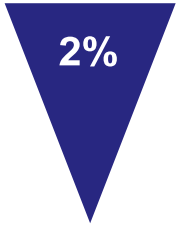




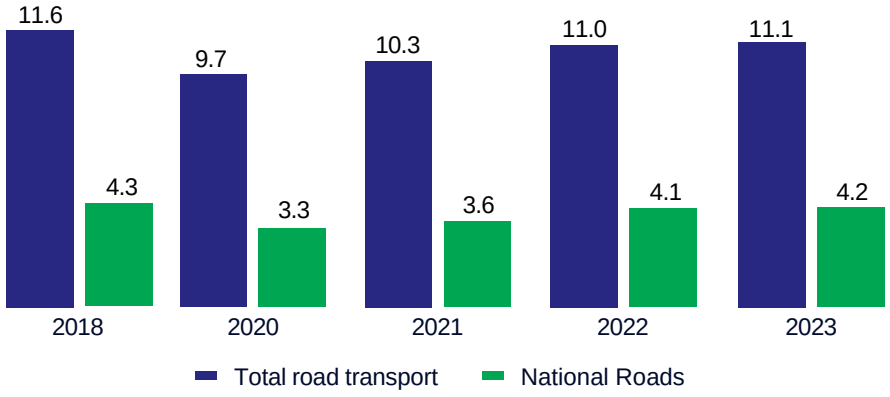
Total Fatalities and Seriously Injured

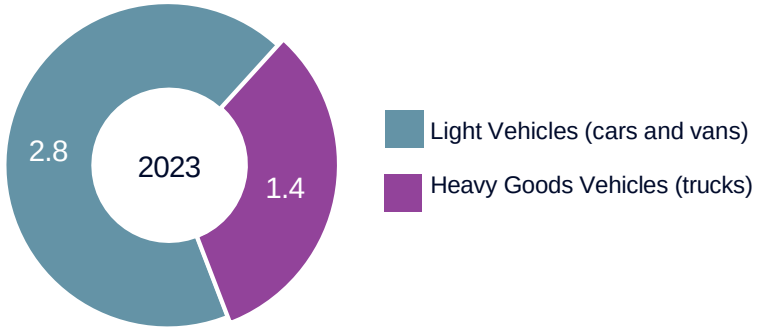


5. Emissions - Annual Road Travel Emissions on National Roads per Vehicle Class (mega tonnes CO_2e)



2% decrease in road travel emissions across the National Roads network in 2023 compared to 2018 baseline.





B: News & Information

How TII Shares News With Road Users

TII's traffic count database includes interactive features.

The site offers enhanced reporting facilities and allows users to create their own dashboard where they can personalise reports.

There are also two global reports available for download: a site-wide monthly summary report and Annual Average Daily Traffic (AADT) and a Heavy Goods Vehicle (HVG) percentage report.

The data is available at trafficdata.tii.ie

Impact Evaluation of National Roads Bypasses on Towns

TII now includes urban realm improvements in the towns bypassed by national road projects to realise the benefits of the bypass and improve opportunities for sustainable mobility.*

TII is undertaking a long-term evaluation of the impacts of bypasses on transport, socio-economic and environmental aspects of bypassed towns.

The town of Macroom, Co. Cork is the first to have a completed one-year post comparative evaluation. Westport, Co. Mayo, Moycullen, Co. Galway, Listowel, Co. Kerry, and Ballyvourney, Co. Cork are also in progress.

*NR2040, 2023.

Updates to National Transport Model

TII is updating the National Transport Model (NTpM), following the release of Census 2022. Additionally, the update aims to support evidence-based decision-making by improving the representation of the movement of people and goods.

This update will empower TII to evaluate future transport policies and plans, while accounting for how different people travel using different modes of transport for individual trips.

Traffic Monitoring and Assistance

TII has over 350 traffic monitoring units around the country that are used to monitor traffic volume and plan future interventions. Additional traffic monitoring units were delivered in 2022.

A **Motorway Service Helpline** is available to assist road users in difficulty on a Motorway. All calls are directed through the Motorway Traffic Control Centre.

T: 0818-715-100 or
E: info@mtcc.ie

Further information and live traffic updates are available at www.tiitraffic.ie

1.

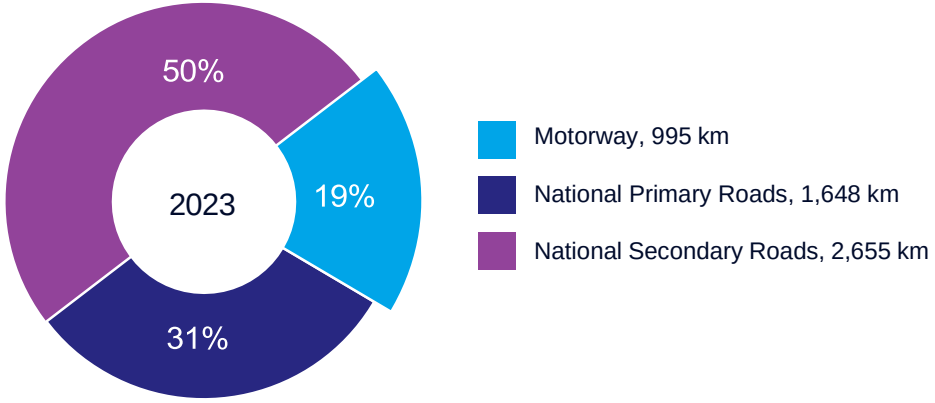
Road Network

A1: Extent of National Roads Network by Classification

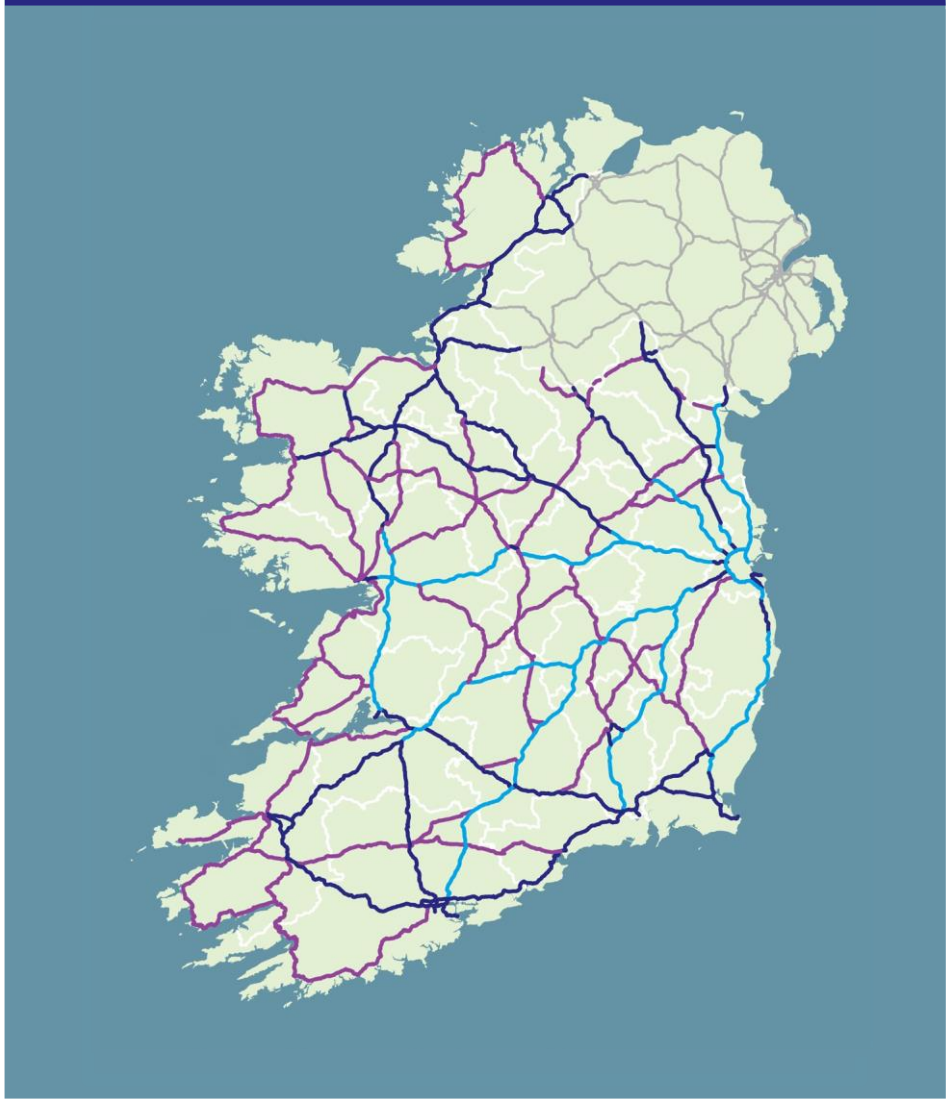
There are approximately 5,300 km of National Roads in Ireland. The length of the network fluctuates every year due to road reclassification, realignments to existing roads and the completion of new roads.

The network encompasses all National Primary Roads, including Motorways, and National Secondary Roads.

Extent of National Roads Network by Classification (2023)



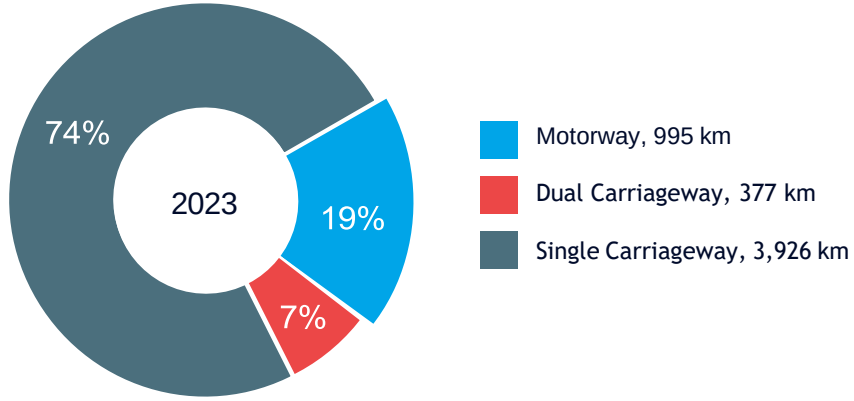
Overview of National Roads Network by Classification (2023)



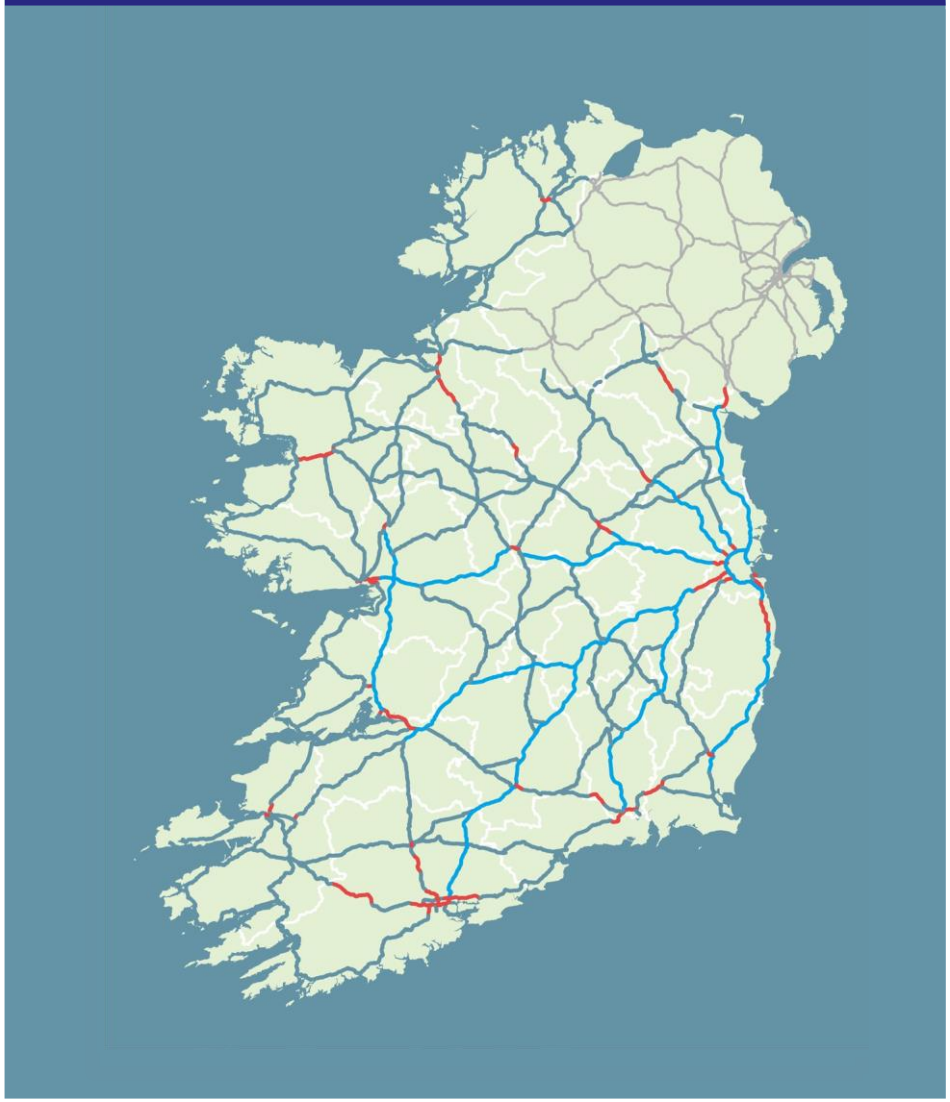
A2: Extent of National Roads Network by Carriageway Type

The National Roads network is also classified by Carriageway Type: Motorways, Dual, and Single Carriageways.

Extent of National Roads Network by Carriageway Type (2023)



Overview of National Roads Network by Carriageway Type (2023)



B1: Level of Usage of the National Roads Network

Traffic levels in 2023 increased from 2022, with maximum AADT levels reaching over 150,000 per day.

- In 2023, the M50 experienced the highest levels of traffic across the country.
- In 2023, the N40 experienced similar traffic levels to 2022.

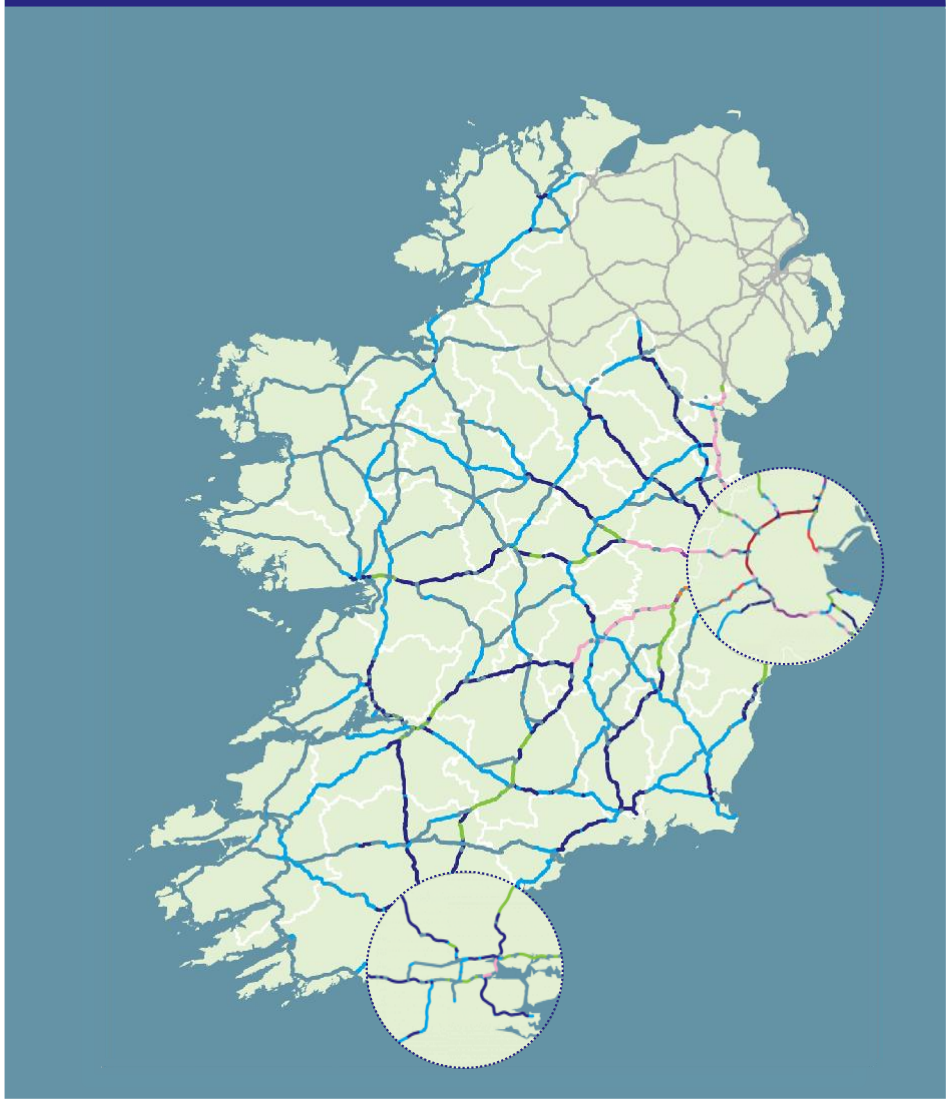
Level of Usage of the National Roads Network Measured by Annual Average Daily Traffic (AADT) (2023)

B2: Freight Movements on the National Roads Network

The National Roads network is used by high numbers of freight vehicles (i.e. vehicles that carry and deliver goods). Ireland's economy is dependent on the efficient movement of goods, both domestically and internationally.

- The M50, the N7, the M7, and Dublin radial routes carried the highest levels of HGV traffic in 2023.

Level of Usage of the National Roads Network by HGV Measured by Annual Average Daily Traffic (AADT) (2023)

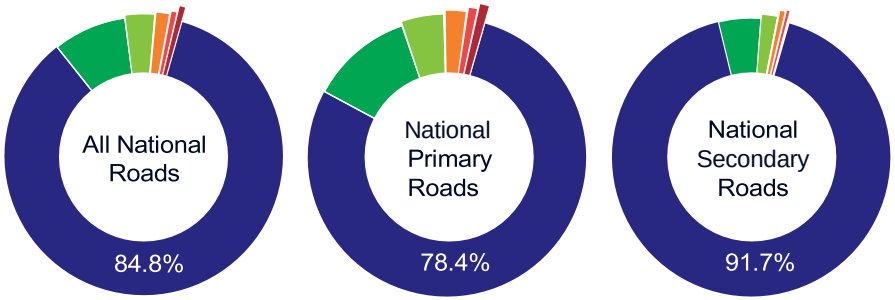


C1: Level of Service: Morning Rush-Hour

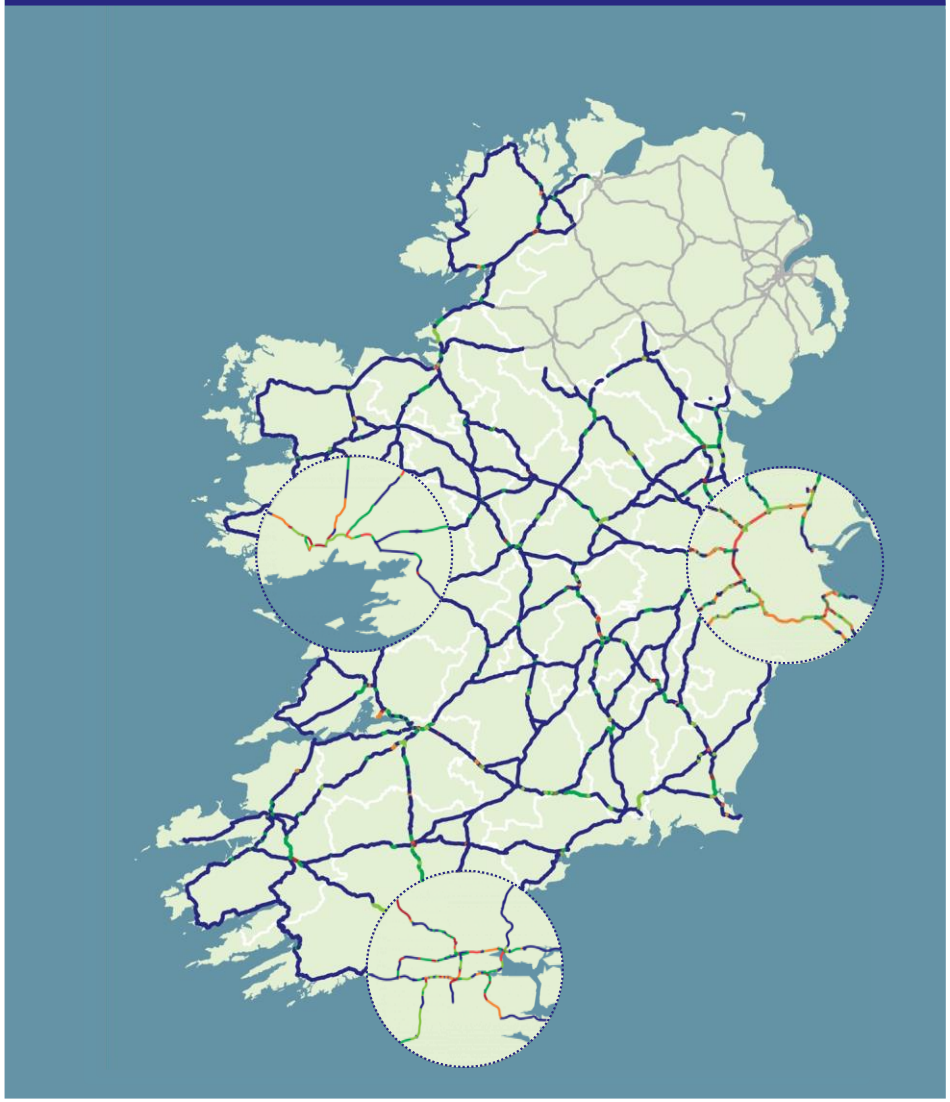
Level of service (LOS) is a measurement used to evaluate road performance in terms of traffic flow and speed. It considers factors such as vehicle speed, mobility and safety.

For further information see: Transport Research and Information Note: A Study of Lane Capacity, online at www.tii.ie/tii-library/strategic-planning

Levels of Service by Road Type (2023)



Level of Service Provided by the National Roads Network During Morning Rush-Hour (2023)



D1: M50 Performance Summary

2023 Key Network Statistics

The M50 is the most heavily used road in the country with close to 150,000 vehicles travelling several sections on an average day.

13,394
Highest hourly flow recorded on the N3 - N2 section at 4pm and 5pm on 27th April

184,978
Highest Daily Flow Recorded on M50 between the N3 - N2

Thursday
Busiest Typical Day

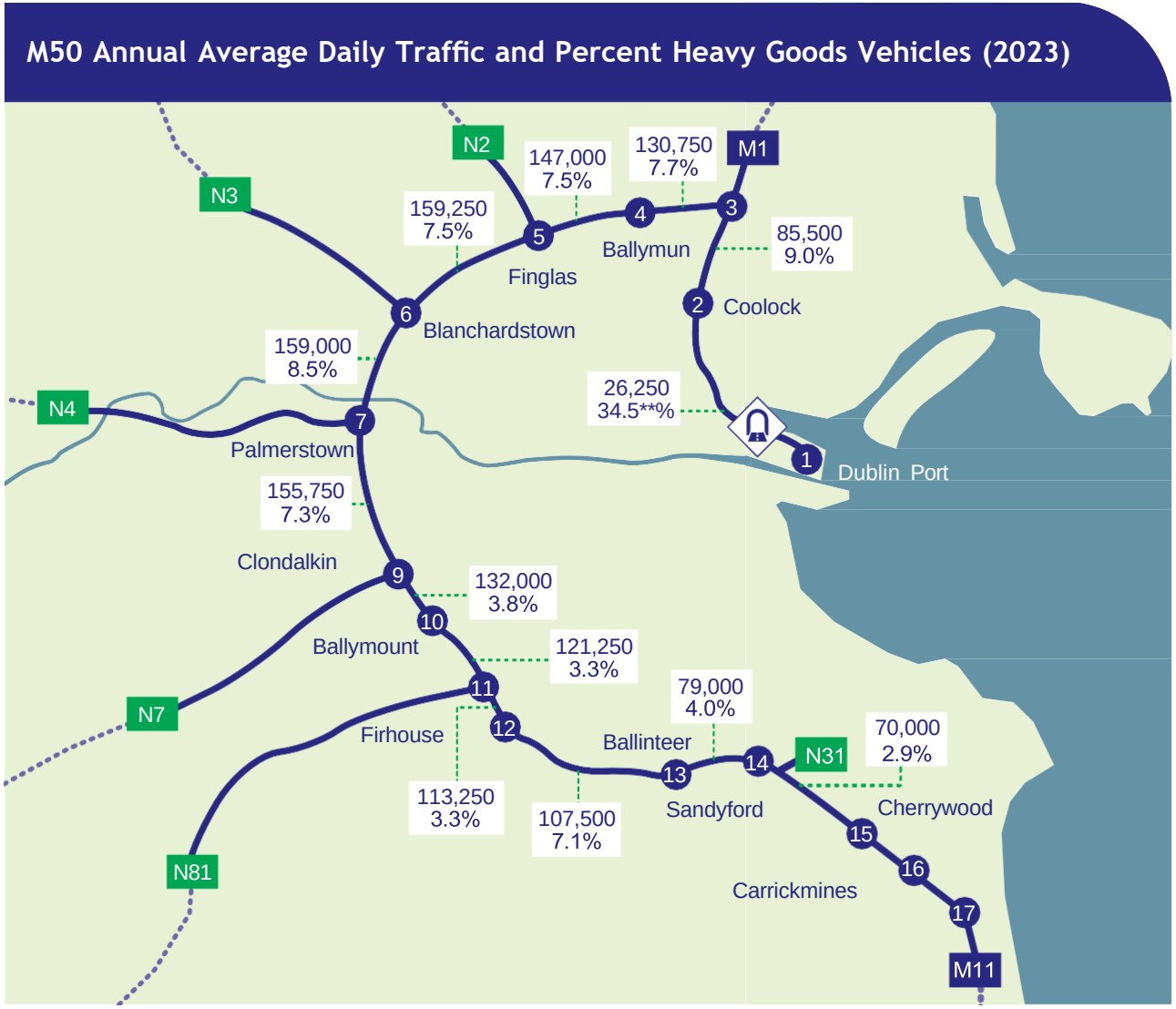
1.6 billion
Vehicle km travelled which represents a 3% increase on 2022

17:00 - 18:00
Peak Incident Time

1,933
Total No. of Incidents of which **737** were Traffic Collisions

15 minutes
Average Response Time to Incidents

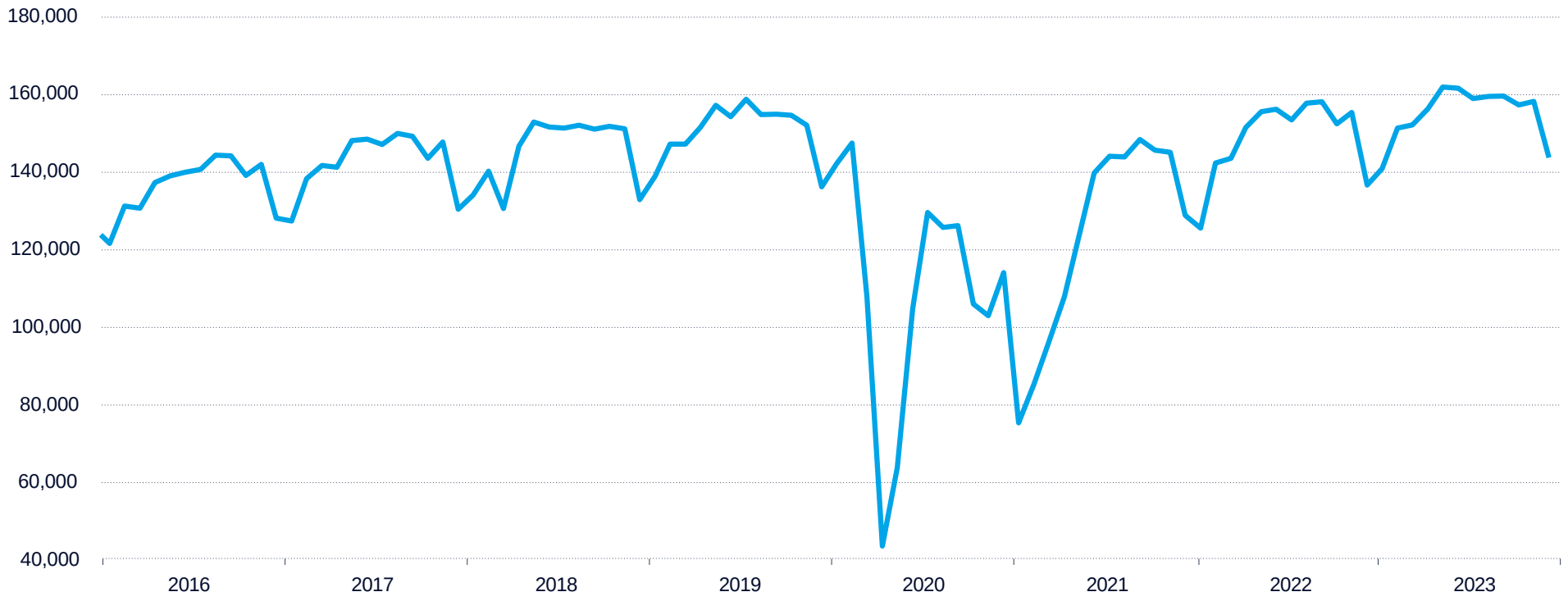
28 minutes
Median Duration of Incidents



* Data at M50 traffic monitoring unit sites J15-J16 and J16-J17 for 2023 is unavailable due to engineering works associated with the M50 eMOS project.
** This figure represents non-tollable traffic volumes at the Dublin Tunnel, which includes HGVs and buses.

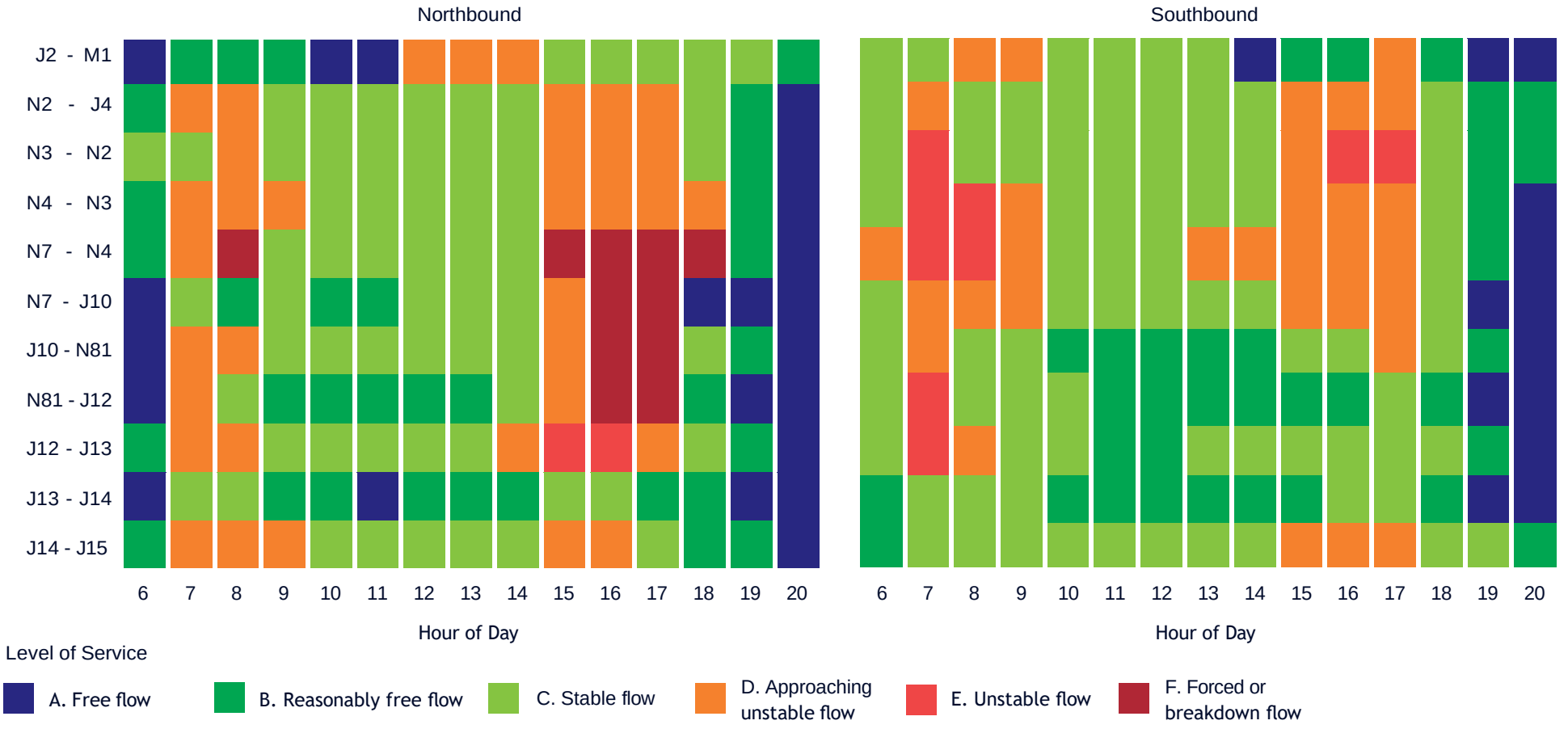
D2: M50 Performance Summary

Monthly Average Daily Traffic (MADT) on the M50 (2016-2023)



Monthly average daily traffic measures the average daily traffic over the period of a month. This is shown above at the location of the M50 eflow toll bridge, for each month between 2016 and 2023

M50 Level of Service
Typical Working Day in 2023



Average hourly levels of service for 2023 were analysed from TII Traffic Monitoring Units to give an indication of travel congestion and typical working days.
A typical working day in 2023 refers to all weekdays, excluding school holidays and public holidays.
*Data at M50 traffic monitoring unit sites J15-J16 and J16-J17 for 2023 is unavailable due to engineering works associated with the M50 eMOS project.

D3: N40 Performance Summary

2023 Key network statistics

Several sections of the N40 Cork Southern Ring Road carry in excess of 80,000 vehicles on an average day.

7,947
Highest hourly flow recorded on the Kinsale Rd - Douglas section at 4pm on 26th October

101,297
Highest Daily Flow Recorded on the Kinsale Rd - Douglas section

Thursday
Busiest Typical Day

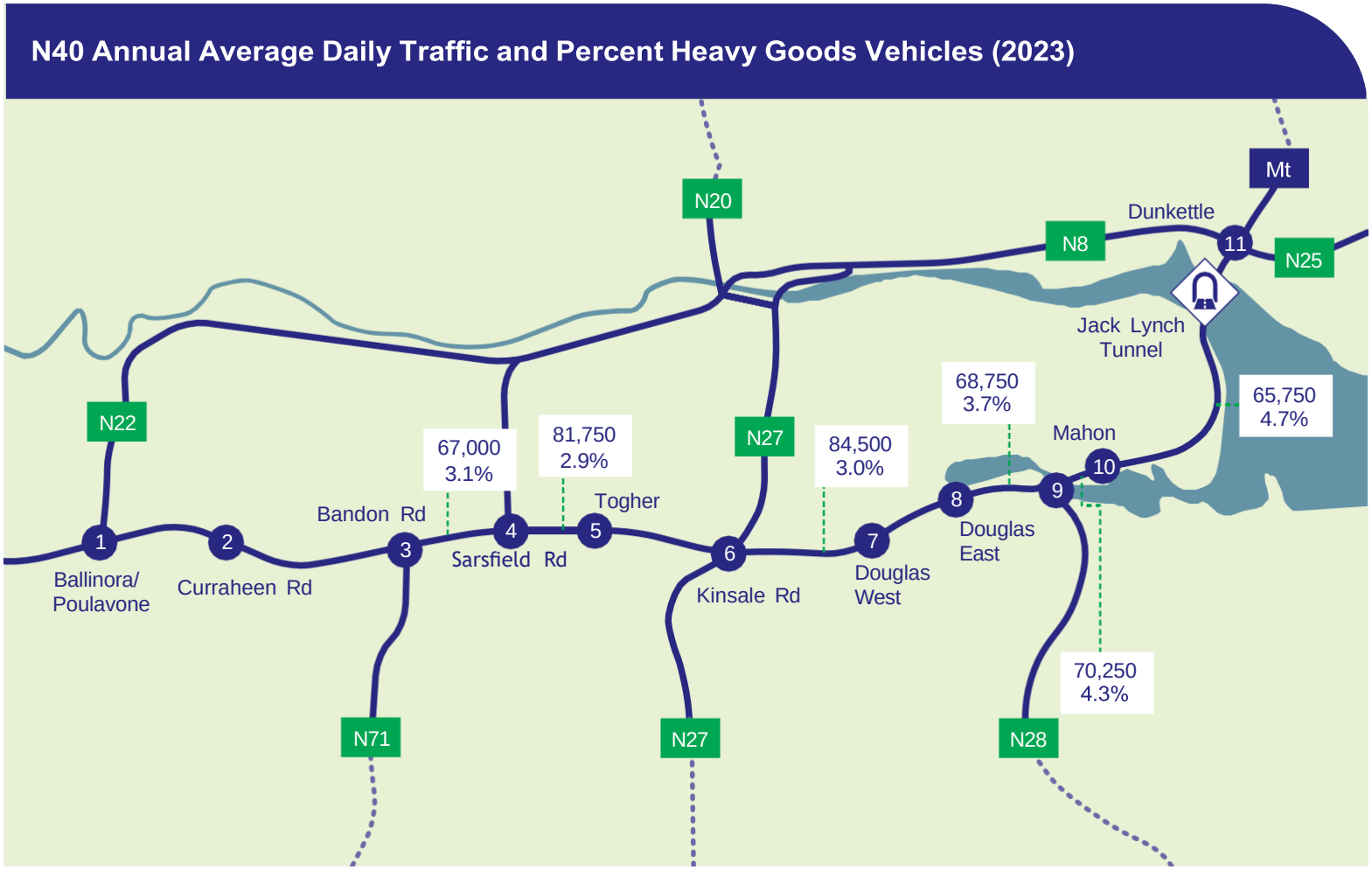
0.34 Billion
Vehicle km travelled which represents a 9% increase on 2022

09:00 - 10:00
Peak Incident Time

254
Total No. of Incidents of which **73** were Traffic Collisions

15 minutes
Average Response Time

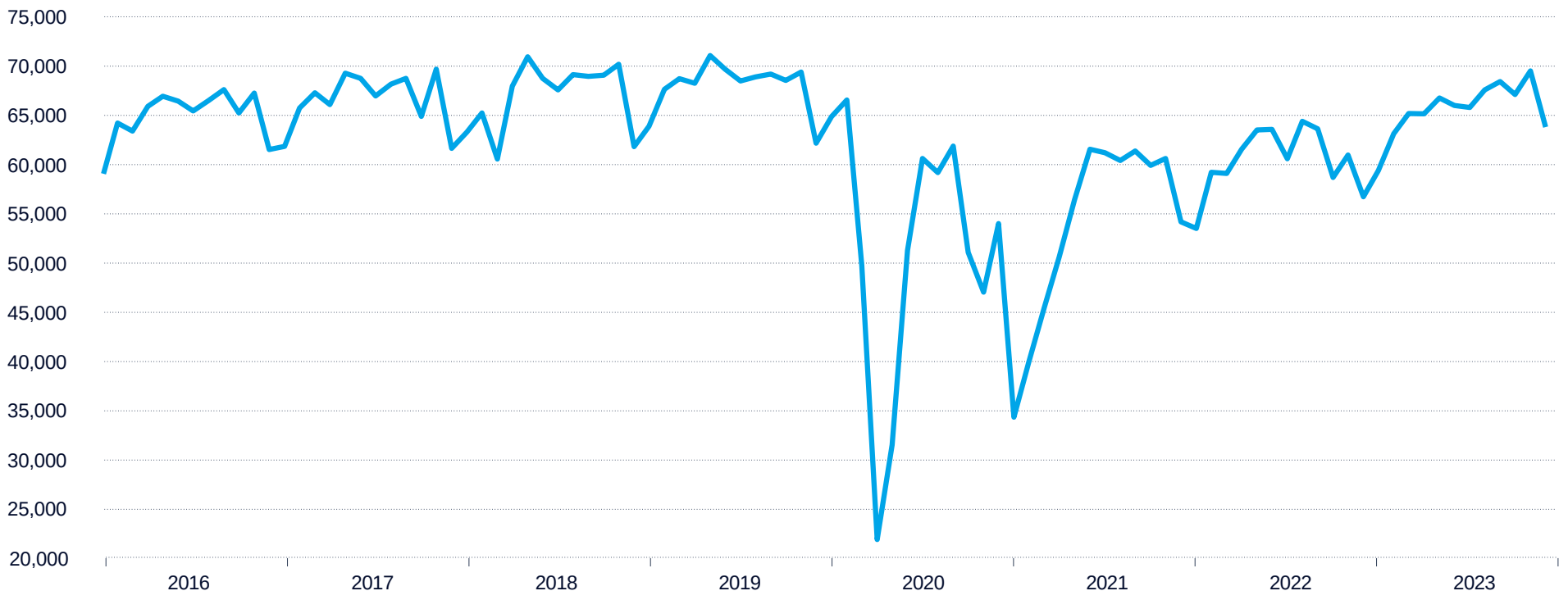
44 minutes
Median Duration of Incidents



*TMU data unavailable for several months in 2023 between J1-J2, this site is therefore excluded for this year

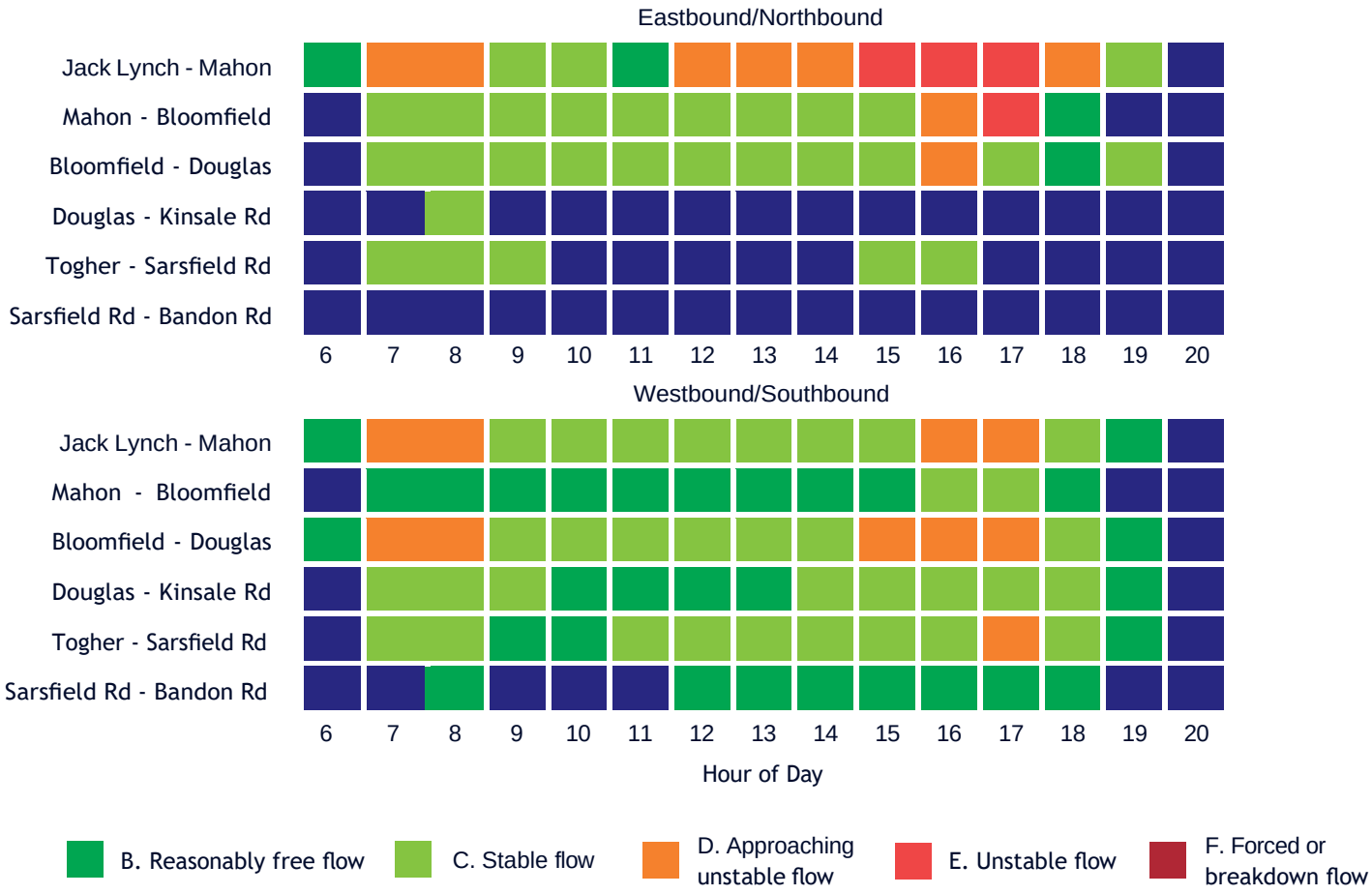
D4: N40 Operational Performance

Monthly Average Daily Traffic (MADT) on the N40 (2016-2023)



Monthly average daily traffic measures the average daily traffic over the period of a month. This is shown above at the location of the Jack Lynch Tunnel, for each month between 2016 and 2023

N40 Level of Service
Typical Working Day in 2023



Average hourly levels of service for 2023 were analysed from TII Traffic Monitoring Units to give an indication of travel congestion and typical working days.
A typical working day in 2023 refers to all weekdays, excluding school holidays and public holidays.
*TMU data unavailable for several months in 2023 between J1-J2, this site is therefore excluded for this year

D5: Dublin Radials Performance Summary

The Dublin Radials represent some of the busiest routes in Ireland converging onto the M50 and providing access to the Greater Dublin Area. They are made up of National Primary Routes including the M1, M2, N3, N4, N7, N81 and M11.

158,664
Highest Daily Flow Recorded on the **M1** between the M50 and Dublin Airport

54,312
Highest Daily Flow Recorded on the **M2** between the M50 and Coldwinters

93,885
Highest Daily Flow Recorded on the **N3** between Blanchardstown and Clonsilla

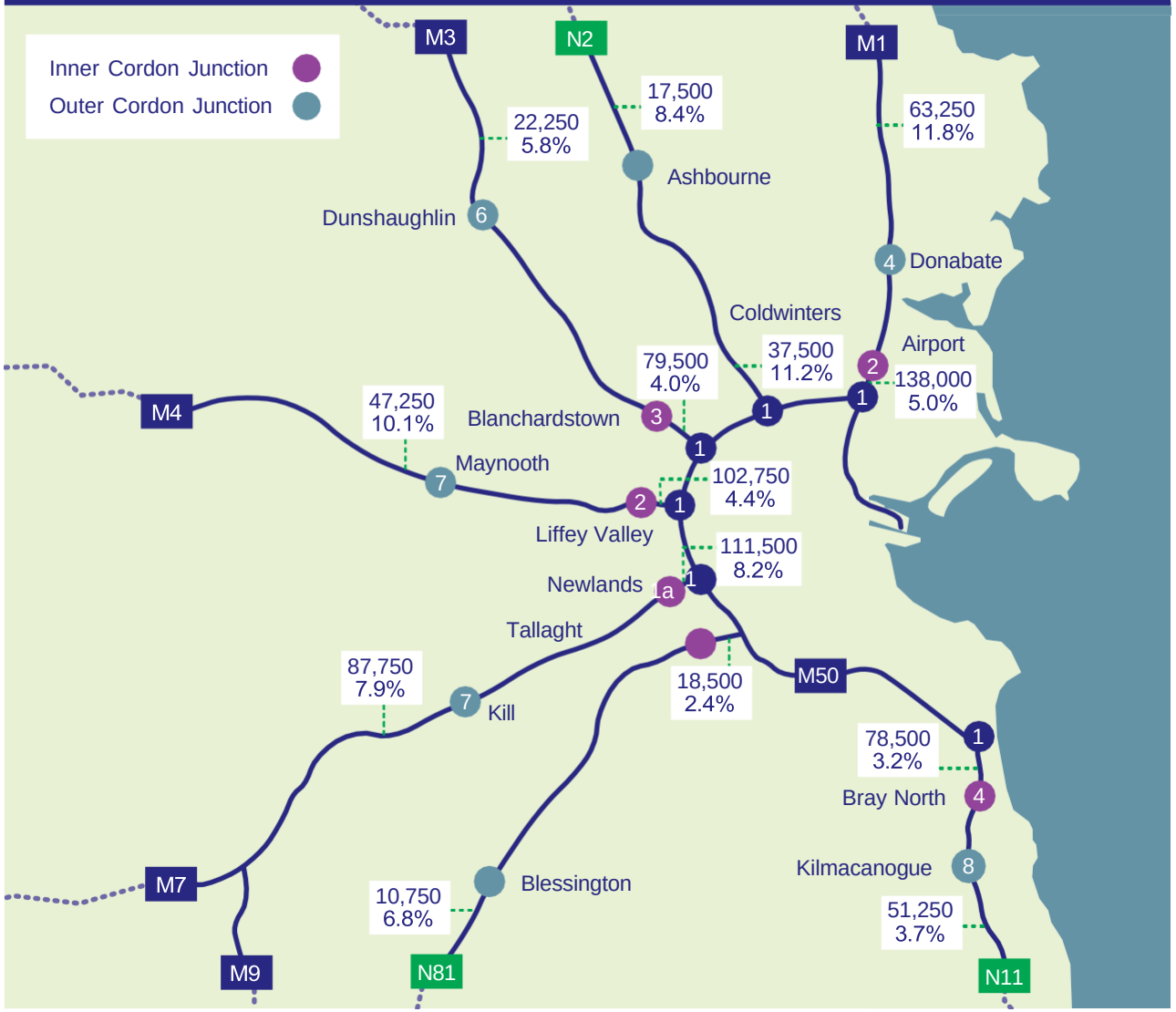
116,900
Highest Daily Flow Recorded on the **N4** between the M50 and Liffey Valley

132,278
Highest Daily Flow Recorded on the **N7** between the M50 and Newlands

34,815
Highest Daily Flow Recorded on the **N81** between the M50 and Tallaght Village

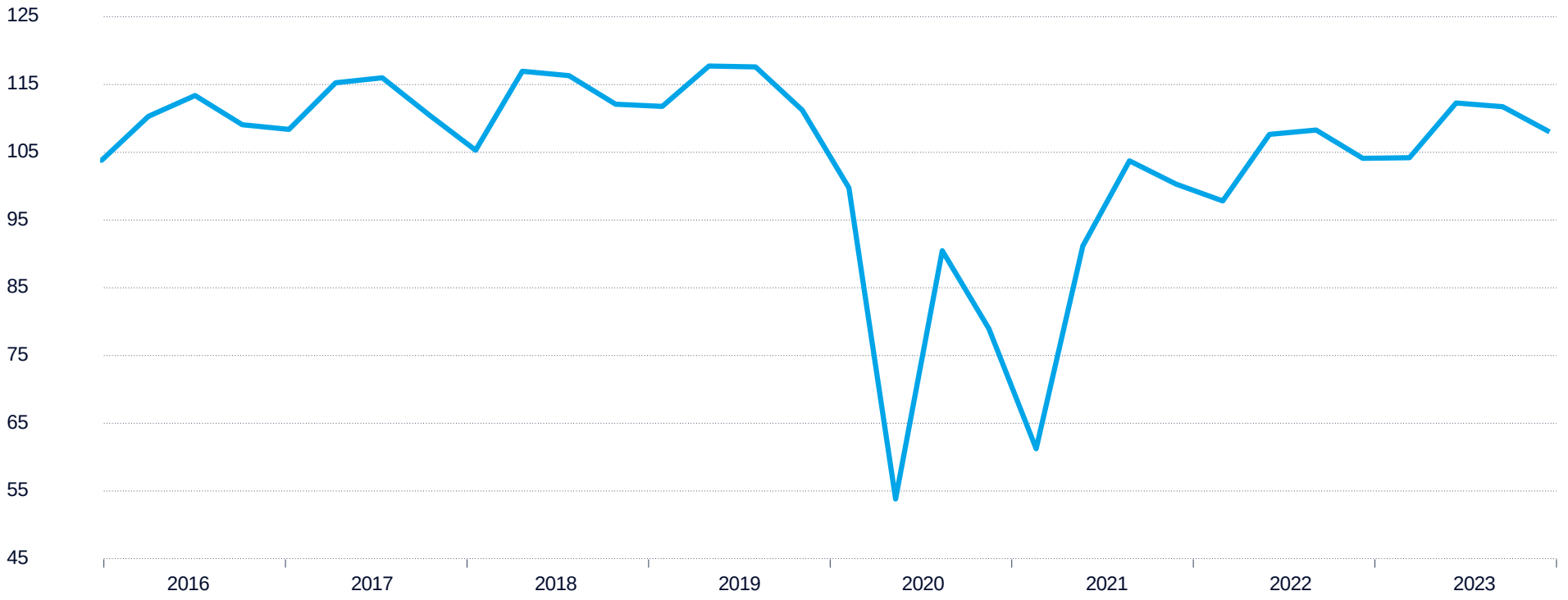
90,811
Highest Daily Flow Recorded on the **M11** between the M50 and Bray North

Dublin Radials Annual Average Daily Traffic and Percent Heavy Goods Vehicles (2023)



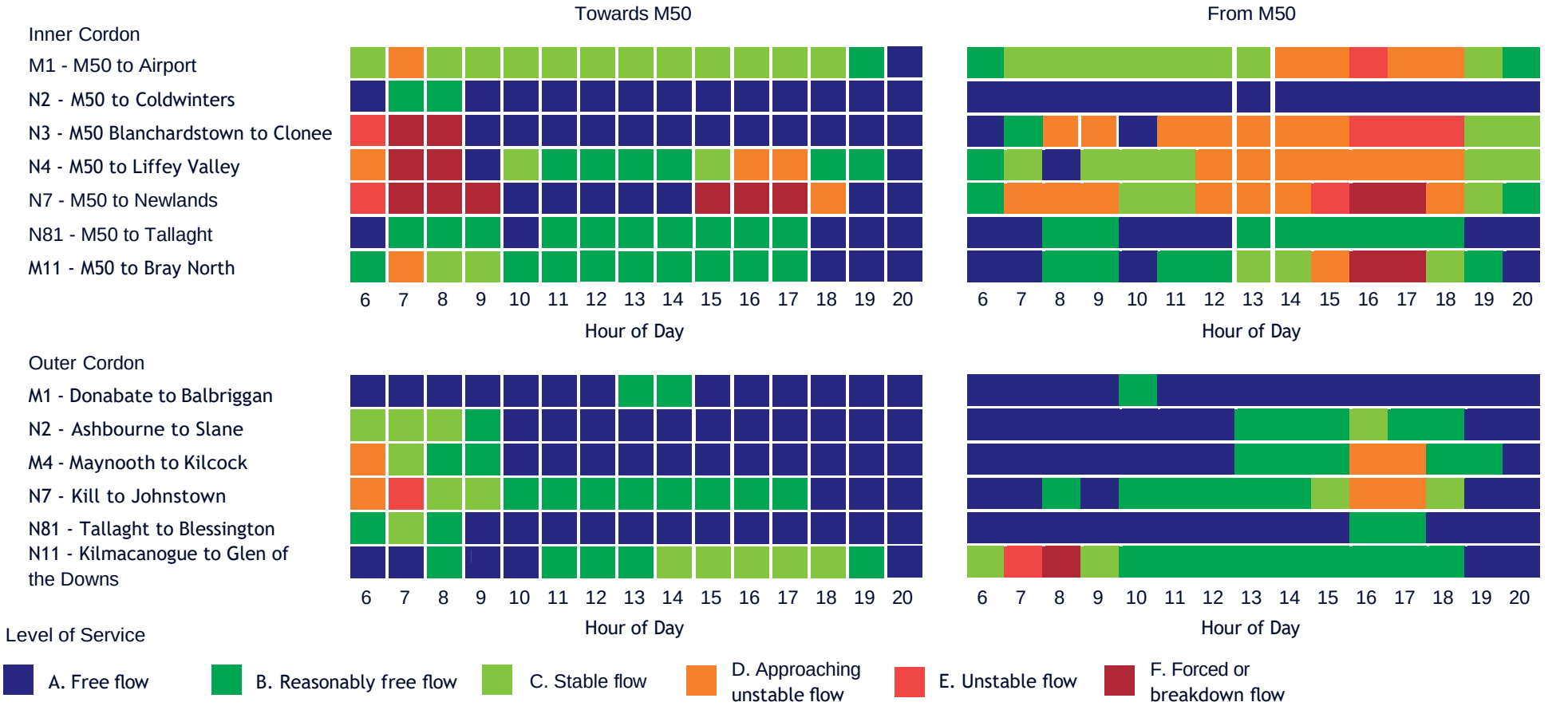
D6: Dublin Radials Performance Summary

Quarterly Traffic Profile of Dublin Radials (2016-2023)
Traffic Volume Index (Base Q3 2016)



Trends in traffic volumes on the Dublin Radials are represented above as a quarterly index of aggregate traffic volumes on each route between 2016 and 2023.

Dublin Radials Level of Service
Typical Working Day in 2023



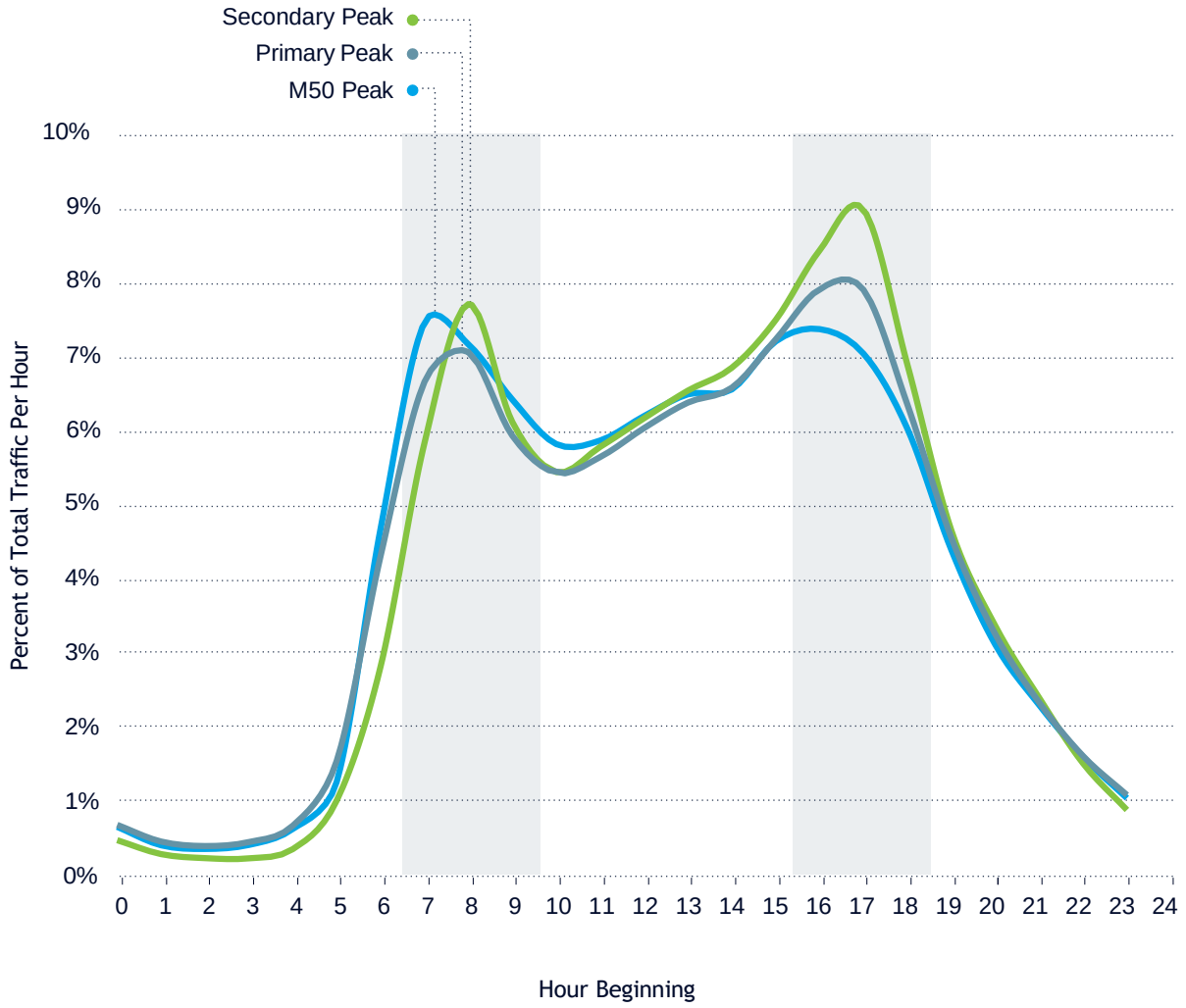
Average hourly levels of service for 2023 were analysed from TII Traffic Monitoring Units to give an indication of travel congestion and typical working days. A typical working day in 2023 refers to all weekdays, excluding school holidays and public holidays. The inner and outer cordons presented above match the locations shown on the map of the Dublin Radials on Page 23.

E: Roads Usage Over the Day

Peak periods on Ireland's National Roads are defined by the demand for travel along the network at a given time. Peak periods have a level of traffic that is usually 30-50% above off-peak levels.

- The peaks on the M50 were more prolonged than other roads with significant traffic flows maintained during the inter-peak periods.

Average Daily Traffic Profile and Peak Periods on the National Roads Network (2023)

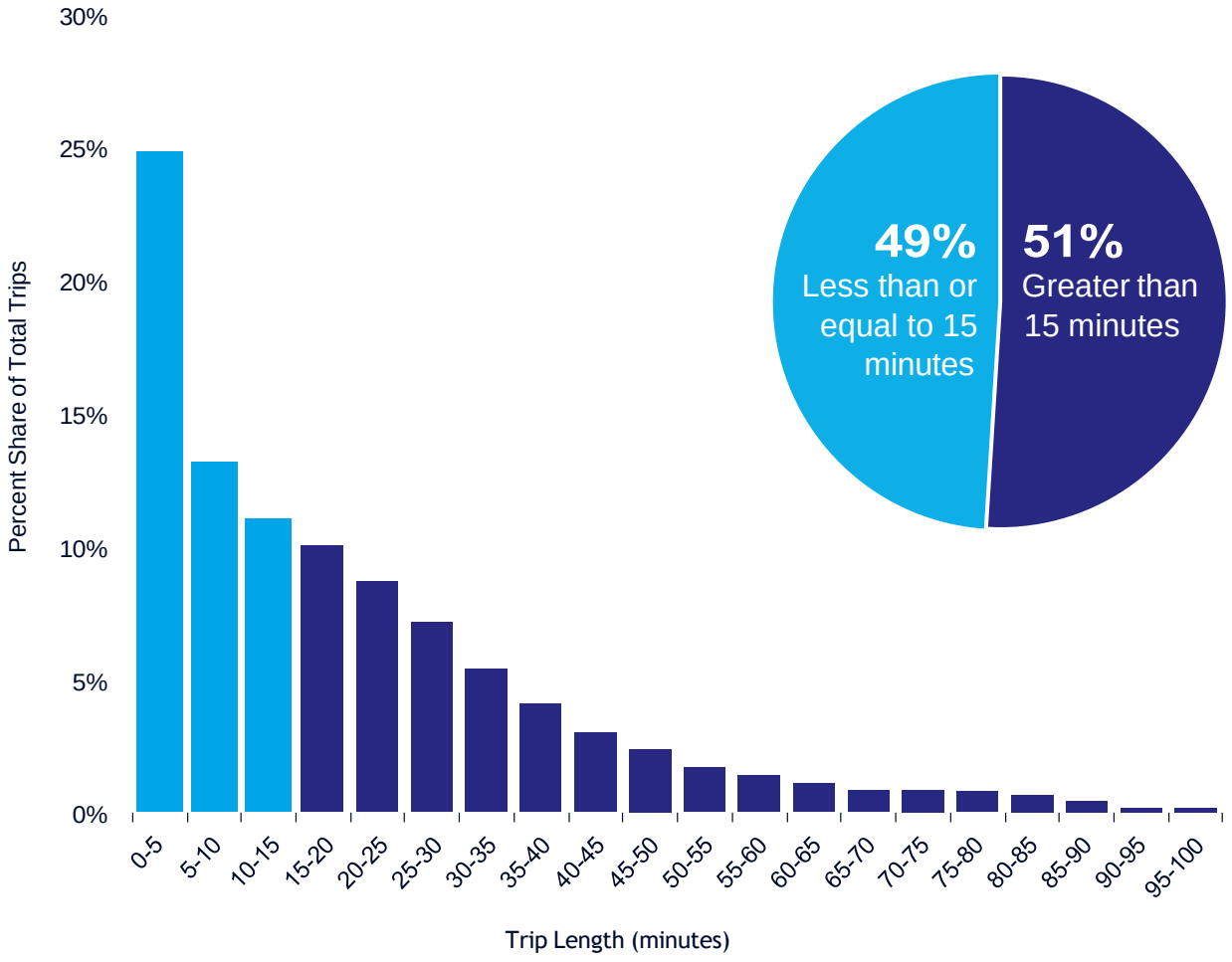


F: Trip Duration on National and Regional Roads

Across Ireland's National and Regional Roads networks, a significant portion of trips that people make are of short duration.

In total in 2023, 49% of trips were of 15 minutes duration or less. The average trip duration was 22 minutes.

Trip Duration on National and Regional Roads - Light Vehicles AM Peak



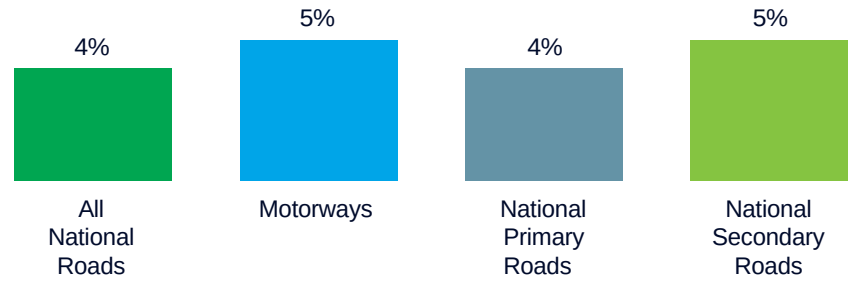
G: Annual Traffic Growth Rates

Traffic levels were up 4% across the National Roads network in 2023 compared to 2022 and have now returned to the pre-pandemic levels seen in 2019

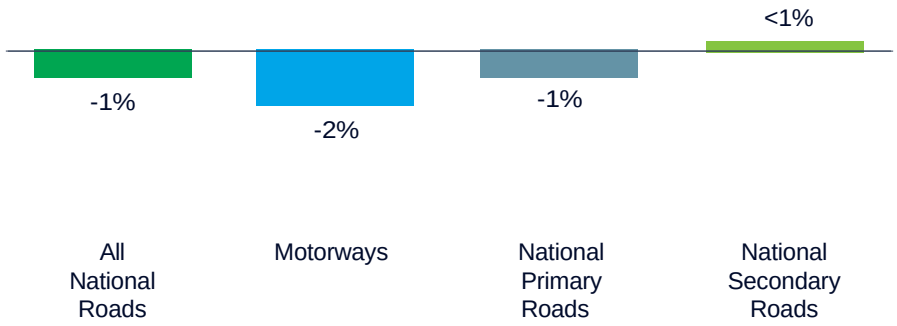
Annual traffic growth rates vary greatly by road type and vehicle type. Roads across different regions of Ireland experienced different levels of growth throughout 2023

Heavy Goods Vehicles seen a slight reduction in growth of 1% relative to 2022. There was a limited impact upon HGVs as result of the pandemic and levels in 2023 are slightly above the pre-pandemic levels seen in 2019.

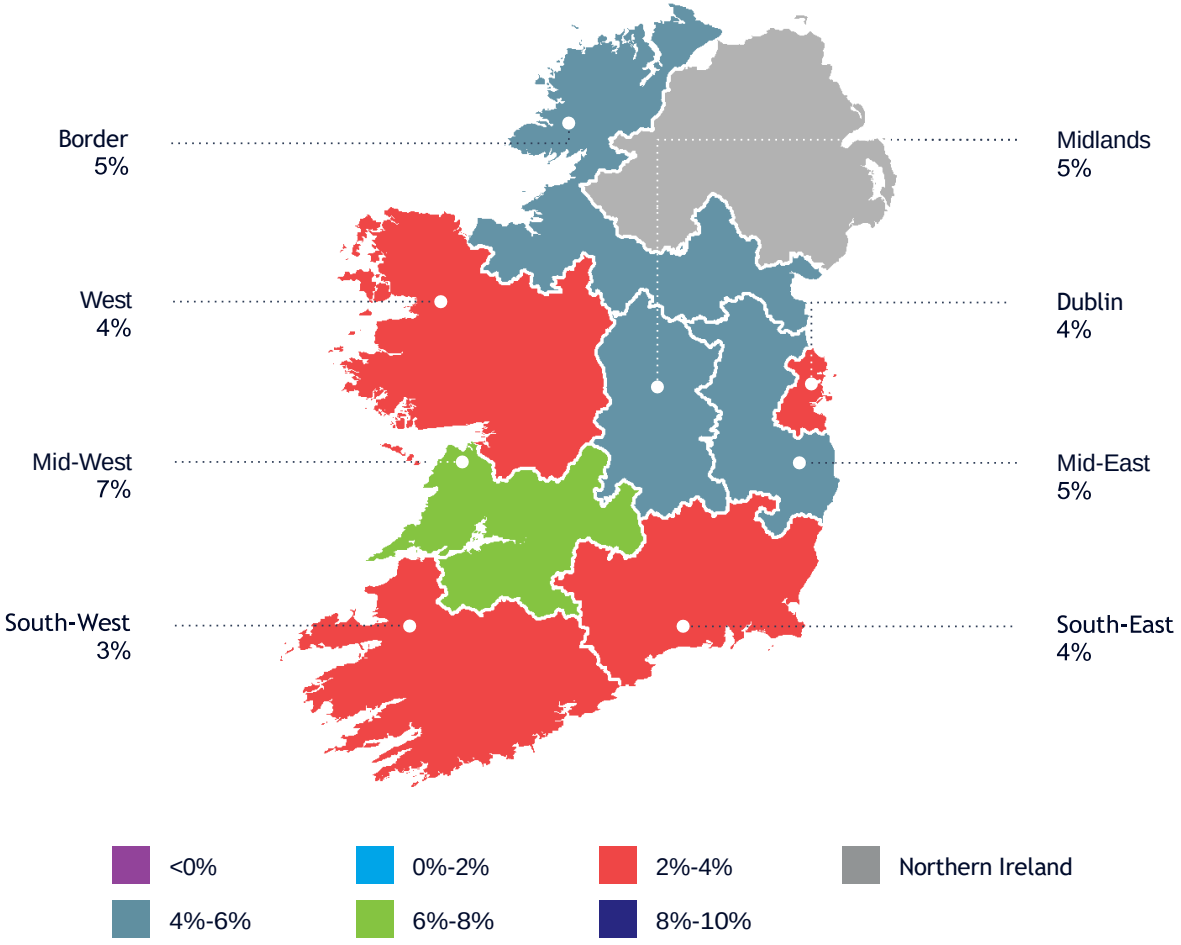
Annual Traffic Growth Rates by Road Type - All Vehicles (2022-2023)



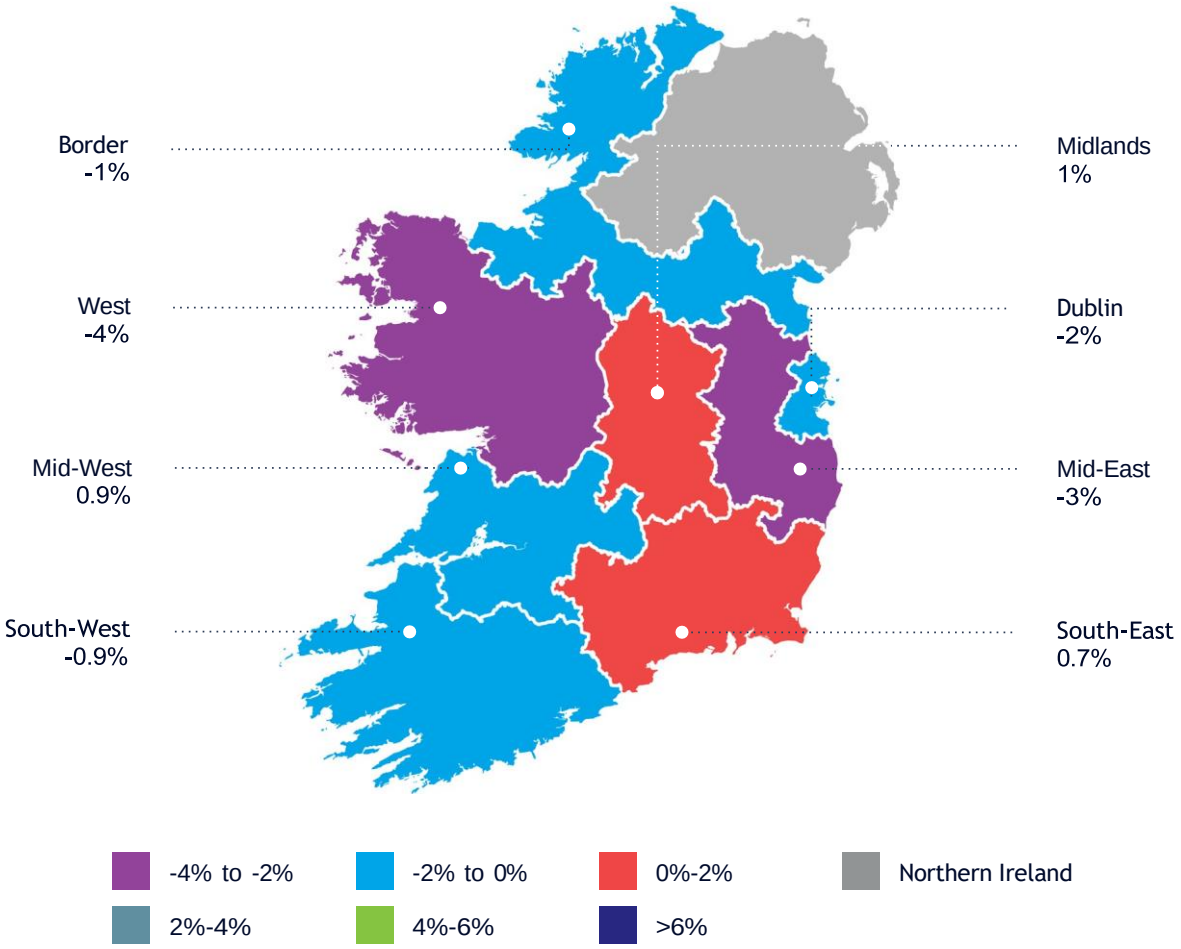
Annual Traffic Growth Rates by Road Type - Heavy Goods Vehicles (2022-2023)



Annual Traffic Growth Rates by Region - All Vehicles (2022-2023)



Annual Traffic Growth Rates by Region - Heavy Goods Vehicles (2022-2023)

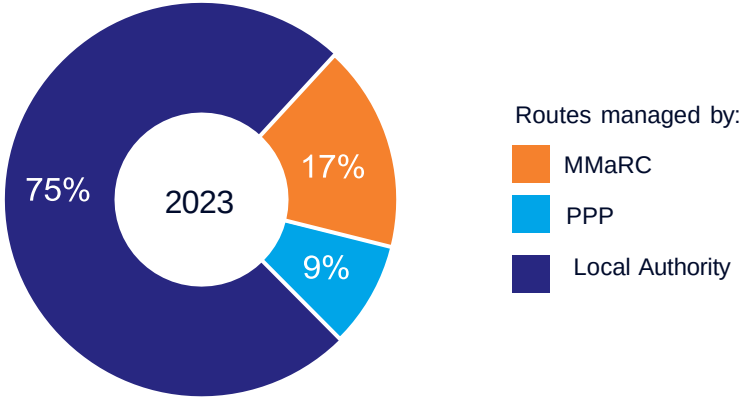


H: Network Management

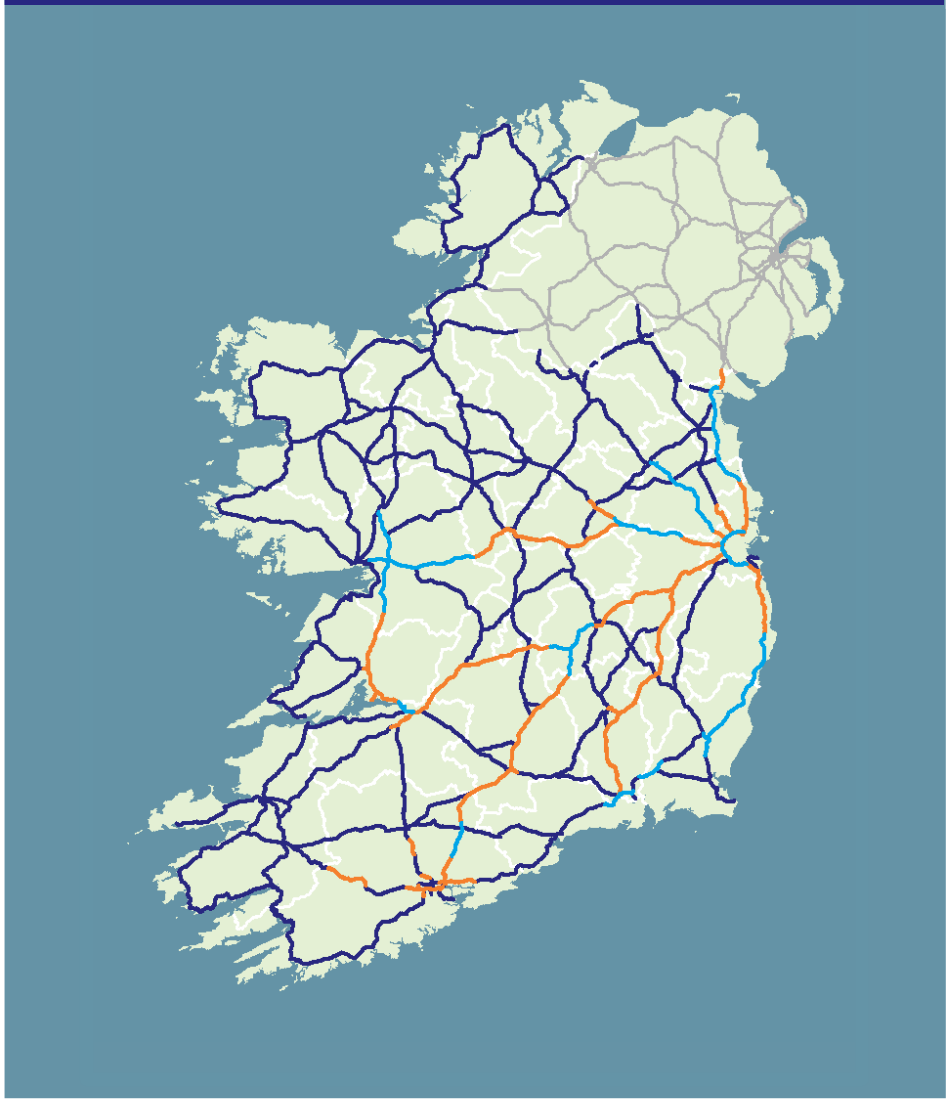
The responsibilities for the Management of the National Roads network are assigned to a number of bodies, with the majority share of National Primary and National Secondary roads administered by local authorities.

Motorways are managed under Motorway Maintenance and Renewal Contracts (MMaRC) or by Public-Private Partnership (PPP) concession companies.

Route Management Breakdown (km)



Overview of the responsibilities for the Management of the National Roads Network



Network Management Key Facts:

131
weather stations in operation on the National Roads Network

63
nights in 2023 where the temperature reached below zero

334
demountable snow ploughs

395
salt spreaders

39,508
tonnes of salt were used on National Roads Network in 2023

1,608
SOS phones in the country

16,469
all emergency calls received by Motorway Traffic Control Centre including SOS phones

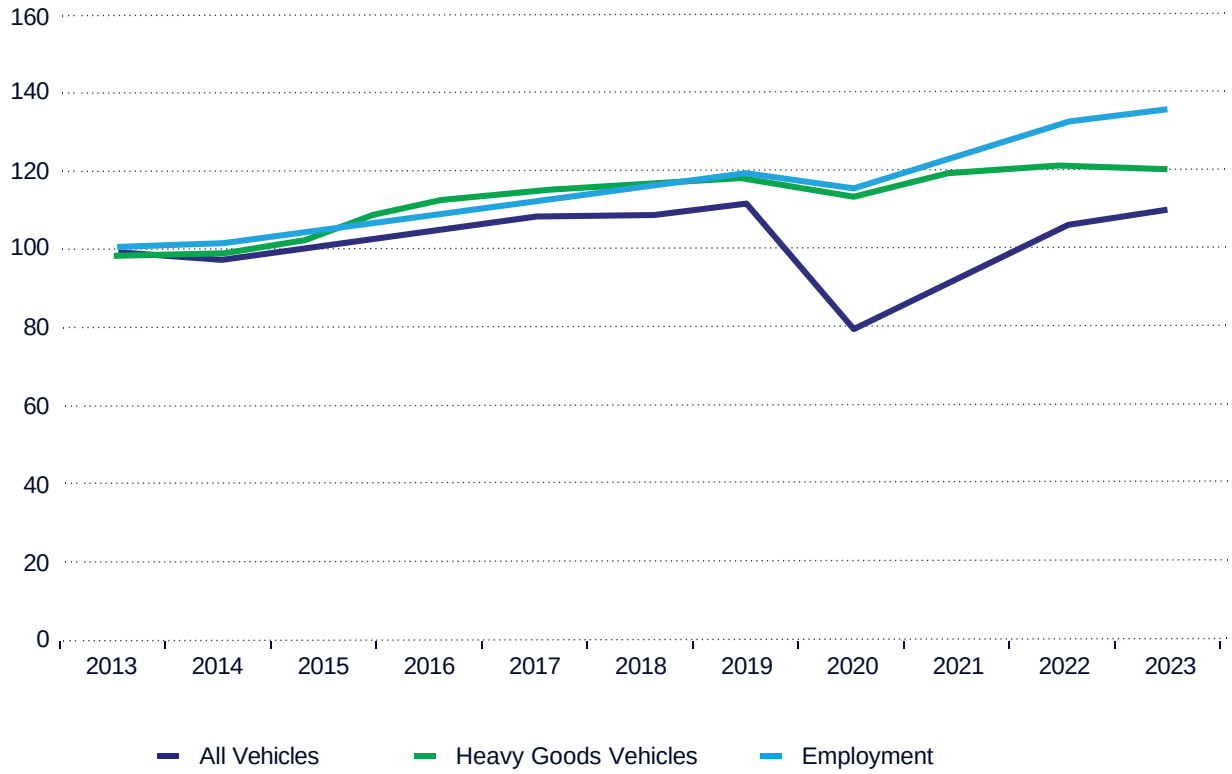
2.

Economics

A: Economic Trends in Transport

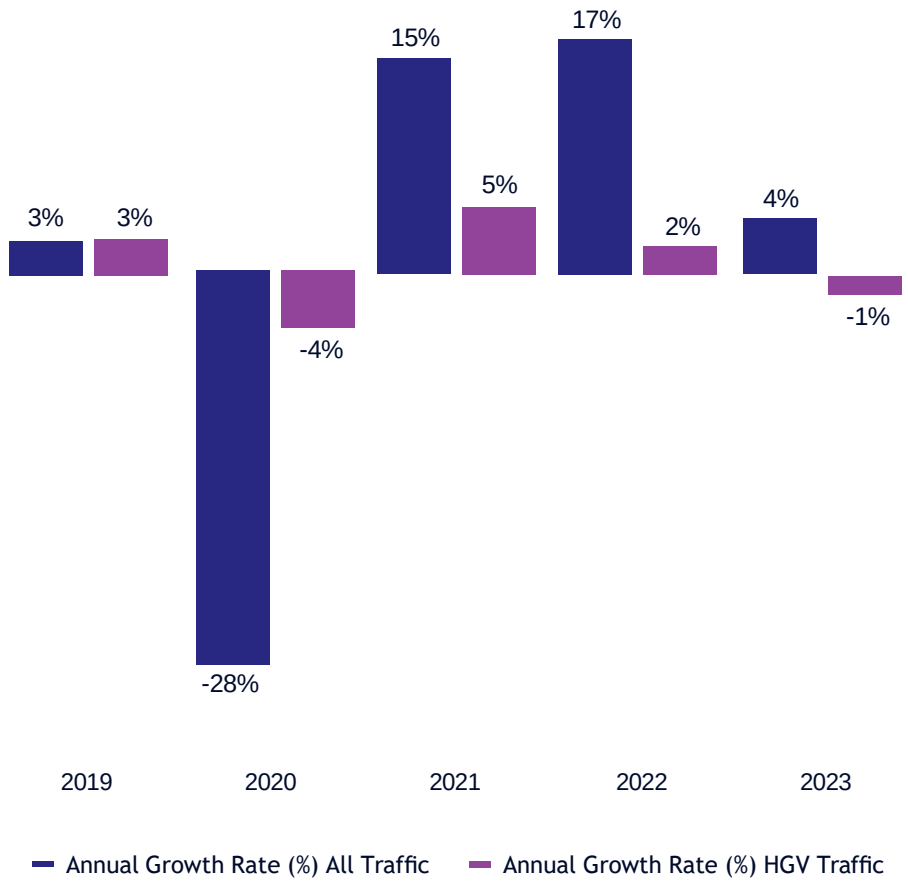
Analysis indicates that Ireland's economic growth trajectory is starting to diverge from traditional indicators like traffic growth. As the level of traffic on the National Road network has recovered to post-pandemic levels (2019), it appears to now be stabilising. However, economic growth in employment level terms has sustained its divergence from traffic levels. This economic growth is reflected in Gross National Income (GNI) having grown by 140 per cent over the same period. This emerging divergence between employment and traffic levels is no longer a temporary response to Covid-19, it represents a potential structural transformation in travel behaviour, as hybrid work models, improvements in public transport and active mode infrastructure, have provided alternatives to private vehicle travel.

Index of Vehicle Kilometres of Travel on All National Roads and Gross National Income*

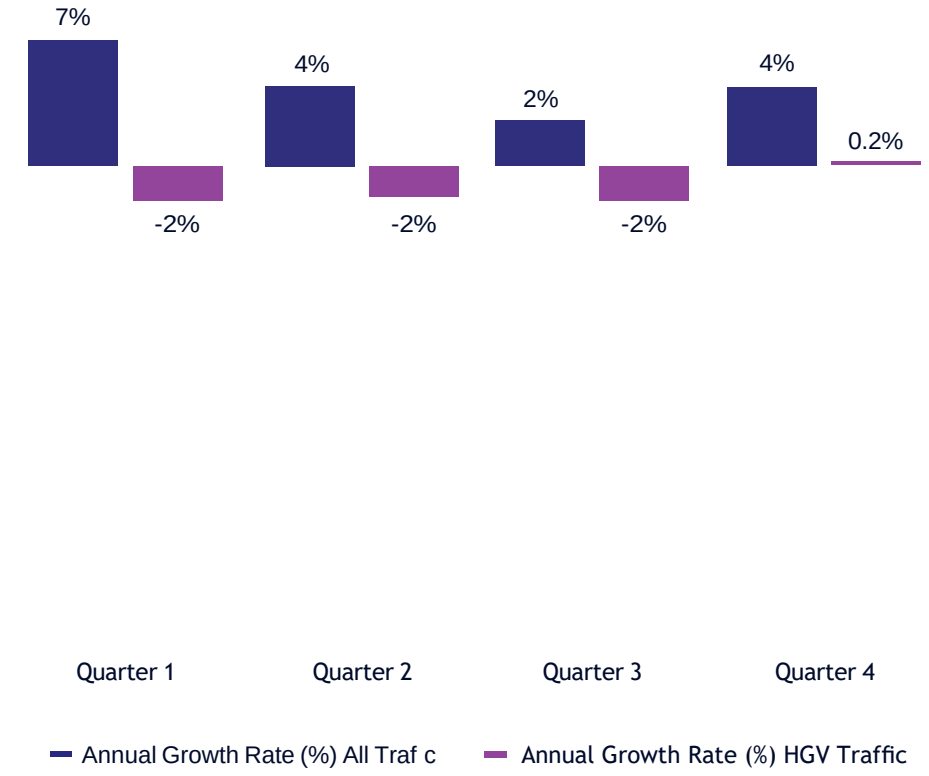


Source of traffic data: https://traffic.tii.ie/
Source of employment data; https://data.cso.ie/table/QLF01

Annual Growth Rate on the National Roads Network



Quarterly Year-over-Year Growth Rate on the National Roads Network (2022-2023)



3.

Road Condition

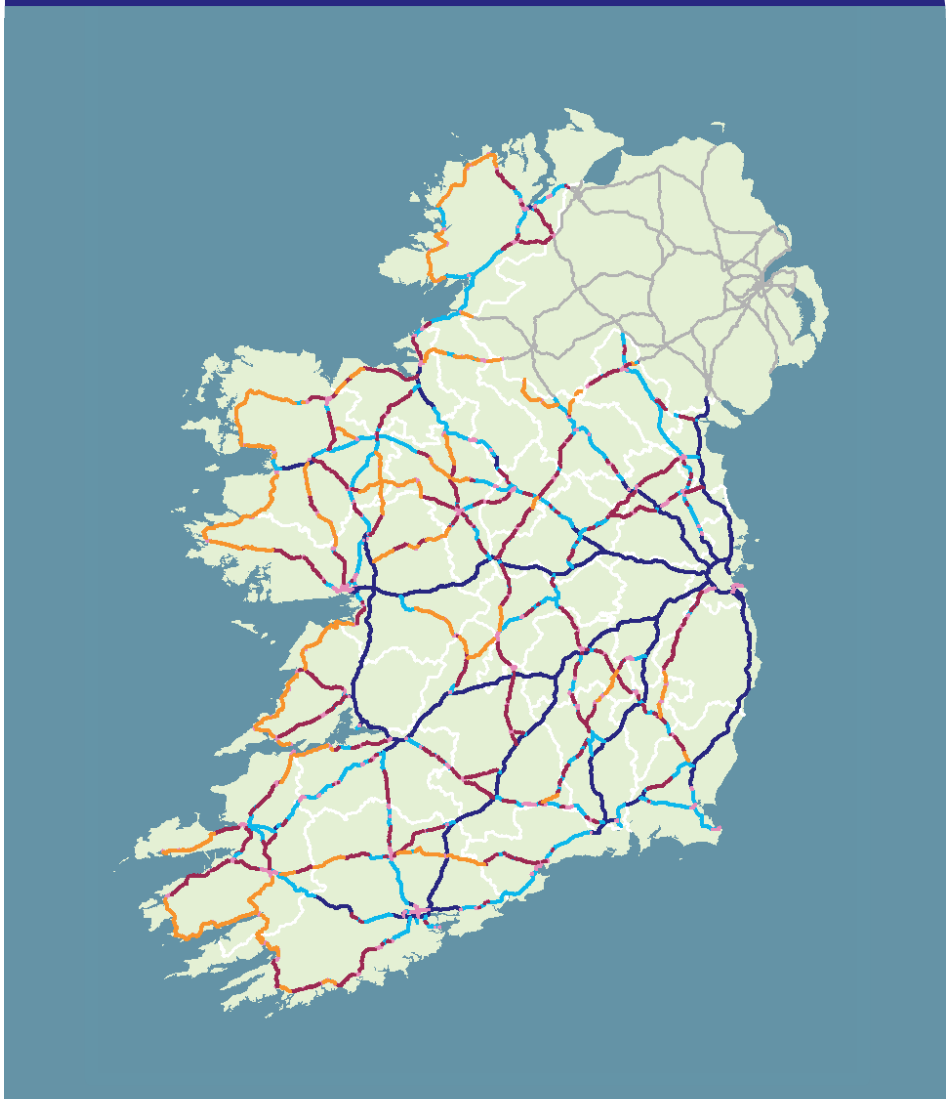
A1: Pavement Maintenance

There is over 5,300 kilometres of road pavement within the National Roads network that must be monitored and maintained. To effectively manage this diverse network, a series of five subnetwork types were established.

National Roads Network Pavement Condition Classification by Subnetworks (2023)

Subnetwork		Classification	% of Network
0	Motorways + dual carriageways	High speed, high volumes pavement, made up of Motorway and Dual Carriageway sections of the network.	24%
1	Engineered pavement	Typically carry reasonably large volumes of traffic, and are identified by presence of hard shoulders adjacent to the carriageway.	23%
2	Urban Areas	Low to medium speed, typically short sections through towns that are not bypassed, also includes longer sections within the cities and larger towns where National Roads start and end.	12%
3	Legacy pavement – high traffic	Legacy subnetwork, typically constructed without formal geometric or pavement design. Typically carries traffic volumes less than 10,000 AADT.	23%
4	Legacy pavement – low traffic	Legacy subnetwork, typically constructed without formal geometric or pavement design. Typically carries traffic volumes less than 5000 AADT.	18%

Overview of National Roads Network Pavement Condition Classification by Subnetworks (2023)[4]



Subnetworks:

- Subnetwork 0: Motorways + dual carriageways
- Subnetwork 1: Engineered pavement
- Subnetwork 2: Urban Areas
- Subnetwork 3: Legacy pavement - high traffic
- Subnetwork 4: Legacy pavement - low traffic

4 Source: TII Pavement Condition Report, 2023

A2: Measuring Performance of Pavements on the National Roads Network

The condition of road pavements i.e., the surface of roads, is a critical element in ensuring the safety and efficiency of the National Roads network. To maintain acceptable performance levels of pavements, significant investment is required annually. Timely upgrades of pavement surfaces can prolong the lifecycle of the sub-surface and structural layers of the pavement.

Road pavements are made up of different layers. The surface layer is key in the road-to-wheel interface and influences both the safety and overall condition of the pavement.

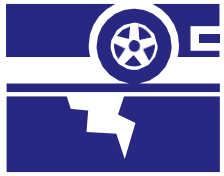
TII determined that the Key Performance Indicators (KPIs) of an efficient pavement network include pavement surface health, surface friction, and structural health. The easiest way to track this is to rank pavement subnetworks on a five-point scale: very poor, poor, fair, good and very good.

TII research indicates on average, it takes approximately seven years for a pavement to transition between points on the scale.

To ensure the safety and efficiency of the network, TII has set performance targets for each of the subnetwork categories under each of the performance indicators.

Pavement Surface Health

Pavement Surface Friction



Pavement Structural Health

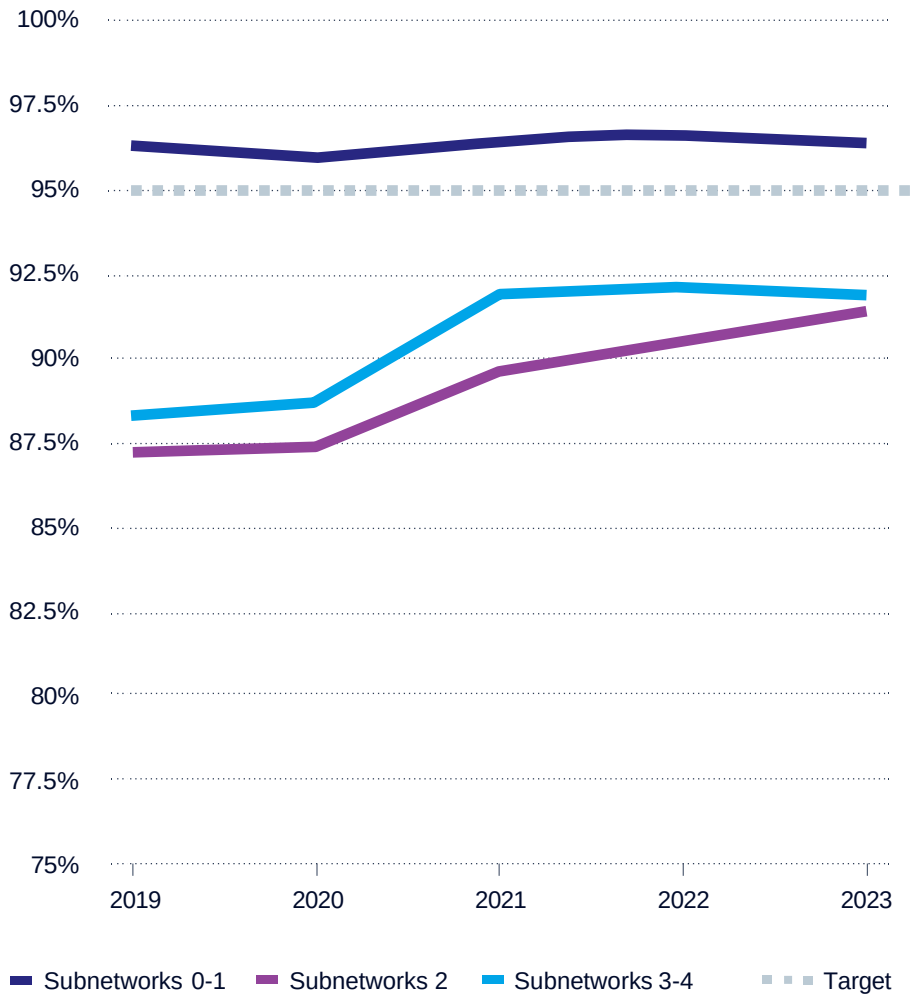
B1: Current Condition of Road Pavements

Pavement Surface Health

TII target 95% performing fair or better for all subnetworks.

- Subnetworks 0-1 remained consistently above target levels for 2019-2023
- Subnetwork 2 showed an improved upward trend line for 2023
- Subnetworks 3-4 showed a slight downward trend line for 2023

Trends in Pavement Surface Health KPI (% Fair or Better) 2019 - 2023



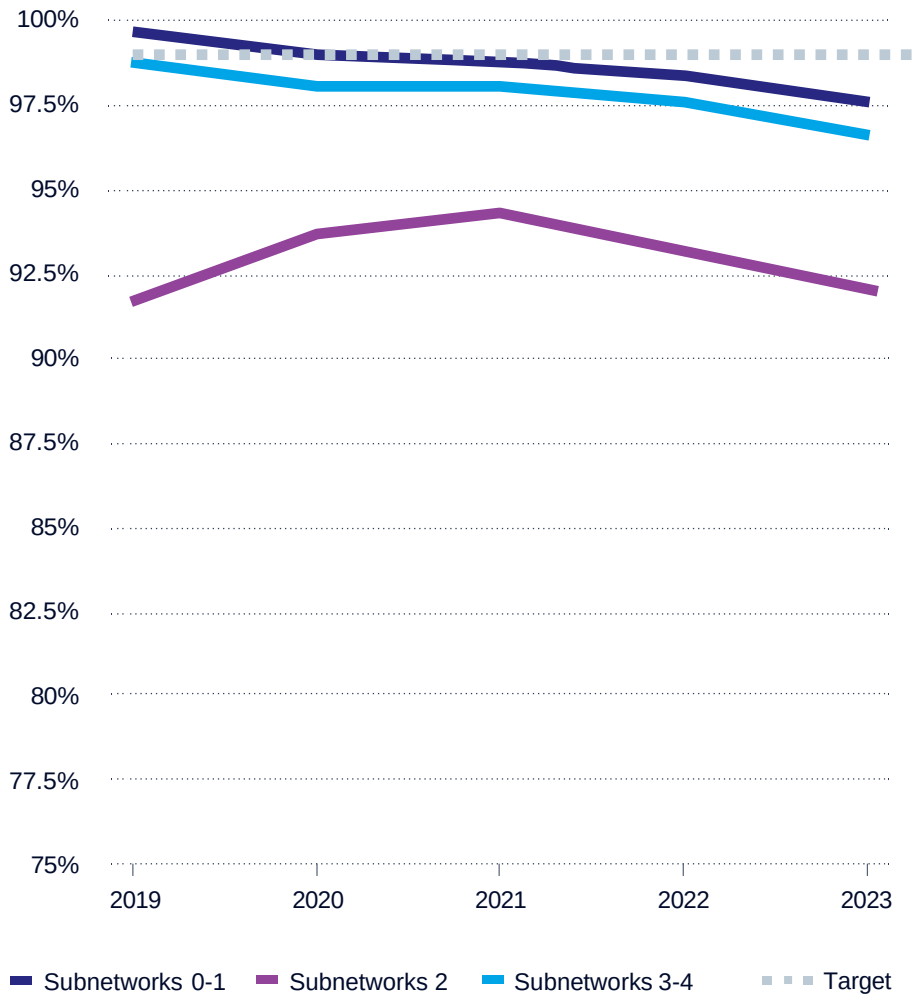
B2: Current Condition of Road Pavements

Pavement Surface Friction

TII target 99% performing fair or better for all subnetworks.

- Subnetworks 0, 1, 3 and 4 experienced a downward trend line below the 99% target continuing from 2022
- Subnetwork 2 remained significantly lower than remaining subnetworks, experiencing the same downward trend

Trends in Pavement Surface Friction KPI (% Fair or Better) 2019 - 2023



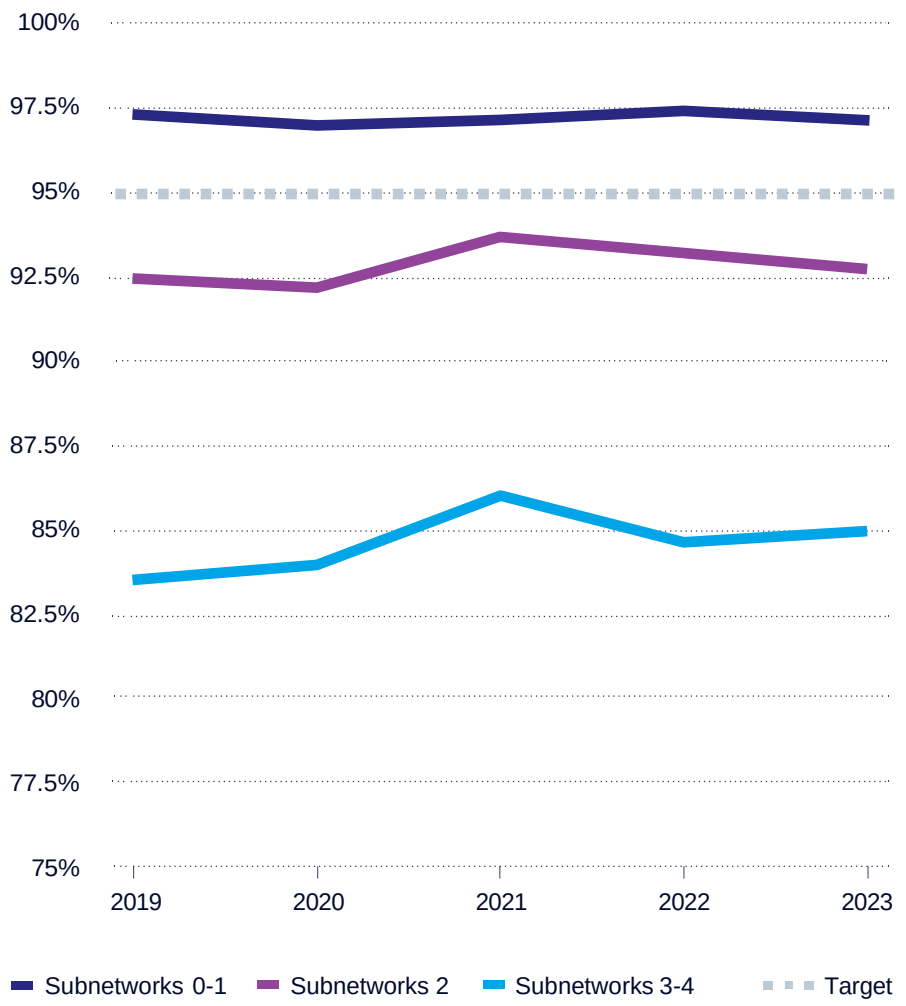
B3: Current Condition of Road Pavements

Pavement Structural Health

TII target 95% performing fair or better for all subnetworks.

- Subnetworks 0-1 were consistently above target levels for 2019-2023
- Subnetwork 2 remains below target levels and experienced a downward trend from 2021-2023
- Subnetworks 3-4 remains significantly below target levels for 2023

Trends in Pavement Structural Health KPI (% Fair or Better) 2019 - 2023



C: National Road Bridge Structures

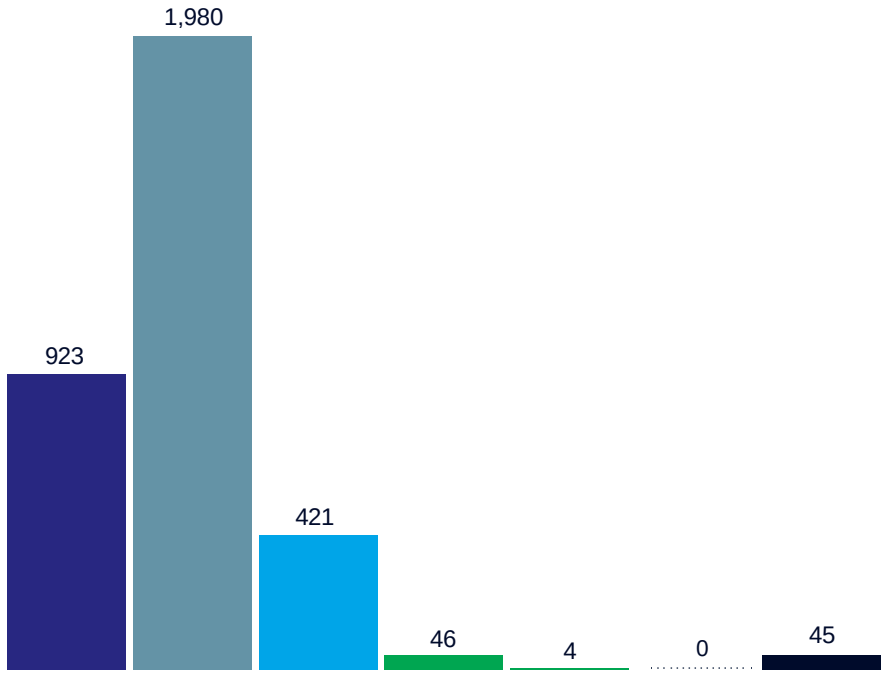
Maintenance and rehabilitation of bridges are an important part of TII's asset management strategy, with bridges throughout Ireland being inspected regularly.

The National Roads network includes 3,419 bridge structures.

Bridge components that receive a condition rating of 0 or 1 do not require repair work, whereas those assigned a rating of 2 or higher are scheduled for future repair.

- Nearly 85% of bridges assessed require no immediate repair work
- 15% require repair when convenient (i.e., no immediate requirement).

National Road Bridge Structures Condition Rating (2023, number of bridges)



4.

Safety

A: Commitment to Safety Along the National Roads Network

Transport Infrastructure Ireland is committed towards promoting safety measures along the National Roads network to reduce traffic collisions

The Safe Systems approach recognises that death and serious injury in road collisions are largely preventable and that it should be a shared responsibility at all levels of road operation to ensure that road collisions do not lead to serious or fatal injuries.

Ireland's Government Road Safety Strategy aims to improve road safety measures, and reduce road fatalities and serious injuries by 50% by 2030. This strategy is part of 'Vision Zero', which was introduced by the Irish Government in 2021 to bring traffic related deaths and serious injury to 0% by 2050.

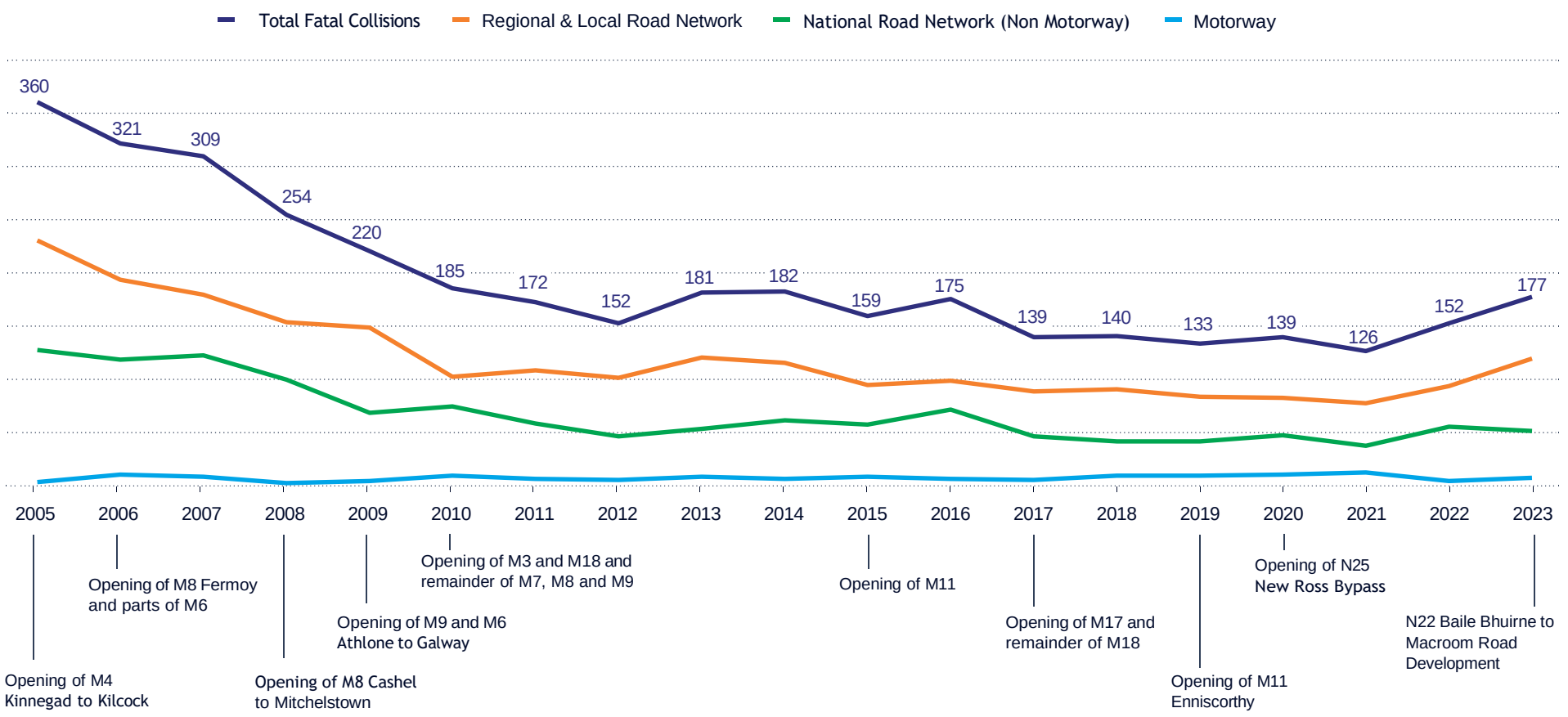
In line with these strategies, TII will:

- Prioritise the delivery of high quality, suitable infrastructure to create forgiving roadsides, self-explaining roads, and a safe environment for vulnerable road users
- Meet asset protection and renewal requirements to help ensure the safety of the network, in line with the National Investment Framework for Transport in Ireland (NIFTI)
- Target investment on sections of national roads with the highest risk of fatal or serious injury in line with the European Union Road Infrastructure Safety Management (RISM) directive

For further details on TII's long term commitments to road safety, see **National Roads 2040** (www.tii.ie/tii-library/strategic-planning/)

B: Fatal Collision Trends (2005-2023) by Network - Highlighting Key Milestones on National Roads

Fatal Collision Trends (2005-2023) by Network with Key Dates of Road Scheme Openings



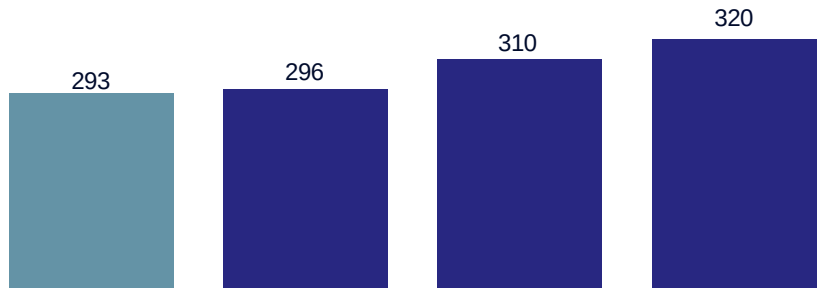
C: Fatal and Serious Injury Collisions on the National Roads Network

It is important to understand what types of collisions happen most frequently on the National Roads Network to work towards overall reduction.

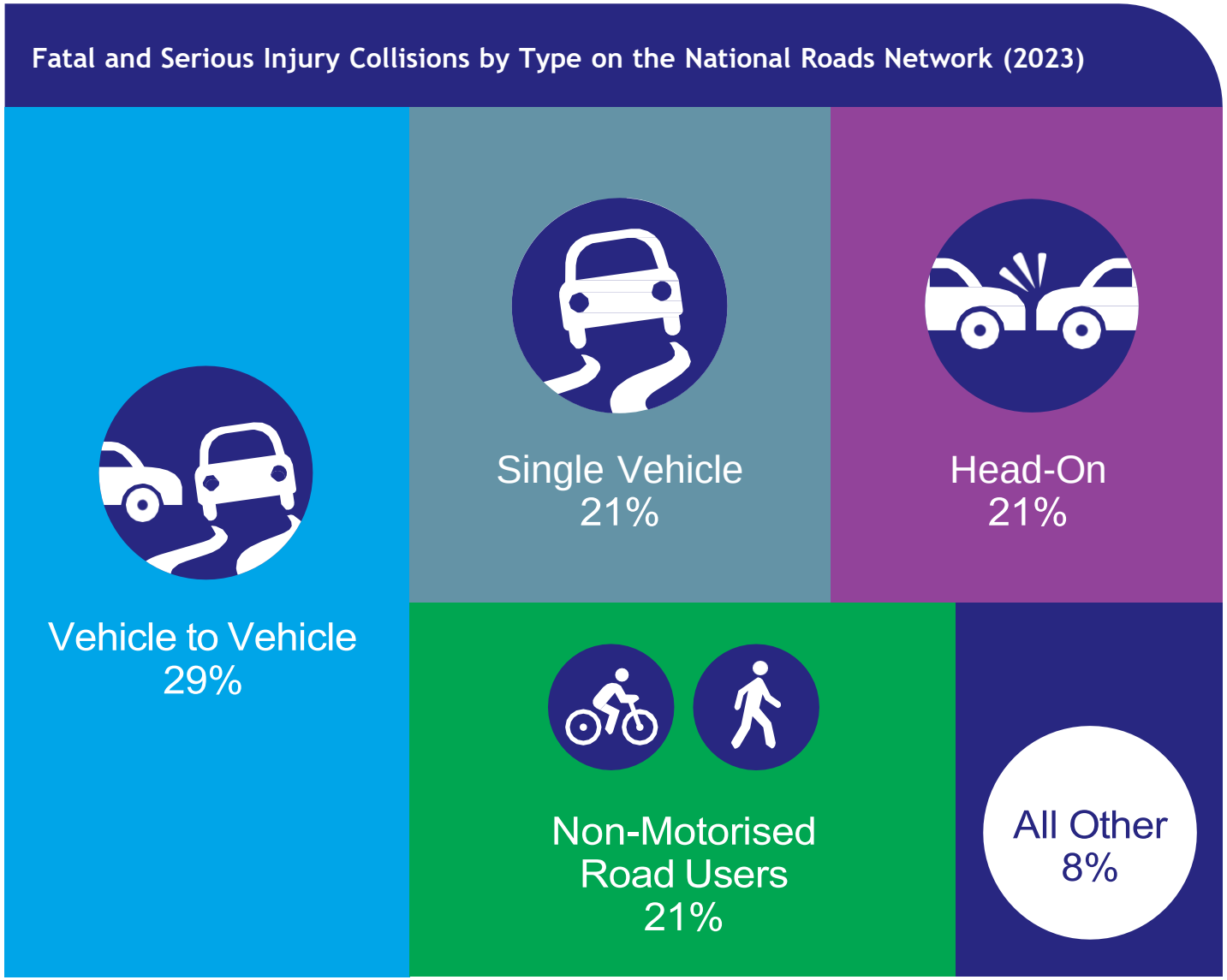
In 2023, there were 320 fatal and serious injury collisions on the National Roads Network.

This represents a 3% increase compared to 2022 and a 9% increase compared to the Baseline.

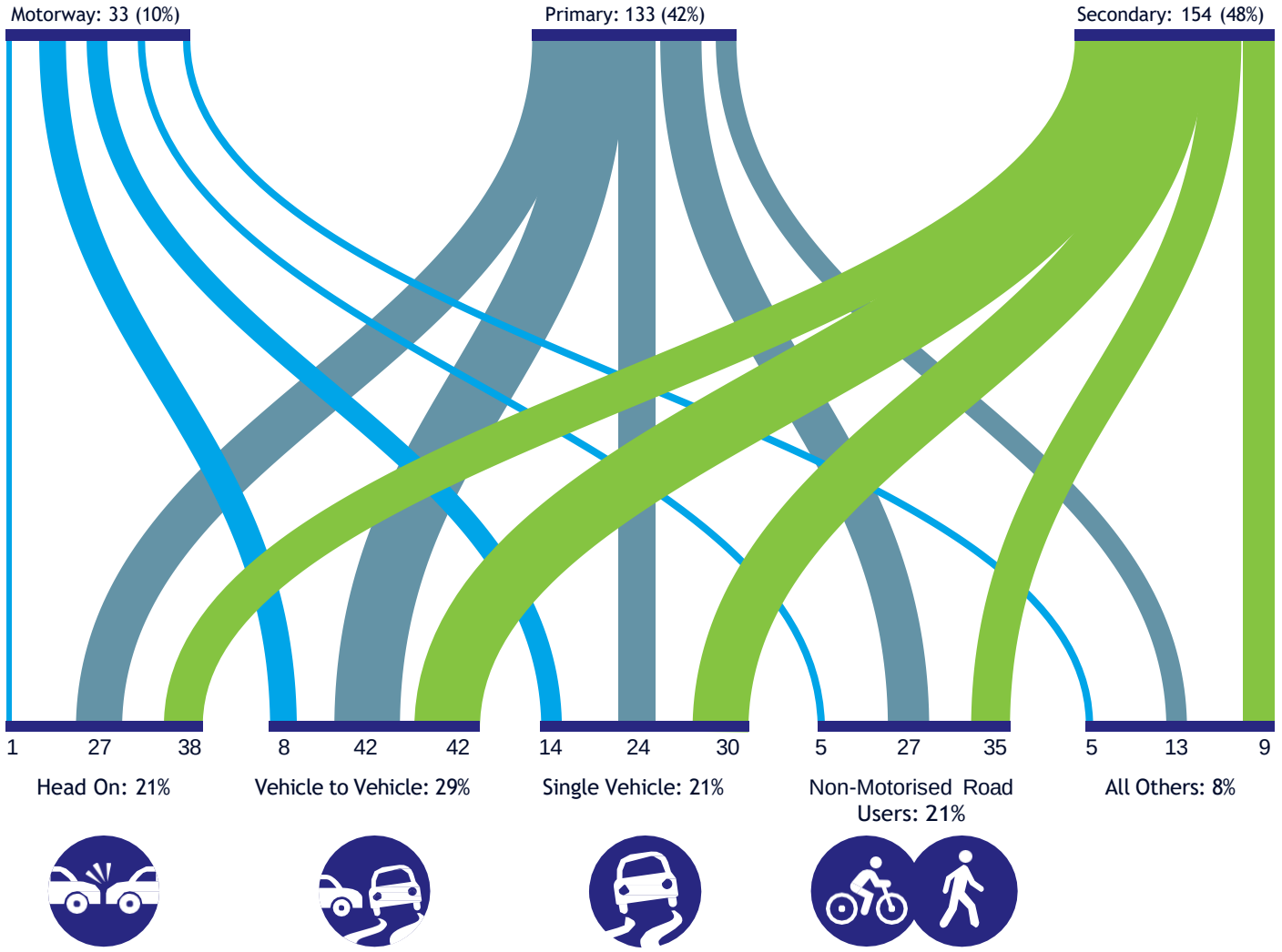
Recent Trends in Fatal and Serious Injury Collisions



*Baseline calculated in line with RISM Directive as an average of 2017-2019 figures for fatal and serious injury collisions


Fatal and Serious Injury Collisions by Type on the National Roads Network (2023)
Vehicle to Vehicle
29%
Single Vehicle
21%
Head-On
21%
Non-Motorised
Road Users
21%
All Other
8%

The Distribution of Fatal and Serious Injury Collisions Across the National Road Network by Broad Collision Type in 2023



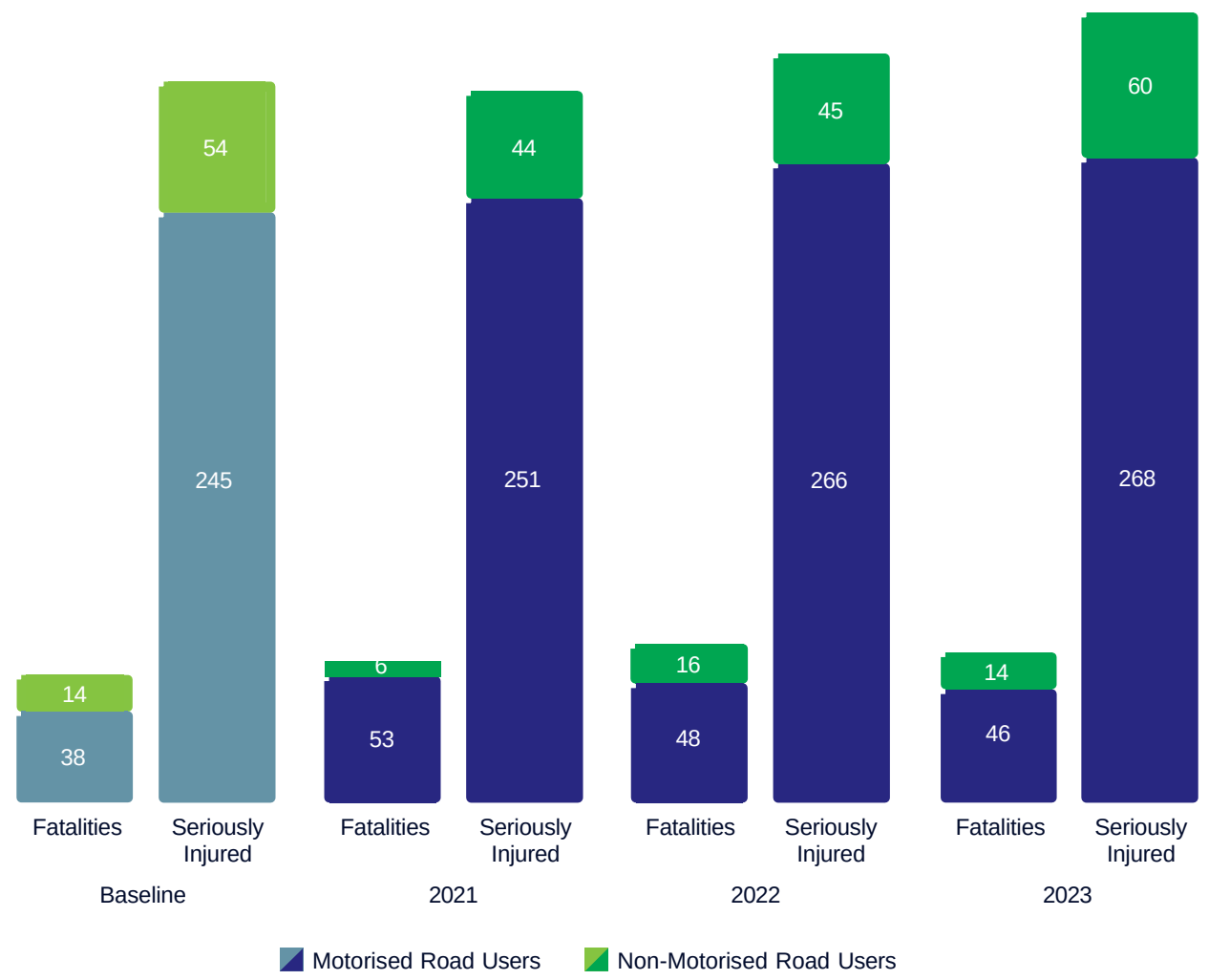
D: Fatalities and Seriously Injured on the National Roads Network

In 2023, 58 collisions on the National Roads Network resulted in 60 fatalities, representing a -6% (-4) decrease compared to 2022, a 2% (+1) increase compared to 2021 and a 14% (+7 increase compared to Baseline.

In 2023, 328 people were seriously injured in road traffic collisions reported along National Roads. This is an increase of approximately 5% (+17) on 2022 figures, an 11% (+33) on 2021 figures and a 10% (+29) increase on the Baseline.

These recent upwards trends in fatal and serious injury collisions show that more attention needs to be brought to bear on fatalities and serious injuries in order to meet the targets set out in the RISM Directive.

Fatalities and Seriously Injured on the National Roads Network

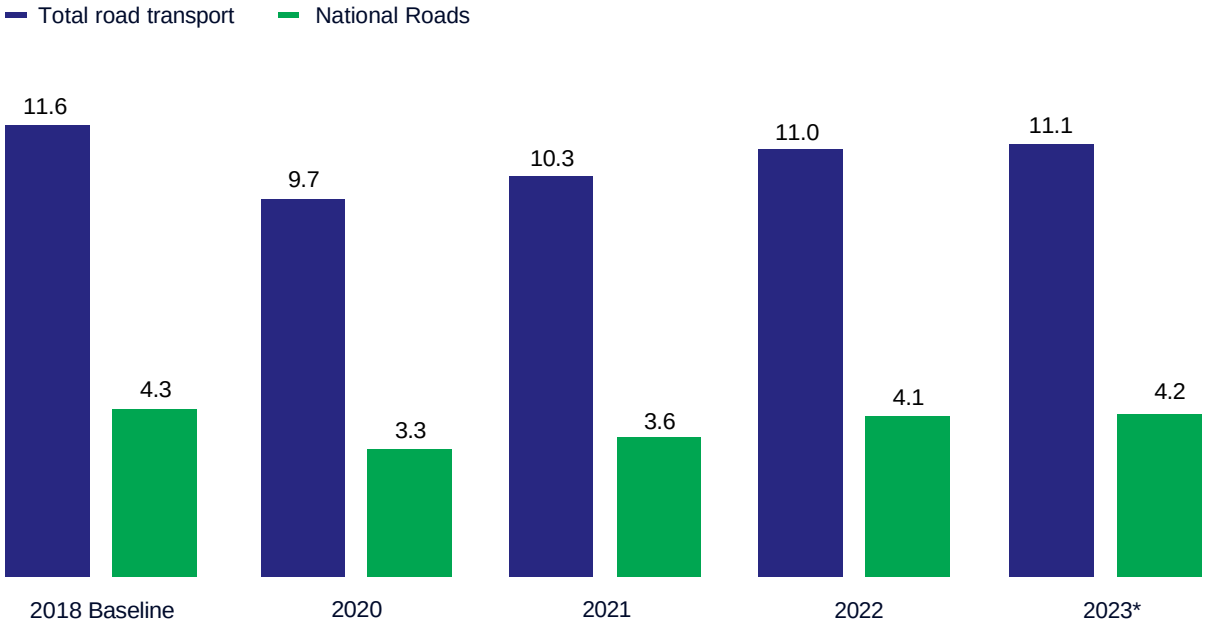


5.

Emissions

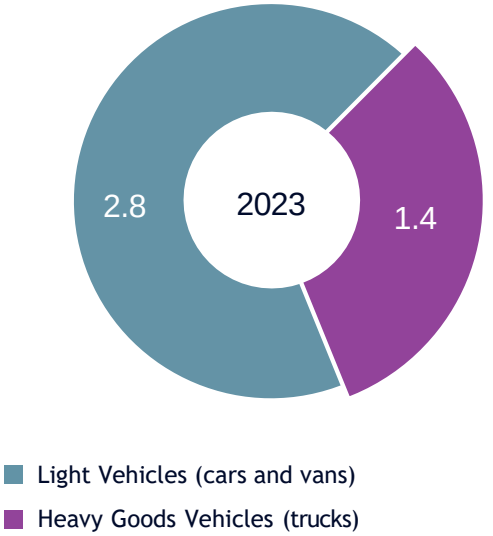
A1: Vehicle Emissions on the National Roads Network

Annual Road Travel Emissions (mega tonnes CO_2e)



Travel on National Roads contributed an average of 36% of total road transport emissions in 2020-2023.

Annual Road Travel Emissions on National Roads per Vehicle Class (mega tonnes CO_2e)



Heavy Goods Vehicles (HGVs) contributed 32% of National Roads emissions in 2023.

Sources: 1. EPA, 2023 (estimate of total transport emissions in 2018 was 12.2 mega tonnes, road travel emissions made up 11.6 mega tonnes of this; *2023 Total road transport emissions is EPA projection and not inventory as per previous years)
2. TII National Transport Model (NTpM), TII Road Emissions Model (REM), CSO and UCC (2021) Irish Car Stock Model v2.1.

A2: Air Quality Emissions on the National Roads Network

In 2023, emissions levels were consistent with or lower than 2022, and higher in comparison with 2020 and 2021 when COVID travel restrictions were in place.

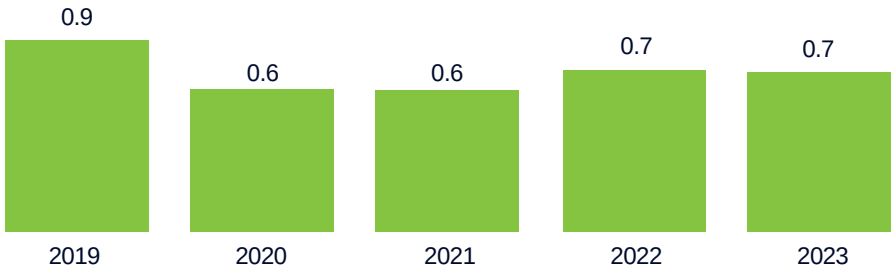
Exhaust emissions from motor vehicles contain a variety of pollutants.

Greenhouse gases (GHG), principally carbon monoxide (CO) and carbon dioxide (CO_2) contribute to climate change.

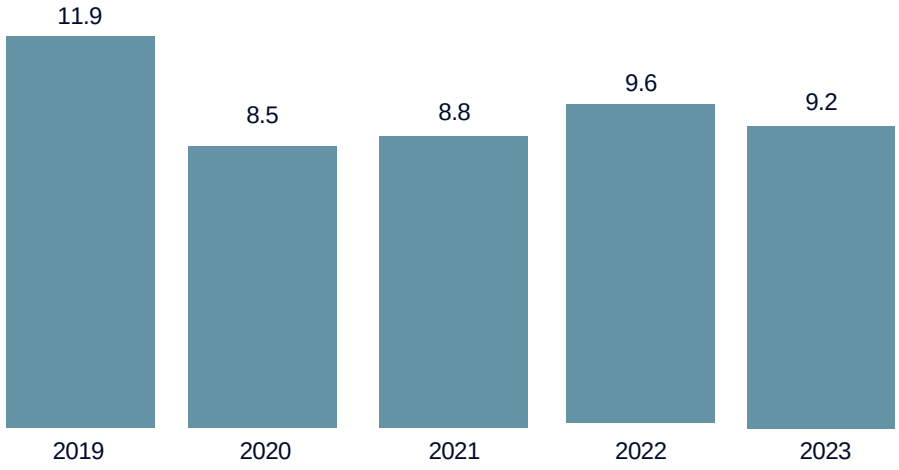
Nitrogen Oxides and very small Particulate Matter, can be harmful to human health and damage a variety of ecosystems.

Total emissions of Oxide of Nitrogen (NO_x) decreased in 2023 from 2022 levels. Total emissions of Particulate Matter (PM_{10}) stayed consistent with 2022 levels.

Annual Emissions of PM_{10} in Megatonnes



Annual Emissions of NO_x in Megatonnes



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