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VMS Messaging Guidelines

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DN Design

Technical

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TII Publications

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Transport Infrastructure Ireland wishes to acknowledge the input received from a range of industry practitioners in the form of comments and feedback received during the development of this document.

This document has been approved by TII. Date and stamp

Preface

About this Document

Transport Infrastructure Ireland's (TII) mission is to provide high-quality transport infrastructure and services – delivering a better quality of life and supporting economic growth. TII aims to establish a framework to provide clear and consistent guidelines for the deployment and utilisation of Variable Message Signs (VMS) operated by TII. The Guidelines for operations that currently exist for Ireland are provided within the Department of Transport (DoT) 'Traffic Signs Manual' (TSM) and the National Road Authority's (NRA) 'Guidelines for the Use of Variable Message Signs on national roads – Part A and B'. In this context, TII has developed a set of guidelines for the usage of VMS. These Guidelines relate to message content and format across Ireland's national road network.

These Guidelines have been designed to provide a clear framework and understanding for anyone who is developing messages to be displayed on VMS on the national road network. This document supersedes the current 'Guidelines for the Use of Variable Message Signs on national roads – Part A and B' which are withdrawn on publication of this document. This document sits under TII's higher level 'VMS Messaging Policy' document. The VMS Messaging Policy covers the use of VMS on national roads in Ireland and should be read in conjunction with Chapter 3 of the DoT TSM and the relevant sections of the tiipublications.ie website.

Guidelines Updates

This document is subject to change and will be maintained and periodically updated as required by TII. This document is available on the TII publications website.

Guidelines Aims

The objective of the Guidelines is to ensure that consistent and coherent messages are displayed on VMS on the national road network. Clear guidance is necessary for the deployment and operation of VMS, to effectively convey clear messages to road users. The VMS Messaging Guidelines include the procedures and frameworks for creating messages and the pre-approved message elements, referred to as Information Units (IU), that are used to construct new messages. The Guidelines also include principles for the development of new message elements, if not covered by the pre-approved IUs.

The objectives of the VMS Messaging Guidelines are to:

- Achieve consistency and continuity in the messages disseminated to road users across the national road network;
- Achieve inclusive design through disseminating messages that are legible to all road users with regards to character sizes, colour, and length of messages;
- Promote national and European harmonisation of VMS usage;
- Maximise the benefits that can be achieved from the VMS with regard to better management of the national road network by providing timely accurate information to road users regarding traffic conditions;
- Improve safety for road users.

The parameters set out in these guidelines should be used by control centre operators.

Contact

Any new messages, not covered by the pre-approved message elements, should be submitted in writing to the TII Traffic Information Policy Team for approval. These requests, and any enquiries or comments on these Guidelines, should be sent in writing to:

TII Network Operations
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or

messageapproval@tii.ie

TII Traffic Information Policy Team

The TII Traffic Information Policy Team is the only authority to approve changes to this Policy document and/or the VMS IUs listed in the appendices. The TII Traffic Information Policy Team comprises members appointed by TII's Network Operations Section. and

Structure of the Document

The first part of the document provides a background and scope into the need for VMS Messaging Guidelines. The next section focuses on the general framework, guidance and legislation in Ireland and Europe for deploying VMS. The third part provides general principles for VMS deployment which include VMS sign types and structures. The fourth part of the document focuses on the messaging strategy for VMS which includes message content and design specifications. The final part focuses on operational guidelines of VMS on the national road network, which incorporates a hierarchy of messages and C-ITS compatibility.

1. Introduction

These VMS Messaging Guidelines set out the general principles for the design and use of VMS used on the national road network.

Any messaging displayed on fixed VMS must comply with the principles and requirements set out in these Guidelines. Messaging on Mobile VMS should be in line with these Guidelines where permissible.

1.1 Background

VMS are widely used in Ireland to provide information to road users and are a core component of Traffic Management Systems. The purpose of this document is to promote a standardised application of VMS messages across the national road network to ensure traffic information is presented to road users in a clear and consistent manner.

1.2 Need for VMS Usage and Operational Guidelines

VMS are one of the key elements of Advanced Traveller Information Systems (ATIS) on the national road network. Hence, it is essential to have guidance for the deployment and operation of VMS. To ensure that road users trust the information displayed on VMS and increase the level of conformance with the provided messages, a standardised use of VMS and message formatting is crucial. The over-use of VMS diminishes the impact of the messaging, and they should be used in accordance with the VMS Messaging Guidelines. In this context, a set of guidelines are necessary to guarantee that VMS on the national road network are being used consistently and coherently. When standard policies, procedures and guidelines are established and adhered to, road users are provided with relevant, harmonised and commonly formatted messages on VMS.

The guidelines for operation that currently exist for Ireland are the 'Traffic Signs Manual' (TSM) published by the Department of Transport. The TSM is of great importance to all operators and managers working with VMS and has a positive impact on improving the road user's experience, safety and travel time. In addition, complying with the same national guidance will ensure safety and efficiency for all road users.

1.3 Document Scope

The intent of this document is to establish a framework to provide clear and consistent guidelines for the deployment of VMS on the national road network. Well-established VMS Messaging Guidelines will positively contribute to an efficient traffic management operation and ensure high quality of information management to the road users.

The development of these Guidelines for Ireland was based on consultation and application of best practices and VMS Operational and Usage Guidelines and Policies. These Guidelines so not replace the DoT TSM and all design requirements for VMS must be aligned with the DoT TSM. Any messaging displayed on fixed VMS must comply with the principles and requirements set out in these Guidelines. Messaging on Mobile VMS should be inline with these Guidelines where permissible.

1.4 Definitions

For the purpose of this document:

- Shall or must indicates that a particular requirement is mandatory;

- Should indicates a recommendation;
- May indicates an option.

2. Guidance and Legislation

These Guidelines integrate European legislation and guidance with TII's own experiences of operating VMS. Where appropriate, the following documents have been included in TII's VMS Messaging Guidelines.

2.1 European Harmonisation Principles

The main principle of the EasyWay programme considers the 23 official European languages used in Europe, and thus the pre-eminence of internationally understood pictograms and the European Common Space (TERN). Sub-principles of VMS design have led to more international VMS messages that are less text dependent and the basic informative elements, main structures of text, and the combination of pictograms and text must follow European design principles.

The translation of general recommendations of design into messages displayed on different types of VMS used across Europe should also be considered. From this, four main VMS types were established using pictograms: pictogram-text, pictogram-pictogram-text, pictogram-text-pictogram, and full matrix. Text-only VMS were also included. Although text-only VMS lack pictograms, the text structures can be harmonised.

The international harmonisation of VMS depends on signage strategies, which rely on pictograms and characters. This is considered in 'the Significant Principle' within the VMS-DG01 Principles of VMS Design. This general principle involves all deployment guidelines that have been developed within the EasyWay programme. The use of pictograms is based on the 1968 Convention on Road Signs and Signal's catalogue and the Consolidated Resolution on Road Signs and Signal's recommendations. Ireland did not sign up to the 1968 convention. VMS that display pictograms or text should align with prevailing national road codes, and where applicable, align with requirements of the EasyWay Deployment Guidelines for VMS Harmonisation VMS-DG01. This will assist the road operators to ensure all messages are widely understood by all road users, so that VMS harmonisation is achieved.

2.1.1 European Standards

EN12966 is the European standard which describes the requirements for the development, manufacture and testing of VMS. Suppliers whose VMS are certified as having met the requirements of EN12966 can use the European Commission's conformity marking (the CE mark) on their products.

2.1.2 European Guidance

The Conference of European Directors of Roads (CEDR) initiated Action FIVE (Framework for harmonised Implementation of VMS in Europe) in 1997 to prepare an inventory of needs and priorities for international harmonisation of VMS.

CEDR prepared a set of recommendations intended to promote the consistent operation of VMS on the Trans European Road Network. Of particular importance is the recommendation to promote the use of pictograms and symbols as VMS displays to minimise text.

The Mare Nostrum VMS Group grew from cooperation between a number of Euro-Regional projects and focused on the use of multipurpose VMS on the long-distance corridor from Seville (Spain) to Trieste (Italy). Similar to the FIVE framework, Mare Nostrum promoted the consistent use of pictograms as one of the main tools in conveying information to road users. Ireland was a member of Mare Nostrum, also known as ESG4 but it no longer meets.

2.1.3 Irish Guidance

The primary guidance for the use of VMS on national roads in Ireland is provided by this document. In addition to the European standards and guidance indicated above, it draws on two other key documents:

The TSM was first published in 1996 and provides details of the traffic signs which may be used on roads in Ireland, including their layout and symbols, the circumstances in which each sign may be used and rules for positioning them. The 'Traffic Sign Manual' relates to the use of VMS on roads in Ireland and should be read in conjunction with these Guidelines.

Figure 2.1 Variable Message Sign at Dublin Tunnel

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The contents of TII Publications are clearly split into 'Standards' and 'Technical' documentation. All documentation for implementation on TII schemes is collectively referred to as TII Publications (Standards), and all other documentation within the system is collectively referred to as TII Publications (Technical).

2.2 VMS Applications

The three general uses of VMS are as follows:

- **Driver information systems** providing road users with information about current or future events on the national road network. The aim of using VMS as a driver information system is to inform road users either in advance or in real time of incidents or events on the national road network that may affect traffic conditions and journey times. The information may relate to network links such as ferry ports, airports or Park and Ride locations.

Events could include roadworks or major sporting events. Related applications could involve the provision of estimated journey time information, road safety campaigns or parking guidance.

- **Tactical control** providing information to road users in response to an incident or event occurring on the road network; and
- **Strategic traffic management** enabling the network operator to provide road users with information and advice on network-wide traffic conditions.

Each of these applications is relevant to the use of VMS on the national road network. The use of VMS on or adjacent to the road network is strictly reserved for the dissemination of traffic-related information and they shall not be used for any form of advertising, promotional or election purposes.

2.2.1 Purpose of the VMS

The European FIVE Framework identified three broad categories of VMS use which relate to the content of messages as follows:

- **Regulatory:**

  Using a VMS to present mandatory information about a regulatory instruction (for example, a change in speed limit) which is designed to elicit an immediate response from road users.

- **Warning:**

  Providing road users with notification and/or guidance relating to a specific immediate hazard ahead.

- **Information:**

  Providing road users with useful traffic-related information that may influence their travel behaviour, their route selection or keep them up to date with network conditions.

The planned use(s) of the new VMS scheme should be identified appropriately within each of these categories. Typical uses include:

- Messages providing road user information to assist with incident management, tactical control or strategic management;
- Warning or traffic control at roadworks (including mobile VMS);
- Car park signs (directions and/or occupancy);
- Lane control signs;
- Periodic or variable speed limits; and
- Diversion of over-height vehicles.

Selecting a VMS should only be decided when it can be shown that a normal fixed plate sign would be inadequate.

2.2.1.1 Regulatory VMS

VMS that are used to present mandatory information about a regulatory instruction (e.g., a change in speed limit) to road users are designed to elicit an immediate response from drivers.

VMS used to present this kind of information should be located close to the start of the regulatory instruction or at an intermediate location within the envelope of the regulatory condition, provided that road users have already been alerted to it in advance by other means (e.g., static signs).

VMS locations within the envelope of the regulatory condition should be selected to either reinforce existing signage or to reinforce the mandatory instruction about the regulatory condition at a key location.

Where several VMS or a combination of VMS and static signing are used to convey mandatory information, signs should be located at regular distances apart to be most effective. Regulatory messages should be used without any text if possible, by displaying the range of regulatory signs in chapter 5 of the TSM.

2.2.1.2 Warning VMS

VMS that convey warning information provide road users with notification and/or guidance relating to a specific immediate hazard ahead. VMS are typically used to provide warning information in response to incidents or locations that are susceptible to extreme weather conditions.

The locations of VMS used to present warning information should be selected so that they are close enough to be clearly associated with the specific hazard but sufficiently far in advance of the hazard to ensure road users have time to react to the warning message. Warning VMS should be located where congestion occurs, either regularly due to saturation traffic flows or periodically in relation to planned events where traffic queues may form.

Danger warning messages that use the yellow diamond should only be used when the dangerous stretch in the road is located nearby the VMS, for example no more than 2km away.

It is important to ensure that the use of VMS to present warning information does not distract road users at critical points on the national road network. In this respect, guidelines on the location of VMS used to present warning messages should also be considered in conjunction with the guidance provided in section 3.1.

Static warning signage is the preferred option for the possibility of permanent hazards as outlined in Chapter 6 of the Traffic Signs Manual. The use of VMS for warning messages is restricted to a specific immediate hazard ahead.

Over Height Vehicles Warning Messages at tunnels

Warning messages can be used to notify over height vehicle users about the height restrictions in locations such as tunnels and bridges.

VMS are used in conjunction with an over height detection system to provide a warning message where appropriate (if the vehicle height is beyond the acceptable level, the detection system will send an alarm to the VMS to notify and warn the driver).

In terms of the hierarchy of the messages, if an incident occurs between the last VMS location and the tunnel, the incident message should have priority above an over height vehicle warning message. However, to ensure the over height vehicle does not reach the tunnel entrance, the traffic signals and barrier will remain in operation.

Figure 2.2 Congestion message on VMS

2.2.1.3 Information VMS

VMS are used to provide road users with useful information that may influence their travel behaviour, their route selection or keep them up to date with network conditions. This can include information on:

- Network conditions (e.g., “congestion ahead”);
- Journey times;
- Advising on current or planned events; and
- Temporary changes in network conditions such as roadworks, restrictions or diversions.

3. VMS Deployment Strategy

VMS are a visible component of TII's traffic operation elements across the national road network. VMS are part of the provision of information by TII to road users. It is essential to standardise VMS usage across the national road network to ensure that all road users have a clear understanding of the purpose and content of the VMS information. VMS message standardisation is achieved when all parties involved in the messaging process have the same understanding of the messages being displayed or acknowledge a similar meaning. These Guidelines aim to achieve VMS message standardisation by discussing the various aspects of the design principles and operational parameters in detail as follows:

- Types of VMS structures;
- Types of VMS signs;
- Types of VMS messages;
- VMS messages design principles; and
- Hierarchy of the messages.

3.1 Types of VMS Mounting Structures

VMS "type" refers here to the choice of mounting structure, the overall capability of the VMS, its layout and geometry. It does not include sign functionality. The VMS mounting structures available for consideration are:

- Post mounted;
- Cantilever mounted;
- Portal/cross carriageway gantry; and
- Mobile (mounted).

VMS scheme can include a combination of these VMS mounting structures. When considering VMS mounting structures, it should be noted that the costs of the civil engineering works required for the foundation installation and the mounting structure can be significant.

Each mounting type offers distinct advantages and disadvantages as follows:

3.1.1 Post-Mounted Signs

These signs are normally located in the left-hand verge.

- **Advantages:** relatively low cost to install and easy to maintain.
- **Disadvantages**: high-sided vehicles travelling in the inside lane can obscure the VMS to other vehicles. If located within the clear zone, it may need to be protected by vehicle restraint system (VRS).

Figure 3.1 Post-Mounted VMS

3.1.2 Cantilever Mounted Signs

These signs are normally mounted in the left-hand verge but with the sign “cantilevered out” over the roadway at a sufficient height to provide clearance and to allow it to be seen by traffic in all the running lanes. Gantries are used to mount cantilever type signs which can be used to display a variety of messages such as notice of tunnel closure.

- **Advantages:** signs are less likely to be obscured by high-sided vehicles. Depending on the design of the sign, maintenance can often be performed without the need for traffic management.
- **Disadvantages:** high cost of the sign and its mounting base. If located within the clear zone, it may need to be protected by VRS.

Figure 3.2 Existing cantilevered VMS

3.1.3 Portal Gantry Signs

Mounting VMS on gantries provides superior visibility and larger display capabilities. Gantries, including cantilever gantries, can also be used to mount additional Intelligent Transport System (ITS) infrastructure such as ANPR cameras and vehicle detection systems. As an alternative lightweight space frame or monotube structures can offer minimal visual intrusion.

- **Advantages:** can be used for traffic management and control as VMS can be positioned directly above each running lane and accommodate LCS and AMIs.
- **Disadvantages:** high initial cost and significant visual intrusion. In addition, ongoing maintenance and installation can be disruptive and costly. If located within the clear zone, it may need to be protected by VRS.

Figure 3.3 Portal gantry mounted VMS

3.1.4 Mobile VMS

These signs are primarily used for local traffic management purposes such as providing signing for events and roadworks. Mobile VMS are physically limited in size, and therefore the scope of the messages they can display is limited.

Mobile VMS may be deployed where there are no immediate permanent VMS signs, or in conjunction with permanent signs.

Mobile VMS are available in many sizes and forms but essentially consist of:

- Trailer mount;
- VMS sign panel;
- VMS control panel;
- Power supply which may include solar panels; and
- Communications infrastructure.

The temporary power supply should ensure that any interruption or decrease in power shall not reduce the legibility of the message. Mobile VMS shall conform to section 4 of these Guidelines with respect to character size and message format.

Mobile VMS should be positioned carefully to ensure that they do not form a hazard to traffic. To achieve that, VMS should be positioned outside a clear zone or behind a VRS.

- **Advantages:** can be quickly deployed at a range of locations to suit various requirements
- **Disadvantages:** requires electrical supplies to allow the operation of non-solar mobile devices in anything other than the short-term.

Mobile VMS shall be regarded as a hazard on roads with speeds of more than 100km/h and shall be treated in the same way as described for large static signs, as stated in chapter 8 of the TSM. They should be located behind a VRS.

Figure 3.4 Mobile VMS

3.2 Types of VMS Signs

3.2.1 Full Matrix VMS Signs

3.2.1.1 Single Colour VMS Sign

Figure 3.5 shows a single colour full matrix (continuous) VMS. This has single colour amber display mounted in a cantilever arrangement.

Figure 3.5 Single Colour Full Matrix VMS

3.2.1.2 Dual Colour Full Matrix VMS Sign

A Dual Colour Full Matrix VMS can display messages in two colours in compliance with EN 12966. A tunnel closure pictogram is an example of a message typically displayed on a Dual Colour Full Matrix VMS, which consists of a yellow tunnel and a red ‘X'.

3.2.1.3 Full Colour/ RGB VMS

A full colour or RGB VMS can display messages in a variety of colours in compliance with EN 12966.

3.2.2 Lane Control Signs

Lane Control Signs (LCS) may be used to inform and direct the road users of lanes that are closed, open, maximum speed at which to drive and direct about moving out of the lane. Flashing amber and/or red lanterns are mounted at/in the corners of the sign.

LCS are mounted centrally over each live lane, normally on gantries or from the tunnel soffit. They should be installed at regular intervals along the required length of road.

The aspects that can be displayed on Tunnel LCS and Motorway LCS are detailed in the TSM. The use of flashing amber or red beacons together with the permitted range of LCS dimensions is further detailed in the TSM.

Figure 3.6 Lane Control Signs

3.2.3 Slip Road Signs

Slip Road Signs (SRS) are mounted on the verge of carriageway slip roads on approach to a controlled section of carriageway. SRS are typically located in pairs directly opposite each other and downstream of fixed plate speed limit signage. SRS should only be used to display the maximum speed at which to drive at and to inform road users that the slip road or carriageway is closed. Lane Closed aspects may be used on SRS in response to incident management.

3.2.4 Information Signs on Urban Approaches to National Roads

Information signs on approach to national roads can be used to enhance overall traffic control and inform road users of diversions as necessary at strategic locations prior to entering or leaving towns and city centres. They can also be used as information signs as shown in Figure 3.7.

Information Signs on approach to national roads are physically smaller than most text VMS, to suit the local environment. They can be designed as single post (as shown) or double post designs. Character sizes are chosen to suit the local speed limits. Typical character heights are 100mm, 160mm and 240mm compared with 320mm and 400mm character heights used on the national road network. The single post design reduces pedestrian restriction and may be considered to have a better appearance.

Messaging on smaller urban signs fall under the responsibility of each individual local authority (unless explicitly installed/ operated by TII) and may not necessarily comply with the requirements for other VMS types on motorways and high-quality dual carriageways.

Figure 3.7 Information VMS on approach to national road

3.3 General Remarks for the Deployment of VMS

In terms of the type of display, the following six factors should be considered:

- **Location** – Does the sign attract appropriate attention in its immediate environment and are there sufficient lines of sight to the sign face? Is the location suitable for the intended purpose of the sign? Is the proposed sign a potential hazard?
- **Legibility** – Can road users easily read the text or pictograms displayed?
- **Information Load** – Do road users have sufficient time to read the entire message?
- **Comprehensibility** – Can the road user readily understand the entire message?
- **Response** – Does the road user have sufficient time to safely and correctly react to the message?
- **Credibility** - Can the road user rely on the information being displayed?

It should also be noted that messages should not be used for advertising or promotions with the exception of the limited promotion of road safety campaigns, for example a ‘Don’t Drink and Drive’ message.

4. VMS Message Strategy

4.1 Types of VMS Messages

The types of VMS on the national road network are summarised in Appendix - 1. This also provides a summary of sizes, functionality, typical locations, and mounting arrangements.

The type of message displayed on a fixed VMS depends on the location of the affected area to the VMS itself. This may vary from strategic messages to tactical messages depending on the context. The different types of messages are as follows:

- Strategic messages
- Tactical messages
- Diversion messages
- Campaign messages

The application of the first three message types are displayed as diagrams in Figure 4.1 below.

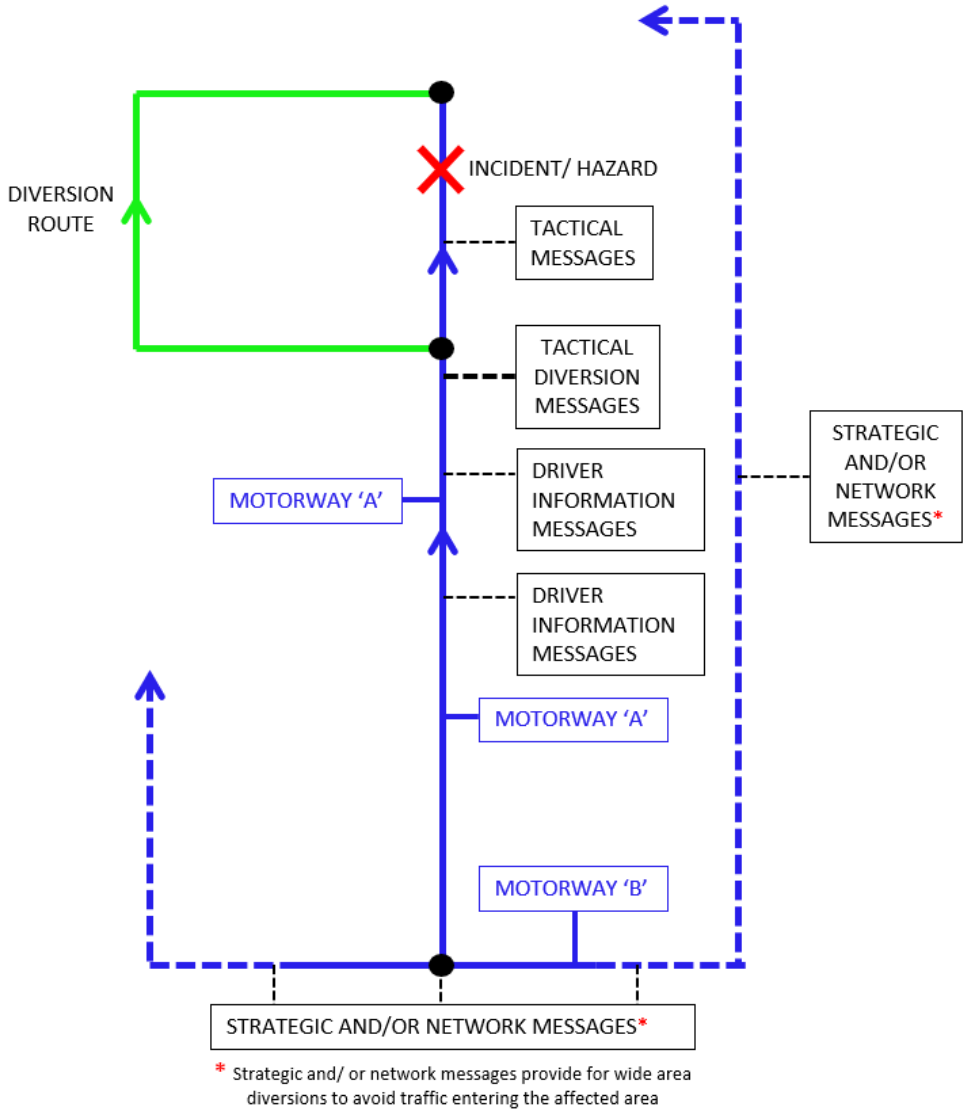


Figure 4.1 Schematic Diagram Indicating Use of Messages

4.1.1 Strategic Messages

Strategic messages relate to traffic conditions on the entire national road network and not just a specific area. They may provide information in advance to road users relating to an incident or traffic conditions on an adjoining route. While this message may not be relevant to all road users at that point, those who may be affected will have the opportunity to revise their route. These messages shall be set far enough away and at locations that allow drivers to make an informed choice about their journey. Strategic messages are primarily conveyed through text.

VMS used to display strategic messages can be used to supplement downstream tactical messaging.

The selection process for choosing the VMS to show strategic messages or tactical messages are similar. However, there is an exception for strategic messages as they can apply to any road section downstream of the sign. Additional location criteria can also include:

- The number, range and significance of strategic sections in the network; and
- The number, range and significance of key tactical routes.

4.1.2 Tactical Messages

Tactical messages are associated with the section of the national road network where the VMS is located, localised for road users that are directly affected by the traffic conditions from nearby roadworks, incidents or events. Tactical messages shall focus on warning drivers of an incident that is immediately ahead, protecting both those at the scene and queuing or approaching traffic. Tactical messages are primarily conveyed using pictograms, supplemented by simple text.

Network sections which may benefit from the use of tactical VMS include those which:

- Have high traffic volume;
- Are regularly congested;
- Experience local problems that require frequent regulatory information to be provided for road users as identified in Section 2.2.1.1; and
- Experience regular weather problems as identified in Section 2.2.1.2.

The location of a VMS displaying tactical messages on any specific section should be chosen such that road users have sufficient time to interpret the context of messages being presented to them and to adapt their behaviour accordingly. Locations could include:

- In advance of queue tails;
- In advance of regulatory zones on the link;
- In advance of part of the link that experience periodic hazards; and
- Where journey time generally begins to differ from that of free-flow conditions.

4.1.3 Diversion Messages

VMS that present diversion messages provide road users with alternative routes to a particular destination as a result of network conditions affecting the original route. The impact of any diversion message depends on the location of the VMS displaying the message relative to key routing decision points and the seriousness of the network conditions affecting the usual route as conveyed by the message. Tactical diversion messages are displayed to road users who are driving towards the situation but still have a chance to change their route.

The selection of VMS locations should align with TII operational diversion plans. VMS diversion route messages should be determined following an analysis of viable diversion routes for each relevant section of the high speed national road network. This analysis should be carried out in consultation with key stakeholders and should consider:

- The location of existing or planned static signs;
- Historical traffic conditions on possible diversion routes;
- The location of key decision points where a road user can act on diversion information;
- Reliable origin/destination data;
- The results of consultations with stakeholders that may impact: suitability of a diversion route for different classes of traffic (e.g., is a particular route suitable for heavy goods vehicles?);
- Restrictions of diversion routes to the same category of roadway (e.g., should traffic from motorways only be diverted to other motorways?);
- Agreement with the Garda Traffic Division and consistency with existing Garda Traffic Division diversion plans; and
- Agreement with road authorities, where proposed to locate a VMS on an approach to the motorway.

Mobile VMS may be deployed to assist in the signing of the diversion route. Based on the diversion route analysis and stakeholder consultation, VMS locations should be selected with consideration of the location of:

- Key routing decision points;
- Other VMS;
- Existing static signs; and
- Other ITS infrastructure.

4.1.4 Public Campaign Messages

Public campaign messages cover both safety and public information messages. VMS can be used to a limited extent to display campaign messages. Policies have been designed to assist in the design and implementation of these messages including:

- Campaign messages are one of the lowest priority of messages that may be displayed on a VMS which can be seen in Table 5.1 VMS message priority;
- Subject to appropriate authorisation by TII, VMS may be used to display campaign messages by An Garda Síochána the Road Safety Authority (RSA), the National Emergency Co-ordination Group or the Department of Transport.
- Campaign messages subject to the authorisation by TII :
  - May be part of a wider communication's strategy undertaken by TII or any other Government organisation with the approval of TII;
  - Must be approved by TII's MOCC Manager, where necessary in consultation with the Traffic Information Policy Team The request for the message should be sent to messageapproval@tii.ie for review with at least one weeks' notice of the event;
- VMS campaign messages will be displayed on appropriate VMS infrastructure, at appropriate times and locations, where road users can observe the message safely;

- Campaign messages must not be displayed on lane control signs;
- The signs used in the VMS campaign messaging plan should allow for other travel information (such as travel times) to coexist;
- Mobile VMS may only be used to display campaign messages when no fixed VMS is available, and must be coordinated and approved by the Traffic Information Policy Team;
- VMS campaign messages should be overwritten by messages with a higher priority;
- Campaign messages should only be displayed between 6am – 10pm. This permits night-time roadworks messages to be displayed.
- Campaign messages should be avoided on VMS immediately in advance (close proximity) of a VMS displaying critical traffic related information;
- The advertisement of downloading apps is not permitted on VMS signs; and
- Within a roadworks area VMS messages should not be used for campaign messages.

4.1.4.1 Safety Campaign Messages

VMS can be used on a limited basis to support road safety messages. However, the following restrictions apply:

- All safety campaign messages must be approved by TII. Once approved, safety campaign messages can be temporarily (for a duration specified by TII) added to the operational procedure.
- Blanket implementation or indiscriminate area-wide display of a safety campaign message is inappropriate. The messages being displayed must be appropriate for the road network.
- Safety campaign messages are have a low priority and will be removed by the control centre operators when a VMS is needed for more pressing traffic management purposes. .
- Where approved, safety campaign messages will be run for agreed periods determined in advance in consultation with TII's MOCC Manager.
- Approved safety campaign messages may be added to the approved list temporarily until a date specified by TII.

An example of a safety message employed on a VMS is illustrated below in Figure 4.2.

Figure 4.2 VMS Displaying Safety Message

4.1.4.2 Public Information Messages

Relevant information related to major public messaging events (e.g., Pandemic, CRI alert) may also be presented on VMS in agreement and coordination with TII.

Typically, An Garda Síochána contact the MOCC directly to request the activation of a CRI alert on available VMS that have a lower priority message displayed. CRI messages are not displayed on specific types of VMS, such as tactical VMS. The content of the CRI alert message is completed by the Garda inspector in charge and sent to the MOCC.

4.1.4.3 Campaign Message Review Process

The Campaign Message Policy is reviewed annually by the TII Traffic Information Policy Team and the MOCC Manager. It will also be reviewed as and when necessary, including but not limited to:

- Technology environmental changes that impact on the way the service is delivered; and
- Regulatory environmental changes that impact on the way the service is delivered.

4.2 VMS Message Design Principles

The design principles for the display of information on VMS consider strategies in relation to certain road and traffic events, the use of regulatory messages and general design principles. Some general principles to be considered for designing the VMS messages are as follows:

- Avoid too much information on one VMS;
- Use of pictograms is encouraged instead of the words; and

- Eliminate irrelevant information to reduce the amount of information drivers need to assimilate.

The following sections will provide detail on the principles for messaging design for VMS.

4.2.1 Message Structure

The structure of VMS messages should adhere to the following guidelines:

- VMS messages that are displayed on national roads must be prescribed or pre-authorised; and
- Messages must only be displayed in the format of text-only or text and pictogram.

4.2.2 Message Content

VMS must be used to display information relevant to road users.

VMS on national roads may not display the following information:

- Advertising;
- Political slogans or electioneering campaigns; and
- Information requests (excluding CRI alerts).

4.2.3 Message Length

A VMS can display a message with typically a maximum of ten words depending on the type of sign as seen in Appendix - A1, with the exception of tactical messaging which should not typically exceed a maximum of seven words. The character size is fixed relative to the speed of the road, but the word length will vary depending on the sign. The message length is sign dependent. Each sign can cover three to four lines. Character size and spacing is detailed in Table 4.1 below.

A VMS can display a message with a maximum number of words on a number of lines as detailed in Appendix - A1.

A single word can be defined as:

- A placename even if it is formed from more than one word. For example, ‘CARRICK-ON-SHANNON’ would be counted as one word (applicable in the same way to bilingual translation of placenames);
- Road names: For example, ‘NAAS ROAD’ instead of ‘N7’ would be counted as one word;
- Infrastructure names even if formed from more than one word. For example, ‘DUBLIN TUNNEL’ or ‘CAR FERRY’ would each be counted as one word;
- Any directions, distances or route extensions. For example, DUBLIN (N), 20 KM or M50 (N2) would each be counted as one word;
- All other words irrespective of length. For example, ‘M50 ROAD CLOSED FROM J5 to J6’ would be counted as seven words;
- Arrows and symbols each count as one word; and
- Any punctuation marks (for example, a dash ‘-‘) are not counted in the length.

4.2.3.1 Road Numbers

Roads should be identified by their number rather than their name on VMS messages, where possible. For example, the N7 should be used as opposed to Naas Road. Truncated or abbreviated versions of road names should be avoided.

Road numbers must be displayed without a gap between the characters.

4.2.3.2 Junction Numbers

Junctions must be identified by their number (e.g., J2) where display space is limited. Where space is available, both the junction name and number can be permitted, as road users might be unfamiliar with the junction (e.g., J2 Airport). The abbreviation for junction that is permitted on VMS is 'J'. The junction name must not solely be displayed, i.e., without the junction number. VMS displaying journey times for different roads along the M50 will display the road and junction number. Junction numbers are always included on VMS messages, but junction names are only included where possible. Regional road numbers must not be used without reference to the national road junction number.

4.2.3.3 Compass Directions

Where a route number or name is displayed, a compass direction may be used as follows:

- Full form - NORTH, SOUTH, EAST, WEST, CITYBOUND; or
- Abbreviated form - N, S, E, W, CITY.

4.2.4 VMS Display Functionality

The types of VMS and LCS, and their characteristics currently used on the national road network are presented in Appendix - A1. Appendix - A1, lists the signs' usage, size range and allowed display layout.

TII's VMS/LCS specifications include technology considerations as follows:

- All signs will be free format full matrix (rather than character-based);
- All signs shall be high resolution with pixel pitch between 20 and 25mm;
- All signs must comply with EN 12966 (Parts 1, 2 and 3) including specified performance levels appropriate to Ireland;
- All signs shall employ RGB LED technology providing red, green and blue colours;
- Messages shall include all upper-case font with the exception of websites which should use lower-case font. Lower-case font and upper-case font shall not be used within a single Information Unit line. Messages will also include specified pictograms and fail-safe messages; and
- VMS shall include ambient light sensors such that the intensity of any message can be adjusted automatically with lighting conditions.

It is recognised that VMS technology and the TII's requirements will both evolve over time. The current specifications will be modified to reflect any changes.

4.2.5 VMS Design Specification

Depending on the type of VMS and its location, the following should be considered when selecting or creating messages:

- Character size;
- Pictograms;

- Colour;
- Lanterns;
- Number of phases (under exceptional circumstances); and
- Message principles.

4.2.5.1 Character Size

The minimum height of characters that are displayed on any light emitting matrix VMS in Ireland should be in accordance with the standards set out in the EN 12966.

Table 4.1, adapted from EN 12966, presents typical values for character dimensions and associated tolerances to be used on VMS to obtain an acceptable legibility. TII use a proportional font and characters have variant widths. These values correlate with the various types of VMS and their character size used by TII. The size range choice is determined by the required legibility distance and approach speed to the sign on site.

Character height is the limiting factor in the maximum legibility distance to the VMS. The time required to acknowledge and assimilate a message varies depending on a number of parameters including the tilt of the VMS, the road user's speed and the distance between the vehicle and the VMS. The minimum character height and minimum legibility distance per 'speed' are listed in Table 4.1.

Table 4.1 Dimensions and Tolerance for Text

Size Range	**Speed** [km/h]	**Minimum character height:** h [mm]	**Minimum character width:** w [mm]	**Minimum character spacing:** sc [mm]	**Minimum word spacing:** sw [mm]	**Minimum line spacing:** sl [mm]	**Minimum backing board border distance:** [mm]
A	50	100	71	28	71	57	100
B	60	160	114	46	114	91	160
C	80	320 (400)	228 (285)	91 (114)	228 (285)	182 (228)	320 (400)
D	100-120	400 (320)	285 (228)	114 (91)	285 (228)	228 (182)	400 (320)

* *Where given, the larger size in brackets should be used if greater prominence of the sign is considered necessary by TII. If greater prominence of the sign is considered necessary by TII, the largest sizes presented in brackets should be used.*

** *Where given, the smaller character height size in brackets may be used where VMS sizing conditions make the provision of the recommended size impracticable or where special considerations apply. The smaller bracketed sizes shall not be used without the prior approval of TII. If the VMS sizing conditions make the provision of the recommended size impractical or where special considerations may apply, the smaller character height sizes shown in brackets may be used. However, the smaller bracket size shall not be used without the prior approval of TII.*

*** *If a fixed character dimension is used, the minimum character width is equal to 5/7h as shown in the table above. If a proportional character font is used, character width may vary.*

Each character on a VMS is made up of elements. The minimum number of elements for an alphanumeric character in vertical direction by horizontal direction is seven by five respectively.

4.2.5.2 Pictograms

A pictogram is a graphical representation of an event or instruction that can be used to support regulatory, warning and information messages on VMS. The pictogram is the most informative element in the whole communication chain, giving messages an opportunity to be language independent and achieving VMS harmonisation as it is widely understood. Pictograms can be read from a distance twice as far as text and use a universal language: pictures. This enables VMS to synthesise complex road/traffic situations to the road users in an efficient manner. The main pictogram will determine the resulting informative structure of the VMS, which will include complementary informative elements such as: alphanumeric characters, secondary pictograms and text.

Where pictograms are displayed on VMS, the minimum overall height of the pictograms shall be 1600mm for size range C and D as referenced in Table 4.1.

Where any regulatory or warning signs included in chapter 5 and 6 of the TSM are displayed as pictograms on VMS (outside of the approved list of pictograms) they shall conform proportionally and graphically with the fixed plate signage.

As pictograms are widely understood by all road users, Principle 2.1 of the EasyWay Guidelines emphasises the importance of pictograms being the main element of VMS messages. In addition, Principle 2.4 also identifies the functional hierarchy in VMS messages where regulatory messages come first, then danger warning, followed by informative, and pictograms should be selected accordingly. The hierarchy of the messages is further elaborated in section 5.1.

The Network Intelligence and Management System (NIMS) library and the VMS Message Library utilise several pictorials to communicate or emphasise a message. The approved pictograms are shown in Appendix A2. Proposals for new pictograms must be submitted in writing to the TII Traffic Information Policy Team for approval.

In addition to the approved pictograms, any Regulatory or Warning sign included in Chapters 5 and 6 of the TSM may also be used. For example, a VMS in the immediate vicinity of roadworks may display a chevron or left/right arrow sign to support “Roadworks”/ “Merge Right” messages.

The meaning of a pictogram is not required to be shown in text in a VMS message. The inclusion of text can help to support understanding of the operational condition to help educate road users as to the meaning of a new pictogram. Pictograms can be used independently as a VMS message or to supplement text as a part of a VMS message.

4.2.5.3 Colour

Some VMS that currently exist on the national road network can display text and pictograms using a combination of RGB and white colours.

All text messages on new VMS should be displayed in yellow.

For legacy signs on the national road network which do not have RGB capability, text messages should be displayed in amber.

Where VMS are RGB compatible and within the roadworks zones, the roadworks signs and messages should be shown in orange.

Red may be used in pictograms, such as a red cross for lane and tunnel closures or the roundel associated with speed limits.

4.2.5.4 Lanterns

Four flashing lanterns can be provided at each corner of the VMS. The lanterns are located outside of the active matrix area and may be used whenever there is a requirement to display flashing lanterns. Red lanterns may be used in conjunction with a Lane Closed overhead lane control sign instead of amber. The use of flashing amber lanterns is only permitted for the following messages:

- C.R.I Alert;
- Closures (e.g., Tunnel, road, lane or bridge closures);
- Incident ahead; and
- Advance roadworks signage for works further up the road network, within two kilometres of the first roadworks cone.
- Lanterns are only permitted for roadworks in the live lane.

4.2.5.5 Phases

Only one phase should typically be used for VMS messages. A maximum of two phases are permitted for VMS messages in exceptional circumstances such as a VMS on a regional road approaching a junction which has a lower speed zone such as 80 km/h. This is to ensure that messages are always legible and visible to road users. If the message content cannot be displayed in two phases, a separate mobile VMS should be deployed. The maximum cycle time of a two-phase message should not exceed 6 seconds (i.e., 3 seconds per phase). The duration required to alternate between two phases should not exceed 0.3 seconds.

The display of alternating or scrolling messages on VMS, also known as sequencing, should be avoided whilst traffic is moving, as they can be a potential distraction to road users and the main content of the message can be missed. An exception to this, is scrolling chevrons on the variable message sign to divert over-height vehicles approaching a tunnel.

4.2.5.6 Message Principles

This section contains the formulae and the components that compile messages. The reading order of the messages, outlined in the EasyWay Guidelines, is shown in Figure 4.3 below. Based on this reading order the components of a message, referred to as Information Units (IU), are arranged as shown in Figure 4.4 below. A pictogram can be used to display the 'main event' information. For example, if the pictogram for congestion is used, there is no explicit need to repeat in text 'congestion ahead' as the pictogram is self-explanatory.

When using VMS with pictograms, the main element of information is given by the pictogram. Specific pictograms are preferable if they exist over generic pictograms as they can provide the road user with more information on the situation.

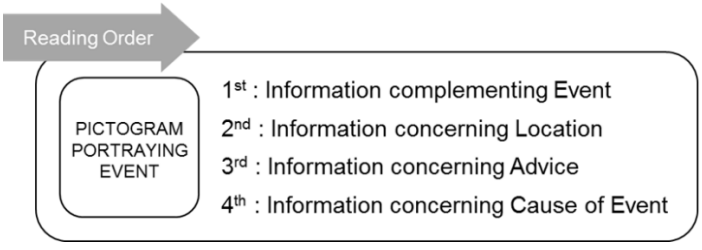


Figure 4.3 VMS Message Reading Order

Figure 4.4 Generic Message Format and information units (IU)

The approved IUs corresponding to each line are tabulated in the sections below. Using this structure, new messages can be composed for unique events by selecting the suitable IUs from the relevant tables. If an event or scenario requires a message for which the pre-approved IUs are not sufficient, the proposed new message must be submitted to TII in writing for approval. In the case of a live event, request for new messages should seek approval from An Garda Síochána. New messages should, as far as possible, adhere to the message principles outlined below.

IU Line 1: Main Event

IUs for the Main Event must contain the nature of the problem. The categories of IU for the main event are as follows:

- Emergency – CRI Alert;
- Incidents;
- Closures (e.g., Tunnel, road, lane or bridge closures);
- Weather related events; and
- Roadworks ahead (WK 001).

Based on these principles, the approved IUs for each of these categories are contained in Appendix B. These can be inserted in the first line of the message formula.

IU Line 2: Location

The information contained in IU Line 2 places the road user's current location in context with the event displayed in IU Line 1. This is used to communicate how the main event may impact on their current route. For example, this distinguishes between whether the incident, closure or restriction is taking place on their current route or on another adjoining route. This will give road users the opportunity to alter their routes, if required. The principles for the usage of direction or location related IU are as follows:

Junction Description:

- The Junction number must be displayed.
- Junction names shall align with the names in the TII Junction layout maps.
- Where the junction intersects with a national road, the national route number should be placed in brackets after the Junction number. Where there is insufficient space for both the junction name and the national route number, the latter shall prevail.
- Where the junction intersects with a regional road, the regional route number should be placed in brackets after the Junction number. Where there is insufficient space for both the junction name and the regional route number, the former shall prevail. The regional route number must be of wayfinding significance to the road user.
- Each junction description for the purposes of Journey Time messaging, shall be agreed with TII due to limited availability of space.

- Junction names are not required on VMS messages on the M50 and N40 due to the urban nature of these routes, but may be included if space permits.
- On the M50, for example:

M50 Motorway
J1
J2
J3 (M1)
J4
J5 (N2)
J6 (N3)

Where there is more than one exit for a single destination these should be accompanied by a single letter in brackets to indicate relative locations. On the M1, for example:

M1 Motorway
J5 BALBRIGGAN (S)
J6 BALBRIGGAN (N)
J14 ARDEE (N33) or J14 (N33)

It should be noted that the limitation of the number of characters include the adjective to describe the location such as “AT” or “BEFORE”.

- **Route Numbers:** It is considered unnecessary to include information regarding the road on which roadworks or an incident are taking place when the message is displayed on that same road. However, when information regarding journey times, roadworks or an incident on one route is displayed on another, the route number must precede the Junction Names or Junction Number. On the M50, for example:

Message about the M50 motorway displayed on M50 motorway	**Message about the M50 motorway displayed on adjoining routes**
J1	M50 J1
J2	M50 J2
J3 (M1)	M50 J3 (M1)

On the M7, for example:

Message about the M7 motorway displayed on M7 motorway	**Message about the M7 motorway displayed on adjoining routes**
J13 KILDARE	M7 J13
J14 MONASTEREVIN	M7 J14
J15 BALLYBRITTAS	M7 J15

- **Location:** Where roadworks or an incident is taking place in the vicinity of a junction, the relevant preposition “AT”, “BEFORE” or “AFTER” should be displayed. This is valid where they are in place at multiple junctions, in which case this should be represented by “&”. For example:

M1 Motorway
BEFORE J14 (N33)
AT J14 (N33) & J15
AT J15 & J16
M50 Motorway
AFTER J1
AT J1 & J2
AT J2 & J3 (M1)

- Where the event is taking place on an on- or off-ramp, the word “SLIP” and its direction may be added. For example, an incident on an off-ramp on the M50 will be communicated as follows:

M50 Motorway
J7 (N4) SLIP (CITY)

On other routes
M50 J7 (N4) SLIP

- **Linkages:** Where the event is between the junctions, the junctions will be displayed using a *hyphen. Hyphens* are used for all indications of “from x to y”, to include from one junction to the next. Junction names should not be displayed.

  For example:

M1 Motorway
J14 (N33) – J16
J15 – J16
J16 – J14 (N33)
M50 Motorway
J1 – J3 (M1)
J3 (M1) – J2
J2 – J3 (M1)

- **Direction:** Display of direction information will be dependent on the space available on the sign itself.

The preference will be to display the entire word, e.g., SOUTHBOUND. Where this is not possible due to space constraints, the standard abbreviation (S) will be displayed instead.

Based on these principles, the approved IUs for each of these categories are contained in Appendix B. These can be inserted in the second line of the message formula.

IU Line 3: Advice and cause of events

The content of IU Line 3 provides road users with advice to support the information on the preceding two lines. This includes instructions or dates and times relating to the main event. Alternatively, IU Line 3 may provide information on the cause of the event. The principles relating to advice and additional information are reflected below:

- **Instruction:** Where applicable, instructions should be used to support closures, restrictions, roadworks or weather-related events. For example:

Instruction
Merge Left
Merge Right
Merge Ahead
Lane Merge Ahead
Prepare To Merge
Use Diversions
Reduce Speed

- **Advice:** "DRIVE WITH CARE" may be used in conjunction with any of the incidents, roadworks or weather-related events. Informing road users to "EXPECT DELAYS" may be used for messages relating to queuing or closures. For example:

Advice
Drive with Care
Expect Delays
HGV Cordon Lifted
Tune to 103.2

- **Cause of Events:** Driver frustration, during periods of heavy congestion, may be alleviated if the cause of the event is known to them. For example, "COLLISION", "FLOODING" OR "ROADWORKS" can all be used as the cause of event for IU Line 3 to explain any slow-moving traffic or lane closures to road users.

Cause of Events
Collision
Flooding
Roadworks

- **Dates:** Dates for planned events, such as roadworks, events or closures should be presented as the date in double digits and an abbreviation of the month.

Dates
01 May
30 Aug
05 Sep

- **Date Range:** *Hyphens* are used for all indications of “from x to y”, to include a start date and an end date.

Date Range
01 - 03 May
30 Aug - 02 Sep
05 Sep

- **Time:** Start or end times for planned events, such as roadworks, concerts or closures should be presented in twenty-four-hour notation.

Time
06:00
23:00
00:00

- **Time Range:** *Hyphens* are used for all indications of “from x to y”, to include a start and an end time.

Time Range
06:00 - 07:00
22:00 - 23:00

Based on these principles, the approved IUs for each of these categories are contained in Appendix B. These can be inserted in the third line of the message formula.

If none of the above parameters are suitable for inclusion in the third line, it is recommended to display the text “DRIVE WITH CARE” in the instance of incidents, roadworks, planned or unplanned events, depending on the relevance.

4.2.6 Approved Messages

The following message elements have been approved for display on a VMS and can be found in Appendix A4:

- Column A – Incident
- Column B – Closure
- Column C – Location

- Column D – Information / Advice
- Column E – Notice (to all or specific traffic)
- Column F - Instruction

Any message element in columns A or B can be preceded by:

- A road name or preferably number;
- A junction name and/or number;
- A compass direction; and
- It is permissible to combine two journey time messages.

Where a message includes a vehicle classification (HGV for example), appropriate text can be replaced by an appropriate symbol.

Guidance on the content and composition of message elements can be found in Appendix A5 and should be read in conjunction with the approved VMS message elements in Appendix A4.

4.2.7 New Message Element Approval

New message elements can be added to the approved lists (see Appendix A4) with the approval of TII. Requests for the approval of new message elements should be submitted to TII in writing or through email (refer to email). Prior to the utilisation of any new message elements, a formal response is required from TII. Non-approved message elements can be used in emergency situations. In such cases, the use of emergency non-approved message elements must be documented, and a briefing note should be submitted to TII as soon as practicable.

4.2.7.1 Restrictions

There are clear restrictions for the content of the VMS. Some examples are provided below:

- Special event messages should be general, traffic-related and no event sponsor name should be used.
- No advertising, commercial, political or personal messages will be displayed on the VMS at any time.
- Phone numbers other than 112 or 999 are not permitted to be displayed without TII approval.
- Websites or SMS addresses will generally not be displayed on the VMS, except in unusual cases where vital information must be communicated to road users. Messages shall include all lower-case font for websites.
- No graphics should be displayed on the VMS with the exception of approved pictograms.
- Messages cannot divert traffic specifically to local streets unless the traffic management plan requires this.
- Messages should not cause unnecessary alarm or disregard for the signs. (i.e., CAUTION!! CAUTION!! Should not be used)
- Abbreviations should be limited; if necessary, recommended abbreviations can be used. Avoid confusing abbreviations.

5. VMS Operational Strategy

TII uses the Network Information Management System (NIMS) to control the VMS on the national road network. In addition to controlling the VMS, the NIMS allows operators to inform motorists of traffic events (e.g., incidents, roadworks and adverse weather conditions.) and to implement VMS response plans. It also allows operators to schedule VMS messages to be displayed on specific VMS at specific times.

A message hierarchy has been established which will be adhered to unless otherwise directed by TII. Any overriding of the message hierarchy will be coordinated through VMS operations to support incident management and will be aligned with TII's NIMS guidelines and protocols.

Operators are permitted to use standard messages within the system to populate VMS for various situations.

5.1 VMS Message Hierarchy and Message Priorities

VMS messages should be displayed according to an order of priority. Careful consideration is required to establish a suitable time for messages to be displayed. It is critical that only the most relevant information is displayed to ensure all user's safety and efficiency. A message hierarchy is outlined in Table 5.1, as part of the National VMS Usage Policy to aid operators in determining message priorities and to avoid information overload. For example, less critical messages such as campaign messaging or journey time information should be removed when a higher priority message such as incident response is required.

Table 5.1 Message priorities and hierarchy for VMS

Message Priority	Situation	Factors and Considerations
Priority 10	Emergency or disaster alert and warning evacuation	Situations affecting wider road network, or multiple routes. Frequent updates may be required based on the changing conditions. May be lane or tunnel closures on motorway/dual carriageway within specific radius of the sign.
Priority 9	Traffic-related emergency situations and major incidents	Unplanned incidents that cause lane closures for long periods of time. Road closures on motorways/dual carriageway or incidents causing congestion. VMS messages should be displayed prior to the situation.
Priority 8	CRI Alert	CRI Alert messages are displayed on available VMS which are not in use with messages of a higher priority, to alert road users of a child abduction to seek their help.
Priority 7	Immediate planned event; Current and planned roadworks and restrictions	Immediate planned event affecting road conditions. Message should not be a maximum of one week prior to the roadworks taking place.
Priority 6	Planned weather event	VMS should not display forecasted road conditions more than 24 hours in advance of a planned severe weather event. This applies to weather events that have a status red warning only.
Priority 5	Planned special event	Traffic management. Initial message should be displayed prior to two decision points to the event. Subsequent messages displayed can be for parking for event.

Message Priority	Situation	Factors and Considerations
		Message lengths are decided by each event's traffic management plan. The National Ploughing Championship is part of a coordinated Garda traffic management plan.
Priority 4	Travel time (LTT)	Long travel times – Long delays. Travel times automatically generated from system based on real time traffic data. Travel time can be forecast by operators if incident occurs. This category can cover: • Delayed travel times; • Mixed travel times, i.e., Delays to one of the destinations; and Priority travel times, i.e., Delays between defined junctions.
Priority 3	Public service or safety campaign announcements, multi-modal information	General public information and safety messages. Requires approval by Operations Manager (TII). Low usage messages are discouraged.
Priority 2	Test messages	Use for testing sign during installation or maintenance work. Test messages should only be applied when there is low traffic and during off-peak hours. This has to be coordinated and approved in advance with TII.
Priority 1	Travel time (STT)	Standard travel times – No delays. Travel time automatically generated from system based on real time traffic data.

Information that is related to current incidents, roadworks, road conditions, traffic and travel time, or weather conditions that might affect the safety of the road user and travel times may be displayed on the VMS. The following exceptions may be displayed:

- Advance notification of roadworks that require lane closures; and
- Advance notification of special events that will adversely affect travel time due to the forecasted increase in traffic or the need to close roads or motorways.

5.1.1 Blank Signs

VMS displays should be left blank during peak or non-peak periods when there is no message to display; there are no incidents, travel conditions, future roadworks or available journey time information that warrant the display of information.

5.1.2 Messages Relating to Regular Events

Messages are used to advise road users of unusual conditions (i.e., incidents, lane blockages, etc.). VMS should not be used to inform road users of already observable conditions but rather provide advance notice of those conditions, i.e. congestion, weather, or what action must be undertaken by the driver.

5.1.3 Display of Future Roadworks

VMS may be considered to warn of future roadworks that require a full road closure or are expected to cause delays.

These messages should typically be displayed a maximum of one week prior to the roadworks taking place, however this timeframe should be determined based on the strategic impact of the roadworks. Advanced notice of roadworks may be displayed on the same motorway as the VMS or on an adjoining route ahead, without the use of lanterns.

However, in case there is a higher priority message needed to be shown, this information will override the upcoming roadworks. VMS may be used to supplement roadwork signage as referenced in chapter 8 of the TSM. Messages that impact the safety and operation of the motorway/ dual carriageway will have priority over messages for upcoming roadworks, in accordance with the message hierarchy shown in Table 5.1.

Future roadworks messages should display information in the order below.

1 – Place / location
2 – Times of closure*
3 – Date(s) of closure
* Times of closure examples are “NIGHT CLOSURES”, “WEEKEND CLOSURES” or “22:00 – 04:00”.

5.1.4 Display of Upcoming Special Events that Adversely Affect Travel

Fixed and Mobile VMS may display advanced notice of upcoming events that will adversely affect travel time. These messages will inform road users of traffic and road conditions that might be affected by the event taking place. Directions to the event and park and ride facilities can also be included on these messages.

Event messaging must be specific for traffic guidance, with no sponsor or commercial information to be displayed on the VMS.

VMS messages for a major event must be pre-planned as part of a special event management plan. As applicable, strategies to coordinate messages across VMS should be incorporated into the event traffic management plan. In providing messages for special events, VMS may not advertise commercial products, sponsorships, services or political party within the content of their messages.

5.1.5 Display of Journey Times

Journey time messages provide journey time information to a junction or destination located on the road being travelled on or on an adjacent road.

Journey times are based on near real time information and are calculated every minute. When there are delays on the network above an agreed threshold the legend shall automatically switch from a travel time to delay time message. When signing for delays, the use of “DELAYS” or “LONG DELAYS” is displayed when journey times are above set thresholds.

Journey time information should be displayed where data is available during peak and non-peak times.

5.1.6 Traffic Diversion

VMS should only be used to divert traffic onto alternative routes if there is adequate capacity available along that route and if it is coordinated as part of the traffic management operation. The following requirements should be met:

- The VMS operator has been instructed by An Garda Síochána about traffic conditions on the alternative route; and
- The use of the alternative route will reduce travel time for road users.

5.1.6.1 Traffic Diversion ‘Up and Over”

When an incident (or roadworks) takes place within a junction (between the slips) that closes the carriageway and results in traffic being diverted 'up and over', drivers can still continue on their journey subject to a minor diversion. This should be considered as a closure from a tactical point of view, tactical messaging should focus on directing customers to the diversion they will need to take.

Strategically an 'up and over' should only be considered a potential disruption to traffic and not a full motorway closure, as drivers can continue their journey subject to the minor diversion.

5.1.7 Weather Events

Met Eireann provides weather alerts yellow, amber and red in advance of and during severe weather events. Given the frequency of occurrence of yellow Alerts, such alerts are not displayed on TII VMS. VMS messages may display information regarding weather events that may result in dangerous road conditions or specific restrictions to road users.

A **planned weather event** occurs when a weather warning is received from Met Éireann in advance of the event occurring.

For status amber and red warnings, an advanced messaging plan will be implemented in advance of the commencement of the warning in the affected region and on the approaches. The message plan continues throughout the period of the active red and amber warning and removed once the warning expires.

The signs used in the planned event messaging plan should allow for the weather event to coexist with other travel information (such as travel times).

Message examples are shown below. No pictogram is required alongside the message.

Example 1
Status Red Warning
Severe Winds
18 May 01:00-14:00

Example 2
Met Eireann
Status Red
Severe Winds

Example 3
Met Eireann Warning
Status Orange
Thunderstorms

Unplanned weather events occur when no active weather warning is in place and a control room operator either observes or receives notice of potentially dangerous adverse weather conditions.

This can be via the Vaisala road weather information system, CCTV, communication from Met Éireann, An Garda Síochána or other network stakeholders.

For unplanned weather events where drivers can see the conditions, messaging should be used where it is deemed to improve safety. Unplanned weather events may occur during yellow warning periods in localised areas.

Unplanned weather events require the operator to set a reactive plan to the conditions within the weather region affected. The signs used in the unplanned event messaging plan should allow for the weather event to coexist with other travel information (such as journey times).

5.1.8 Incidents

Incidents that occur on the national road network affecting the safety of the road user or the road worker and travel times must be communicated to road users. The following aspects of information could be included on the VMS; the location of the incident, the distance from the VMS (i.e., Road user) to the incident and lane closures if any. Depending on the extent of the incident, diversion messages may be displayed to divert road users to alternative routes. If multiple incidents take place, NIMS will prioritise the incident that is considered to have the most immediate effect on road users.

5.1.9 Multi-Modal and Inter-Modal Information

Although not currently actively used on the national road network, VMS may be used to assist road users with other aspects of travel or to notify them of tolling. VMS may display the following variety of messages such as:

- Parking availability at Park-&-Ride facilities;
- The activation of variable tolling or toll restrictions; and
- Parking availability at airports, train stations, and bus stations.

5.1.10 Test Messages

If the setting of an alternative message for test purposes is required by a signs maintenance or installation contractor, this must be undertaken with direct input from operators in the MOCC Test messages and test processes are only permitted with the approval of TII's MOCC manager.

When lane control signs are being tested in a live environment, a sign in advance must warn of this testing. Examples of the messages to be displayed are shown below.

Example 1
Sign Ahead Under Test

Example 2
Lane Control Signs Under Test

Figure 5.1 Test message on VMS

5.2 Future Considerations for C-ITS Compatibility

Connected and autonomous vehicles are a growing trend in Intelligent Transport Systems. The connected part refers to the infrastructure that can communicate with the vehicle and vice versa. VMS and connected vehicles can communicate through Vehicle to Infrastructure (V2I) connections, where vehicles can send and receive information to surrounding infrastructure such as traffic signals and road sensors.

In order to ensure harmonisation of C-ITS implementation across Ireland, the Guidelines provided by the C-Road platform on standardisation of variable messages to the road users should be borne in mind.

5.3 Summary of Key Principles for VMS Operations

- The use of VMS on or adjacent to the road network is strictly reserved for the dissemination of traffic-related information and they shall not be used for any form of advertising, promotional or election purposes.
- The over-use of VMS diminishes the impact of the messaging, and they should be used judiciously in accordance with the VMS Messaging Guidelines.
- All VMS messages should be clear, consistent, brief and legible.
- Standard messages taken from the approved message library do not require approval for usage.
- All customised VMS messages must be approved by The TII's MOCC Manager, where appropriate in consultation with the Traffic Information Policy Team, in TII before display on any VMS.
- All letters on a VMS message should be capitalised with the exception of website addresses.
- Where no incidents or journey time information exist, VMS displays should remain blank, with the exception of dots being displayed to indicate the functionality of the VMS.

- Travel time messages may be displayed during regular peak and off-peak travel conditions.
- Travel time messages should not be updated manually, they should only be displayed using automatic processes of traffic data.
- VMS messages will divert traffic to prescribed exits only for special event-specific purposes, incidents or roadworks.
- As part of traffic diversions, VMS messaging should only be used where the route has been confirmed and advised by the relevant authorities.

References

An Garda Síochána. (2012, May). *Child Rescue Ireland Alert; CRI Alert*. Retrieved from Garda website: https://www.garda.ie/en/about-us/publications/policy-documents/child-rescue-ireland-cri-alert-policy-document.pdf

Arbaiza, A., & Lucas-Alba, A. (2012, December). *Variable Message Signs Harmonisation; Principles of VMS Messages Design.* Retrieved from EasyWay: https://portal.its-platform.eu/index.php?q=filedepot_download/1729/5384

Conference of European Directors of Roads. (2003, December). *Framework for harmonised Implementation of VMS in Europe (FIVE).* Retrieved from Conference of European Directors of Roads: https://www.cedr.eu/download/Publications/2009/e_Variable_Message_Signs.pdf

Department of Transport, Tourism and Sport. (2011, February). *Traffic Signs Manual*. Retrieved from Government of Ireland website: https://www.gov.ie/en/publication/f288e1-traffic-signs-manual/

Department of Transport, Tourism and Sport. (2019, August). *Chapter 1 Introduction and Sign Location; Traffic Signs Manual.* Retrieved from The Governemnt of Ireland website: https://assets.gov.ie/34708/5ead6743874f4f2785310a28ccff4295.pdf

Department of Transport, Tourism and Sport. (2019, August). *Chapter 3 Variable Message Signs.* Retrieved from Traffic Signs Manual: https://assets.gov.ie/34712/1bc816e06b714b7da28c8f3809d4222e.pdf

European Committee for Standardisation. (2004, December). *Variable Message Traffic Signs; Part 1 - Section 6.3.* Retrieved from Road Vertical Signs: http://www.sinaldetransito.com.br/normas/pmv_en_12966_1.pdf

Kimley-Horn and Associates, Inc. (2010, May). *National Variable Message Sign Usage Policy.* Retrieved from The South African National Roads Agency Limited: http://www.itssa.org/wp-content/uploads/2016/04/VMS-Policy-Final_-03052010.pdf

National Roads Authority . (2010, July). *Figure 4 - VMS/ LCS types allowed for in the NRA's Framework Agreement.* Retrieved from Guidelines for the use of Variable Message Signs on National Roads - Part B: https://www.tiipublications.ie/downloads/SRM/20-VMS-guidelines-part-b-v2.1-july2010.pdf

National Roads Authority. (2003, October). *Instant; Contract for Design Services; D504 Final Report - Implementation Strategy.* Retrieved from European Commission website: https://trimis.ec.europa.eu/sites/default/files/project/documents/20060728_155925_76462_INSTANT_Final_Report.pdf

National Roads Authority. (2005, November). *The Use of Variable Message Signs on All-Purpose and Motorway Trunk Roads.* Retrieved from Transport Infrastructure Ireland: https://www.tiipublications.ie/library/DN-ITS-03037-01.pdf

National Roads Authority. (2007, December). *National Roads Authority Design Manual for Roads and Bridges.* Retrieved from Transport Infrastructure Ireland: https://www.tiipublications.ie/library/GE-INT-01003-01.pdf

National Roads Authority. (2010, July). *Guidelines for the use of Variable Message Signs on National Roads.* Retrieved from Transport Infrastructure Ireland: https://www.tiipublications.ie/downloads/SRM/20-VMS-guidelines-part-b-v2.1-july2010.pdf

National Roads Authority. (2010, July). *Guidelines for the use of Variable Message Signs on National Roads: Part A - General Information.* Retrieved from Transport Infrastructure Ireland: https://www.tiipublications.ie/downloads/SRM/19-VMS-guidelines-part-a-v2.1-july2010.pdf

National Roads Authority. (2010, July). *Section 4.3.3 - Information; Guidelines for the use of Variable message Signs on National Roads; Part B.* Retrieved from Transport Infrastructure Ireland: https://www.tiipublications.ie/downloads/SRM/20-VMS-guidelines-part-b-v2.1-july2010.pdf

Appendix A:

A1 VMS/LCS Types Allowed for National Road Network

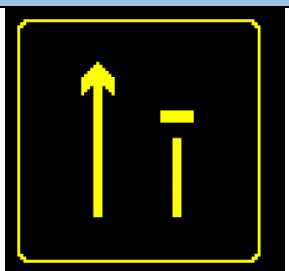
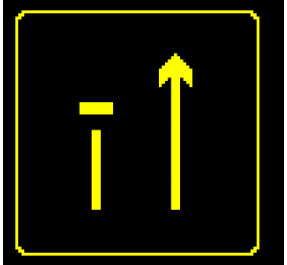
Sign Type	Sign Usage	Size Range**	Allowed Display Layout	Typical Location
Free Format Full Matrix VMS	Strategic VMS	D	• Three lines of twenty-one characters • Three lines of eighteen characters • Pictogram and three lines of eighteen characters	• Motorway and national roads
		C	• Four lines of twelve characters	• Motorway and national roads
	Tactical VMS	D	• Four lines of twelve characters • Pictogram and three lines of twelve characters	• Motorway and national roads
	Urban VMS	A, B	• Four lines of twelve characters	• Regional /local roads • Motorway and national roads
LCS (Lane Control Signs - above Lane – Motorway)	Display lane control information, and speed limit signs.	Refer to table N.2 in EN 12966 Road vertical signs – Variable message traffic signs*	Refer to Appendix A3.	• Dual carriageway • Motorway
LCS (Lane Control Signs – Slip road signs - verge mounted)	Display lane control information, and speed limit signs.	Refer to table N.2 in EN 12966 Road vertical signs – Variable message traffic signs*	Refer to Appendix A3.	• Motorway entry slip roads

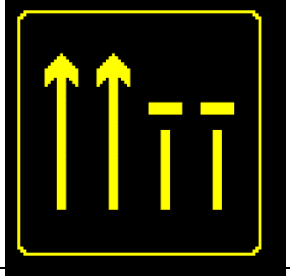
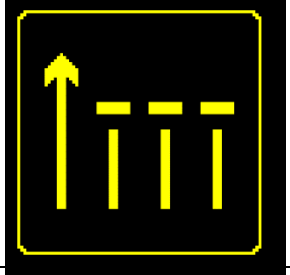
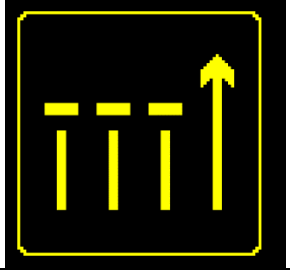
Sign Type	Sign Usage	Size Range**	Allowed Display Layout	Typical Location
Tunnel Lane Control Signs	Display lane control information, and speed limit signs.	Refer to table N.2 in EN 12966 Road vertical signs – Variable message traffic signs*	Refer to Appendix A3.	• Tunnels and approaches
Mobile VMS	Display signs, pictograms, and text.	D	• Three lines of seven characters	• Motorway and national roads • Dual carriageway • Regional / local roads
		B, C	• Three lines of nine characters • Fours lines by twelve characters	

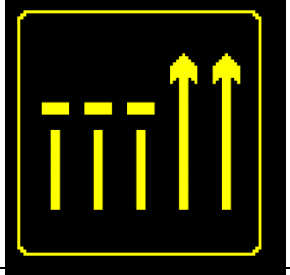
* *Size ranges for circles is in Table N.2 of EN 12966*

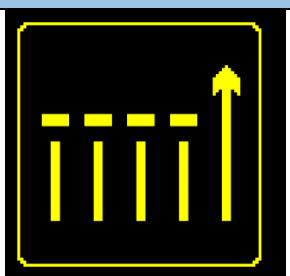
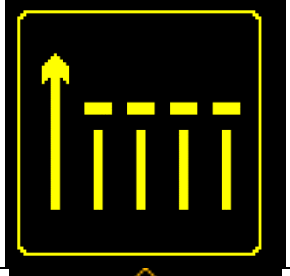
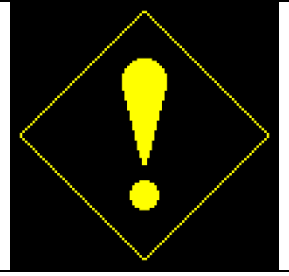
** *Size ranges are presented in Table 1*

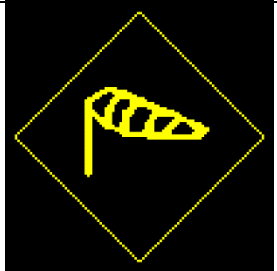
A2 Approved Pictogram Library

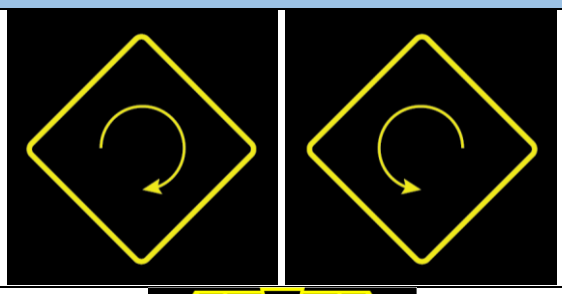
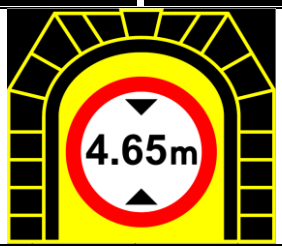
Purpose	Pictogram
WVMS 105 OX Lane Ahead Closed	
WVMS 105 XO Lane Ahead Closed	
WVMS 105 OOX Lane Ahead Closed	
WVMS 105 OXX Lane Ahead Closed	
WVMS 105 XOO Lane Ahead Closed	
WVMS 105 XXO Lane Ahead Closed	

Purpose	Pictogram
WVMS 105 OOOX Lane Ahead Closed	
WVMS 105 OOXX Lane Ahead Closed	
WVMS 105 OXXX Lane Ahead Closed	
WVMS 105 XOOO Lane Ahead Closed	
WVMS 105 XXOO Lane Ahead Closed	
WVMS 105 XXXO Lane Ahead Closed	

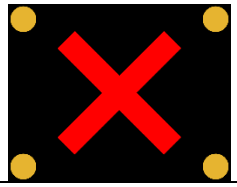
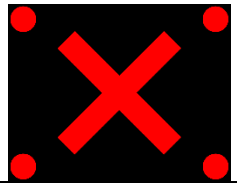
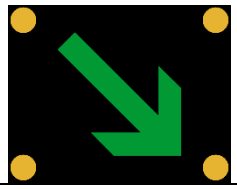
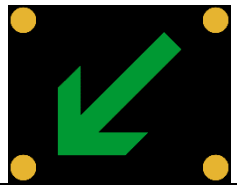
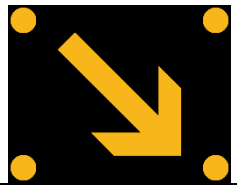
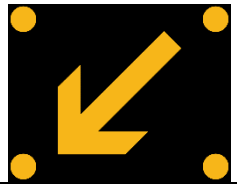
Purpose	Pictogram
WVMS 105 XOOOO Lane Ahead Closed	
WVMS 105 OOOOX Lane Ahead Closed	
WVMS 105 XXOOO Lane Ahead Closed	
WVMS 105 OOOXX Lane Ahead Closed	
WVMS 105 XXXOO Lane Ahead Closed	
WVMS 105 OOXXX Lane Ahead Closed	

Purpose	Pictogram
WVMS 105 XXXXO Lane Ahead Closed	
WVMS 105 OXXXX Lane Ahead Closed	
Wk 001v Roadworks Ahead	
W 132v Slippery Road	
WVMS 102 Collision Ahead	
W 170v Other Hazard	

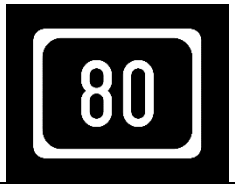
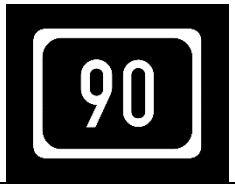
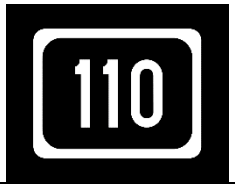
Purpose	Pictogram
W 163v Queue's Likely	
W 166v Crosswind	
WVMS 101 Low Temperature	
W 162v Tunnel	
Tunnel Closure	
WVMS 104 Risk of Overturning	

Purpose	Pictogram
W 033v Loop	
WVMS 103 Tunnel Height Restriction	

A3 Lane Control Sign Aspect Tables

Description	Aspect	Additional Information
Lane Closed*		*Amber flashing lights*
Lane Closed		*Red flashing lights*
Lane Open		*No flashing lights*
Move into Lane on Right		Yellow variant also permitted, see below.
Move into Lane on Left		Yellow variant also permitted, see below.
Move into Lane on Right		*Amber flashing lights*
Move into Lane on Left		*Amber flashing lights*
Mandatory Speed Limit **30 km/h variant**		**Speed limits Available:** 30, 40, 50, 60, 70*, 80, 90*, 100, 110*, 120

Description	Aspect	Additional Information
Mandatory Speed Limit 40 km/h variant		**Speed limits Available:** 30, 40, 50, 60, 70*, 80, 90*, 100, 110*, 120
Mandatory Speed Limit 50 km/h variant		**Speed limits Available:** 30, 40, 50, 60, 70*, 80, 90*, 100, 110*, 120
Mandatory Speed Limit 60 km/h variant		**Speed limits Available:** 30, 40, 50, 60, 70*, 80, 90*, 100, 110*, 120
Mandatory Speed Limit 70 km/h variant		**Speed limits Available:** 30, 40, 50, 60, 70*, 80, 90*, 100, 110*, 120
Mandatory Speed Limit 80 km/h variant		**Speed limits Available:** 30, 40, 50, 60, 70*, 80, 90*, 100, 110*, 120
Mandatory Speed Limit 90 km/h variant		**Speed limits Available:** 30, 40, 50, 60, 70*, 80, 90*, 100, 110*, 120
Mandatory Speed Limit 100 km/h variant		**Speed limits Available:** 30, 40, 50, 60, 70*, 80, 90*, 100, 110*, 120
Mandatory Speed Limit 110 km/h variant		**Speed limits Available:** 30, 40, 50, 60, 70*, 80, 90*, 100, 110*, 120
Mandatory Speed Limit 120 km/h variant		**Speed limits Available:** 30, 40, 50, 60, 70*, 80, 90*, 100, 110*, 120

Description	Aspect	Additional Information
Cautionary Speed 30 km/h variant		**Speeds Available:** 30, 40, 50, 60, 70, 80, 90, 100, 110, 120
Cautionary Speed 40 km/h variant		**Speeds Available:** 30, 40, 50, 60, 70, 80, 90, 100, 110, 120
Cautionary Speed 50 km/h variant		**Speeds Available:** 30, 40, 50, 60, 70, 80, 90, 100, 110, 120
Cautionary Speed 60 km/h variant		**Speeds Available:** 30, 40, 50, 60, 70, 80, 90, 100, 110, 120
Cautionary Speed 70 km/h variant		**Speeds Available:** 30, 40, 50, 60, 70, 80, 90, 100, 110, 120
Cautionary Speed 80 km/h variant		**Speeds Available:** 30, 40, 50, 60, 70, 80, 90, 100, 110, 120
Cautionary Speed 90 km/h variant		**Speeds Available:** 30, 40, 50, 60, 70, 80, 90, 100, 110, 120
Cautionary Speed 100 km/h variant		**Speeds Available:** 30, 40, 50, 60, 70, 80, 90, 100, 110, 120
Cautionary Speed 110 km/h variant		**Speeds Available**: 30, 40, 50, 60, 70, 80, 90, 100, 110, 120

Description	Aspect	Additional Information
Cautionary Speed 120 km/h variant		**Speeds Available:** 30, 40, 50, 60, 70, 80, 90, 100, 110, 120

A4 Approved VMS Message Elements

Column A **Incident**	**Column B** **Closure**	**Column C** **Location**	**Column D** **Information/ Advice**	**Column E** **Notice**	**Column F** **Instruction**
ABNORMAL LOAD ANIMALS COLLISION CONGESTION DEBRIS DIVERSION FLOODING FLOODS FOG GRITTING IN PROGRESS INCIDENT MAJOR ROADWORKS MET EIREANN WARNING OBSTRUCTION ONCOMING VEHICLE PEDESTRIANS QUEUE [colour] RAIN WARNING DRIVE WITH CARE ROADWORKS ROADWORKS PLANNED (location, dates) SEVERE WINDS SLIPPERY SURFACE SMOKE SNOW SNOW PLOUGH SPILLAGE	[Junction name] CLOSED [Junction number] CLOSED [route name] CLOSED [route number] CLOSED (xxx) BRIDGE CLOSED (xxx) TUNNEL CLOSED BRIDGE CLOSED BUS LANE CLOSED EXIT CLOSED LANE [x] CLOSED LANE CLOSURE LANES [x] [x] CLOSED LEFT LANE CLOSED M [x] CLOSED MOTORWAY CLOSED N [x] CLOSED NEXT SERVICE AREA CLOSED ROAD CLOSED SLIP ROAD CLOSED TUNNEL CLOSED	[bridge name] [junction name] [junction number] [junction number] TO [junction number] [number] KILOMETRES [number] KM [route name] [route number] ABNORMAL LOAD AHEAD INCIDENT AHEAD AFTER [bridge name] AFTER [junction name] AFTER [junction number] AFTER [place name] AFTER [tunnel name] AFTER NEXT JCT AFTER NEXT JUNCTION AHEAD AT [bridge name] AT [junction name] AT [junction number] AT [place name] AT [tunnel name] AT EXIT AT NEXT EXIT AT NEXT JCT AT NEXT JUNCTION AT TOLL BEFORE [bridge name]	[junction name] [travel time] MIN [junction name] [travel time] MINUTES [junction number] [travel time] MIN [junction number] [travel time] MINUTES [number] HOUR DELAYS [number] HR DELAYS [number] MINUTE DELAYS [place name] [travel time] MIN [place name] [travel time] MINUTES CAUTIONARY SPEED [xx] ALT. ROUTE FOLLOW [symbol] ALT. ROUTE USE [route name] ALT. ROUTE USE [route number] ALTERNATIVE ROUTE FOLLOW [symbol] ALTERNATIVE ROUTE USE [route name] ALTERNATIVE ROUTE USE [route number] AVOID LANE CHANGES	[vehicle category] AND [vehicle category] ALL TRAFFIC CARAVANS CARS HGV'S HIGH SIDED VEHICLES HIGH SIDED VEHS M'CYCLES MOTORCYCLES	EXIT AT [junction name] EXIT AT [junction number] EXIT AT NEXT JCT EXIT AT NEXT JUNCTION EXIT MOTORWAY FOLLOW [place name] FOLLOW [symbol] FOLLOW DIVERSION HIGH VEHICLES USE MIDDLE OF ROAD LEAVE AT [junction name] LEAVE AT [junction number] LEAVE AT NEXT JCT LEAVE AT NEXT JUNCTION LEAVE MOTORWAY USE [junction name] USE [junction number] USE [route name] USE [route number] USE BUS LANE USE HARD SHOULDER WAIT FOR GARDAI GARDA AHEAD DO NOT PASS GARDA AHEAD PREPARE TO STOP

Column A **Incident**	**Column B** **Closure**	**Column C** **Location**	**Column D** **Information/ Advice**	**Column E** **Notice**	**Column F** **Instruction**
STATUS RED WARNING STRONG WINDS SURFACE WATER TRAFFIC SIGNALS OUT WARNING STRONG WINDS WEIGHT CHECK		BEFORE [junction name] BEFORE [junction number] BEFORE [place name] BEFORE [tunnel name] BEFORE NEXT JCT BEFORE NEXT JUNCTION CONGESTION AHEAD FOR [number] KILOMETRES FOR [number] KM IN [place name] IN ROAD ON [name of bridge] BRIDGE ON BRIDGE ON M[x] ON N[x] ON SLIP ROAD QUEUE AHEAD ROAD CLOSED AHEAD TO [route name] TO [route number]	CONGESTION LIKELY EXPECT DELAYS DELAYS DELAYS POSSIBLE DIVERSION AHEAD HARD SHOULDER FOR EMERGENGY VEH ONLY EMERGENCY SERVICES ONLY ON HARD SHOULDER DRIVE WITH CARE DRIVE WITH CAUTION FOR [place or event name] FOLLOW [place name] FOR [place or event name] FOLLOW [symbol] FOR [place or event name] USE [junction name] FOR [place or event name] USE [junction number] FOR [place or event name] USE [route name] FOR [place or event name] USE [route number] FOR [x] KM LONG DELAYS M[x] [junction name] [travel time] MIN		MERGE LEFT MERGE RIGHT MERGE AHEAD LANE MERGE AHEAD PREPARE TO MERGE USE DIVERSIONS REDUCE SPEED

Column A **Incident**	**Column B** **Closure**	**Column C** **Location**	**Column D** **Information/ Advice**	**Column E** **Notice**	**Column F** **Instruction**
			M[x] [junction name] [travel time] MINUTES M[x] [junction number] [travel time] MIN M[x] [junction number] [travel time] MINUTES N[x] [junction name] [travel time] MIN N[x] [junction name] [travel time] MINUTES N[x] [junction number] [travel time] MIN N[x] [junction number] [travel time] MINUTES ONE LANE OPEN REJOIN MAIN CARRIAGEWAY SLOW DOWN SLOW TRAFFIC SLOW TRAFFIC FOR [x] KM HGV CORDON LIFTED TUNE TO [channel]		

A5 Message Content and Message Element Composition

Message Content	Incident + Closure	Incident + Location	Incident + Location + Advice	Incident + Location + Notice + Instruction	Incident + location + Instruction	Incident + Advice	Incident + Notice + Instruction	Incident + Instruction
Message Element Composition	A + B	A + C	A + C + D	A + C + E + F	A + C + F	A + D	A + E + F	A + F
Message Content	Closure	Closure + Location	Closure + Location + Advice	Closure + Location + Notice + Instruction	Closure + Location + Instruction	Closure + Advice	Closure + Notice + Instruction	Closure + Instruction
Message Element Composition	B	B + C	B + C + D	B + C + E + F	B + C + F	B + D	B + E + F	B + F

Appendix B:

B1 Information Units – Main Event

The following tables are examples of pre-approved message elements that are displayed in the information units of VMS in Ireland.

Table B1.1 UI LINE 1 - Main Event

EMERGENCY - CRI ALERT	
	CRI ALERT
INCIDENTS	
	INCIDENT
	QUEUE
	QUEUE ON SLIP
	SLOW TRAFFIC
	ANIMALS
	DEBRIS
CLOSURE	
	CLOSED
	CLOSURE
	SLIP CLOSED
RESTRICTIONS	
	1 LANE CLOSED
	2 LANES CLOSED
	1 LN BLOCKED
	2 LNS BLOCKED
WEATHER	
	FLOODING
	FLOODING AHEAD
	FOG
	FOG AHEAD
	GRITTING AHEAD
	HEAVY RAIN
	HIGH WINDS
	LOW ROAD TEMP
	LOW ROAD (IU1) TEMPERATURE (IU2) – No location
	SNOW
	SURFACE WATER

ROADWORKS	
	ROADWORKS
	MOBILE ROADWORKS

B2 Information Units – Location

Table B2.1 UI LINE 2: LOCATION - HIGHLEVEL

EMERGENCY - CRI ALERT	
	TUNE TO 103.2
	CAR MAKE/MODEL
ROUTE NAME	
-	M1
ON	M2
	M3
	M4
	M6
	M7
	M8
	N8
	M9
	M11
	N25
	N40
	M50
DIRECTION	
	M1 (S)
	M1 (N)
	M2 (E)
	M2 (W)
	M3 (E)
	M3 (W)
	M4 (E)
	M4 (W)
	M6 (S)
	M6 (N)
	M7 (S)
	M7 (N)
	M8 (S)
	M8 (N)
	M9 (S)
	M9 (N)
	M11 (S)

	M11 (N)
	N40 (E)
	N40 (W)
-	CORK TUNNEL
IN	CORK TUNNEL (N)
	CORK TUNNEL (S)
	DUBLIN TUNNEL
	DUBLIN TUNNEL (S)
	DUBLIN TUNNEL (N)
	LIMERICK TUNNEL
	EAST LINK BRIDGE
MULTIPLE LOCATIONS	
	JX & JY
	J1 & J2
	J3 (M8) & J6 (M8)
LINKAGE	
	X - Y
	Y - X
	J1 - J2
	J2 - J1
	J1 - J3
	J3 - J1
	J3 (M8) - J6 (M8)

B3 Information Units - Additional Information

Table B3.1 Advice/Additional Information

CRI ALERT	
	CALL 112/999
	CAR MAKE/MODEL
DIVERSIONS	
	DIVERSIONS
	USE DIVERSIONS
DISTANCE	
FOR	1 KM
	8 KM
	500M
INSTRUCTION	
	MERGE LEFT
	MERGE RIGHT
ADVICE	
	REDUCE SPEED
	DRIVE WITH CARE
	EXPECT DELAYS
	HGV CORDON LIFTED CITYBOUND
	1 LANE CLOSED
	2 LANES CLOSED
	1 LN BLOCKED
	2 LNS BLOCKED
	TUNE TO 103.2
MULTIPLE LOCATIONS	
	JX & JY
	J1 & J2
	J3 (R433) & J4 (R639)
LINKAGE	
	X - Y
	Y - X
	J1 - J2

	J2 - J1
	J1 - J3
	J3 - J1
	J3 (R433) - J6 (N62)
	J3 (M8) - J6 (M8)
DATE	
	01 JUN
	24 AUG
DATE RANGE	
	28 APR - 02 MAY
	02 FEB - 03 FEB
TIME	
	23:00
	06:00
TIME RANGE	
	22:00 - 23:00
	12:00 - 14:00

Appendix C:

C1 Standard Abbreviations for Messages

Word Message	Standard Abbreviation
Alternative	ALT
By way of, through	VIA
Citybound	CITY
East	E
Hour/Hours	H
Heavy Goods Vehicle	HGV
Junction	J
Kilogram	KG
Kilometre/Kilometres	KM
Kilometres per hour	KM/H
Lane	LN
Metre/Metres	M
Minute/Minutes	MIN
Motorcycle	M'CYCLE
North	N
North-East	NE
North-West	NW
Park and Ride	P + R
South	S
South-East	SE
South-West	SW
Ton	T
Vehicle	VEH
West	W

C2 The List of Glossary

ANPR	Automatic number plate recognition
Aspect	In general, Aspect refers to any display on a Lane Control Sign or Tunnel Lane Control Sign or a Periodic or Variable Speed Limit. In conjunction with some Aspects, two pairs of amber or red Lanterns may be required.
ATIS	Advanced Traveller Information System
CEDR	Conference of European Directors of Roads
C-ITS	Connected and Intelligent Transport Systems
DMRB	Design Manual for Roads and Bridges
ESG4	Expert and Study Group 4
FIVE	Framework for Harmonised Implementation of VMS in Europe
IU	Information Units
ITS	Intelligent Transport System
JTMS	Journey Time Management System
LCS	Lane Control Signs
MOCC	Motorway Operations and Control Centre
National Road Network	Includes national roads and regional roads on approach to the national road network.
NIMS	The Network Intelligence and Management System
RSA	Road Safety Authority
TII	Transport Infrastructure Ireland
TSM	Traffic Signs Manual
VMS	Variable Message Signs
VRS	Vehicle Restraint System
V2I	Vehicle to Infrastructure

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