



**SUPPLY CHAIN SAFETY
LEADERSHIP GROUP**

Highways Safety Hub Raising the Bar No.27 Preventing and Managing Incursions

Issued July 2013 Revised May 2025

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KEY MESSAGE

Intentional or unintentional incursions into road work zones or conflict with operatives operating and maintaining measures to prevent any incursion is wholly unacceptable and those designing, planning supervising the work shall plan to eliminate them, design systems that eliminate, minimise, or control the incursions, check systems and act if the system is not performing as designed.

- Traffic management operatives shall not be used as the primary means of preventing incursions, they are not security to act effectively as 'bouncers'.
- Traffic management vehicles shall not be used to barricade a site or operate as the gate, this only increases the risk to the operative from a determined intentional incursion or the road user who is impaired or confused.
- Design methodologies and other equipment shall be used prevent an incursion at its source and to remove operatives from the potential of harm. This document outlines considerations in this process.
- The majority of incursions are unintentional or opportunistic, and if a location is repeatedly experiencing an incursion, then a design review shall be undertaken as there will be a traffic engineering reason why the incursions are occurring.
- Conflict at a closure is not 'something that goes with the job' there is an engineering reason why, organisations shall review system performance, checking to identify the design or implementation flaw and act to prevent further nonconformity.
- All contractors and all sites shall provide uniform application of this standard, local or company preferences should not be used without valid risk assessment.
- The design of traffic management at an identical road location or closure location must be broadly similar on any network road with standardised signs and layouts used so that a user can understand the action required. Locally devised systems or signs may be unlawful or actually increase the potential of an incursion or harm occurring.

Objective

This Raising the Bar Guidance Document provides practical guidance on how to comply with the Supply Chain Safety Leadership Council Common Intent Document on Preventing and Managing Incursions as well as providing guidance to the Traffic Management Designer and Contractor as to the standardised approach required and method of compliance preferred by National Highways.

The overall objectives specific to Raising the Bar No.27 are to:

- Promote and ensure that a uniform approach is implemented to traffic management design at commonly used identical situations where the road user is required to commence a diversion, so as to prevent an incursion by improving road user comprehension
- Ensure robust measures are commonly implemented to deter incursions and that supporting technologies are correctly and efficiently applied to a common standard.
- Promote and guide organisations on how to reduce stress, conflict and harm to person involved in managing incursions so as to ensure all staff go home safe and well.
- Introduce the Plan Do Check and Act approach to the prevention of an incursion.
- Promote communication with customers.

Scope

This guidance applies to all Tier 1 and Temporary Traffic Management providers to National Highways (both Major Projects and Operations) who are responsible for the provision of traffic management operations covered by National Highways Sector Scheme 12 including those organisations who provide design and supervision activities.

This raising the bar document may be read in conjunction with the guidance document Standardised Approach to Preventing Temporary Traffic Management Incursions – March 2021 published and overseen by and created by a working group drawn from industry.



Figure 1 An airlock

Incursions

An incursion into a works area whether intentional or unintentional is wholly unacceptable. Contractors are expected to implement a series of measures to comprehensively eliminate, reduce or control unintentional or unauthorised entry into work zones by members of the public or emergency services. This process must start at the design stage for the traffic management systems.

Incursions are classified as:

- Intentional Incursion where the road user seeks to gain a benefit.
- Intentional Incursion where the road user is seeking information.
- Intentional Incursion where the road user is seeking refuge.
- Unintentional incursion where a road user follows a works vehicle into the works in error, also known as a follow in.
- Unintentional incursion where a road user enters the works area because of confusion.
- Unintentional Incursion where a road user enters the works area or traffic management because of a collision or to avoid a collision.

The working area and space created by the Temporary Traffic Management (TTM) installed for Contractor is a workplace under the *Construction Design and Management Regulations 2015*. We have a legal duty to segregate the public and others from the place under our control.

At a static building site, a hoarding and gates secure the site effectively however on a highway special devices and equipment are needed to install to measures following legislative requirements, this is TTM. TTM prevents and controls workforce access to a highway work site and segregates the site from the public. An incursion is an entry into this construction area, by vehicles (and occupants) and pedestrians (on foot), who are unauthorised to do so. This includes mistaken entry into a construction area.

The TTM we provide on a highway must be as robust and as informative at preventing an incursion as the hoardings and security we provide around a static building site.

This document was first published in 2013 and 9 years later vehicle incursions stubbornly remain as one of the highest risks to road workers. Each incursion represents a significant risk to the workforce and this document intends to further raise the bar to progress to elimination.

Focus of this version

Across industry, there is a continuing need and desire to address the issue of incursions and the Balfour Beatty led working group brought best practice, experience and innovation together to raise the bar even further with the aim of achieving this.

This document updates the original and gives guidance on how we can further raise the bar and ultimately meet the objective of the elimination of many intentional and unintentional incursions by establishing a standardised Safe System of Work (SSOW) to be uniformly adopted by all contractors that presents a uniform appearance to customers.

A key objective is that no road user is harmed when travelling alongside or around our work area and that they are provided with sufficient information at the appropriate time to clearly understand the action required of them and the route they should take to avoid, intentionally or unintentionally, an incursion into our work area, which puts them and the safety of our workforce at risk.

This document sets out the standardised design approach, the required minimum equipment and mandated technologies, in addition to providing best practice guidance and information for those persons designing, managing, supervising, or providing TTM measures at standard and relaxed work scenarios. For any organisation working for National Highways whether

a major, maintenance or utility project and a standard for any client to adopt to support elimination of Incursions on their project.

Preventing Incursions – Four step approach.

Step 1	Assess:	Identify the potential risk at the design stage by: <ul style="list-style-type: none"> • Potential type of incursions, • Potential persons / populations involved • Potential locations where they are likely to occur.
Step 2	Address:	Design TTM arrangements using this document to eliminate or reduce the likelihood of incursions at source i.e. the road user. Use additional mandated technologies to provide controls for residual risks present in the TTM design without requiring a person to be the deterrent or control.
Step 3	Implement:	Install TTM to the design, install the mandated technologies and implement the controls.
Step 4	Monitor:	Maintain the TTM, monitor effectiveness of the design and the controls by observing the way traffic responds. Ensure all technologies are functioning. Encourage all incursions to be reported and make sure all are investigated by competent highway safety engineers.

All risks must be:

- **Eliminated** wherever possible.
- **Reduced** to an acceptable level
- **Isolated** so that the risk cannot be realised.
- **Controls** implemented for residual risks that cannot be eliminated or reduced completely.

Delivering Prevention

Every aspect of the works site must be looked at by the Traffic Management Manger (TMM) and Traffic Management Designer (TMD) and a detailed site-specific design risk assessment must be prepared by a TTM Engineer (qualifications listed in RTB 39) meeting the requirements for training and assessment as defined in NHSS 12. The TTM Engineer responsible shall be identified in the quality documentation and where the Principal Contractors staff require changes to the design outputs, such as works access or egress they shall be agreed with the identified TTM designer.

The risk assessment should document each of the identified incursion types, relevant populations, locations of potential incursions and the measures have been put in place in the design to reduce the likelihood of a vehicle incursion and to reduce the consequences of an incursion should it occur.

The TTM drawings illustrate the design solutions being provided to manage the hazards, traffic, and all measures must be detailed on the drawings, for instance, the means of access to private frontages, where bridleways or footpaths intersect the carriageway and will generate non vehicle based traffic.

The design risk assessment must be robust in its nature, all aspects of the traffic movements must be assessed, considered and risk process ERIC followed with the outputs included in a design that creates a SSOW for the traffic management, a composite design that is illustrated by the TTM drawings. The Principal Contractor must allow sufficient time to allow design development activities.

The GG104 framework requires that the safety of all road populations is taken into consideration in safety risk assessments, in order to achieve the optimal safety outcome for everyone. Where the works are on non-motorways the needs of persons with a sensory impairment shall be included as well as those who are cyclists, particularly for road closures.

Road user comprehension

The devices provided at roadworks, traffic signs, have a primary role to provide information on the action required of the road user and should provide information as the route or situation without the need for there be additional devices such as CCTV/ANPR UNIT or non TSRGD signage.

It is essential that all devices are uniformly manufactured and are of the correct layout, text and size. Failure to manufacture signs to the working drawings or provide legends that are permitted by the Department for Transport not only reduces comprehension due to the visual image being different, it is unlawful. Clients and organisations must not provide bespoke (non-prescribed) signage without national authority approval.

All closure points should be monitored by observations during maintenance by TTM supervision and if a closure point has any of the following symptoms the supervisory staff should investigate the cause as there has been a potential failure in road user comprehension, i.e. a failure in the suitability of the engineering of the SSOW.

- Traffic passing several times around a roundabout or repassing a closure point several times.
- Traffic or users stopping at closure point to ask 'which way'.
- Traffic continually approaching an intermediate closure point down a link between the diversion route and the closed carriageway.
- Traffic entering a works access or egress in non-breakdown situations.
- Users regularly and constantly vocally or visually providing negative feedback to staff on site.
- Client receiving customer feedback through contact channels.

- Traffic queues negotiating the closure point
- Issues with sat nav.

Checking an established system forms the C part of the Plan Do Check Act (PDCA) quality cycle and all closure points should be checked to ensure that the design remains suitable by diverting traffic without conflict, not just for compliance with the design.

Road worker comprehension

Worker comprehension with a workplace is gained by familiarity with the information or arrangements at a given situation within that workplace. All good SSOW should gain compliance and action by those who use it by presenting standardised infographics in similar places in similar arrangements on each site.

To gain the benefits of compliance and comprehension by triggers in the environment it is imperative that one Contractor's environment corresponds as closely as possible with this standard and that it is promoted and matches that on another principal contractor's site. Contractors working on the same framework will often have the same subcontractors or staff so those contractors should standardise on site matters as much as reasonably practical. Contractors should not deviate from this document or introduce house standards without good reason as itinerant workers will need to learn each new environment every time.

Operation of roof mounted and rear mounted warning lights on contractors' vehicles.

The purpose of roof mounted vehicle beacons is to alert the traffic behind that a vehicle is about to make a manoeuvre that requires the vehicle following to adjust their driving. This is done by the works vehicle operating roof mounted amber warning lights at an appropriate distance in advance of an access and whilst they are leaving an egress. Operating the lights too early or too late or the driver leaving them on whilst travelling at normal

speed eliminates the benefit due to reduced confidence in their use. This leads to follow ins and potential of more serious rear end collisions with works traffic.

Works access and egress should be located where there is good visibility for the road user and should not be relocated without agreement of the TTM designer. Roof mounted lights should be operated within this visibility zone when the works vehicle is in lanes open to traffic and when moving at site speed through the works area.

Consideration should be given to switching off amber roof beacons, switching head lights to side lights when stationary and parked on site as mandated by RtB 02 Traffic Management Entry and Exit. If a vehicle has sufficient reflective markings the roof beacons on other moving vehicles will reflect in the markings of the stationary ones negating the need to leave the stationary vehicle lights on. The recent increased use of LED light sources has increased the output of light, this reduces the ability of the road user to identify coloured sign faces in the head lamps of their vehicle.

All works vehicle white lights shall be checked to ensure that they are creating a pool of working light, not a beam of distracting light to third party traffic. Traffic shall avoid parking next to traffic signs when possible as the increase in reflective markings on the rear of the vehicles using the same material as sign faces can also reduce the ability of traffic to identify signs providing information.

Large, clustered groups of strong white or amber light introduces the likelihood of road user confusion resulting in traffic slowing down and creating an unintentional incursion trigger that cannot be mitigated. Also there is the risk of a third-party driver having temporary blindness caused by strong light sources at night and thereby increasing the potential of an intentional or intentional error resulting in an incursion from missing signage or delineation.

Once the works vehicle has left the egress the workforce driver needs to be reminded to switch off the roof mounted lights within a short distance once they match normal traffic conditions. All vehicles should be fitted with a device to remind the driver that the beacons are illuminated to ensure they remember to switch them off. Vehicles running in live lanes with roof lights illuminated reduces confidence in roadworks and leads to incursions together with putting traffic management and recovery operators at risk during their operations.

Driving in and out of a works entrance or exit is not taught on a driving test and contractors shall ensure that staff have the competence.

Works vehicles must also be clearly marked on the rear and contracts should make sure all vehicles, including cars comply with the requirements of the Traffic Signs Regulations and General Direction 2016. The Highway maintenance sign of the rear is a prescribed sign to diagram 7404 and failure to follow the exact layout in the working drawing, such as not using Transport Heavy font is unlawful and a prosecutable offence. The working drawing can be found at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/884231/traffic-sign-drawing-schedule-13-part-06-item-12-p7404.pdf



Figure 2 P7404 Working drawing extract

Sizes stated in Chapter 8 are guidance and the letter height may be between 52.5mm and 210mm, the largest size possible should be used on each vehicle and may require additional plate to mount the sign.

Placement of Temporary Signs Within the Work Area

Where signs are provided solely for works traffic that is already within the works area they should be a significantly smaller size and should not be able to be confused with signs relevant to third party traffic by being placed at the same height. 600mm regulatory height, RA1 reflectivity grade and a mounting height of no more than 300mm above road level.

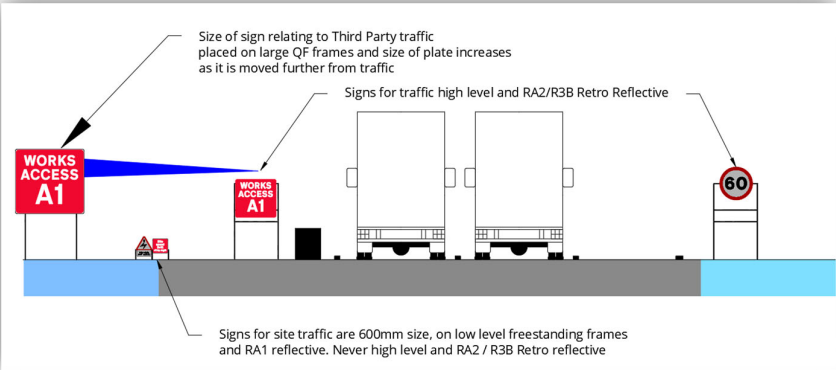


Figure 3 Sign comprehension and x height

When a sign, especially works access and road ahead closed signs are placed, they should be located as near as practical to the nearest lane to which they apply, as the lateral distance affects the capability of the driver to observe, read and react to signage. Signs are often moved in standard roadworks away from the lane towards the fence line or left on the central reserve to avoid works traffic, or access or egress movements. The further that the sign is moved laterally the less readable it becomes and the more likely to be missed and an incursion to occur.

Wherever possible signs that are relevant to work access, egress, refuges or exit locations should not be moved laterally away from the feature as this

leads to a disconnection with the feature and thereby increases the potential for confused motorists to make an unintentional incursion.

Where work access and egress points are altered from the agreed TTM design or the agreed location this should only be authorised by a suitably experienced / competent person, e.g. the TMD or TMM on standard works or TSS (exTSCO) on works subject to relaxations by undertaking a dynamic risk assessment and it shall be recorded.

Construction work should not take place near or adjacent to a works access (including advance signage extent) as per temporary TM design produced for each respective location / configuration.

Road Closure Points

General requirements

The TTM designer must under CDM regulations work with those planning the construction activity within the closure to manage the access and egress routes. Access routes should be planned by conscious decision of the site team/TTM Designer and not an onsite decision at the start of the shift. Design information should be clear on the SSOW and access / egress locations and measures.

Access via a closed entry slip road should be avoided and all works traffic shall be clearly advised and informed prior to arriving on site of the planned route usually through a main carriageway works access. Where works traffic ignores the routing detailed in the planned SSOW there should be robust measures for those direct and indirect employees who choose to ignore the SSOW or take short cuts.

Tampering with TTM measures by unauthorised staff significantly raises the probability of an unintentional or intentional incursion during the immediate period following the tampering and moving a device is a prosecutable offence in law that could result in a criminal conviction.

The movement of a traffic device or barrier by a person other than an appointed member of TTM staff should be considered of the same significance as an unauthorised person removing a handrail on a scaffold. Clearly, sending away an errant loaded delivery lorry on a time dependent task without unloading may not be practical solution but an essential part of preventing an incursion is to ensure the integrity of the TTM devices provided to prevent that incursion and the consequences for tampering by unauthorised staff need to be clearly set out by the contractor and rigorously enacted upon.

Conflict

Contractors have consistently requested gate persons to act as a deterrent, ‘bouncers’, at closure points and these gate people often end up being on the front line of conflict putting them at risk. Use of staff remote from the main works area, often in a lone working situation also places them at increased risk of customer contact and the design must select a SSOW that places the worker and the customer at the least risk of harm. Use of operatives should maintain and reinforce a closure but be not the primary front line deterrent.

The use of operatives sat in vans in effect acting as ‘bouncers’ shall be the last resort as a control measure. An operative wearing a bodycam will always be intimidating to a member of the public who may already be stressed and therefore technologies that allow remote monitoring, good information and barriers should always be the focus for preventing incursions.



Figure 4 Simple unmanned closure point

This can be achieved by good design of traffic management schemes, by ensuring that all schemes are only designed or overseen by a professionally registered engineer who meets the requirements of NHSS 12 and is registered as a TTM Engineer, including having successfully achieved the Temporary Traffic Management Engineering Course Professional Diploma and is entitled to use the post nominals of RegTTME.

If a member of the public needs to approach a member of the workforce to ask for information on the traffic route, then the traffic management design has failed the fundamental requirements of Chapter 8 and needs to be reviewed urgently as there has been a failure of comprehension.

Contracts shall ensure that there are suitable controls established to manage change of TTM layouts and that at all stages of the design, installation, maintenance and operation of roadworks the minimum level of intelligent warning systems, supporting technologies and measures are used to control residual risks remaining from the agreed design.

Conflict Prevention

Traffic management systems shall be designed to minimise the number of potential points of conflict and maximise the number of users who will never approach a point of conflict. We are required by law to take all reasonably practical steps to reduce the risk by using mechanical or technological means before placing a human to do the task.

The primary means of eliminating incursions is the position, legend, size, colour, layout and size of the traffic management signage and its visibility together with a clear arrangement of cones and lamps to delineate a route and remove gaps that allow entry. The designs given in the annex to this document shall be a minimum standard and shall not be deviated from without a design risk assessment by a TTM designer.

TSCO's shall understand the requirements and verify on each and every use the compliance with this standard or the agreed design.

The use of an incursion warning system at manned and unmanned closure points that monitors the position and movement of TTM equipment should be provided as the first level of mitigation against incursions. Intelligent warning systems have been proven to significantly reduce the risk to TTM staff, workforce and road users helping to avoid conflict by removing the operative from closure points and providing warning to site workers. They have also been found to reduce cost as one TTM crew can monitor multiple closure locations. Digital incursion systems that remove operatives from the point of conflict shall always be the first measure employed.

The parking of a works vehicle with roof warning lights can act as a reinforcement of the closure message however it shall not be a barrier or be placed as such in a position where should a vehicle intentionally and aggressively enter a closure it would be collided with. The operatives in the vehicle shall have time to assess the situation and move to a place of safety having activated the incursion warning system alarm for others. The vehicle should not be parked in the minimum length longitudinal safety zone from any closure point based on the 85% percentile speed of traffic at the closure point.

When placing airlock barriers across any closure point, they should be visible to the road user and shall present a clear linked fence line all the way across the carriageway, hard shoulder and verges between a solid object such as a lamp column or safety fence or other obstruction such that there is visibly no opportunity of a vehicle bypassing the line of barrier. This shall include footways where a staggered arrangement that allows pedestrians to access can be provided.



Figure 5 Sign to Diagram 878



Figure 6 Small standard sign for vehicles or other equipment fitted with CCTV

The barrier system must always be delineated by TSRGD compliant cones and signs in front of the barrier system.

Signage provided to implement the road closure such as 'Road closed' or 'Diversion' should be provided beside the delineator cones. Signage that reinforces the closure such as 'Traffic enforcement cameras' or 'respect our workplace' should not be provided at the delineation but placed in line with the barriers behind the cones. If you place too many signs with too many words at the closure point then the road user will not be able to read the key information.

The legend, of the signs at the barrier shall be of sufficient size to be visually recognised by traffic for their purpose and information before they decide to stop. The easily recognisable and understood at a distance sign P878 'traffic enforcement cameras' shall be used instead of any black on yellow 'CCTV in operation' sign. Sizes are given in the annex to this document.

Closure points shall also include information for non-motorised users and consideration shall be given to providing an interactive information board with a location specific message for pedestrians and cyclists. Dual carriageways and single carriageways that are closed in an urban area at any time or rural area during daytime shall always provide this interactive information.

Technologies such as CCTV/ANPR UNIT linked to an incursion warning system should be used to re-enforce the static signs of closures with the

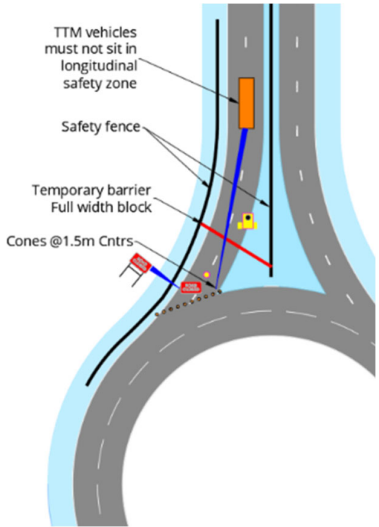


Figure 7 Example of parking safely by visibly

universally understood sign in Figure 5 provided to provide a deterrent by informing and warning potential intentional incursions. The sign in Figure 6 should be attached to all plant and vehicles where CCTV recording is fitted.

An airlock system and supporting means of escorting pedestrians or traffic safely and securely in a controlled operation should always be provided where works or public premises access is required through or past a works area or closed highway leading to a works area.

Signs of poor design or wording that are too small to too extensive to be comprehended encourages users to stop or to intentionally enter a closure to read them. Policies have implemented signs advising of the policy or respect required and the limitation of word heavy unprescribed signs should be realised.

Large pictorial images or signs with sufficient x height to be read at the correct distance and containing less than 12 units of information at each location of signage are recommended as more cannot be easily read by road users and will lead to increased potential of incursions. Designers should consider the total adjacent information at each closure location not just each individual sign face.

Capturing data for enforcement or investigation

There will always be an element of society that believe themselves to be above or beyond the reach of law. Where we place TTM personnel in locations that are likely to bring them in to contact with those who are determined to access our site it is imperative that we deploy additional technologies and associated signs to act as a deterrent and capture unacceptable actions so that formal enforcement action is possible. This is



Figure 8 Typical CCTV unit used at Airlocks

usually captured using CCTV/ANPR UNIT images.

The use of CCTV/ANPR UNIT will require registration with the Information Commissioners Office (ICO) and compliance with the General Data Protection Regulation (GDPR) and the Diagram 878 sign, Traffic enforcement Cameras, at all closure points.

If a person fails to comply with a regulatory sign or other device or an unauthorised person moves a lawfully placed sign, cone or barrier that is of the size type / colour required by the Traffic Signs Regulations and Directions 2016 so as to be legally placed, they can be prosecuted, as it is an offence under the Road Traffic Act 1988 Section 36.

To be prosecuted in this circumstance the sign needs to have been lawfully placed, therefore it is imperative that elements of this standard and that layouts and sign faces are as prescribed in this standard in the annex to this document and the traffic signs working drawings and they should never be locally altered, branded or ad hoc manufactured. The TM Company and or TSCO shall ensure all signs are placed and visible and manufactured or procured this standard.

Personal Safety

When customers approach staff at closure points, they may often be stressed, confused or nervous, it is imperative that the staff on these airlocks present the best image for the contract, the client and Contractor. Personal presentation, personal hygiene and language all contribute to successfully diffusing confrontation and projecting the industry as a considerate constructor. Contracts should develop engagement training that results in a safe breakaway situation if the engagement turns negative.

Staff should always wear clean compliant PPE with the company / contract name clearly located on both sides of the PPE.

TTM operatives often wear a different type of hard hat to the normal site worker. This specialist helmet is designed to prevent harm to the head in a personal fall from height as well as an object falling on their head. This more advanced helmet has been proven by incident to protect the TM operative's head without any harm when a normal site helmet would have not in falls from height and windy conditions dealing with TTM equipment. A four point cradle strap is normal provision with this type of hard hat.



Figure 9 TTM operative in minimum PPE

All operatives, site engineers and managers should as part of compliance with this document receive conflict management training in breakaway techniques for dealing with customers.

A body worn camera should be the exception not the rule for PPE as it only controls residual risks. The use of body worn camera's by personnel key to a temporary traffic management operation should be subject to risk assessment specific for each location of use, incorporating the timing of use, i.e., review of the 24 hour clock, and days/nights of the week.

Vehicle / Operative Safety

When operating an airlock operatives are on foot in and around manoeuvring site vehicles, many have blind spots and It is essential that organisations manage the risk to those operatives from this hazard. Operatives may also be working with a colleague(s) to open and close gates and it is imperative that a safe system of work is established that restricts the movement of traffic to only occurring when both operatives are in a place of safety.

The safe system of work shall ensure that one operative cannot cause a vehicle to move when another operative is at risk of being crushed by a

moving vehicle or item of plant. Coning off an area to designate a safe location is one such method of starting to create a safe system of work.

Where sites have regular and frequent movements consideration should be given to providing remotely operated barriers that can be operated from a safe location and require the operative to be in that safe location to operate the barriers. Both barriers of an airlock should never be open at the same time as this defeats the object of providing an airlock and operatives should also be provided with headtorches with front and rear lights to mark their location. Task lighting should be checked to ensure that the mirrors and cameras fitted to vehicles are not obscured.

When establishing an airlock on an open carriageway operatives shall never be required to stand between a vehicle and live traffic behind them e.g. where lanes 1 and 2 are shut and traffic is in lane 3. The briefing of a driver must be done from the nearside of the vehicle not on the offside, even if a lateral safety zone is provided.

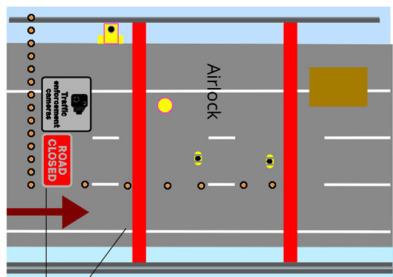


Figure 10 Airlock with coned safe zone

Gate person / Airlock Operator Training and Assessment Requirements

All persons who are installing maintaining, supervising, or removing an airlock should hold NHSS 12 Airlock Operative (Gate person) and organisations providing those measures shall be registered NHSS 12 suppliers.

Communication between Staff and Contractors

Contracts shall ensure all persons working on site are trained/briefed on the works access and egress procedures before they access the traffic management. They shall in addition be informed of the severe consequences should they tamper with TTM equipment.

Contractors shall effectively control vehicle operators who are not involved in TTM operations and should ensure that they only enter a works access when the TTM crew or TSCO advise that the system has been installed and it is safe to do so. An entry at any other time is an intentional incursion by a worker seeking benefit.

Managers and supervisors shall monitor works crews and ensure that devices placed to provide incursion warning for operatives are charged, fully operation and are positioned where they will be immediately visible and audible to staff, including those sat within machines. The incursion system shall never be left inside works or welfare vans.



Figure 11 Example of portable incursion alarm commonly placed on site adjacent to workers.

It is recommended that on all sites the following bullet points are cascaded appropriately in site inductions, site rules and tool box talks to all levels of staff, direct and in directly employed with all persons confirm understanding.

- Purpose of TTM equipment
- What is an incursion
- TTM contractor’s role
- TSS and TMM role and responsibilities
- SSOW for access and egress from the measures
 - And that ‘new to highways’ staff demonstrate competence.
- SSOW for Parking on / off site and locations to wait
 - Safe parking location awaiting TTM.

- SSOW for operation of roof mounted beacons
- How to request change to TTM and how to contact TTM maintenance
- How to deal with incursions
- How to deal with face to face contact
- How to operate the workforce element of an incursion warning system
- SSOW for small groups e.g. surveyors within a closed of area.
- Works vehicle requirements
- Airlock access process and protocol
- Relevant safety signs and specific to company signage
- How to manage and report follow ins.
- Recognition of customer elements

That moving or removing any item of TTM equipment, a traffic sign, including all signs, cones or barriers, by persons other than authorised personnel is potentially a criminal offence and akin to having the same implications as a person tampering with a scaffold when you are not an scaffolder.

Communication between works and highway users (Customers)

It is essential that contractors work with the project client to communicate disruptive traffic management arrangements to customers of the highway authority. There is a statutory duty and must assist in managing disruption and therefore changes in risk on the highway.

Contractors who unduly delay traffic create an unsafe situation on the highway and significantly increase the risk on an intentional incursion.

The first priority of roadside information is to ensure that roadside messages are impactful and relevant and updated. All roadside signs have specific design rules in law and whilst many different legends can be created there are limitations on the length and detail that can be placed. In providing roadside signs, use of website addresses is strongly discouraged and twitter, facebook or other social media tags are not permitted by the Department

for Transport to be included on any roadside fixed plate signs. Detailed guidance can be found in the Traffic Signs Manual Chapter 7 and 8.

Dates or time must only be in the format of 12-hour clock, e.g., 9.30 am – 3.30 pm 24 June etc. The annex to this document provides samples and standard arrangements to be implemented following the requirements of the Traffic Signs Regulations and General Direction 2016. 24-hour clock may only be used on VMS signs and dates must never be expressed 24/06/20 on any vertical sign.

VMS signs should avoid being used to provide generalised day to day information as this reduces their ability to significantly influence driver behaviour at the time that it is most required by the site, such as to avoid a road closure or an incident. Designers should also realise limitations of fixed plate signs that are remote from the works to effect a change in users approaching a closure, as these generally these are not considered accurate by users.

Checks need to be made to ensure that signs and devices are removed when no longer relevant or not in regular use to reduce confusion in addition to also allowing relevant information to stand out when needed. In law a sign displayed at the roadside must be accurate and relevant which if proved to be redundant or no longer relevant could be considered a hazard.

Sites will have a difficult decision to make in creating a balance between communications locally with knowledgeable locals whilst also communicating with road users from further afield who probably will not know place names or junction names for instance. Engagement with the client's communications teams should also be sought for advice.

A diversion route should be checked by the TTM crew immediately before each and every use and a further check made by the TSCO sufficiently in advance of a closure that the TTM crew can rectify defects and discrepancies before the road is closed. Roads shall not be closed until the diversion route is established and confirmed as suitable and sufficient.

Interchanges

Closing the carriageway at grade separated or at grade interchange

Traffic Signs Manual Chapter 8 sets out a clear minimum standard for signs and cones when closing the main carriageway. Ensuring the signs and cones effectively ‘fence in’ the closed area is the first stage of preventing incursions. The annex to this document lists the requirements for main carriageways and other contains sample layouts that should be the minimum signing standard to prevent an incursion.

It is recommended that any work access for a closed dual carriageway shall be located at least 400m up stream of the facing wall in lane 1 pushing traffic off the main carriageway. This moves a potential opening away from the actual movement to exit and allows for potential error in sat nav directions or user misinterpretation of those directions.

Closed Entry Slip Roads – No works or public access

Entry slips roads are one of the locations at significant risk of an incursions.

The principal method of preventing an incursion is to provide clear and relevant warning of the closure in the TTM Design with a well signed diversion route.

Where an entry slip road is to be closed and not used as a works access a solid line of cones at no more than 1.5m centres should be detailed across the entire width of the mouth of the slip and where wide verges exist barriers shall be continued to prevent drive arounds. Cones shall be lamped at 9m centres.

A robust conspicuous barrier should be sited behind the traffic lane cones, with red warning lamps provided on each length of barrier so that the barrier completely blocks the carriageway and any verges.

The use of additional technology such as movement sensors built into certain TM equipment and visual monitoring systems should be used to provide additional warning to TTM personnel of tampering and the equipment warn the workforce within the closure.

The signage in the annex to this document should be the minimum signing standard to prevent an incursion at an Entry Slip road.

Closed Entry Slip Roads – Works and/or Public access required.

Entry slips roads with a works access are one of the highest location at significant risk of an incursion plus a collision between works traffic and vehicular traffic as they enter or a collision with a TTM operative and traffic as they have to rapidly move and replace cones to allow works traffic to enter but avoid a third party follow in.

Entry slip roads should not be used as a works access, the works access should be via the main carriageway lane closure as this is the route with the least risks to manage.

Where traffic movements from quarries, compounds or holding areas require unavoidable access through an entry slip road then this shall be identified at the design stage and a SSOW implemented for the entry slip. The works access signage should only be displayed once the airlock has been fully installed.

The principal method of preventing an incursion is to provide clear and relevant warning of the closure in the TTM Design with a well signed diversion route.

Where a slip has to be used as access, a lane closure should be installed as this may allow the access to be in the lane closure away from the slip road mouth such that the risks outlined above are eliminated. This also allows unauthorised vehicles to be turned back from the airlock and to safely re-join the roundabout area.

An airlock system should be used at all slip road works access locations. The barriers provided shall be at least one articulated lorry apart or two rigid delivery lorries depending on the type of works. The barriers should extend the full width between obstructions to prevent drive arounds.

Operatives shall be supported by use of additional technology such as Portable CCTV/ANPR UNIT with linked to an incursion warning system and/or movement sensors built into TTM equipment plus overtly placed active monitoring systems should be used to provide additional warning to the operative of tampering. This is so that the operatives can remain a safe distance from the closure point and they or the equipment have time to warn the workforce within the closure.

The signage in this document should be the minimum signing standard to prevent an incursion at an Entry Slip road.

Exit Slip Roads – No Works Access

An Exit slip road that is closed but presents users with no obvious reason for its closure will always attract opportunistic incursions because of the often lengthy diversion that would delay the user reaching their destination, either to deliver goods on time or to reach home at the end of their day.

Where a slip road has to be closed so as to facilitate works that are out of the view at the exit, the exit should have a full width row of airlock barrier with red warning lights on each barrier for the full width of the exit slip between obstructions and any verge, hatched, paved surfaces and flat grass areas that could potentially attract drive arounds must also be close coned.

The signage in this document should be the minimum signing standard to prevent an incursion at an Exit Slip road.

Exit Slip Roads – Works Access

Exit slips roads with a works access are another location at significant risk of an incursion. Where an exit slip road is used as a works access it should not be directly closed without closure of the nearside lane and hard shoulder on the main carriageway. This allows the works access to be located upstream from the closure and an acceleration route for unauthorised vehicles to be provided that returns them to the main carriageway through a works exit.

The principle method of preventing an incursion is to provide clear and relevant warning of the closure on the main carriageway in advance in the TTM Design with a well signed diversion route to the next junction and return.

The works access shall be located at least 300m prior to the start of the exit slip road Diagram 1010 marking and the lane closure coning be coned at a maximum spacing of 9m centres between the works access and the start of the closure coning.

An airlock system should be used at all exit slip road works access locations. The barriers provided shall be at least one articulated lorry apart or two rigid delivery lorries depending on the type of works. Barrier must be full width to prevent drive arounds.

Operatives shall be supported by use of additional technology such as Portable CCTV/ANPR UNIT linked to an incursion warning system and/or movement sensors built into TTM equipment plus overtly placed active monitoring systems should be used to provide additional warning to the operative of tampering. This is so that the operatives can remain a safe distance from the closure point and they or the equipment have time to warn the workforce within the closure.

The signage in this document should be the minimum signing standard to prevent an incursion at an Exit Slip road.

Minor Side Road access and premises

All-purpose dual and single carriageways frequently require lengthy sections of carriageway to be closed so as to direct traffic onto diversion routes. This creates significant numbers of minor side road and premises access locations that are required to be closed or closed and managed during roadworks.

Closing side roads with operatives to reinforce the closure at the point of closure should be discouraged. It is recommended that incursion warning systems should be provided with maintenance crew/s monitoring multiple locations within the general vicinity.

To prevent incursions, the fundamental principle is to provide adequate information of the alternative for the user at the point that the decision is required so as to avoid the user having to seek further information at the closure point. The annex to this document provides additional information and layouts.

Airlock operation

The primary purpose of providing the secondary security of an airlock is to provide a gated means of controlling who is accessing the site in addition to creating a visual measure to prevent intentional incursions before the risk is realised. The double gate system allows TTM personnel to bring a vehicle to a stop and then direct the driver appropriately without the driver ignoring the signage or making a sudden movement that then places the operatives at risk of being harmed by the vehicle.

For an airlock to be effective it is imperative that sufficient Airlock Barrier should be installed to provide a physical obstruction fully covering both the carriageway and verges at each side and a SSOW established to manage the passage of authorised traffic past the TTM staff on foot.

By providing a gated access it prevents road users from gaining unauthorised access to the closed carriageway and allowed the TTM staff to control a situation if a road user manages to enter the traffic management

as they should be able to re-join the live carriageway in a safe and controlled manner.

It is less likely to get intentional incursions from the main carriageway as traffic is gradually being directed down the slip road and to minimise incursions the works access on the main carriageway should be located as far away from the point of closure as is possible. The additional risks to the traffic management operatives in extending lane closures should be considered and weighted against the benefits of increasing the distance of the works access to the point of closure. It is strongly recommended that the works access is sited prior to the 'Road ahead closed' sign. The length of the airlock should be of sufficient length to accommodate the maximum individual length of vehicle expected to require access to the works.

Where considered practical an automatic barrier can be used to form part of the continuous airlock barrier to remove operatives from working adjacent to moving plant and from the conflict location. The barrier system must display a flat 300mm P7105 sign in RA2 retroreflective material to mark(s) the ... 'road closed to traffic' over the full length of the arm on the first traffic facing row of continuous air lock barrier. It may also be lit to a similar standard as the current manual barriers. There should also be no gaps around the automatic barrier, and it shall always be behind a row of delineator cones. An emergency contact number for the TM crew shall be displayed adjacent to the barrier for use in the event of failure but this number shall be small enough only to be visible to a person waiting immediately at the barrier.



Figure 12 A typical intercom information sign used to avoid direct contact and interaction

Airlock Operator Training and Assessment

All persons installing, maintaining, operating and removing airlock systems shall be persons holding NHSS 12 registration in the appropriate unit, Airlock Operative (Gate person). Specific NHSS training and assessment requirements for airlock operators are due to be available in early 2022 and organisations are expected to become compliant at the earliest opportunity but no later than by December 2022.

Works Access Points

Location of the works access or works exit requires careful consideration by the TM designer and site team/TM Manager to mitigate follow-in incursions. It should not be decided on site.

All works access and exit locations in lane closures shall be located wherever possible away from slip roads and slip road countdown signage.

The works access, especially within temporary vehicle restraint systems, should be the shortest length possible to accommodate normal works traffic that are required to enter, this is to minimise incursions caused by traffic believing the

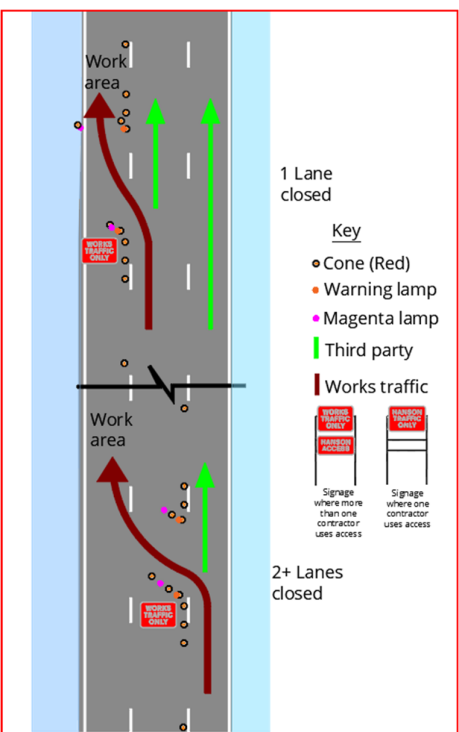


Figure 13 Works access arrangements

roadworks to have finished and enter a gap because of believing the lane is open.

Large, heavy and or long vehicles will negotiate a works access at a much-reduced speed and assistance may need to be sought to create a short sterile gap in traffic to allow such vehicles to negotiate a standard works access or egress.

Sat Nav systems can have an error in positioning of around 300m and a gap in the longitudinal run of delineation should not be provided for at least this distance in advance of an exit slip road or another location where in the permanent junction layout prior to the implementation of the temporary layout the road user would have been receiving a direct instruction to 'exit' or 'leave' or move to a dedicated lane on the carriageway. Placing a gap in delineation at this type of location significantly increases the risk of follow ins or unintentional incursions.

During the design phase the TTM designer should assess how the temporary layout conflicts with permanent signage to accord with Chapter 8 by managing all conflicting traffic signs including overhead signage.

Works Egress Points

Works exits are designed for the normal expected works traffic minimising the gap in the physical vertical delineation. Where a larger vehicle would occasionally need to negotiate the gap at a slower speed then alternative arrangements shall be made to eliminate traffic so as to allow it to make the exit manoeuvre safely rather than designing wider gap that is more prone to incursions.

All works exit arrangements shall be preceded by a sign to Diagram P7307 to indicate works traffic is merging and should have good visibility for the traffic exiting the site.

Long lengths of unoccupied coned off lanes

Where the works generate large areas of coned off carriageway incursions rise and so do site traffic speeds. A traffic chicane of cones may be provided on 3 or 4 lane carriageways at 500 or 1000m intervals to remind road users, particularly those who are fatigued or seeking an exit which lane(s) are open for traffic. When an airlock is within a closed carriageway with a preceding approach likely to generate higher site traffic approach speeds or allow an intentional determined incursion to achieve high speeds a traffic chicane of cones should be provided 50 – 100m in advance of the airlock to reduce or highlight the approach speed of traffic protecting the airlock operators.

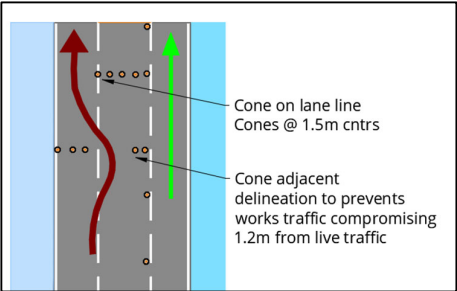


Figure 14 Traffic chicane for reducing traffic speeds and reaffirming which lanes are shut

Longitudinal coning

When planning lane closures subject to relaxation where it is considered that there are areas of increased risk of traffic entering the closure, the cone spacing shall be locally decreased from 18m centres to 9m centres and may also require warning lamps where:

- Isolated operatives working on foot in long lane closures
- Large numbers of operatives working in a laterally congested area

Work requires operatives to walk through a dark in an otherwise deserted coned off area to undertake a task shall be accompanied by a marked vehicle to highlight their presence approximately 50m behind them to minimise the risk of an intentional incursion entering an area that is notionally empty. The

operation should be in possession of an incursion warning system when deployed on the closure.

Consideration shall be given to providing a traffic chicane of cones in advance of a works area when there has been a long section of coned off area with no work preceding the work area. This should be a minimum of 100m from the work area.

A common TTM practice is to walk cones off to a verge and this often leads to two or more rows of cones being visible at night with only one row in use and this can increase the potential of confusion to a tired or nervous user especially at junctions and interchanges. Consideration should be given to removing equipment on site that has been previously used but no future use is yet programmed. This also reduces the potential of TTM debris causing an incident. The potential of confusion by a tired or nervous driver shall be considered and managed by a TSCO when inspecting the system of measures.

Refuges & dealing with road user breakdowns – Standard works

The risk to road users breaking down in a live traffic lane should be considered at the design stage. With vehicle barriers being more extensively used to segregate traffic from work areas the need to assess the risks to road users and provide a means of rapidly and accurately identifying breakdowns and incidents is much more of an imperative. Users will become an incursion when an access or exit is available in the cones or at gaps in barrier and they enter it.

Where specific locations for breakdowns are provided or locations where emergency

Figure 15 Trial images of customer points



telephones can be safely accessed but are out of use, consideration should be given to providing replacement technologies to contact assistance such as interactive information signs.

At any works access or egress or whenever emergency telephones are not available but there is refuge on the verge side, means should be provided to enable users to make contact directly with the TSCO and Contractors responders to prevent members of the public continuing to walk into a live construction site at the end of the deceleration area of the location. Symbolic signage should be used as Figure 16.



Figure 16 Post trial sign face

Meeting requirements for access through a works area

S.14 of The Road Traffic Regulation Act 1984 provides for the National Highways to prevent public access by implementation of a Notice or Order to an area or whole streets for the purposes of repairing or improving the carriageway, however the ability to prevent an incursion in law is only able to be effected when the correct design of signs or barriers are displayed. Therefore, it is fundamental to the ability to enforce this prevention that the TTM is designed and specified correctly to provide a robust SSOW and that all signs present a uniform approach by placement and design.

Public Access to premises

Vehicular access though a work area or a closed carriageway, to a drive or access adjacent to a work area is able to be suspended but access on foot to premises is not able to be prevented, unless there is an alternative route to the premises that is not through the site. There will be occasions where the design will need to include the management of the legal right to access premises.

This access normally consists of a series of control measures to guide, users in a controlled manner to and from their premises.

Emergency vehicles route – Road closed to all traffic

Emergency vehicles including Traffic Officers can be excluded from a works area during a complete closure of a route using a Temporary Traffic Regulation Order (TTRO), though the accepted convention is that this only done when it is not physically possible to for them to pass through the site because it is obstructed or unsuitable for their vehicles.

The re-routing of emergency vehicles is provided for in the TTRO application process however the re-routing increases response times. As there are adequate technologies are available to warn staff that an emergency vehicle is passing though, passage through a closed route should, wherever practicable, be accommodated using these controls when the route is unobstructed to assist responders.

Emergency vehicles route – Standard works

When an incident occurs within a lane open to normal traffic queues and delays rapidly build up in the area open to live traffic. Significant constraints are created by the provision of temporary vehicle restraint system at standards works and a balance needs to be struck between providing access points and protecting the passing traffic from the works. Too many openings increase incursions, too few restrict access to the works and to incidents.

The contract emergency plan should include the ability to suspend works, moving plant, equipment, plant / traffic interface gates and workers to a place of safety, to allow emergency responders to access the incident location through the works area at their speed. Signage should be



Figure 17 Sample emergency route sign

Where specific requirement exists to provide static signs for the information and routing of the emergency services to or through a site, signs should be provided that are identifiable to emergency responders and a communications plan implemented.

Where the TTM provided is in the form of a relaxation lane closure with traffic passing adjacent to the works area the probability of an emergency vehicle passing through works area is substantially reduced so long as traffic is moving at the design speed in the open lanes.

There remains the risk that responders may be forced to travel through site if the traffic lane becomes blocked. Site supervision should be aware of passing traffic and should stationary traffic occur due to an incident or congestion, consider suspending works because of the increased risk of intentional incursions from frustrated users, not just emergency responders seeking to bypass a blocked traffic lane.



When a road other than a motorway is closed then information at the closure point should be provided for non-motorised users.

Wider carriageways and overhead signage

Carriageways of 4 or more lanes normally are provided with overhead signage on the approach to a junction which advises traffic to move to a specific lane to reach a named destination.

To achieve a safer taper location the lane closure often commences significantly in advance of a work area leading to large areas of lanes coned off with no work being undertaken.

When lane closures are installed through overhead signage customers seeking to exit at the destination within the lane closure are unsure of how to reach the exit or panic and enter the lane closure because they incorrectly believe they are on the wrong side of the cones leading to an incursion.

An incursion can be minimised by providing signs to Diagram 7245 and clearly indicating the exit point with a sign to diagram 7245 (7241) replacing the diagram 610s in the nosing of the split of traffic.



Figure 19 P7245 'nosing sign' Always site specific

Exit slip roads and services

When a carriageway is to be totally closed the TTM designer should assess all routes that traffic may intentionally access a closed route including those routes that are illegal and considered highly dangerous such as the entry route to services of the exit slip from a junction. These routes require a driver to intentionally drive 'against the legally permitted flow of traffic' i.e. commit an illegal act. Assuming that traffic will obey permanent no entry signs or use common sense has been proven to be mistaken belief.

When closing an area of carriageway all exit points that are not being used for traffic to exit the carriageway should be provided with suitable placed signs clearly indicating that the road is closed and be supplemented by airlock barrier across the full width of the closed carriageway. The annex to this document contains ample layouts and signage.

These signing measures should always be supplemented by incursion warning systems linked to the traffic management crews and be able to provide audible visual alerts to works operations in the event that the equipment is monitored. Where a route is used as temporary access this should be provided with an airlock visible from the closure point.

When a carriageway is closed past a service area the primary defence in preventing an incursion is communication, both before the closure is implemented and during the closure. Whilst advanced publicity and consultation with the service area operator should always be undertaken, the limitations of this should be realised for trucks who park up. Whilst some goods vehicles may be on a regular route and park up each week at the same place and time, most will choose to park up for a statutory rest break without coming into contact with any roadside signage or publicity. Many will park up planning to leave after their statutory daily rest break of 11 or a minimum of 9 hours which means they enter when the exit is unaffected and wake up when ability to continue their journey is affected.



Figure 20 Entry slip from a motorway where permanent signs are frequently ignored by traffic in a total closure despite clear indication.

Many goods vehicle loads are on a timed delivery, routed very accurately, monitored by a control room that require the driver to start / stop arrive at specific times with minimum daily rest breaks allowed with no allowance for being enclosed in services. Any closure of the planned route should have been identified up front but practically often is not. Commercial pressures in the haulage industry, both organisational and personal often force drivers to attempt to leave services at the appointed time and become an incursion during a closure because of these pressures and therefore digital incursion warning systems should always be provided to identify this situation, together with providing information on the closure accessible in a range of common languages.

It should be considered a mandatory requirement of this standard to provide a sign on the closed exit from any services over and above the statutory minimum road closed signage, that allows the customer seeking to leave to access sources of information on how and should include.

- Details of the alternative route to leave in a format they can take with them, usually digital accessed by QR code or similar.
- Or
- If no route is available, access to accurate information on when the exit will reopen accessed by QR code that converts to the phones set language.
- And
- Further means to digitally contact the traffic management for further support.

As a minimum most European HGV drivers on international work will understand common terms in English, French and German. A sample of an information point sign is below.



Figure 21 Interactive services exit sign.

Glossary of Terms

ALARP – As Low As Reasonably Practical

CDM REGULATIONS – The Construction Design and Management Regulations currently in force.

Chapter 8 – Traffic Signs Manual Chapter 8 and constituent volumes.

CPD – Continuing Professional Development

DMRB – Design Manual for Roads Bridges

GALE – Generally At least Equivalent

Highway Authority – Organisation with responsibility for management of the highway.

IHE- Institute of Highway Engineers

LANTRA – Training Scheme Awarding Body for NHSS

NHSS – The requirements of the current edition of the National Highways Sector Scheme(s)

Principal Contractor– As defined by the CDM Regulations currently in force.

PUWER – Provision and Use of Work Equipment Regulations currently in force.

RSA – Road Safety Audit

Relaxation – TTM works on all roads that are subject to suitable traffic flows, weather and visibility.

RegTTME – Registered Temporary Traffic Management Engineer with the Institute of Highways Engineers published on their register of practitioners.

RAMS – Risk Assessment and Method Statements

SLG – Signing Lighting and Guarding

SSOW – Safety System of Work

TSCO – Traffic Safety and Control Officer – previous name of TSS replaced in September 2021

Traffic Safety and Control – The system of work that maintains safety of the road user, road worker and others.

TMD – Traffic Management Designer

TMF – Traffic Management Foreperson

TMM – Traffic Management Manager

TSRGD – Traffic Signs Regulations and General Directions currently in force.

TSM – Traffic Signs Manual

TSS – Traffic Safety Supervisor

TTM – Temporary Traffic Management

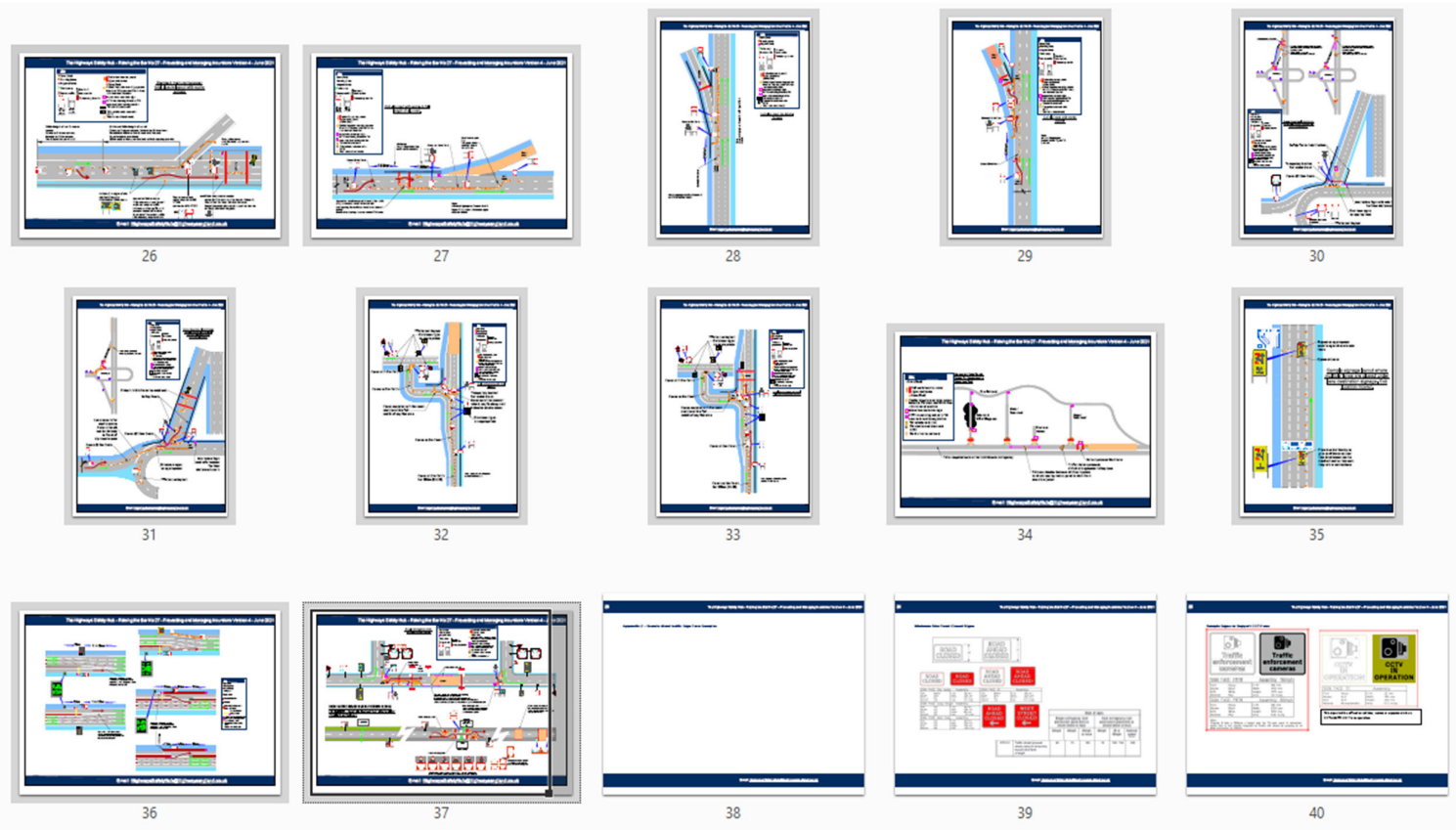
TTME - Temporary Traffic Management Engineering

TVRS – Temporary Vehicle Restraint System (Temporary safety barrier)

VRS – Vehicle Restraint System (Safety fence or barrier usually known as temporary barriers.

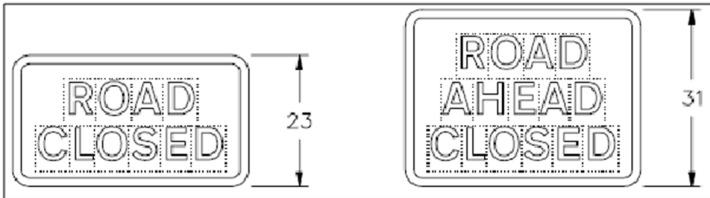
Appendix 1 – Sample Traffic Management Plans

Placed on the Highways Safety Hub are a series of standardised design layouts, these form this appendix and part of the document and shall be used by designers to support standardised design solutions that prevent incursions



Appendix 2 – Standardised traffic Sign Face Samples

Minimum Size Road Closed Signs



SIGN FACE: Slip roads Assembly:			SIGN FACE: S1 Assembly:		
Font	Medium	X Ht:	Medium	X Ht:	
Border:	White	Width:	White	Width:	
B/G:	Red	Height:	Red	Height:	
Material:	RA2	Area:	RA2	Area:	
SIGN FACE: Cway Single Assembly:			SIGN FACE: Main Cway Assembly:		
Font	N/A	X Ht:	N/A	X Ht:	
Border:	N/A	Width:	N/A	Width:	
B/G:	N/A	Height:	N/A	Height:	
Material:	RA2	Area:	RA2	Area:	



Sizes of signs					
Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit
60	75	100	75	100 / 150	200

P7010.1	Traffic should proceed slowly owing to temporary hazard described x-height
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Sample Signs to Support CCTV use



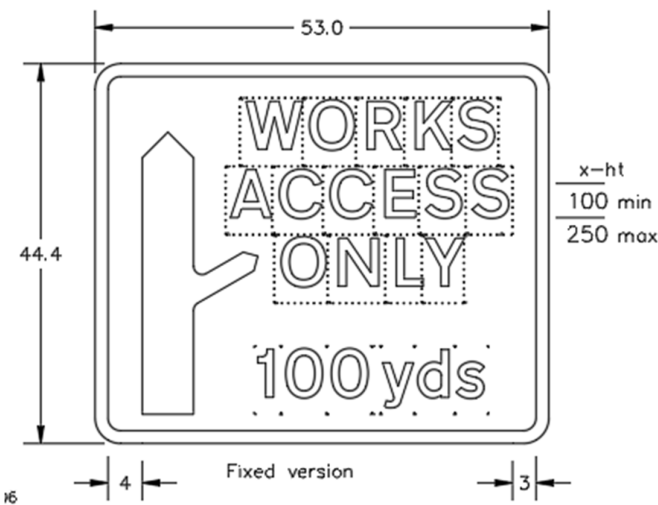
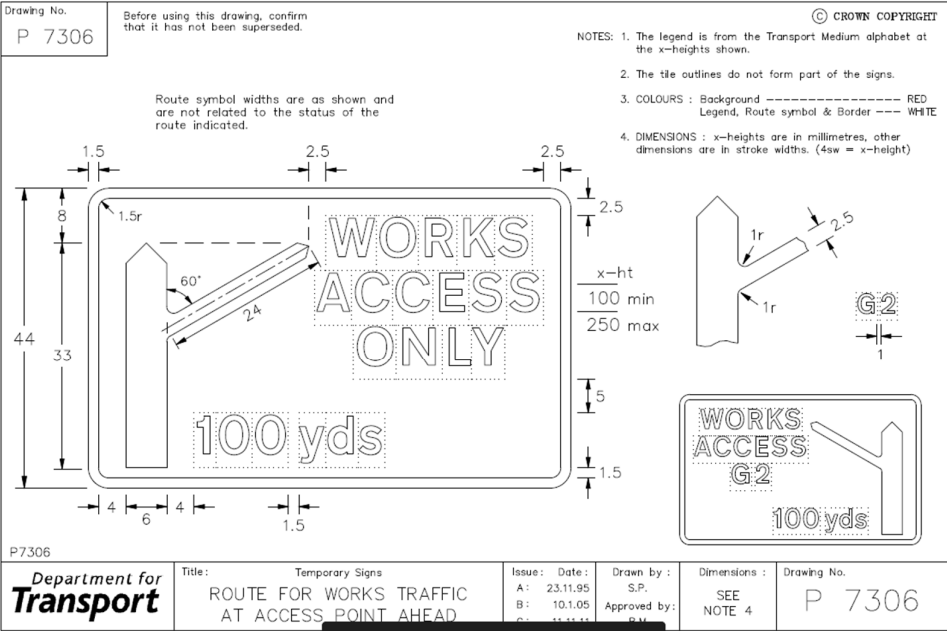
SIGN FACE: P878		Assembly: 50mph	
Font	Heavy	X Ht:	100 mm
Border:	Black	Width:	1410 mm
B/G:	White	Height:	1275 mm
Material:	RA2	Area:	1.8 m/sq
SIGN FACE: P878		Assembly: 60mph	
Font	Heavy	X Ht:	150 mm
Border:	Black	Width:	2120 mm
B/G:	White	Height:	1910 mm
Material:	RA2	Area:	4.05 m/sq

Note:
Chapter 8 lists a 250mm x height sign for 70 mph road. In relaxation works this is not usually required as traffic will rarely be passing at an 85% percentile of 70mph



SIGN FACE: S1		Assembly:	
Font	Heavy	X Ht:	25 mm
Border:	N/A	Width:	335 mm
B/G:	N/A	Height:	370 mm
Material:	Microprismatic	Area:	0.12 m/sq

This sign shall be affixed to vehicles, cabins or equipment where CCTV/ANPR UNIT is in operation.



Sizes of signs					
Single carriageway road (permanent speed limit as shown below or less)			Dual carriageway road (permanent speed limit as shown below or less)		
30mph	40mph	50mph or more	40mph	50 or 60mph	National speed limit

P7306	Direction works traffic should take at a works access ahead x-height	100	100	125	100	125 / 150	200
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Sample with contractor
and location identifiers



Reversible version from
TSM Chapter 8 Part 3



Traditional version

All works access signage must remain within the parameters allowed by the TRSGD 2016 those signs that are not presented in the layout, colour or wording allowed could be considered unlawfully placed. Contractor and location specific references are allowed to be included within the sign; examples are illustrated. The sign must be of the x height size prescribed in the Traffic Signs Manual to allow the text on the sign to be readable especially if the sign contains a location or contractor specific reference. this allows the information to be read and reacted to by site traffic.

The use of the traditional P7306 sign at the required x height was never practical but alternative versions are now available which are illustrated in TSM Chapter 8 Part 3. Known as the reversible version there is also permitted a handed version of the reversible version which is illustrated in the top left which will fit on site at the required x height.

All signage displayed to the general public must be lawful.