MERIDIAN Deliverable D10 – 'D1.10 – Onsite Visit IE - Report'

Document Information

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Distribution

Date	Version	Dissemination
09/01/24	Final	

Abstract

On the 11th October 2023 following a successful committee meeting in Dublin, the host, Transport Infrastructure Ireland (TII) were pleased to welcome 20 of the European partners to a site visit at the Motorway Operations Control Centre (MOCC).

The delegates were welcomed by Daniel Pentony of TII, the Motorway Operations manager.

Daniel gave a presentation to the delegates on the operations of the control centre and the recent upgrades from the Tunnel control centre to the Motorway Operations Control Centre.

Previously the motorway control operations were run from the toll plaza control room for the Dublin Tunnel. There was insufficient space which restricted services and operational capabilities.

In 2021 an expansion to the building was completed which centralised the tunnel and motorway operations creating the Motorway Operations Control Centre.

The new control centre is equipped with the latest technology for real time monitoring of the motorway network, the Dublin Port Tunnel and the Jack Lynch Tunnel. There

are 37 control room staff with 8 on duty at peak hours. A video wall 3m high and 15m wide displays real time feeds from the motorway CCTV camera network and tunnel CCTV. There are 200 no. CCTV cameras across the network and 120 no, in Dublin Port Tunnel and Jack Lynch Tunnel that are monitored from the control room. This facilitates the management of tunnel ventilation, fire safety, over height detection, traffic flow in the tunnel and is a central hub for monitoring over 1300km of motorway using advanced traffic management systems. The MOCC is responsible for incident management and response, the gathering and distribution of information to assist the road user and other stakeholders.

The MOCC gathers information from many sources e.g. Gardai (Irish police force), emergency services, Emergency roadside telephones, ANPR. CCTV, maintenance contractors, Met Eireann etc. which allows it to control traffic on the network, give road users information via VMS, media, social media and TII website etc. they also provide assistance to the road safety authority and Gardai for road safety campaigns via VMS messaging. There are 225 Variable messaging signs on the network controlled from the MOCC.

The MOCC is also responsible for overseeing approximately 500 Road Space Bookings (applications for maintenance and renewal) per month. This ensures that works/closures on the motorway network is planned, controlled and coordinated.

The M50 motorway is Irelands busiest motorway. There is frequent heavy traffic and traffic flow is often interrupted causing long tail backs and congestion increasing the risk of accidents and incidents. TII is currently installing a new system, the Network intelligence & Management System (NIMS). NIMS provides advanced traffic management to enhance safety, increase information provision and improve road network reliability through the use of variable speed limits. This will allow the MOCC to manage traffic flow to deliver safe and predictable journey times through smoothing out traffic flow and reducing stop-start traffic and congestion on the M50. Currently the signage is cautionary as new legislation has not been implemented. Once fully implemented this legislation will enable Regulatory speeds for the management of traffic.

The delegates were then taken for a tour of the control room where operations staff explained how the equipment works and answered questions.

For more information on the MOCC please see attached Daniels presentation and two videos.

Links to presented videos:

https://www.youtube.com/watch?v=p9vOIHLLP4M&t=23s

https://www.youtube.com/watch?v=bki_9THkAzM&t=104s

Presentation without videos:

MOCC presentation - 111023 - no videos

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

The Motorway Operations Control Centre

Daniel Pentony
Motorway Operations Manager - TII

The Motorway Operations Control Centre

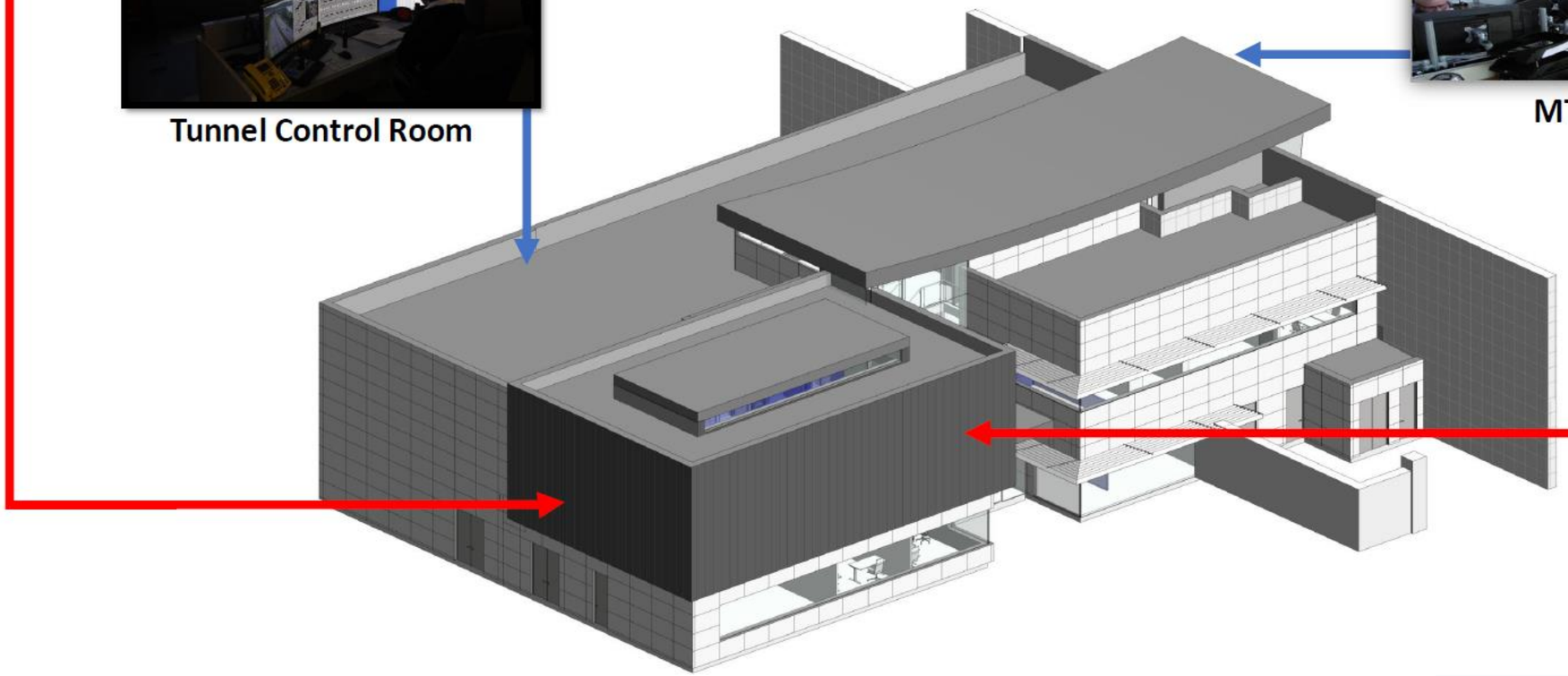
- Existing motorway operations run from the Toll Plaza Control Room (3 workstations)
- Insufficient space restricting services [servers / people]
- Increased operational capabilities now & into the future will require increased personnel
- Increased complexity of the operational service being provided will require facilitation of Operator training
- Expansion of existing Building required

The Motorway Operations Control Centre

MOCC - Centralisation of Tunnel & Motorway Operations

Tunnel Control Room

MTCC



The Motorway Operations Control Centre

The Motorway Operations Control Centre

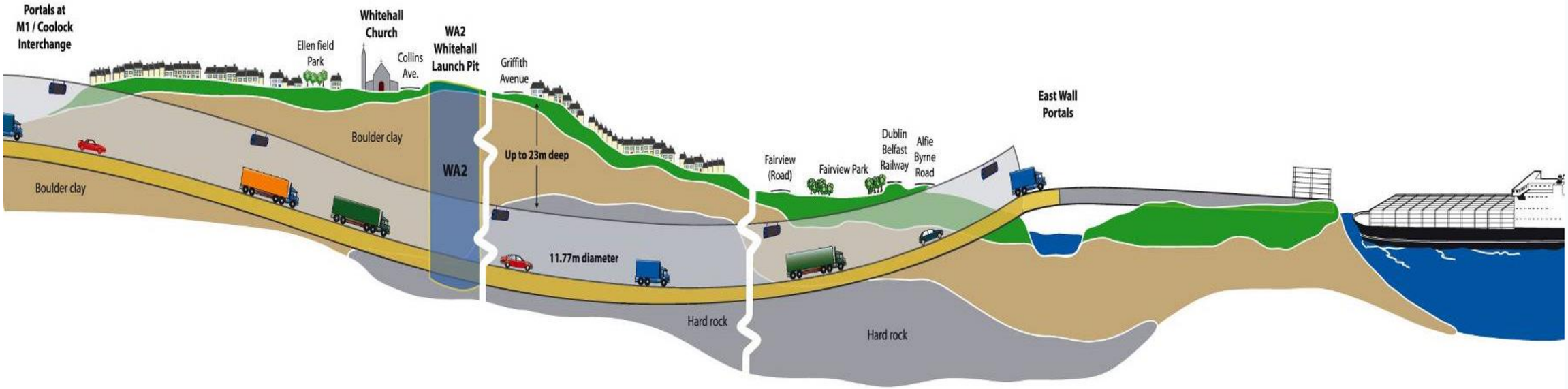
- Location : Tunnel Control Building, East Wall Road, Dublin.
- Combined motorway and tunnel control centre, 24-7 operation.
- Operator: Egis Road & Tunnel Operations (ERTO)
- Construction : 2019-2020 part of the enhanced Motorway Operation Services (eMOS) project
- 37 control room staff for Motorway & Tunnel operations.
- Peak Hour: 8 control room staff on Duty

The Motorway Operations Control Centre

- Constructed as part of an upgrade and extension to the existing Tunnel Control Building
- Equipped with latest technology for real-time monitoring of the Motorway network, Dublin & Jack Lynch Tunnel
- A video wall of 3m high and 15m wide, displays real-time feeds from the motorway CCTV camera network, Tunnels and others ITS systems.

- Dublin Tunnel – Opened 2006
  - 4.5km long comprising Two separate bores, 2 lanes per bore
  - 19 Pedestrian and 4 vehicle Cross Passageways,
- Jack Lynch Tunnel – Opened 1999
  - 610m long, two separate driving bores, 2 lanes per bore
  - Central pedestrian passage,6 emergencies exits to central bore
  - Immersed tube tunnel and integral part of the N40 southern ring road of Cork
- Control of Tunnel Ventilation, Fire Safety, Over height detection, Traffic Control etc via Supervisory Control and Data Acquisition (SCADA) System

Benefits and Strategic Importance of Dublin Tunnel



- High quality access route for HGVs between M50 C-ring and Dublin Port facilitating Irish economy
- 2.25 million HGVs removed from the City Centre and residential areas annually
- Major Public Transport corridor –
- Pedestrian and cycling facilities in the City Centre enhanced with reduction in pedestrian deaths and injuries.
- Improvement of the City Centre air quality and environment
- Reduced consumption of fossil fuels, diesel in particular
- Average speed enforcement system in place. Circa 3 violations per 1000 vehicles, pre go live 15.2 per 1000 veh.

Dublin Tunnel - Toll

- 10 Lane plaza with reversible central lanes
- Extra wide outer lane in each direction for HGVs
- Toll lanes can be operated in manual or automatic
- There is a subterranean tunnel connecting the Control Building
- Toll Free for HGVs > 3,500 kg, buses >25 passengers and exemption cards or DTES disc holders
- Fees: Peak Time - €10 / Off-Peak Time - €3 and remains unchanged
- Operations of Toll Plaza include:
  - Collection, management and reporting of revenue
  - Traffic management
  - Customer Relations Management, including complaints and fare evasion
  - Meet Service-level obligations

Dublin Tunnel – LED Retrofit

Background: Dublin Tunnel's lighting system consists of approx. 1700 luminaires, a majority of which are required to be lit 24 hours per day. While the system is still fully functional with several years' useful life remaining for core components, much more energy efficient technologies are now available.

Measures Taken: ERTO has engaged with Signify Lighting, who have developed an OEM (Original Equipment Manufacturer) product retrofit solution enabling LED light units to be installed as direct replacements for the existing high pressure sodium luminaires using the existing mountings.

Output: The completed work is expected to save in excess of 1.5 million kWh of electricity annually, enough to power up to 300 typical Irish households for one year (approximately 500 tonnes of CO2).

Benefits and Strategic Importance of Dublin Tunnel

Dublin Tunnel Tolling Project

The system will retain traditional barriers considered necessary from a tunnel / traffic safety perspective and also include slow speed free-flow for non-tollable traffic, in particular eligible Heavy Goods Vehicles and buses, and those with registered means of payment (tag or video account).

Drivers of tollable classes without a registered means of payment will be able to make payment at a booth or automatic toll payment machine.

Project completion scheduled for 2024.

Anticipated Output:

This improved system will allow TII to more effectively manage vehicle transits, protect the Tunnel asset and minimise the enforcement burden, while providing a smoother and more sustainable passage for most customers. This will be of particular benefit the HGVs by replacing “stop and go” with “slow and go”, thereby removing wasteful and polluting braking and acceleration.

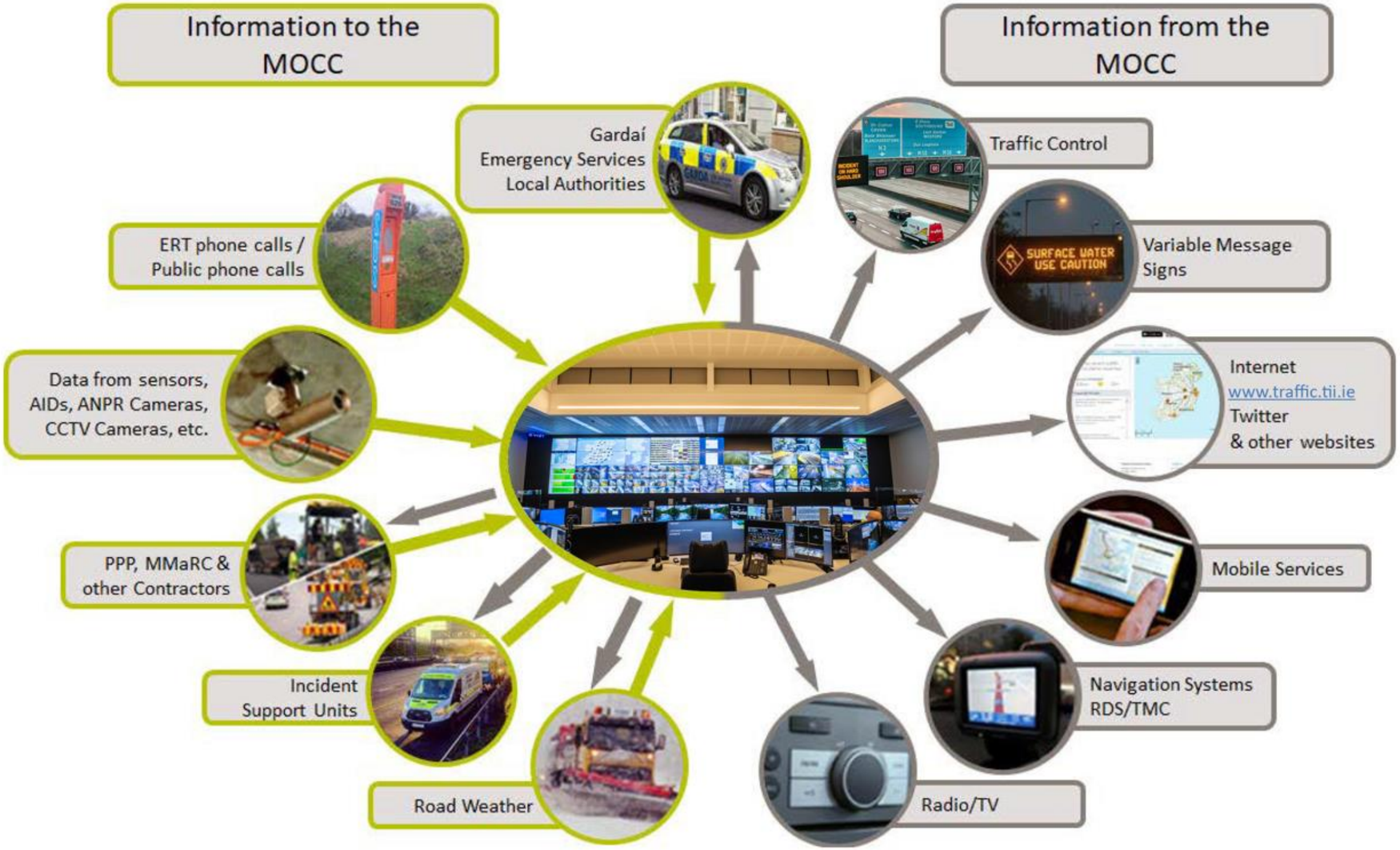
Main physical changes:

2 no. additional walkable half-span gantries on extended islands containing VMSs, ANPR cameras, tag readers and vehicle classification equipment.

Gantries place 25 – 30m in advance of barrier line to allow processing before vehicle reaches barrier.

30 km/h speed limit at plaza

The Motorway Operations Control Centre – Communication Hub

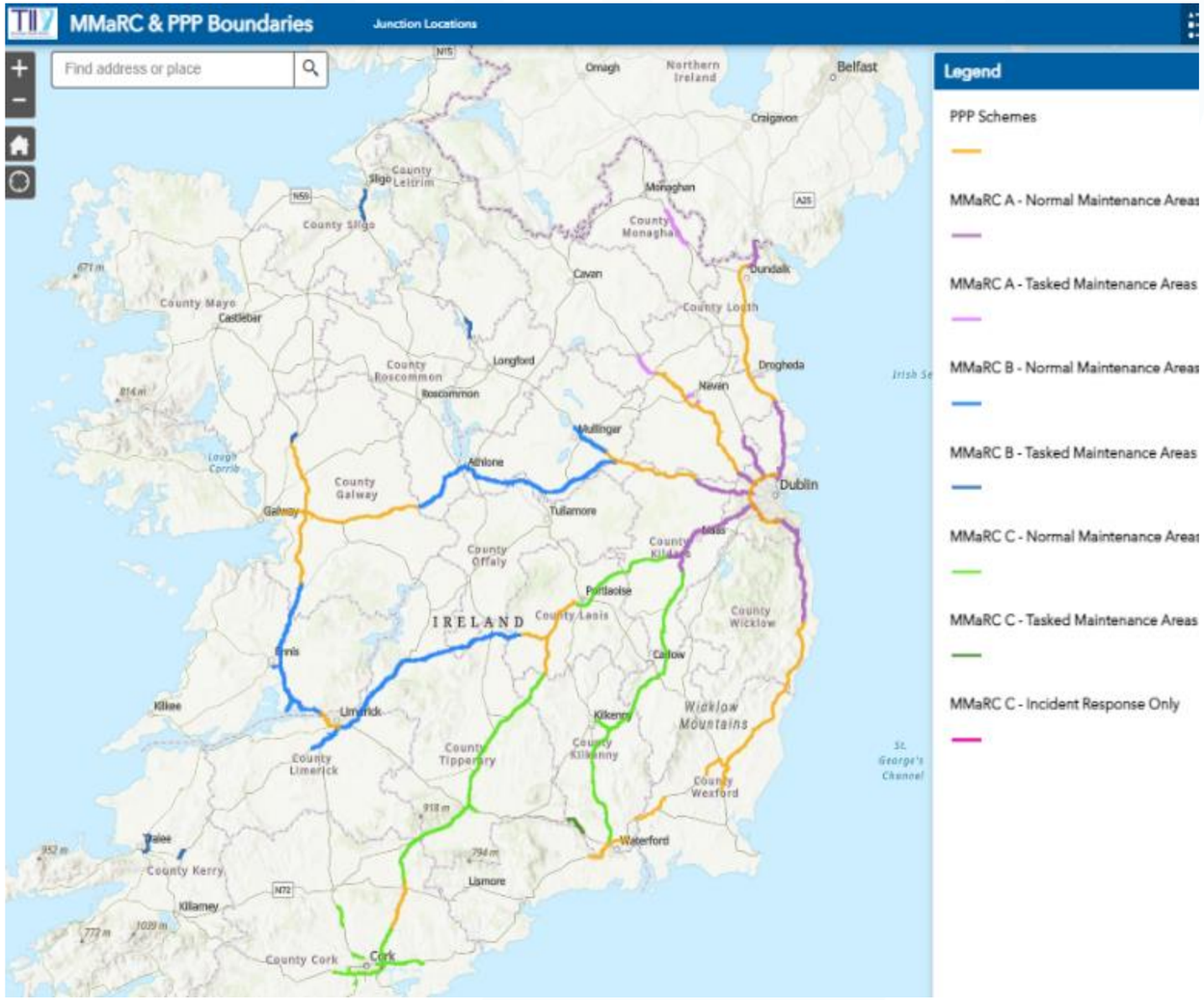


MOCC Coordination – Motorway Maintenance and Renewals Contracts & PPP

- MMaRC (Motorway Maintenance and Renewals Contracts)

  Area A – 173km, Area B – 257km, Area C - 330km

- 13no. **PPP** roads plus 2no. Motorway Service Area PPP's - Approx 470km
- MMaRC & PPP have Incident response requirements, response times, coordinated from control centre



The Motorway Operations Control Centre – National Responsibility

MOCC national responsibilities include:

- Monitoring the vehicle journeys of over 1300 km of Motorway/Dual carriageway, utilising Advanced traffic management systems (Including the new NIMS system), CCTV, TMU, AID, Google maps etc
- Central hub for communication for incident management and oversees response to all incidents on the network
- Gathers & distributes relevant information to assist the road user and other stakeholders, including for CRI alerts
- Use of Variable Message Signs (VMS) to inform the public of information which may affect their journey time.
- Assist in providing information for weather warnings, Garda and RSA ‘Slow Down’ campaigns.
- Answering the Emergency Roadside Telephone (ERT) network – 1600 phones including Tunnel phones
- Customer care service where queries from the public are processed and distributed.
- Liaison with emergency services and operational partners
- Management of TII traffic social media account
- Allows for the safe and efficient management of the national roads network

The Motorway Operations Control Centre

- MOCC dispatch the M50 Free Vehicle Recovery Service
  - Removes vehicles to a point of safety off the Network, reducing congestion and increases motorist safety
  - 3939 vehicles recovered in 2022 from breakdowns, collisions etc.
  - Average Response time 12 minutes
- MOCC is responsible for overseeing the Road Space Bookings applications for Maintenance & Renewals.
  - This ensures that work activity on the network is planned, controlled and coordinated.
  - Manages access to the Network & avoids roadworks congestion and clash's
  - Communication of bookings, approved, closed, rejected. Approx 500 RSB applications per month
  - Manages Approx 45 Wide Load (abnormal) applications per month ensuring no conflict arises with works
  - LA permit conditions require hauliers contact the control centre,
  - Safety benefits for the public and road workers and journey time reliability for hauliers.

M7 pilot scheme - Average Speed Safety Camera

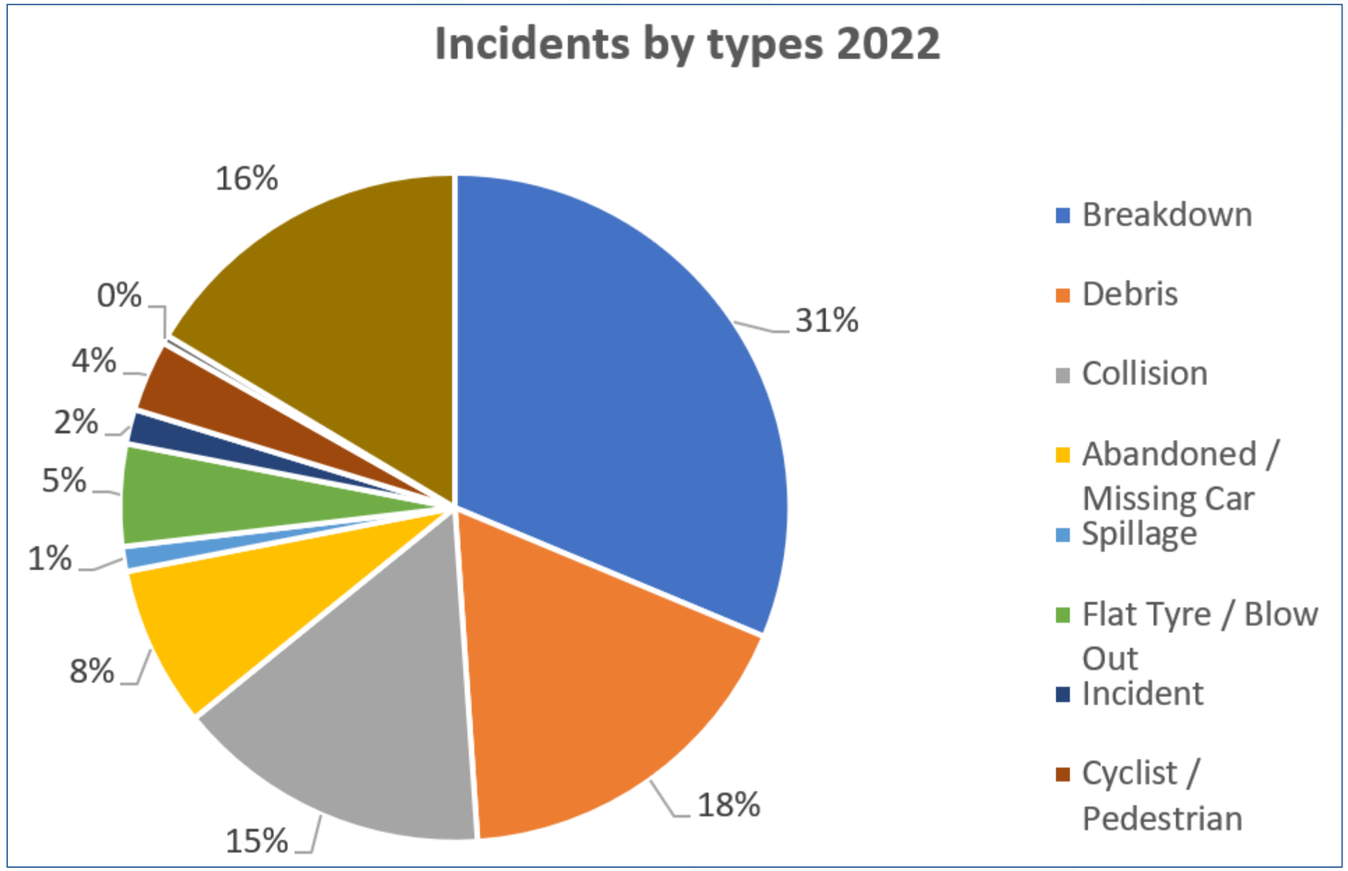
Following on success of Dublin Tunnel system

- M7 pilot mainline motorway system, Nenagh – Birdhill
- Engineering, Education, **Enforcement**
- Study of historical data on the corridor
- Speeding coupled with inadequate reductions in speed in adverse weather conditions
  - Additional micro-climate issues in locality
- Historical compliance in region of 60 – 70%
- Managed from Tunnel Control Building, in association with An Garda Siochana
- Less than 1% receive penalty points
- Renewed interest in ASC systems in recent weeks.

The Motorway Operations Control Centre

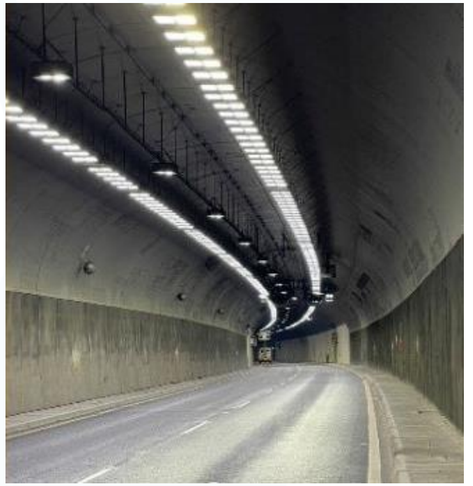
Headline Statistics

- 11,891 incidents managed in 2022
- 1,937 collisions across the Network in 2022 (15% of all incidents)
- 764 Collisions on the M50
- Average of 8000 incoming/ outgoing calls to all stakeholders, public, ERT.
- This includes 400 ERT and 850 customer care incoming calls answered per month.

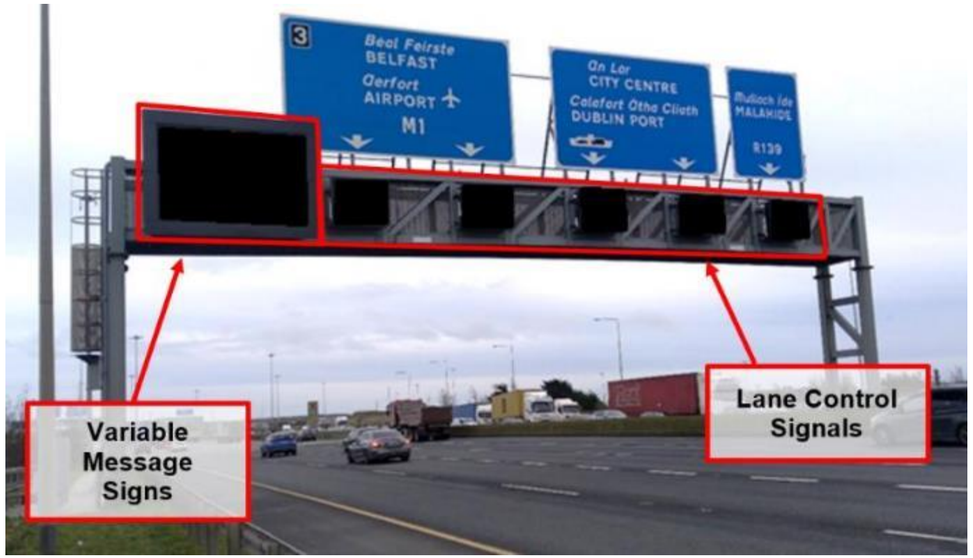


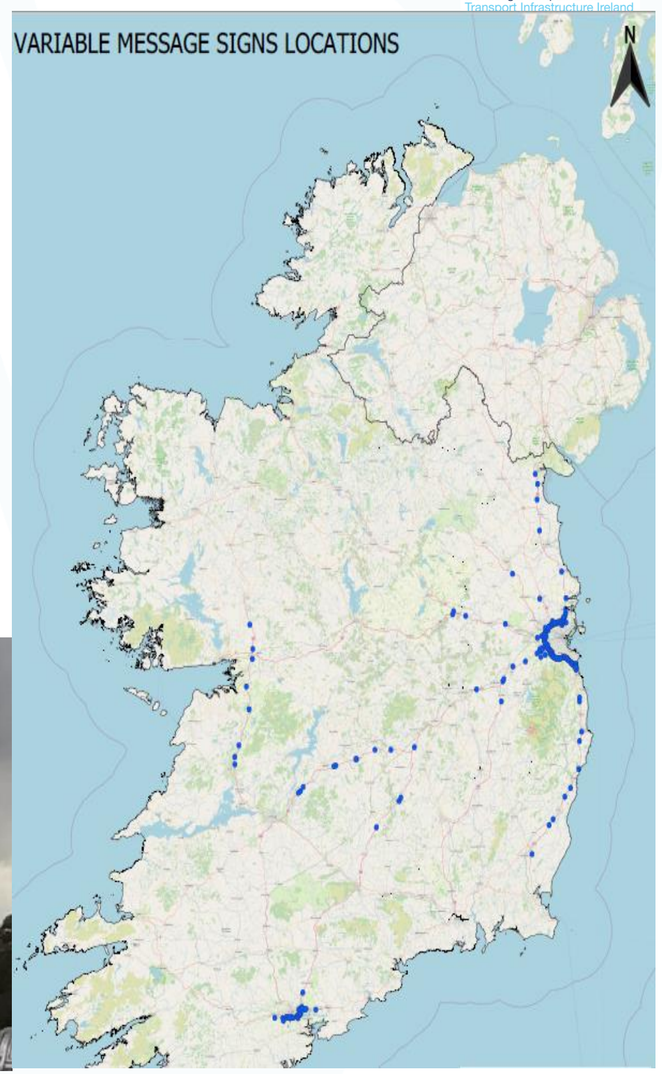
The Motorway Operations Control Centre

- 200 no. CCTV cameras on M50, M1, M4, N7, N40 etc
- Approx. 1500 no. Emergency roadside telephones
- 170 no. ANPR motorway cameras
- 125 AID (Automatic incident detection) sites
- Approx 120 no. Dublin Tunnel & Jack Lynch CCTV cameras



The Motorway Operations Control Centre



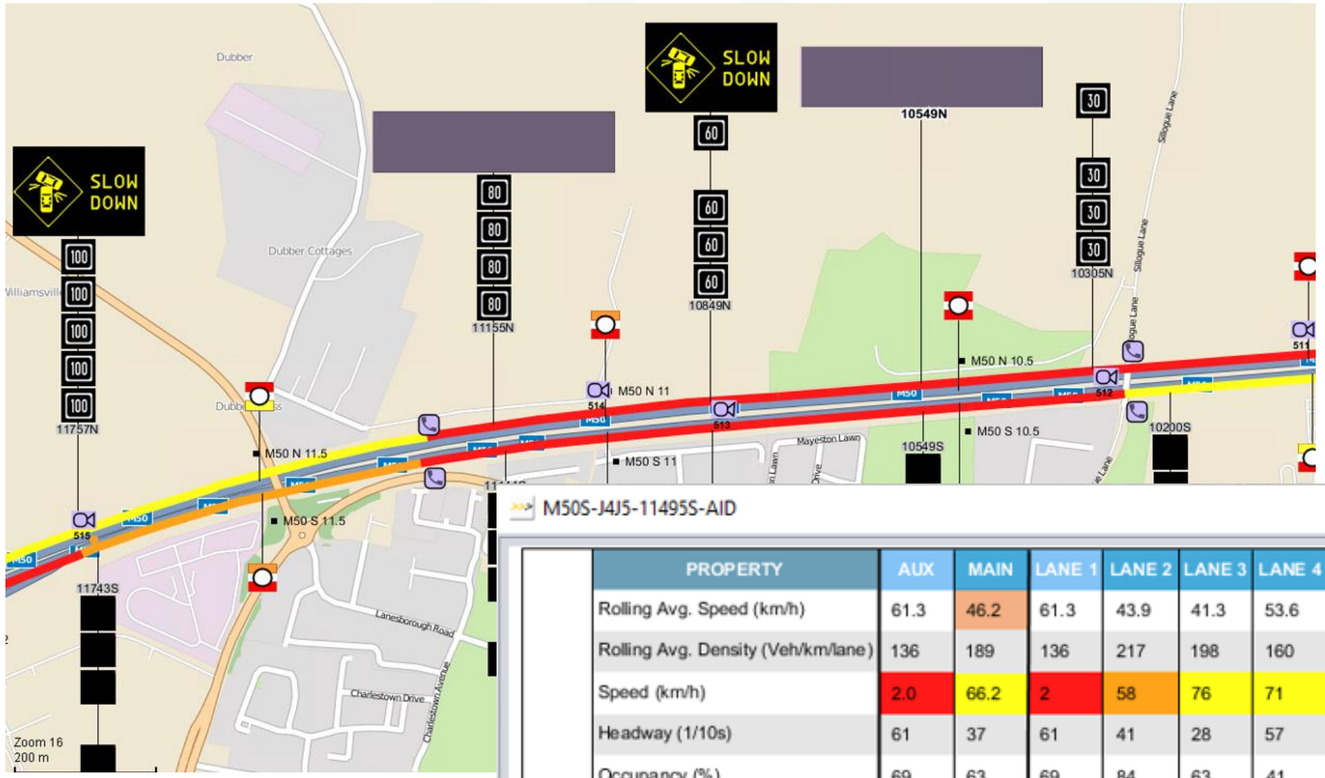


- Variable Message Signs – 225
- Lane Control Signs - 300

The Motorway Operations Control Centre - NIMS

- Network Intelligence & Management System (NIMS) - provided by Kapsch TrafficCom Ireland Limited:
  - NIMS provides advanced traffic management and connected mobility software technology. It provides the functionality to enhance the safety, increase information provision and improve road network reliability through the use of variable speed limits on the LCS and VMS.

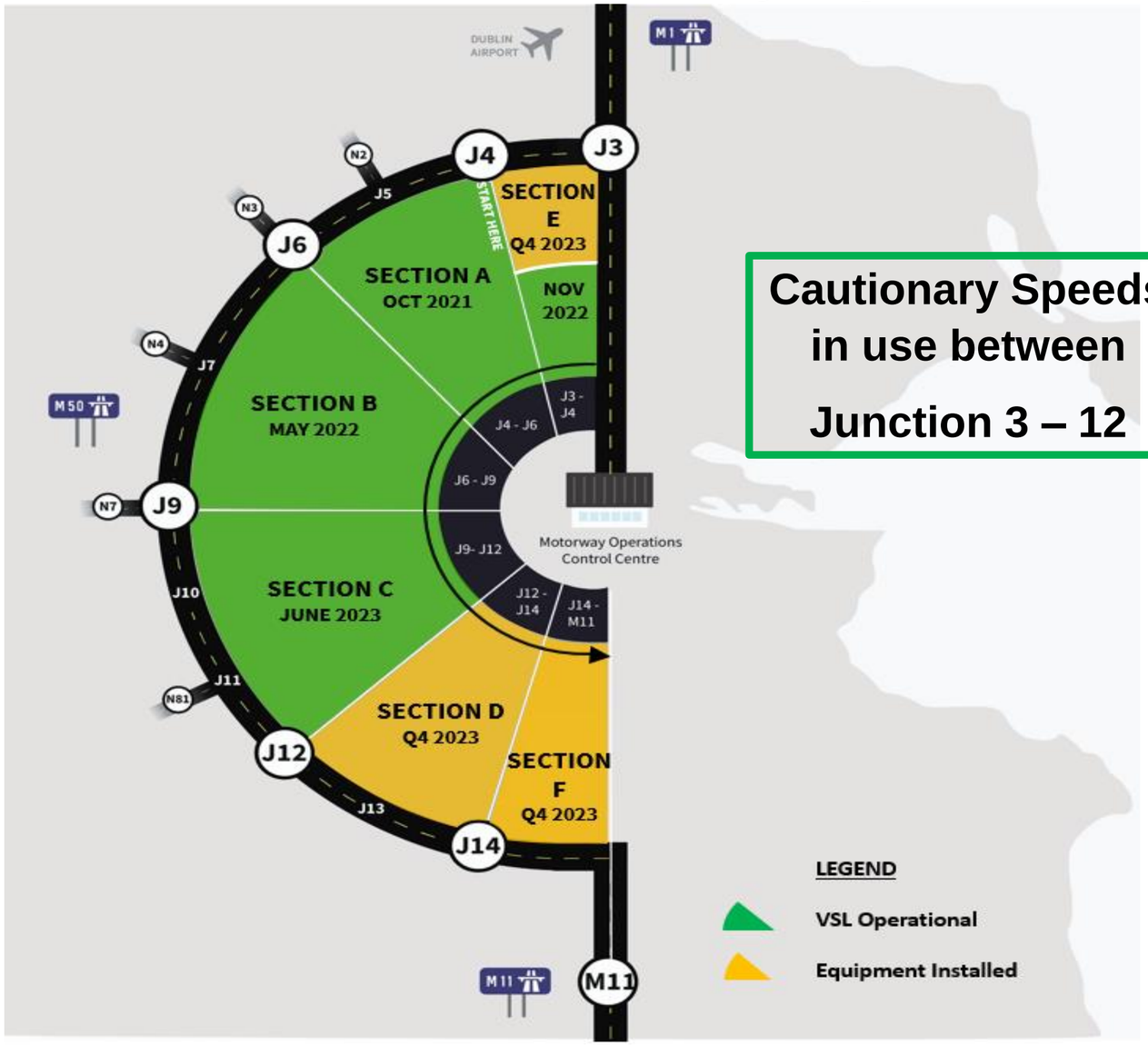
- NIMS services include:
  - management of traffic flow to deliver safe, stable and predictable journey times on the M50
  - coordination of incident responses with the emergency services and incident response units
  - capturing and disseminating traffic information to road users via a variety of mediums, including roadside variable message signs, social media and the TII Traffic website



M50S-J4J5-11495S-AID

PROPERTY	AUX	MAIN	LANE 1	LANE 2	LANE 3	LANE 4
Rolling Avg. Speed (km/h)	61.3	46.2	61.3	43.9	41.3	53.6
Rolling Avg. Density (Veh/km/lane)	136	189	136	217	198	160
Speed (km/h)	2.0	66.2	2	58	76	71
Headway (1/10s)	61	37	61	41	28	57
Occupancy (%)	69	63	69	84	63	41
Flow (Veh/h)	1,440	31,346	1,440	16,196	12,055	3,059
Length (dm)			94	54	73	25

The Motorway Operations Control Centre- NIMS



Cautionary Speeds in use between

Junction 3 – 12

CAUTIONARY SPEED LIMIT 120KM/H

CAUTIONARY SPEED LIMIT 100KM/H

CAUTIONARY SPEED LIMIT 80KM/H

CAUTIONARY SPEED LIMIT 60KM/H

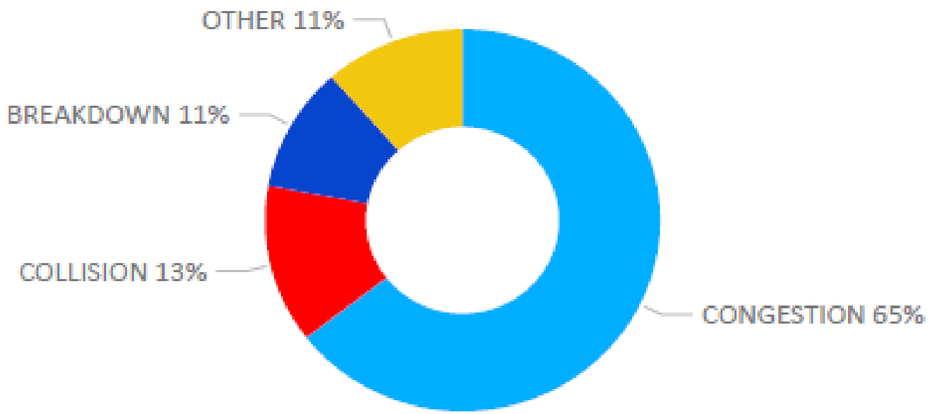
CAUTIONARY SPEED LIMIT 50KM/H

CAUTIONARY SPEED LIMIT 40KM/H

CAUTIONARY SPEED LIMIT 30KM/H

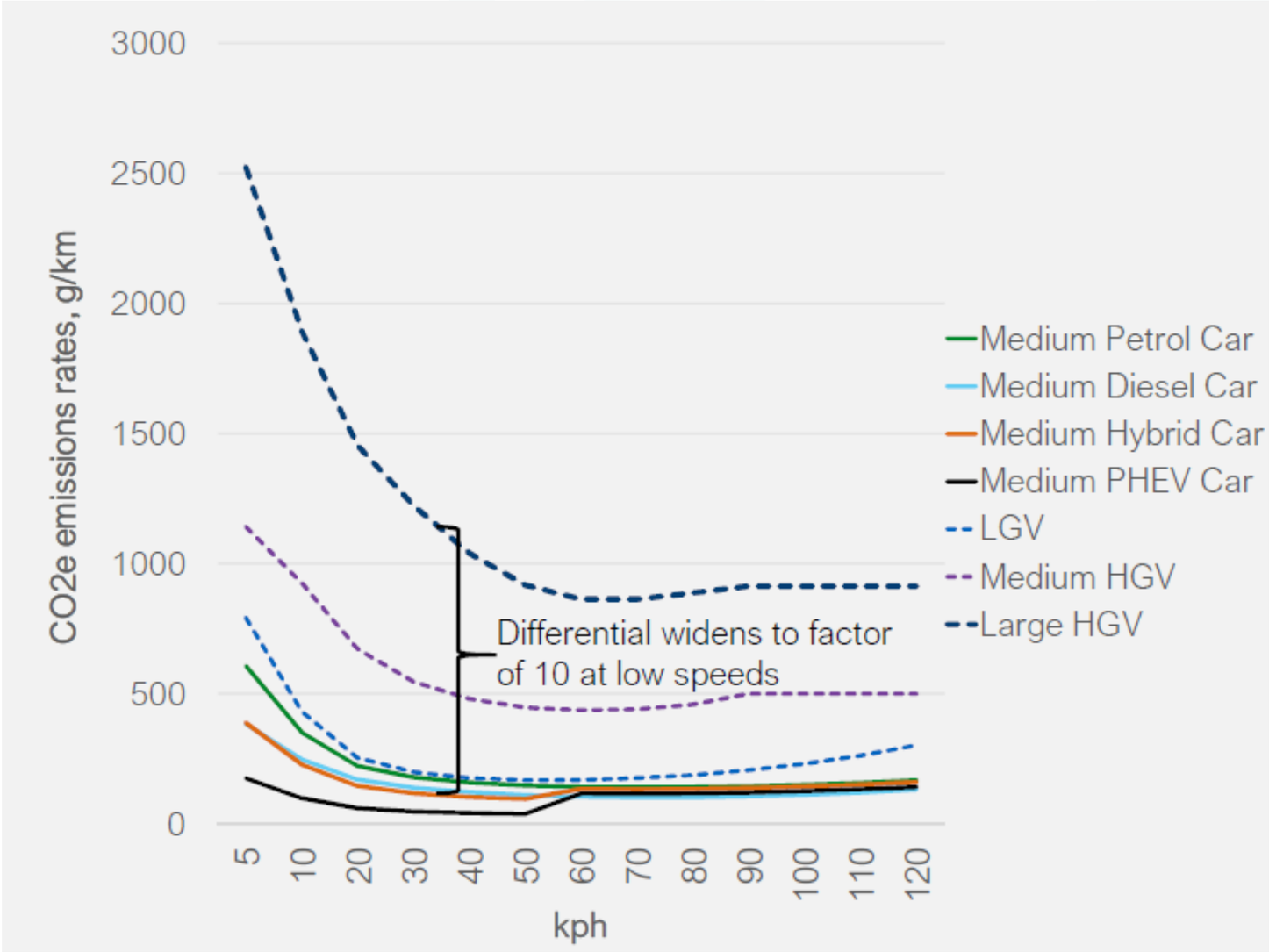

BLANK / OFF

WHY WAS SPEED REDUCED?



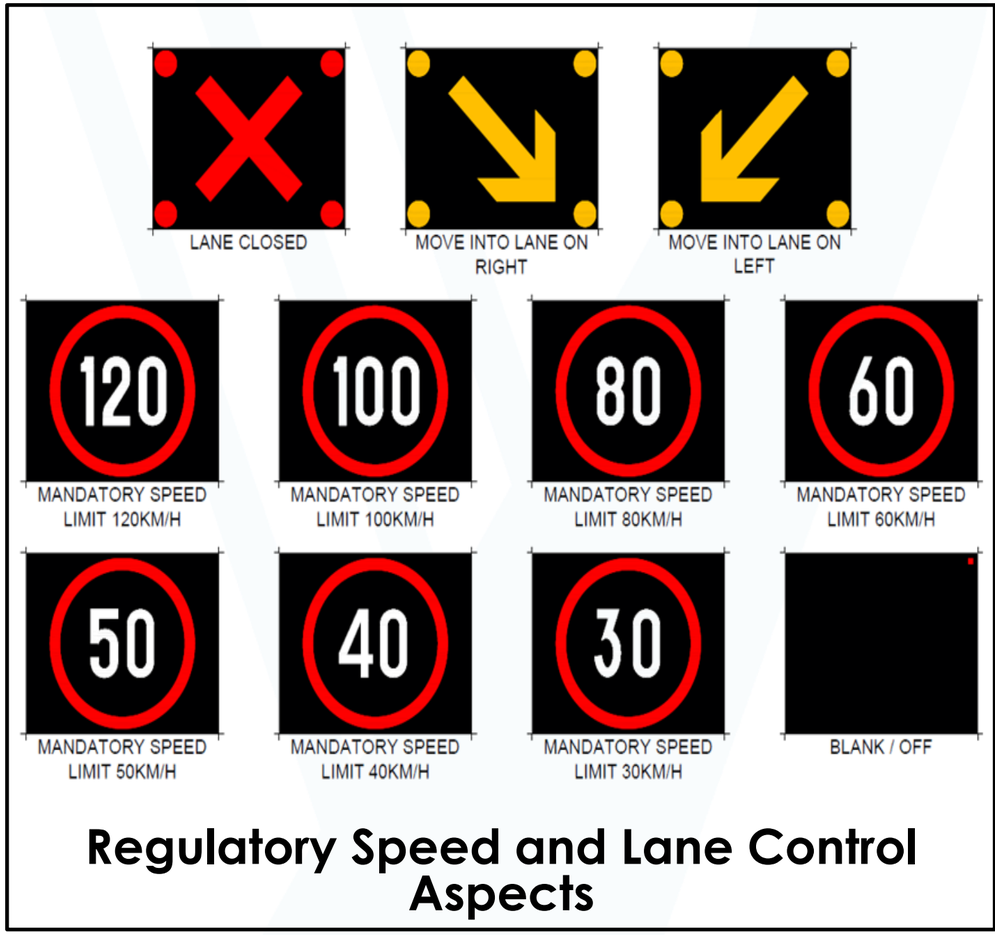
M50 Traffic Flow Optimisation – Environmental Benefits

- Smooths out traffic flows
- Reduces ‘shockwave’ behaviour
- Reduces stop-start traffic conditions & congestion
- Reduces heavy braking / acceleration
- Constant speeds of 60-80kph results in lowest CO_2 emissions
- Positive impact on emissions



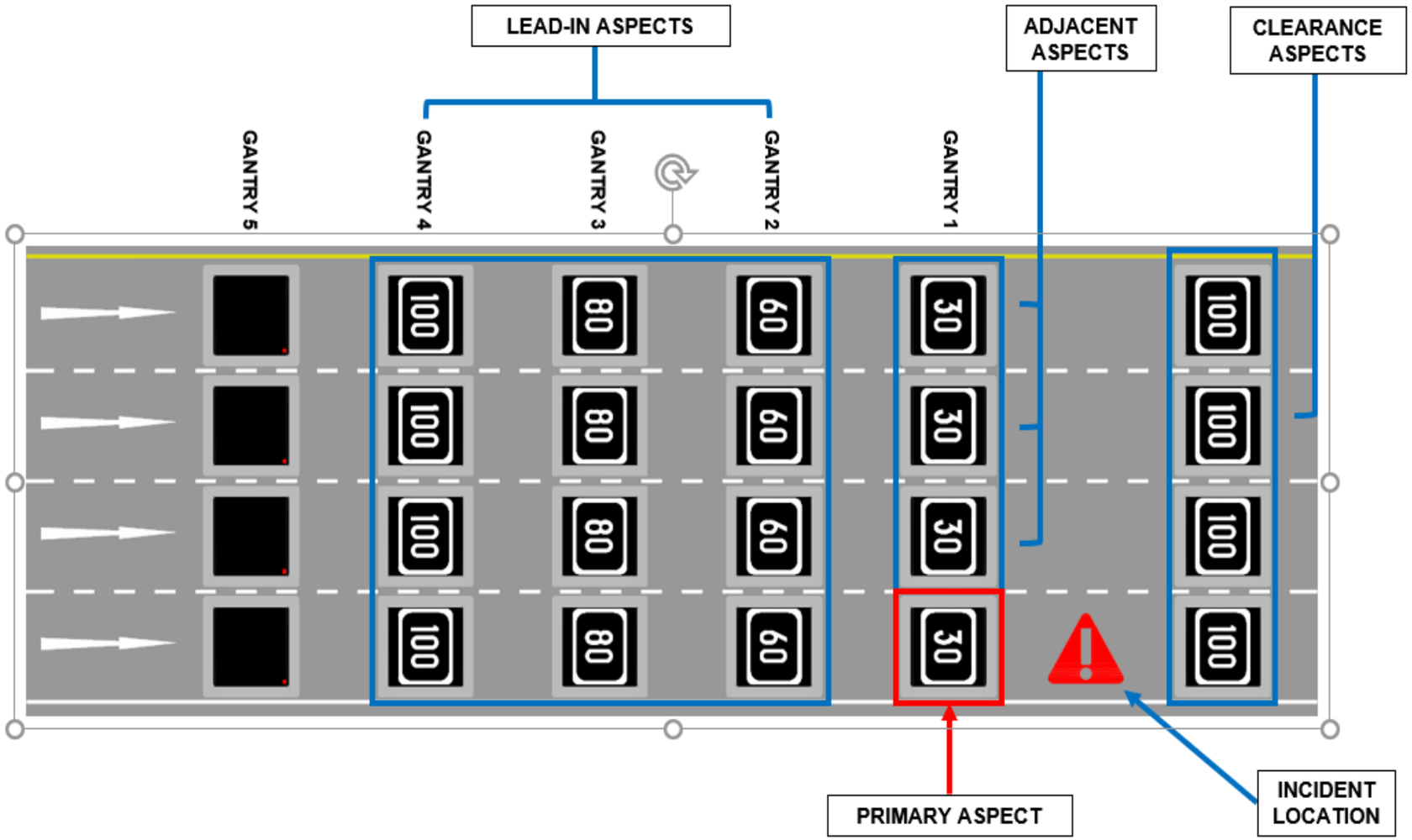
Roads Traffic and Roads Act 2023

- Signed by the President on 23rd June 2023.
- Introduces the concept of a *National Managed Road,* designated by the Minister.
- The Authority (TII) will be responsible for provision of Regulatory, Warning and Information Signs on *National Managed Roads.*
- The Authority will be responsible for;
  - Variable speed limits
  - Special speed limits
  - Speed limits at road works
- Once fully implemented this legislation will enable the use of ‘Red X’ and Regulatory speeds for the management of traffic on the M50.
- The Act will also allow road authorities and the Authority to setup and operate cameras and other data gathering devices on public roads.
- The Department of Transport are currently developing the necessary secondary legislation.

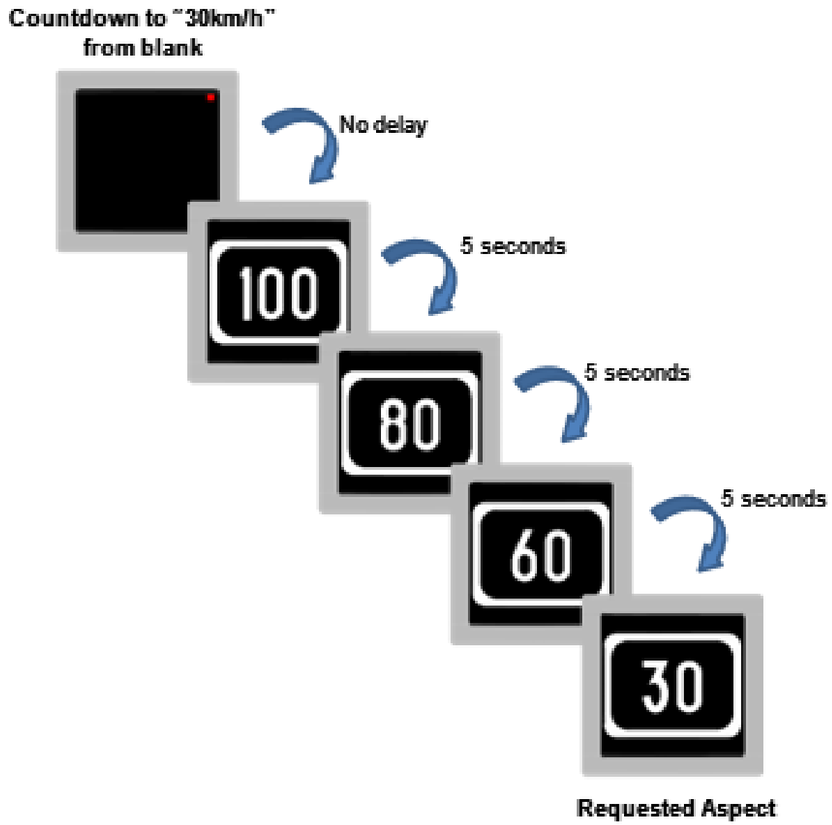


Regulatory Speed and Lane Control Aspects

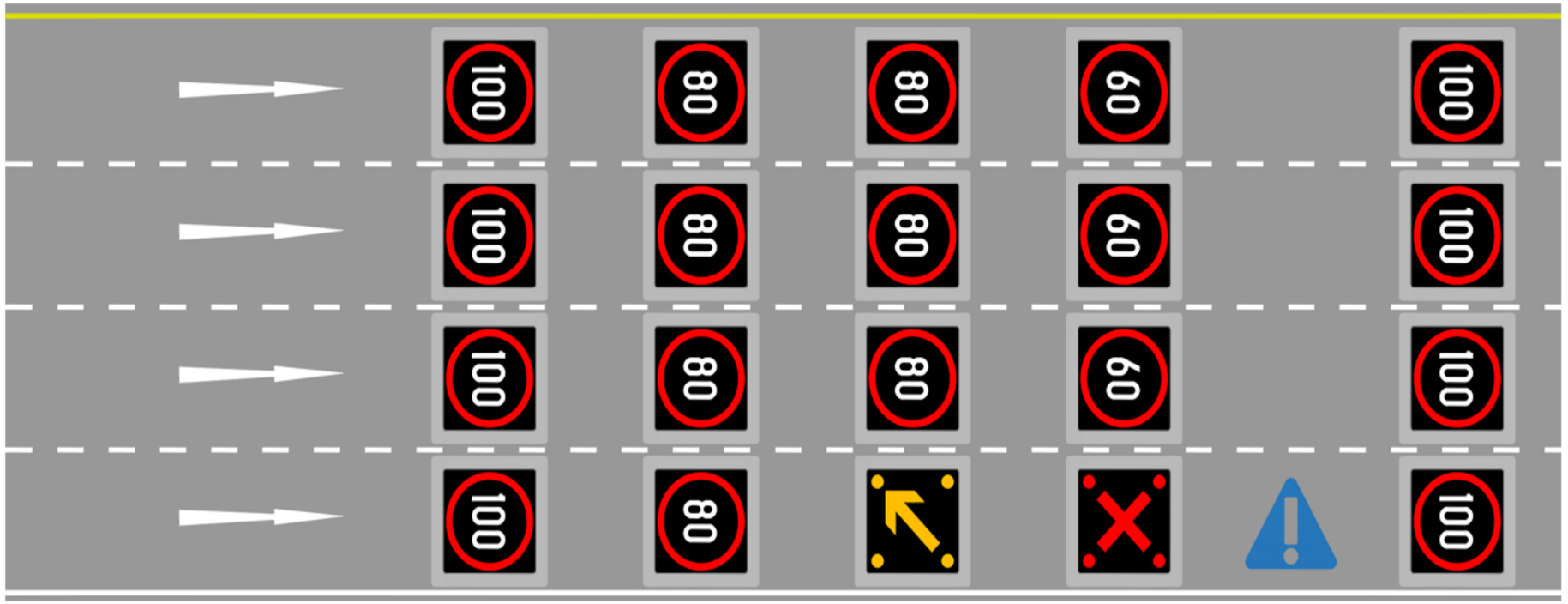
Typical Signal Sequencing Rule Pattern for Speed Management using Cautionary Signs



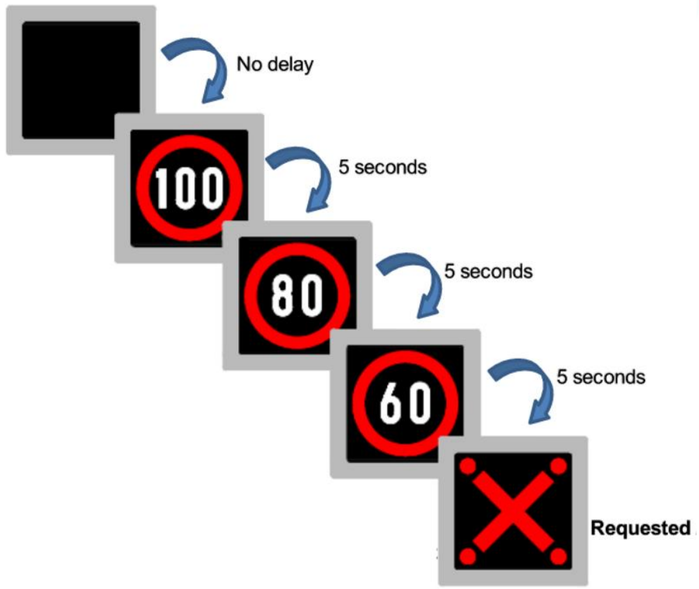
Countdown Sequence



Typical Lane Closure Pattern using Regulatory signage



Countdown Sequence for Lane Closure

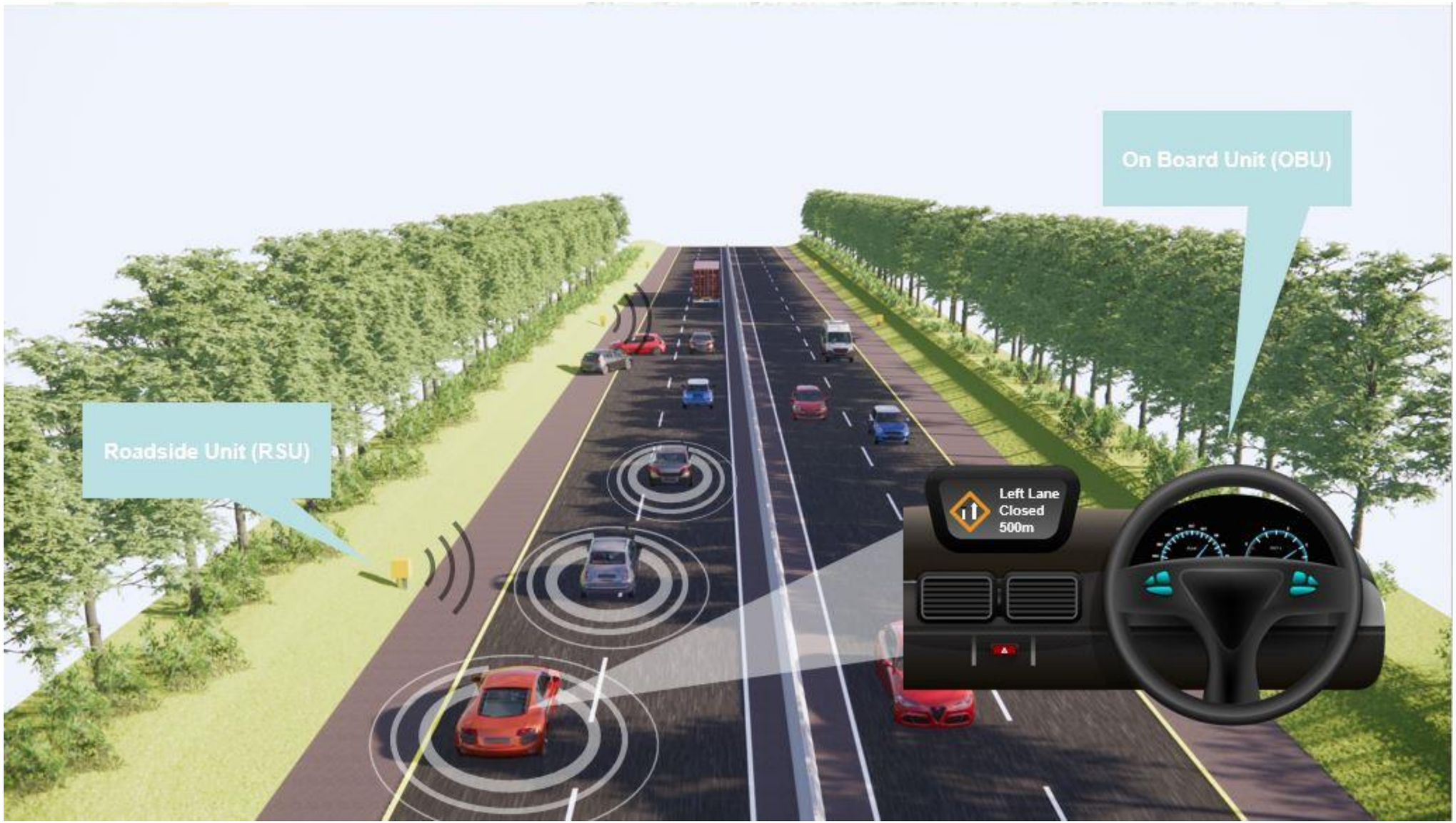


Note:
- Km/h to be removed
- Tweaking of sizing and flash pattern
- Lane Change Arrow colour changed

Setting can be:-
- Manual by an Operator
- Automatic by NIMS system
  - Using algorithms
  - Processing data received from the roadside – traffic lane speed data
  - Determines appropriate speed to display to approaching drivers on M50 via overhead signs

Incident with Intelligent Transport Systems (ITS)

Incident with Cooperative Intelligent Transport Systems (C-ITS)



C-ITS Pilot

Key components:

- Route covers comprehensive TEN-T Network
- Piloting Urban/InterUrban C-ITS Services
- Seeking to Pilot Services where traditional ITS cannot reach
- Evaluation of Technology, Safety, Efficiency and Compliance impact
- Support new standards for Irish and wider EU deployment
- Representing Ireland at C-ROADs Platform

Year	Key Activities
2018	Design Concept
	Stakeholder Engagement
2019-2020	Procurement Planning, design and trial specification and network build C-ITS Development & Prototyping
2021-2024	Finalise Pilot regime and commence Road Trials Evaluation & Progress Outcomes