

Traffic Control Devices Manual

Part 8

Code of practice for temporary traffic management (CoPTTM)

manual number: SP/M/010

Section D

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www.nzta.govt.nz

Fourth edition, Amendment 2 of
Code of practice for temporary traffic management

Effective from July 2013

ISBN 978-0-478-40772-3 (print)

ISBN 978-0-478-40773-0 (online)

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More information

Published 2013

ISBN 978-0-478-40772-3 (print)

ISBN 978-0-478-40773-0 (online)

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SUPERSEDED

D1 General

D1.1 Introduction

Temporary traffic management (TTM) for mobile operations is described and detailed in this part of the NZ Transport Agency's the *Code of practice for temporary traffic management* (CoPTTM).

Each **level** of TTM has different requirements and these are detailed in section [D5 Mobile closures operational requirements](#) and section [D6 Semi-static closures](#). Some mobile operations have specific requirements and these are detailed in section [D7 Special mobile operations](#).

D1.2 Mobile operation definition

A mobile operation is an activity or work carried out within the road reserve that is not contained within a fixed worksite. The vehicle(s) associated with the activity travel along the road in the direction of the traffic flow, usually at a slower speed or in a different manner, to normal traffic flow on the road.

There are three categories of mobile operation:

1. Mobile closure:
A normally continuously moving activity or work operation carried out ***within the road reserve*** that may also stop briefly at a particular location for a period of no more than 10 minutes.
Note: Activities like mole ploughing and drain digging move along the road but they move too slowly to be considered mobile operations. These types of activities must be planned and managed as static operations.
 2. Semi-static closure:
A short term activity or work operation that is carried out ***on the carriageway of a road*** at a particular location that takes more than 10 minutes, and less than one hour, to complete.
Note: The 10 minutes to one hour timeframe applies only to the working period and does not include the time required to install and remove the TTM devices on the worksite. No activity is to be undertaken during set-up or removal of the TTM equipment.
 3. Special operations:
These are mobile operations which may vary the requirements of the above two categories or provide additional requirements to enhance safety for certain situations. Included in this category are:
 - inspections
 - kerbside collections
 - road marking
 - rolling blocks.
-

D1.2.1 Examples of mobile operations

Mobile operations can be used for, but are not necessarily limited to:

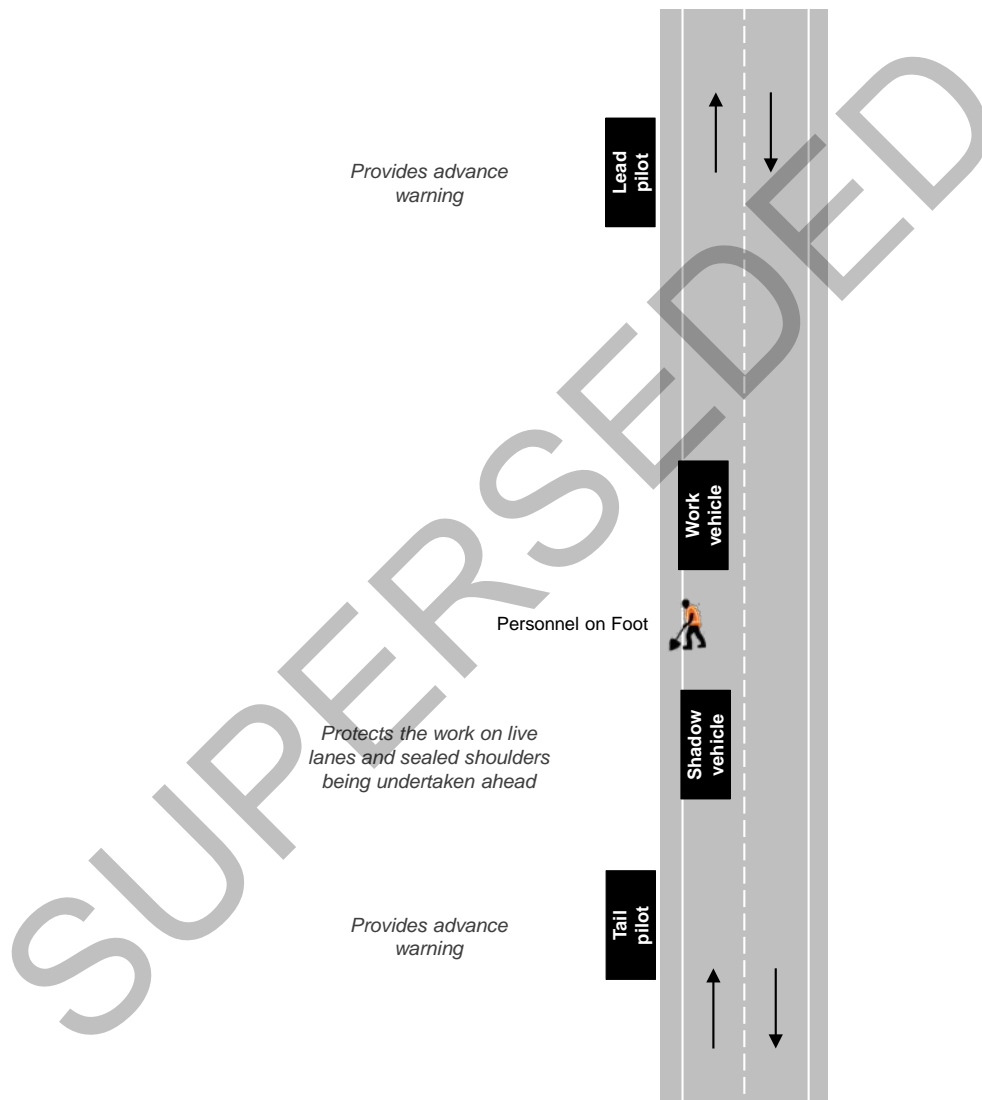
- road marking
- installing or removing raised pavement markers
- road inspections
- pavement testing
- mowing
- weed spraying
- shoulder grading
- pavement sweeping
- cesspit, sump or manhole cleaning
- marker post maintenance
- installation of road closures
- sight rail and road safety barrier repairs
- litter and debris pick-up
- pothole repairs
- road skid and roughness testing
- snow clearing/spreading grit
- sporting/cultural/community events held on public roads
- kerbside refuse and recycle collection
- surveying
- monitoring traffic counts
- maintaining roadside cabinets.

D1.3 Vehicles

The vehicles used in various combinations for mobile operations are:

- lead pilot vehicles
- work vehicles
- shadow vehicles
- tail pilot vehicles.

Note: Some operations will require only some of these vehicles.



Vehicles must:

- be registered for normal use on the road by the NZ Transport Agency (NZTA) and be able to travel at the speed of the activity
- have at least four rubber-tyred road wheels
- be task specific, ie only undertaking one task at a time (eg a pilot vehicle cannot at the same time be a work vehicle).

D1.3.1 Vehicle operation

For mobile operations:

- vehicles normally operate to the left of the road centre line
 - all vehicles must face and move in the same direction as the traffic flow and, with the exception of pilot vehicle(s), operate in unison and maintain the recommended vehicle spacings
 - when an activity is completed all vehicles must accelerate together and maintain their set positions until they reach the normal operating speed of traffic on the road
 - after they have safely merged into the traffic stream, all flashing beacons must be turned off and, when a suitable safe location is reached, the vehicles must be stopped clear of the carriageway. Ensure that all signs and equipment that is no longer required, or applicable, must be covered or removed
 - non-operational stops, eg to adjust equipment, must be carried out in a safe location and clear of the live lanes.
-

D1.3.2 Communications

A communication system with a consistently available channel, appropriate to the work environment must be used for a mobile operation. The site traffic management supervisor (STMS)/traffic controller (TC) must maintain absolute control of all facets of the mobile operation and the drivers of all vehicles must have appropriate, and continuous communication with the STMS/TC and each other at all times.

Cellular phones do not provide instantaneous communication and do not work in all locations, therefore, a simplex radio/telephone system is the most appropriate communication method. Outside calls must be discouraged during mobile operations.

D1.4 Traffic signs mounted on vehicles

D1.4.1 Introduction

Each vehicle in a mobile operation is required to have at least one CoPTTM compliant traffic sign mounted on it. The signs that can be used for mobile operations include, but are not limited to:

- road works – T1A or T1B (TW1.X)
- GRADER – T132 (TW-1.3)
- MOWER – T136 (TW-1.3)
- SKID TESTING – T133 (TW-1.3)
- ROAD MARKING – T134 (TW-1.4)
- vulnerable road users – T227 or T228 or T229 (TW-2.13)
- stock – TF1 or TF2 (TW-6)
- ROAD INSPECTION – TV3 (TW-27)
- ROAD WORKS – TV2 (TW-26)
- keep left – RD6L (RG-17) and keep right – RD6R (RG-34)
- PASS WITH CARE – TV4 (TW-34), and
- Truck-mounted attenuator (TMA) display – R3-13.3.

For details about each sign refer to subsection [B1.4 Signs used at worksites](#).

D1.4.2 Requirements

Vehicle-mounted traffic signs must:

- be the approved size as detailed in subsection [B1.4 Signs used at worksites](#)
- be removed, covered or folded to ensure they are not visible when the vehicle is not undertaking a role in a mobile operation
- have a retro-reflective fluorescent orange background unless specified otherwise
- be positioned such that their longitudinal axis is at right angles to the centre line of the vehicle, plus or minus five degrees
- be mounted such that they are clearly visible to approaching road users.

D1.4.3 TV 2 (TW-26) ROAD WORKS sign

A front-mounted TV2 (TW-26) road works sign is required on all lead pilot vehicles.

Where activity is being carried out in a live lane on a two-way two-lane road, and a lead pilot vehicle is not required, a front-mounted TV2 (TW-26) ROAD WORKS sign is required on the leading work vehicle where the speed limit is greater than 65km/h.

D1.4.4 Signs for tail pilot vehicles

Tail pilot vehicles must have:

- the appropriate advance warning sign and supplementary plate if required
- the RD6R (RG-34) or RD6L (RG-17) sign.

The advance warning variable message sign (AWVMS) is a tail pilot vehicle. Refer to subsection [D1.9 Advance warning variable message sign \(AWVMS\)](#).

D1.4.5 Signs on work vehicle more than 5m from edgeline

Where the work vehicle is more than 5m from the edgeline the work vehicle must have either:

- the appropriate advance warning sign with supplementary plate if required and the RD6R (RG-34) sign
- or
- the TV4 (TW-34) PASS WITH CARE sign and the RD6R (RG-34) sign.

D1.4.6 Signs on a truck-mounted attenuator (TMA) truck

TMA trucks fitted with an approved light arrow system and rear display do not require further TTM signage.



D1.4.7 Signs on cars or light utility vehicles

Where cars or light utilities under the following categories LA, MD1, MD2, MD3, MA, MB and MC, are used for inspections, sports events and high speed data capture, only the appropriate supplementary sign will be required eg road inspection, cycle race, road works.

D1.4.8 When RD6L/R (RG-17/34) signs can be omitted from the TV4 (TW-34) PASS WITH CARE sign

Where a horizontal arrow board is used in a mobile operation the TV4 (TW-34) PASS WITH CARE sign will be retained but the RD6L/R (RG-17/34) signs are not to be used.

Where the situation is constantly changing (eg rolling, grading, road marking, water cart, drag brooming operations on two-lane one-way roads) and it is impractical to change the RD6L/R (RG-17/34) sign frequently, this component may be omitted.

D1.5 Amber flashing beacons

D1.5.1 Use of amber flashing beacons

The amber flashing beacon(s) must meet the requirements of subsection [B14.1 flashing beacons](#) and they must be visible in all directions at all times.

All vehicles in a mobile operation must be fitted with one, and preferably two, amber flashing beacons.

These must be fitted on the roof of the vehicle, or in some other suitable position, where all those involved in the activity and other road users will have a clear view of them at all times.

The beacons on all vehicles in a mobile operation:

- must remain turned on and operational until the vehicles are safely inside a work area, or until they have reached a speed similar to other vehicles on the road when exiting a work area
- may be turned off and the vehicles hazard lights turned on when they are within work areas that are clearly separated from live lanes by delineation devices, and
- must be kept on at all times when undertaking a mobile operation.

D1.6 Arrow boards (light arrow system and horizontal arrow board)

D1.6.1 General

Arrow boards are used to:

- direct road users to the left or right, and
- caution traffic.

D1.6.2 Operating procedures for arrow boards

Where there is sufficient width, ie more than 3m, for vehicles to pass a mobile operation either on the right without crossing the centre line, or on the left, the arrow board display the arrow mode in the appropriate direction.

Where it is unsafe for road users to pass a mobile operation the caution mode lane closed must be displayed.

Where arrow boards are required, they must be operated continuously to ensure that all road users approaching a mobile operation receive adequate warning of the operation.

During night time operations arrow board light intensity must be adjusted as necessary to ensure that boards avoid excessive glare and to maximise the clarity of the arrow in all prevailing ambient light conditions.

When an arrow board is operating care must be taken that any flashing beacons do not impair the visual performance of the arrow board. However, the flashing beacons must be visible to approaching opposing traffic.

Care must be taken to ensure that arrow boards are operating in the correct mode and direction at all times, and that they are switched off when the mobile operation is completed.

On level 2 and 3 roads the arrow board of the shadow vehicle and the message of the tail pilot vehicle must match. This is vitally important because both messages may be visible to road users at the same time.

D1.6.3 Types of arrow boards

There are two types of arrow:

1. light arrow system (LAS)
2. horizontal arrow board.

D1.7 Light arrow system (LAS)

D1.7.1 LAS requirements

LAS are only to be used on level 2 and level 3 roads to ensure the uniqueness of the system for the higher volume roads.

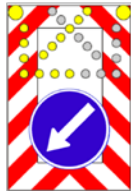
LAS type arrow boards and the rear display is mandatory for all new contracts on level 2 and 3 state highways, and from 1 July 2012 for all mobile operations on level 2 and 3 state highways.

LAS must not be used to direct traffic in alternating flow situations.

Where a LAS is in use, the RD6L/R (RG-17/34) must be used to direct traffic where there is at least 3m of clear space to their side and a lane designated for traffic moving in the opposite direction.

Also If the traffic is required to follow the TMA truck then the RD6 L/R (RG-17/34) must not be displayed. Where the RD6L/R (RG-17/34) is not to be used, the arrow component is not to be visible to road users.

LAS is operated as follows:



Arrow left

Lane change left required (because a driving lane is closed).



Arrow right

Lane change right required (because a driving lane is closed).



Caution mode left

A part of the roadway which is not used for driving is closed (usually a centre median). Road users may pass on this side when it is safe to do so.



Caution mode right

A part of the roadway which is not used for driving is closed (usually a shoulder). Road users may pass on this side when it is safe to do so.



Caution mode lane closed

A part of the roadway which is used for driving is closed and it is unsafe to pass.



Note: Downward or upward pointing arrows are currently not gazetted signs and **must not** be used.

An RD6L (RG-17) or RD6R (RG-34) sign must not be visible when TMA is not actively engaged in traffic management.

D1.7.2 Xenon lights

Users must ensure that the height and orientation specified in appendix E of the NZTA's *P37 Specifications for mobile variable message signs* (in press) is maintained to ensure that road users are not adversely affected by the operation of the xenon warning lights.

D1.8 Horizontal arrow board

D1.8.1 Horizontal arrow board requirements

Horizontal arrow boards may be used on non-state highway level 2 roads and also on level LV and level 1 roads.

Horizontal arrow boards must not be used to direct traffic in alternating flow situations.

Where horizontal arrow boards are being used in a mobile operation the TV4 (TW-34) PASS WITH CARE sign will be retained but the RD6L/R (RG-17/34) signs are not to be used.

A red and white rear panel is required on all horizontal arrow boards effective from 1 July 2012. Refer to subsection [B.8.3.4 Rear panel](#) for specifications of the rear panel.

Xenon lights must not be used in conjunction with a horizontal arrow board as the horizontal arrow board is lower than the LAS, the xenon lights could cause a hazard for road users.

D1.8.2 Operation of horizontal arrow board

Vehicle-mounted arrow boards must only operate in:

- a **single sequential arrow mode** where the arrowhead, with a tail, moves left or right to direct traffic to the left or the right
 - a **caution mode** where all four corner lights on the arrow board flash on and off simultaneously.
-

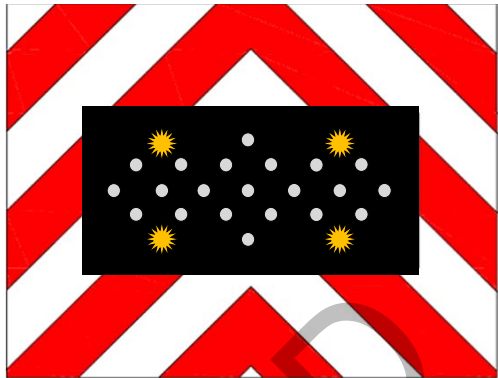
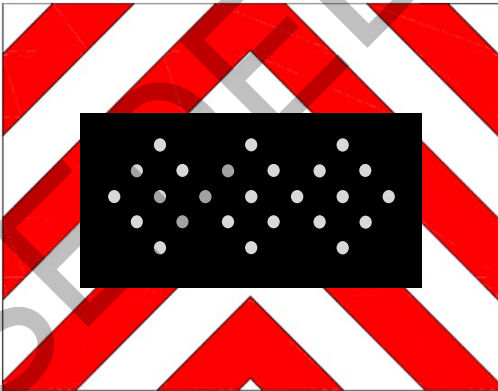
D1.8.3 Permitted display for horizontal arrow board

Single sequential arrow

Mode	Phase	Display
single sequential arrow left (Reverse direction for arrow right.)	Phase 1	
	Phase 2	
	Phase 3 (After phase 3 the sequence returns to phase 1.)	

Note: This display configuration varies from that shown in the joint Australian and New Zealand standard AS/NZS 4192:2006 (and amendments) *Illuminated flashing arrow signs* (AS/NZS 4192:2006).

Caution mode

Mode	Phase	Display
Caution mode	Phase 1	
	Phase 2	

Note: This display configuration varies from that shown in AS/NZS 4192:2006.

D1.9 Advance warning variable message sign (AWVMS)

D1.9.1 Introduction

The AWVMS must be used to provide advance warning in conjunction with a TMA truck fitted with a LAS and approved rear display and a work vehicle on level 2 and 3 state highways (it may be also used on level 2 and 3 non-state highways).

D1.9.2 AWVMS

D1.9.2.1 Use of the AWVMS

On state highways the AWVMS replaces the need for a tail pilot TMA vehicle.

The AWVMS must display fixed sign messages (ie no scrolling of messages or signs) and can only be supported on a class NA light goods vehicle, or a TA very light trailer with limited weights and dimensions. Refer to subsection [B9.1.2 About the AWVMS](#). It must be located out of the live lane.

Using an AWVMS is optional for most road controlling authorities (RCAs). However on level 2 and 3 state highways their use is mandatory (from 1 July 2012).

D1.9.2.2 Operational principles

The AWVMS may only be used:

- within a working space, or
- on the left hand roadside shoulder clear of the edgeline, or
- in the central median where it can be established 2m clear of any live lane, unless protected by a barrier.

Where and when it is safe to do so, the AWVMS may either be driven slowly along the road shoulder (or median as appropriate), or join the traffic flow and travel forward to the next warning location, to maintain position with the mobile convoy ahead. Note if it is safe to do so, the AWVMS may remain erected during this operation.

The AWVMS should be operated from the cab of the vehicle to which it is attached.

The AWVMS system must not be entered or operated from the traffic side of the apparatus. In situations where there is ample central median and a median barrier, the operator must attend the apparatus from the side that is protected by the median barrier.

For mobile operations (excluding semi-static operations), the AWVMS must:

- never be left unattended
- be operated from within the driver compartment of the supporting vehicle.

For semi-static operations, the AWVMS may be:

- left unattended
- operated remotely.

In the event of a breakdown occurring and repairs are required from the road shoulder; they must not be undertaken from the traffic side of the AWWMS. For mobile operations there must generally be a separation of five and 20 seconds (this equates to approximately 100m to 600m at 100km/h). However, the maximum allowable separation from an AWWMS to a shadow vehicle TMA is 1600m. This distance may be extended from 1600m to 3km if there is no available shoulder width for the AWWMS within 1600m of work vehicle.

Clear sight distance (CSD) (eg 3 x posted speed limit) for traffic approaching the AWWMS must be maintained at all times when the AWWMS is operating.

To avoid lamps shining directly at drivers of approaching vehicles, an AWWMS must not be located on a sag curve. The AWWMS must be located on a level surface for visibility performance and safety.

The display must be positioned as specified in the TMP. The height and orientation as specified is required to ensure that road users are not unduly affected by the operation of the board and the attached xenon warning lights.

If the AWWMS is used in any function other than as an advance warning sign for TTM, the xenon lights must be turned off. When used as a VMS sign only, it must comply with the NZTA's *P37 Specifications for mobile variable message signs* (in press) and other sections of CoPTTM.

AWVMS models must comply with the technical information and performance characteristics detailed in subsection [B.9 Advance warning variable message sign](#) and in the NZTA's *P37 Specifications for mobile variable message signs* (in press).

D1.10 Truck-mounted attenuator (TMA)

D1.10.1 Requirements

The need for a vehicle in a mobile operation to be fitted with a rear-mounted attenuator, commonly known as a truck-mounted attenuator or TMA, varies with the level of TTM required, in the following manner:

Level 1:

- A TMA is not necessary on any vehicle used in a mobile operation on a **level LV** or **level 1** road.

Level 2:

- A TMA is not necessary on a lead pilot vehicle.
- A TMA is not needed on the tail pilot vehicle of a mobile operation on a level 2 road when the activity is not on the carriageway and both the tail pilot vehicle and work vehicle are located more than 2m from the edgeline.
- An AWWMS may be used to give advance warning.
- Where other vehicles are used to either provide advance warning or shadow protection, a compliant TMA must be used when a mobile operation on a level 2 road is on the live lane or is on the road shoulder within 2m of the live lane.

Level 3:

- A TMA **must** be used on all shadow vehicles in a mobile operation on a level 3 road.
- A TMA is not required on an AWWMS.

D1.10.2 Use of TMAs

TMAs must be used in accordance with the manufacturer's recommendations.

While TMAs are primarily used for mobile and semi-static operations, they can also be useful in some high-risk static operations.

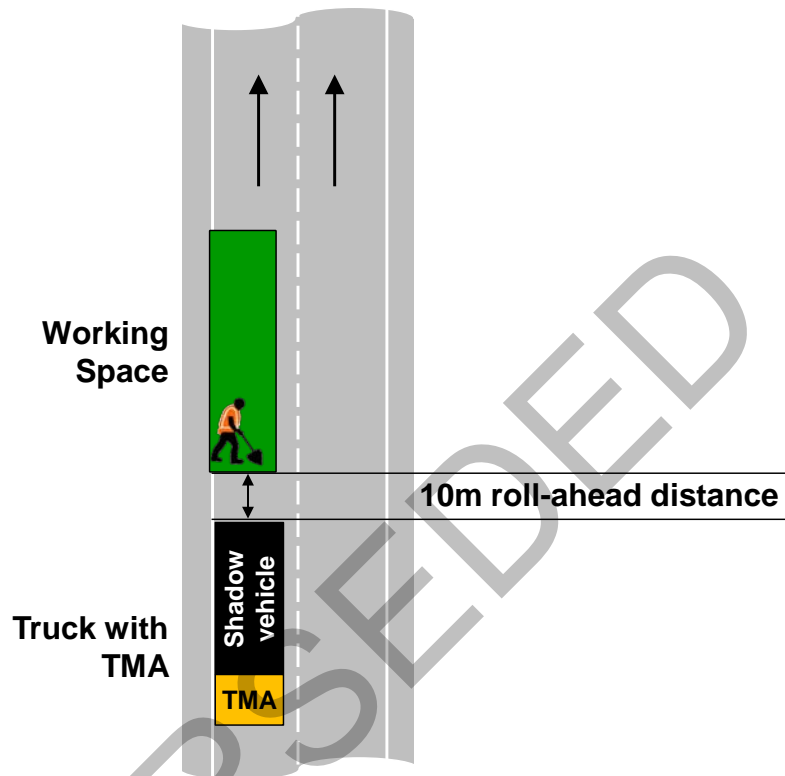
D1.10.3 Allow for roll ahead

When a TMA is impacted it will roll forward. This roll-ahead distance is dependent on many factors including:

- angle of impact
- speed of the impacting vehicle
- weight of the vehicle impacting the TMA
- weight of the vehicle mounted with the TMA
- pavement conditions
- brake engagement.

D1.10.4 Roll-ahead distance

When a shadow vehicle is used to protect workers on foot in the lane then a minimum 10m roll-ahead distance must be provided in front of the shadow vehicle to allow the truck to safely move forward if impacted.



D1.10.5 Braking of vehicle fitted with a TMA

When in a stationary position, vehicles in a mobile operation must have their handbrake applied and either park applied or be engaged in a low gear.

D1.11 Visibility

D1.11.1 CSD

A mobile operation must be clearly visible to the drivers of approaching vehicles. CSD is the minimum visibility required.

CSD is measured from the driver's eye level (approximately 1m above the carriageway) to the position of the object (approximately 1m above the carriageway) and is expressed in terms of metres based on the permanent speed.

The minimum value is 3 x the permanent speed limit (or operating speed if declared by the RCA) for all roads

75m CSD may be applied to level LV and level 1 roads that are not state highways and have a permanent speed limit of less than 55km/h. The RCAs may designate a greater CSD for these roads.

Note: Where the RCA has defined an operating speed for the road, that speed may be used instead of the permanent speed limit for the calculation of CSD.

D1.11.2 Maintaining CSD during a mobile operation

Pilot vehicle(s) must be positioned in such a manner that approaching drivers will have the appropriate CSD to them while at the same time maintaining a distance of between five and 20 seconds travel time at the normal operating speed of traffic on the road (this equates to approximately 100m to 600m at 100km/h) from first the shadow or work vehicle(s).

To maintain these distances, and CSD to the pilot vehicle(s), drivers in the mobile operation may have to stop their vehicles, or move them further ahead, as shadow and work vehicle(s) travel around a curve, or some other visibility obstruction.

Where CSD cannot be achieved in these situations additional shadow vehicles must be used.

Work must cease and all traffic management must be removed from the road if the CSD cannot be maintained due to fog, rain or other weather conditions, unless the activity is specifically required to deal with a climatic condition, eg ice gritting and snow clearing.

D1.11.3 Summary of key distances for level 1

Refer to the figure [Summary of key distances for level 1 mobile operation](#).

D1.12 Safety zones

D1.12.1 Requirements

The safety zone requirements for mobile operations are generally the same as for static operations, but with the following amendments:

- the longitudinal safety zone is the full length of the shadow vehicle plus 10m roll ahead
- on the live-lane side, the working space must not encroach beyond 1m from the edge of the work and/or shadow vehicle
- on **level 2** and **level 3** roads a shadow vehicle must be used when mobile operation activity is located 2m, or less, from a live lane or an a live lane.

D1.13 Personnel on foot

D1.13.1 General

The number of personnel on foot required for a mobile operation must be kept to the absolute minimum necessary to complete the work.

For safety reasons it is desirable that personnel on foot do not enter a live lane unless protected by a shadow vehicle.

D1.13.2 Level LV, level 1 and 2 roads

Personnel on foot must keep within the working space and safety zones of the worksite. Only under emergency circumstances and with the utmost care should anyone enter a live lane.

D1.13.3 Level 3 roads

With the exception of the STMS, personnel on foot must not enter or undertake activities in a live lane at any time during the installation, maintenance or removal of traffic management equipment.

An STMS, under exceptional circumstances, may enter a live lane when it is necessary to erect a sign, place a delineation device or remove a hazard. This activity must be carried out:

- in accordance with the guidelines set out in the contingency section of the approved traffic management plan (TMP)
- in the quickest and safest manner possible, and
- a lookout person must be used.

D1.13.4 One-way roads with three or more lanes

Where a mobile closure is required for the centre lane of a three-lane, or more, one-way road the most suitable adjoining edge lane must also be closed. A shadow vehicle is used to close this lane and an additional shadow vehicle used to close the centre lane.

Where a semi-static closure is required for the centre lane of a three-lane, or more, lane one-way road the nearest adjoining edge lane must also be closed and cones placed:

- from the work vehicle and the shadow vehicle along the lane line that separates the working space from the live traffic lane
- to form a taper from the shadow vehicle to the additional shadow vehicle, and
- to form a taper from the shadow vehicle to the edge of the carriageway.

D2 Work vehicles

D2.1.1 General

A work vehicle is a vehicle carrying out activity adjacent to the road, or on the carriageway, or supporting personnel on foot. Work vehicles include, but are not limited to:

- road marking vehicles
- cone pick up vehicles
- road survey vehicles
- mowers
- street cleaners
- TTM equipment vehicle
- graders
- sprayers
- sweepers
- snow ploughs, and
- vehicles spreading grit on icy road surfaces.

Work vehicles must avoid unnecessary delays to traffic (eg pull over when 10 or more vehicles are delayed by the operation).

Work vehicles must be task specific and complete only one task at a time (eg a work vehicle cannot at the same time be a tail pilot vehicle).

On level LV and level 1 roads, the work vehicle must have rear visibility of 50m. If a shadow vehicle is used then this distance applies to the rear of the shadow vehicle.

D2.1.2 Workers on the back of a working vehicle

Workers on the back of a working vehicle must be protected by a shadow vehicle at all times.

D2.1.3 Rotating role of vehicles on level 2 and 3 roads

For mobile operations on level 2 and 3 roads, contractors are expected to use:

- AWWMS, or on non-state highways tail pilot vehicle(s), to provide advance warning
- shadow vehicles fitted with TMAs to protect work vehicles or workers in the lane, and
- work vehicles.

While maintaining the full complement of vehicles, the contractor may rotate the roles of the vehicles on site, providing the work vehicle is a TMA truck and there are no workers on the back of the AWWMS or shadow vehicles.

While rotating the roles of vehicles, work activity must not be undertaken.

D2.1.4 Multiple work vehicles

When a mobile operation or semi-static activity contains more than one work vehicle (and there is no-one on foot) the recommended distance between each work vehicle is 50m.

Where this is not possible, each work vehicle must be treated as a separate mobile operation.

D2.1.5 Operating mobile operations within an established static worksite

Where a mobile operation is contained completely within an existing fixed static worksite which has advance warning and direction and protection signs, including approved temporary speed limit (TSL), sign(s) installed, the requirement for a tail pilot vehicle for any mobile operation within the worksite is waived.

This dispensation must only be applied to worksites with a minimum of CSD visibility to the work vehicle at all times during the operation.

This dispensation will apply to mobile activities such as:

- sweeping excess chip from a chip seal /reseal worksite
- road marking a newly sealed road that has been swept.

Note: Apart from the tail pilot dispensation above, all other requirements for mobile operations with respect to shadow and work vehicles must still be applied.

D2.1.6 Summary of key distances for level 1

Refer to the figure [Summary of key distances for level 1 mobile operation](#).

D3 Pilot vehicles

D3.1 General

A pilot vehicle is used to provide road users with advance warning of a mobile operation on the road ahead. The vehicle can be either a lead pilot or a tail pilot and it will be the first vehicle encountered by approaching drivers.

Pilot vehicles are not required on **level LV, level 1** and **level 2** roads with permanent speed limits less than 65km/h. Static advance warning signs must be installed on the road when a pilot vehicle is not used.

Lead and tail pilot vehicles **are not** required when the work vehicle(s) operates in excess of 80 percent of the permanent or operating speed. This is to be recorded and approved in the TMP. Static signing **is not** required in these situations.

D3.1.1 Summary of key distances for level 1

Refer to the figure [Summary of key distances for level 1 mobile operation](#).

D3.2 Lead pilot vehicles

D3.2.1 General

A lead pilot vehicle is used to provide advance warning for road users travelling in the opposite direction to a mobile operation.

Forward CSD allows the road users travelling in the opposite direction to a mobile operation to react, and stop their vehicle if necessary, before reaching the work vehicle.

The maximum distance between the pilot vehicle and the nearest work vehicle is between five and 20 seconds normal travel time. This equates to approximately 100m to 600m at 100km/h.

Where visibility is restricted, the lead pilot vehicle will need to advance further ahead to a position where CSD is achieved.

D3.2.2 Requirements

A lead pilot vehicle must be used on undivided two-way roads with permanent speed limits greater than 65km/h when:

- the length of road with visibility less than CSD is more than one 1km, or
- the operation crosses the centre line.

A lead pilot vehicle is not required for snow clearing or ice gritting operations.

A lead pilot vehicle is not required for the inspection activities described in subsection [D7.6 Inspections and non-invasive works](#) when the vehicle used is not travelling slower than normal traffic and, if stopped, is parked clear of the live lane.

A lead pilot vehicle is **not** required on one way or multi-lane divided roads.

D3.2.3 Vehicle position

A lead pilot vehicle must be positioned as far to the left as practicable and, if possible, on the shoulder and clear of any live lanes.

This position must also ensure that road users approaching from the opposite direction:

- have at least forward CSD to the lead pilot vehicle
 - will encounter first work vehicle between five and 20 seconds travel time at the normal speed of traffic on the road (this equates to approximately 100m to 600m at 100km/h) after passing the lead pilot vehicle.
-

D3.3 Tail pilot vehicles

D3.3.1 General

A tail pilot vehicle is used to provide drivers of vehicles travelling in the same direction as a mobile operation with advance warning of the mobile operation on the same road ahead of them.

D3.3.2 Requirements

A tail pilot vehicle is not required on **level LV** and **level 1** roads where the permanent speed limit is greater than 65km/h and where the work vehicle(s) is:

- within 5m of the edgeline,
- is not on the carriageway, and
- CSD to the work vehicle(s) is available at all times.

In these situations the appropriate road works signs must be erected to warn road users of the mobile operation on the road ahead. These signs must be erected at spacings no greater than 4km. A TG2 (TW-16) WORKS END sign must be erected at each end of the mobile operation worksite.

A tail pilot vehicle is not necessary on **level LV**, **level 1** and **level 2** roads with permanent speed limits greater than 65km/h for the Inspection Activities described in section [D7 Special mobile operations](#), when the inspection vehicle is:

- not travelling slower than the normal operating speed of traffic on the road, and
- if stopped, is parked clear of the live lane.

D3.3.3 Vehicle position

A tail pilot vehicle must be positioned as far to the left as practicable and, if possible, on the shoulder and clear of any live lanes so that road users are not significantly disrupted while passing it. The tail pilot must also be positioned to ensure that the road users approaching from behind:

- have at least CSD to the tail pilot vehicle, and
- will encounter the nearest work or shadow vehicle between five and 20 seconds travel time at the normal speed of vehicles on the road (this equates to approximately 100m to 600m at 100km/h) after passing the tail pilot vehicle.

Note: To maintain the required CSD a tail pilot driver may have to stop their vehicle while the work vehicle(s) travel around a curve or along a short section of road with restricted visibility.

D4 Shadow vehicles

D4.1.1 General

A shadow vehicle is used to provide close protection from the rear for personnel on foot and/or work vehicles in the working space.

The driver of the shadow vehicle must remain in the cab of the vehicle while working as part of a mobile operation.

D4.1.2 Requirements

Shadow vehicles are not required on level LV and 1 roads unless personnel on foot are on the carriageway. This does not apply to inspections and non-invasive works. Refer to subsection [D7.6 Inspections and non-invasive works](#) for further information.

On **level LV and level 1** roads a shadow vehicle is not required to have a TMA.

On **level 2 and level 3** roads a shadow vehicle with a TMA must be used for mobile operations where the working space is:

- not on the carriageway but within 2m of a live lane, or
- on the live lane.

If a shadow vehicle is not available in these situations a static TTM operation must be implemented.

On **level 2 and level 3** roads multiple lane closures require multiple shadow vehicles. The first shadow vehicle must close the nearest adjoining edge lane and the other shadow vehicle(s) must close the subsequent lanes in a staggered manner.

D4.1.3 Vehicle position

The distance between a shadow vehicle and the work vehicle(s) immediately in front of it must be monitored to ensure compliance with the distances stated in the table below.

If the shadow vehicle is too close, and is hit from behind, there is a danger of it running down personnel on foot in the working space.

If the shadow vehicle is too far away other road users may get in between the shadow vehicle and the work vehicle(s).

The distance between the work and shadow vehicles is:

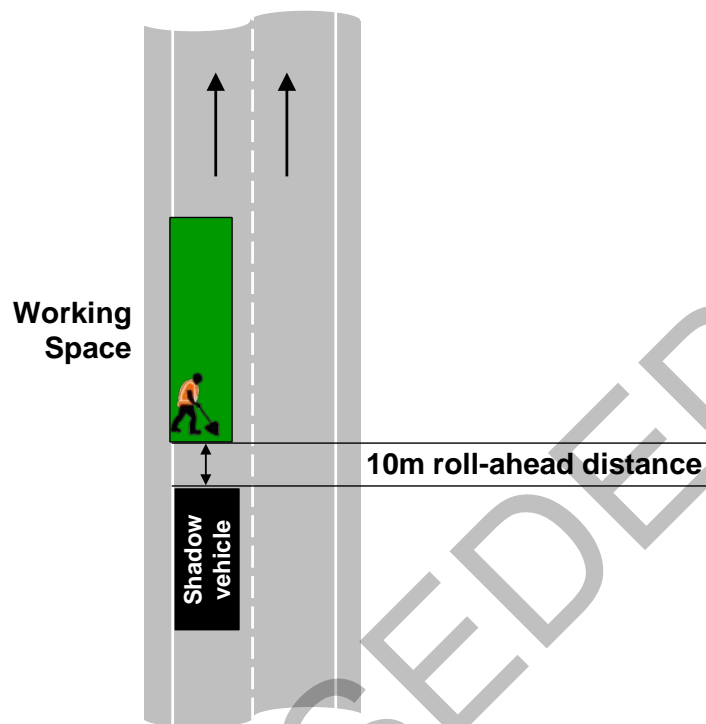
Permanent speed limit (km/h)	Distance between work and shadow vehicle (metres)	Position on road
Under 65	Between 25 and 40 behind the work vehicle(s)	In the same lane
Over 65	Between 40 and 60 behind the work vehicle(s)	In the same lane

The rear visibility required for a shadow vehicle is at least:

- 50m on **level LV and level 1** roads, if a shadow vehicle is not used then this distance applies to the rear of the work vehicle, and
- 100m on **level 2 and level 3** roads.

D4.1.4 Roll-ahead distance

When a shadow vehicle is used to protect workers on foot in the lane then a minimum 10m roll-ahead distance must be provided in front of the shadow vehicle to allow the truck to safely move forward if impacted.



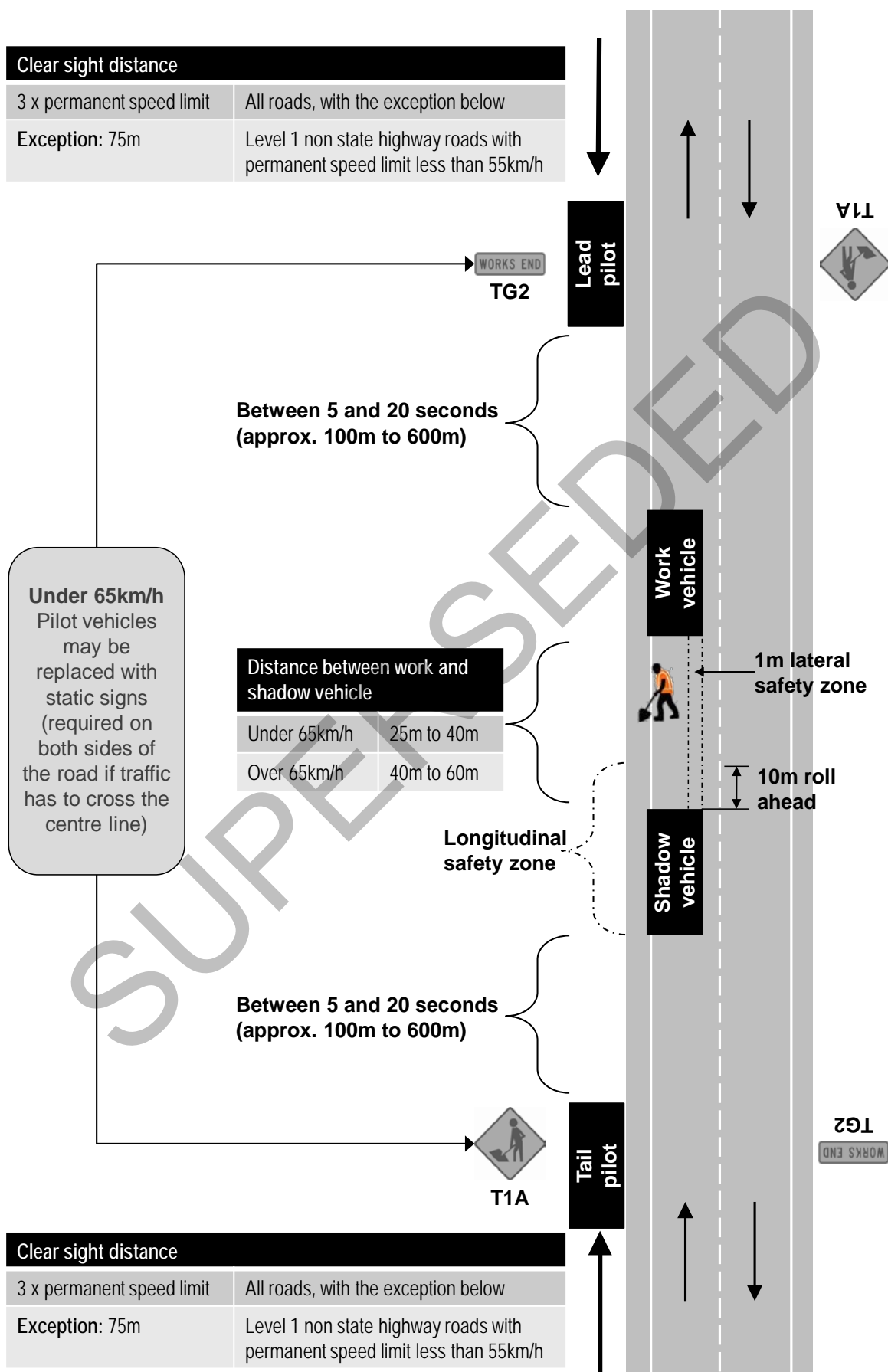
D4.1.5 Braking of vehicles

When in a stationary position, vehicles in a mobile operation must have their hand brake applied and either park applied, or be engaged in a low gear.

D4.1.6 Summary of key distances for level 1

Refer to the figure [Summary of key distances for level 1 mobile operation](#).

Summary of key distances for level 1 mobile operation



D5 Mobile closures operational requirements

D5.1 Level LV and level 1 roads

D5.1.1 Common requirements for level LV and level 1 mobile operations

D5.1.1.1 Specific requirements for level LV low-risk mobile operations

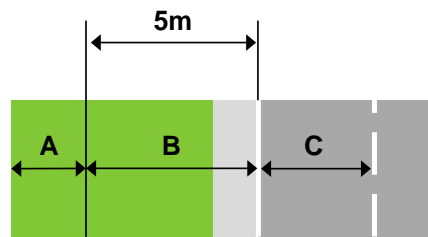
- Mobile operations for this level utilise rear mounted advance warning T1 (TW-1) type signs or TV4 (TW-34) PASS WITH CARE sign and the RD6R (RG-34) sign.
- Each vehicle has at least one (preferably two) amber flashing beacon(s).
- The minimum rear CSD required is 3 x the permanent speed limit (or operating speed if declared by the RCA). Rear CSD of 75m may be applied to roads that are not state highways and have a permanent speed limit of less than 55km/h.
- This method applies to roads with a permanent speed (or operating speed) of less than 65km/h.
- If the above requirements cannot be achieved the operation must be modified to comply with the requirements of a higher risk rating.

D5.1.1.2 Requirements for level LV and level 1 mobile operations

- A TMA is not needed on any vehicle used in a mobile closure operation on any level LV or level 1 road.
- The minimum rear CSD required for a tail pilot vehicle is 3 x the permanent speed limit (or operating speed if declared by the RCA).
- Rear CSD of 75m may be applied to level LV and level 1 roads that are not state highways and have a permanent speed limit of less than 55km/h.
- The distance from the tail pilot vehicle to the first shadow or work vehicle may vary between five and 20 seconds travel time at the normal operating speed of traffic on the road (this equates to approximately 100m to 600m at 100km/h).
- The distance from a shadow vehicle to the first work vehicle may vary between 40m and 60m (or between 25m to 40m if the permanent speed limit is under 65km/h).
- TV4 (TW-34) PASS WITH CARE sign may be replaced with an arrow board.

The following summaries of requirements for level LV and level 1 roads are dependent on where the operation is located on the road.

Zones of a mobile operation



A Greater than 5m from edgeline

B Within 5m of edgeline and not on live lane

C On live lane

D5.1.2 Where an activity is more than 5m from an edgeline (zone A)

Where the work vehicle is more than 5m from the edgeline the work vehicle must have either:

- the appropriate advance warning sign with supplementary plate if required and the RD6R (RG-34) sign
- or
- the TV4 (TW-34) PASS WITH CARE sign and the RD6R (RG-34) sign.

D5.1.3 Where an activity is within 5m of an edgeline (zone B), and

- a. is not on the live lane, and greater than rear CSD is available:
 - a T1A (TW-1.x) ROAD WORKS sign, and any relevant supplementary plate, must be erected in advance of the worksite
 - additional T1A (TW-1.x) ROAD WORKS signs and any relevant supplementary plates must be erected at intervals no greater than 4km throughout the length of the worksite
 - a TV4 (TW-34) PASS WITH CARE sign and an RD6R/L (RG-34/17) keep right/left sign must be mounted on the work vehicle(s)
 - a TG2 (TW-16) WORKS END sign erected at the end of the worksite.
- b. is not on the live lane, and less than rear CSD is available:
 - where the permanent speed limit is less than 65km/h the requirements of 3(a) above apply
 - where the permanent speed limit is greater than 65km/h a tail pilot vehicle fitted with a T1A (TW-1.x) ROAD WORKS sign and any relevant supplementary plate and an RD6R (RG-34) keep right sign, or an RD6L (RG-17) keep left sign is required
 - the work vehicle(s) must be fitted with rear TV4 (TW-34) PASS WITH CARE sign(s) and an RD6R/L (RG-34/17) keep right/left sign(s).

D5.1.4 Where an activity is on the live lane (zone C), and

-
- a. the permanent speed limit is less than 65km/h:
 - a T1A (TW-1.x) ROAD WORKS sign, and any relevant supplementary plate, must be erected in advance of the worksite
 - a shadow vehicle fitted with a TV4 (TW-34) PASS WITH CARE sign and an RD6R (RG-34) keep right sign or an RD6L (RG-17) keep left sign is required when personnel are on foot within the worksite
 - the work vehicle(s) must be fitted with rear-mounted TV4 (TW-34) PASS WITH CARE sign and an RD6R (RG-34) keep right sign or an RD6L (RG-17) keep left sign
 - a TG2 (TW-16) WORKS END sign erected at the end of the worksite.
 - b. on a level LV road, the above requirements can be applied to roads with any permanent speed limit
 - c. the permanent speed limit is greater than 65km/h:
 - a tail pilot vehicle fitted with a T1A (TW-1.x) ROAD WORKS sign with any relevant supplementary plates and an RD6R (RG-34) keep right sign or an RD6L (RG-17) keep left sign is required
 - a shadow vehicle fitted with a TV4 (TW-34) PASS WITH CARE sign and an RD6R (RG-34) Keep Right sign or an RD6L (RG-17) keep left sign is required when there are personnel on foot within the worksite
 - the work vehicle(s) must be fitted with rear-mounted TV4 (TW-34) PASS WITH CARE signs with RD6R (RG-34) keep right signs or RD6L (RG-17) keep left signs
 - the leading work vehicle must be fitted with a front-mounted TV2 (TW-26) ROAD WORKS sign, unless a lead pilot vehicle is required
 - where the activity is on a two-lane road, and forward CSD to the first work vehicle on the live lane cannot be achieved on sections of road 1km in length or longer, a lead pilot vehicle fitted with a front-mounted TV2 (TW-26) ROAD WORKS sign is required.
-

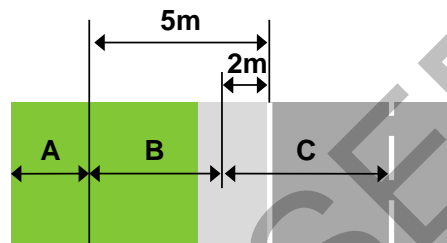
D5.2 Level 2 roads

D5.2.1 The common requirements for level 2 mobile operations

- The minimum rear CSD required for a tail pilot vehicle is 3 x the permanent speed limit (or operating speed if declared by the RCA).
- The distance from the tail pilot vehicle to the first shadow or work vehicle may vary between five and 20 seconds travel time at the normal operating speed of traffic on the road (this equates to approximately 100m to 600m at 100km/h).
- The distance from a shadow vehicle to the first work vehicle may vary between 40m and 60m (or between 25m to 40m if the permanent speed is under 65km/h).

The following summaries of requirements for level 2 roads are dependent on where the operation is located on the road.

Zones of a mobile operation



A Greater than 5m from edgeline

B From 2m outside the white edgeline to a point 5m outside the white edgeline

C On the live lane and the first 2m outside the white edgeline on the road shoulder

D5.2.2 Where an activity is more than 5m from an edgeline (zone A)

The only signing needed is a T1B (TW-1.x) sign and any relevant supplementary plate mounted on the rear of the work vehicle(s).

D5.2.3 Where an activity is between 2m and 5m from an edgeline (zone B), and has

- a. more than rear CSD available:
 - a T1B (TW-1.x) ROAD WORKS sign and any relevant supplementary plate, must be erected in advance of the worksite
 - additional T1B (TW-1.x) ROAD WORKS signs and any relevant supplementary plates must be erected at intervals no greater than 4km throughout the length of the worksite
 - a TV4 (TW-34) PASS WITH CARE sign and an RD6R/L (RG-34/17) keep right/left sign must be mounted on the work vehicle(s)
 - a TG2 (TW-16) WORKS END sign erected at the end of the worksite.
- b. less than rear CSD available and:
 - the permanent speed limit is less than 65km/h:
 - o the requirements of 3(a) above apply
 - the permanent speed limit is greater than 65km/h:
 - o a tail pilot vehicle fitted with a T1B (TW-1.x) ROAD WORKS sign and any relevant supplementary plate and an RD6R (RG-34) keep right sign or an RD6L (RG-17) keep left sign is required - located at least 2m from edgeline at all times
 - o the work vehicle(s) must be fitted with a rear-mounted TV4 (TW-34) PASS WITH CARE sign(s) and RD6R (RG-34) keep right sign(s).

D5.2.4 Where the activity is on the live lane or is 2m or less from an edgeline (zone C), and

- a. the permanent speed limit is less than 65km/h:
 - Advance warning:
 - o a T1B (TW-1.x) ROAD WORKS sign and any relevant supplementary plate must be erected in advance of the worksite
 - Shadow vehicle:
 - o a shadow vehicle fitted with a TMA and the R3-13.3 sign consisting of the red and white delineation, the RD6T (light arrow system) and the blue disk and white arrow RD6L/R (RG-17/34)
 - o on non-state highways, and with the relevant RCA's permission, horizontal arrow boards may be used instead of the RD6T (light arrow system) and the RD6L/R (RG-17/34) (blue disk/white arrow)
 - Work vehicle:
 - o the work vehicle(s) must be fitted with a rear-mounted TV4 (TW-34) PASS WITH CARE sign and the relevant RD6L/R (RG-17/34) keep left, keep right signs
 - o where the activity is on a two-way two-lane road the leading work vehicle must be fitted with a front-mounted TV2 (TW-26) ROAD WORKS sign unless a lead pilot is required
 - Works end:
 - o a TG2 (TW-16) WORKS END sign is erected at the end of the worksite.

-
- b. the permanent speed limit is greater than 65km/h:
- Advance warning (tail pilot):
 - o either a light goods vehicle (or light trailer) mounted AWWMS displaying a T1B (TW-1.x) ROAD WORKS sign and direction and protection signs
 - o on non-state highways, and with the relevant RCA's permission, a TMA truck fitted with horizontal arrow boards may be used instead of the RD6T (light arrow) and the RD6L/R (RG-17/34) (blue disk/white arrow), and the T1B (TW-1x) road works sign and any supplementary plates
 - Shadow vehicle:
 - o a shadow vehicle fitted with a TMA, and the R3-13.3 sign consisting of the red and white delineation, the RD6T (light arrow) and the blue disk and white arrow RD6L/R (RG-17/34) is required
 - o on non-state highways, and with the relevant RCA's permission, a TMA truck fitted with horizontal arrow boards may be used instead of the RD6T (light arrow) and the RD6L/R (RG-17/34) (blue disk/white arrow)
 - Work vehicle:
 - o the work vehicle(s) must be fitted with a rear-mounted TV4 (TW-34) PASS WITH CARE sign and the relevant RD6L/RD6R (RG-17/34) keep left, keep right signs
 - Lead pilot vehicle:
 - o where the activity is on a two-lane two-way road the leading work vehicle must be fitted with a front-mounted TV2 (TW-26) ROAD WORKS sign unless a lead pilot is required
 - o where the activity is on a two-lane two-way road and forward CSD to the first work vehicle on the live lane, or to a work vehicle within 2m of the edgeline, cannot be achieved on sections of road 1km in length or longer, a lead pilot vehicle fitted with a front-mounted TV2 (TW-26) ROAD WORKS sign is required.
-

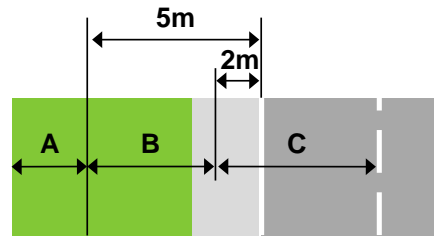
D5.3 Level 3 roads

D5.3.1 Location on the road

-
- The minimum rear CSD required for a tail pilot vehicle is 3 x the permanent speed limit.
 - The distance from the tail pilot vehicle to the first shadow vehicle may vary between five and 20 seconds travel time at the normal operating speed of traffic on the road (this equates to approximately 100m to 600m at 100km/h).
 - The distance from a shadow vehicle to the first work vehicle may vary between 40m and 60m.
-

The following summaries of requirements for level 3 roads are dependent on where the operation is located on the road.

Zones of a mobile operation



A Greater than 5m from edgeline

B From 2m outside the white edgeline to a point 5m outside the white edgeline

C On the live lane and the first 2m outside the white edgeline on the road shoulder

D5.3.2 Where an activity is more than 5m from an edgeline (zone A)

The only signing needed is a T1B (TW-1.x) ROAD WORKS sign and any relevant supplementary plate mounted on the rear of the work vehicle(s).

D5.3.3 Where an activity is between 2m and 5m from an edgeline and not on the carriageway (zone B), and

- a. more than rear CSD is available:
 - a T1B (TW-1.x) ROAD WORKS sign and any relevant supplementary plate must be erected in advance of the worksite
 - additional T1B (TW-1.x) ROAD WORKS signs and any relevant supplementary plates must be erected at intervals no greater than 4km throughout the length of the worksite
 - a TV4 (TW-34) PASS WITH CARE sign and an RD6R (RG-34) keep right sign must be mounted on the work vehicle(s)
 - a TG2 (TW-16) WORKS END sign erected at the end of the worksite.
- b. less than rear CSD:
 - a light goods vehicle (or light trailer) mounted AWVMS displaying a T1B (TW-1.x) ROAD WORKS sign and direction and protection signage plus distance ahead
 - the work vehicle(s) must be fitted with a rear-mounted TV4 (TW-34) PASS WITH CARE sign and the relevant RD6L/R (RG-17/34) (keep left, keep right signs).

D5.3.4 Where an activity is 2m or less from an edgeline and not on the carriageway, or is on the live lane

- A light goods vehicle (or light trailer) mounted AWVMS displaying a T1B (TW-1.x) ROAD WORKS sign and direction and protection signage plus distance ahead.
- A shadow vehicle(s) fitted with a TMA and the R3-13.3 sign consisting of the red and white delineation, the RD6T (light arrow) and the blue disk and white arrow RD6L/R (RG-17/34) is required.
- The work vehicle(s) must be fitted with a rear-mounted TV4 (TW-34) PASS WITH CARE sign and the relevant RD6L/R (RG-17/34) (keep left, keep right signs).

D5.4 Summary of requirements for mobile closures

D5.4.1 Introduction

The summaries of requirements for each level of road are set out on the following pages.

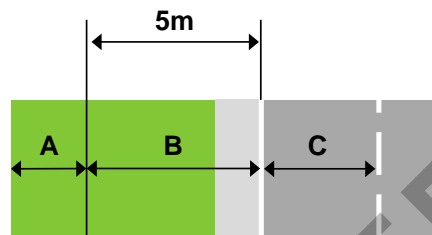
Each summary includes requirements that are dependent on location on the road, speed and CSD.

D5.4.2 Location on the road

D5.4.2.1 Level LV and level 1

The key for location on the road for level LV and level 1 mobile operations is:

Zones of a mobile operation



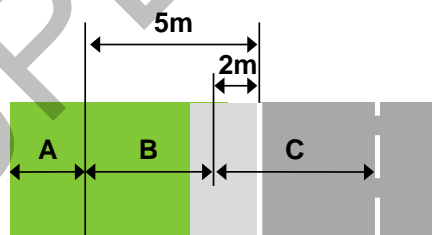
- A Greater than 5m from edgeline
- B Within 5m of edgeline and not on live lane
- C On live lane

Refer to the figure [Summary of key distances for level 1 mobile operation](#).

D5.4.2.2 Level 2 and 3

The key for location on the road for level 2 and level 3 mobile operations is:

Zones of a mobile operation



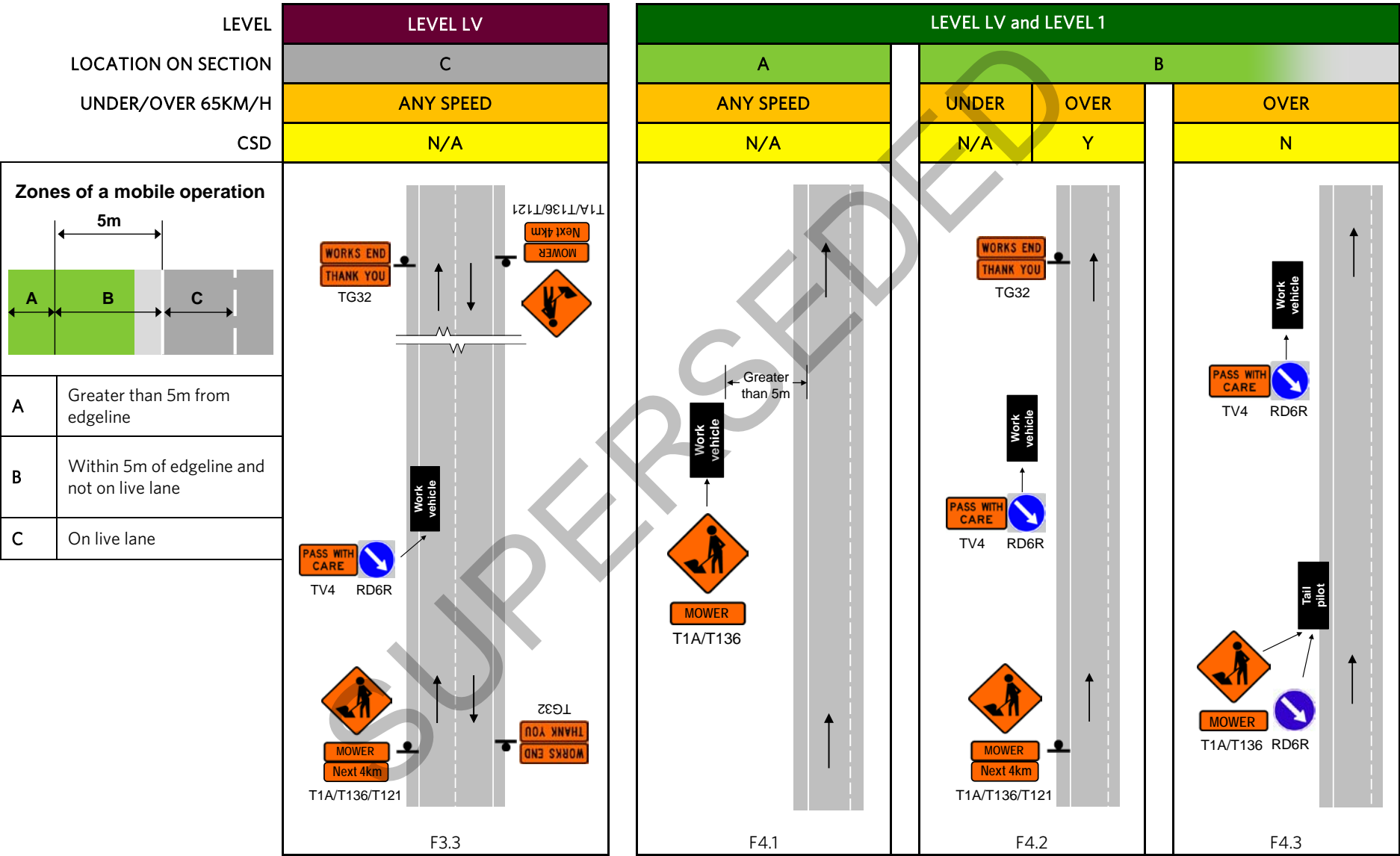
- A Greater than 5m from the white edgeline
- B From 2m outside the white edgeline to a point 5m outside the white edgeline
- C On the live lane and the first 2m outside the white edgeline on the road shoulder

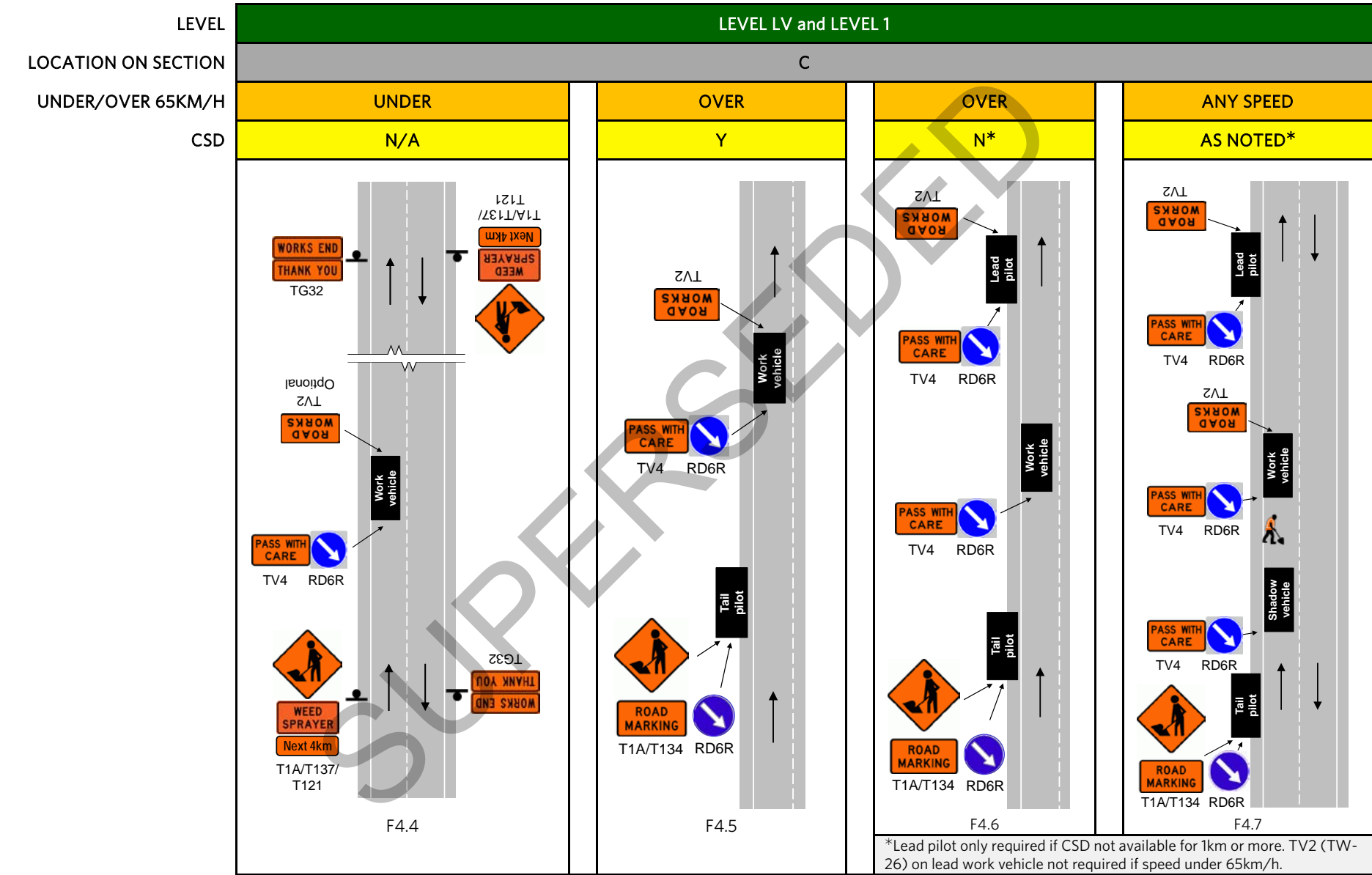
D5.4.3 CSD

The key to interpreting the CSD requirements is:

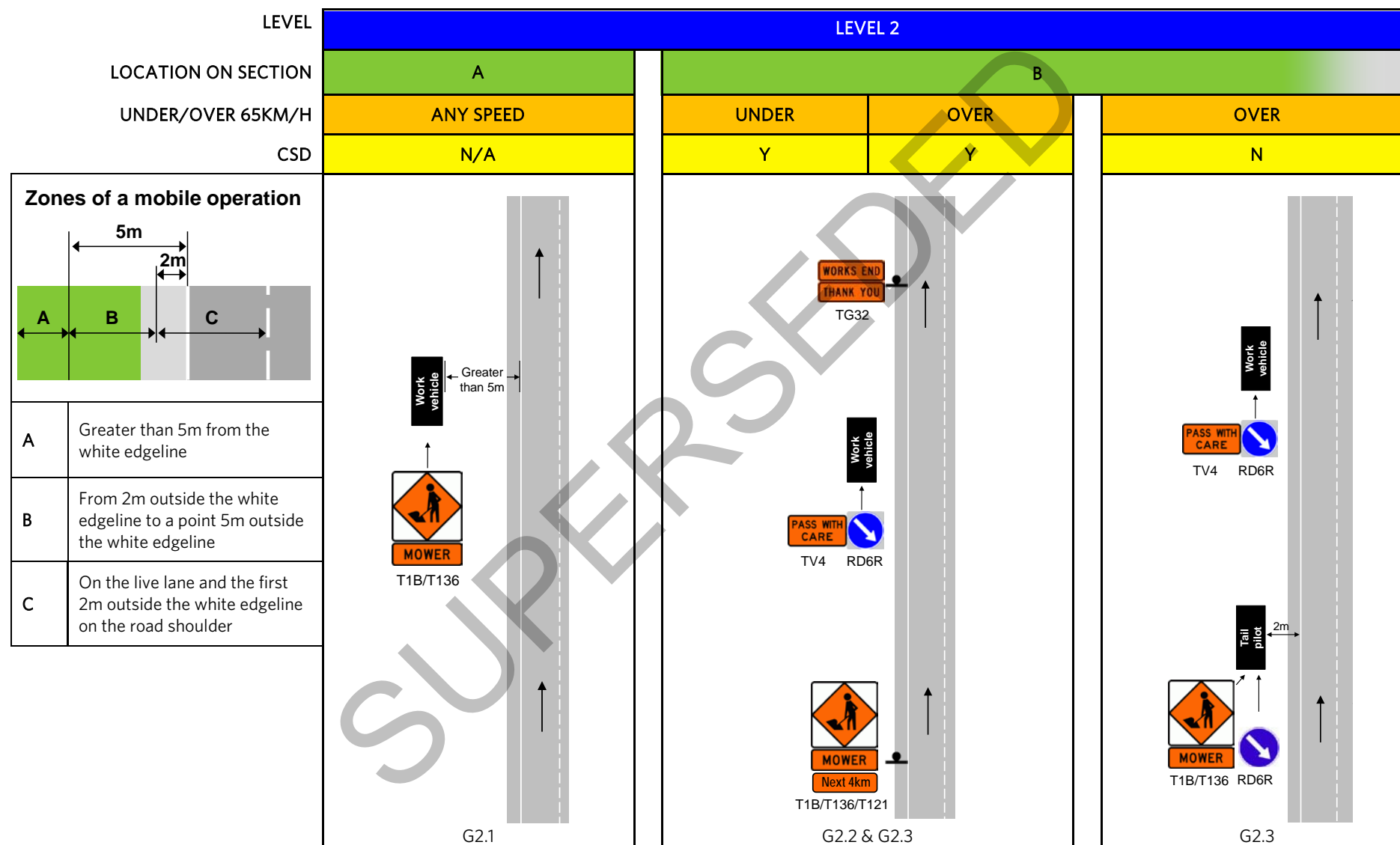
Y	You have CSD to the work vehicle
N	CSD to work vehicle not available
N/A	CSD not applicable

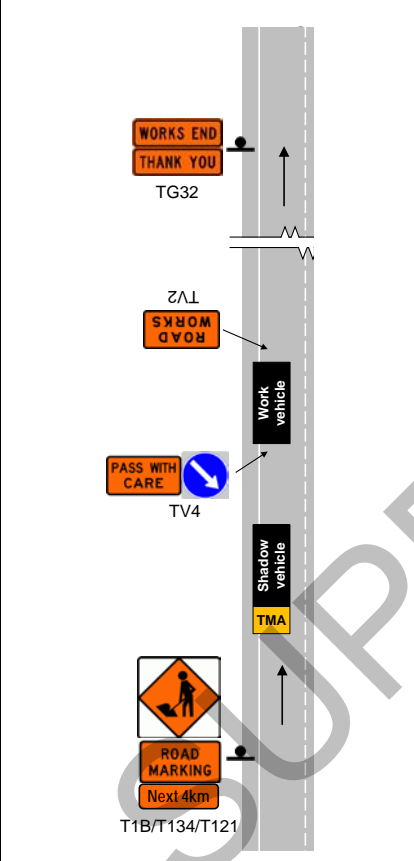
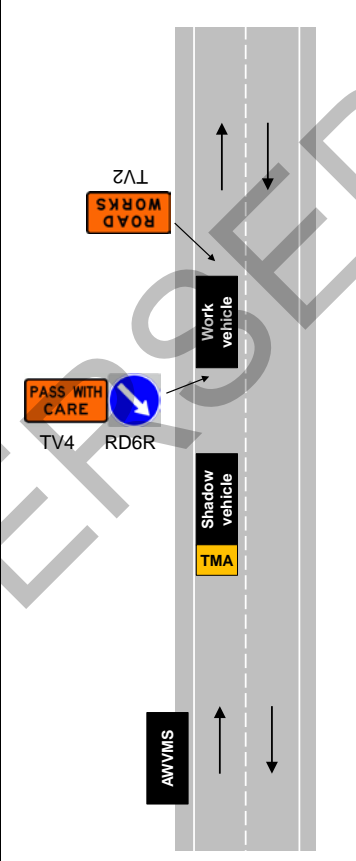
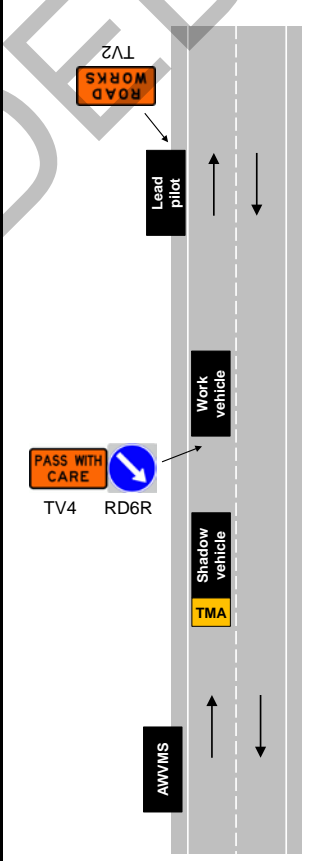
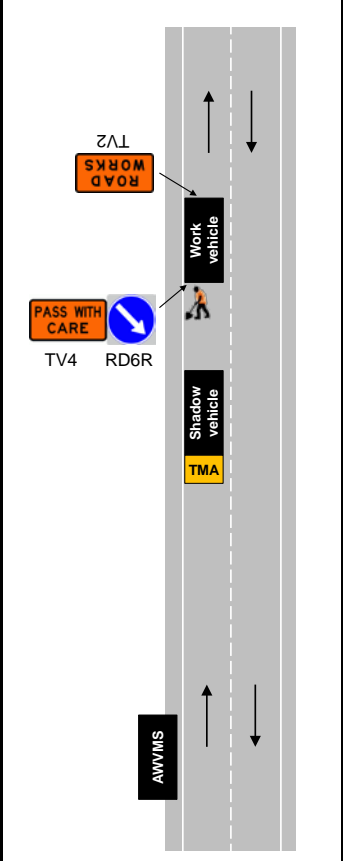
D5.4.4 Summary of requirements for level LV and level 1 mobile closures



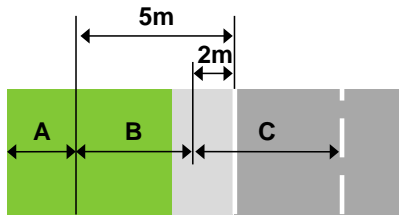
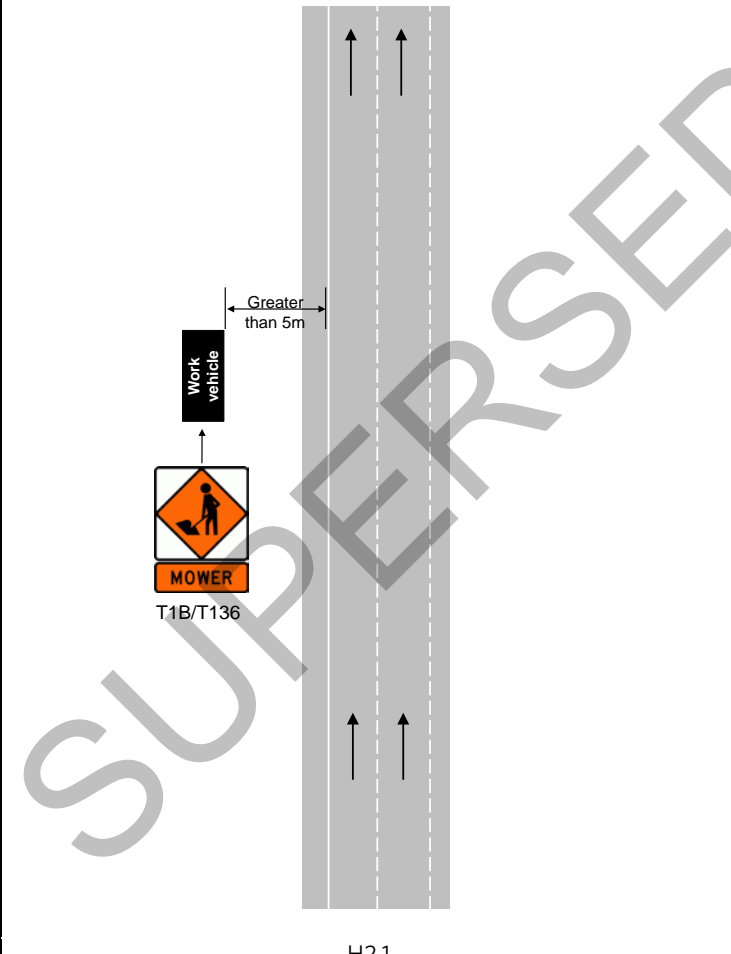
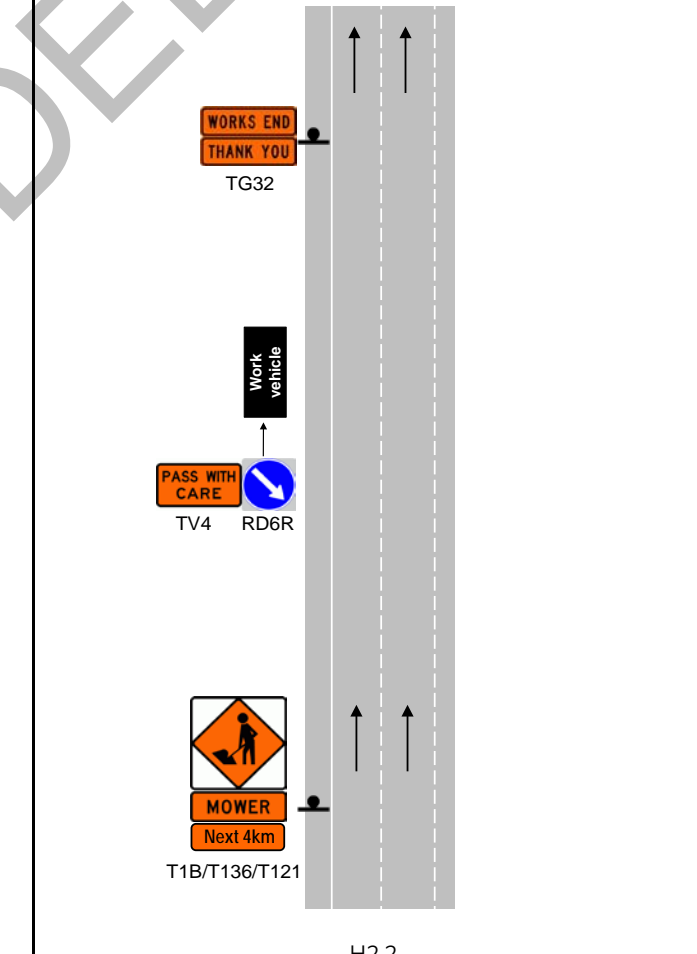


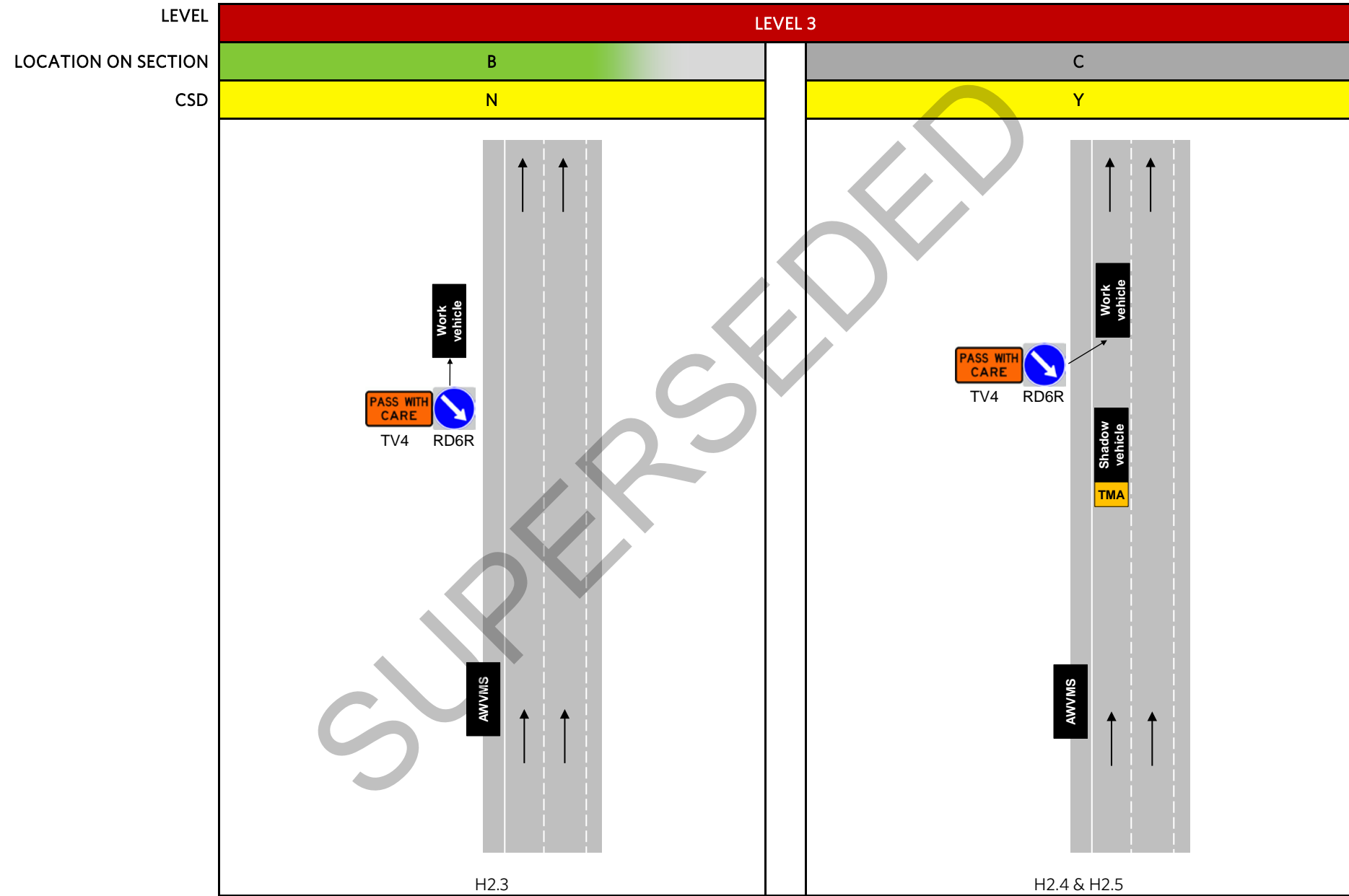
D5.4.5 Summary of requirements for level 2 mobile closures



LEVEL	LEVEL 2			
LOCATION ON SECTION	C			
UNDER/OVER 65KM/H	UNDER	OVER	OVER	OVER
CSD	N/A	Y	N	Y
	 <p>If between 0m to 2m - G2.4 & G2.9 If on live lane - G2.6</p> <p>TV2 ROAD WORKS sign required on the lead vehicle if on a two-way road.</p>	 <p>G2.5 & G2.10</p>	 <p>G2.7</p>	 <p>G2.8</p>
	On non-state highways, and with the relevant RCA's permission, horizontal arrow boards may be used instead of the RD6T (light arrow) and the RD6L/R (RG-17/34) (blue disk/white arrow) mounted on TMA trucks.			

D5.4.6 Summary of requirements for level 3 mobile closures

LEVEL		LEVEL 3	
LOCATION ON SECTION		A	B
CSD		N/A	Y
Zones of a mobile operation 			
A	Greater than 5m from the white edgeline		
B	From 2m outside the white edgeline to a point 5m outside the white edgeline		
C	On the live lane and the first 2m outside the white edgeline on the road shoulder		



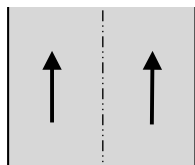
D6 Semi-static closures

D6.1.1 General

Where a mobile closure on the carriageway of the road cannot be completed within 10 minutes, it becomes a semi-static closure, by definition.

A semi-static closure is a short-term operation on the carriageway of the road that is more than 10 minutes and less than one hour in duration. The 10 minutes to 60 minutes timeframe applies only to the working period and does not include the time required to install and remove the TTM devices on the worksite.

Where the activity cannot be completed within one hour it becomes a static closure, by definition.



Semi-static closures **are permitted** on all one-way multi-lane roads.

Semi-static closures are **not permitted** on two-lane two-way roads.

However, semi-static closures may be used on two-lane two-way roads where the closure occupies the painted flush median.

Semi static closures are not permitted where traffic is forced to cross the centre line. The flush median must not be used as a traffic lane for semi-static closures.

D6.1.2 Worksite layout

The visibility, vehicle spacing and signing requirements for a semi-static closure on the carriageway of a road are exactly the same as those for an equivalent mobile closure in the same situation.

In addition, the following requirements also apply to all semi-static closures:

- Advanced warning signs must be placed in advance of the closure.
- Cones must be placed between the shadow vehicle and the work vehicle(s).
- A cone taper must also be installed in advance of the shadow vehicle.
- If an AWWMS is used, the cone taper is not required in front of the shadow vehicle.
- Cone spacings must conform to the requirements given in the appropriate layout distance table in section [C2 Worksite layout](#).

D6.1.3 Signs

D6.1.3.1 On one-way multilane roads

On one-way multilane roads T1A or T1B (TW-1.x) type road works signs must be placed in advance of the closure and on both sides of the road.

If a tail pilot vehicle is being used, the advance warning sign mounted on the tail pilot vehicle performs this function for one side of the road and a static sign is erected on the other side of the road.

D6.1.3.2 For two-way two-lane roads

For two-way two-lane roads (with painted flush median), static T1A or T1B (TW-1.x) type signs must be placed at each end of the closure.

D6.1.3.3 All roads

Signs, cone spacing, taper lengths and distance between tapers must conform to the requirements given in the appropriate layout distance table in section [C2 Worksite layout](#).

D6.1.3.4 AWWMS

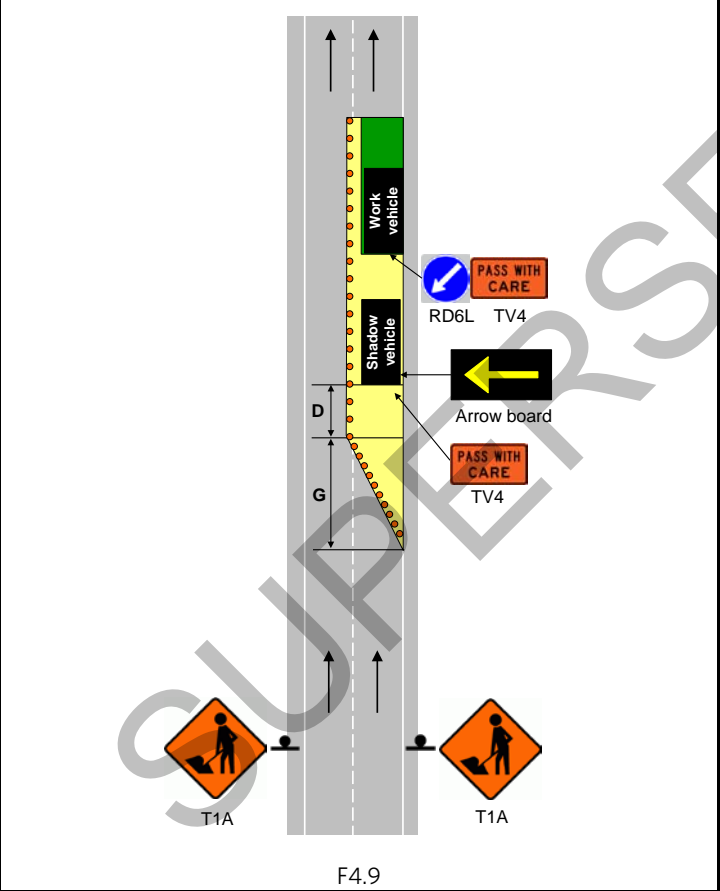
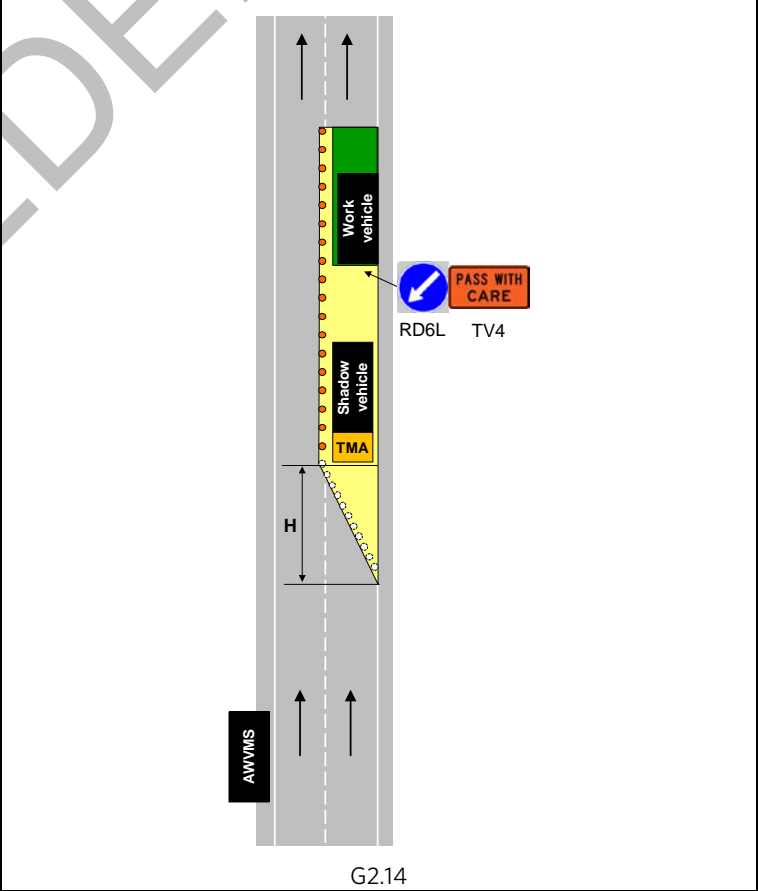
Where an AWWMS is used as the advance warning and direction and protection sign for the semi-static closure, the following applies:

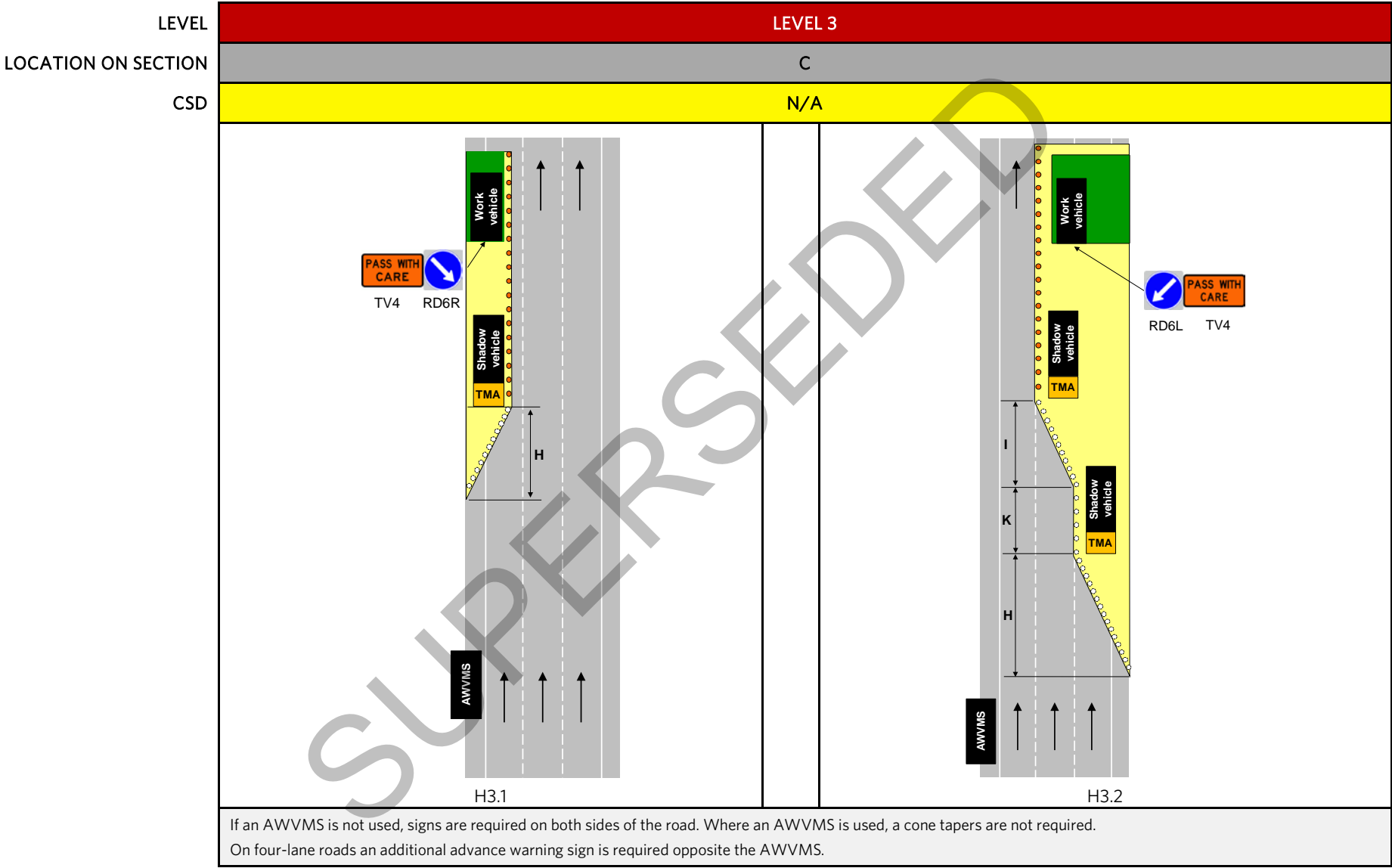
- If there are three or less traffic lanes in the same direction, there is no need for a static sign(s) to be erected on the shoulder, opposite the AWWMS on the other side of the road.
- If there are four or more traffic lanes in the same direction, a static sign(s) must be erected on the shoulder, opposite the AWWMS on the other side of the road, or the operation must revert to a static closure.
- There is no requirement to place a cone taper to the rear of the shadow vehicle.

D6.1.3.5 Side roads

When stopped to carry out a semi-static operation with a side road between the tail pilot and the shadow work vehicle, additional signing must be placed on the side road to warn approaching road users.

D6.1.4 Summary of requirements for semi-static closures (work for more than 10 minutes but less than one hour)

LEVEL	LEVEL 1	LEVEL 2
LOCATION ON SECTION	C	C
UNDER/OVER 65KM/H	ANY SPEED	ANY SPEED
CSD	N/A	N/A
	 <p>F4.9</p> <p>One of the T1A signs could be mounted on a tail pilot vehicle.</p>	 <p>G2.14</p> <p>Where an AWWMS is used, a cone taper (H) is not required.</p>



D7 Special mobile operations

D7.1 General

The following procedures are provided to enhance the safety of specific mobile operations. Unless otherwise stated, the requirements of CoPTTM apply.

D7.2 Road marking

To assist with TTM for road marking operations some industry best practice TMPs have been prepared and are available in section I.2 of CoPTTM which is only available electronically from the NZTA's website.

D7.2.1 General

Road marking using type A applicators may be carried out as a mobile operation.

Road marking using type B applicators may only be carried out as a mobile operation when all activities fully comply with the requirements for a mobile operation.

Flexible lines for transporting air, paint and other products are considered to be part of the work vehicle(s) and are required to fully comply with the requirements of CoPTTM in regard to maintaining safety zone dimensions.

For further information on type A and B applicators refer to the [NZTA/NZRF T/8:2008 Specification for Roadmarking applicator testing](#).

D7.2.2 Protection of new road markings

The cones used for protecting new road markings must have a minimum height of 450mm. All other cones used in pavement marking operations must have a minimum height of 900mm.

When cones are used solely for the protection of new road markings they must be placed in a manner that ensures:

- at least three cones will be visible to road users at any one-time
 - they are at no greater than 50m spacings on straight sections of road
 - they are placed at closer spacings on curves, when necessary, so that at least three cones will be visible to drivers users at any one-time, and
 - they are deployed only for the short time pavement markings are vulnerable to damage by road users.
-

D7.2.3 Installation of raised pavement markers

A mobile operation may be used to install raised pavement markers.

Care must be taken to avoid peak traffic flows.

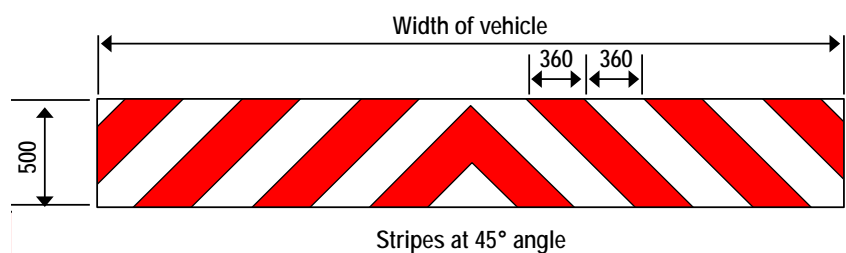
D7.3 Kerbside collection activities

D7.3.1 Kerbside refuse and recycle collections

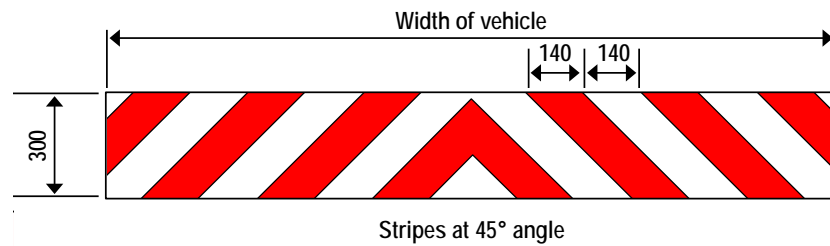
For kerbside refuse and recycle collections the following applies:

1. All vehicles must operate in accordance with the traffic regulations and *The official New Zealand Road Code*.
2. A TMP must be prepared by an STMS. Any generic TMPs must be reviewed yearly.
3. All drivers must be trained as a waste collection traffic leader (WCTL). Training must be carried out by an NZTA qualified CoPTTM trainer.
4. All mobile work teams (usually a driver and collectors) must be led by a WCTL.
5. Training for a WCTL is available through the CoPTTM training system. WCTL is a unique qualification for the Waste Collection Industry and must be renewed every three years.
6. All WCTLs and crews must be briefed by an STMS once every six months on safety procedures when operating as a mobile activity. The safety briefing must be documented.
7. Prior to starting work, the qualified WCTL must give a safety briefing to the crew. The safety briefing must be documented.
8. There must have a minimum of one STMS per company. Where a company has more than one branch they may require an additional STMS.
9. The approved TMP must be available and be kept in the vehicle at all times.
10. The RCA may restrict the hours of operation on some roads
11. All vehicles involved in a kerbside collection activity must display a hatched reflective panel (red/white) across the rear of the vehicle (see the two options below). Gaps and variations are permitted where the vehicle's rear section is broken by loading features. Where hatching cannot be placed the full width of the vehicle, additional depth of hatching, i.e. 300-500mm, should be applied, where practicable.

Option 1



Option 2



12. Each vehicle must have installed, at the front, one operating amber beacon and to the rear two amber beacons. The beacons to the rear are to be installed to the highest most practical extremes of the vehicle. The vehicle's hazard warning lights (flashers used in emergency mode) must not be used as amber beacons.
13. All vehicles in a kerbside activity must have an audible operating reversing warning buzzer installed to warn workers and the public.
14. All vehicles in a kerbside activity must have an operational rear-mounted camera with an active monitor in the cab for the driver.
15. All drivers and crew members must wear a CoPTTM-compliant garment.
16. All existing drivers must obtain a WCTL qualification and carry their warrant card when operating a kerbside collection vehicle.
17. All new drivers must obtain a WCTL qualification within four months of commencement of employment.
18. The STMS is not required to be within 30 minutes of a given site. However, the STMS must respond to a call within 30 minutes.
19. All work vehicles must have a TV4 (TW-34) PASS WITH CARE sign. This sign must comply with the [Land Transport Rule: Traffic Control Devices 2004 \(TCD Rule\)](#), the shape and size is a rectangle 900x450mm.

D7.4 Repairing a flexible median barrier

D7.4.1 Introduction

During repairs undertaken where the median is narrow, the contractor must take steps to protect workers from traffic from both directions.

During a semi-static closure in a multiple lane (in both directions, ie a 2+2 lane highway) this can be achieved by placing shadow vehicles and advance warnings on both approaches.

If closure of adjoining lanes is not possible, as with a 2+1 lane or 1+1 lane highway, the contractor must set up a static site with TSL commensurate with safety.

D7.5 Rolling blocks

D7.5.1 Requirements

Rolling blocks may be conducted on level 2 and level 3 divided carriageways subject to the following:

- They must only be carried out in terms of an approved TMP for the activity.
- They must only be carried out for a maximum period of five minutes.
- The TMAs must keep moving forwards at all times.
- All onramps feeding into the area of the rolling block must be controlled.
- They may only be implemented where delay calculations indicate that any queues forming during a rolling block of five minutes, can be immediately dissipated once the block is withdrawn.
- Advance warning of queues ahead must be provided at least 5km in advance of the rolling block - a variable message sign (VMS) and /or AWWMS and /or advance traffic management system (ATMS) may be used.
- Further advance warning of queues ahead must be provided 1km from the point where the block vehicles commence slowing of traffic and 500m in advance of the furthest extremity of the predicted queuing.

Note: Rolling blocks can be used for works that require the full width of the carriageway.

At present, there are no formal guides to direct STMS(s) on the best practice to conduct rolling block operations. However, within the Auckland network, rolling blocks have been applied extensively and successfully by both the New Zealand Police and the traffic control contractors. The rolling blocks are used to clear the road ahead to assist in the transportation of heavy equipment and machinery into worksites.

D7.6 Inspections and non-invasive works

D7.6.1 Factors affecting inspections

The general principle for inspection and non-invasive activities is that the person undertaking the inspection must move to avoid traffic on the road, ie they must not expect traffic to move or slow down for the inspection activity.

The TTM measures required for the activities involved in road inspections, investigations, measurement and/or testing, etc depend on:

- the time taken for the activity
- the CSD required for the permanent speed limit on the road or the operating speed as defined by the RCA for the road, and
- the traffic volume on the road at the time.

For a summary of the inspection requirements refer to subsection [D7.7 Summary of requirements for inspections](#).

D7.6.2 Planned inspection and non-invasive work activities

Planned inspection and non-invasive activities are those where the inspector(s) are on foot and undertaking simple tasks such as:

- observation, using a measuring wheel, surveys, traffic counts
- installing traffic count equipment
- road maintenance activities such as removal of litter, cleaning signs, cleaning edge markers, installing edge marker posts, temporary pothole repairs, hand clearing vegetation from culvert headwalls and inlet/outlets or taking photographs.

More complex activities, or those which cannot immediately move off the live lane, require mobile or static TTM.

D7.6.3 Basic requirements

Inspectors must move from live lanes to avoid traffic. They must not expect traffic to drive slowly or drive around them.

On level LV and level 1 roads, a person completing an inspection or non-invasive works cannot be on a live lane for more than five minutes.

Unless otherwise approved by the RCA, all inspections on the live lane of level 1 roads require a spotter. The RCA may provide a list of roads, times and/or activities suitable for inspection by a single inspector (eg where no level LV roads have been declared by the RCA).

A spotter is not required for inspections and non-invasive works on level LV roads.

Where an unaccompanied inspector is not able to maintain adequate attention (eg due to work tasks or poor visibility), a spotter person will be required or another type of traffic management operation used.

The requirements of CoPTTM such as wearing a high-visibility garment must apply.

A copy of the approved TMP for the inspection being carried out must be available on-site.

Where CSD is not available (eg for a road with a permanent speed limit of 70km/h the CSD required is $3 \times 70 = 210\text{m}$) extra care must be exercised on all levels of road and the use of a lookout person or static, or mobile TTM is required.

On busy roads where traffic levels affect access to the lane, peak periods must be avoided or higher levels of TTM applied.

An unaccompanied inspector may walk across a level LV, level 1 or 2 road.

Climbing over median barriers is **not** permitted on any level of road unless you are protected on both sides (i.e. by a barrier or closure both sides).

Inspection activities are not permitted on a live lane of level 2 or 3 roads. Mobile or static closures must be implemented for these inspection activities.

D7.6.4 Vehicle requirements

Vehicles must:

- be parked clear of the live lane, and
- have an amber flashing beacon(s) operating.

The vehicle must have a rear-mounted sign (eg TV3 (TW-270 ROAD INSPECTION) indicating the type of activity taking place and to give advance warning (of more than CSD) to drivers approaching the inspector(s).

The following exemptions apply:

- A vehicle is not required on a level LV or level 1 road with a permanent speed of less than 65km/h if the inspector remains on a footpath.
- On roads with a permanent speed of less than 65km/h an amber flashing beacon is not required on the vehicle if the inspector or non-invasive works is on an unsealed shoulder (or further away from the carriageway - including a footpath).

D7.6.4.1 LV roads

A vehicle-mounted sign is not necessary for inspections on level LV.

D7.6.5 Training requirements

D7.6.5.1 Level LV and level 1 roads

For inspection activities on level LV and level 1 roads the minimum training requirement is TC subject to the following:

- The TMP for the activity must be designed by an STMS.
- The STMS must brief the TC undertaking the inspection activity.
- All the above actions must be documented by the STMS.
- The TC-trained inspector (or an STMS named in the TMP) must be on-site at all times.

D7.6.5.2 Level 2 or level 3 roads

For inspection activities on a level 2 or level 3 road where the activity is totally outside the edgeline on the shoulder of the road, the inspection activity must be under the control of an onsite non-practising site traffic management supervisor (STMS-NP), or an onsite level 2/3 STMS.

D7.7 Summary of requirements for inspections

Type of road	On shoulder – no time limit	On live lane up to five minutes	On live lane for more than five minutes
Level LV	One person activity. STMS or TC-qualified inspector working under a TMP prepared by a STMS – inspector must be briefed by a STMS. STMS or TC must be onsite at all times.		
Level 1		Two person activity. STMS or TC-qualified inspector working under a TMP prepared by a STMS – inspector must be briefed by a STMS. STMS or TC plus lookout/spotter must be onsite at all times.	
Level 2 and 3	STMS -NP on site and in control of activity at all times.		Mobile, semi-static closure or static fixed site closure required.

General rules (apply to all the above)

Inspectors must move to avoid traffic. They must not expect traffic to move or slow down to avoid them.

On busy roads where traffic volumes and speed affect access to the live lane, peak periods should be avoided or a higher level of TTM considered.

Crossing a level LV, 1 or 2 road does not constitute being on a live lane but crossing a level 3 road does, unless a pedestrian crossing facility is being used.

Vehicle

Advance warning in the form of an inspection vehicle fitted with one and preferable two amber flashing beacons and a rear-mounted sign indicating the type of activity taking place must be positioned in advance of the inspection site.

A vehicle is not required on a level LV or level 1 road with a permanent speed of less than 65km/h if the inspector remains on a footpath.

On roads with a permanent speed of less than 65km/h an amber flashing beacon is not required on the vehicle if the inspector or non-invasive works is on an unsealed shoulder (or further away from the carriageway - including a footpath).

Spotter

A spotter is not required for inspections and non-invasive works on level LV roads.

Where no LV roads have been designated, the RCA can select level 1 roads for 'single inspector' inspections.

Where an unaccompanied inspector is not able to maintain adequate attention (eg due to work tasks or poor visibility), a spotter person will be required or another type of traffic management operation used.