Bonneagar Iompair Éireann
Transport Infrastructure Ireland

Transport Infrastructure Ireland

National Roads Network Indicators 2022

May 2023

Contents

Introduction

Transport Infrastructure Ireland's mission is to deliver transport infrastructure and services that contribute to the quality of life of the people of Ireland and support the country's economic growth

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

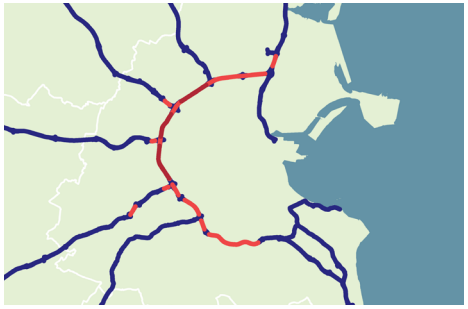
Efficient use of the National Roads network provides a variety of benefits to all road users (drivers, passengers, bus users, road freight) in the form of shorter journey times, reduced traffic congestion and lower vehicle operating costs.

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.

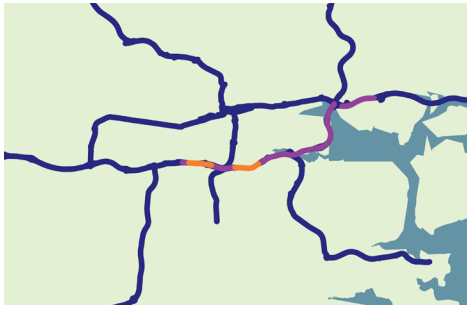
A: Key Trends Summary

1. Road Network - Travel Hotspots

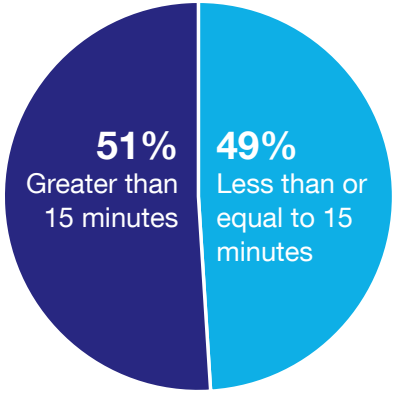
M50 Dublin area:
100,000 or more vehicles per day hotspot:



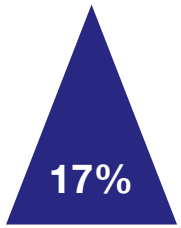
N40 Cork area:
50,000 or more vehicles per day hotspot:



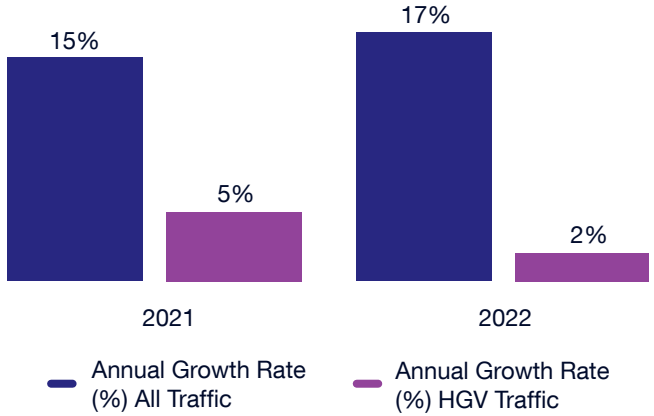
Trip Duration on National and Regional Roads - AM Peak



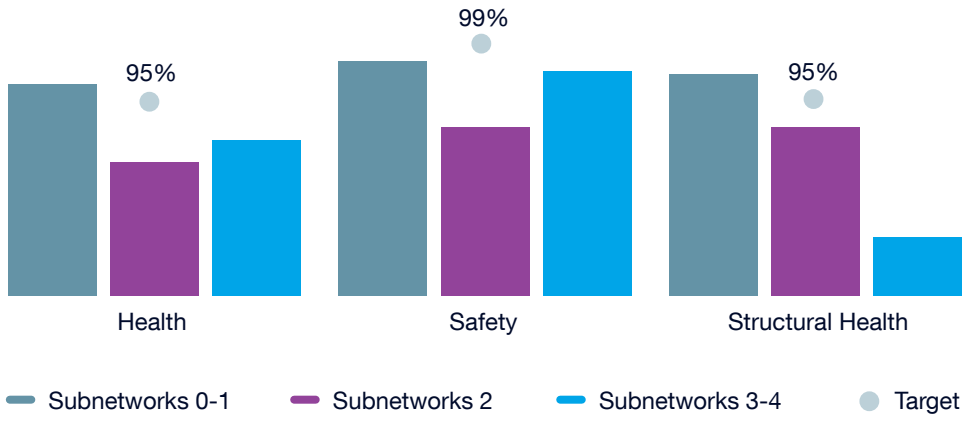
2. Economic - Traffic Growth 2021-2022



Traffic across the network increased by 16.8% in 2022



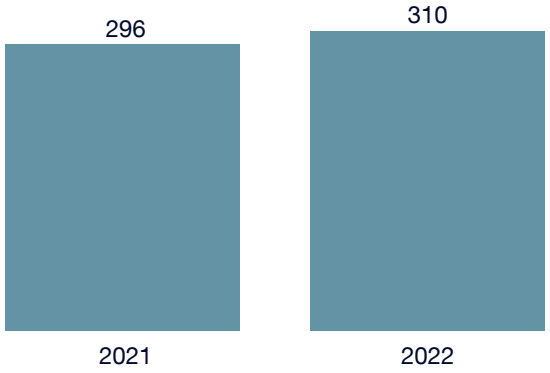
3. Road Condition - Pavement Surface



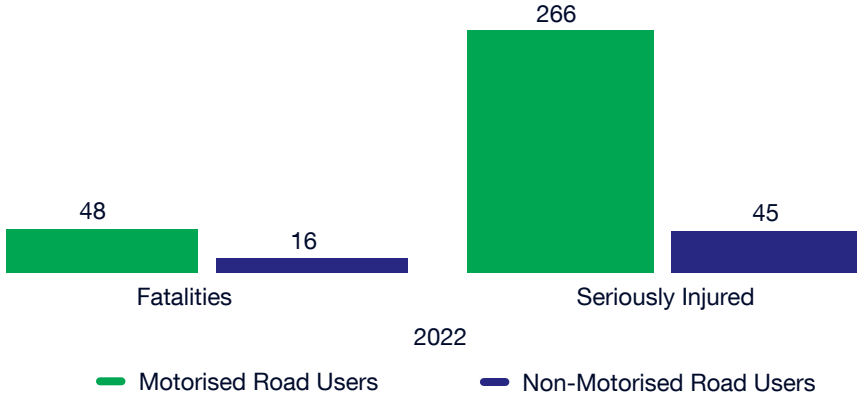
A: Key Trends Summary (Cont.)

4. Safety - Fatal and Serious Injury Collisions

In 2022, 310 Fatal and Serious Injury Collisions produced 64 fatalities and 311 serious injuries across the National Roads Network. This represents a 5% increase from 2021.



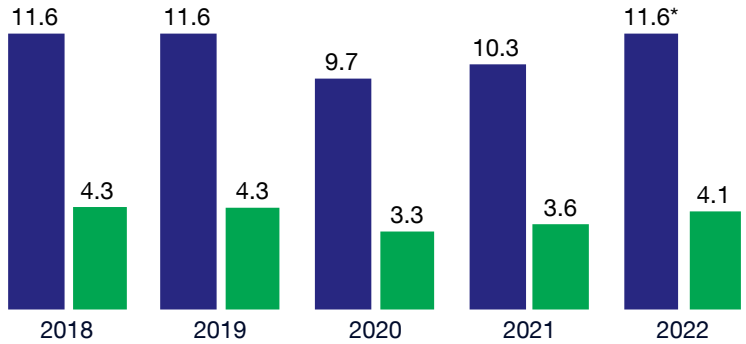
Total Fatalities and Seriously Injured



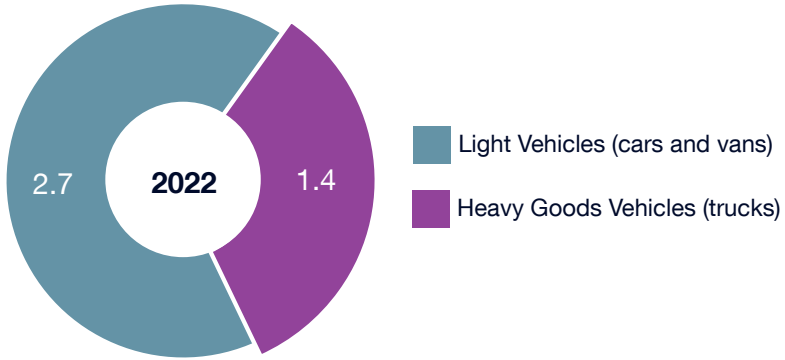
5. Emissions – Annual Road Travel Emissions on National Roads per Vehicle Class (mega tonnes CO2e)

5%

5% decrease in road travel emissions across the National Roads network in 2022 compared to 2018 baseline



*2022 EPA projection.



B: News & Information

Upgrading How TII Shares News With Commuters

TII's traffic count database has been upgraded with new interactive features. The new 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**

New Road Emissions Model Launched

TII has developed a new tool that easily calculates vehicle emissions to help quantify greenhouse gas and air quality emissions.

This Road Emissions Model (REM) considers how vehicle fleets in Ireland may change over time using data from the Marine and Renewable Energy Ireland (MaREI) research centre at University College Cork and the Central Statistics Office. It uses emission rates combined with the number, composition and speed of vehicles projected on the network to calculate total emissions.

Information on vehicle emission rates is taken from European Environment Agency (EEA) standard vehicle emissions calculator (COPERT) along with other sources. Traffic volumes, speeds and compositions are provided by the TII National Transport Model.

National Roads 2040 Published

NR2040 TII's long-term investment framework for the maintenance, development, and management of Ireland's National Roads network has been published.

The strategy and accompanying environmental reports can be accessed at: **www.tii.ie/tii-library/strategic-planning/**

Traffic Monitoring and Assistance

Traffic Monitoring Units

TII has over 387 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.

For Additional Information: **trafficdata.tii.ie**

Motorway Service Helpline

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.

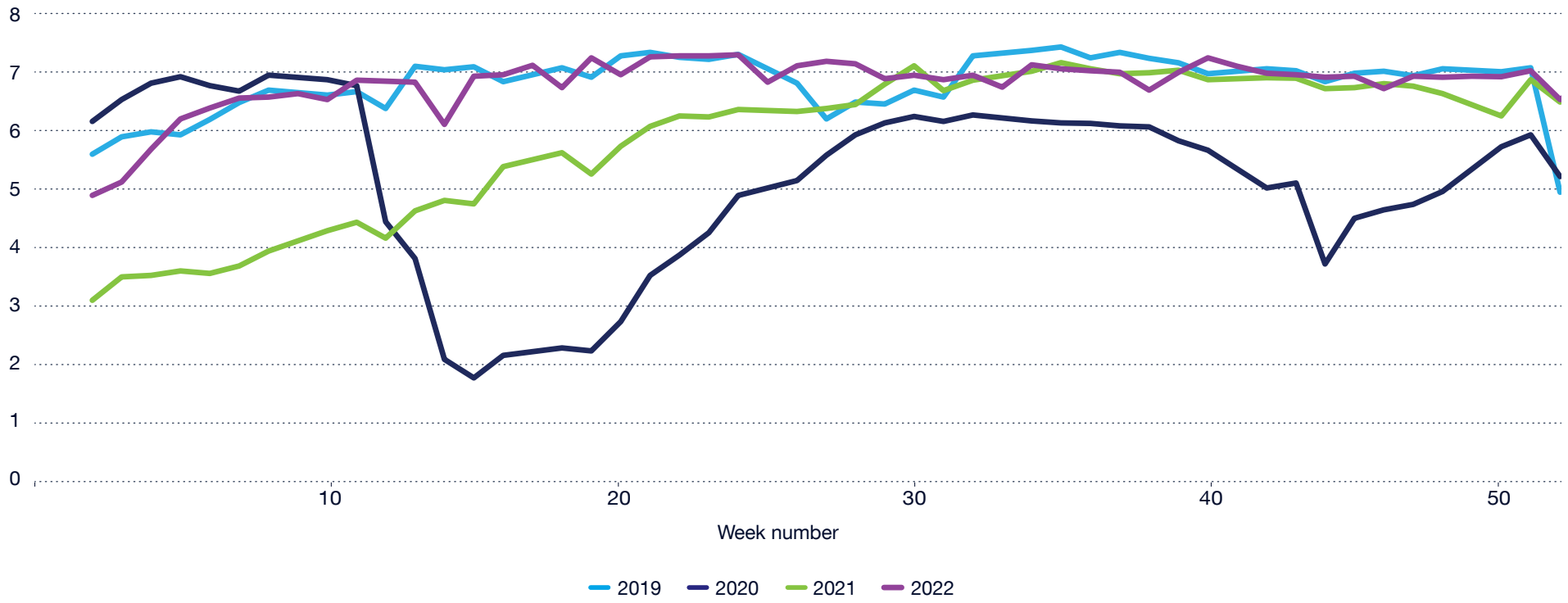
T: 0818-715-100 or
E: **info@mtcc.ie**

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

C: Post-Pandemic Trends

In 2022, traffic returned to pre-pandemic levels, however COVID-19 has changed how and when people travel

Traffic Volumes on National Roads 2019 – 2022
Aggregated weekly traffic volumes on select National Roads (millions)



1.

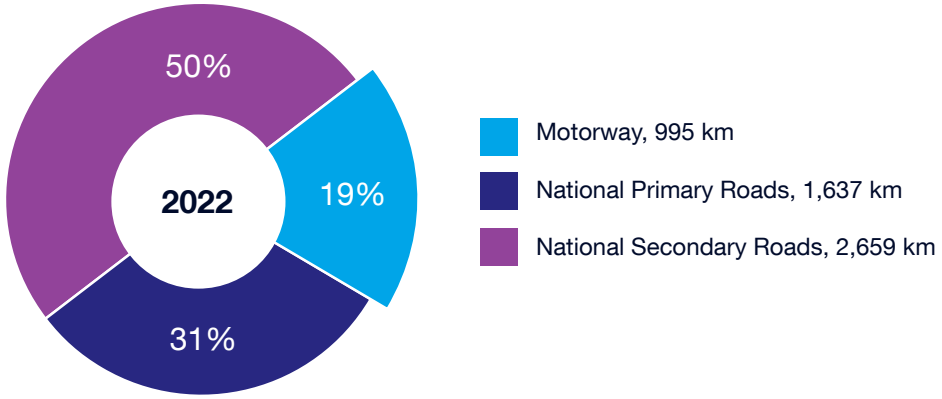
Road Network

A1: Extent of National Roads Network by Classification

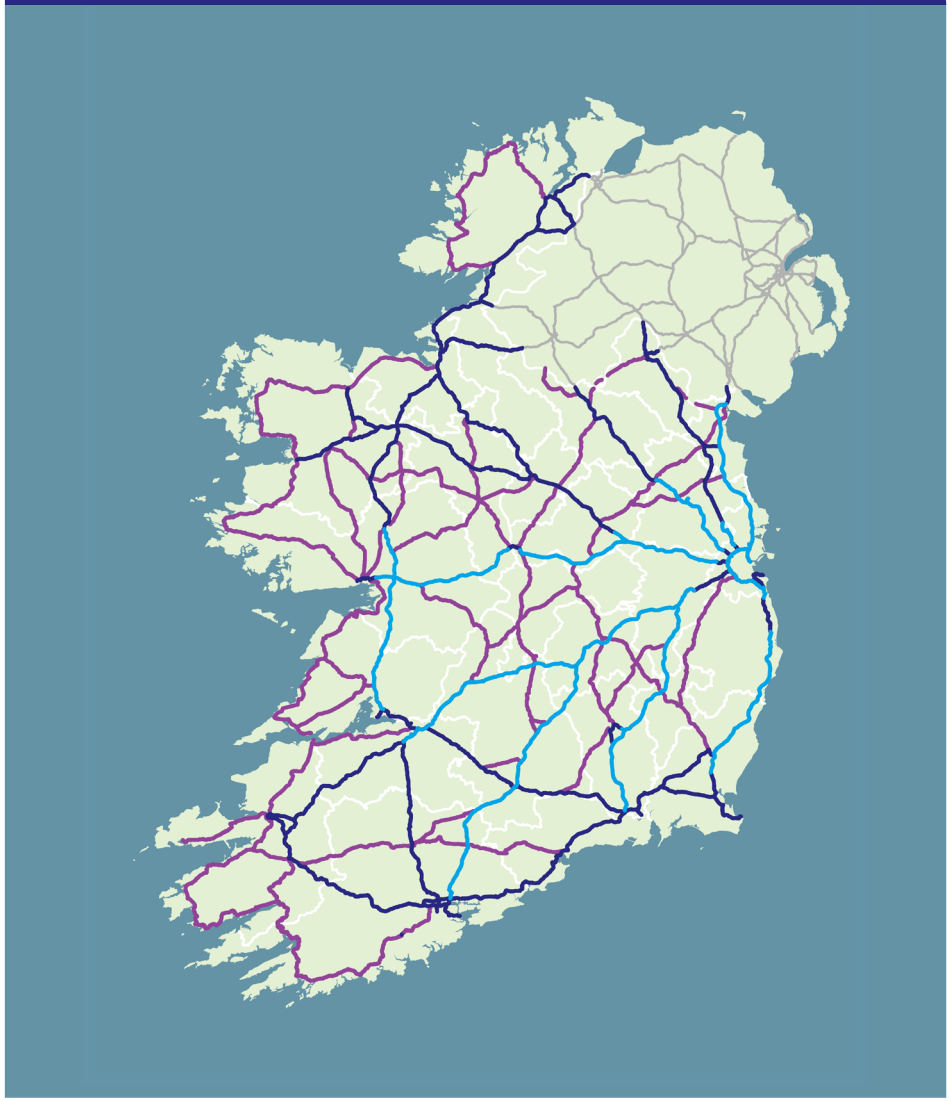
There are approximately 5,300 km of National Roads in Ireland. The length of the network fluctuates every year due to road reclassification, realignments to existing roads and the completion of new roads.

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

Extent of National Roads Network by Classification (2022)



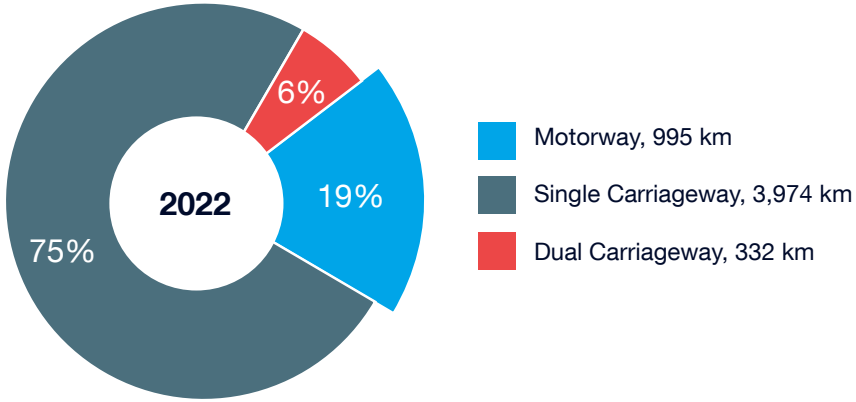
Overview of National Roads Network by Classification (2022)



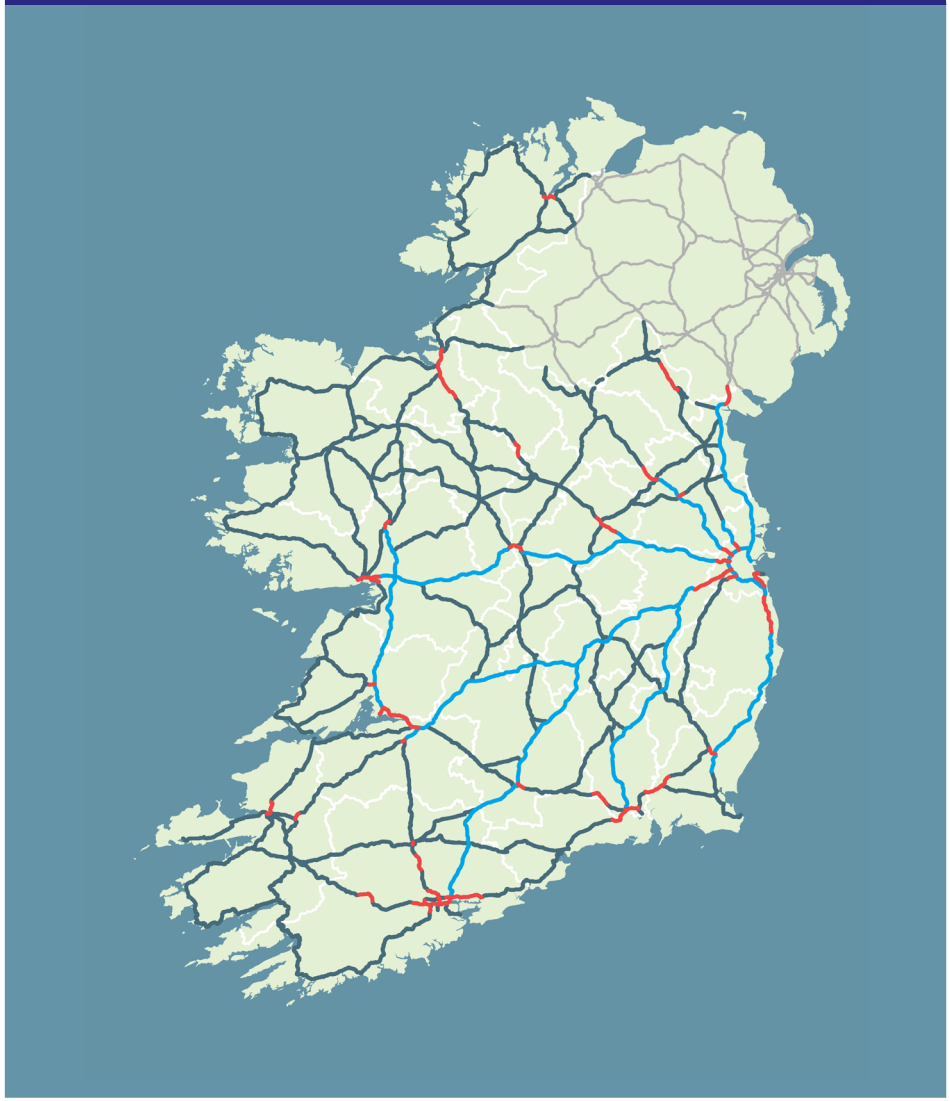
A2: Extent of National Roads Network by Carriageway Type

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

Extent of National Roads Network by Carriageway Type (2022)



Overview of National Roads Network by Carriageway Type (2022)

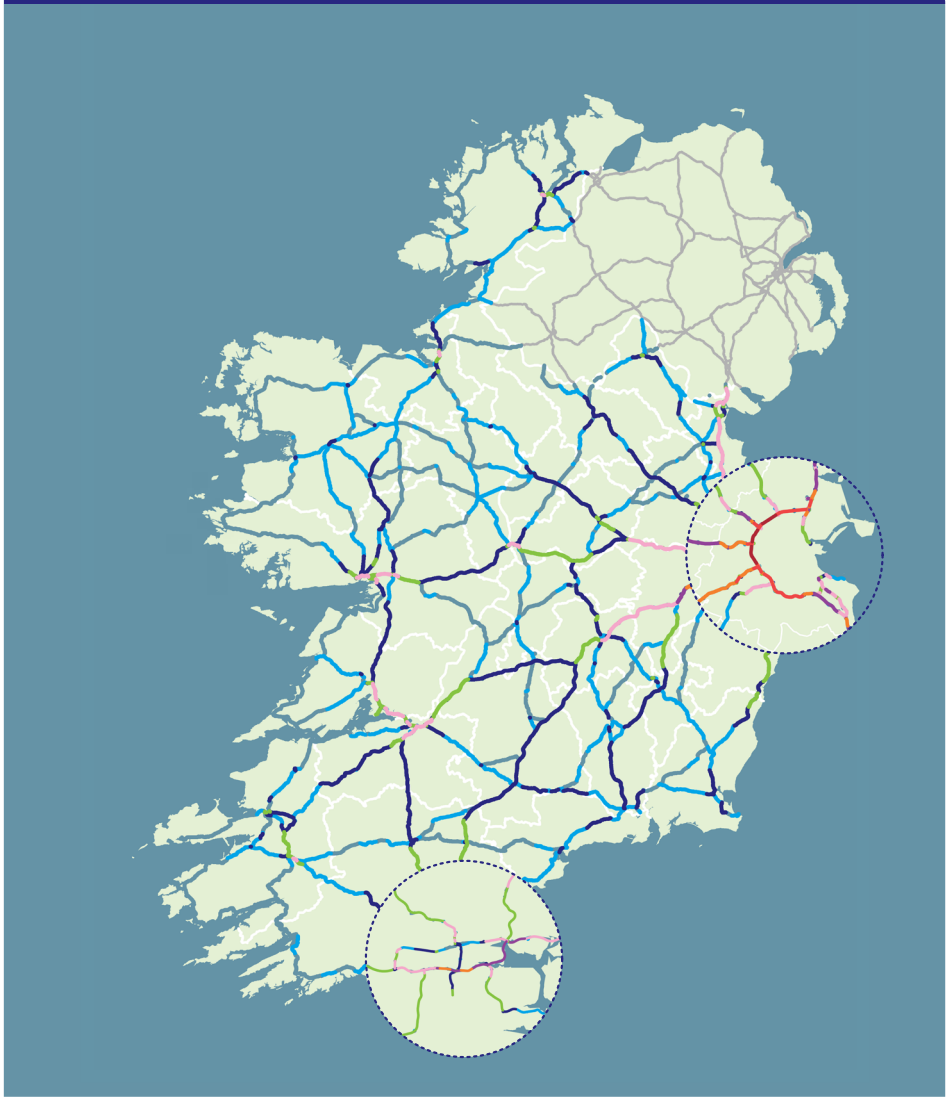


B1: Level of Usage of the National Roads Network

Traffic levels in 2022 increased from 2021, returning to pre-pandemic levels, with maximum AADT levels reaching over 150,000 per day.

- In 2022, the M50 experienced the highest levels of traffic across the country.
- The N40 also experienced elevated levels of traffic in 2022 compared to 2021.

Level of Usage of the National Roads Network Measured by Annual Average Daily Traffic (AADT) (2022)

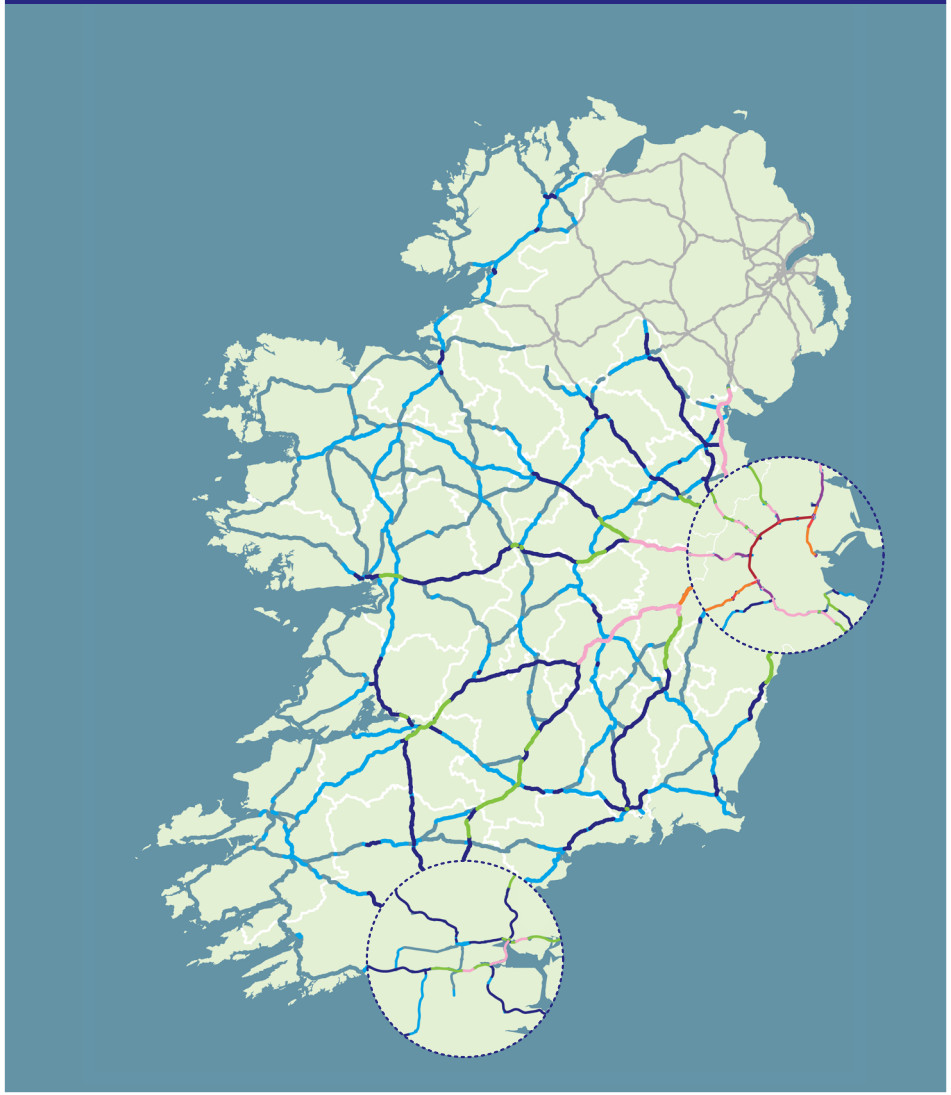


B2: Freight Movements on the National Roads Network

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 2022.

Level of Usage of the National Roads Network by HGV Measured by Annual Average Daily Traffic (AADT) (2022)

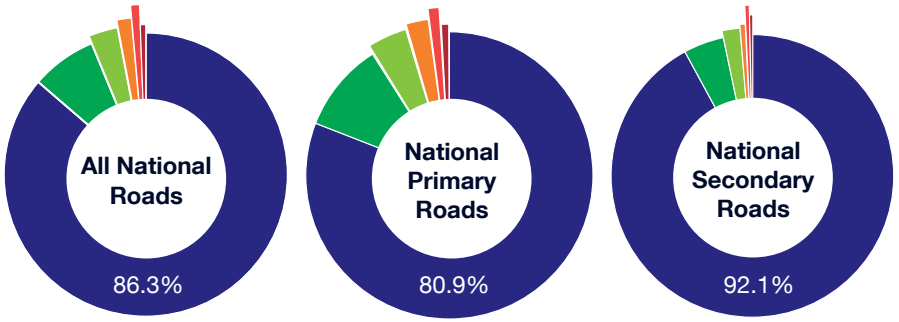


C1: Level of Service: Morning Rush-Hour

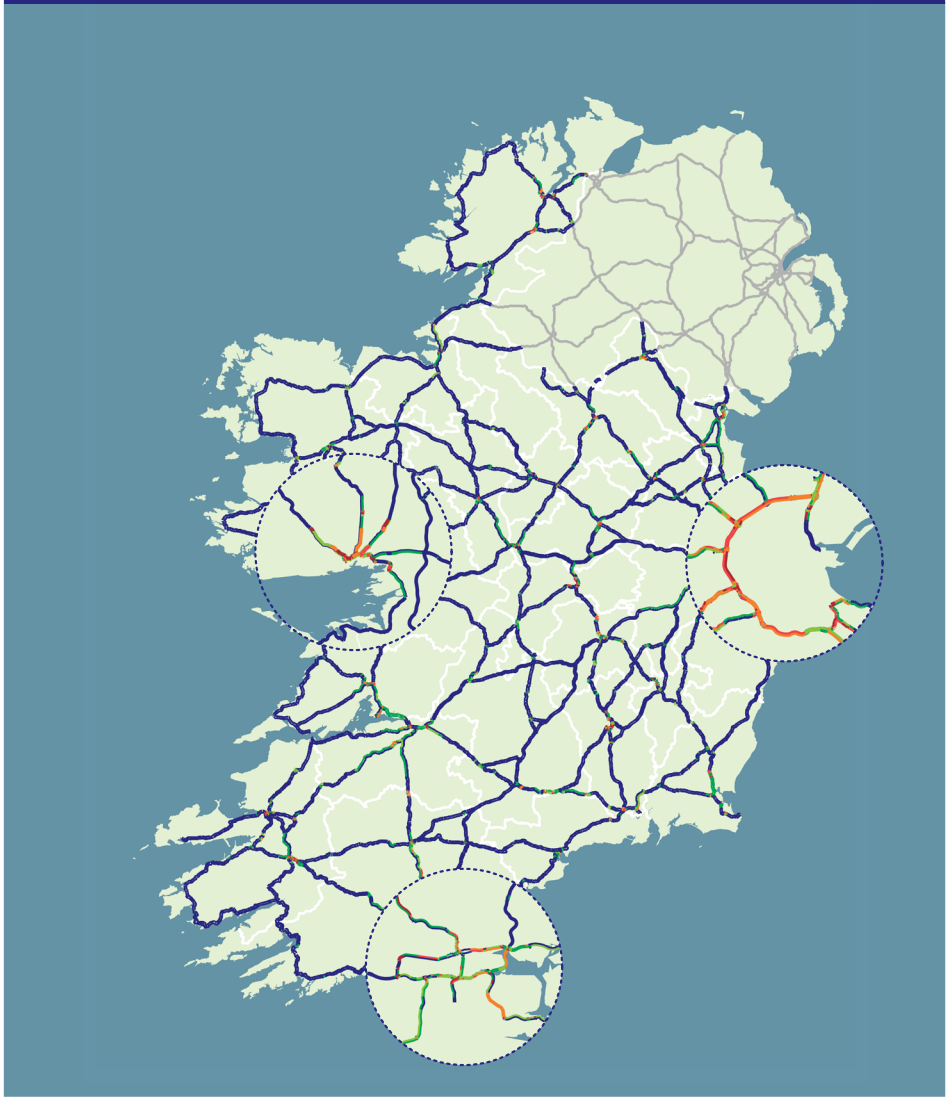
Level of service (LOS) is a measurement used to evaluate road performance in terms of traffic flow and speed. It considers factors such as vehicle speed, mobility and safety.

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 (2022)



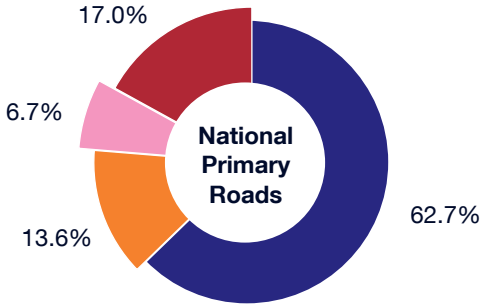
Level of Service Provided by the National Roads Network During Morning Rush-Hour (2022)



C2: Volume to Capacity Ratio: National Primary Roads

Volume to Capacity (V/C) Ratio is used to assess the amount of traffic on a road compared to the amount of traffic it is equipped to handle, representing congestion levels.

Volume to Capacity (V/C) Ratio: National Primary Roads (2022)



Level of Service

- Operating below 80% capacity
- Operating between 80% - 100% capacity
- Operating between 100%-120% capacity
- Operating above 120% capacity

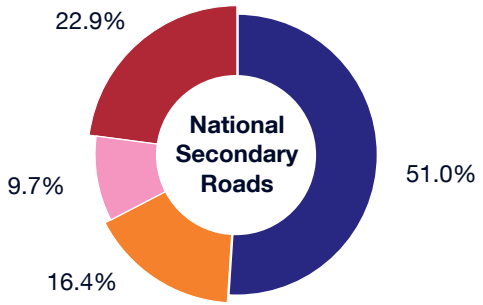
Extent of the National Primary Roads Network Operating at Each Level of Capacity (2022)

1 Capacity based on TII Rural Road Link Design Standard Table 6.1 (DN-GEO-03031). Source: TII National Transport Model, 2022

C3: Volume to Capacity Ratio: National Secondary Roads

Volume to Capacity (V/C) Ratio is used to assess the amount of traffic on a road compared to the amount of traffic it is equipped to handle, representing congestion levels.

Volume to Capacity (V/C) Ratio: National Secondary Roads (2022)



Level of Service

- Operating below 80% capacity
- Operating between 80% - 100% capacity
- Operating between 100%-120% capacity
- Operating above 120% capacity

Extent of the National Secondary Roads Network Operating at Each Level of Capacity (2022)

D1: M50 Performance Summary

2022 Key Network Statistics

The M50 is the most heavily used road in the country with close to 145,000 vehicles traveling several sections on an average day.

13,575
Highest hourly flow recorded on the N3 - N2 section between 4pm and 5pm on 4th May

181,839
Highest Daily Flow Recorded on M50 between the N3 - N2

Middle of Week - School Holiday
Busiest Typical Day

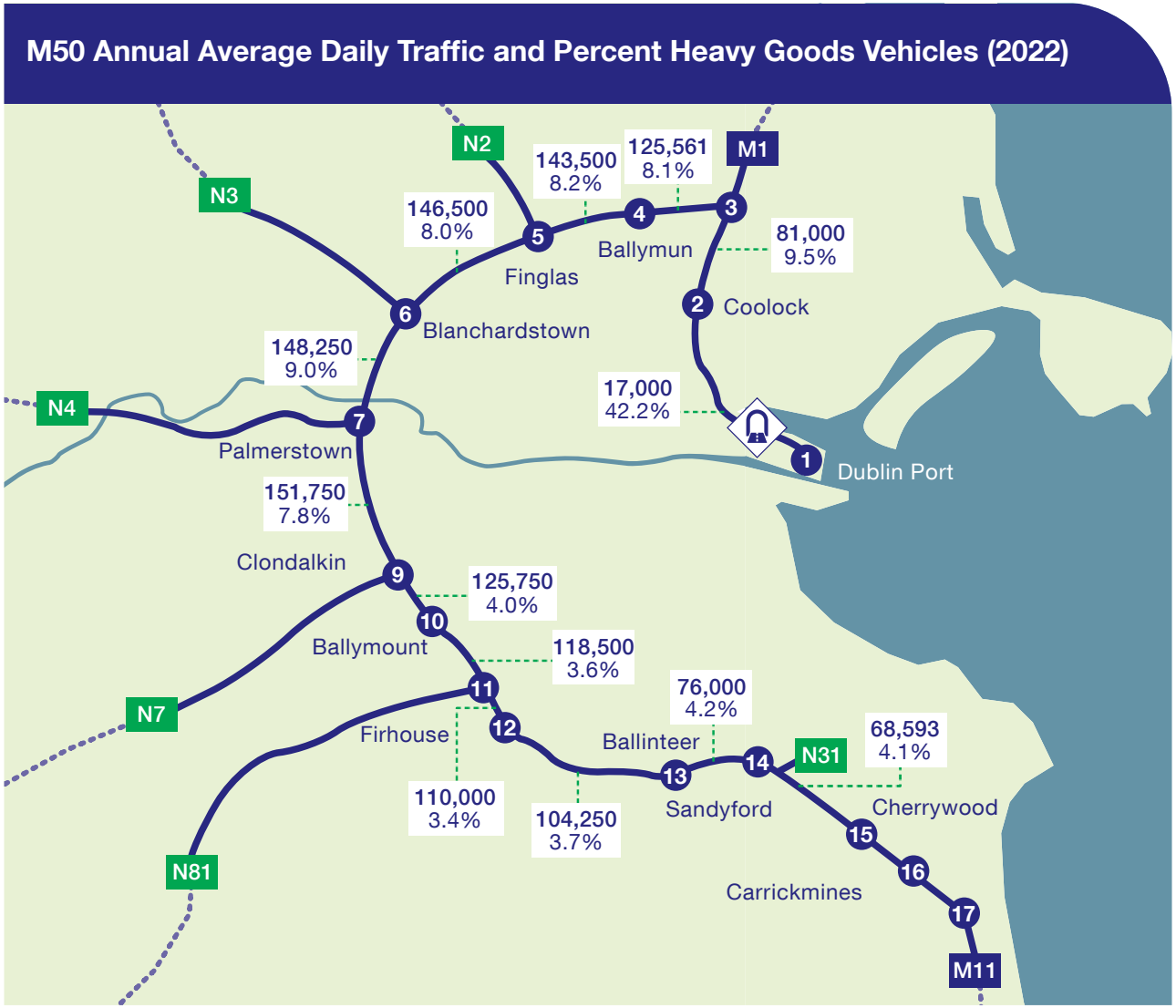
1.6 billion
Vehicle km travelled which represents a 29% increase on 2021

08:00 - 09:00
Peak Incident Time

1,751
Total No. of Incidents of which **698** were Traffic Collisions

13 minutes
Average Response Time

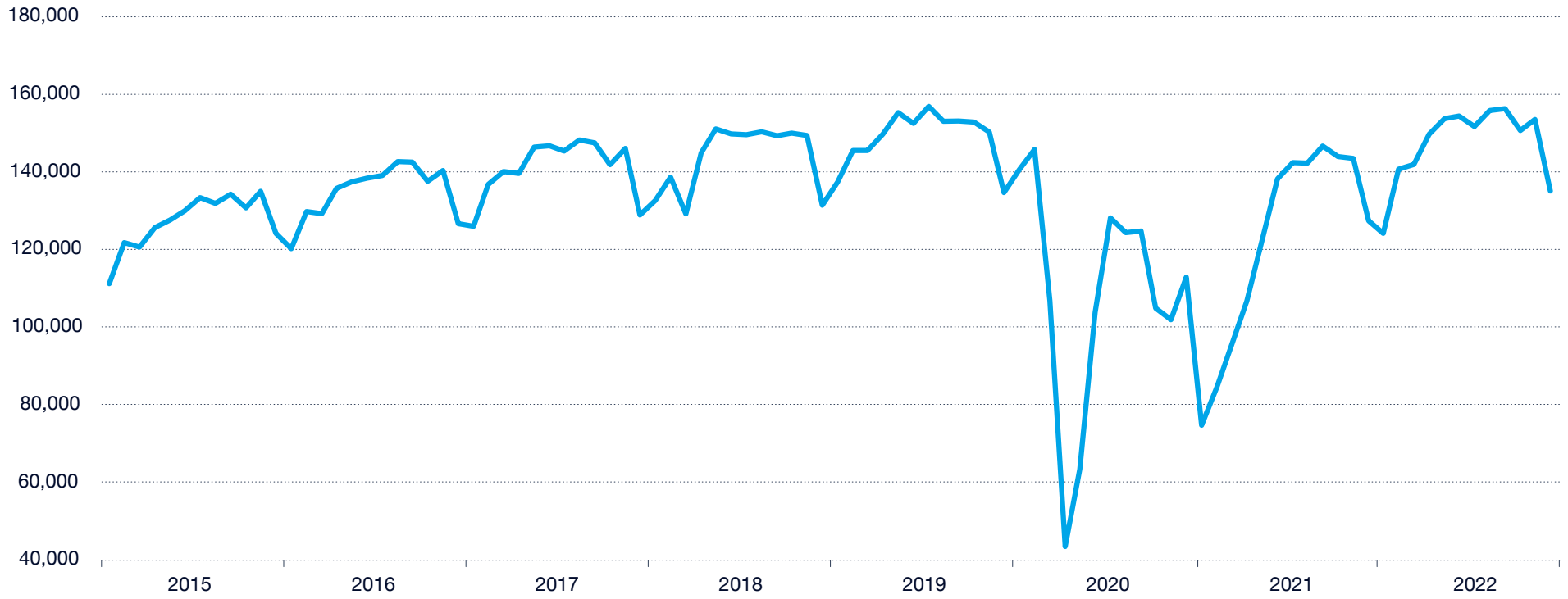
28 minutes
Median Duration of Incidents



* Data at M50 traffic monitoring unit sites J15-J16 and J16-J17 for 2022 is unavailable due to engineering works associated with the M50 eMOS project.

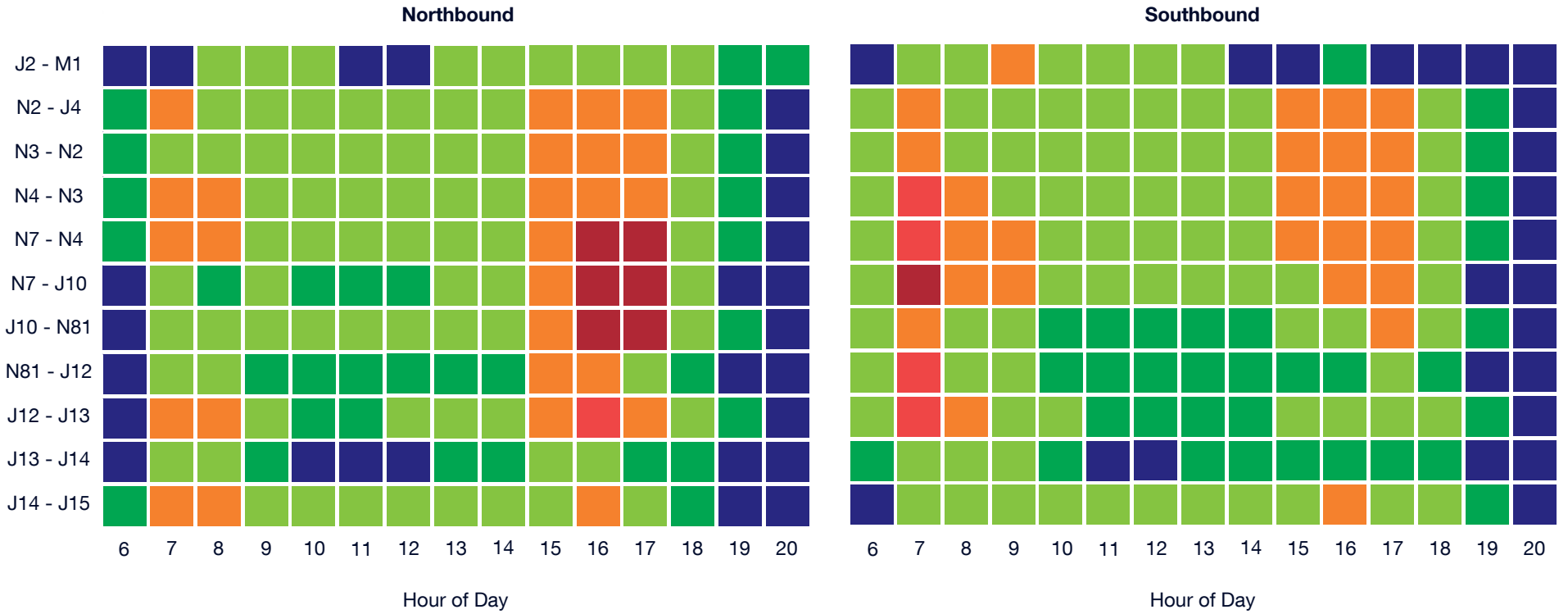
D2: M50 Performance Summary

Monthly Average Daily Traffic (MADT) on the M50 (2015-2022)[2]



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 2015 and 2022

M50 Level of Service
Typical Working Day in 2022



Average hourly levels of service for 2022 were analysed from TII Traffic Monitoring Units to give an indication of travel congestion and typical working days.
A typical working day in 2022 refers to all weekdays, excluding school holidays and public holidays.

D3: N40 Performance Summary

2022 Key network statistics

Several sections of the N40 Cork Southern Ring Road carry in excess of 75,000 vehicles on an average day.

7,631
Highest hourly flow recorded on the Kinsale Rd - Douglas section between 8am and 9am on 21st September

97,914
Highest Daily Flow Recorded on the Kinsale Rd - Douglas section

Thursday
Busiest Typical Day

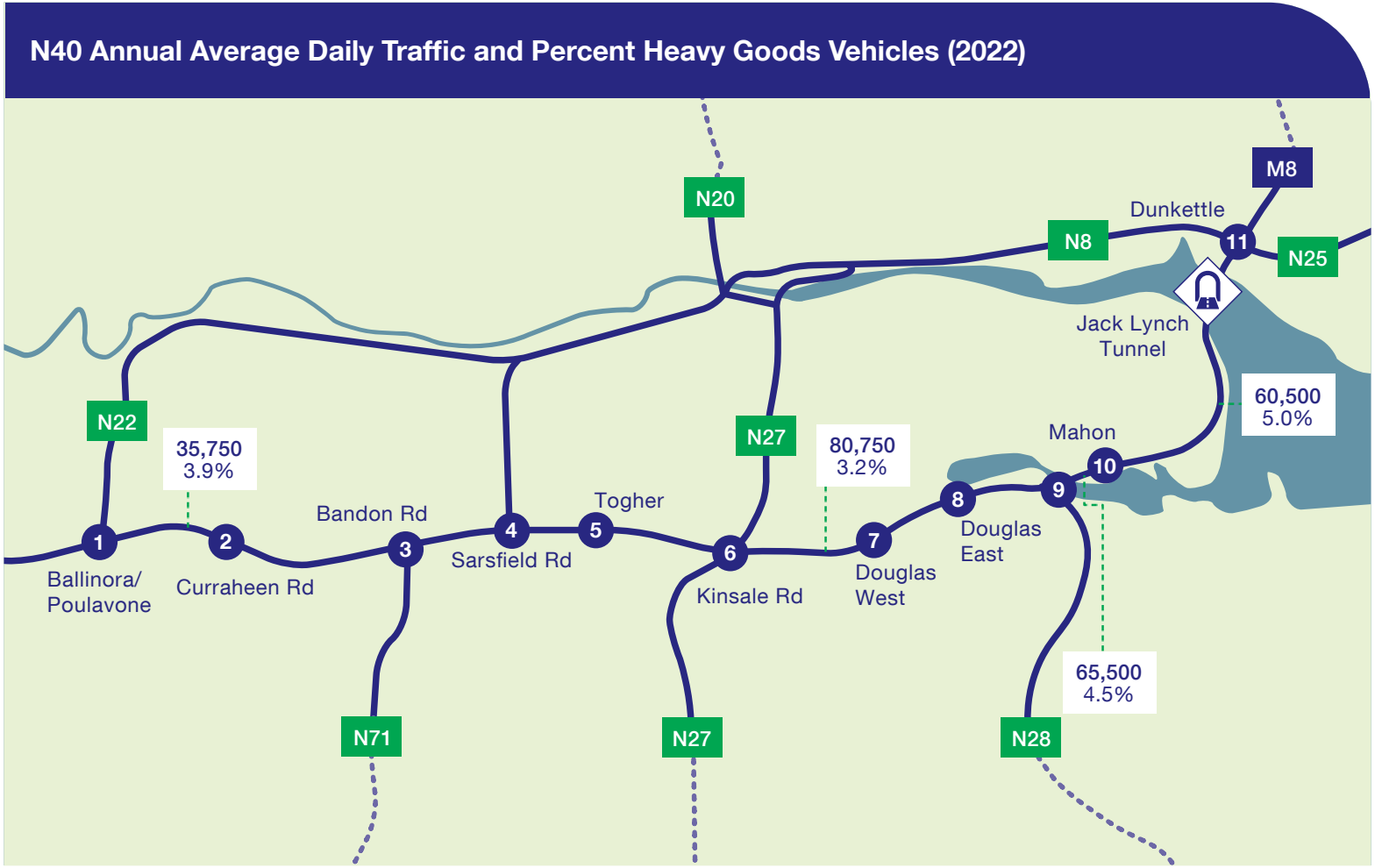
0.31 Billion
Vehicle km travelled which represents a 12% increase on 2021

07:00 - 08:00
Peak Incident Time

245
Total No. of Incidents of which **60** were Traffic Collisions

14 minutes
Average Response Time

40 minutes
Median Duration of Incidents

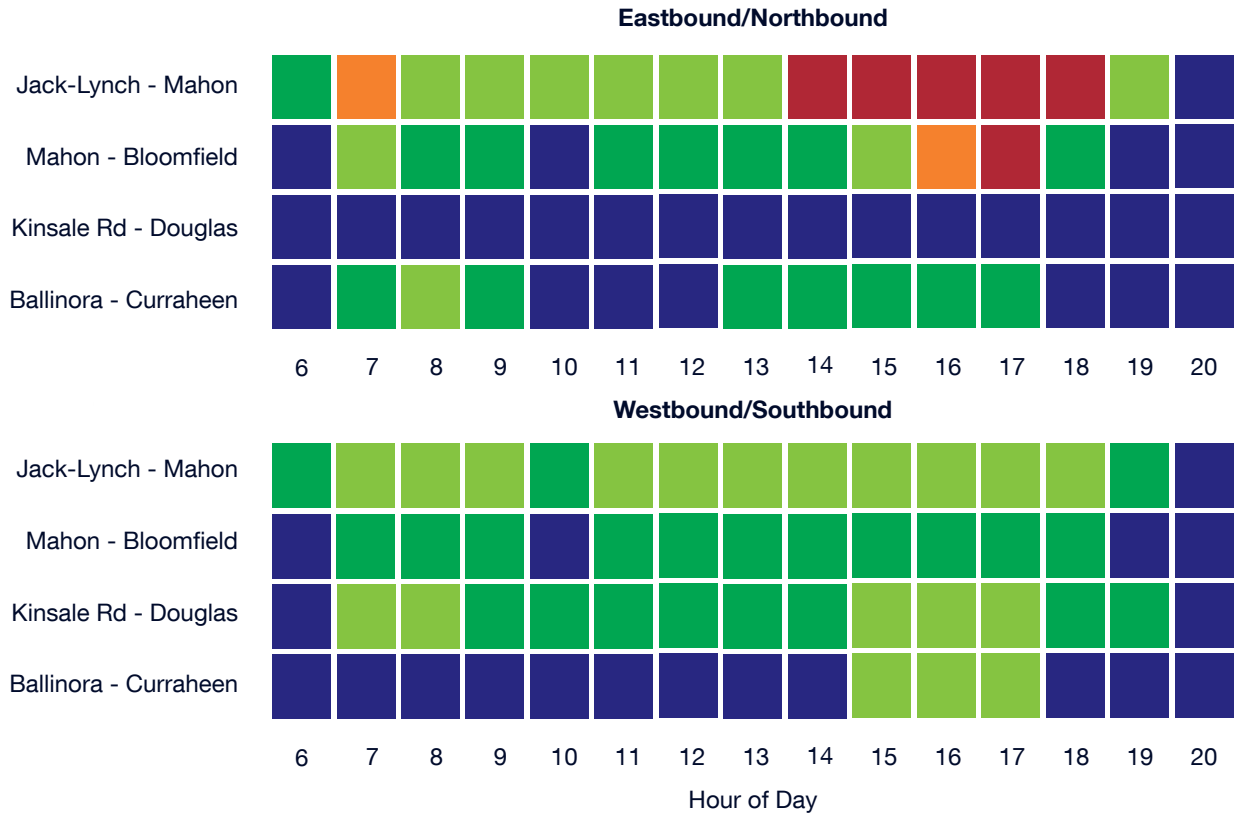

N40 Annual Average Daily Traffic and Percent Heavy Goods Vehicles (2022)
N20
M8
Dunkettle
N8
11
N25
Jack Lynch
Tunnel
60,500
5.0%
N22
35,750
3.9%
N27
80,750
3.2%
Mahon
10
9
8
7
6
5
4
3
2
1
Bandon Rd
Togher
Douglas
East
Douglas
West
Sarsfield Rd
Kinsale Rd
Ballinora/
Poulavone
Curraheen Rd
65,500
4.5%
N71
N27
N28

D4: N40 Operational Performance

Monthly Average Daily Traffic (MADT) on the N40 (2015-2022)[3]

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 2015 and 2022

N40 Level of Service
Typical Working Day in 2022



Level of Service

A. Free flow
B. Reasonably free flow
C. Stable flow
D. Approaching unstable flow
E. Unstable flow
F. Forced or breakdown flow

Average hourly levels of service for 2022 were analysed from TII Traffic Monitoring Units to give an indication of travel congestion and typical working days. A typical working day in 2022 refers to all weekdays, excluding school holidays and public holidays.

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.

158,017
Highest Daily Flow Recorded on the **M1** between the M50 and Dublin Airport

50,728
Highest Daily Flow Recorded on the **M2** between the M50 and Coldwinters

89,927
Highest Daily Flow Recorded on the **N3** between Blanchardstown and Clonsilla

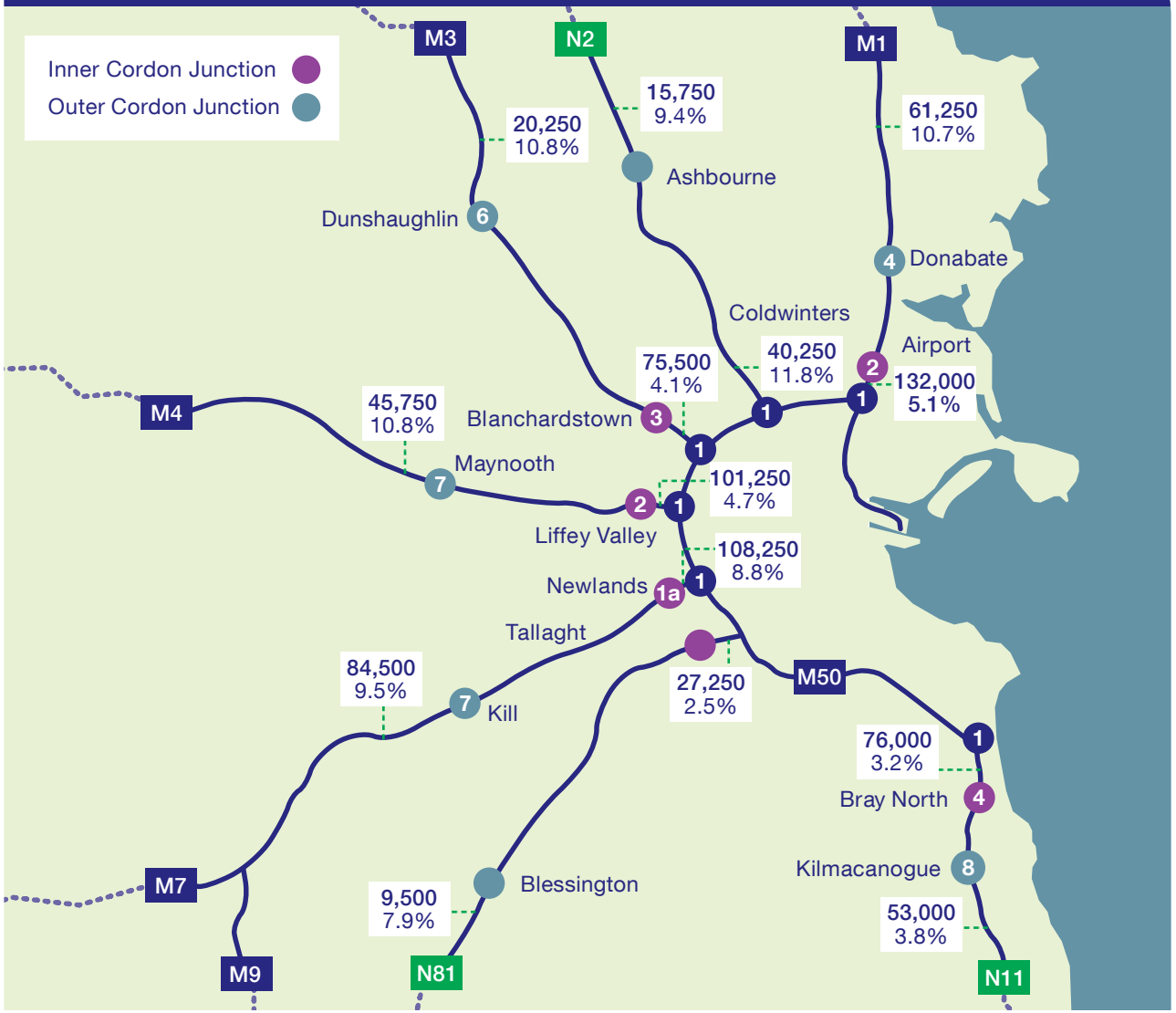
117,546
Highest Daily Flow Recorded on the **N4** between the M50 and Liffey Valley

129,557
Highest Daily Flow Recorded on the **N7** between the M50 and Newlands

33,671
Highest Daily Flow Recorded on the **N81** between the M50 and Tallaght Village

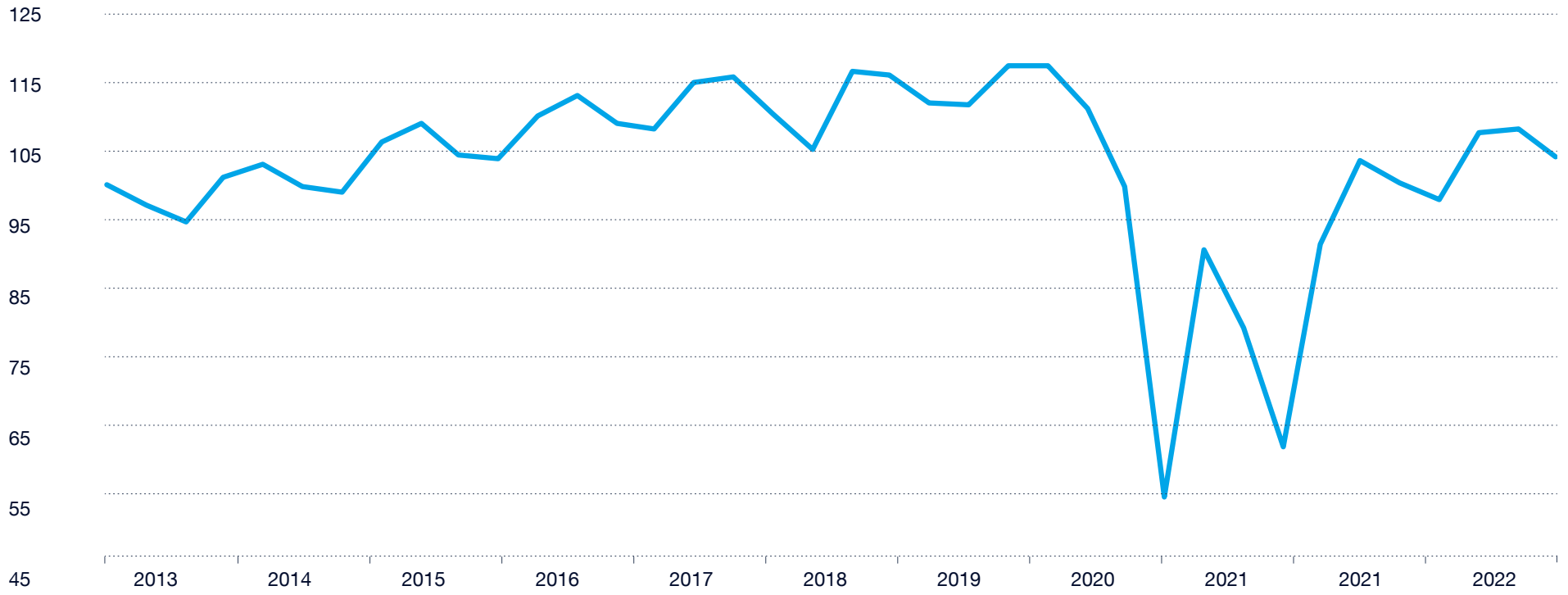
91,982
Highest Daily Flow Recorded on the **M11** between the M50 and Bray North

Dublin Radials Annual Average Daily Traffic and Percent Heavy Goods Vehicles (2022)



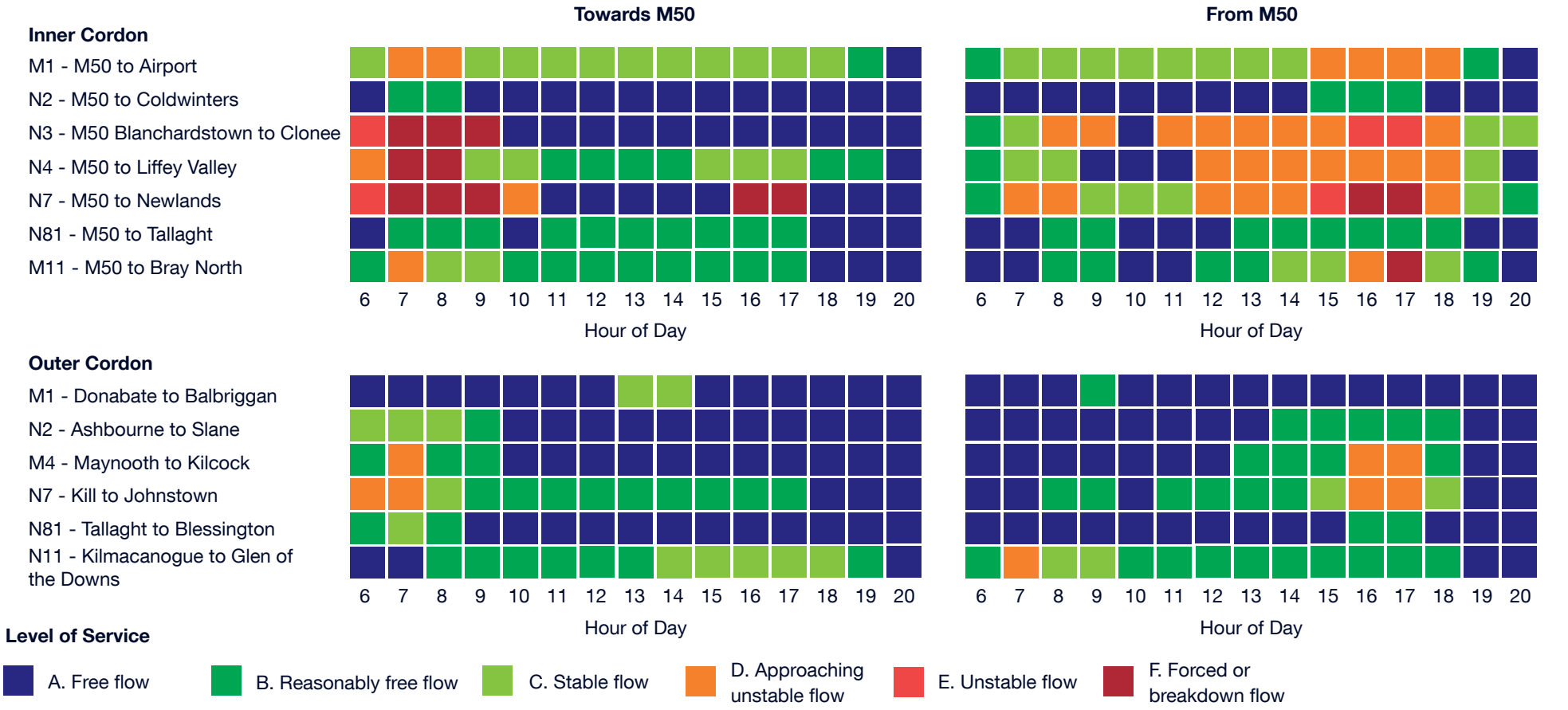
D6: Dublin Radials Performance Summary

Quarterly Traffic Profile of Dublin Radials (2013-2022)
Traffic Volume Index (Base Q3 2013)



Trends in traffic volumes on the Dublin Radials are represented above as a quarterly index of aggregate traffic volumes on each route between 2013 and 2022.

Dublin Radials Level of Service
Typical Working Day in 2022



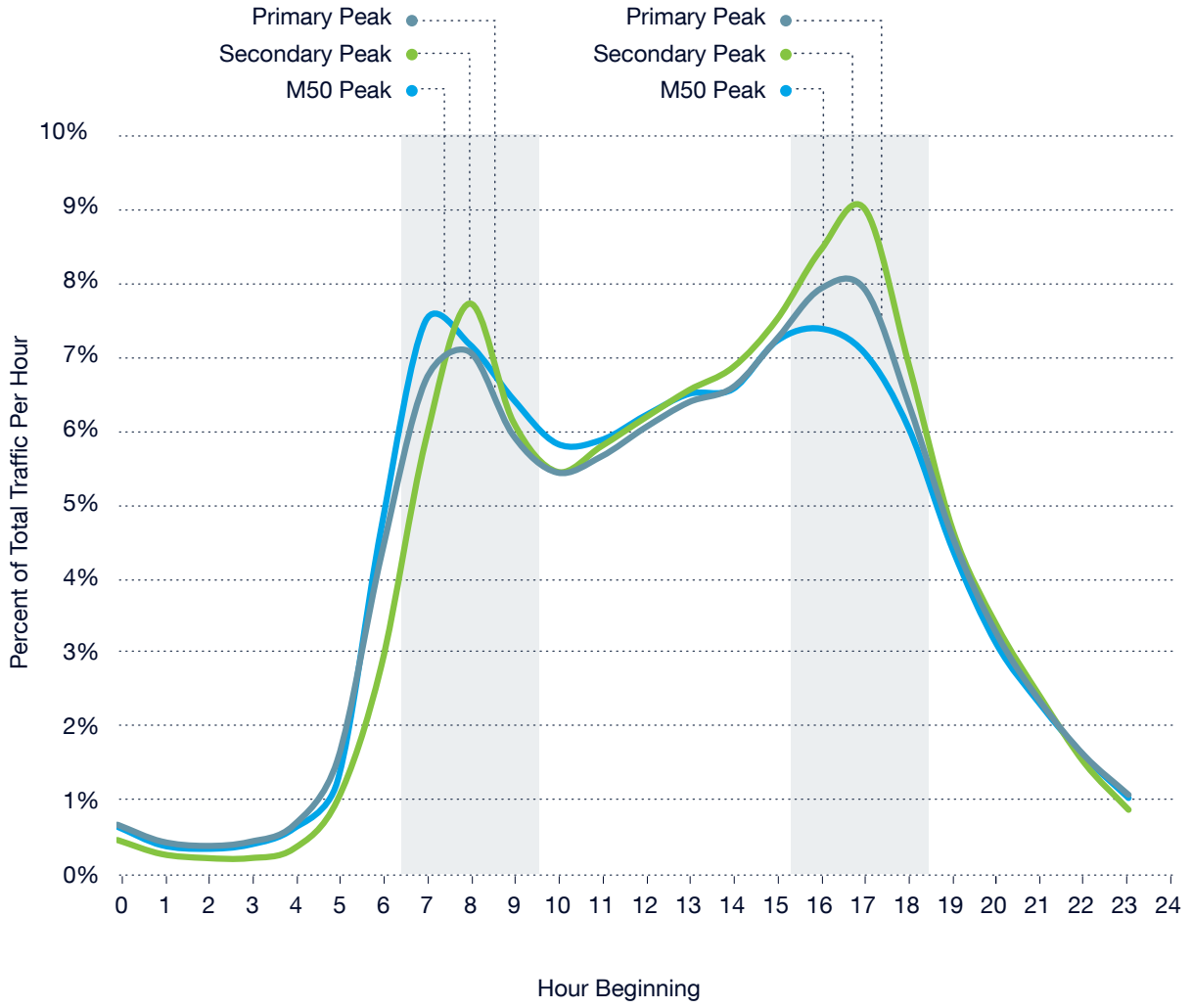
Average hourly levels of service for 2022 were analysed from TII Traffic Monitoring Units to give an indication of travel congestion and typical working days. A typical working day in 2022 refers to all weekdays, excluding school holidays and public holidays. The inner and outer cordons presented above match the locations shown on the map of the Dublin Radials on Page 26.

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.

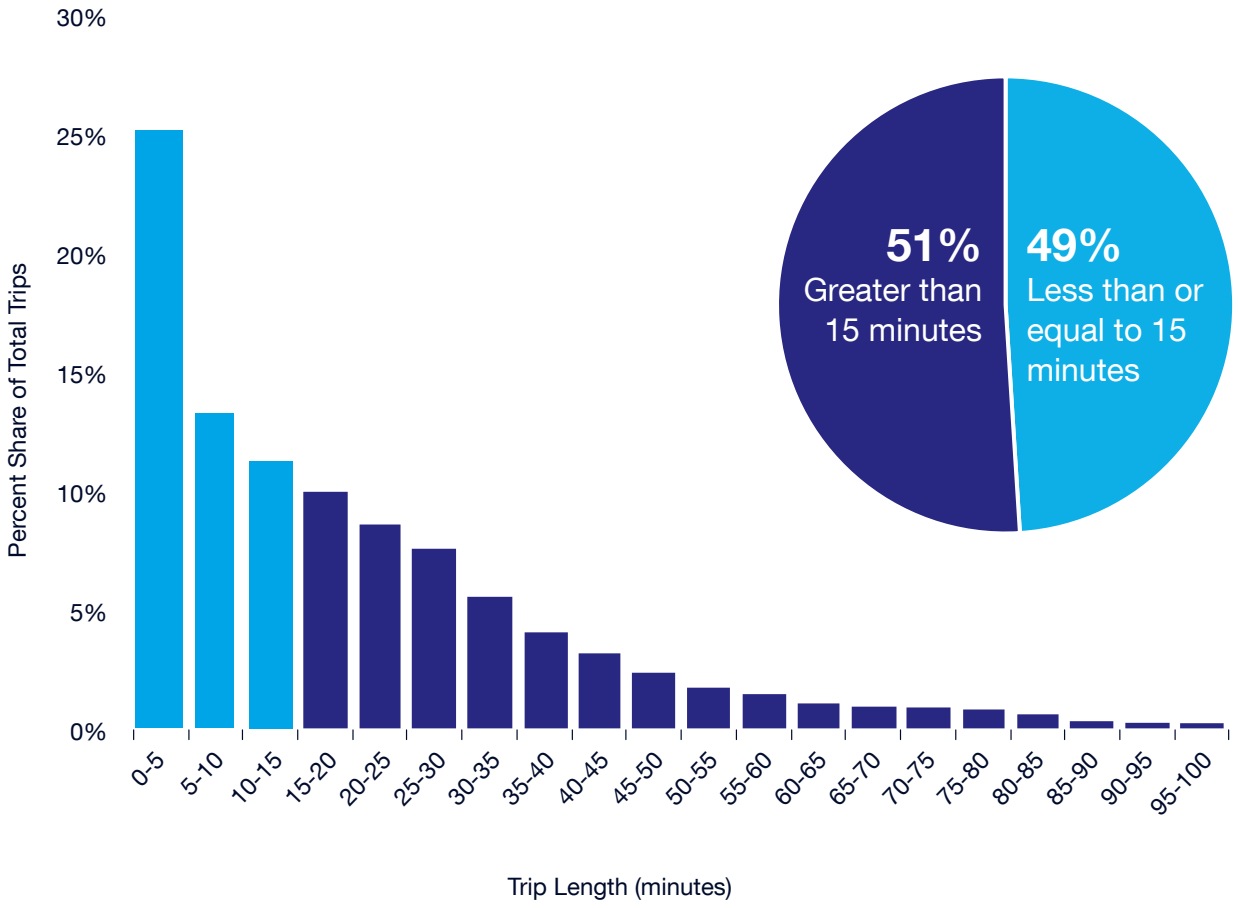
Average Daily Traffic Profile and Peak Periods on the National Roads Network (2022)



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, 49% of trips are of 15 minutes duration or less. The average trip duration is 21 minutes.

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



average trip duration = 21mins

G: Annual Traffic Growth Rates

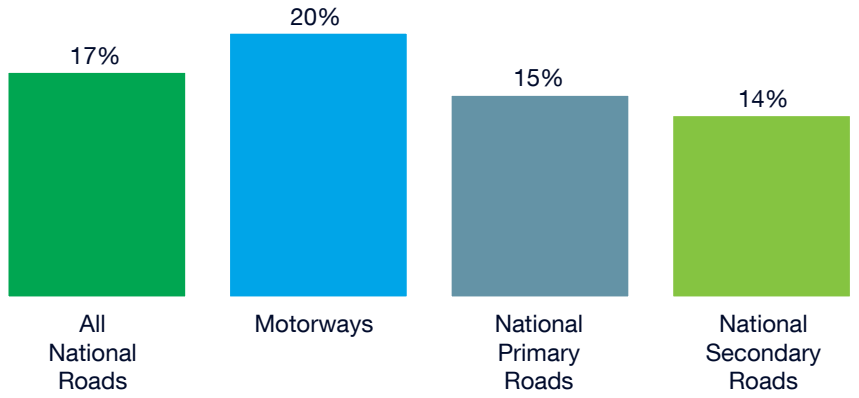
Traffic growth was almost 17% across the National Roads network in 2022 compared to 2021

Annual traffic growth rates vary greatly by road type and vehicle type. Roads across different regions of Ireland experienced different patterns of traffic growth throughout 2022.

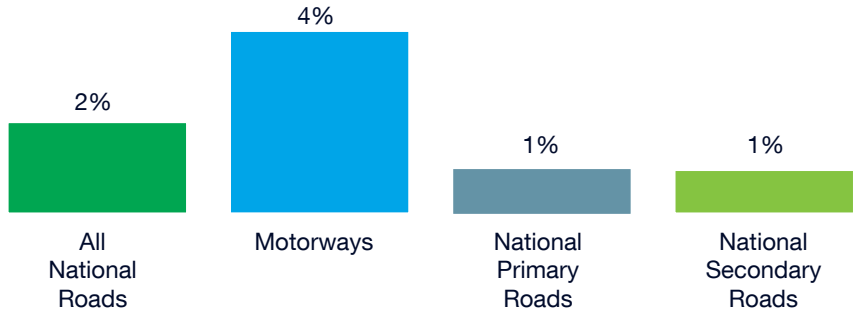
The high growth rates for 'All Vehicles', between 2021 and 2022, are influenced by travel restrictions in early 2021 associated with the COVID-19 pandemic.

However, the growth rates for 'Heavy Goods Vehicles' are lower, when analysed in isolation, as these vehicles were not as severely impacted by the COVID-19 pandemic restrictions in 2021 due to their importance in the supply chain of essential goods.

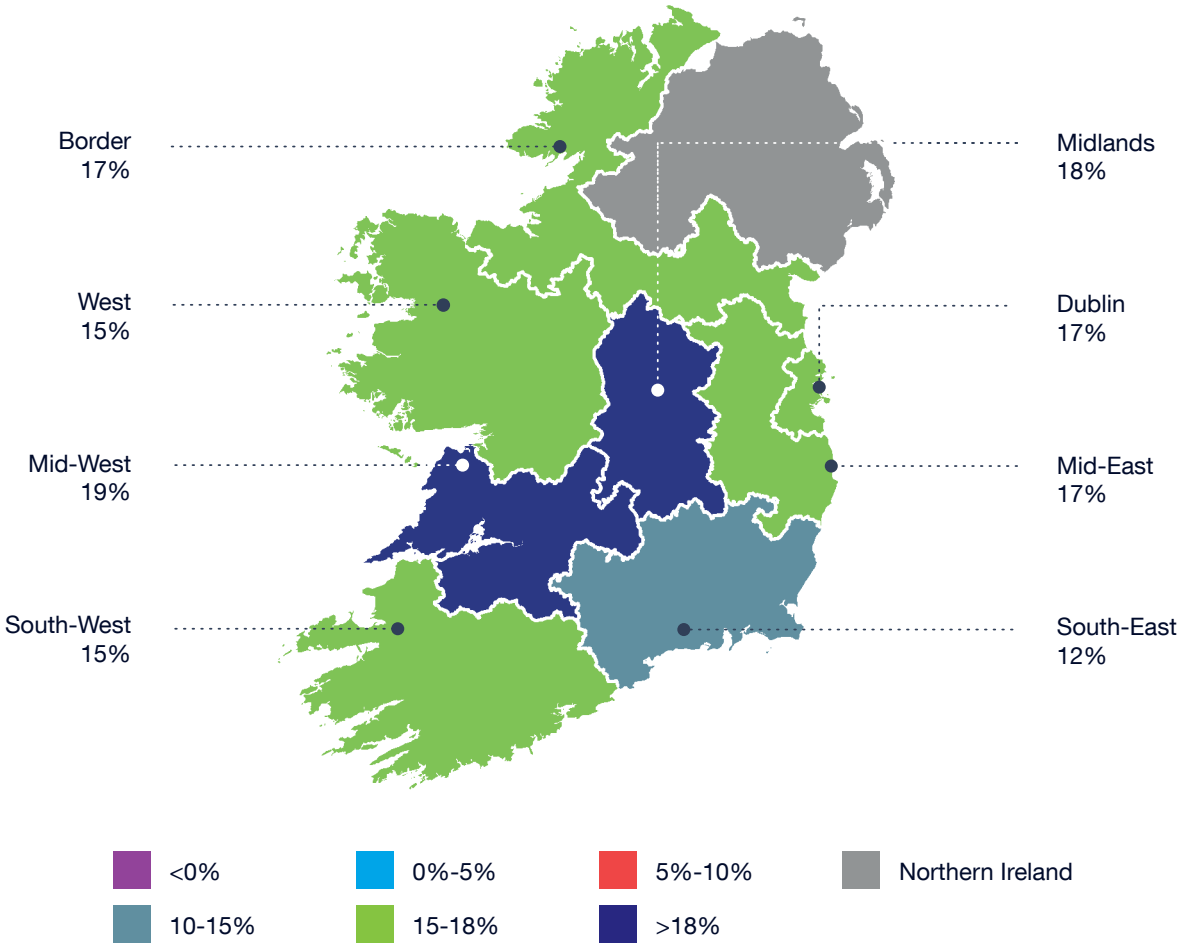
Annual Traffic Growth Rates by Road Type - All Vehicles (2021-2022)



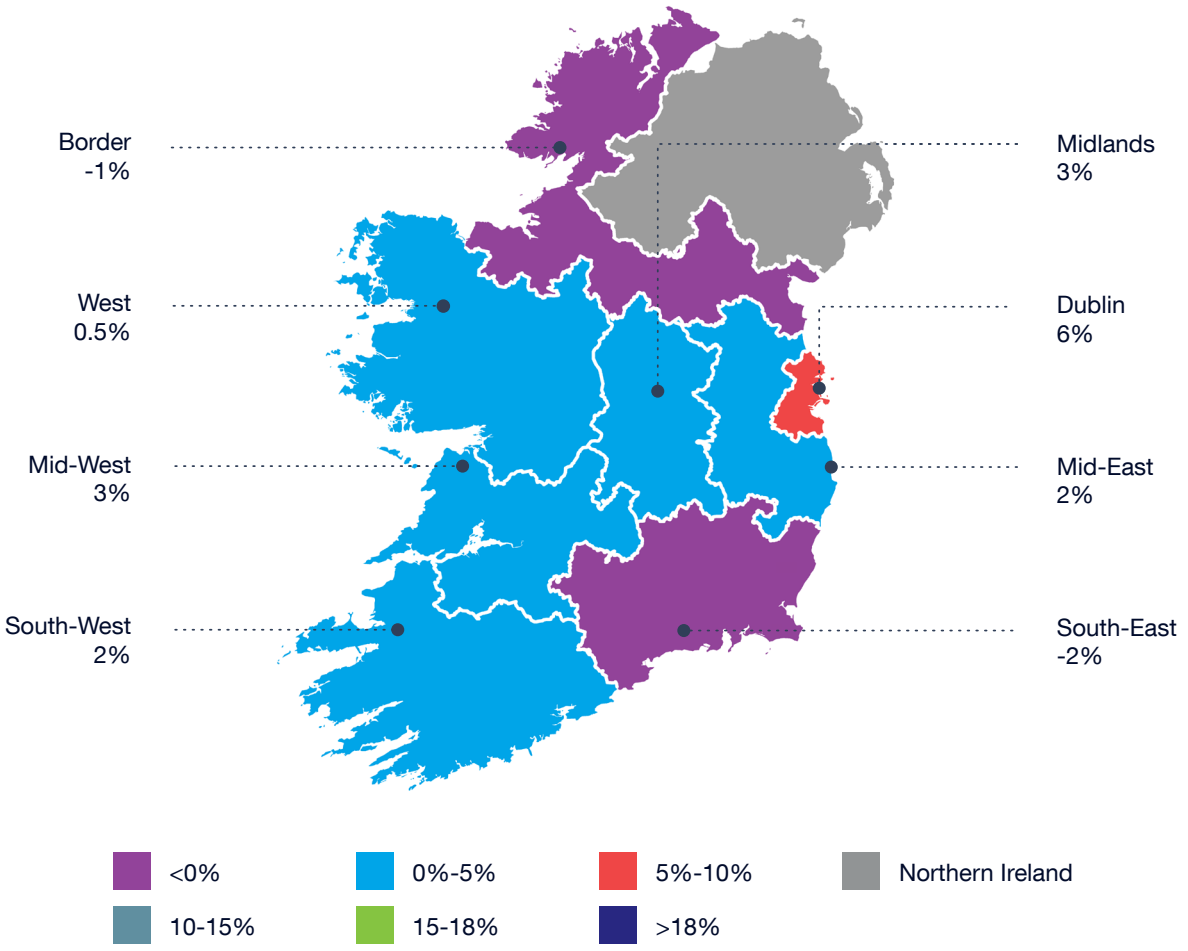
Annual Traffic Growth Rates by Road Type - Heavy Goods Vehicles (2021-2022)



Annual Traffic Growth Rates by Region - All Vehicles (2021-2022)



Annual Traffic Growth Rates by Region - Heavy Goods Vehicles (2021-2022)

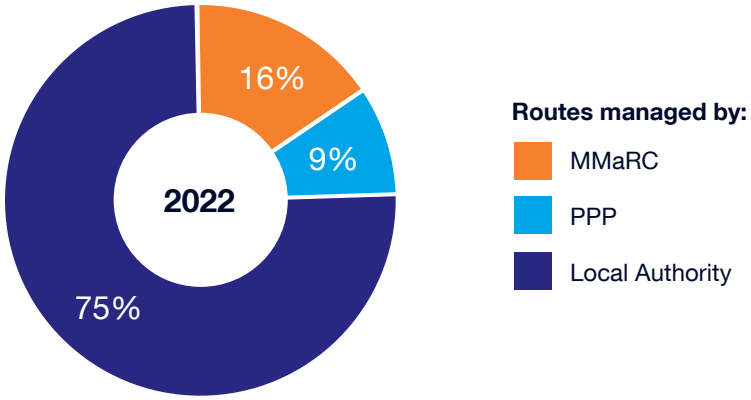


H: Network Management

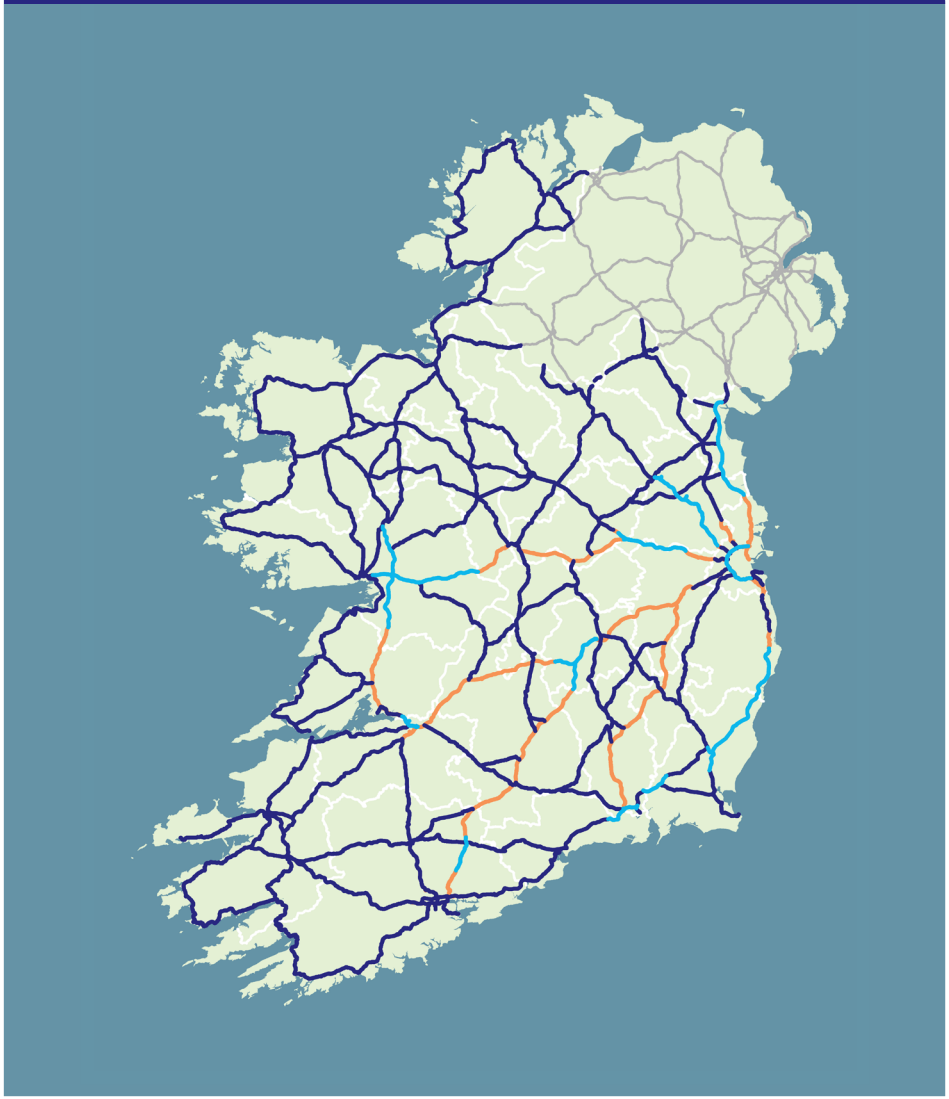
The responsibilities for the Management of the National Roads network are assigned to a number of bodies, with the majority share of National Primary and National Secondary roads administered by local authorities.

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:

119
weather stations in operation on the National Roads Network

74
nights in 2022 where the temperature reached below zero

327
demountable snow ploughs

388
salt spreaders

33,536
tonnes of salt were used on National Roads Network in 2022

1,608
SOS phones in the country

15,082
all emergency calls received by Motorway Traffic Control Centre including SOS phones

2.

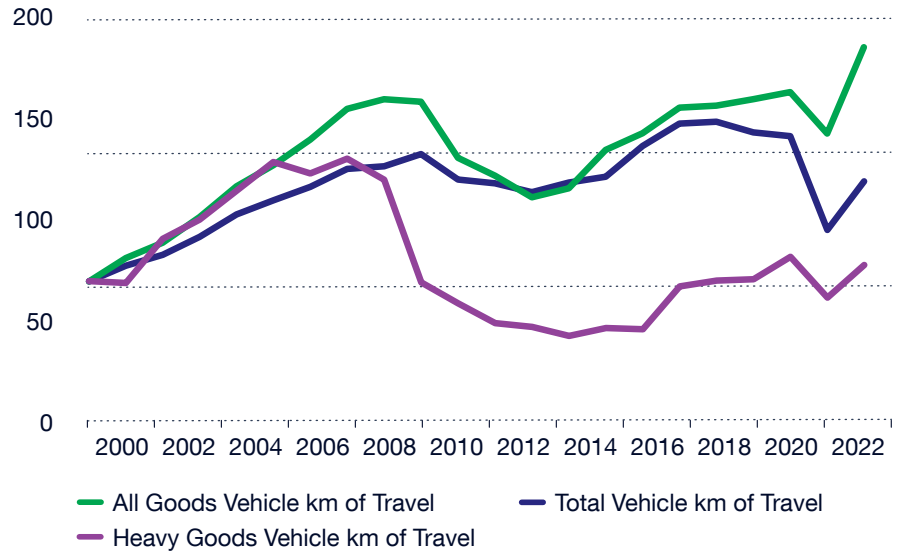
Economics

A: Economic Trends in Transport

Typically, total transport demand in Ireland is closely related to national economic performance. This is illustrated by the trends we see in the data from the economic and financial crisis. Between 2009 and 2012, total vehicle kilometres of travel declined by 10% and goods traffic by 22%. Economic growth began to recover in a sustained way in 2012; with employment levels following a year later. By 2015, overall vehicle kilometres of travel had returned to its pre-crisis level.

However, there has been a weakening of the relationship between total transport demand and national economic performance since the start of the COVID-19 pandemic. Modified Final Domestic Demand has been increasing at a rate which is to be expected with Ireland currently at full employment, but total vehicle kilometres of travel has increased at a slower rate, having still not reached earlier 2019 levels. This new trend may be expected to continue as Ireland's economy continues to grow. With increasing alternatives available to people such as working from home, and improvements to public transport and active travel infrastructure, the growth in road traffic can be expected to slow.

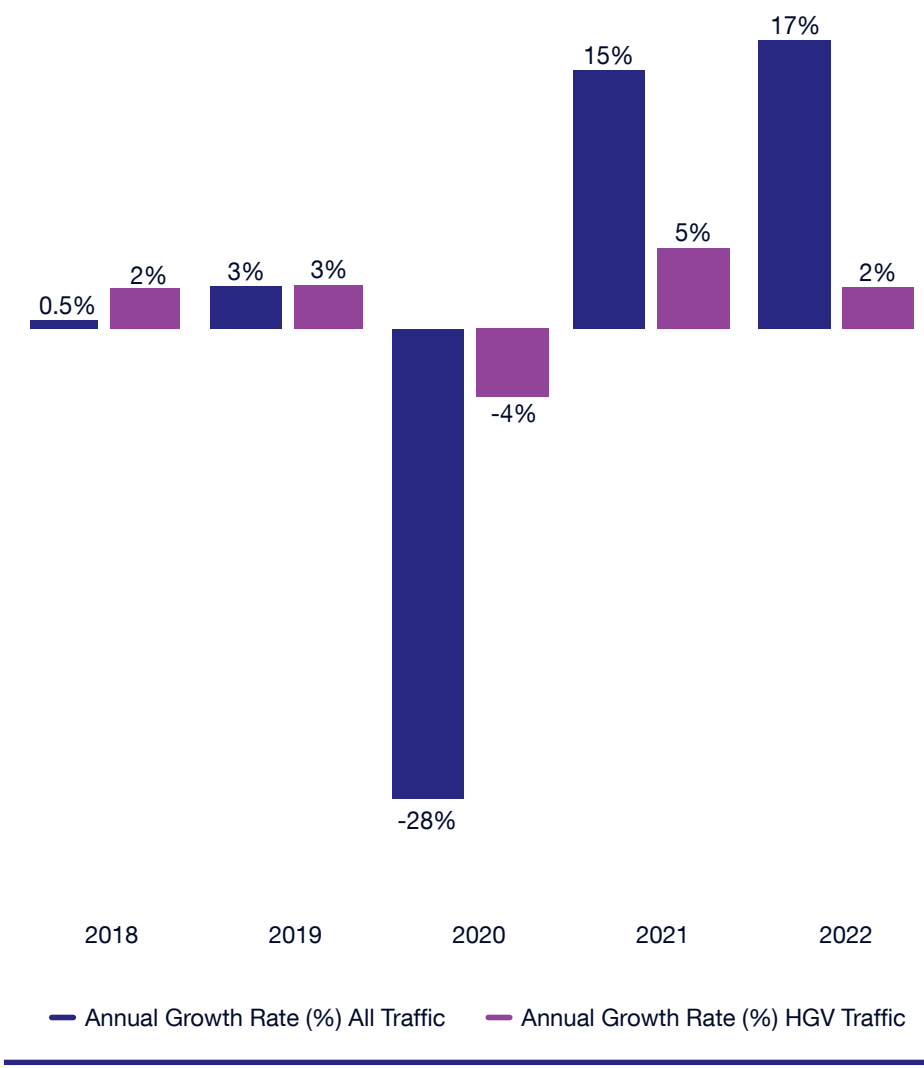
Index of Vehicle Kilometres of Travel on All National Roads*



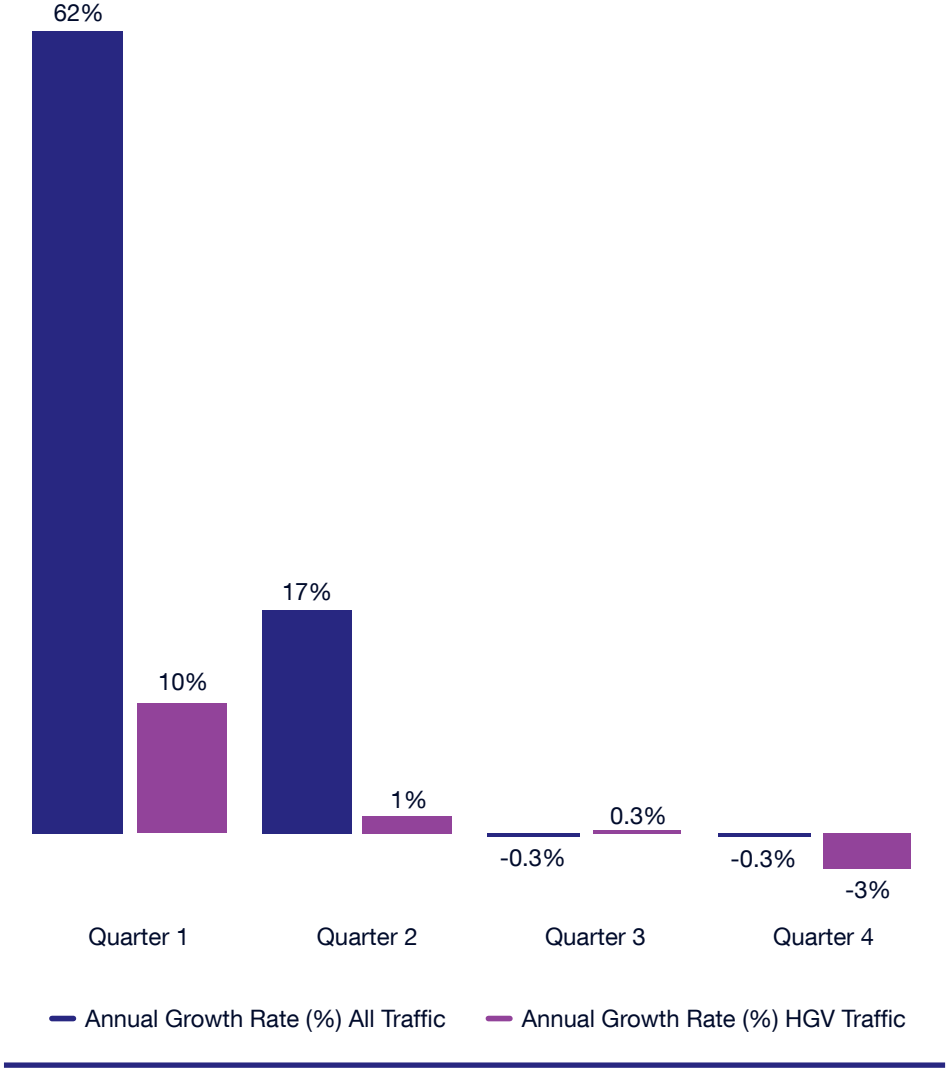
* Source: Domestic Demand - CSO - Central Statistics Office
Data is shown up to 2021 as data for 2022 has not yet been published by the CSO. 2022 data will be presented in the 2023 Indicators report

Modified Domestic Demand is used for measuring economic trends, it represents household expenditure, government spending and capital investment excluding imports/exports and large transactions of foreign corporations.

Annual Growth Rate on the National Roads Network



Quarterly Year-over-Year Growth Rate on the National Roads Network (2021-2022)



3.

Road Condition

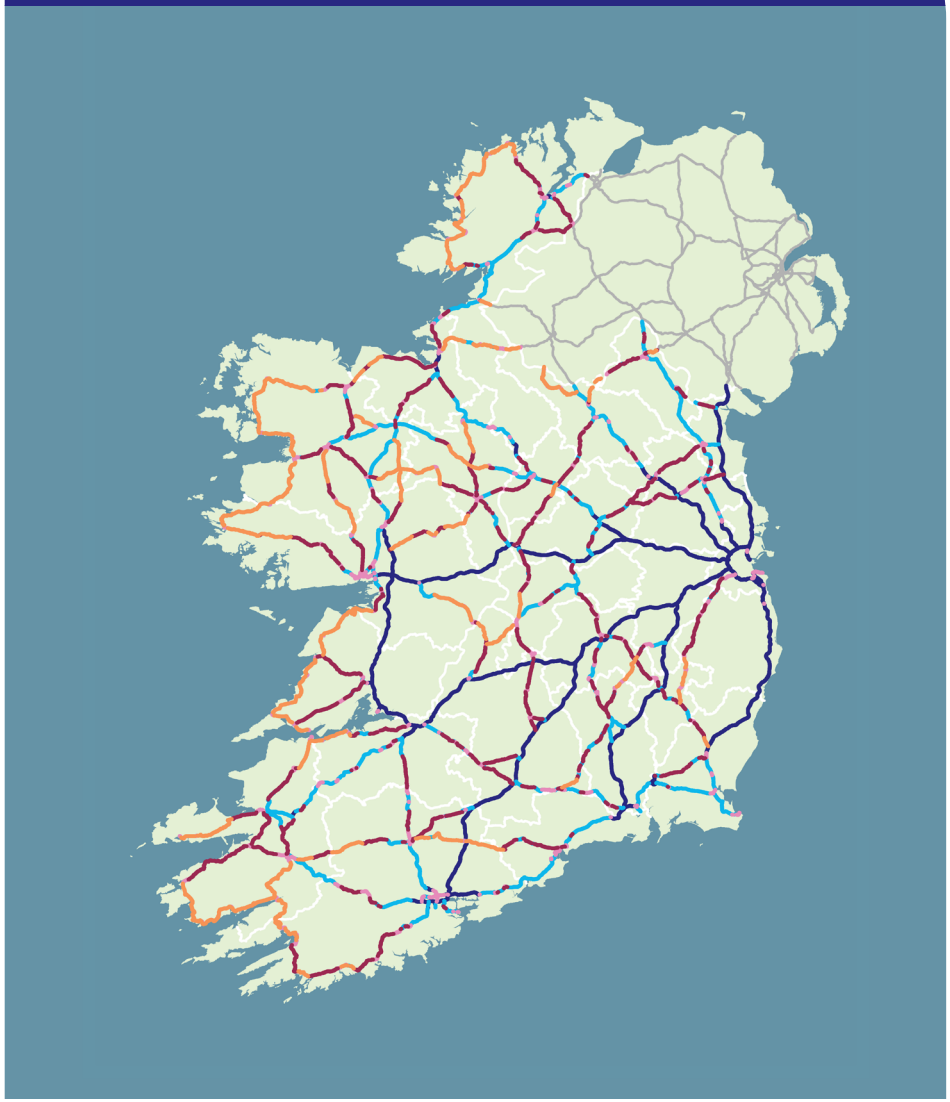
A1: Pavement Maintenance

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 (2022)

Subnetwork		Classification	% of Network
0	Motorways + dual carriageways	High speed, high volumes pavement, made up of Motorway and Dual Carriageway sections of the network.	23%
1	Engineered pavement	Typically carry reasonably large volumes of traffic, and are identified by presence of hard shoulders adjacent to the carriageway.	22%
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.	13%
3	Legacy pavement – high traffic	Legacy subnetwork, typically constructed without formal geometric or pavement design. Typically carries traffic volumes less than 10,000 AADT.	24%
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 (2022)[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, 2022

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.

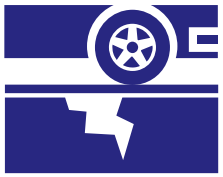
TII determined that the Key Performance Indicators (KPIs) of an efficient pavement network include pavement surface health, surface safety, and structural health. The easiest way to track this is to rank pavement subnetworks on a five-point scale: very poor, poor, fair, good and very good.

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 Safety



Pavement Structural Health

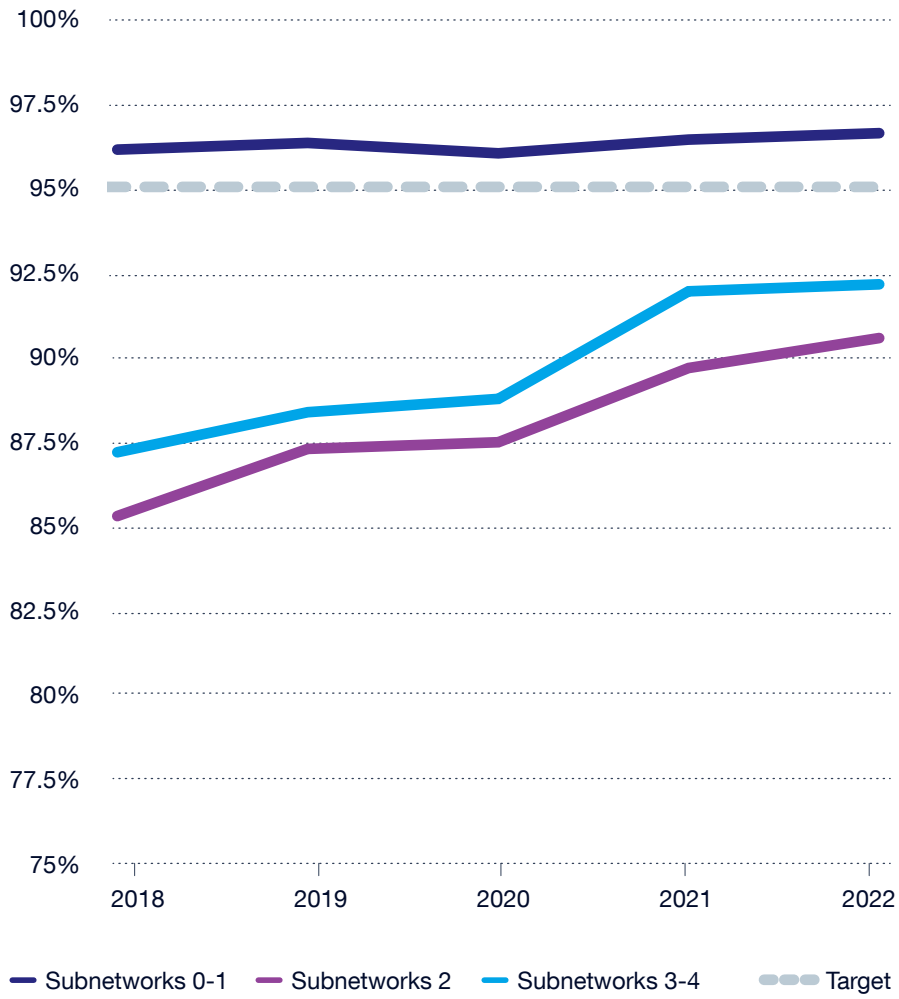
B1: Current Condition of Road Pavements

Pavement Surface Health

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

- Subnetworks 0-1 were consistently above target levels over a five-year period from 2017-2022
- Increased investments in pavement Subnetworks 2 and 3-4 showed an improved upward trend line for 2022

Trends in Pavement Surface Health KPI* (% Fair or Better) (2018-2022)



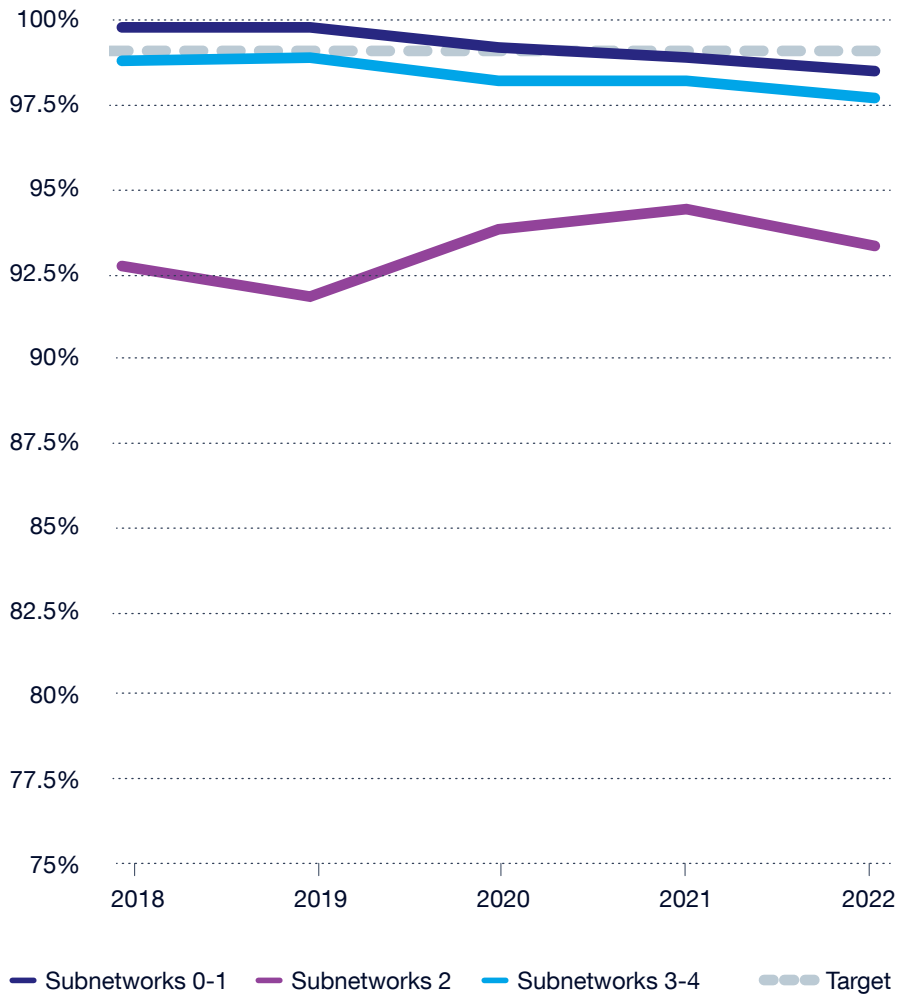
B2: Current Condition of Road Pavements

Pavement Surface Safety

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

- Subnetworks 0-1 were consistently above target levels over a five-year period from 2017-2022
- Subnetworks 3-4 are below target levels but fall close to the target line
- Subnetworks 2 (urban areas) are lower, but the increased emphasis on pavement upkeep and treatment within urban areas in the past few years has resulted in a gradual increase in performance

Trends in Pavement Surface Safety KPI* (% Fair or Better) (2018-2022)



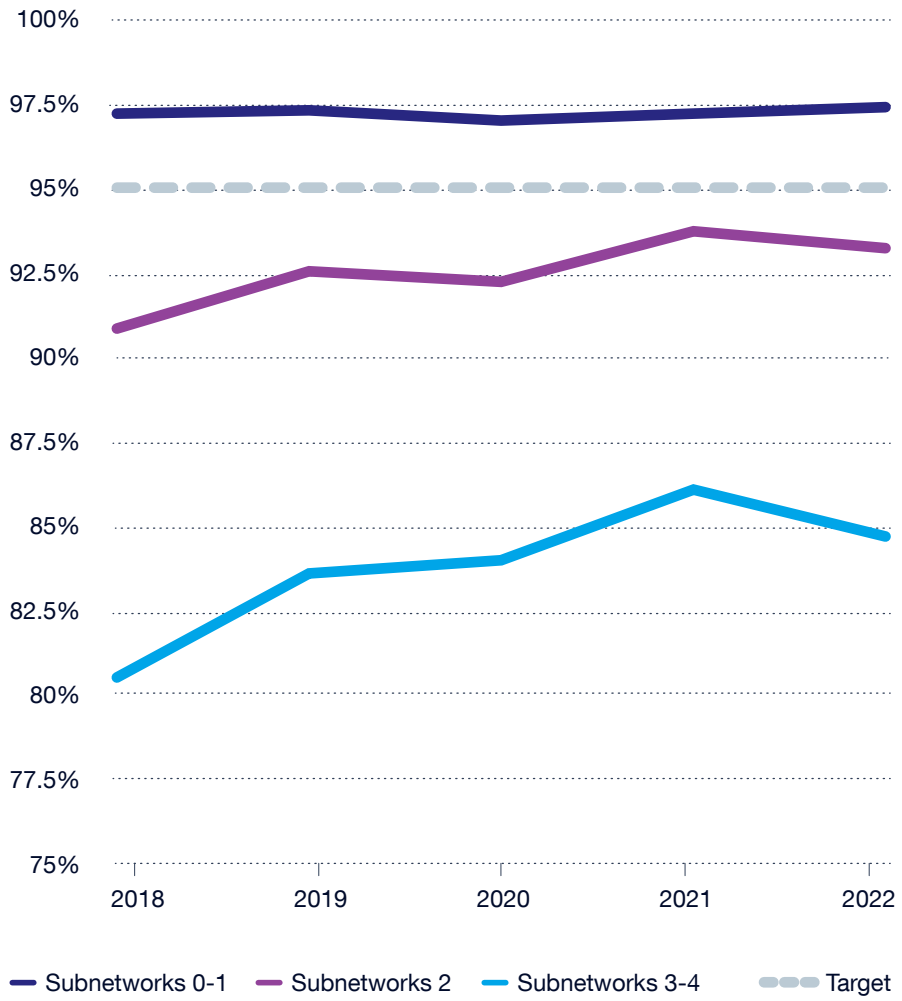
B3: Current Condition of Road Pavements

Pavement Structural Health

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

- Subnetworks 0-1 were consistently above target reflecting the relatively new age profile of most road sections in this category
- Subnetworks 3-4 are below target levels but fall close to the target line
- Subnetworks 2 (urban areas) are score significantly higher than Subnetworks 3-4 and was close to target in 2021
- Both Subnetworks 2 and 3-4 show an improved upward trend in recent years.

Trends in Pavement Structural Health KPI* (% Fair or Better) (2018-2022)



C: National Road Bridge Structures

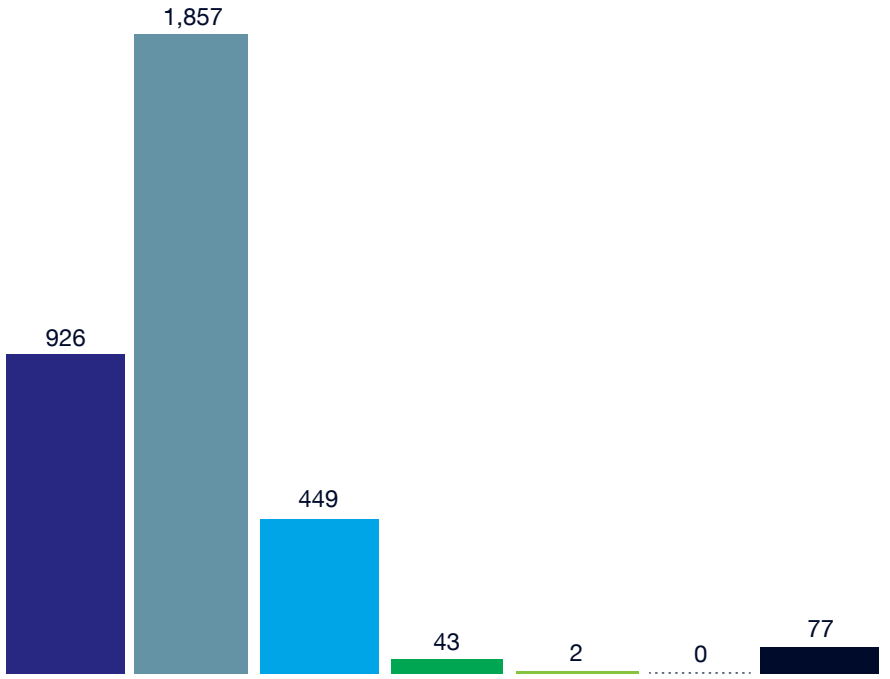
Maintenance and rehabilitation of bridges are an important part of TII's asset management strategy, with bridges throughout Ireland being inspected regularly.

The National Roads network includes 3,354 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 83% of bridges assessed require no immediate repair work
- 13% require repair when convenient (i.e., no immediate requirement).

National Road Bridge Structures Condition Rating (2022, 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.

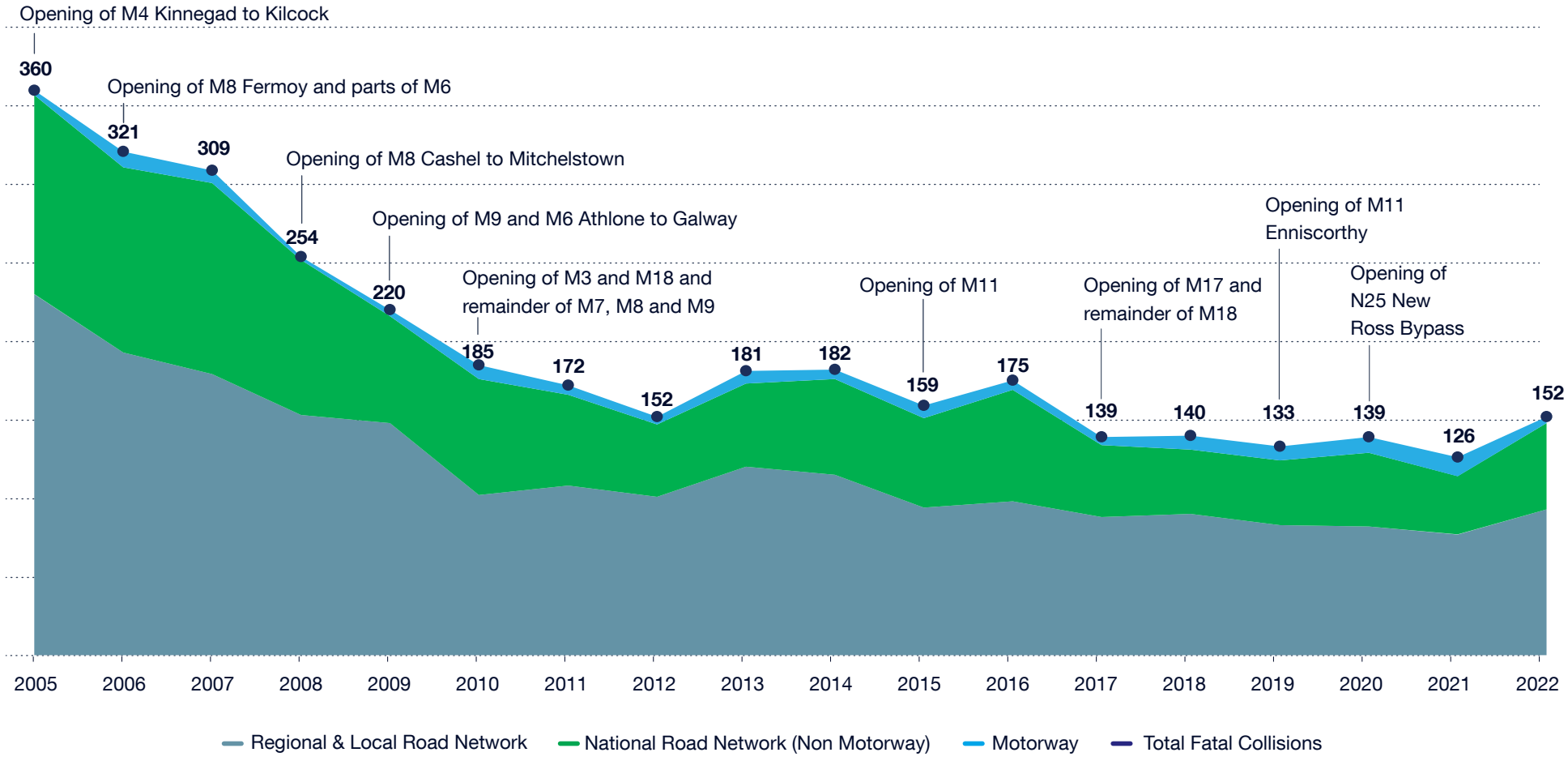
In line with these strategies, TII will:

- 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: National Trends in Fatal Collisions

Fatal Collision Trends (2005-2022) by Network with Key Dates of Road Scheme Openings



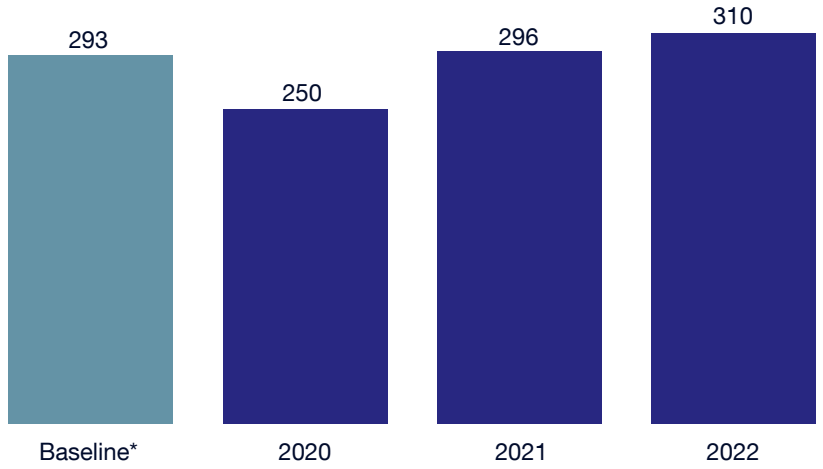
C: Fatal and Serious Injury Collisions on the National Roads Network

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

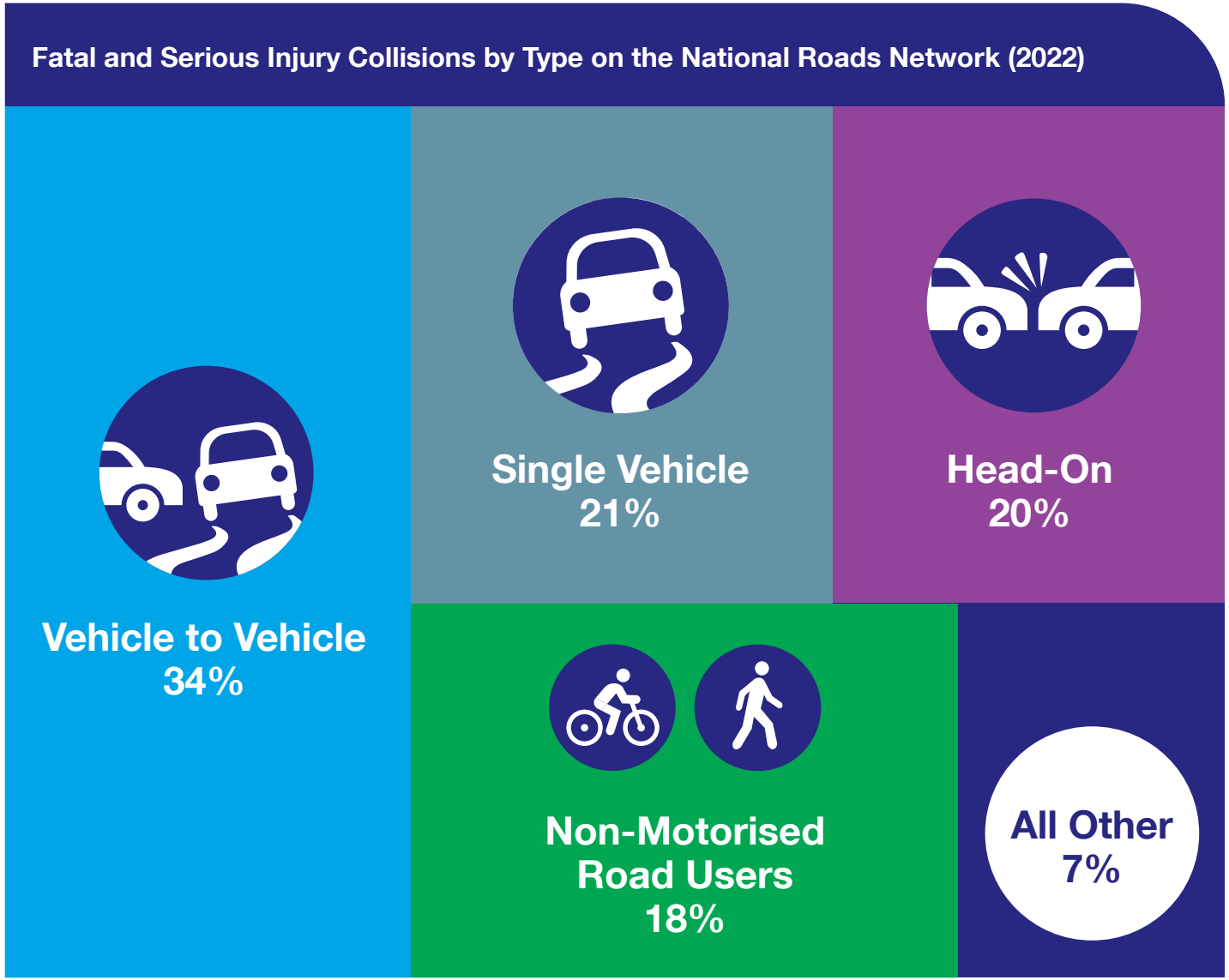
In 2022, there were 310 fatal and serious injury collisions on the National Roads Network.

This represents a 5% increase compared to 2021, a 24% increase compared to 2020 when COVID-19 travel restrictions were in place, and a 6% increase compared to the Baseline.

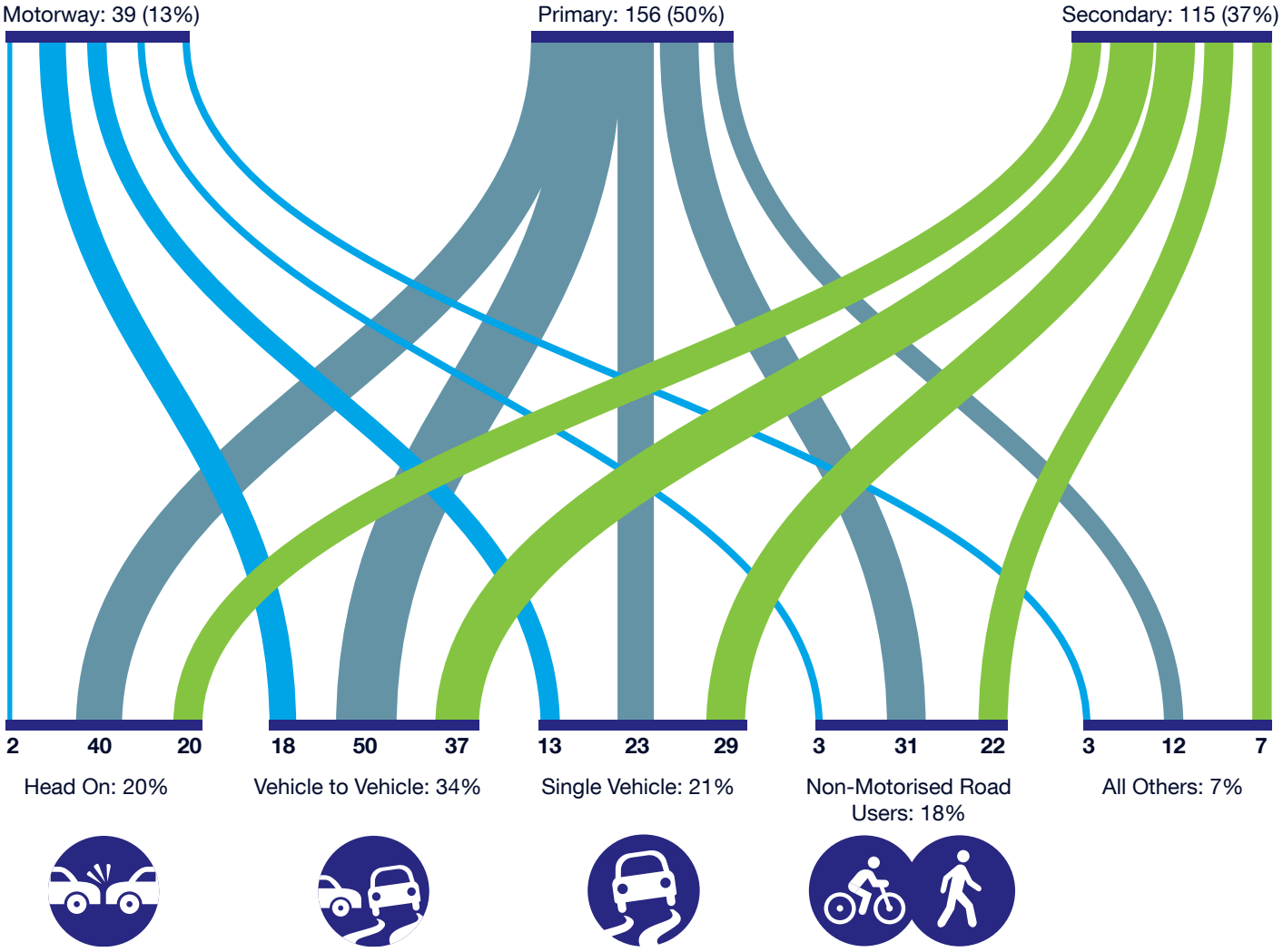
Recent Trends in Fatal and Serious Injury Collisions



*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 (2022)
Vehicle to Vehicle
34%
Single Vehicle
21%
Head-On
20%
Non-Motorised
Road Users
18%
All Other
7%

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



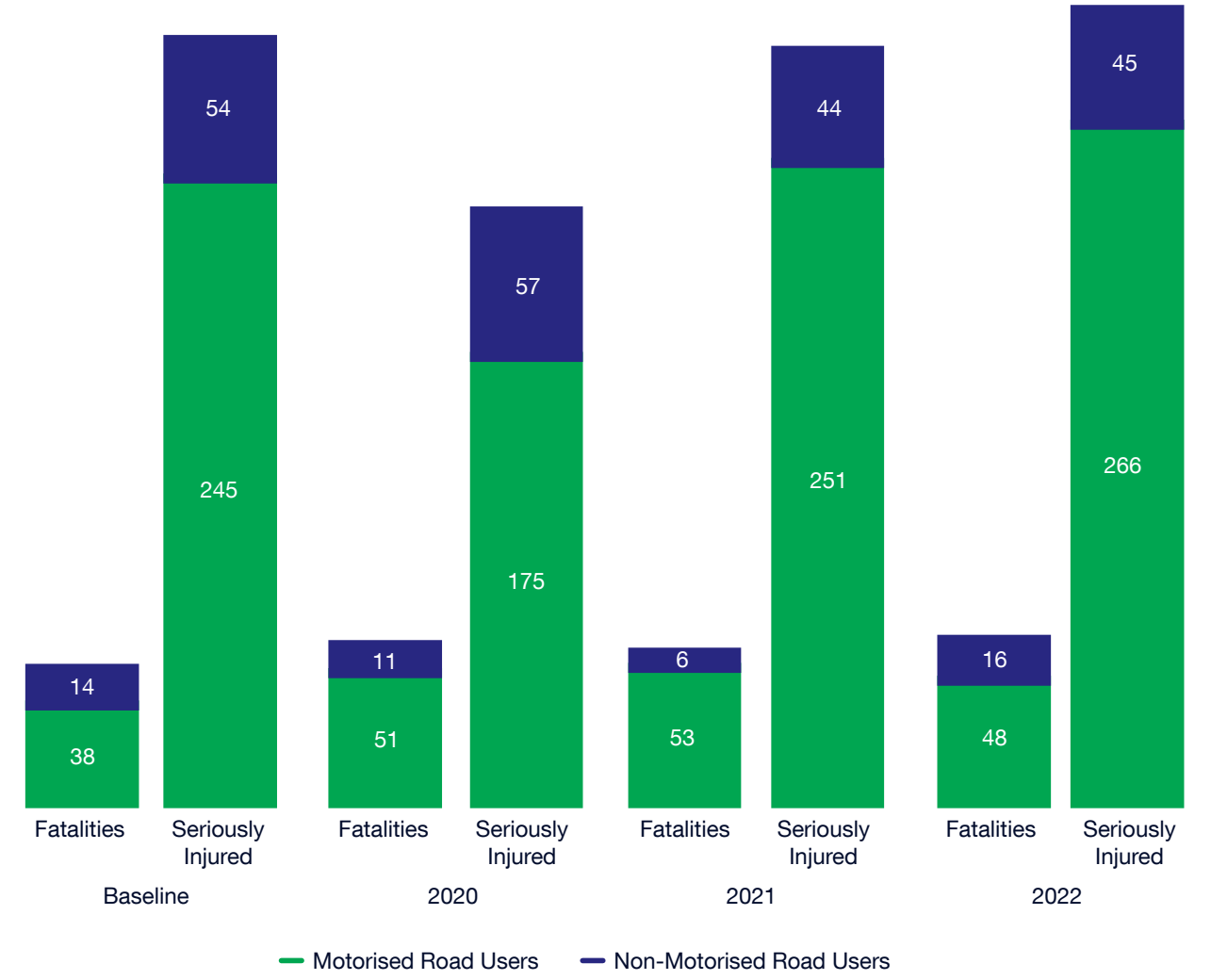
D: Fatalities and Seriously Injured on the National Roads Network

In 2022, 59 collisions on the National Roads Network resulted in 64 fatalities, representing a 21% (+11) increase compared to 2021, a 3% (+2) increase compared to 2020 and a 37% (+17) increase compared to Baseline.

In 2022, 311 people were seriously injured in road traffic collisions reported along national roads. This is an increase of approximately 5% (+16) on 2021 figures and a 4% (+12) increase on the Baseline.

These recent upwards trends in fatal and serious injury collisions shows 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 (2020-2022)

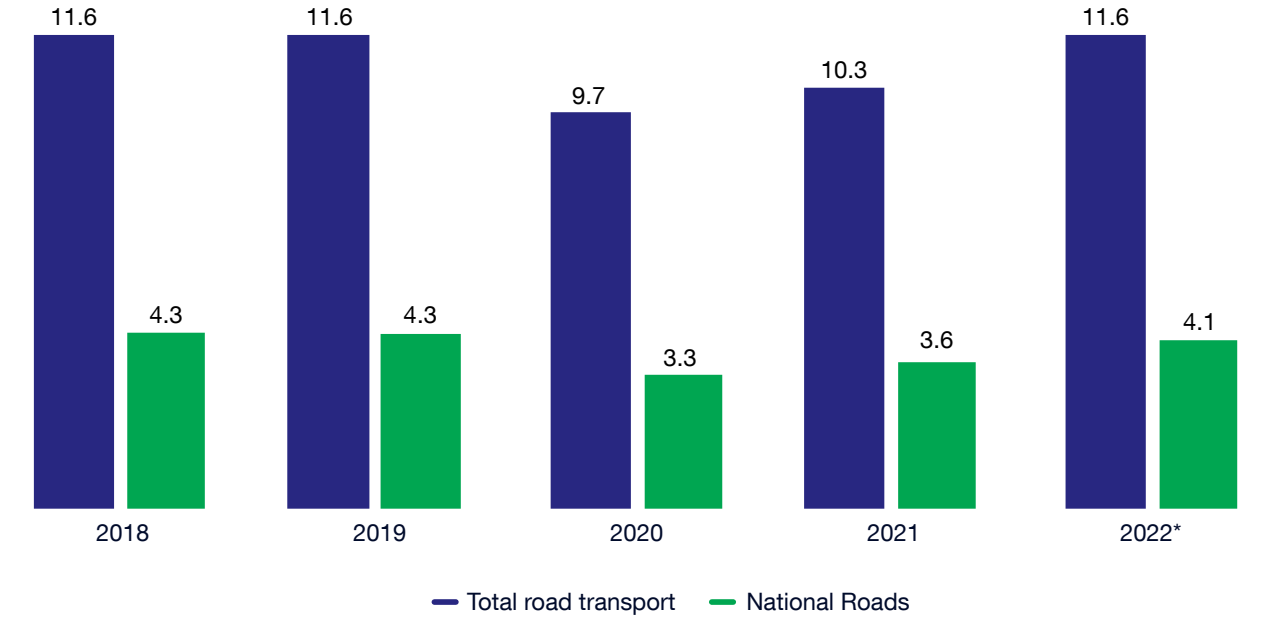


5.

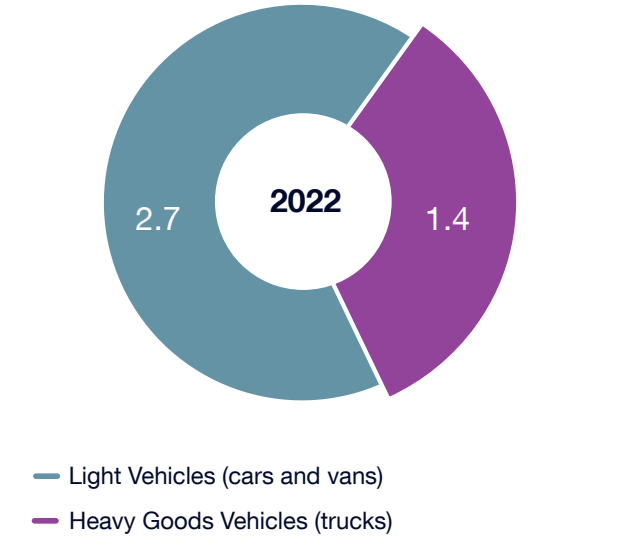
Emissions

A1: Vehicle Emissions on the National Roads Network

Annual Road Travel Emissions (mega tonnes CO_2e)



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



Travel on National Roads contributed an average of **35%** of total road transport emissions in 2018-2022.

Heavy Goods Vehicles (HGVs) contributed **34%** of National Roads emissions in 2022.

Sources: 1. EPA, 2022 (estimate of total transport emissions in 2018 was 12.2 mega tonnes, road travel emissions made up 11.6 mega tonnes of this; *2022 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

Emissions increased in 2022 following low levels associated with the COVID-19 pandemic in 2020 and 2021.

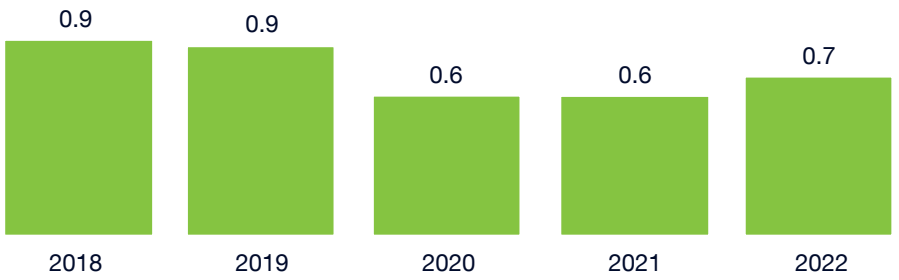
Exhaust emissions from motor vehicles contain a variety of pollutants.

Greenhouse gases (GHG), principally carbon monoxide (CO) and carbon dioxide (CO2) contribute to climate change.

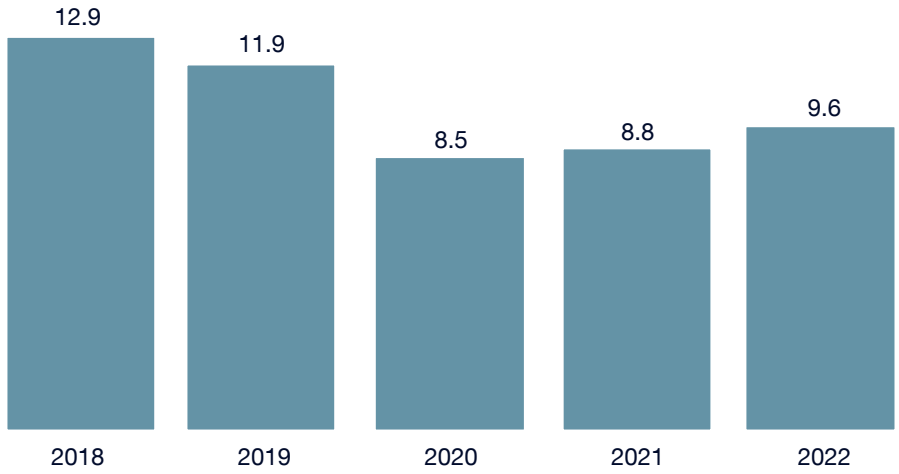
Nitrogen Oxides and very small Particulate Matter, can be harmful to human health and damage a variety of ecosystems.

Total emissions of Oxide of Nitrogen (NOx) and Particulate Matter (PM10) have increased in 2022 in comparison with 2020 and 2021, when Covid travel restrictions where in place, however remain lower then pre-pandemic levels in 2018 and 2019.

Annual Emissions of PM_{10} in Megatonnes (2018-2022)



Annual Emissions of NO_x in Megatonnes (2018-2022)



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