

The Delivery Hub health, safety and environment
Raising the bar 27
Managing temporary traffic management incursions

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Objective

This 'Raising the Bar' document sets out current best practice developed by the road maintenance and road construction industry. It is intended to be a means of sharing best practice to set the expected minimum requirements for our works sites and promote the importance of a consistent approach in reducing the risk of incursions into road works

Definition of an incursion

An intentional or unintentional unauthorised entry into temporary traffic management, by all or part of a vehicle being driven by members of the public or emergency services.

Intentional Incursions can be separated into three groups

- 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 Incursions can be separated into three groups

- 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 as a result of confusion.
- Unintentional Incursion where a road user enters the works area or traffic management as a result of a collision or to avoid a collision.

Why are incursions a problem?

We do not expect road users to enter our work sites. The work site is our workplace. Road workers need to be able to work effectively and efficiently within their work site without fear of road users injuring or killing them. Sadly, this isn't the case, following several fatal accidents resulting from road user vehicles entering road works sites, with the resulting incursions ending in the deaths of road workers. We are producing this document to "raise the bar". By doing this we hope to eliminate or reduce the likelihood of road users entering our workplace.

Focus of this "Raising the Bar" document

Industry has identified vehicle incursions as one of the highest risks to road workers. Large numbers of incursions are continually reported by road workers and we know only too well the devastating results caused by vehicles entering temporary traffic management and colliding with our road workers and/or their works vehicles.

Across industry, there is a continuing need and desire to address this. Best practice by the industry has been brought together in this document to 'Raise the Bar' even further. This document gives guidance on how we can achieve this and creates a solid position from which the industry can continue to develop new methods to "raise the bar" further and ultimately eliminate incursions.

Road users entering our workplace is not acceptable

Other resources

Other resources are available to support reducing incursions including other Raising the Bar (RtB) guidance, in particular the RtB on influencing driver behaviour at road works.

Preventing incursions – the four step approach

- Assess: Identify the risk of incursions and where they are likely to happen.
- Address: Design methods to eliminate or reduce the likelihood of incursions.
- Implement: Install traffic management to eliminate or reduce the likelihood of incursions.
- Monitor: Maintain the traffic management and report all incursions

1 - ASSESS

Identify the risk of incursions and where they are likely to happen.

At the planning stage of any traffic management it is important that a detailed design brief has been prepared. The design brief should include, as a minimum, details such as:

- The exact location of planned works, including any marker posts locations of the work zone.
- The presence of side roads or grade separated junctions within the works area.
- Any private frontages that are requiring access during the works period.
- The presence of bus stops or lay-bys.

- The likelihood of pedestrians or cyclists within the works area.
- Whether works will be undertaken using lane closures, narrow lanes, hard shoulder running or complete carriageway closures.
- The exact nature of the works, such as surfacing, barrier repair etc.
- The likely number of works vehicles wishing to access the site, this should be expressed as vehicles per hour.
- The expected duration of the works.
- A sketch detailing the works zone.
- Historical data on likely traffic flows throughout the operating period.
- Historical data on any incidents that have occurred at that location, particularly incidents when traffic management was in place or being established / removed.

This check list is not exhaustive and other factors will require additional information. With the design brief in place the TM designer can start the process of assessing the locations and likelihood of possible vehicle incursions.

Risk assessment

Every aspect of the works site must be looked at and a detailed site specific Risk Assessment must be prepared. This should detail each of the hazards identified and what control measures have been put in place to reduce the likelihood of a vehicle incursion. Certain hazards must be detailed on the drawings, for instance the presence of private frontages or where bridleways or footpaths intersect the carriageway. The risk assessment must be robust in its nature, all aspects of the design must be assessed and mitigation recommended.

Areas Beyond the Site

A wider assessment should be carried out on the surrounding area. It is less likely to experience an intentional vehicle incursion in a wholly rural area with no junctions or side roads, whereas it is highly likely to experience incursions in urban areas with many side roads, bus stops etc. In an urban area it may be necessary to detail coning to a higher specification such as Detail C2 (cones at 3m c/c), this will significantly lessen the chances of a vehicle being able to enter the works area or works zone through the cones. Even in a rural area there is the potential for incursions where, for instance, a side road leads to a village or town where a considerable number of vehicles may wish to access. It is often the case where drivers with local knowledge are aware of a lengthy diversion route in place and try to circumvent this by driving through the works area.

Emergency Vehicles

As part of the assessment process consideration must be given to emergency vehicles. It should be clearly noted on the TTRO as to whether emergency vehicles and the Traffic Officer Service will have access through the works. Careful consideration must be given at this stage as to whether it would be safe for the workforce to allow emergency vehicles access through the works. The decision to prohibit the use of the closed carriageway by emergency vehicles and the Traffic Officer Service should be taken in conjunction with emergency services and the Traffic Officer Service.

Incursions at a Works Access

Most vehicle incursions of a deliberate nature tend to occur during traffic management where relaxations apply, and to a lesser degree during longer term standard works. Careful design can contribute to fewer incursions. In many cases the principal contractor will request works accesses at various locations. These locations must also be subjected to a detailed robust risk assessment, and if necessary these locations may have to be changed. The TM designer should look at each access and assess whether incursions, either intentional or accidental, are likely to occur and what measures need to be taken to reduce this likelihood. Local road geometry and permanent existing signing that may give confusing information to road users are just two considerations the designer should take into account. Many more will be present.

2 - ADDRESS

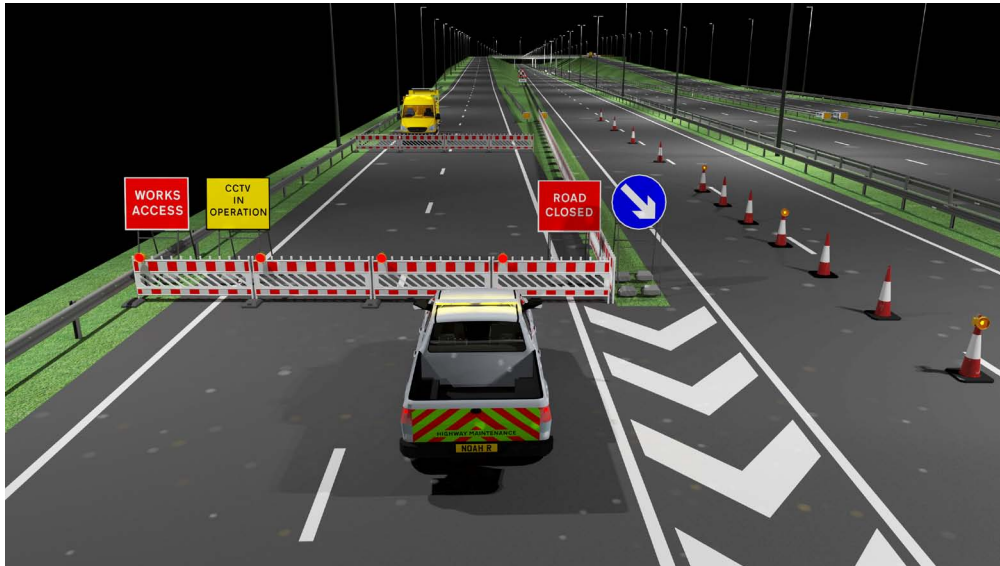
Design methods to eliminate or reduce the likelihood of incursions

Airlock System

Where a complete carriageway closure is required, the 'Airlock' system is a proven method to reduce the likelihood of vehicle incursions. When specifying the 'Airlock' system the safety of the public must be taken into consideration. The primary reason for using the Airlock is to prevent road users from gaining unauthorised access to the closed carriageway, however if a road user manages to enter the traffic management they must be able to re-join the live carriageway in a safe and controlled manner. The design must show how an 'escape route' for unauthorised vehicles can be implemented. The Airlock system should be used at all entry points to the closed carriageway where works vehicles will access the works. To reduce the number of follow-ins it is suggested that the access be from the primary carriageway and not an entry slip road. It is less likely to get intentional incursions from the main carriageway as traffic is gradually being directed down the slip road. The works access on the main carriageway should be located as far away from the point of closure as is possible. This is to discourage motorists from accessing the site and also to allow for a certain amount of stacking for site vehicles whilst waiting to enter the site. The length of the 'Airlock' must also be specified, where a site with a minimal number of works traffic accessing the works is likely then 20 to 30m would be sufficient. Where greater numbers of works vehicles are likely, such as surfacing operations, the 'airlock' should be lengthened accordingly to allow for more works vehicles to get onto site with the minimum of hindrance.



Exit slip road closures

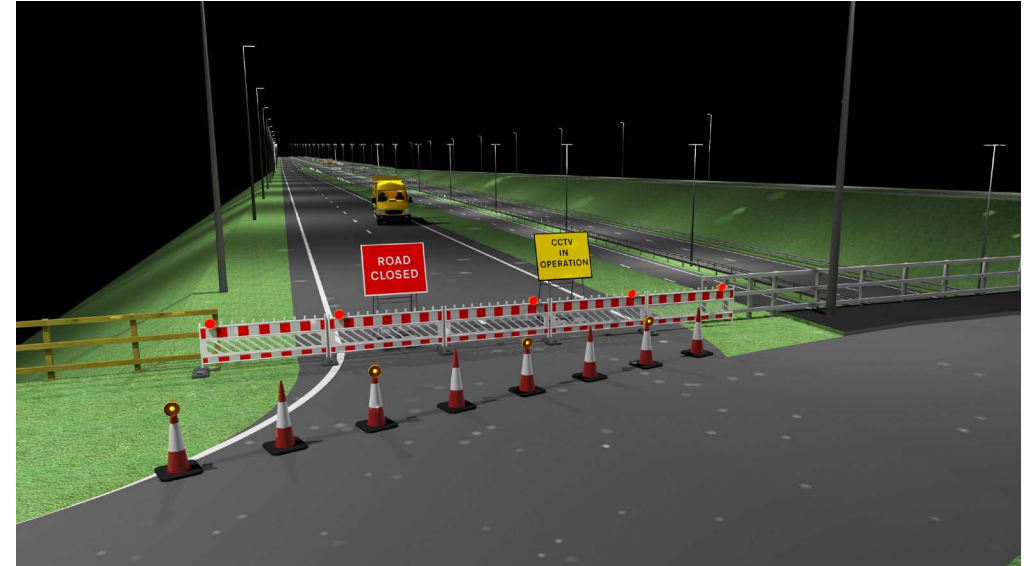


The Airlock system can also be used where an exit slip road is to be closed. It is more likely that an attempted incursion may take place as the motorist can see the destination but cannot use it and may be aware of a potentially lengthy diversion route.

As with the main carriageway closure it is important that there is a safe 'escape route' back on to the main carriageway for any road user who has gained entry in to the traffic management.

All layouts should make use of a 'CCTV IN OPERATION' or similar sign to indicate to the public that their actions may be recorded. The use of CCTV will require the organisation utilising the CCTV to be registered with the Information Commissioners Office (ICO) and they must comply with their Code of Practice.

Entry slip road closures



Where works accesses are located at entry slip roads the public are more likely to either attempt to gain access to the slip road by force, i.e. moving the cones or driving through them, or following a slow moving works vehicle. This will make it difficult and potentially hazardous to direct the unauthorised vehicle back onto the carriageway in a safe and controlled manner. Therefore, unless it is absolutely necessary, a works access should not be specified at entry slip roads.

Where it is unavoidable to create a works access on the entry slip road, consideration must be given to members of the public gaining unauthorised access to the site. The airlock system will retain them in a controlled area, however a safe method must be designed to allow unauthorised traffic to exit the slip road in a safe and controlled method, this may require an outer ring

closure to the roundabout to facilitate this. A balance must be found between achieving this and exposing traffic management operatives to a higher risk by establishing additional traffic management.

Where an entry slip road is to be closed and not used as a works access a solid line of cones should be detailed showing all possible entry on to the slip road being closed off. A trained TM operative should be briefed to remain in position at the slip road, however the TM vehicle should be situated back from the entry to the slip road. This should deter the public from confrontation with the operative. It is important to keep the operative in the vicinity as they would provide a much greater deterrent to motorists trying to gain access to the closed carriageway. The use of additional technology such as movement sensors built into certain TM equipment may provide additional warning to the operative of an incursion attempt. A robust risk assessment is required for all entry slip roads as this has, in the past, been the area at the highest risk of intentional incursion.

Specifying the equipment

In certain circumstances the type of equipment to be used should also be specified. Where an Airlock system has been specified the TM drawings should detail the use of a robust barrier that will stand up during most weather conditions, is easily seen but relatively easy to install and remove without specialist lifting equipment. For closures which are likely to be in place for longer than 24 hours then the use of a temporary barrier of either steel or concrete construction may be more appropriate, this would alleviate the need for a traffic management crew to be in attendance throughout the closure period. The barrier should incorporate some form of conspicuity to avoid the risk of vehicles striking it in error. Again this will need to be identified in the Risk Assessment.

Follow-ins

Follow-ins can be quite regular on busy stretches of carriageway and it is quite likely that this may involve many vehicles. It is imperative that the principal contractor has educated his workforce on the safe access into the works area, see Raising The Bar – Traffic Management Entry and Exit. The TM designer must take steps to make this type of incursion less likely. This could be achieved by the use of larger signs, although on some sites this would not be possible where there is already restricted room available. Another possible solution would be to specify more advance works access signs. If an incursion does occur there must be a safe means of getting public traffic out of the traffic management and back onto the live carriageway in a controlled manner. It is not practical or safe to 'escort' members of the public through a construction site to reach the next exit. The principal contractor must plan his works accordingly to allow additional room for escape routes. For longer term works where temporary vehicle restraint barrier is used it may be possible to include an Airlock within the works access.

Works accesses

Works accesses should not be sited where the public could be misled. Locations such as adjacent to advance direction signs could give the impression that the public should exit at that point and this could result in a number of incursions. This not only puts the workforce at risk but also the public who may be confused and disorientated by driving through a construction site with all the hazards associated with that.

Where relaxed lane closures are to be used the TM designer should ensure that the works access is as far enough away from the works zone as is reasonably practicable, this will ensure that possible fast moving public traffic that does enter the traffic management in error does not come straight into the works zone. If more than one lane is to be closed a similar system to the

'airlock' should be used, this will help to eliminate follow in traffic from accessing the work zone. A safe egress for follow-in traffic must be detailed on the TM drawings and within the risk assessment.

The TM designer should be aware of the programme to ensure that alternative works access and egress points have already been planned so that when works have reached the point of an existing access or exit it can be moved to a safer pre-agreed location.

Where carriageway or slip road closures are required it is important that the TM designer takes into account the suitability of the diversion to be used. The longer the diversion route the more frustrated motorists may be and the more likely they are to attempt a vehicle incursion to avoid a lengthy route.

Where there are Variable Message Signs available a request should be made to the Regional Control Centre in plenty of time to post an advance notice, of up to one week, of the closure on the VMS signs. If such signs are not available the designer should consider the use a mobile VMS, these signs have a greater impact over more traditional methods of signing and but should only be used in conjunction with and not instead of traditional signs. The use of portable VMS signs is particularly recommended where a carriageway or slip road closure might affect traffic wishing to access a mainline railway station or airport outside normal working hours.

Temporary vehicle restraint barrier

Where narrow lanes are used or hard shoulder running is required for longer than 24 hours the TM designer must take into account the likelihood of an unintentional incursion into the works area as a result of a Road Traffic Collision (RTC). By their very nature RTC's are very unpredictable in the location, time and in its outcome. Sufficient protection must be given to both the work force and road user alike. Where there is a clear requirement for a

temporary vehicle restraint barrier to be used, it is important that the correct type of barrier is specified. In all circumstances only barrier that is approved by Highways England may be used on a HE road. Details of the current acceptable systems available are published regularly by Highways England called 'List of EN1317 Compliant Road Restraint Systems' and may be found at www.standardsforhighways.co.uk.

The type of barrier specified will depend on a number of variables such as:

- The speed restriction in force.
- The width of the lanes.
- The severity of a breach of the barrier.
- The working room required.

Typically for temporary layouts either a N1 or N2 barrier would be used, where protection is needed that requires a higher restraint value, such as protection for structures or protection for deep excavations then a higher restraint value must be specified. Another consideration will be the working width. A working width of W2 is much narrower than that of say W6, thus giving more working room, however W2 barrier would be much more expensive and usually takes longer to install or remove, a balance must be found and the results recorded of the working width to be specified. Some barriers will require a Departure of Standards to be used, details of these barriers are listed in 'Highways England List of EN1317 Compliant Road Restraint Systems' document. Care must be taken when hard shoulder running has been specified, the TM designer must take into account the additional hazards that may be present when traffic is running on the hard shoulder. Additional measures such as hardening of verges or stone drains must be thoroughly assessed and addressed. Existing vehicle restraint barrier should be assessed and addressed for suitability where high volumes of traffic, particularly heavy goods vehicles, are running adjacent to the barrier during hard shoulder running. There may be a need to specify a barrier with a higher restraint value.

Where a scheme is of a particularly complex nature and would require a Stage 3 Road Safety Audit due to a significant diversion of the traffic, then the traffic management design should be subjected to a Stage 2 Road Safety Audit.

Breakdowns

During long term works, particularly where closures exceed the recommended maximum of 4km in length, consideration must be given to motorists that may break down and attempt to pull in to the traffic management, although this is a lower risk to the workforce it may be a higher risk for the motorist being stranded on a construction site and the subsequent recovery of that vehicle. The TM designer should seek ways to minimise this risk. An effective recovery system should be implemented with regular signing to inform the motorist that they will be recovered free of charge. Where space exists, consideration should be given to providing emergency refuge areas to provide a safe area for broken down vehicles.

Enhanced technology

There are now a number of products that are available on the market that can assist in either the identification of intentional incursions or will enable the enforcement of a road closure. The designer should give consideration to specifying the use of a real time incursion warning system. The motion sensitive equipment and proximity sensors can automatically detect perimeter intrusions and give warning to the traffic management operatives. Traffic management operatives situated on a gate can also be provided with personal alarms which can offer increased security from abuse and enable operatives to raise an instant incursion warning. Audio-visual alarms instantly warn personnel in the event of an incursion. Real time alerts and deployment information enable proactive maintenance. The ability of this type

of equipment can generate automated incursion location reports that may be used to enhance future traffic management deployments and design. There are also products available to automate gates at works access points. These products can give the impression of a solid barrier across the carriageway but are able to be opened electronically, either at the gate or remotely. This gives the benefit of being able to monitor who has access into the works area without the traffic management operatives being in a place of danger having to move traffic management equipment

3 - IMPLEMENT

[Install traffic management to eliminate or reduce the likelihood of incursions.](#)

It is important that all the measures shown on the traffic management drawings are implemented on site.

Gates

During carriageway or slip road closures a TM operative should always be in attendance during the closure even if there isn't a works access at that location. Under certain circumstances enhanced technology could be used instead of the TM operatives, but only at lower risk sites and where a risk assessment has indicated this is acceptable. Where a physical barrier, such as steel or concrete, that cannot be moved without specialised equipment, is used it would not be necessary to have operatives based at that location. This would usually be at a location where the closure was likely to be in place for longer than 24 hours.

It is strongly recommended that all TM operatives placed at entry points are issued with working video recording equipment, this will act as a deterrent to members of the public against threatening or abusive behaviour towards the operative. Good evidence helps support any enforcement action and improves incident data quality, enabling further measures to be implemented

as appropriate. A key part of the use of CCTV of any type is ensuring that road users know that CCTV is in use and their actions are being recorded. Where members of the public do come into direct contact with traffic management operatives it is important that the operatives remain calm and courteous at all times. This often has the effect of defusing the situation and makes the likelihood of abusive actions against the operative less likely. It is recommended that operatives who are detailed to work at a gate should have received some form of Conflict Management Training. It is recommended that training only be given by Approved Contractors of the Security Industry Authority

Stage 3 road safety audits

On all Highways England Major Project schemes, it is usual that, where a significant diversion of the traffic has taken place, a Stage 3 Road Safety Audit is carried out. The Road Safety Audit should be undertaken by an audit team in accordance with HD19/15. On completion of the audit a report is prepared and sent to the client.

It is encouraged that the TM designer accompany the auditors during the audit, this will not only give valuable input for the auditors on the reasons for the design but will also allow the TM designer to see the implemented TM from a driver's perspective and understand and address any issues that may be identified by the auditor.

The auditor, in addition to the main audit, should look for and identify any areas within the traffic management that they believe are at risk from either accidental or intentional incursion.

The checklist below identifies some of the areas that would require auditing for vehicle incursion

- Sufficient vehicle restraint barrier adjacent to works area, where required.
- Sufficient vehicle restraint barrier adjacent to verge during hard shoulder running.
- Likelihood of vehicle incursion at crossover points.
- Works Accesses in a location that may mislead the road user.
- Verges that may cause loss of control if a vehicle leaves the road, such as stone drains etc.

This information should be recorded and sent to the client and the traffic management designer for comment and possible rectification.

Informing the motorist

It is important to keep the motorist informed, particularly where a slip road or carriageway closure is required. Intentional incursion where road users are seeking to gain information such as the diversion route to be followed can be avoided by the use of advance notice signs at least two weeks in advance of the closure and by the use of clear diversion route signing. The diversion route must be regularly inspected during the closure period to ensure all signing remains visible.

4 - MONITOR

Maintain the traffic management and report all incursions

Maintenance

To prevent accidental incursion, it is important that the traffic management system is patrolled at regular intervals for the duration of the works. Areas of coning that have been displaced may lead some motorists to enter the traffic management in error. It is important that any displaced equipment is replaced as soon as possible to prevent this.

Deterrents and enforcement

Where vehicle incursions do occur it is important that as many details are captured at the time of the incident, this also includes photographic evidence that may be used in a court of law as evidence. The workforce must be made aware that they may be called as a witness if an incident results in the driver going to court. Many will not want to get involved if they know this may be required. It should be impressed upon them that their assistance will help prevent future incidents and possible injuries or fatalities to their workmates. Where appropriate it may be possible to add a deterrent to road users committing a wilful incursion into the work area by the use of strategically placed works vehicles with livery similar to that used by the Safety Camera Partnerships. These vehicles are Welfare Vans that have been modified by the use of magnetic stickers. Trials taken place have shown the use of such vehicles have significantly reduced vehicle incursions and also a noticeable increase in traffic compliance with the road works speed limit.



Reporting

To enable the industry to monitor the effectiveness of the measures used to eliminate or reduce vehicle incursions it is vitally important that ALL incursions are reported, no matter how trivial they appear to be. Details such as time of day, day of week, weather conditions, counter measures used to prevent incursion, should all be recorded. It is only by monitoring the effectiveness of these measures that we are better placed to plan for them in the future. Below is a template form that can be distributed among the workforce to accurately record any vehicle incursions that they witness. Once the form has been completed it can be passed onto the site supervisors and entered onto the AIRSWEB system. The data collected will enable Highways England draw up a 'Heat Map' of areas where vehicle incursions have occurred. This information can then be used to identify areas where incursions are more likely and will assist in planning to eliminate these incursions.

By reporting all instances of incursion we can help make your workplace safer

Annex A – Vehicle Incursion Reporting Template



This form should be completed each time a vehicle incursion is witnessed. The information gained from this form will be used by Highways England to identify ways to eliminate vehicle incursions into your workplace. Please complete this form as fully as possible and hand it to your supervisor.

Name of road or contract

Your name
(This information will not be kept or used by Highways England)

Date of incursion

Time of incursion

Exact location of incursion

Weather Conditions

Type of Incursion

- Intentional to seek benefit
- Intentional because of breakdown
- Intentional to seek information
- Unintentional – Driver confused
- Unintentional – Follow in
- Unintentional – Result of an accident

Please give any further details, including type of vehicle
(use reverse of this form if required)

Registration of vehicle (if known)

Were the Police notified? Yes No

If yes, please give incident number

Did the driver give any verbal abuse or threaten? Yes No
physical abuse

Thank you for completing this form, the information you have provided will help us stop vehicle incursions in the future and improve your workplace safety

If you need help accessing this or any other Highways England information, please call **0300 123 5000** and we will help you.

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