Traffic Control Devices Manual
Part 8

Code of practice for temporary traffic management (CoPTTM)

manual number: SP/M/010

Section A

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Fourth edition, Amendment 3 of
Code of practice for temporary traffic management

Date of issue: November 2018

Effective date: 1 February 2019

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

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

More information

Published 2013

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

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

Document management plan

1) Purpose

This management plan outlines the updating procedures and contact points for the document.

2) Document information

Document name	*Code of practice for temporary traffic management*
Document number	SP/M/010
Document availability	This document is in electronic form on the NZ Transport Agency's website at www.nzta.govt.nz
Document owner	National Traffic and Safety Manager
Document sponsor	National Manager Professional Services
Prepared by	Professional Services, NZ Transport Agency

3) Amendments and review strategy

All corrective action/improvement requests (CAIRs) suggesting changes will be acknowledged by the document owner.

	Comments	Frequency
Amendments (minor revisions)	Updates to be notified to users by publication of a technical memorandum placed on the NZ Transport Agency's website.	As required.
Review (major revisions)	Periodic updates will be undertaken where amendments fundamentally changing the content or structure of the manual or new technology resulting from research or ongoing refinement have been identified.	As required.
Notification	All users that have subscribed to receive notifications on the Code of practice for temporary traffic management (CoPTTM) page of the NZ Transport Agency's website will be advised by email of amendments and updates.	Immediately.

4) Distribution of this management plan

Copies of this manual management plan are to be included in the NZ Transport Agency intranet.

Record of amendments

This document is subject to review and amendment from time to time. Amendments will be recorded in the table below.

Amendment number	Description of change	Effective date	Updated by
0	The NZTA *Code of practice for temporary traffic management 4th* edition published on line only to replace the Transit New Zealand *Code of practice for temporary traffic management 3rd* edition	November 2012	Incorporated
1	Published on line only to make minor corrections and clarifications. Track changes are available on line	May 2013	Incorporated
2	The NZTA *Code of practice for temporary traffic management 4th* edition published to replace the Transit New Zealand *Code of practice for temporary traffic management 3rd* edition. (Available in print and on line)	July 2013	Stuart Fraser
3	Published on line to make minor corrections and clarifications. An update note is available on line to identify the amendments Changes take effect from 1 December 2014	1 December 2014	Stuart Fraser
4	Published on line to include some new requirements and to make minor corrections and clarifications. An update note is available on line to identify the amendments Changes take effect from 1 August 2015	1 August 2015	Stuart Fraser
5	Published online to include some new requirements and to make minor corrections and clarifications. An update note is available online to identify the amendments Changes take effect from 1 April 2017	1 April 2017	Stuart Fraser
6	Published online to include some new requirements and to make minor corrections and clarifications. An update note is available online to identify the amendments Changes take effect from 1 February 2019	1 February 2019	Stuart Fraser

Foreword

Code of Practice for Temporary Traffic Management

The NZ Transport Agency creates transport solutions for a thriving New Zealand.

We achieve this through our four core business functions:

- planning the land transport networks
- investing in land transport
- managing the state highway network, and
- providing access to and use of the land transport system.

Temporary traffic management is an important aspect of managing our construction and maintenance programmes. It is designed to ensure the safety of road workers and road users while maintaining access at a reasonable cost.

The New Zealand Transport Agency (NZTA) is pleased to release the fourth edition of the Code of Practice for Temporary Traffic Management (CoPTTM).

NZTA is committed to providing a safe and efficient state highway system that meets the needs of all road users and communities. A key element of this commitment is the continual improvement of road safety.

Road controlling authorities, their consultants, those who work on the roads, and those that drive on the roads, cyclists and pedestrians must all share in the responsibility of making roadwork sites safe.

The interim version of the Code was released in July 2000 and over the last twelve years the roading industry has gained considerable experience and made improvements to the traffic management regime. NZTA recognises the key role that the roading industry has had in the development of this Code, through the contribution of their knowledge and experience.

The CoPTTM Governance Group provides governance and reviews the projects available to improve the Code and NZTA welcomes comment on this edition so that we may continue to improve our services to our customers.

I trust that the safety of roadwork and event sites continues to improve through the guidance herein.

Kevin Reid
National Manager Professional Services – Highways and Network Operations
The NZ Transport Agency

Preface to CoPTTM

General

The NZ Transport Agency's *Code of practice for temporary traffic management* (CoPTTM) describes best practice for the safe and efficient management and operation of temporary traffic management (TTM) on all roads in New Zealand.

Its application applies to any activity that varies the normal conditions of any road and applies to the total road reserve.

Mission statement

The mission of the NZ Transport Agency is to be a world leader in road safety by maintaining consistent and high levels of TTM on all the nation's roads.

CoPTTM

CoPTTM has been produced to meet the following:

- The statutory duty of road controlling authorities (RCA) to ensure so far as reasonably practical the safe and efficient operation of the roading network under their authority.
- The need to improve the standard of TTM in New Zealand through consistency of application which simplifies the task for the road user by aiding recognition and understanding, thereby improving their behaviour and safety.
- The need to reduce the high rate of crashes occurring at worksites. The NZTA crash analysis system (CAS) over the period 2007 to 2011 has recorded in excess of 200 crashes each year.
- The need to manage the increasing incidence and variety of activities that are being undertaken on the road by individuals and organisations.
- Allowing industry review to maintain best practice.

Contents

Glossary of terms

A list of terms used in this document having specialised meanings or interpretation in the NZ Transport Agency's *Code of practice for temporary traffic management* (CoPTTM).

AADT	See *annual average daily traffic.*
Activity	A planned event or operation undertaken within the road reserve or affecting the normal use of the road reserve. An activity covers, but is not limited to, the following: • construction projects • maintenance activities • utility service operations • mobile operations • static operations • on-road events and races • emergency services operations • tow truck operations • stock droving and crossing • survey and investigation operations • road inspections • adjacent activities, eg logging, blasting, building works • adjacent events, eg horse races, flower shows.
Active warning sign	A sign incorporating flashing lights and/or LED components that are only displayed when the presence of a hazard is automatically detected.
Advance warning variable message sign	A specialist variable message sign used at roadworks to provide advance warning and direction to approaching road users.
Alternating flow	The movement of vehicles in alternating opposing directions normally controlled by traffic signals or manual traffic controllers.
Annual average daily traffic (AADT)	The total volume of traffic passing a roadside observation point over the period of a calendar year, divided by the number of days in that year (365 or 366 days). The AADT is measured in vehicles per day (vpd).
AWVMS	See *advance warning variable message sign*.
Barricade	A sight rail which when erected on-site is positively attached to two end supports.
Barrier	An obstruction placed to prevent access to a working space which physically separates it from vehicles in live lanes and other road users.
Bidirectional flow	The controlled channelling of traffic flows, usually onto temporary alignments, to maintain a traffic flow in both directions. Delineation devices or physical barrier systems are normally used to separate the traffic flows.
CAR	See *corridor access request*.
Carriageway	The part of a road, sealed or unsealed and including any shoulder areas, where a normal wheeled vehicle can traverse. Two carriageways are deemed to exist where the carriageways are divided longitudinally by a physical island, median or barrier.

Centreline	A centreline means the following: a. In relation to any portion of a roadway not marked with a flush median –a dotted or solid line or lines of paint, or raised studs (or any combination of those lines or studs) intended to separate opposing traffic. b. In relation to any portion of a roadway marked with a flush median –the longitudinal white line that forms the left side of the median as viewed by a driver facing forward. c. In relation to an unmarked roadway – the inferred line down the longitudinal centre of the roadway.
Channelling	The defining of traffic lanes by use of traffic control devices, separately or in combination.
Chicane	The lateral movement of traffic from one or more lanes onto another alignment before a shift back toward the original road alignment but not necessarily into the original lane or lanes.
Clear sight distance (CSD)	The distance a road user can clearly see along the road. Minimum CSD is expressed in terms of metres based on the permanent speed limit or operating speed. For example, for a road with a permanent speed limit of 100km/h the CSD required is (3 x 100) = 300m. The following CSD may be required for a mobile operation: • Rear CSD – the clear sight distance required by drivers travelling in the same direction as a mobile operation to a tail pilot vehicle, and/or shadow vehicle, in a mobile operation. • Forward CSD – the clear sight distance required by drivers travelling in the opposite direction to a mobile operation to the lead pilot vehicle or, when the activity is being carried out in a live lane on a two-way two-lane road and a lead pilot vehicle is not required, to the first work vehicle.
Closure	In the context of road works a closure is the physical area from which the road users are to be excluded. This includes but is not limited to shoulder closures, lane closures and road closures.
CoPTTM	See *Code of practice for temporary traffic management.*
CoPTTM Governance Group	The CoPTTM Governance Group provides industry oversight of the direction and procedures of the *Code of practice for temporary traffic management.*
Code of practice for temporary traffic management **(CoPTTM)**	The NZ Transport Agency's *Traffic control devices manual* part 8 *Code of practice for temporary traffic management* describes best practice for the safe and efficient management and operation of temporary traffic management (TTM) on all roads in New Zealand and is mandatory on state highways.
Contingency plan	The plan describing how unforeseen scenarios will be addressed (eg weather, excessive delays, queues of vehicles, two lanes unexpectedly reduced to one lane, one lane unexpectedly reduced to no lanes).
Contractor	Contractor means a person, organisation or company responsible for implementation of an activity on, or affecting, a road whether or not under a contract with the road controlling authority (RCA). This includes organisations such as, but is not limited to: • utility companies • surveyors • adjacent forestry operators • stock drovers • filming crews, and • personnel managing events on roads. The terms contractor and applicant have the same meaning in this *Code of practice for temporary traffic management* (CoPTTM).
Contra-flow	Traffic flow in a direction opposite to the normal flow. For example, directing traffic into a lane that normally operates in the opposing direction.
Corridor access request (CAR)	An application to undertake works in the road corridor.

Crash	Any incident resulting in damage to any installed TTM equipment, vehicles, plant or injury to a person.
CSD	See *clear sight distance (CSD).*
Delineation device	A piece of equipment manufactured specifically for a wide range of purposes such as, but not limited to, marking temporary traffic lanes and drawing attention to specific hazards.
Detour	A temporary route to guide road users around a worksite operation.
Edgeline	A continuous painted or audio-tactile line marked along the edge of a lane, or an inferred line along the edge of a lane.
Emergency	An uncontrolled event that has caused, or is risking to cause, loss of life, injury or serious property damage. It can include declarations of civil defence emergencies, traffic crashes or other significant incidents. It does not include delays unless these are the result of one of the above situations.
Emergency services	New Zealand Police, New Zealand Fire Service, Ambulance Services and Civil Defence.
Engineer	The professional engineer, consultant or another person named in the contract documentation, or agreement or consent, appointed to act as engineer to the contract under New Zealand Standard 3910:2003 *Conditions of contract for building and civil engineering construction*, or any agreement or consent which allows the activity to be undertaken, eg New Engineering Contract 3rd edition (NEC3), by the principal and/or the road controlling authority (RCA).
Engineering exception decision (EED)	A written decision made following consideration of all factors, including the safety of all concerned, to vary a code of practice(s), standard(s) and/or guideline(s), to suit a particular situation. The decision must be included with the traffic management plan (TMP).
Flare	The deflection of the leading end of a road safety barrier, or channellising device, away from the general alignment of the road and/or direction of traffic flow.
Flare rate	The rate at which a road safety barrier flares away from the general alignment of the road, nominally a 1:10 (10 percent) taper.
Flashing beacon	Flashing beacons refer to roof-mounted devices. Hazard warning lights should be used where appropriate but are **not** considered to be beacons. Flashing beacons consist of a light encapsulated in an amber casing that may either flash (strobe) or appear to flash when circled by a rotating reflector.
Flush median	A painted median that may be used to assist turning vehicles or in some cases crossing pedestrians, or to increase the separation of traffic moving in different directions.
Frangible	Collapsible on impact and resulting in less damage than an unyielding object.
Gated	The installation of the same design of traffic sign on each side of a roadway. Signs are often 'gated': • where other vehicles may obscure the view of a sign on one side of the roadway for an approaching driver, or • at a threshold between two sections of road with markedly different characteristics and the size and placement of the signs impacts on the driver speed choice.
Gating	A term used to describe the action of the end terminal of a road safety barrier that is designed to break away, pivot or hinge to allow a vehicle to pass through when impacted at an angle to the end, or at a point on the flare near the end.
Hazard	Any activity and/or condition that varies the normal operating conditions of a road that is an actual or potential cause or source of harm to road users and/or road workers.

Installation Designer	The person that designs the length, location and types of components of a system to be installed on a section of the road network. The Installation designer designs the system to suit the particular conditions of the section of road network (refer AS/NZS 3845 Road safety barrier systems and devices – Part 2: Road safety devices). An STMS who prepares a TMP incorporating road safety hardware and/or devices is considered an Installation Designer.
Intervisibility	This is the unobstructed sight between two points, eg for single-lane give way control it would be the unobstructed sight between the priority single lane – RP52, and the supplementary give way signs – RP51/RP22.
IRG	The industry review group was responsible for consideration of the content of the *Code of practice for temporary traffic management* (CoPTTM). This group has now been replaced by the *CoPTTM Governance Group.*
Lamp	A self-contained light which can be attached to any obstruction, delineation device or channelling equipment.
Lane	A longitudinal strip of roadway that is intended for the passage of vehicles or a specific class of vehicle, generally travelling in a single line that is separated from other parts of the roadway by a longitudinal line or lines of paint, or raised studs, or other form of channelisation, and includes: • a cycle lane • a lane for the use of vehicular traffic that is at least 2.5m wide • a lane of a two-way road divided by a centreline.
Lane line	A painted continuous or segmented line or a line of raised pavement markers that divide two lanes of traffic.
Lateral safety zone	Lateral safety zones are positioned on the traffic side of the working space (or temporary pedestrian walkway) to separate workers, pedestrians, vehicles, plant or materials from passing road users.
Level LV low risk road	This is a subcategory of level LV roads which may be declared by the RCA with guideline annual average daily traffic (AADT) counts of less than 250 vehicles per day (vpd).
Level LV road	A low volume road designated by a road controlling authority (RCA) with guideline annual average daily traffic (AADT) counts of less than 500 vehicles per day (vpd).
Level 1 road	A low to medium-volume road designated by a road controlling authority (RCA) with guideline annual average daily traffic (AADT) counts of less than 10,000 vehicles per day (vpd) on rural roads and less than 15,000vpd on urban roads.
Level 2 road	For the purposes of the *Code of practice of temporary traffic management* (CoPTTM), a high-volume road designated by a road controlling authority (RCA) with guideline annual average daily traffic (AADT) counts of 10,000vpd or more on rural roads and 15,000vpd or more on urban roads.
Level 3 road	For the purposes of the *Code of practice of temporary traffic management* (CoPTTM), a high-volume, high-speed, multi-lane road or motorway road designated by the road controlling authority (RCA) and with an annual average daily traffic (AADT) greater than 10,000 vehicles per day (vpd).
Live lane	A lane available for use by a class or classes of vehicles.
Local roads supplement (LRS)	See *temporary traffic management for local roads supplement to NZTA CoPTTM.*
Long-term operation	An activity on a level 2 or level 3 road that occupies a worksite for more than one day. There is no differentiation between a short-term and long-term activity on **level LV** and **level 1** roads.

Longitudinal safety zone	A longitudinal safety zone is the initial portion of a closed lane in advance of the working space. It is an emergency breaking zone allowing road users who have crashed through the taper time to gain control of their vehicle.
MTC	See *manual traffic controller.*
Manual traffic controller (MTC)	A person controlling the flow of traffic in a single lane past a closure with the use of stop/go paddles – RP4/RP41.
MBIE	See *Ministry of Business, Innovation and Employment (Labour).*
Median	The defined area separating two opposing carriageways not normally intended for use by traffic. This definition also includes flush and painted medians. See also *flush median.*
Ministry of Business, Innovation and Employment (Labour) (MBIE)	The workplace health and safety regulation function of the MBIE (Labour) has been transferred to WorkSafe NZ. See *WorkSafe NZ.*
Mobile operations	Mobile operations are those activities or operations not contained within a fixed worksite where vehicles are progressively travelling in the same direction as, but at a speed less than, or in a manner different from normal traffic. Mobile operations may involve planned stops of up to ten minutes.
Motorway	Means a motorway declared as such by the Governor-General in Council under section 138 of the Public Works Act 1981 or under section 71 of the Government Roading Powers Act 1989 and includes all bridges, drains, culverts, or other structures or works that form a part of any motorway so declared but does not include any local road, access way or service lane (or the supports of any such road, way or lane) that crosses over or under a motorway on a different level.
MOTSAM	The NZ Transport Agency's *Manual of traffic signs and markings*.
Multi-lane roads	For a driver, means a one-way road, or a two-way road, with two or more marked lanes (except bicycle lanes) that are: • on the side of the dividing line or median strip where the driver is driving • for the use of vehicles travelling in the same direction.
NZ Transport Agency (NZTA)	The government agency in New Zealand responsible for: • planning and delivering national transport networks • supporting local networks • making public transport and freight networks more effective • improving road safety.
NEC	New Engineering Contract 3rd edition.
Notice of non-conformance	An instruction in writing to the traffic management supervisor or contractor to advise them that traffic management measures do not comply with the approved traffic management plan (TMP), or the actions of the site traffic management supervisor (STMS) do not comply with the requirements of the *Code of practice of temporary traffic management* (CoPTTM).
NZTA	See *NZ transport Agency.*
Operating speed	The 85th percentile speed of vehicles on a section of a road or the operating speed as declared by the road controlling authority (RCA).
Pavement	The structural layer(s) of the roadway, including metalled shoulders, that forms the running surface for vehicular traffic.

Peak	The times of the day or night, month or year, when the road carries the highest traffic flows, in one or both directions.
Peak period	The period (hour, half hour, etc) with the highest volume of traffic or number of passengers during the day.
Peak traffic flow	The traffic volume during a time period of specified length during which such volume is at its maximum.
Permanent speed limit	The legal speed limit for a specific section of road indicated by permanent speed limit signs.
Positive traffic management	A method of using signs, delineation devices, pavement markings, traffic signals or manual traffic controllers (MTC) together or separately to reduce speed at a worksite, while maintaining adequate safety and capacity.
Posted speed limit	The legal speed limit for a specific section of road indicated by permanent speed limit signs.
RCA	See *road controlling authority.*
RCA Forum	See *Road Controlling Authority Forum.*
Retro-reflectivity	Material with the specific property of reflecting illuminating light from a source, usually vehicle headlights, back towards the source.
Road	For the purpose of temporary traffic management (TTM), a road is defined as the entire road reserve (see *road reserve*). For private roads, such as those on port authority land, within public car parks and airport authority land, etc the road must be defined as the portion of land set aside for the use of road users, including pedestrians and cyclists.
Road controlling authority (RCA)	In relation to a road an RCA: • means the authority, body or person having control of the road, and • includes a person acting under and within the terms of a delegation or authorisation given by the controlling authority.
Road Controlling Authority Forum (RCA Forum)	A closed, non-political group with representatives from the 73 territorial local authorities, the Department of Conservation, NZ Transport Agency and Local Government New Zealand.
Road environment constraints	A road environment constraint can be a short urban block, access to commercial or residential premise and similar items which may interfere with standard taper length or sign spacings.
Road levels	The designation given to a road by a road controlling authority (RCA), ie low volume (LV), levels 1, 2 and 3.
Road reserve	The area of land between the legal boundaries, usually fence line to fence line and including any safety run-off areas, which is dedicated to allow the passage of road users. The road reserve also includes an airspace of six metres directly above the road surface. The terms road and road reserve have the same meaning in the NZ Transport Agency's *Traffic control devices manual*.
Road user	Any user of the road, including motor vehicle drivers, motorcyclists, pedestrians and cyclists.
Roll-ahead distance	The distance to allow for forward movement of a vehicle following a rear impact from another vehicle.

Safety zones	A safety zone is a three-dimensional space extending to the front and back, to the sides and above a working space. This space also includes the areas within the coned tapers although these are not included in the safety zone dimensions.
Static operations	Static operations are those activities that are contained within a fixed area.
Semi-static operation	Semi-static operations are mobile type activities that stop for more than ten minutes and less than one hour at one location.
Short-term operation	An operation occupying a location for less than one day on a **level 2** or **level 3** road. There is no differentiation between a short-term and long-term activity on **level LV** and **level 1** roads.
Shoulder	A sealed or unsealed part of the road outside the edgeline, or an inferred edgeline, which is trafficable and flush with the pavement.
Shy line	The distance from a hazard beyond which a typical road user will not perceive it as an immediate danger so they will not normally change their vehicle's speed or placement.
SID	See *Speed information device*
Side friction	A form of positive traffic management that uses delineation devices placed close to a live lane, to give road users the impression that they are travelling in a more restrictive width than they actually are.
Sign stand	A sign stand consists of a base and an upright.
Sign visibility distance	The minimum distance over which the driver of an approaching vehicle must be able to see the first advance warning sign. Where necessary, increase sign spacings to achieve visibility distance.
Site	See *worksite*. Also see *closure*.
Site access	An access point through which personnel or vehicles enter or leave a working space.
Site traffic management supervisor (STMS)	An NZ Transport Agency (NZTA) qualified person who has specific responsibility for documentation and management of temporary traffic management (TTM).
Site traffic management supervisor – non-practising (STMS-NP)	An NZ Transport Agency (NZTA) qualified person who has specific responsibility for traffic management plan (TMP) documentation. The STMS-NP may act as an STMS on level LV and level 1 roads and may manage temporary traffic management (TTM) on level 2 and 3 roads in restricted circumstances.
Speed environment	The speed that 85 percent of drivers do not exceed on a section of road that passes through relatively consistent terrain conditions and has similar horizontal curves, road widths and grades.
Speed information device (SID)	An electronic sign helping to reduce the number of road users exceeding the speed limit at or through road work sites. The SID can also be used in combination with other devices such as a variable message sign or arrow board to create a speed control system.
Static operations	An activity contained within a fixed area.
STMS	See *site traffic management supervisor.*
STMS-NP	See *site traffic management supervisor – non-practising.*
System Installer	The person that installs a system designed by an Installation Designer. See *Installation Designer.*
Taper	A straight or smoothly curved row of delineation devices used to shift traffic laterally, eg from a lane to the shoulder.
Target value	The visibility of an article and the ability of a chosen colour, pattern, graphic or light system to attract visual attention in a given environment.

TC	See *traffic controller.*
Temporary speed limit (TSL)	A speed limit that is in force for a period of less than 12 months and is set under the Land Transport Rule: Setting of Speed Limits 2017 by the RCA.
Temporary traffic management (TTM)	The process of managing road users through or past a closure in a safe manner with minimal delay and inconvenience.
***Temporary traffic management for local roads supplement to NZTA CoPTTM* (LRS)**	This is a supplement to the *Code of practice for temporary traffic management* (CoPTTM) that provided and allowed authorised variations to CoPTTM, which suited local road environments. This document has now been amalgamated with CoPTTM and no longer applies.
TMC	*S*ee *traffic management coordinator.*
Traffic controller (TC)	An NZ Transport Agency (NZTA) qualified person who has specific responsibility to manage a worksite on a level LV and level 1 road.
TMA	*See truck-mounted attenuator.*
TMC	*See traffic management coordinator.*
TMD	*See traffic management diagram.*
TMP	See *traffic management plan.*
Traffic management coordinator (TMC)	A person, or position, in an organisation that has the delegated authority from a road controlling authority (RCA) to approve traffic management plans (TMPs), coordinate temporary traffic management (TTM) and, where appropriate for local roads, to delegate power to approve TMPs to others.
Traffic management diagram (TMD)	The TMD is a traffic management diagram within, and forms part of, the TMP. A TMP may have more than one TMD included as part of it.
Traffic management plan (TMP)	A document describing the design, implementation, maintenance and removal of temporary traffic management (TTM) while the associated activity is being carried out within the road reserve or adjacent to and affecting the road reserve.
Travelled path	The swept path of a vehicle as it travels over a section of road.
Truck-mounted attenuator (TMA)	A safety device fitted to the rear of a vehicle that collapses when impacted by another vehicle.
TTM	See *temporary traffic management.*
Variable message sign	This is an optional device that can be used to highlight specific hazardous situations (eg where visibility is restricted or where additional useful messages can be provided to road users).
VMS	See *variable message sign.*
vpd	Vehicles per day.
vph	Vehicles per hour.
WAP	See *works access permit.*
Warning distance	The minimum distance between the first advance warning sign and the start of the cone taper or the beginning of the closure or working space.

Warning lamp	Amber unidirectional flashing lamp used to warn oncoming traffic, pedestrians and cyclists of a hazard ahead. The illumination for these lamps may be supplied by conventional light bulbs, strobe light bulbs or light emitting diodes that meet the light intensity and beam width requirements. The Xenon warning light is a special form of warning lamp.
Works access permit (WAP)	A written permission from the corridor manager to enable works on a road corridor to proceed.
WorkSafe NZ	WorkSafe NZ is New Zealand's workplace health and safety regulator. It works to reduce work-related death and injury rates, and support employers and employees in productive work. It provides information and guidance to workplaces on occupational safety and health issues and managing hazardous substances. It enforces health and safety legislation, researches workplace health and safety matters, and provides policy advice to government.
Work vehicle	In a mobile operation, a work vehicle is a vehicle carrying out activity adjacent to the road, or on the road carriageway, or supporting personnel on foot.
Worksite	The section of road defined at each end by advance warning and end of works signs, or between vehicles in a mobile operation, including the vehicles themselves. In the NZ Transport Agency's *Code of practice for temporary traffic management* (CoPTTM) it is sometimes referred to as the site. Also see *closure*.
Working space	The area within a worksite that is available for workers use to complete the activity. The working space is to contain any reasonably foreseeable risk of the activity.

Section A – Introduction and general

A1 About CoPTTM

A1.1 Three components

The overall system is made up of three components:

1. the body of knowledge (CoPTTM)
2. the training system
3. the audit system.

When all components are present the system operates effectively.

A1.2 Availability of CoPTTM

CoPTTM is available in two forms:

1. Electronic format:

   CoPTTM is available as a PDF on the NZTA's website.

2. Printed format:

   A complete copy or specific sections of CoPTTM are available to order from the NZTA's website (www.nzta.govt.nz/resources/code-temp-traffic-management/copttm.html).

A1.3 Sections of CoPTTM

CoPTTM is divided into the following sections:

- System and operations
  - Section A: Introduction and general
  - Section B: Equipment
  - Section C: Static operations
  - Section D: Mobile operations
  - Section E: Standard forms and descriptions.
- Example layout diagrams (illustrating principles)
  - Section F: Example layout diagrams for level LV and level 1
  - Section G: Example layout diagrams for level 2
  - Section H: Example layout diagrams for level 3.
- Specific activities (these will be available electronically from the NZTA's website)
  - Section I: Specific activity procedures and diagrams
    - Subsection I:1 – Winter maintenance
    - Subsection I:2 – Road marking
    - Subsection I:3 – Events
    - Subsection I:4 – Vehicle crossing construction
    - Subsection I:5 – Stock droving
    - Subsection I:6 – Roadside assistance
    - Subsection I:7 – Kerbside collection
    - Subsection I:8 – Sealing and resealing operations
    - Subsection I:9 – Speed cameras (consult with the New Zealand Police)
    - Subsection I:10 – Level LV and level 1 traffic management diagrams.
- Additional resources
  - Section J: – Level LV and level 1 temporary traffic management handbook.

A2 Scope of CoPTTM

A2.1 General

This document supersedes and replaces the following:

- Transit New Zealand's:
  - G/1 specification (May 1996)
  - *Working on the road handbook* (June 1998)
  - *Code of practice for working on high capacity highways* (November 1997)
  - *Code of practice for temporary traffic management* (third edition, November 2004)
  - *Temporary traffic management for local roads supplement to NZTA CoPTTM*. (This has now been amalgamated with CoPTTM).

CoPTTM includes:

- a description of the powers and responsibilities of relevant government agencies, RCAs, emergency services, utility operators, event organisers, engineers, contractors and any other relevant parties
- levels of traffic management, assessed in terms of traffic volumes and speeds
- practices for the development of TMPs for all New Zealand roads
- specifications for TTM equipment
- requirements and guidelines for the installation and operation of static and mobile TTM
- typical layout diagrams for a wide range of activities.

A2.2 CoPTTM feedback

Feedback is important to the ongoing development of an effective and meaningful industry-supported code of practice. Comments on the content, format and overall methodology are encouraged.

Suggestions regarding innovation to improve safe working practices and TTM equipment are also welcome. A form for submission of proposed changes is available on the NZTA website.

The NZTA regularly meets with industry groups to discuss the application of and any proposed amendments to CoPTTM.

The CoPTTM Governance Group (CGG) is another forum enabling the NZTA to engage with industry groups/associations. The group is made up of representatives from the following industry sectors; contractors, consultancies, Road Controlling Authorities and CoPTTM trainers. The CGG provides industry oversight to the direction and procedures of CoPTTM.

The NZTA offers a training programme for practitioners to receive training on CoPTTM. The range of training workshops provide an opportunity for contractors and managers to engage with NZTA approved trainers and give feedback on CoPTTM requirements. The NZTA meets regularly with senior trainers to discuss changes to training material based on this feedback.

Please forward suggestions to:

CoPTTM.Consult@nzta.govt.nz

A3 Principles

To ensure, so far as reasonably practicable, safe and efficient TTM, CoPTTM is based on the following fundamental principles:

- TTM must be consistent throughout New Zealand.
- TTM must be fit for purpose, suitable for the nature and duration of the work, installed, set up, and used correctly.
- TTM must ensure, so far as reasonably practicable, the provision and maintenance of safe systems of work for on road activities for road workers and road users.
- All on-road activities must be carried out in accordance with a TMP that has been approved by the RCA or delegated person (refer to section A7 Traffic management plans (TMPs)).
- The provision of an environment that is without risks to health and safety of road users and road workers must be an integral part of all activities carried out on the road from planning the activity through to completion.
- Clear and positive guidance must be provided for road users approaching, travelling through and exiting the worksite.

Activities on any road must be planned so as to cause as little disruption, delay or inconvenience to road users as possible without compromising safety. The length, width and duration of any TTM must be restricted to the minimum required for the safe operation of the activity.

A4 Levels of temporary traffic management (TTM)

A4.1 General

A4.1.1 Four levels of TTM

Roads are divided into different levels, to reflect their intensity of use and associated risk.

There are four primary levels of road:

- Level low volume (LV)

  For level LV, the following subcategory can also be designated for roads that have particularly low volumes of traffic:

  - LV low-risk
- Level 1
- Level 2
- Level 3.

The designation for each road is made by the RCA.

A4.1.1.1 Guidelines for designation of road

The default level is level 1.

If level 1 is not appropriate, it is the responsibility of the RCA to designate any of the following:

- level LV roads
- level 2 roads
- level 3 roads.

Detailed guidelines to assist RCAs with the selection of road levels are included in subsection A4.6 Road controlling authority's (RCA) guidelines for designating road levels.

A4.2 Level LV roads

A4.2.1 Explanation of LV roads (level LV)

These roads have an AADT volume of less than 500vpd.

This encompasses some urban streets and some local roads (with or without a centreline), sealed and unsealed.

Detailed guidelines to assist RCAs with the selection of road levels are included in subsection A4.6 Road controlling authority's (RCA) guidelines for designating road levels.

A4.2.2 Explanation of LV low-risk roads

This is a subcategory of level LV roads which may be declared by the RCA.

These roads have an AADT volume of less than 250vpd.

A4.3 Level 1 roads

A4.3.1 Explanation of level 1 roads

Low to medium-volume roads designated by an RCA with guideline AADT counts of less than 10,000vpd on rural roads and less than 15,000vpd on urban roads.

This encompasses most urban streets, most rural roads, and most state highways, (with or without a centreline) sealed or unsealed.

Usually 750mm x 750mm signs are used. Larger signs may be required in some circumstances.

Except for multi-lane roads and TSLs, where signs are required on both sides of the road, signs are only required on the left-hand side of the road. The RCA, engineer or contractor can request signs on both sides of a road, when this is considered desirable for safety or traffic management reasons.

Detailed guidelines to assist RCAs with the selection of road levels are included in subsection A4.6 Road controlling authority's (RCA) guidelines for designating road levels.

A4.4 Level 2 roads

A4.4.1 Explanation of level 2 roads

These are high-volume roads designated by an RCA with guideline AADT counts of 10,000vpd or more on rural roads and 15,000vpd or more on urban roads. The lower limits are guides only.

This level of road may include major urban streets in the central business district, some arterial roads, two-lane two-way roads, one-way streets and multi-lane roads.

This level of road generally requires larger signs (eg 850mm x 850mm on 1200mm square backing boards).

Stringent criteria for mobile operations apply to this level of TTM.

Detailed guidelines to assist RCAs with the selection of road levels are included in subsection A4.6 Road controlling authority's (RCA) guidelines for designating road levels.

A4.5 Level 3 roads

A4.5.1 Explanation of level 3 roads

These are high-volume, high-speed multi-lane roads and motorways with a divided carriageway.

This will include any on-ramps or off-ramps.

They have:

- an AADT volume greater than 10,000vpd. This lower limit is a guide only
- a speed limit greater than 75km/h.

This encompasses major multi-lane highways and motorways in and around major urban areas, eg the Auckland motorway system.

They use the same size signs as for level 2 roads.

At this level, static worksites must be set up and removed using a mobile operation.

Detailed guidelines to assist RCAs with the selection of road levels are included in subsection A4.6 Road controlling authority's (RCA) guidelines for designating road levels.

A4.6 Road controlling authority's (RCA) guidelines for designating road levels

A4.6.1 Recommended guidelines

The following guidelines are recommended but need to be balanced with the need for consistency throughout the network for the road user and roading contractors:

Step 1 – Get started

Obtain spreadsheet of roads within network including:

- name
- sections
- displacements
- start and end names
- traffic volumes.

Step 2 – Identify which roads are to be declared level 2 and level 3

Identify any motorway/expressways and designate as the CoPTTM levels 2 or 3. **Note:** Include all ramps for these designations.

Identify all roads carrying 10,000vpd or more on rural roads and 15,000vpd or more on urban roads. Consider use of the CoPTTM level 2 for these roads. Consider grounds for not designating these roads as level 2 which could include:

- less than 50km of associated road network at this level

  Note: An RCA needs to have a viable length of road on their network to designate as level 2 for TTM. To enable contractors to stock the larger signs, RCAs need to have a length of road that is commercially viable. RCAs need to have contiguous length of road of at least 50km of two-way undivided road or 25km of divided road before level 2 TTM is considered.

- more than 60 percent of the 10,000 plus traffic travels in peak times
- cases where the 10,000 is barely reached or where the majority of the traffic travels during peak times
- limiting work access at times of congestion such as peak periods and maintaining the level 1 road designation.

Step 3 – Identify which roads are to be declared LV

Roads that have a particularly low volume of vehicles may be classified as follows:

- LV roads – AADT volume of 500vpd, less than 40vph.
- This particularly applies to narrow roads with speeds less than 65km/h where risks are low and safety zones and tapers may be reduced.LV low-risk roads – AADT volume of 250vpd, less than 20vph.

  This particularly applies to roads with a permanent or operating speed of less than 65km/h. This level utilises appropriate advance warning T1 type signs (static installation) and amber flashing beacon on working vehicle when on shoulder.

  If the above requirements cannot be achieved the operation must be modified to comply with the requirements of a higher risk rating.

  Stop/go or give way control of traffic is to be considered when activity encroaches onto live lane.

Step 4 – Identify which roads are to be declared level 1

The remaining roads are declared level 1.

A4.6.2 Do not mix level LV, 1, 2 and 3 roads

Levels LV,1, 2 and 3 may not be mixed for the following reasons:

- To ensure consistency of TTM on a road, route or network at all times.
- To avoid possible confusion with equipment requirements on a road, route or network.

The level of TTM on a road must not be altered after it is determined unless the AADT changes and a permanent change to another level is warranted.

The risk for road users and workers, and the safety needs of the network, are taken into account when setting TTM levels.

A5 Powers and responsibilities

A5.1 Powers

A5.1.1 Relevant acts, regulations and rules

Relevant acts including any subsequent amendments or alterations include, but are not limited to, the following:

- Biosecurity Act 1993
- Building Act 2004
- Crimes Act 1961
- Electricity Act 1992
- Fencing Act 1978
- Fire Service Act 1975
- Gas Act 1992
- Health and Safety at Work Act 2015
- Impounding Act 1955
- Land Transport Act 1998
- Land Transport Management Act 2003
- Litter Act 1979
- Local Government Act 1974 and 2002 (the roading provisions of the 1974 Act are still in force)
- Public Works Act 1981
- Resource Management Act 1991
- Summary Offences Act 1981
- Telecommunications Act 2001
- Transport Act 1962 (bylaw making powers still in force)

The acts listed above may impose obligations in respect of the activity and detail specific powers for officers from the New Zealand Police, New Zealand Fire Service, New Zealand Civil Defence, the NZTA, WorkSafe NZ, territorial authorities, RCAs and network utility operators.

The acts are supplemented by regulations, orders, rules, bylaws and manuals made under their authority.

Local agreements between statutory bodies may exist.

A5.1.2 Statutory health and safety responsibilities – Duty of care

Any person conducting a business or undertaking ('PCBU') in connection with or pursuant to temporary traffic management (TTM) and the CoPTTM, has a 'duty of care', so far as is reasonably practicable, that the health and safety of workers who work for the PCBU or whose activities in carrying out work are influenced or directed by the PCBU, are not exposed to health and safety risks arising from that business or undertaking.

A PCBU must ensure, so far as reasonably practicable, that the health and safety of other road users are not exposed to health and safety risks arising from any TTM and CoPTTM business or undertaking.

A PCBU must ensure, so far as reasonably practicable, that the health and safety of other road users are not exposed to health and safety risks arising from any TTM and CoPTTM business or undertaking.

A PCBU includes all types of working arrangements such as crown agencies, organisations, companies, principals, contractors and sub-contractors.

A5.2 Systems and procedures for compliance

A5.2.1 Default by the contractor – work under contractual agreement

Owing to the importance of public safety and the need to act immediately to correct unsatisfactory TTM measures, contracts need to state that unsatisfactory work is to be rectified immediately.

Where general conditions of contract are used, for example the current versions of:

- New Zealand Standard 3910: *Conditions of contract for building and civil engineering construction*
- New Zealand Standard 3915: *Conditions of contract for building and civil engineering construction (where no person is appointed to act as engineer to the contract)*
- New Zealand Standard 3917: *Conditions of contract for building and civil engineering - Fixed term*
- NEC4: *Engineering & Construction Contract*

these conditions must be modified as follows:

- These modifications must be in respect of the requirements for TTM works only.
- The duration of default and time allowed for replacement of defective work under section 14.2, ie ten working days, does not apply.
- Once a notice of non-conformance has been issued, the contractor must immediately rectify unsatisfactory TTM measures.
- The RCA must have recourse to the provisions of the general conditions of contract, section 14.2.3 under which they must have the power to:
  - appoint an alternative engineer and/or contractor for the traffic management portion of the work only, and/or
  - request police to remove measures implemented at the time, and
  - make payments in terms of section 14.2.4.

  The above provisions must be implemented immediately following either:

  - the second unsatisfactory performance of work by the contractor, or
  - where an audit of the worksite results in a dangerous rating.
- Advice of such defective work must be in writing and be issued as a default notice.
- The engineer must have authority to act for the principal and is not required to advise the principal in writing as provided in section 14.2.1(d).

Normally the principal would be notified of the action taken, without delay.

The written notice of the engineer or engineer's representative to the contractor, or any subcontractor responsible for TTM, must be sufficient for the implementation of the above provisions. The contractor must then be prohibited from carrying out any traffic management measures for the duration of the contract, unless agreed otherwise by the principal.

A5.2.2 Default by the contractor – work under consensual agreement (including service agreements)

Where an organisation is working regularly within the road reserve they may apply to enter into a service agreement with the RCA (refer to subsection A7.1.3 Frequent non-invasive maintenance activities).

Where any organisation or individual causes, or allows an activity to occur on a road that does not comply with the principles of CoPTTM, the RCA may summarily issue a stop work notice to the party undertaking the work.

Upon receipt of this notice the recipient must immediately cease all works covered by the notice and withdraw from the road in a manner agreed with the RCA.

Where such a notice is issued, no payment for losses arising out of the notice will be made by the RCA, unless it can be established that the activity was in fact in compliance with an approved TMP or agreed variation to that plan.

If the organisation responsible for the traffic management of the worksite is unable to immediately implement remedial measures to make the worksite safe, then the RCA or the engineer is empowered to engage another contractor to install traffic management measures and reinstate safety at the worksite.

All costs involved in undertaking the above must be a direct charge to the organisation that was initially responsible for traffic management of the worksite.

A5.2.3 Eliminate or minimise the hazard

All those involved with activities on, or adjacent to, the road have a statutory duty to systematically identify any hazards and if a hazard is identified all reasonably practical steps must be taken to ensure no person is harmed.

This will include steps to eliminate risks to health and safety and if it is not reasonably practicable, minimise risks to health and safety by implementing risk control measures in accordance with Health and Safety at Work (General risk and Workplace Management) Regulations 2015.

A5.3 Road controlling authority (RCA)

A5.3.1 Responsibilities of the RCA

The RCA has a statutory duty to ensure so far as reasonably practicable the healthy, safe and efficient operation of the roading network under their authority. The RCA is responsible for:

- ensuring that all TTM measures are in accordance with CoPTTM
- consulting with neighbouring RCAs with the objective of gaining consistency as to the level of TTM for roading networks
- designating the level of each road within the network
- notifying the contractor or those responsible for the TTM as to the level of traffic management to be used for the various sections of network
- appointing a TMC and notifying the contact details (refer to subsection A5.5 Traffic management coordinator (TMC))
- identifying, prior to tendering, any requirements with respect to a particular activity on a worksite which are additional or different from those covered in CoPTTM and which may not be evident to an experienced practitioner by site inspection, observation and knowledge of traffic volumes
- declaring operating speeds if chosen
- providing traffic volume data, upon request and where available, to assist traffic management planning, including:
  - 24-hour counts for all roads
  - hourly counts for roads with more than 10,000vpd
  - special events occurring on or near the site
  - formal approval or rejection of TMPs
- authorising:
  - temporary speed and parking restrictions, and the use of other regulatory signs
  - all planned road closures
- authorising and setting conditions for work and other activities on the road
- approving:
  - public notices for media release or distribution to local residents. Appendix E in section E provides a standard format for newspaper advertisements
  - Engineering exception decisions (EEDs)
- checking applications for recognition of previous experience (ROPE) when a level 2/3 STMS is renewing their warrant
- checking that all long term TSLs are reapproved as required (Refer to section I-18: Guidance on TMP Monitoring Processes for Temporary Speed Limits)
- fulfilling legal responsibilities under relevant legislation.

For level LV and level 1 roads (non-state highways)

The RCA is responsible for:

- deciding which roads can use a generic traffic management diagram instead of a site-specific traffic management diagram as part of the TMP
- designating the minimum clear sight distance (CSD) on roads with a permanent speed of less than 55km/h
- identifying roads where inspection activities may be completed by unaccompanied inspectors
- deciding whether level 2/3 sign sizes are required on selected multi-lane roads

  deciding whether TMP approvals will be delegated to selected STMS
- delegating to selected STMS for selected level LV and level 1 roads, the power to authorise the following:
  - approval of TMPs
  - TSLs
  - the use of regulatory signs.

  Note: Consider a delegation period of between one and five years for STMS-delegated authority.

For all levels of road

The RCA is responsible for:

- ensuring appropriate delegation of authorities are set in place which may include delegating to an engineer or TMC the RCA's power to approve:
  - TMPs
  - TSLs
  - parking restrictions
  - the use of approved portable traffic signals systems
  - the use of regulatory signs
  - all planned road closures
- ensuring there is adequate monitoring and audit of all traffic management within the RCA's roading network by monitoring documentation and worksite activities to ensure compliance with CoPTTM. These checks are to be selected randomly and it is recommended that the RCA aims for five percent coverage of worksites. Refer to section A8 Temporary traffic management (TTM) safety audit procedures
- identifying (or requiring a contractor/consultant to identify) the scope of disruption likely to be caused to road users by the proposed works
- showing (or requiring a contractor/consultant to show) that it is possible to construct the proposed design, including any required TTM measures
- showing (or requiring a contractor/consultant to show) that the traffic management measures listed in the estimate and schedule of prices have been correctly quantified.

An RCA acts not only as an RCA, but when carrying out its own work the RCA becomes the principal to the contract for that work and must ensure the contractors and consultants meet the standards laid out in the CoPTTM.

A5.3.2 Process for delegating powers to selected STMS for approval of TMPs on selected level LV and level 1 roads

If the RCA has decided to delegate powers to approve TMPs on selected level LV and level 1 roads to selected STMS it will need to:

- prepare for the process:
  - request STMS to complete the application form in section E, appendix I
  - create a delegations database. Refer to section E, appendix J
- review the applications for delegated authority and decide:
  - whether delegation will be assigned
  - the extent of delegations

    Note: The RCA may consider the following:
    - track record of applicant and employer
    - qualification history of applicant
    - type of activity envisaged (eg lines work)
    - type of roads they will work on
- record the decision on the delegated authority form and return it to the applicant
- record details in the delegations database, if delegation is to be assigned
- communicate the decisions to adjoining RCAs, contractors and consultants.

A5.3.3 Renewal of delegations

Before the end of the delegation period the STMS submits the form in section E appendix H to apply for renewal of their delegation.

The RCA will decide whether renewal of delegation will be granted.

The RCA may consider the following grounds for revoking powers:

- changed employment
- incurring a notice of non-conformance(s)
- any other sanction process adopted by the RCA.

A5.4 Non-road controlling authority (non-RCA) principal

A5.4.1 Non-RCA principal's responsibilities

A non-RCA principal (eg a telecommunications company) is responsible to seek permission in the form of consent to undertake any activities within the road reserve or adjacent to the road reserve where the activity may affect road users.

A non-RCA principal is responsible for ensuring:

- it has RCA authorisation for any work or activity it intends to carry out in the road reserve. This may take the form of either:
  - a one-off authorisation
  - a consent to occupy
  - a consent for works
  - a service agreement (eg Agreement to work on state highway (ATWOSH))
- that their contractors undertake activity in the road reserve, or in an adjacent area affecting the road reserve, with an approved TMP in accordance with CoPTTM.

The non-RCA principal must make this information available to the TMC or engineer and contractor for the activity to be undertaken on the RCA's roads.

A5.5 Traffic management coordinator (TMC)

A5.5.1 TMC's responsibilities

The RCA-appointed TMC responsibilities include:

- setting conditions for work and other activities on the road
- approving public notices for media release or distribution to local residents. Appendix E in section E provides a standard format for newspaper advertisements
- prioritising access to the network (eg where contractors apply to undertake activity in the same vicinity, the first notification received will generally be given approval to proceed unless the priority of another activity is deemed more important by the RCA)
- approving TMPs for non-RCA contractual activity on the network (including service agreements)
- approving compliant TMPs
- approving TSLs within a TMP and ensuring the renewal of any TSLs extending beyond 12 months (Refer to section I-18: Guidance on TMP Monitoring Processes for Temporary Speed Limits)
- refusing to allow any TMP to be implemented where they consider it to be unsafe or in contravention of CoPTTM, and/or the Health and Safety at Work Act 2015, or where reasonably practicable alternatives may exist that may eliminate the risk, or minimise the risk to health and safety and are safer, or cause less traffic delay. Reasons must be given
- checking, coordinating and accepting any previously approved TMPs
- considering applications for non-generic EED where the road environment constraints make the design and installation of CoPTTM compliant TTM impractical and/or unreasonable
- ensuring there is adequate monitoring and audit of all traffic management within the RCA's roading network by monitoring documentation and worksite activities to ensure compliance with CoPTTM and/or the Health and Safety at Work Act 2015. These checks are to be selected randomly and represent a minimum of five percent of all worksites in any month. Refer to section A8 Temporary traffic management (TTM) safety audit procedures.

  If, after a TTM audit, a worksite is found to have a dangerous rating, then the TMC issues a notice of non-conformance to the contractor's STMS appointed for the worksite. Refer to section E, appendix F for the standard format of a non-conformance notice.

  Send a copy by email to both:

  copttm.quals@nzta.govt.nz

  AND

  Principal CoPTTM Advisor
  NZ Transport Agency
  National Office
  Private Bag 6995
  Wellington 6141
  Phone: +64 21340245
  Email: neil.greaves@nzta.govt.nz

- requiring an activity to be stopped, where corrective action resulting from a notice of non-conformance is not achieved within the required time frame
- suspending the STMS and removing all TCs from the worksite without advance notice where a serious non-compliance with the TMP is found, or the STMS and/or the TC has been found to be acting outside the requirements of CoPTTM or in breach of their obligations in the Health and Safety at Work Act 2015. The activity is to be stopped and the worksite made safe immediately
- notifying the New Zealand Automobile Association, emergency services, RCA, media, public transport operators, etc where the activity is likely to cause disruption to these organisations or their clients
- where requested, to identify (or require a contractor/consultant to identify) the scope of disruption likely to be caused to road users by the proposed works
- where requested by the RCA, to show (or require a contractor/ consultant to show) that it is possible to construct the proposed design, including any required TTM measures
- where requested to show (or require a contractor/consultant to show) that the traffic management measures listed in the estimate and schedule of prices have been correctly quantified
- for any crash at a worksite, notifying the RCA as soon as possible after the event has occurred and providing a report within 24 hours (definition of a crash is provided in A5.7.3 Notification to WorkSafe)
- fulfilling legal responsibilities under relevant legislation.

A5.5.2 Requirements of the TMC

The TMC must hold a TTM qualification appropriate for the highest level of road within the network area for which they are responsible.

The TMC must be independent of the drafting of the TMP to be approved. Any relevant amendments made prior to the approval are to be recorded and summarised on the TMP.

A5.6 Engineer to an RCA contract

A5.6.1 Engineer's responsibilities

The engineer's TTM responsibilities are delegated in the contract of engagement.

The engineer's responsibilities include:

- preparing contract or consent documents
- evaluating tender documents
- setting conditions for work and other activities on the road
- approving public notices for media release or distribution to local residents. Appendix E in section E provides a standard format for newspaper advertisements
- approving compliant TMPs and sending to TMC for acceptance. Where the TMC will not accept the TMP, the engineer must meet with the TMC to reach an agreement. If agreement cannot be reached the RCA must set up a meeting with all parties to facilitate a decision
- approving TSLs within a TMP and ensuring the renewal of any TSLs extending beyond 12 months (Refer to section I-18: Guidance on TMP Monitoring Processes for Temporary Speed Limits)
- refusing to allow any TMP to be implemented where they consider it to be unsafe, in contravention of CoPTTM, and/or the Health and Safety at Work Act 2015, or where reasonably practicable alternatives may exist that may eliminate the risk, or minimise the risk to health and safety and are safer, or cause less traffic delay. Reasons must be given
- considering applications for EED where the road environment constraints make the design and installation of CoPTTM-compliant TTM impractical and/or unreasonable
- ensuring there is adequate monitoring and audit of all TTM for the project. Refer to section A8 Temporary traffic management (TTM) safety audit procedures.

  If, after a TTM audit, a worksite is found to have a dangerous rating, then the engineer issues a notice of non-conformance to the contractor's STMS appointed for the worksite. Refer to section E, appendix F for the standard format of a non-conformance notice.

  Send a copy by email to both:

  copttm.quals@nzta.govt.nz

  AND

  Principal CoPTTM Advisor
  NZ Transport Agency
  National Office
  Private Bag 6995
  Wellington 6141
  Phone: +64 21340245
  Email: neil.greaves@nzta.govt.nz

- requiring an activity to be stopped, where corrective action resulting from a notice of non-conformance is not achieved within the required time frame

  The engineer has the authority to suspend the STMS and remove all TCs from the worksite without advance notice where a serious non-compliance with the TMP is found, or the STMS and/or the TC has been found to be acting outside the requirements of CoPTTM or in breach of their obligations in the Health and Safety at Work Act 2015. The activity is to be stopped and the worksite made safe immediately
- where requested, to identify (or require a contractor/consultant to identify) the scope of disruption likely to be caused to road users by the proposed works
- where requested by the RCA, to show (or require a contractor/consultant to show) that it is possible to construct the proposed design, including any required TTM measures
- where requested, to show (or require a contractor/consultant to show) that the traffic management measures listed in the estimate and schedule of prices have been correctly quantified
- notifying the TMC where the activity is likely to cause disruption to road users
- reporting on the performance of a contractor or worksite operator. The report will cover the performance assessment of TTM and may include a summary of public delays, inconveniences and complaints
- for any crash at a worksite, notifying the RCA as soon as possible after the event has occurred and providing a report within 24 hours (definition of a crash is provided in A5.7.3 Notification to WorkSafe)
- fulfilling legal responsibilities under relevant legislation.

A5.6.2 Requirements of the engineer

The engineer must hold a qualification appropriate for the highest level of road within the project area for which they are responsible.

The engineer must be independent of the TMP to be approved.

A5.6.3 Reporting on TTM

If asked to report on the TTM at a worksite, the engineer's report may include but not be limited to the criteria listed in subsections A5.8 Site traffic management supervisor (STMS) and A5.9 Traffic controller (TC). The engineer may also include, as appropriate:

- the requirements of any contract documents, including the schedule of specific job requirements for traffic management and safety. Refer to section E, appendix A
- the requirements of any other consent or agreement
- any specific requirements of the RCA
- the output from any completed audits
- detail any requirements recommended to eliminate or minimise risk and improve safety, capacity or reduce road user delays.

A5.7 Contractors

A5.7.1 Contractor's responsibilities

Contractors are responsible for:

- ensuring they have the authorisation of each RCA affected by the work or other activity in the road reserve or affecting the road reserve
- preparing accurate TMPs that reflect the worksite conditions, in accordance with CoPTTM and any contractual requirements or RCA authorisation conditions
- ensuring they have an approved and accepted TMP before starting any work
- ensuring that any TSLs are approved in the TMP and renewed if required within the 12 month timeframe (Refer to section I-18: Guidance on TMP Monitoring Processes for Temporary Speed Limits)
- ensuring those preparing TMPs are trained STMS (or STMS-NP for level 2/3) for the level of TTM for the road on which the activity will take place
- obtaining approval and timings for occupation of the worksite, from the TMC prior to commencing work
- implementing approved TMPs
- operating in terms of the traffic regulations and the requirements of *The official New Zealand road code*
- ensuring, so far as reasonably practicable, the safe and efficient movement of all road users through and around the working space, particularly cyclists and pedestrians. Adequate resources must be reasonably available to make changes to the TTM if worksite conditions require changes to be made
- ensuring that the STMS is supported in matters of safety
- ensuring that all TSLs have been authorised by the RCA (or person with delegated authority)
- storing any TTM equipment or plant not in immediate use, off the carriageway and in accordance with C11.2.8 Redundant TTM equipment and C14.1.4 Parking and storage of vehicles, plant and materials
- retaining a record of training and experience for each TC and STMS within the company or organisation
- the appointment of a suitably trained STMS and/or TC, and staff for each worksite (refer to section A6 Training)
- recording details of inspections/audits of TTM measures
- fulfilling their legal responsibilities under relevant legislation
- suspending any STMS issued with two notices of non-conformance within a three-month period from TTM supervision duties. A suspended STMS will be required to undergo retraining and a replacement STMS must be appointed immediately
- arranging for the publication of approved notices in local newspapers or other media as specified in the request for tender
- reporting on crashes at worksites to TMC within 24 hours (definition of a crash is provided in subsection A5.7.3 Notification to WorkSafe).

The contractor or applicant must notify the TMC of the proposed road activity and request permission to proceed. Notification must be in the form of a letter, fax or email at least two working days in advance of the activity commencing.

A5.7.2 Contractor's support of STMS in matters of safety

The contractor is responsible for ensuring that the STMS is supported in matters of safety.

In safety situations where the STMS is overridden by the contractor, any non-conformance will apply to the organisation. The STMS may contact the RCA with any concerns or contact WorkSafe NZ.

The Health and Safety at Work Act 2015 at section 144 provides for private prosecutions
http://www.legislation.govt.nz/act/public/2015/0070/latest/DLM6455600.html

PROSECUTION BY OTHERS

In limited circumstances the Act now allows for people other than an inspector to take prosecution action.

This possibility depends on what the regulator (being WorkSafe or any other designated agency) or a regulatory agency, such as NZTA, New Zealand Police or other agency identified in the Health and Safety at Work Act 2015 has decided to do about a particular incident or situation.

A prosecution by someone else is only possible if the regulator or a regulatory agency has looked at the circumstances and has decided to take no action at all against any of the parties involved. If the regulator or regulatory agency has chosen or intends to take enforcement or prosecution action against one party for one offence, this includes issuing an infringement notice to one party, then prosecution action by anyone else is no longer possible.

This is because the prosecuting authority (the regulator or regulatory agency) has made a judgement about what formal enforcement action is appropriate in the circumstances and the alleged offender(s) should not thereafter be subject to further scrutiny.

But if the regulator and the regulator agency has decided to take no action at all, a private prosecution may proceed.

Persons interested in pursuing prosecution action need to express their interest to the regulator and regulatory agency so that the regulatory agency can tell them whether or not they are going to prosecute or use an infringement notice.

If a person wishes to pursue prosecution action after the regulator and regulatory agency has decided to take no action at all, they normally need to do so within 2 years of the regulator finding out about the offending. A person considering taking prosecution action needs to be able to prove the offending beyond reasonable doubt in the same way that an inspector would have had to.

A5.7.3 Notification to WorkSafe

Any crash resulting in either the death of a person, or a notifiable injury or illness, or a notifiable event or incident (any immediate or imminent exposure to a serious risk to a person's health or safety) must be reported to WorkSafe NZ as soon as possible after the crash becomes known to:

- an employer
- a self-employed person, or
- the principal.

For the definition of notifiable injury or illness or event see sections 23-25 of the Health and Safety at Work Act 2015.

If WorkSafe is notified of the crash, reasonable steps must be taken to ensure the site is not disturbed until authorised by an inspector.

A5.7.4 Recording crashes and briefing the TMC, the RCA (and for an RCA construction project the engineer to the project)

The contractor must record all crashes at worksites and, within **24 hours** of any crash, brief the TMC, the RCA (and for an RCA construction project the engineer to the project) on the details of the crash, including the following:

- a copy of the signed and approved TMP for the worksite
- details of the incident including a diagram showing the layout of the worksite at the time of the crash. The diagram must also show any relevant crash details such as vehicle travel paths, skid marks, etc
- photographs of the crash site.

Minor incidents, such as one or two cones being struck, do not need to be recorded unless there appears to have been potential for a serious incident to have occurred.

To aid the ongoing improvement of CoPTTM, crashes and any notifiable events and incidents must also be reported to copttm.incident@nzta.govt.nz using the CoPTTM Incident Report form available on the CoPTTM pages of the NZTA website. This is in addition to any other Health and Safety reporting requirements.

A5.8 Site traffic management supervisor (STMS)

A5.8.1 General

Appropriately trained and qualified staff must supervise TTM duties at all worksites.

The person in charge of TTM at each worksite is the STMS.

The qualified staff for level LV and level 1 roads are:

- TC
- STMS.

The qualified staff for level 2 and 3 roads are:

- STMS-NP in limited situations (eg shoulder closures)
- STMS.

A5.8.2 Authority of the STMS

The STMS has the authority to:

- postpone, cancel or modify operations due to adverse traffic, weather or other conditions that affect the safety of the worksite
- permit visitor entry to the worksite
- order people off the worksite for issues of non-compliance or safety.

Note: Where a visitor is wearing a compliant high visibility vest this will be enough to enter the worksite. The visitor may be denied entry to the working space if a higher level of personal protective equipment (PPE), such as safety helmets, is required.

Note: The STMS **cannot** amend TSLs without delegated authority or prior approval of the RCA or the engineer.

A5.8.3 STMS's general responsibilities on level LV, 1, 2 and 3 roads

The qualified STMS is responsible for designing and drafting TMPs.

An STMS who prepares a TMP incorporating road safety hardware (eg barriers) and/or devices (eg cones, tubular delineators) is considered an Installation Designer. They must ensure the installation design will protect both workers and the public and is fit for purpose.

The general responsibilities of the appointed STMS for each worksite are to:

- Check that the TMP is appropriate to the worksite. Where the TMP is not suitable, halt proceedings until the necessary actions have been taken. Refer subsection C11.1.1 General.
- arrange on-site meetings for discussions concerning TTM measures at:
  - the start of each set-up
  - on a regular basis (eg daily)
  - each change of a TTM measure due to a change in worksite conditions
- ensure all personnel and visitors on-site are wearing compliant high-visibility clothing in accordance with section B3 High-visibility garments, and any other safety equipment required by the activity
- ensure all personnel entering the worksite are briefed on the safety hazards and the safety procedures to be followed. Visitors are to sign confirming they have understood the briefing
- train MTC on how to carry out their function
- record and notify the RCA or engineer as appropriate within 24 hours of all crashes at the worksite and any complaints about the TTM
- ensure there is a copy of the approved TMP available on-site at all times when the worksite is attended and that this is available for inspection
- record and inform the RCA or engineer immediately of any significant modifications (eg change of detour) to TTM measures not included in the approved TMP. All other changes are to be noted on TMP and RCA or engineer to be advised as soon as possible or no later than the following working day

Note:

For level LV and level 1 roads if:

- the STMS has been delegated authority to approve TMPs, **and**
- the changes are not significant or are in excess of the minimum requirements, **then**

the STMS records any changes on the TMP or the on-site record, and notification is not required. Any modifications must be in accordance with CoPTTM

- ensure contingency plans are implemented when excessive traffic delays, emergencies, weather conditions or other factors occur
- ensure that they can be contacted by mobile phone or two-way radio at all times, for the duration of the installation, maintenance and removal of TTM at the worksite
- where shift work is involved, brief the STMS for the next shift (at the worksite) on the TTM and inspection requirements before handing over responsibility. Briefing must be confirmed in writing to acknowledge the handover
- brief the TC on the TTM requirements of the worksite before handing control of the worksite to the TC. Briefing must be confirmed in writing to acknowledge the handover
- ensure that persons on the worksite operate in terms of the traffic regulations and the requirements of *The official New Zealand road code*
- complete a traffic count before setting up closure and delay set-up if traffic is too high
- ensure traffic is monitored for queuing and delays. Take appropriate action as required. Refer to subsection C16.2.1 Queuing.
- ensure worksite inspections of all TTM equipment is completed at least two-hourly or as detailed in the minimum inspection frequency table in subsection C19.5.1 Monitoring frequency for TTM measures.
- ensure that all corrective action detailed in a notice of non-conformance is undertaken within the required time frame
- ensure any TTM changes required by the New Zealand Police, WorkSafe NZ, RCA or engineer are made immediately and documented on the TMP. The TMC is to be informed within 24 hours.

Where the TTM for one worksite interferes with the TTM of another worksite (eg any signs or other devices overlap on the same piece of road) the STMS seeking to undertake activity on the affected piece of road must meet with the STMS of the established worksite.

They should establish whether both worksites can co-exist by adjusting the TMP and agreeing either:

- one STMS takes responsibility for the TTM (eg the other organisation works within the existing worksite)
- each STMS remains responsible for their section of the worksite (to be recorded on each on-site record).

If the TMPs cannot be easily adjusted on site to accommodate the two worksites a new TMP must be drawn up.

Conditions and responsibilities within the works access permit (WAP) remain with the WAP applicant for each working space.

If the matter cannot be resolved the issue must be referred to the TMC or RCA for a decision.

A5.8.4 Responsibilities of STMS on level LV and level 1 roads

On **level LV and level 1** roads the STMS may undertake other worker roles in addition to their STMS duties. The STMS role must take priority.

The STMS is restricted to managing a maximum of six attended worksites.

The STMS, or a TC, to whom the STMS has delegated worksite control, must be on-site at all times on an attended worksite.

During the period of delegation to a TC or for unattended worksites the STMS must be within the following requirements:

Level of road	Attended worksite delegated to a TC	Unattended worksite
Level 1	30 minutes travel time of each worksite	60 minutes travel time of each worksite
Level LV	60 minutes travel time of each worksite	120 minutes travel time of each worksite

The STMS must limit the number of unattended worksites they are responsible for subject to their ability to satisfactorily perform all their duties to the required standards at all times.

To ensure CoPTTM requirements continue to be met any attended worksite that has been delegated to a TC must be inspected by the STMS:

- for worksites in place for a full day or longer the worksite must be inspected, at least on a daily basis
- where a TC is in charge of static or mobile activities that move from worksite to worksite within a day the STMS must inspect one of the worksites on a daily basis.

These worksite inspections must be documented by the STMS.

Note: The STMS does not have to undertake a worksite inspection of an activity being controlled by a TC where that activity is an inspection as defined in section D.

For inspection activities, as defined in section D, the STMS must be immediately contactable but does not have to be within 30 minutes travel time of the worksite.

For a capital project (projects funded under the capital works vote as opposed to maintenance works) an STMS is permitted to control all worksites at any one time subject to the following:

- the STMS remains within 30 minutes of all worksites
- that a person with a minimum qualification of TC must be present and take charge of each attended worksite
- that TC must have been briefed by the STMS and the briefing documented.

For mobile operations and short-term operations, which do not require more than five personnel in total to satisfactorily undertake the work, the STMS may also undertake other aspects of the work.

A5.8.5 Responsibilities of STMS on level 2 and 3 roads

A5.8.5.1 When the level 2/3 STMS can take another role

On level 2 and level 3 roads the STMS responsibilities must be limited to TTM and activities of site safety officer. The only permitted exceptions to this rule are:

- mobile operations
- short-term static closures which require no more than five people to perform the activity.

In the above situations, the STMS may also perform another function within the closure, providing that this does not interfere with the duties of the STMS which must always take first priority.

A5.8.5.2 When the level 2/3 STMS must be on-site

The STMS must be present at an attended worksite at all times except during a drive through when the STMS may need to leave the worksite to gain access to the front of the worksite. In this case the STMS may be away from the worksite for up to 30 minutes.

Exceptions to this rule are as follows:

- Shoulder closures

  An STMS is permitted to control up to **four attended shoulder closure worksites** on level 2 and level 3 roads at any one time subject to the following:

  - an STMS remains within 30 minutes of all worksites
  - a person with a minimum qualification of STMS-NP is present and takes charge of TTM at each attended worksite
  - that STMS-NP must have been briefed by the STMS and the briefing documented
  - the STMS must be present for the set-up, alteration and removal for each of the worksites

- Capital projects

  An STMS is permitted to control all worksites for a capital project at any one time subject to the following:
  - the STMS remains within 30 minutes of all worksites
  - that a person with a minimum qualification of STMS-NP is present and takes charge of TTM at each attended worksite
  - that STMS-NP must have been briefed by the STMS and the briefing documented
  - the STMS must be present for the set-up, alteration and removal for each of the worksites

A5.8.5.3 When the level 2/3 STMS is not on-site

Unattended worksites

The STMS must limit the number of unattended worksites they are responsible for subject to their ability to satisfactorily perform all their duties to the required standards at all times.

The STMS must be within 60 minutes travel time of each worksite.

A5.8.5.4 Mobile operations on level 2 roads

On level 2 roads where all activity is at least two metres clear of the edgeline, an STMS-NP may take the role of an STMS and set up, maintain, alter and remove TTM under the following conditions:

- the STMS must brief the STMS-NP in charge of the operation on the TTM requirements
- all the above actions must be documented by the STMS.

A5.8.6 Site safety briefings

A5.8.6.1 Toolbox briefing

Prior to activity commencing, everyone with an involvement with the activity at the worksite must be briefed by the STMS and/or the TC using the approved TMP to explain:

- identified hazards
- the TTM requirements for the worksite
- safety zone requirements and limits.

Briefings are to be completed:

- at the start of each set-up
- on a regular basis (eg daily)
- at each new phase of the works.

A5.8.6.2 Site induction briefing

All people arriving on-site must receive a worksite induction before proceeding around the worksite. This will include the following:

- staff of subcontractors
- engineer and/or their representatives
- the principal.

The approved TMP is used to explain:

- the worksite hazards
- site driving and parking requirements
- the method of entering and leaving the worksite.

The contractor must keep a record of induction sessions held, who attended and the TTM configuration(s) explained.

A5.8.7 Identification of STMS

The STMS must have with them their NZTA warrant card (or suitable certified documentation as evidence of qualification).

The STMS must ensure that they are readily identifiable on-site by wearing a fluorescent STMS garment in accordance with section B3 High-visibility garments.

On a level LV and level 1 road where there are less than three personnel on-site the STMS may wear the fluorescent red-orange high-visibility garment.

A5.9 Traffic controller (TC)

A5.9.1 Authority of the TC

When delegated control of a worksite, the TC has the authority to:

- postpone, cancel or modify operations due to adverse traffic, weather or other conditions that affect the safety of the worksite
- permit visitor entry to the worksite
- order people off the worksite for issues of non-compliance or safety.

Note: Where a visitor is wearing a compliant high visibility vest this will be enough to enter the worksite. The visitor may be denied entry to the closure or working space if a higher level of personal protective equipment (PPE), such as safety helmets, is required.

A5.9.2 When TC can take the role of an STMS

For **level LV and level 1** roads a TC may take the role of an STMS and set up, maintain, alter and remove TTM for the worksite under the following conditions:

- there is an approved (and where required accepted) TMP for the worksite
- the STMS must brief the TC in charge of the worksite on the TTM requirements
- to ensure CoPTTM requirements continue to be met the worksite is to be inspected by the STMS:
  - for worksites in place for a full day or longer the worksite must be inspected at least on a daily basis
  - where a TC is in charge of static or mobile activities that move from worksite to worksite within a day the STMS must inspect one of the worksites on a daily basis
- all the above actions must be documented by the STMS.

The TC may also perform other duties (eg foreman, grader driver) however TTM responsibilities must take priority.

A5.9.3 TC's general responsibilities for level LV and level 1 roads

The general responsibilities of the TC who has been delegated worksite control are to:

- Check that the TMP is appropriate to the worksite. Where the TMP is not suitable, halt proceedings until the necessary actions have been taken. Refer subsection C11.1.1 General
- carry out on-site briefings as described in subsection A5.8.6 Site safety briefings. The approved TMP is used to explain
  - the worksite hazards
  - site driving and parking requirements
  - the method of entering and leaving the worksite
- keep a record of induction sessions held, who attended and the TTM configuration(s) explained
- ensure all personnel and visitors on-site are wearing compliant high-visibility clothing in accordance with section B3 High-visibility garments and any other safety equipment required by the activity
- ensure traffic is monitored for queuing and delays

- ensure worksite inspections of all TTM equipment is completed at least two-hourly or as detailed in the minimum inspection frequency table in subsection C19.5.1 Monitoring frequency for TTM measures
- ensure that persons on the worksite operate in terms of the traffic regulations and the requirements of *The official New Zealand road code*
- contact the STMS immediately if there is a need to complete modifications to TTM measures not included in the approved TMP
- ensure contingency plans are implemented when excessive traffic delays, emergencies or weather conditions or other factors occur
- record and notify the STMS or contractor as appropriate within 24 hours of all crashes at the worksite and any complaints about the TTM (definition of a crash is provided in A5.7.3 Notification to WorkSafe)
- ensure that they can be contacted by mobile phone or two-way radio at all times, for the duration of the installation, maintenance and removal of temporary traffic measures at the worksite
- ensure that all corrective action detailed in a notice of non-conformance is undertaken within the required time frame
- ensure any TTM changes required by the New Zealand Police, WorkSafe NZ, RCA or engineer are made immediately and documented on the TMP. Notify the STMS immediately. The TMC is to be informed within 24 hours.

A5.9.4 Identification of TC

The TC must have with them their NZTA warrant card (or suitable certified documentation as evidence of qualification).

The TCs must wear the fluorescent red-orange high-visibility garment detailed in section B3 High-visibility garments.

A5.10 Site personnel

Individual worksite personnel must:

- wear high-visibility garments in accordance with section B3 High-visibility garments
- comply with the requirements of the approved TMP
- follow instructions given by the STMS or TC in charge
- follow company health and safety procedures, eg wear appropriate personal protective equipment (PPE)
- comply with the requirements of the Health and Safety at Work Act 2015 and its regulations
- take reasonable care for his or her own health and safety; and take reasonable care that his or her actions do not adversely affect the health and safety of other persons
- comply with the requirements of the traffic rules and *The official New Zealand road code*.

All worksite personnel need to be aware of the general configuration of signs and devices and report any defect to the STMS or TC in charge.

A6 Training

A6.1 General

A6.1.1 Who must complete training

All personnel who have supervising responsibilities (TC, STMS and STMS-NP) must be trained to the appropriate standard for the:

- level of road, and
- tasks that they are undertaking.

This includes:

- submitting and approving TMPs
- installing, maintaining or removing TTM
- inspecting or auditing TTM.

It is recommended that workers receive TC training or similar training based on the TC curriculum. Refer to subsections A6.4.2 Refresher training requirements and A6.4.4 Details of courses.

A6.2 Extract from the Health and Safety at Work Act 2015

Set out below are the duties of PCBUs in relation to training and supervision as stated in the Health and Safety at Work Act 2015:

'The provision of any information, training, instruction, or supervision that is necessary to protect all persons from risks to their health and safety arising from work carried out as part of the conduct of the business or undertaking.'

A6.3 Certification of temporary traffic management (TTM) training courses

A6.3.1 The NZTA's role

The NZTA is the certifying organisation for all CoPTTM training courses.

The NZTA is tasked with:

- development of training curriculums
- certifying course tutors
- auditing training courses
- issuing certificates of achievement
- maintaining a database of trained people
- issuing and withdrawing warrant cards.

The NZTA will hold Train the trainer workshops. Suitably qualified and experienced individuals can attend these workshops. Only those persons who attend a Train the trainer workshop and meet the pass requirements will be awarded trainer status.

Applications can be made to:

Senior Advisor Technical Training and Education)
NZ Transport Agency
National Office
Private Bag 6995
Wellington 6141

Phone: +64 21 485 383
Email: copttm.quals@nzta.govt.nz

Trainers can be certified to teach:

- TC and STMS level 1 courses, and
- STMS-NP level 2/3 courses.

Only a limited number of trainers will be certified to teach level 2/3 courses.

A limited number of assessors will be certified to carry out practical field assessments for the level 2/3 STMS qualification.

A6.4 Certification and registration

All persons who are certified will have their qualification registered on the NZTA's TTM database. There will be a small cost for the registration process. All those who are registered will receive a certificate and warrant card.

A6.4.1 Levels of training

The NZTA awards the following qualifications:

Standard:

- level 1 TC
- level 1 STMS
- level 2/3 STMS-NP
- level 2/3 STMS.

Special:

- KCTL
- TC Inspector.

A6.4.2 Refresher training requirements

Qualification	Lapse period and required action
Level 1 TC, TC Inspector, Level 1 STMS and Level 2/3 STMS-NP	These qualifications lapse three years after the date of the course assessment. Once lapsed, the holder is deemed out of date and can no longer fulfil a TTM role. Qualifications are renewed on successful completion of a refresher course. If the qualification has lapsed for over 12 months, the candidate will be required to successfully complete a full workshop for their lapsed level of qualification before being recertified.
Level 2/3 STMS	This qualification is tied to the time frame for the STMS-NP. They will lapse together, and the STMS-NP must first be renewed as above. In addition, the applicant is required to either: • re-sit a practical field assessment, or • submit a recognition of prior experience (ROPE) form to the NZTA's Principal CoPTTM Advisor. **Note:** Existing L2/3 STMS must complete a practical field assessment every other renewal **ROPE** This form must contain the details of six closures completed while the practising STMS held their qualification (including the on-site record for each closure). The six closures must be carried out in the nine months preceding submission of the ROPE application. **Non-conformance** Applicants who have received a non-conformance, or who have an unsatisfactory report from referees may not be considered for ROPE. However, if a non-conformance report is followed by a 12-month period of satisfactory performance the ROPE may still be allowed.

A6.4.3 Summary of certification pathway

Certification	Summary of pathway
Level 1 TC	**Prerequisite:** No prerequisite **Pass mark:** 60% **On job assessment:** None
Level 1 TC Inspector	**Prerequisite**: No prerequisite **Pass mark:** 60% **On job assessment:** None
Level 1 STMS	**Prerequisite:** Hold TC (or TC Inspector) for one month **Pass mark:** 60% **On-job assessment:** None
Level 2/3 STMS-NP	**Prerequisite:** Level 1 STMS **Pass mark:** 60% **On-job assessment:** None
Level 2/3 STMS	**Prerequisite:** Level 2/3 STMS-NP **On-job assessment:** Yes

A6.4.4 Details of courses

Details of courses for each level of training may be obtained from:

NZ Transport Agency
National Office
Private Bag 6995
Wellington 6141

Phone: +64 21 485 383
Email: copttm.quals@nzta.govt.nz

A6.5 Level 1 traffic controller (TC) training

A6.5.1 About the training

This is the most basic qualification for this level of traffic management. There is no prerequisite qualification for this level of training.

This qualification enables the holder, once briefed by the STMS, to:

- set up, maintain, alter and remove level LV and level 1 TTM worksites
- undertake the on-site duties of an STMS for **level LV and level 1** TTM.

Those who **must** hold this qualification are:

- all RCA project staff
- all engineer's project management, design and worksite supervision staff
- all contractor's on-site management staff including worksite managers, worksite forepersons and leading hands who set up, maintain, alter and remove a worksite without an STMS present.

Additional training may be required to operate specialist TTM equipment. The TC training is not mandatory for MTCs but they must be trained by the worksite STMS to carry out their function.

A6.5.2 Type of course

This is a one-day workshop with assessments. Attendees must achieve a 60 percent pass of the assessments to gain the qualification.

Those who pass the course can apply through their trainers to receive a certificate of achievement and a warrant card that will be issued by the NZTA.

Those who take charge of a worksite in the absence of the STMS must be certified and registered on the NZTA's TTM database.

This qualification is a prerequisite for the New Zealand Qualifications Authority (NZQA) unit standard 5627 *Temporary traffic management – Operate as a traffic controller (TC) for low volume and level 1 roads*.

A6.6 Traffic controller – Inspector (TC-I) training

A6.6.1 About the TC Inspector training

This training is similar to the TC training but includes level 2 and level 3 inspection material.

This training is delivered by selected trainers and may include a regional network induction for the region where the workshop is being held.

Prior to carrying out inspections in any region, the TC Inspector must receive that RCA's level 2 and 3 network induction.

There is no prerequisite for this level of training.

This qualification enables the holder, once briefed by the STMS, to:

- set up, maintain, alter and remove level LV and level 1 TTM worksites
- undertake inspections that are totally outside the edgeline of level 2 and level 3 roads
- undertake inspections on the lane of level 2 roads with permanent speed under 65km/h. For this activity, the onsite control must be by an STMS L2/3, or an STMS-NP or a TC Inspector.

This special qualification is designed for:

Type of person	Examples
Person who might be infrequently (eg 4 or less occasions per annum) required to carry out inspections on the live lane of level 2 roads	Planners/property staff required to make confirmatory site or location inspections on level 2 or level 3 roads over the course of one year
Students or casual workers employed to carry out a study	A traffic count from a safe location, or a visual inspection of an asset such as a sign or a barrier system

Staff who are regularly involved in the installation of TTM closures on level 2 and level 3 roads, which may include inspecting or carrying out non-invasive work, are not eligible for the TC Inspector and must hold the level 2/3 STMS or STMS-NP qualification.

Examples of staff involved in activities that will not be eligible are:

- contract manager for level 2/3 project
- litter collection
- gardening
- sign or other device cleaning.

A6.6.2 Type of course

This is a one-day workshop with assessments. Attendees must achieve a 60 percent pass of the assessments to gain the qualification.

Those who pass the course can apply through their trainers to receive a certificate of achievement and a warrant card that will be issued by the NZTA.

Those who take charge of a worksite in the absence of the STMS must be certified and registered on the NZTA's TTM database.

A6.7 Level 1 site traffic management supervisor (STMS) training

A6.7.1 About the training

This is the highest qualification for this level of traffic management.

People attending this course must hold a current **level 1** TC certificate of achievement for a minimum of one calendar month prior to attending the STMS course.

This qualification enables the holder to:

- draft TMPs
- check and approve TMPs prepared by others
- undertake the duties of an STMS for **level LV and level 1** TTM
- undertake TTM audits of TTM of worksites for **level LV and level 1** TTM.

Those who **must** hold this qualification are:

- all RCA project managers
- all engineer's staff who:
  - approve contract documents
  - check and approve TMPs
- all engineer's project management and senior worksite supervision staff
- all contractor's staff who:
  - draft TMPs
  - undertake the duties of the STMS for **level LV and level 1** TTM
- all contractor's project management staff
- all TTM auditors who will undertake TTM audits of TTM at worksites
- others who will undertake similar activities for this level of road

Additional training may be required to operate specialist TTM equipment.

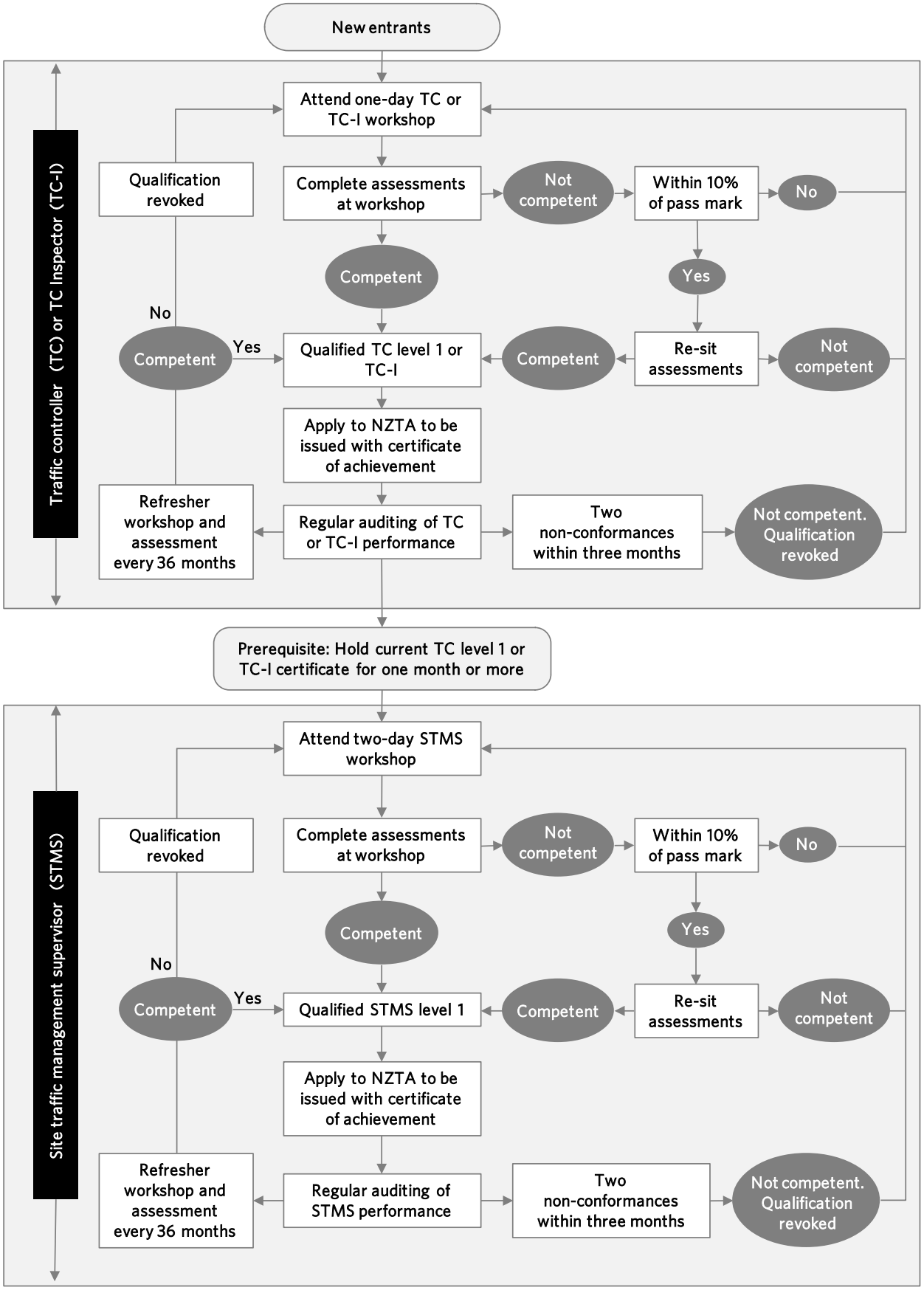
A6.7.2 Type of course

This is a two-day workshop with assessments. Attendees must achieve a 60 percent pass of the assessments to gain the qualification.

Those who pass the course can apply to the NZTA through their trainers to receive a certificate of achievement and a warrant card.

This qualification is a prerequisite for the NZQA unit standard 5628 *Temporary traffic management – Operate as a site traffic management supervisor*.

STMS assessment and certification process – level LV and level 1 roads



A6.8 Level 2/3 site traffic management supervisor non-practising (STMS-NP) training

A6.8.1 About the training

This is the highest qualification for this level of traffic management.

People attending this course must hold a current **level 1** STMS certificate.

This qualification enables the holder to:

- draft TMPs for **level 2** and **level 3** roads
- check and approve TMPs prepared by others
- undertake TTM audits of worksites for **level 2** and **level 3** TTM.

Those who **must** hold this **level 2/3** qualification are:

- all RCA project managers
- all engineer's staff who draft, check and/or approve TMPs
- all engineer's project management and worksite supervision staff
- all contractor's staff who draft TMPs
- all contractor's project management staff
- all TTM auditors who will undertake TTM audits of traffic management at worksites
- others who will undertake similar activities for this level of TTM.

Additional training may be required to operate specialist equipment such as TMAs and arrow boards.

A6.8.2 Type of course

A two-day workshop with assessments. Attendees must show competence in the NZQA assessments and achieve a 60 percent pass in the tests to gain the qualification.

Those who pass the course can apply to the NZTA through their trainers to receive a certificate of achievement and a warrant card.

At this stage of the qualification the attendees may be responsible for all aspects of TTM except for field operations involving installation, alteration and removal of TTM equipment.

Level 2/3 STMS-NP certificate will not include the STMS warrant. To become a fully qualified **level 2/3** STMS, and hence be able to undertake full responsibility for all aspects of TTM, the applicant must undertake and pass a field assessment. Prior to the field assessment the candidate must competently install, manage and remove 3 worksites. A verifier will confirm the candidate's work.

This qualification is a prerequisite for the NZQA unit standard 20879 *Temporary traffic management – Operate as a site traffic management supervisor non-practising*.

A6.9 Level 2/3 site traffic management supervisor training

A6.9.1 About the training

This is the highest qualification for this level of traffic management.

The practical assessment for this qualification may be taken any time after passing the level 2/3 STMS-NP course. Candidates must be able to provide evidence of the successful establishment and removal of level 2 and 3 worksites, under the guidance of a fully qualified STMS.

There is no course for this qualification. It is awarded once the candidate has successfully completed a practical assessment. People undertaking this assessment must hold a current **level 2/3** STMS-NP certificate.

The level 2/3 STMS qualification enables the holder to:

- draft TMPs
- check and approve TMPs prepared by others
- undertake the duties of STMS for **level 2** and **level 3** TTM
- undertake TTM audits of TTM of worksites on **level 2** and **level 3** roads.

Those who **must** hold this qualification are:

- all contractor's staff who will undertake the duties of the STMS for **level 2** and **level 3** TTM
- others who will undertake similar activities for this level of TTM.

Additional training may be required to operate specialist equipment such as TMAs and arrow boards.

A6.9.2 About the assessment

Candidates are advised to take the practical assessment for this qualification as soon as possible once they have passed the **level 2/3** STMS-NP course. The period for this qualification is tied to the **level 2/3** STMS-NP. If a candidate passed the assessment two years after attaining the **level 2/3** STMS-NP, their STMS qualification would only be valid for one year before requiring renewal.

The assessment process, the assessment forms and list of **level 2/3** assessors are available on the NZTA website.

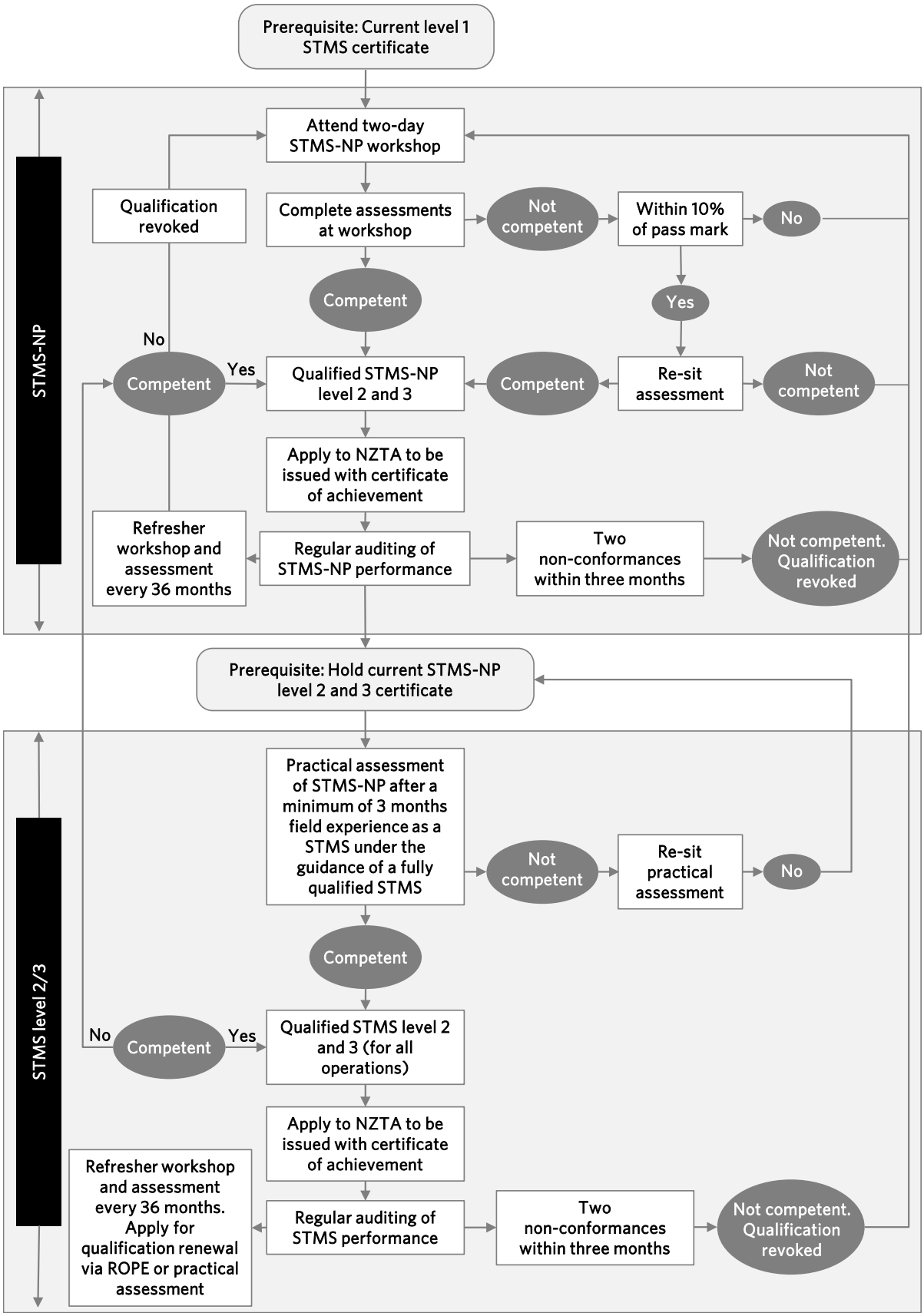
Before undertaking an assessment, it is recommended that candidates have at least three months practical experience as an STMS on **level 2** and **level 3** worksites under the guidance of a fully qualified STMS.

A probationary status may be awarded where there is no STMS to understudy. An application for the probationary status may be made in writing to the:

NZ Transport Agency
National Office
Private Bag 6995
Wellington 6141
Phone: +64 21 485 383
Email: copttm.quals@nzta.govt.nz

On passing the field assessment, the applicant will become a fully qualified level 2/3 STMS and can apply to the NZTA to receive an STMS warrant card. This qualification is a prerequisite for the NZQA unit standard 20880 *Temporary traffic management – Operate as a site traffic management supervisor for level 2/3 roads.*

STMS assessment and certification process – level 2 and level 3 roads



A6.10 Kerbside collection traffic leader (KCTL)

A6.10.1 About the KCTL training

This is a unique qualification for the Waste Collection Industry and must be renewed every three years.

There is no prerequisite qualification for this level of training.

This qualification enables the holder to lead a mobile work team (usually a driver and collectors) to complete kerbside collection activities.

Training must be carried out by an NZTA qualified CoPTTM trainer.

Requirements for this qualification are:

- all drivers must be trained as a KCTL
- all mobile work teams (usually a driver and collectors) must be led by a KCTL
- there must be a minimum of one STMS per company. Where a company has more than one branch they may require an additional STMS.

A6.10.2 Type of course

This is a 4 hour workshop with assessments. Attendees must achieve a 60 percent pass for the assessments to gain the qualification.

Those who pass the course can apply through their trainers to receive a certificate of achievement and a warrant card that will be issued by the NZTA.

All drivers and those who lead mobile work teams must be certified as a KCTL and registered on the NZTA's TTM database.

A7 Traffic management plans (TMPs)

A7.1 General

A7.1.1 About TMPs

A TMP details the measures to ensure, so far as reasonably practicable, the safety for all people involved in the activity.

It is a document describing the nature and extent of TTM at a worksite and how road users (including pedestrians and cyclists) will be managed by the use of TTM measures.

The TMPs are required for all activities that vary the normal operating conditions of a road, irrespective of whether the activity is on a carriageway, on a footpath, or on a road shoulder.

The TMPs are also needed for activities outside the road reserve, which will affect the normal operating conditions of the road.

Depending on the size, duration and location of the worksite multiple TMPs (or a TMP with multiple TMDs) may be required for various stages of the work.

TMPs must include local RCA requirements (RCAs must be consulted as they may have local requirements for managing pedestrians, cyclists and parking).

Where regulatory parking and stopping areas are to be affected by the works additional consultation time may be required during planning for the activity.

A7.1.2 Consent to works

The TMP does not replace the need to obtain the required consent from the RCA for the activity to be undertaken (eg road opening notice or after 1 July 2011 the Code of Practice for Utilities Access to the Transport Corridors - Corridor Access Permit No/s).

A7.1.3 Frequent non-invasive maintenance activities

A variety of approaches are available for service authorities to carry out frequent non-invasive maintenance activities. These include:

- service agreements
- letters of consent
- road opening specifications.

These approaches spell out conditions designed to protect the:

- asset
- workers
- road users.

The approach chosen must:

- limit the activity (eg to inspections of switchboards)
- not cover the installation of new equipment or the need to dig to find a fault
- be reviewed at least every 12 months.

A7.2 Application and approvals procedure

Step	Actions/Comments
RCA gives consent for the activity	Applicant requests authority from each affected RCA to carry out activity on road reserve. The RCA or representative authorises the activity (subject to various conditions, including the use of TMP). Note: Some RCAs may require the TMP to be submitted with the application for consent to carry out the activity.
TMP drafted	An STMS drafts the TMP using the CoPTTM TMP format as follows: • *If simple activity and RCA permits,* use short TMP form • *If more complex activity*, use full TMP form.
TMP submitted for approval (or if delegated authority, an STMS approves TMP)	An STMS submits TMP to RCA for approval. For selected level LV and level 1 roads (non-state highways) an STMS can approve the TMP without submitting it to the RCA if the: • STMS has been delegated authority to approve TMPs by the RCA, and • situation is one where TMC approval is not required by the RCA. Refer to subsection A7.2.1 STMS delegated authority – situations for TMC approval. For a detailed list of each RCA's requirements refer to the NZTA's website.
TMP approval	The RCA acknowledges receipt of the TMP to the contractor within 24 hours of receiving the TMP. Decision is made by the RCA's TMC/engineer who must: • be independent of the preparation of the TMP • have received training from an NZTA-certified training course for this purpose • be delegated the authority by the RCA as suitable to approve such plans on their behalf. TMC/engineer decides whether the TMP is approved or requires amendment. If the TMP is approved by the engineer it must be forwarded to the RCA/TMC for acceptance and coordination. With stated reasons, the RCA/TMC/engineer may refuse to approve and/or accept any TMP if the proposed TTM is considered to be unsafe, in contravention of CoPTTM, or where reasonable alternatives may exist that may be safer or cause less traffic delay. Examples where RCA/TMC/engineer may refuse to approve a TMP are: • the closure of some lanes may lead to dangerous queuing • merging tapers are too short to safely merge traffic. Where two TMPs are lodged for the same stretch of road to undertake activities at the same time, the RCA/TMC/engineer may approve one TMP and allow both groups to undertake their activity within that TMP.
RCA returns TMP	A copy of the signed TMP is returned to the applicant, within the specified time frame. If the TMP has not been approved, the applicant will be advised what amendments are required. If an amendment is required to the TMP, the applicant: • makes the required amendment/s • resubmits the TMP for approval. For any minor changes, the TMC or approving engineer can mark changes on TMP and approve it. The applicant must be advised of the changes made to the TMP. Approval must be obtained prior to commencing the activity.

Step	Actions/Comments
Approval to work	The applicant notifies the TMC at least two working days in advance of the works being undertaken. The TMC notifies the applicant as to whether they can proceed with the activity at the requested time.
Record hazard identification, set-up, maintenance and removal of the worksite	Once TMP is approved the worksite can be set up following requirements in section C and/or section D. Complete hazard identification before setting up the worksite and put in place any mitigation steps required. Record the set-up, maintenance and removal of the worksite on the CoPTTM on-site record (refer to section E, appendix A) or a company site safety checklist provided it includes the following information: • details of the person responsible for working space • details of the STMS who is in charge of the TTM for the worksite (name, qualification, identification and expiry date of qualification) • if the worksite is handed over to another STMS, details of the STMS who is now in charge of the worksite • if worksite delegated to a TC (level 1) or STMS-NP (only on limited level 2 worksites), details of the TC/STMS-NP who is in charge of the worksite (name, qualification, identification and expiry date of qualification) • the worksite monitoring including: – site set-up – two-hourly monitoring – site removal • details of any TSLs installed: – date installed – time installed – placement (route position or street numbers) – TSL speed – length of TSL (in metres) – date removed – time removed. Record all changes to the TSL (change of speed or change of location of TSL). A new on-site record must be completed when there is a handover to another STMS.

A7.2.1 STMS delegated authority – situations for TMC approval

If the STMS has been delegated authority to approve TMPs on selected level LV and level 1 roads (non-state highways) they still must submit TMPs to the TMC for approval in the higher risk situations. Each RCA can declare its own situations, but the common ones are where:

- approval has been requested by the RCA during the planning process for a particular worksite or collection of worksites
- there is no traffic management diagram in the level LV and level 1 example plans that represents the worksite
- a road needs to be closed or traffic delays for more than five minutes at any one time during the day, or for a cumulative period of 30 minutes in any one hour period, except where otherwise specified by the RCA
- a footpath will be closed and users will have to enter/cross a live lane
- a cycle lane will be closed
- a pedestrian crossing or traffic signal installation is affected
- restricted parking, bus stops, loading zones and/or taxi stands will be affected
- portable traffic signals are to be used
- a lane closure is required at an intersection
- signs need to be placed on a flush median
- traffic moving in one direction is split around a closure
- mobile operations are on roads with posted speed limit exceeding 50km/h (except for grading operations)
- the activity is an event
- other situation/s as may be stipulated by the RCA.

For a detailed list of each RCA's requirements refer to the NZTA's website.

A7.3 Principles for traffic management plans (TMPs)

A7.3.1 Principles

The following principles are to be used when designing a TMP:

- The TMP must be consistent with CoPTTM.
- The TMP must identify reasonably foreseeable hazards that could give rise to risks to health and safety.
- Traffic management measures must prioritise the treatment of the hazard(s) created by the activity in the following order:
  - eliminate risks to health and safety
  - minimise those risks so far as is reasonably practicable by implementing risk control measures in accordance with the Health and Safety at Work Act 2015 and its regulations.

  Actions to ensure this occurs on site must be recorded on the TMP and the on-site record.
- Any risk control measure to eliminate or minimise risk must be effective, maintained and reviewed in accordance with the Health and Safety at Work Act 2015 and its regulations.
- The person approving the TMP must be satisfied that the hazards have been managed.
- The TMP must be designed and drafted by an STMS trained and qualified to the level of TTM required by the RCA for the activity.
- The activity and associated TTM must be carried out in such a manner as to avoid, or at least minimise, inconvenience or delay to road users whilst still providing safe conditions for both the road user and those carrying out the activity.
- The activity must be separated from road users wherever possible.
- The TTM measures proposed must not be over restrictive nor use an excessive number of signs.
- The TSLs must have the minimum possible reduction in speed limit for the minimum time and over a minimum length while still providing for the safety of road users and those carrying out the activity. Refer to section C4.
- Activities with varying on-site phases must have multiple TMPs or TMDs covering each phase. This includes unattended worksites.

A7.4 Contents of traffic management plans (TMPs)

A7.4.1 Contents

Simple TMPs contain:

- contract/consent numbers
- location details and road characteristics
- description of work
- other aspects affecting the road
- proposed TTM, either in a worksite-specific layout or a generic traffic management diagram
- organisations (contractor, principal/client, RCA/s)
- approvals.

In addition, more complex TMPs may also contain:

- contact details
- work programme
- proposed traffic management method
- positive traffic management measures
- contingency plans
- authorisations
- EED applicable
- delay calculations/trial plan to determine potential extent of delays
- liaison with emergency services and public transport operators (if they could be affected by the worksite)
- changes to parking controls
- public notification plan
- on-site monitoring
- method for recording daily worksite TTM activity (eg on-site record)
- detours
- AADT and peak hour flow
- alternative dates if activity delayed
- materials storage
- plant operational requirements, eg truck waiting and filling areas
- pedestrian safety fences, delineation and equipment to be used
- extraordinary safety measures
- other information (eg temporary speed issues)
- list of worksite-specific layout diagrams.

TMPs for mobile operations should also include the following additional information:

- the type and function of each vehicle in the mobile team
- the vehicles that will be equipped with attenuators and arrow boards, and their location within the closure
- the number, location and duration of exposure, and tasks of personnel who are permitted to leave their vehicles
- the method of inter-vehicle communication.

A7.4.2 Layout diagrams

CoPTTM sets out the **minimum** requirements for TTM. Elements from two or more layouts may be used to produce the required design.

The layout diagrams must be of a standard which:

- allows the STMS to install the equipment correctly
- ensures the layout is fit for purpose
- provides protection for the activity
- allows for any worksite constraints.

Where conflict appears to occur between layout diagrams and the text or tables, then the text or tables will take precedence.

Particular consideration will be needed where an increased level of hazard is identified. Examples of these include:

- activities at or near intersections or commercial and other entrances where there are many turning and manoeuvring movements
- where there are pedestrian and cyclist amenities
- on- or off-ramps
- activities adjacent to rail crossings (consult with railway authorities)
- vertical and horizontal curves (hills and corners).

The worksite-specific requirements for TMPs, a blank TMP form and the schedule of specific job requirements for traffic management and safety form are contained in section E, appendix A.

A7.5 Generic traffic management plan (GTMP)

A7.5.1 Lodging a GTMP

Repetitive activities may have GTMPs.

The repetition could be either:

- the same type of activity at similar locations (eg edge break repairs on a straight stretch of road)
- returning to the same worksite to perform the same activity (eg mowing a centre island once a month).

These repetitive activities may be performed by:

- network maintenance contractors
- utility maintenance contractors
- gardening contractors
- sports organisations
- others as approved by the RCA (the GTMP is not usually suitable for the overall planning of a construction contract, however where there are repetitive closures the contractor may apply to use a GTMP).

The GTMPs must be approved by the TMC and may be issued for a maximum time period of 12 months.

A GTMP must be resubmitted to the RCA for approval if it has been modified to accommodate:

- additional hazards
- statutory changes
- a lesser degree of protection.

A7.5.2 Using GTMPs

The GTMPs may **not** be appropriate for every situation and it is the responsibility of the contractor, RCA and the engineer to check for this.

Notifying the TMC

Prior to using the GTMP the TMC must be notified of the GTMP number, the diagram(s) being used, the location and the date and time of the works to be undertaken and the STMS/TC in charge.

The TMC may stipulate the method and extent of notification.

Actions on site

Each time a GTMP is used the following actions must be completed:

- Check that the diagram used is appropriate for the site – Refer section E, appendix A for the checking process for generic TMPs
- Complete the onsite record - Refer section E, appendix A.

A7.6 Recommended response times

A7.6.1 Response times

The TMP is submitted in time to allow for any changes required by the RCA or engineer to ensure the TMP meets the requirements of CoPTTM.

The table below shows the time frames for the submission, review and approval of TMPs for short-term, mobile and long-term activities.

A7.6.2 Submission and acceptance times of TMPs

Activity	Road category	Time frame (working days)	
		Submit prior to start date*	RCA or engineer to approve
All activities	Level LV and level 1	5	3
Short-term and mobile operations	Levels 2 and 3	5	3
Long-term operations	Levels 2 and 3	10	5

* Where there is a requirement for public notification, or an EED, the plan must be submitted a minimum of ten working days before it needs to be publicly notified.

A7.7 Availability of traffic management plans (TMPs)

A7.7.1 Copy of TMP on-site

A copy of the signed and approved TMP/generic TMPs must be available on-site at all times when the worksite is attended, and be available for inspection by the RCA, engineer, New Zealand Police or WorkSafe NZ registered inspector.

A7.7.2 Copy kept for one year

Whether approved under delegated authority or by the RCA, the TMP (and any associated on-site records) must be must be kept by the contractor for one year.

A7.8 Emergency situations not at a planned worksite

A7.8.1 Dealing with emergencies

TTM used in unforeseen emergency situations is to comply with the practices in CoPTTM as far as practicable. Emergencies are often dealt with initially by the police and/or other emergency services. If assistance is requested, TTM measures may be installed without a prior approval from the RCA.

Except in emergencies to save lives and/or prevent injury, TTM must be installed before activities commence.

New Zealand Police may direct a contractor to alter or remove TSLs. They may direct a contractor to erect, alter or remove all other signage. Civil defence officers and the fire service have similar levels of authority to the police in an emergency situation.

A7.9 Engineering exception decisions

A7.9.1 About EEDs

Variations to the requirements of CoPTTM may be considered on a case by case basis if the road environment constraints make the design and installation of TTM impractical and/or unreasonable. Any variation to CoPTTM must be in terms of a written EED statement. An EED cannot be used to avoid a legal requirement.

The EED statement must describe:

- What the problem is:
  a. Describe the road environment constraint.
  b. State CoPTTM requirements for the proposed activity.
- Why CoPTTM-compliant TTM should not be installed.
- How will safety be ensured?

The EED is a signed formal agreement. The EED proposal is submitted by the principal to the contract, and/or their contractor/supplier and approved by the RCA.

The EED must be attached to, and form part of, the TMP for the activity. The EED must be applied for across boundaries where applicable. All NZTA offices or their consultants must send a copy of all generic EEDs and the relevant plan for approval to the:

Principal CoPTTM Advisor
NZ Transport Agency
National Office
Private Bag 6995
Wellington 6141
Phone: +64 21340245
Email: neil.greaves@nzta.govt.nz

RCA staff and their representatives may forward any generic EEDs to the above address for information and/or feedback if appropriate. See example EED on following page.

Example of typical EED

ENGINEERING EXCEPTION DECISION			
Name of RCA	*(For example, Auckland Transport or for state highways network description such as Northern Canterbury State Highways Network)*	**EED No**	
Basic description of the activity associated with EED			

Location detail and scheduled dates			
Location	This EED relates to TTM activities at:	**Dates:**	From: To:
It is proposed to vary the requirements of CoPTTM.			

WHAT the problem is: (a) describe the road environment constraint, (b) state CoPTTM requirements for the proposed activity.	
a. The road environment constraint	Work on a level 1 road at a rural intersection with a posted speed of 70km/h. The activity is a digout on centreline and part of the northbound lane. This reduces the lane width to 3.25 metres (m).
b. CoPTTM requirements for the proposed activity	CoPTTM requires a 70m taper.

WHY CoPTTM compliant TTM should not/cannot be installed.
A 70-meter taper will close the intersection to right hand turns and straight through traffic on the east-west lanes.

HOW will safety be ensured?
To allow the side traffic to progress through the intersection we will place a short 10-meter taper immediately in front of the working space. Cones in this taper will be spaced at 1m. The lane width past the closure will be 2.75m with a TSL of 30km/h to provide positive traffic management. To slow northbound traffic we will insert two 70m lines of cones prior to the intersection. One line of cones on the edgeline, and the other line on the centreline. The centreline cones will taper by 750mm and direct traffic towards the left-hand side of the northbound lane – away from the closure. Workers will not be permitted to enter the area of the closure adjacent to the intersection (the bottom of the working space) and no plant and equipment will operate in this area.

This EED must be attached to the TMP. Any generic EEDs must be forwarded to the NZ Transport Agency.

EED – Proposal				
Signed for and behalf of:				
	Insert contractor's name			
Signed by:				
	Name	*Designation*	*ID number*	*Expiry date*
	Signature		*Date*	

EED – Approved by				
Signed for and behalf of:				
	Insert RCA name			
Signed by:				
	Name	*Designation*	*ID number*	*Expiry date*
	Signature		*Date*	

Diagram showing the issue of the taper blocking traffic from side roads

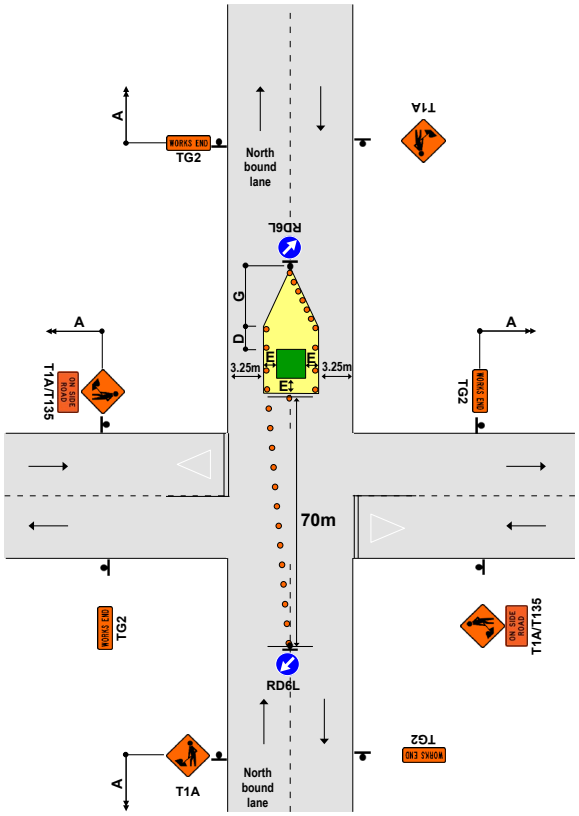
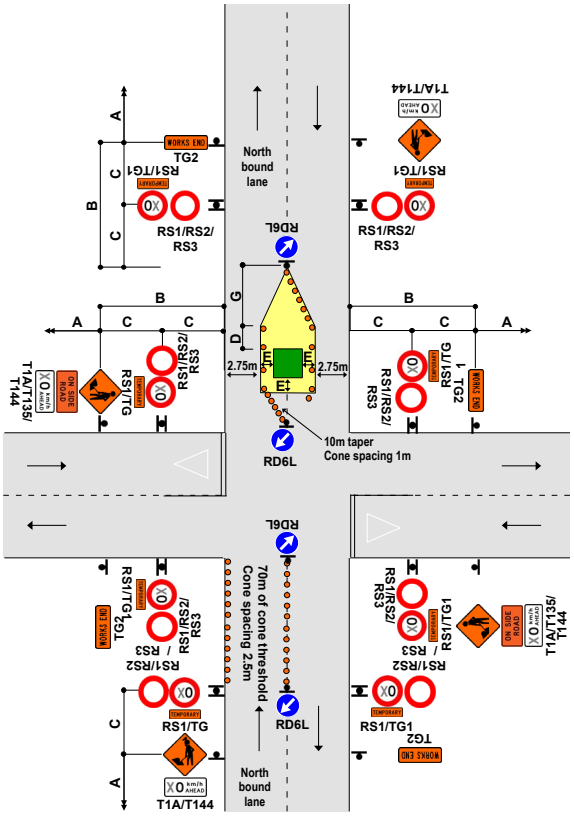


Diagram showing the solution – 70m taper substituted by a 10m taper with positive traffic management



A8 Temporary traffic management (TTM) safety audit procedures

A8.1.1 About the TTM audit

It is recommended that auditing of worksites be carried out by both the RCA and any party who has activity completed for them on the roads. This is to provide assurance that good traffic management is being achieved and, if not, to identify problems that need to be remedied.

The RCA monitors documentation and activities to ensure continuing effectiveness and uniformity of TTM.

If worksites are found to have a dangerous site condition rating (refer to section E, appendix C), then the level and frequency of audits must be increased.

A8.1.2 Use of the TTM audit procedures

These procedures must be used to audit activities requiring TTM.

Refer to section E, appendix C for a full description of the audit methodology and actions to take after the audit.

There are two audit forms (full audit and short audit) which can be used for the following:

Full audit	Short audit
• Attended and unattended static worksites. • Semi-static activities. • Mobile and inspections activities. • Day-time and night-time activities.	• Attended and unattended static worksites. • Day-time and night-time activities.

A8.1.3 Who could use the procedures

These procedures may be used by the following:

Who can use procedure	How procedures can be used
RCAs/TMCs	To establish the level of compliance for TTM installed and maintained for each activity in terms of CoPTTM, and to measure the level of safety within their network.
Consultant/engineers	To establish contractor safety compliance.
Principals	To meet their obligations for safety compliance of their staff and contractors.
Contractors	To self audit own activities.
WorkSafe NZ	WorkSafe NZ inspectors may use these procedures as part of their inspection process for any activity. The audit form can be used to support formal improvement notices.

A8.1.4 Training Requirements

People using these procedures must hold a current STMS or STMS-NP certification (refer to subsection A5.8 Site traffic management supervisor (STMS)) to the level of the TTM for which they are auditing.

Traffic Control Devices Manual
Part 8

Code of practice for temporary traffic management (CoPTTM)

manual number: SP/M/010

Section B

www.nzta.govt.nz

Fourth edition, Amendment 4 of
Code of practice for temporary traffic management

Date of issue: November 2018

Effective date: 1 February 2019

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)

Section B – Equipment

B1 Signs (including stands and supports)

B1.1 Introduction

This part describes all temporary works signs and any relevant regulatory signs that apply to temporary traffic management (TTM).

The numbering of signs for TTM is in accordance with the Land Transport Rule: Traffic Control Devices 2004 (TCD Rule) and the Traffic sign specifications.

This part displays some general detail about sign features such as colour and size, it references back to the Traffic sign specifications for detailed measurements.

The TCD rule now allows for a minimum width supplementary sign of 900mm. Previously these signs were manufactured to a 950mm standard. The 950mm signs are not obsolete and may continue to be used while fit for purpose.

B1.2 General

TTM signs are set out at worksites to:

- provide advance warning
- direct and protect road users, and road workers
- notify road users when they are safely through a worksite.

All TTM signs must comply with the NZTA's:

- TCD Rule
- CoPTTM.

Signs used in TTM fall into two categories:

- temporary warning signs
- regulatory signs.

B1.3 Sign standards

All signs must comply with the requirements in New Zealand Standard 5414:1977 *Specification for the construction of traffic signs* (NZS 5414:1977) and Australian and New Zealand Standard 1906.1:2007 *Retro-reflective materials and devices for road traffic control purposes - Retro-reflective sheeting* (AS/NZS 1906.1:2007), except where modified by CoPTTM. Where requirements are duplicated, AS/NZS 1906.1:2007 must take precedence over NZS 5414:1977.

All sign faces (temporary and regulatory) must have retro-reflective material backgrounds. Retro-reflective material must only be applied to substrates approved by the manufacturer and application methods must comply with the manufacturer's recommendations.

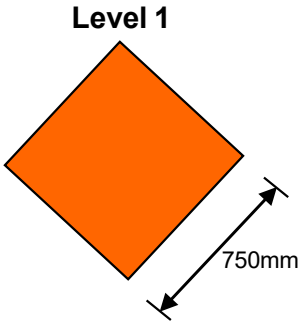
Most temporary warning signs must have retro-reflective fluorescent orange backgrounds. For exceptions, refer to the TCD Rule, schedule 1.

B1.3.1 Sign standards on level LV and level 1 roads

B1.3.1.1 Warning signs

All signs must comply with the dimensions and facings (retro-reflective, fluorescent orange backgrounds) detailed in the TCD Rule, schedule 1.

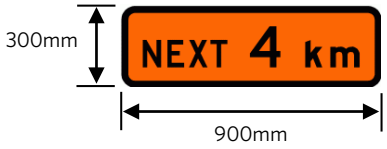
Typically level 1 signs are used on level LV and level 1 roads.



The larger level 2 and 3 signs may be used at the road controlling authority's (RCA) discretion or where required specifically in CoPTTM.

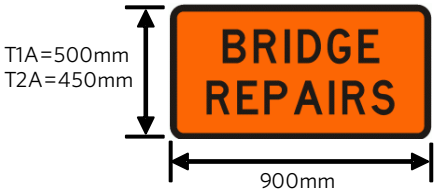
The minimum size for a diamond-shaped sign is 750mm x 750mm.

The minimum size for a supplementary plate with a single line is 900mm x 300mm.



The minimum size for a supplementary plate with a double line is:

- 900mm x 500mm for any T1A supplementary plate
- 900mm x 450mm for any T2A supplementary plate

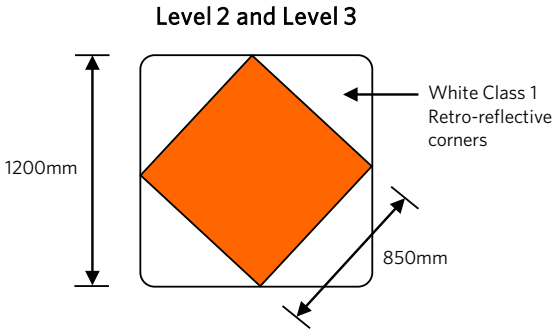


B1.3.1.2 Regulatory signs

The minimum size for a regulatory sign is 750mm diameter. However, 600mm diameter signs may be used for mobile operations.

B1.3.2 Sign standards on level 2 and 3 roads

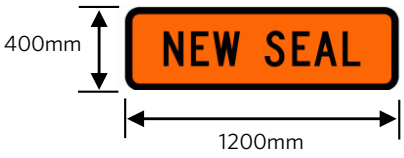
B1.3.2.1 Warning signs



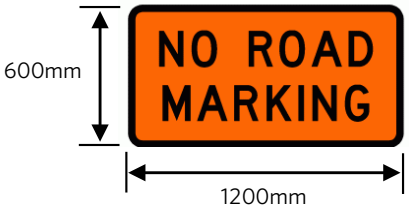
All signs must comply with the dimensions and facings (retro-reflective, fluorescent orange backgrounds) detailed in the TCD Rule, schedule 1.

The minimum size for a diamond-shaped sign must be 850mm x 850mm and it must be superimposed on a white 1200mm x 1200mm square-shaped backing board.

The minimum size for a level 2 and 3 supplementary **or** rectangular sign with a single line is 1200mm x 400mm.



The minimum size for a level 2 and 3 supplementary **or** rectangular sign with a double line is 1200mm x 600mm.



B1.3.2.2 Regulatory signs

The minimum size must be as stated in the table below.

Level 2 roads	1200mm diameter for regulatory speed (RS1) signs. 900mm diameter for all other regulatory signs. 750mm diameter for vehicle-mounted signs unless specified otherwise in CoPTTM.
Level 3 roads	1200mm diameter for all regulatory signs. 750mm diameter for vehicle-mounted signs unless specified otherwise in CoPTTM.

B1.3.2.3 900mm warning and regulatory signs for shoulders, medians and roadside areas

Where shoulders, medians and roadside areas will not accommodate a full size sign, a 900mm warning or regulatory sign including a speed limit sign may be used with the RCA's permission. These 900mm signs must not be used at other worksites without the approval of the RCA.

B1.3.3 Non-standard, one-off or special signs

The words and symbols on existing signs are chosen from experience and are designed to maintain consistency.

Only those signs approved in the TCD Rule and listed in CoPTTM are to be used.

Signs for special purposes can be approved by the RCA. These must comply with the TCD Rule. The signs must comply with the following general temporary warning sign requirements:

- Signs must be symbolic rather than in words wherever possible.
- Where permanent warning sign legends/symbols are adopted for TTM purposes at worksites, the sign background must be specified as reflective orange rather than the retro-reflective yellow.
- Additional direction signs must comply with the usual format used by the RCA. Letter sizes and spacing must match those on permanent sign faces, and be related to the vehicle-approach speed at the sign location.

If a contractor considers the range of signs inadequate and a sign with a different legend is required, a request must be made to:

Principal CoPTTM Advisor
NZ Transport Agency
National Office
Private Bag 6995
Wellington 6141
Phone: +64 21340245
Email: neil.greaves@nzta.govt.nz

The NZTA will consider the request and notify the decision.

B1.3.4 Sign stands and supports

Sign stands and/or supports must be designed to ensure they:

- will not cause significant damage to a vehicle if struck by one
- are stable under all reasonably expected weather conditions and air turbulence from passing traffic, and
- will not present a hazard to vehicles, including bicycles, after being knocked or falling over, ie the sign's support and stand must lie relatively flat with no part more than 150mm above the ground surface.

Sandbagging is an effective method of securing signs. Signs must not be secured by hanging a weight from any part of the sign. Concrete and heavy steel (truck wheel rims, welded water pipe, etc) must not be used as a base for signs.

Where ballast is used on a sign stand or base it must:

- be designed so that it **cannot** roll
- be constructed from hessian, rubber or plastic bags containing a soft granular material, and
- be no higher than 300mm above ground level.

Sign bases must:

- be designed so they **cannot** roll
- be able to be placed/disassembled to a height equal to or less than 150mm
- be designed to break away from the rest of the sign support system on impact.

Subject to application via a TMP and approval by the RCA median barrier brackets may be used to support TTM signs.

Note: When a sign on a barrier is removed, the bracket must also be removed.

B1.4 Signs used at worksites

For the full sign use policies and sign design details refer to the Traffic sign specifications.

All temporary warning and regulatory signs are available in either level 1 or level 2 and 3 sizes.

The following table only illustrates level 1 signs unless a sign is only available as a level 2 and 3 sign.

B1.4.1 Advance warning

Sign name	Sign reference	Illustration	Requirements for use
Road works Levels LV and 1	T1A		This sign is erected at all attended worksites. The sign is also used at unattended worksites where there are hazards within 5m of the edgeline. An authorised supplementary sign may be used.
Road works Levels 2 and 3	T1B		
Road works 1 or 2 km	T141		This sign is used to give advance warning of **major long-term worksites on level 2 and level 3 roads** where there is a probability that a traffic queue will form.
	T142		This supplementary plate can be used as an alternative to the T141 when it is combined with a T1B sign. It measures 1200mm X 450mm.
Road works DELAYS POSSIBLE 1 or 2 km	T143		This sign is used to give advance warning of **major long-term worksites on level 2 and level 3 roads** where there is a probability that a traffic queue will form and that some delays are also likely.

Sign name	Sign reference	Illustration	Requirements for use
Road works '_' km/h AHEAD	T144		This sign is a supplementary plate for an advanced warning sign. It gives notice of a temporary speed limit ahead. The speed shown must be the same as the temporary speed limit imposed at the worksite. Supplementary plate size: • level 1 roads 900mm x 450mm • level 2 and 3 roads 1200mm x 600mm.
Road works NEXT 1, 2, 3 or 4 km	T121		This supplementary plate is used with an advance warning sign to indicate the extent of the road works. The sign is used where any type of activity has resulted in a road surface inferior to that on the approaches and that extends for more than 1km. It is to be used in conjunction with a T1A/B or any other advance warning sign.
Road works NEW SEAL	TR31		This supplementary plate is used with a T1A/B sign to indicate sealing operations and a newly sealed surface while it is susceptible to damage by motor traffic. It is used with a T1A/B advance warning sign.
Road works WET TAR	T145		It is used to indicate bleeding of a completed seal, new or otherwise. This supplementary plate may also be used as an alternative to the TR31 NEW SEAL supplementary plate. It is used with a T1A/B advance warning sign.
Road works Specialist mobile plant	T132		This supplementary plate indicates that there is a grader operating on the roadway or within 5m of the edgeline. It is to be used in conjunction with a T1A/B advance warning sign. Where the maintenance operation is outside the roadway but within 5m of the edgeline the T132 sign may be erected to warn road users approaching on the affected side only. Where the maintenance operation is on the roadway T132 signs must be erected on both approaches to the worksite.
	T133		This supplementary plate indicates that there is skid testing being performed on the roadway or within 5m of the edgeline. It is to be used in conjunction with a T1A/B advance warning sign.

Sign name	Sign reference	Illustration	Requirements for use
Road works Specialist mobile plant	T136		This supplementary plate indicates that there is a mower operating on the roadway or within 5m of the edgeline. It is to be used in conjunction with a T1A/B advance warning sign.
	T137		This supplementary plate indicates that there is a weed sprayer operating on the roadway or within 5m of the edgeline. It is to be used in conjunction with a T1A/B advance warning sign.
Road works ROAD MARKING	T134		This supplementary plate indicates that road marking is being carried out. It is to be used in conjunction with a T1A/B advance warning sign or if used in a mobile road marking operation it may be used in place of a supplementary road works sign TV2.
Road works ON SIDE ROAD	T135		This supplementary plate indicates that there is a worksite or hazard on a side road. The sign is used where the worksite or hazard is too close to the intersection to meet the visibility criteria for advance warning signs. It is to be used in conjunction with T1A/B or T2A/B advance warning signs.
Road works SHOULDER CLOSED	T138		This supplementary plate indicates that the shoulder is temporarily closed by some road works activity. It is to be used in conjunction with a T1A/B advance warning sign.
Road works SURVEYING	T139		This supplementary plate must be displayed when a survey party is actually on the roadway or within 5m of the edgeline. It can be used in conjunction with a T1A/B or a T2A/B advance warning sign.
Road works BRIDGE REPAIRS	T140		This supplementary plate indicates that maintenance activity is being undertaken on a bridge. It is to be used in conjunction with a T1A/B advance warning sign.

Sign name	Sign reference	Illustration	Requirements for use
Hazard warning Levels LV and 1	T2A		This sign denotes a hazard warning and must only be erected in combination with approved supplementary plates.
Hazard warning Levels 2 and 3	T2B		
Hazard warning FLOODING	T211		This supplementary plate is used wherever surface water on the roadway creates a hazard. A depth of a few centimetres can be dangerous. It must be used in conjunction with a T2A/B advance warning sign.
Hazard warning WASHOUT	T212		This supplementary plate is used wherever a portion of road has eroded or fallen away and reduced the road width available to traffic. Edge marker posts or temporary delineation devices can be used to indicate the edge of the useable roadway. It must be used in conjunction with a T2A/B advance warning sign.
Hazard warning LINEMEN	T213		This supplementary plate is used when people or machines are working on overhead lines or poles within the road reserve. It must be used in conjunction with a T2A/B advance warning sign.
Hazard warning BLASTING	T214		This supplementary plate is used to indicate blasting operations in hand on or near the road and where there is a danger to road users from flying debris. It must be used in conjunction with a T2A/B advance warning sign. Manual traffic controllers (MTCs) using RP4/RP41 STOP/GO paddles together with TA2/TA21 must employ manual traffic control signs on all road approaches in conjunction with the T214 supplementary plate, to prevent traffic entering the danger area for the duration of each danger period.

Sign name	Sign reference	Illustration	Requirements for use
Hazard warning TREE FELLING	T215		This supplementary plate is used to indicate tree trimming and/or felling operations are being carried out on or near the road and there is a danger to road users from falling branches or trees. It must be used in conjunction with a T2A/B advance warning sign. MTCs using RP4/RP41 STOP / GO PADDLES together with TA2/TA21 must employ manual traffic control signs on all road approaches in conjunction with the T215 supplementary plate, to prevent traffic entering the danger area for the duration of each danger period.
Hazard warning LOGGING TRUCKS	T216		This supplementary plate is used in situations where logging truck movements occur to and from a road over relatively short period (typically four to six weeks) while small forestry blocks are being logged. It must be used in conjunction with a T2A/B advance warning sign. The signs must be covered or removed overnight or when log hauling operations are suspended for more than four hours.
Hazard warning TRUCKS CROSSING	T217		This supplementary plate is used where a large number of heavy commercial vehicles are required to turn into and out of a site. It must be used in conjunction with a T2A/B advance warning sign. The signs are not used in urban areas or at road works sites and must be covered or removed overnight.
Hazard warning NO ROAD MARKING	T218		This supplementary plate is used in situations where road markings have been obliterated due to road work operations such as pavement water blasting or cutting and where use of the TR31 NEW SEAL supplementary plate is inappropriate. It must be used in conjunction with a T2A/B advance warning sign.
Hazard warning SIGNALS CHANGED	T219		This supplementary plate is installed in advance of an intersection where the traffic signal control sequence has been changed. The supplementary plate must be erected for a minimum of two weeks following the change in control. It must be used in conjunction with a T2A/B advance warning sign.

Sign name	Sign reference	Illustration	Requirements for use
Hazard warning SIGNALS NOT WORKING	T220		This supplementary plate is used when a traffic signal is not operational because of a fault or maintenance work. The supplementary plate is not required when traffic signals are operating in the amber-flashing mode. It must be used in conjunction with a T2A/B advance warning sign.
Hazard warning NEW ROAD LAYOUT	T221		This supplementary plate is installed in advance of a change to the road, or an intersection, layout. The supplementary plate must be erected for a minimum of two weeks following the change. It must be used in conjunction with a T2A/B advance warning sign.
Hazard warning TRAFFIC SURVEY	T222		This supplementary plate is used on the approaches to roadside traffic survey sites for the duration of survey. It must be used in conjunction with a T2A/B advance warning sign. When a T222 supplementary plate is used it must be augmented with a TA21 PLEASE STOP ON REQUEST plate and a TG31 THANK YOU plate is to be erected downstream of the survey site.
Hazard warning Vulnerable road user event	T227		This supplementary plate is used for events involving cyclists. This supplementary plate is to be erected on a stand, as for static operations, to warn road users of the event. It must be used in conjunction with a T2A/B advance warning sign.
	T228		This supplementary plate is used for events involving runners. This supplementary plate is to be erected on a stand, as for static operations, to warn road users of the event. It must be used in conjunction with a T2A/B advance warning sign.
	T229		This supplementary plate is used for events involving walkers. This supplementary plate is to be erected on a stand, as for static operations, to warn road users of the event. It must be used in conjunction with a T2A/B advance warning sign.

Sign name	Sign reference	Illustration	Requirements for use
Hazard warning ACCIDENT	T223		This supplementary plate is to be used whenever any traffic management measures are implemented at a crash site. It must be used in conjunction with a T2A/B advance warning sign.
Hazard warning FIRE	T224		This supplementary plate is used whenever fire fighting operations and/or drifting smoke presents a hazard to normal traffic operations. It must be used in conjunction with a T2A/B advance warning sign.
Hazard warning Vulnerable road users ahead	T230		This supplementary plate is used for long distance events involving cyclists. The supplementary plate is to be erected on pilot vehicles accompanying the event to warn approaching and following drivers that there are cyclists on the road ahead. It must be used in conjunction with a T2A/B advance warning sign.
	T231		This supplementary plate is used for long distance events involving runners. The supplementary plate is erected on pilot vehicles accompanying the event to warn approaching and following drivers to indicate that there are runners on the road ahead. It must be used in conjunction with a T2A advance warning sign.
Hazard warning Vulnerable road users ahead	T232		This supplementary plate is used for long distance events involving walkers. The supplementary plate is erected on pilot vehicles accompanying the event to warn approaching and following drivers to indicate that there are walkers on the road ahead. It must be used in conjunction with a T2A advance warning sign.
Hazard warning FUNERAL	T225		This supplementary plate may be used in advance of a site where it is likely that funeral activities will present a hazard to normal traffic operations. It must be used in conjunction with a T2A/B advance warning sign.

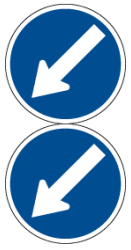
Sign name	Sign reference	Illustration	Requirements for use
Hazard warning FILM CREW	T226		This supplementary plate may be used in advance of a site where it is likely that film making activities will present a hazard to normal traffic operations. It must be used in conjunction with a T2A/B advance warning sign.
Hazard warning HIDDEN QUEUE	WG12		This supplementary plate may be used in advance of a site where queues of vehicles (which have been delayed by roadworks or a temporary event) occur in a situation where they are hidden by road curvature or alignment from approaching vehicles. It is to be used in conjunction with a T2A/B advance warning sign.
Slips Left	TR1L		This sign is used wherever slips or other fallen debris affects part of the roadway.
Slips Right	TR1R		
Slippery surface	TR2		This sign is used where road construction or maintenance machines carry clay or other materials onto the roadway surface, which consequently may temporarily become greasy when wet. A WR3/WR32 SLIPPERY SURFACE - WHEN WET permanent sign is used where other surface defects not of a temporary nature cause the road surface to become slippery when wet.

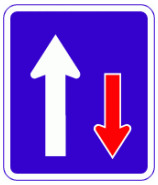
Sign name	Sign reference	Illustration	Requirements for use
Slippery surface ICE/GRIT and WHEN FROSTY	TR21	 	This supplementary plate is used when grit or CMA is spread onto the roadway surface to combat ice. It is to be used in conjunction with a TR2A/B advance warning sign. Additional TR2A/B and TR21 signs, spaced no more than 2km apart, must be erected along sections of road when grit or CMA has been spread on the roadway surface. Where several such sections of road occur in close proximity, the first TR2A/B sign and TR21 supplementary plate may be augmented with an additional supplementary plate NEXT '_' km. Where a TR2A/B and TR21 sign is to be erected near a WR3/WR31 SLIPPERY SURFACE - WHEN FROSTY permanent sign, it is to be located past the WR3/WR31 sign by approximately 20 to 50m and in such a position that both signs will be visible at the same time to an approaching road user.
Gravel surface	TR3		This sign is used when a section of normally sealed road temporarily has a gravel surface. Because this is a more specific warning than the T1A/B road works sign it is to be used in preference to that sign whenever the main hazard is a gravel surface. The supplementary plate TR31 NEW SEAL is to be added as soon as the surface has been sealed.
Gravel surface **NEW SEAL**	TR31		This supplementary plate is to be used as soon as new sealing has been completed and must remain in position until all loose chip has been removed and new pavement markings have been installed. It is to be used in conjunction with a TR3 advance warning sign.
Gravel surface **SEAL REPAIRS**	TR32		This supplementary plate is used for multiple seal repair patches along a section of road less than 1km in length. It is to be used in conjunction with a TR3 advance warning sign. Where the length of road under repair is greater than 1km the TR32 supplementary plate must be repeated every 1km. Where several such sections of road occur in close proximity the first TR32 supplementary plate may be augmented with a T121 NEXT '_' km supplementary plate.

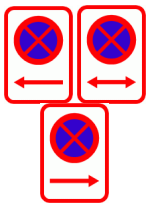
Sign name	Sign reference	Illustration	Requirements for use
Stock – temporary Cattle/Sheep	TF1		These signs are used where driven stock crosses or travels short distances along the road at infrequent intervals (greater than two days) and in such a location as to cause a traffic hazard. The signs should only be displayed when stock is actually within the road reserve. When the frequency of stock movements is greater (on a regular daily basis - often perhaps several times a day) or, where the lack of fences, walls, etc. along the road reserve results in continual presence of stock on the road the WF12/11 STOCK signs are a better option.
	TF2		
ROAD WORKS	TV2		This sign indicates that this vehicle is involved with an operation on the road. It must be used in conjunction with a vehicle-mounted flashing amber beacon. It must be mounted on the front of the lead pilot vehicle for all mobile operations.
ROAD INSPECTION	TV3		This sign must be used in conjunction with vehicle-mounted flashing amber beacons and must be mounted on the rear of any vehicle conducting road inspections.
Diverge	TL1		This sign may be used within a site where traffic lanes in the same direction are required to pass either side of a hazard. **Note**: TL1 signs **must** never be used for centre lane closures.
Uneven surface	TR4		This sign is used where road surface deformation constitutes an additional hazard at a worksite.

B1.4.2 Direction and protection

Sign name	Sign reference	Illustration	Requirements for use
Speed limit TEMPORARY To be used with the following RS1 signs: • 20km/h • 30km/h • 40km/h • 50km/h • 60km/h • 70km/h • 80km/h	RS1/TG1		The TG1 temporary plate must be used in conjunction with RS1 regulatory speed signs to apply a temporary speed limit (TSL) and restrict traffic speeds. A TSL is used when there is a risk of danger to a worker or the public, or a risk of damage to a road due to: • physical work occurring on or adjacent to a road • an unsafe road surface or structure • a special event • an emergency. The TSL must be 80 km/h or less and at least 10km/h less than the normal speed limit for that section of road. On all roads, except Level LV roads, the TG1 signs must be gated (ie a sign on both sides of the road). Repeater TSLs are only required on the left hand side at 400m intervals. Level 1- 750mm minimum diameter for static operations. TEMPORARY supplementary plate - minimum 900mm x 300mm (TCD rule allows a minimum of 800mm x 250mm. This size is not recommended as it will not fit stands). Level 2 and 3 - 1200mm minimum diameter for static operations.
No right turn	RD1R		These signs are used to stop traffic turning into a hazard area. Level 1 - 750mm minimum diameter for static operations. Level 2 - 900mm minimum diameter for static operations. Level 3 - 1200mm minimum diameter for static operations.
No left turn	RD1L		
NO ENTRY	RD2		This sign can only be used after formal authorisation by the controlling authority. It is used for temporary traffic management where there is a partial road closure and approaching vehicles are not permitted to enter a road section eg one direction closed and the carriageway is temporarily made into a one-way road. RD2 signs must be augmented with T1A/B road works signs and TD-type detour direction indicator signs used to indicate the shortest alternative route with an adequate width and no height restrictions. Level 1 - 750mm minimum diameter for static operations. Level 2 - 900mm minimum diameter for static operations. Level 3 - 1200mm minimum diameter for static operations.

Sign name	Sign reference	Illustration	Requirements for use
ROAD CLOSED	RD3		This sign can only be used after formal authorisation by the controlling authority that the road is closed to ordinary vehicular traffic for the purpose of facilitating road works or any other legitimate activity. RD3 signs must be augmented with T1A/B road works signs and TD-type detour direction indicator signs used to indicate the shortest alternative route with an adequate width and no height restrictions. Level 1 - 750mm minimum diameter for static operations. Level 2 - 900mm minimum diameter for static operations. Level 3 - 1200mm minimum diameter for static operations.
Keep left	RD6L		RD6L and RD6L twin disc signs are used to indicate that drivers must pass to the left of an obstruction or that the traffic lane(s) shift to the left. Where an RD6L sign on the centre line of a two-way two-lane road is likely to pose a hazard due to insufficient lane widths the alternative RD6L twin disc sign may be used, subject to the approval of the TMP by the RCA or delegated person. Level 1 - 750mm minimum diameter for static operations. Level 2 and 3: • 900mm minimum diameter for static operations • 1500mm for mobile operations in association with R3-13.3 • 750mm when used with TV4.
Keep right	RD6R		RD6R signs are used to indicate that drivers must pass to the right of an obstruction or that the traffic lane shifts to the right. Level 1 - 750mm minimum diameter for static operations. Level 2 and 3: • 900mm minimum diameter for static operations • 1500mm for mobile operations in association with R3-13.3 • 750mm when used with TV4.
Twin disk	RD6L *TWIN DISC*	 *(300mm diameter)*	On level LV and level 1 roads where an RD6L sign on the centre line of a two-way two-lane road is likely to pose a hazard due to insufficient lane widths the alternative RD6L twin disc sign may be used, subject to the approval of the TMP by the RCA or delegated person.

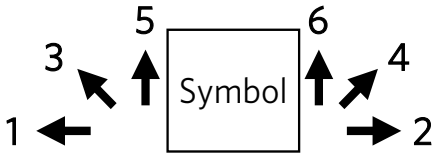
Sign name	Sign reference	Illustration	Requirements for use
Truck-mounted attenuator (TMA) display	R3-13.3		The display, installed on a vehicle equipped with an attenuator used to protect activity being conducted on the road beyond the sign, provides warning and indicates which side of the vehicle drivers must pass. This sign replaces W4-9 horizontal arrow board which is being phased out as the steady diagonal downward arrow in sign R3 -13.3 is better understood by drivers than the 'moving' horizontal arrow in sign W4-9. This display consists of three parts: • the red and white delineation • the light arrow RD6T • the blue disk and white arrow RD6L/R.
Light arrow	RD6T		
Keep left/right single disk	RD6L/R		The RD6L/R disk must be 1500mm in diameter (±50mm). **These arrows must not point vertically.**
Single-lane give way	RP51 *(priority single lane)*	 *(750mm minimum diameter)*	The sign is used where a two-lane two-way road has been reduced to a single lane through a worksite or by a temporary hazard. The RP51 sign is combined with the RP22 supplementary plate **These signs must only be used on two-lane two-way roads with an AADT of less than 1000vpd.** RP51 sign must be used in conjunction with RP52 SINGLE LANE - PRIORITY and TL9 ONE LANE signs. RP51 signs must be erected in advance of the single lane section of road and on the approach where drivers have the best visibility through the single section and hence are in the best position to assess whether they must give way to oncoming traffic or may proceed if the road is clear.
	RP22 *(supplementary GIVE WAY)*		
Single lane priority	RP52	 *(560mm x 625mm minimum)*	RP52 signs must be used in conjunction with RP51 SINGLE LANE - GIVE WAY and TL9 ONE LANE signs. The sign is used where a two-lane two-way road has been reduced to a single lane through a worksite or by a temporary hazard. This sign must only be used on two-lane two-way roads with an AADT of less than 1000vpd. RP52 signs must be erected in advance of the single lane section of road and on the approach considered most appropriate for assigning the priority traffic movement.

Sign name	Sign reference	Illustration	Requirements for use
STOP ON RED SIGNAL	RP61	 *(600mm x 600mm)*	When it is impracticable to mark a limit line on the road surface these signs are used to emphasise where drivers are to stop. They may be used at temporary or part time traffic signals with unsealed approach roads. The RP61 STOP ON RED SIGNAL sign must be mounted on the primary traffic signal pole immediately below the traffic signal head.
STOP HERE ON RED SIGNAL	RP62		The RP62 STOP HERE ON RED SIGNAL sign must be mounted at the point where vehicles are required to stop.
No stopping at all times (urban and road works situations)	PN11	 *(350mm x 500mm minimum)*	These signs are used to prevent parking where parked vehicles could restrict traffic flows through a worksite or temporary hazard site.
Lane closed Two-lane one-way road	TL2L		This sign is used when the left lane is closed on two-lane one-way carriageway. A supplementary distance plate is used for signs on level 2 and level 3 roads.
	TL2R		This sign is used when the right lane is closed on two-lane one-way carriageway. A supplementary distance plate is used for signs on level 2 and level 3 roads.
Lane management supplementary 100m 200m 300m 400m	TLS		This supplementary distance plate is used to provide warning of approaching lane change, lane merge or lane shifts on level 2 and level 3 roads. This supplementary plate is used in conjunction with TL type signs. The use of the TLS supplementary plate is mandatory where signs are required at specified distances in advance of the lane changes, merges or shifts.

Sign name	Sign reference	Illustration	Requirements for use
Lane closed Three-lane one-way road	TL3L		This sign is used when the left lane is closed on three-lane one-way carriageway. A supplementary distance plate is used for signs on level 2 and level 3 roads.
	TL33		This sign is used when the right lane is closed on three-lane one-way carriageway. A supplementary distance plate is used for signs on level 2 and level 3 roads.
Centre lane closed Three-lane one-way road	TL31		This sign may be used for a centre lane closure on three-lane one-way carriageway, where the speed limit is 50km/h or less and vehicles are required to merge to the left. This sign must not be used on level 2 or level 3 roads, any state highways or roads with a speed limit in excess of 50km/h. Refer subsection C8.2.9 Centre lane closures.
	TL32		This sign may be used for a centre lane closure on three-lane one-way carriageway, where the speed limit is 50km/h or less and vehicles are required to merge to the right. This sign must not be used on level 2 or level 3 roads, any state highways or roads with a speed limit in excess of 50km/h. Refer subsection C8.2.9 Centre lane closures.
Lane closed Four-lane one-way road	TL4L		This sign is used when the left lane is closed on four-lane one-way carriageway. A supplementary distance plate is used for signs on level 2 and level 3 roads.
	TL4R		This sign is used when the right lane is closed on four-lane one-way carriageway. A supplementary distance plate is used for signs on level 2 and level 3 roads.
Lane shift Two-lane one-way road	TL5L		This sign is used on a two-lane one-way carriageway to indicate that the road ahead is temporarily shifted from its normal alignment to the left. A supplementary distance plate is used for signs on level 2 and level 3 roads.
	TL5R		This sign is used on a two-lane one-way carriageway to indicate that the road ahead is temporarily shifted from its normal alignment to the right. A supplementary distance plate is used for signs on level 2 and level 3 roads.

Sign name	Sign reference	Illustration	Requirements for use
Lane shift Three-lane one-way road	TL6L		This sign is used on a three-lane one-way carriageway to indicate that the road ahead is temporarily shifted from its normal alignment to the left. A supplementary distance plate is used for signs on level 2 and level 3 roads.
	TL6R		This sign is used on a three-lane one-way carriageway to indicate that the road ahead is temporarily shifted from its normal alignment to the right. A supplementary distance plate is used for signs on level 2 and level 3 roads.
Merging traffic Main road	TL71		This sign is used on level 2 and level 3 roads when one or more lanes on the main road are closed and the normal on ramp taper has been extended to the lanes remaining open to traffic. A supplementary distance plate is used for signs on level 2 and level 3 roads.
Side road	TL72		This sign is used on on-ramps to level 2 and level 3 roads when one or more lanes on the main road are closed. A supplementary distance plate is used for signs on level 2 and level 3 roads.
Advance exit	TL81		This sign is used on level 2 and level 3 roads when one or more lanes on the main road are closed and the normal off ramp taper has been extended to the lanes remaining open to traffic. A supplementary distance plate is used for signs on level 2 and level 3 roads.
Exit direction	TL82		This sign is normally only used on multi-lane divided carriageway roads where one or more of the main road lanes have been closed and an off ramp exit lane has been extended to meet the lane remaining open to traffic.

Sign name	Sign reference	Illustration	Requirements for use
One lane Left side narrowing	TL9L		These signs must only be used on two-lane two-way roads with an AADT of less than 1000vpd where the road is effectively reduced to a single lane. They are combined with a TL9S supplementary plate. TL9L/R and TL9B signs must be augmented with RP51 single lane - give way signs and RP52 single lane - priority signs.
One lane Right side narrowing	TL9R		
One lane Both sides narrowing	TL9B		
One lane ONE LANE	TL9S		This supplementary plate is used to inform road users that the road ahead narrows to one lane. It is to be used in conjunction with a TL9L/R/B sign.
Traffic signals Temporary	TA1		This sign is normally only used on two-lane two-way roads to provide advance warning of temporary traffic signals at a worksite. TA1 signs must be augmented with T1A/B ROAD WORKS signs and TG1 speed limit – TEMPORARY signs (30km/h or less).
Manual traffic control	TA2		This sign is used at worksites on two-lane two-way roads to provide advance warning of manual traffic control using RP4/RP41 STOP/GO paddles. TA2 and TA21 signs must be augmented with T1A/B ROAD WORKS signs and TG1 speed limit - TEMPORARY signs (30km/h or less).
PLEASE STOP ON REQUEST	TA21		This sign is used in advance of the T222 TRAFFIC SURVEY sign and also may be used as a supplementary plate to the TA2 manual traffic control sign.

Sign name	Sign reference	Illustration	Requirements for use
ROAD CLOSED AHEAD	TD1		This sign is used where the road ahead is closed. In normal circumstances an alternative route or detour will also be provided.
EXIT CLOSED AHEAD	TD2		This sign is used where a motorway/expressway exit ahead is closed. In normal circumstances an alternative route or detour will also be provided.
DETOUR AHEAD FOLLOW 'symbol'	TD3A		These signs are used to indicate that the start of a detour route is ahead.
	TD3B		
	TD3C		
	TD3D		
Detour direction indicator	TDA1		These signs are used to indicate a detour route, changes of direction of the route and also confirmation of the route where the direction might not be clear to drivers (eg at intersections). 
	TDA2		
	TDA3		
	TDA4		
	TDA5		
	TDA6		
	TDB1 to TDB 6		
	TDC1 to TDC 6		
	TDD1 to TDD 6		

Sign name	Sign reference	Illustration	Requirements for use
PILOT CAR FOLLOW ME	TV1		This sign is attached to the rear or roof of a pilot vehicle which is used to lead traffic through a worksite at a desired speed. TV1 signs are used in conjunction with MTCs using RP4/RP41 STOP/GO paddles.
SITE ACCESS '_' 00m	TZ1L		This sign is erected to give advance warning of an approved access point to a site located adjacent to the road, when the site access is directly off a live lane on that road.
	TZ1R		
SITE ACCESS Direction indicator	TZ2L		This sign may be erected at the approved access to a site located adjacent to the road when the site access is directly off a live traffic lane on that road.
	TZ2R		
CROSSING CLOSED PLEASE USE ALTERNATIVE CROSSING	TU1		This sign is used where a formal pedestrian crossing place is no longer available because of road works or some other temporary activity. TU3 type pedestrian direction signs must be used to direct pedestrians to another formal crossing point.
FOOTPATH CLOSED PLEASE USE OTHER SIDE	TU2		This sign is used where a formal footpath cannot be used because of road works or some other temporary activity and there is an alternative footpath on the other side of the road. TU2 signs must not be used on roads with a speed limit greater than 65km/h or on level 2 and 3 roads.

Sign name	Sign reference	Illustration	Requirements for use
Pedestrian direction	TU31		These signs are used to guide pedestrians to a temporary route or formal crossing point, and indicate the alignment of the temporary route, when the normal facility is not useable due to road works or some other temporary activity.
	TU32		
	TU33		
	TU34		
	TU35		
	TU36		
Cyclist direction	TU41		These signs are used to guide cyclists to a temporary route or formal crossing point, and indicate the alignment of the temporary route, when the normal facility is not useable due to road works or some other temporary activity.
	TU42		
	TU43		
	TU44		
	TU45		
	TU46		

Sign name	Sign reference	Illustration	Requirements for use
STOP / GO paddle	RP4		These signs may only be used by personnel that have been trained as MTCs by the STMS. Refer to subsection C10.2 Stop/go operations (manual traffic control). The RP4 may be combined with either the RP41 Go or the RP42 SLOW paddle. MTCs using these paddles must have the following signs in advance: • T1A/B ROAD WORKS • TA2 manual traffic control, and • TG1 speed limit – TEMPORARY signs (30km/h or less).
	RP41		
	RP42		
PASS WITH CARE	TV4 and RD6L		This sign advises road users to take care whilst passing. It is mounted on the rear of shadow and work vehicles involved in temporary mobile operations. The RD6L or RD6R sign may be omitted when the vehicle is fitted with an arrow board. Where a vehicle in a mobile operation is constantly changing position in the lane and it is impractical to frequently change the RD6L/R sign, this component may be omitted.
	TV4 and RD6R		
	TV4		
Width markers	WYBL		This sign is used to mark the narrowest part on the left side of bridges and similar end hazards such as barriers or barrier terminals.
	WYBR		This sign is used to mark the narrowest part on the right side of bridges and similar end hazards such as barriers or barrier terminals.
Hazard marker	WYHM		Used to mark service poles and other isolated hazards such as flared barrier terminals.

B1.4.3 End of works

Sign name	Sign reference	Illustration	Requirements for use
Speed limit 10, 20, 30, 40, 50, 60, 70, 80 and 90km/h	RS1		These signs are used to de-restrict the speed of traffic after passing through a temporary speed limit. On all roads, except level LV roads, the RS signs must be gated (ie a sign on both sides of the road). The sign must be placed opposite the TG1/RS1 sign on two-way two-lane roads. On one-way carriageways a TG2 WORKS END sign is attached as a supplementary plate and placed at the appropriate sign spacing distance past the working space or other hazard area.
Speed limit 100km/h	RS2		
Speed limit De-restriction	RS3		
Speed limit 110km/h	RS4		
WORKS END	TG2		This sign is used to indicate the end of a worksite that has T1 type advance warning signs.
THANK YOU	TG31		This sign is used to indicate the end of another hazard area indicated with T2 type advance warning signs and also worksites indicated with TR1, TR2, TR3 and TF type advance warning signs.
WORKS END THANK YOU	TG2/ TG31		This sign combination may be used to indicate the end of any worksite or other hazard area when the RCA or person with delegated authority, considers the combined message is desirable.
DRY YOUR BRAKES	TG4		This sign is used to indicate the end of a section of road that has been signed with T2A/B and T211 FLOODING advance warning signs.
DETOUR ENDS	TD5		This sign is used to indicate the end of a temporary detour route.
CEMENT SPLASHES WASH CAR TODAY	TG51		These signs are used to augment other signs at worksites where lime or cement stabilisation is being undertaken and vehicles travelling through the worksite can become contaminated with lime or cement splashes. The signs are not usually be required under dry working conditions.
LIME SPLASHES WASH CAR TODAY	TG52		

B2 Delineation devices

B2.1 General

Delineation devices such as cones, tubular delineators and barrels, must be specifically designed and manufactured for temporary traffic management (TTM) use.

Manufacturers must be able to demonstrate colour and luminance compliance and photometric performance compliance of the retro-reflective material from a recognised independent testing laboratory's certificate of compliance. Such certificate must note the device tested.

In order to confirm device compliance with CoPTTM section B2 Delineation devices, the letters TTMC XX/YY *(month and year of compliance certificate)* of a practicable size must be embossed or otherwise permanently marked on the upper base of the device.

This revised compliance requirement will come into effect upon publication.

B2.1.1 Manufacture and supply

All items claiming conformance with CoPTTM must be compliant to the revised specifications included in this edition.

B2.1.2 Use

Devices compliant to the previous edition of CoPTTM purchased prior to this date may remain in use until such time as they are no longer suitable for purpose.

B2.2 Colour

All delineation devices (eg cones, tubular delineators and barrels) must be fluorescent orange with:

a. chromaticity coordinates in accordance with table 2.5 of AS/NZS 1906.1:2007,
b. minimum luminance factor in accordance with table 2.8 of AS/NZS 1906.1:2007.

In addition, the internal colour and the underside of the base of cones, tubular delineators and barrels must be either white or orange to ensure the device remains visible if knocked over. Orange must be compliant to a. above but need not be fluorescent per b. above.

Note: Colour dispensation will be allowed for the underside of a cone base that is manufactured using a minimum of 30% of recycled cone material. In such instances colour must comply with the specification in AS/NZS 1906.4 for orange red:

x	0.690	0.595	0.458	0.550
y	0.310	0.315	0.404	0.450

For continued production to remain compliant and in order to avoid the need to test each batch for colour and luminance compliance, a certificate of compliance for the device may remain valid for a maximum of 36 months. During this time manufacturers are expected to take all practicable steps to ensure that colour and luminance remain within specification. A new certificate of compliance must be completed within 36 months.

Note: The NZTA reserves the right to effect or require confirmation testing at any time to reconfirm colour compliance.

B2.3 Retro-reflectivity

Delineation devices must have white or silver retro-reflective bands that:

- Meet a minimum of the photometric performance requirements for Class 1 material in table 2.2 of AS/NZS 1906.1:2007,
- Conform to the band width and positioning on the device as noted below, and
- Be affixed securely to the device with an adhesive that is appropriate for use with such material.

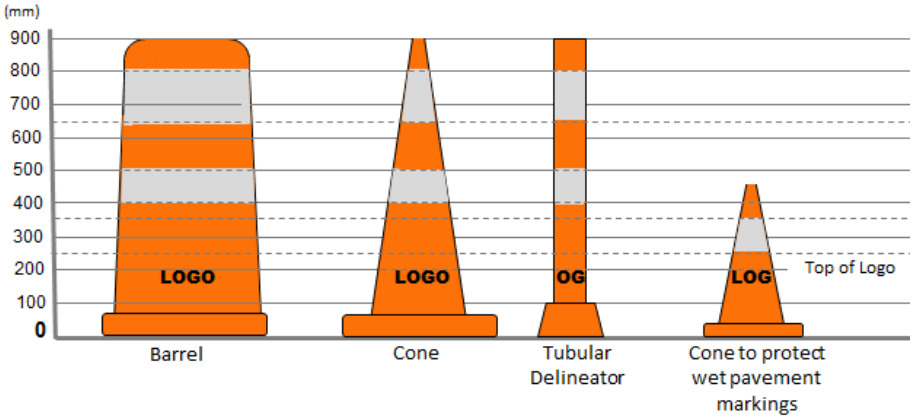
The certificate of compliance for retro-reflective material must be no older than 36 months.

B2.4 Dimensions

On all levels of roads the cones, tubular delineators and barrels used for delineation purposes must have a minimum height of 900mm and an unballasted weight not exceeding 7kg.

A 450mm high cone may be used to delineate and protect wet road markings but will not be compliant for any other use.

Size (mm)	Use	Number of bands	Band width (mm)	Height of bottom edge of bands from ground (mm)
900	All roads	2	At least 150 No wider than 165	650±5 Upper band
			At least 100 No wider than 110	400±5 Lower band
450	To protect freshly painted road markings	1	100	250±5



Company logos applied to the sides of delineation devices must be no greater than 5000mm^2 (eg 50mm x 100mm) with the top of the logo being no higher than 200mm (±20mm) from the road surface.

B2.4.1 Cones

All cones must:

- be sufficiently stable to remain upright in most anticipated service conditions
- have a base designed to stop the cone from rolling if knocked over
- be capable of returning to their original shape after impact
- be made of a flexible polymer or similar material

Note: Delineators must not be installed in stacks of 2 or more. Refer to subsection C5.2.1 Use for more information on the reasons why delineators are not installed in stacks.

In locations where high-wind speed is a concern, cones may be either:

- ballasted with sandbags, as per B1.3.4 Sign stands and supports, or
- stabilised using light weight short flexible connecting strips. The combined weight of a single cone and the stabilising strip must not exceed 7.0kgs in weight.

B2.4.1.1 Cone bars

Light weight, striped, orange and black or yellow and black plastic poles with rings appropriate for purpose at each end. Rings are to fit onto the cone and thereby connect cones together. Cone bars may be used to provide a channel for pedestrians on worksites where workers are in attendance.

These must not be used to replace a safety fence and may not be left unattended when a worksite closes.

Cone bars must meet the following specifications:

Materials	Rigid plastic
Weight	Under 7kg.
Length	Minimum length 1m - Extends up to 2.2m.
Diameter	Minimum 35mm to 100mm.
Frangibility	Non-splintering frangible type material. Will not present a hazard to vehicles after falling from the cone support.
Colour/retro-reflectivity	Alternating black and orange or black, and yellow stripes. Minimum length 150mm. Maximum length 300mm. Orange or yellow must be Class 2 Engineer Grade retro-reflective sheeting complying with AS/NZS 1906.1:2007 Table 2.4

Refer to subsection C.5.2.4 Cone bars for information on how these cone bars may be used.

B2.4.2 Barrels

All barrels must have:

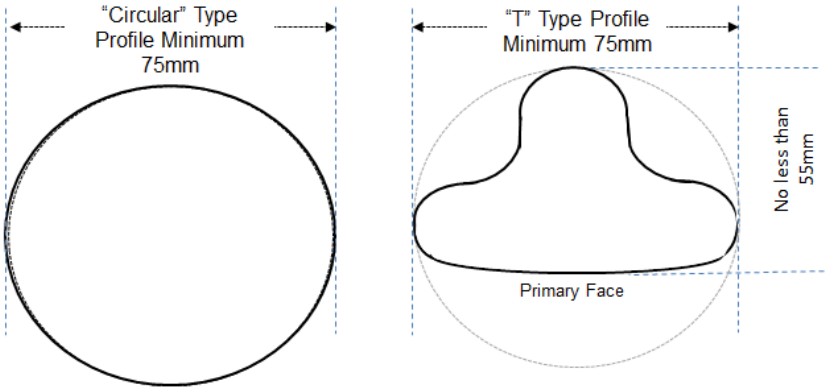
- a minimum base dimension of 600mm x 600mm
- rectangular or slightly chamfered corners
- a stable base design that will accommodate sandbags as ballast
- be made of a flexible polymer or similar material
- have the standard pattern of retro-reflective tape

B2.4.3 Tubular delineators

Tubular delineators may be either circular, or a "T" type profile with a fixed or weighted base. They must:

- if circular, be no less than 75mm when viewed from any direction
- if a "T" type profile, the primary approach face must be no less than 75mm in width and the reinforcing spine measurement no less than 55mm from primary face
- have the standard pattern of retro-reflective tape
- be capable of returning to their original shape after impact (unless dislodged from its base)
- must not use a method of fixing that will damage the pavement surfacing.

Note: In some specific circumstances NZTA may approve use of a flat delineator profile when it forms part of a system that includes a continuous centreline base.



B2.5 Device durability

It should be recognised by suppliers and users of these delineation devices that colour and luminance fades in direct sunlight.

While this cannot be avoided when the device is in use it may be good practice to store out of direct sunlight when not in use.

Users should be aware of device **suitability for purpose** at the time of use; that colour and retro-reflective performance is appropriate for the conditions, retro-reflective bands remain firmly affixed in position and the device is clean of environmental soiling. Refer also to subsections C19.3.4 and C19.3.5.

B3 High visibility garments

B3.1 Material compliance

All material used in the manufacture of the garment must comply with the joint Australian and New Zealand Standard AS/NZS 1906.4:2010 *Retro-reflective materials and devices for road traffic control purposes Part 4: High Visibility Materials for Safety Garments.*

Manufacturers must be able to demonstrate compliance of high visibility background and retro-reflective materials used in the manufacture of all compliant garments to AS/NZS 1906.4:2010 from a recognised independent testing laboratory's certification of compliance.

Note: Clause 1.5 previously included in the AS/NZS 1906.4:1997 Standard has been deleted in the AS/NZS 1906.4:2010 Revision. This eliminates automatic cross compliance from EN 471 Standards. Materials used in the manufacture of all garments must now be tested and approved to the AS/NZS 1906.4:2010.

B3.1.1 Colour

The background material must be fluorescent Class F orange red conforming to the requirements of clause 2.3, Table 2.1 and Table 2.2 in AS/NZ1906.4:2010 when tested in a dry condition. The measurement for fluorescence is made over a black background therefore some open mesh materials may not comply.

Where requirements such as the risk of static electricity build-up for gas related projects, or the need for fire retardance exist, contractors may wear garments made from a fibre incapable of retaining a fluorescent colour, Class NF high visibility non-fluorescent coloured material conforming to clause 2.4, Table 2.1 and Table 2.3 in AS/NZS 1906.4:2010, when tested in a dry condition may be used.

All Class F and Class NF background materials must comply with the wet weather performance test specified in clause 2.6 of AS/NZS1906.4:2010 meeting all the requirements of clause 2.3 (Class F) and clause 2.4 (Class NF) except for a reduction in luminance factor to not less than 85% of that specified in Table 2.2 for Class F materials and Table 2.3 for Class NF materials.

Although the wet weather performance test is noted as optional for Class F material compliance with the AS/NZ1906.4:2010 Standard, all Class F and Class NF background material must comply with this test as noted for compliance with section B3 High visibility garments.

B3.1.2 Retro-reflectivity

All retro-reflective material must comply with the specification for Class 'R' material as noted in Section 3 and Table 3.2 of AS/NZS1906.4:2010.

Retroreflective orange red material for STMS panels must comply with the colour specification for Class F background material as noted in Clause B3.1.1 and exhibit a level of retro-reflectivity no less than 60 CIL/m2 at entrance angle 5.0 degrees and observation angle 0.2 degrees.

Note: Rainfall performance and luminance factor tests are not required for the retroreflective panels.

B3.2 Logos

Garments must not display any lettering, symbols or logos on any compliant high visibility material except within an area located on the wearer's upper front left side of the garment.

The maximum area permitted is 7500mm^2 (eg 100mm x 75mm).

Garment designs that include a clear plastic pocket where a business card or similar identification may be displayed must locate this pocket within the above described maximum 7500mm^2.

Where required for related safety reasons a fabrics technical recognition I.D. may be added in an area not exceeding 30mm x 30mm (900mm^2) to the wearer's upper front right side of a garment.

A manufacturers label to a maximum size of 50mm x 20mm may be sewn or printed on non-compliant material on the lower sleeve or leg.

Note: The STMS garment is limited to the STMS logo located on the upper front left side of the garment and as specified on the back of the garment and the technical recognition I.D. as appropriate. Other logos or labels may not be added.

B3.3 Garment compliance

Garment compliance is based on the Australian and New Zealand Standard AS/NZS 4602.1:2011 *High visibility safety garments Part 1: Garments for high risk applications* including Amendment 1:2016 and the additional subsections and Figures that follow herein. All background high visibility material must comply with the wet test, as specified in subsection B3.1.1 Colour.

In order to confirm compliance with Section B3 new compliance letters '*TTMC-W17* of a practicable size must be included on the garment label.

Note:

i. Refer also to subsection B3.4.7 Exemption for extra small size garments
ii. Hereafter, mention of the AS/NZS 4602.1 Standard or Amendments refers to both the Standard plus amendments.

All retro-reflective material applied to garments, including extra small size garments complying with subsection B3.4 Garment design must be in strips no less than 50mm wide. With the exception of the Overall garment (refer to subsection B3.4.4 Overall garment) hoops must completely encircle the torso with no breaks except for the permitted front opening. The 'waist' hoop for the overall garment may include additional breaks no greater than 50mm at each side to enable pocket openings.

Braces or the rear cross configuration must meet at the top of the shoulder and at the hoops.

Vertical measurement for the positioning of the 'waist' hoop is now taken from the shoulder high point to harmonise with Amendment 1 (Refer to garment Figures).

Garment compliance must be achieved for a garment size designed to fit a 100-105cm body chest measurement. This design must remain consistent throughout the garment size range, grading increasing or decreasing proportionately with the design integrity of the compliant small size.

Hereafter, mention of the **Test Size** refers to the garment size designed to fit a body chest measurement 100-105cm.

Garment designs must not be altered without the direct authority of the NZTA. The NZTA may request a garment manufacturer to present a compliance certificate to confirm garment design compliance. In such instances the garment manufacturer will be required to forward material compliance certificates covering colour, luminance and retro-reflectivity with the garment to an NZTA approved industrial testing laboratory.

B3.4 Garment design

The publication of Amendment 1:2016 to the Australian and New Zealand Standard AS/NZS 4602.1:2011 has required the amendment of the CoPTTM section B3 in order to maintain harmony with the 4602.1:2011 Standard.

In order to provide manufacturers and suppliers sufficient time to incorporate design changes, effective immediately and for a period until February 28th 2019, garments complying with CoPTTM Edition 4 February 2017 will be adjudged equally compliant.

From 1st March 2019, all garments manufactured must comply with the TTMC-W17 specifications.

B3.4.1 Sleeveless vest

B3.4.1.1 Sleeveless vest requirements

The sleeveless vest design based on the Australian and New Zealand standard AS/NZS 4602.1:2011 must include the following additional requirements:

- when calculating the area of high visibility background material as specified in clause 6.4.2 in AS/NZS 4602.1:2011 Amendment 1:2016 the measurement rectangle shown in Figure 1 and Appendix A Figure A1 may be extended below waist level to the bottom of the garment providing such extension for the 100-105cm test size does not exceed 710mm at the front
- the design must include a shirt tail back that is 150±5mm longer than the front
- the garment's shirt tail may be split, providing an overlap of material ensures that continuity of background material is maintained. It is recommended that a hook and loop product secures the split. This feature may be included if there is a danger that the garment could snag when the wearer alights from any construction equipment. However, good practice dictates that when alighting from any construction equipment the operator faces the vehicle
- background high visibility material must encircle the torso from the top without the inclusion of any other colour except for:
    i. Specified retro-reflective material
    ii. Permitted front opening and
    iii. Permitted logo and technical ID area
- the minimum qualifying area measurement of background high visibility material for the recognised 100-105cm test size vest not covered by retro-reflective material or printing must be:
    i. Front of garment $0.24m^2$
    ii. Rear of garment including the 150mm shirt tail $0.3m^2$
- a permitted front opening to accommodate a zip fastener or similar closing device may be no wider than 25mm. Zip colour may be black but a colour matching the garment colour is preferred. Any buttons, domes or similar closure devices on any compliant high visibility must match the colour of the garment (matching colour need not be compliant)
- compliant retro-reflective material must be positioned to comply with the pattern in Figure 1

- the retro-reflective elements must form a recognised belt and braces pattern with an additional horizontal strip on the shirt tail located 50±5mm above the bottom hem. The braces join the belt at the front, passing over the shoulder to the belt at the back
- each brace must be spaced a minimum of 150mm apart at the belt, front and back as shown in Figure 1
- An optional cross configuration permitted for the back only must meet the front braces at the shoulder and the belt at the back vertically below the shoulder position to comply with the pattern in Figure 1
- The optional retroreflective cross configuration on the back of a garment is not permitted for STMS garments.

Note: Refer to subsection B3.4.7 Exemption for extra small size garments that follows.

High visibility garments must **always** be worn correctly fastened.

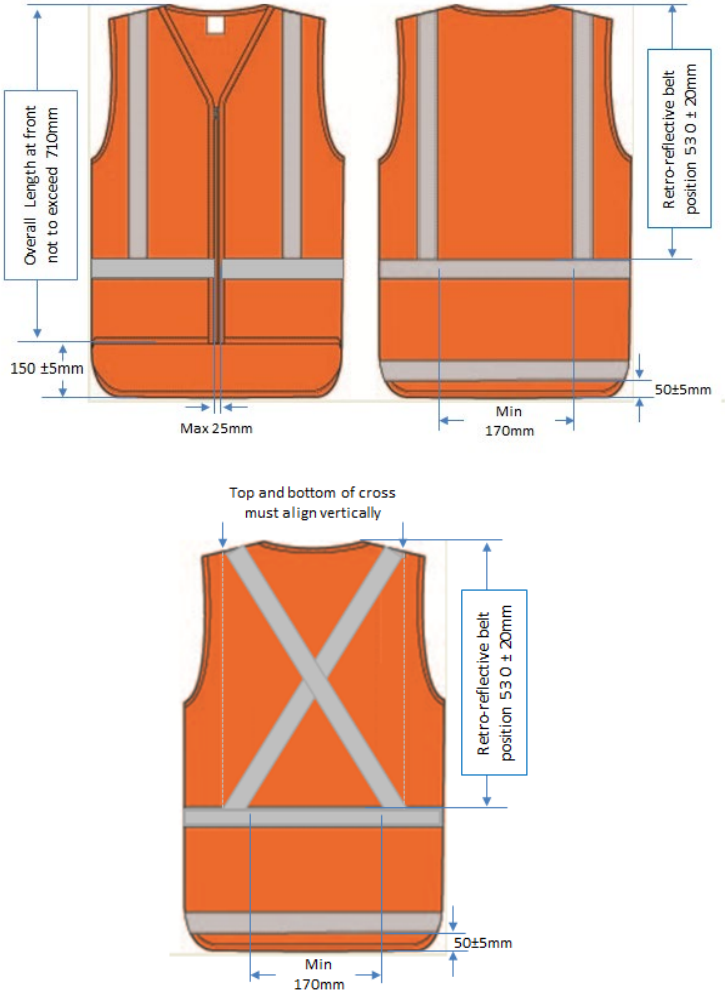


Figure 1: Sleeveless vest (100-105cm test size).

B3.4.1.2 Application of cross configuration on back of high visibility garment

To date NZTA has seen little evidence that supports any improvements in safety by using the cross configuration on the back of high visibility garments rather than the belt and braces configuration.

Despite this lack of evidence NZTA is allowing the use of an optional cross configuration on the back of high visibility garments.

The optional retroreflective cross configuration on the back of a garment is not permitted for STMS garments.

Contractors will be able to use this optional cross configuration for their staff but will not be able to require subcontractors or any visitors to site to have the cross configuration rather than the belt and braces configuration on the back of their high visibility garments.

B3.4.2 STMS and MTC garments

Two special purpose garments differ from the standard compliant orange coloured high visibility garment range specified in section B3.4 Garment design.

Although these garment designs must comply with the standard compliant orange garment design the background material colour must become a compliant fluorescent yellow where specified.

Both garments identify the specialised responsibility of the wearer.

B3.4.2.1 STMS sleeveless vest

The STMS sleeveless vest enables the person responsible for TTM at a worksite to be readily identified.

The STMS vest (Figure 2A) has the same specifications as the sleeveless vest specified in subsection B3.4.1 Sleeveless vest except for the following subsections:

- the background material colour must be fluorescent yellow, commonly known as lime yellow, as specified in clause 2.3, Table 2.1 and Table 2.2 of AS/NZS 1906.4:2010.
  Note: Class NF non fluorescent yellow high visibility background material may be used for an STMS vest when appropriate. (Refer to subsection B3.1.1 Colour)
- a retro-reflective fluorescent orange red panel measuring 150mm x 150mm (±10mm) must be placed on the upper left front of the garment. This panel may cover some of the retro-reflective element at the front and replaces the permitted logo area. Refer to subsection B3.2 Logos
- a retro-reflective fluorescent orange red panel measuring 300mm x 150mm (±10mm) must be placed on the upper back of the garment, between the retro-reflective braces. This panel may cover some of the retro-reflective elements at the back.

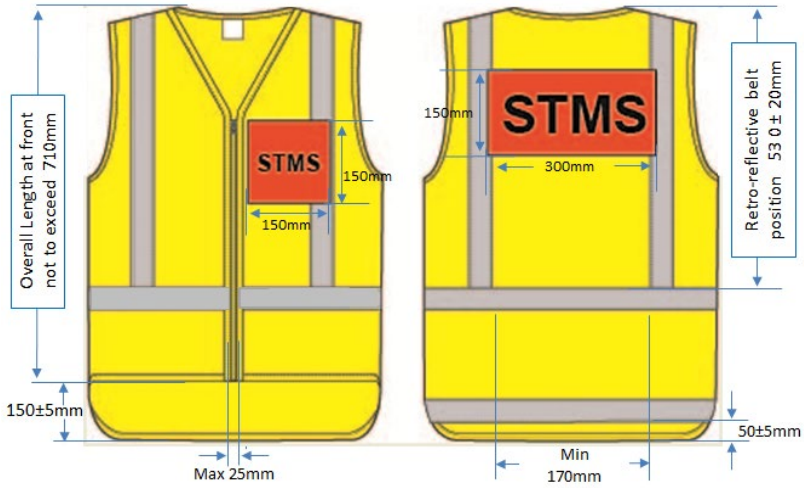


Figure 2A: STMS sleeveless vest (100-105cm test size).

The legend, STMS, must be displayed on the back and front left orange red panels in the following manner:

Colour	Black	
Font	Helvetica Bold	
Letter height	Front	50±2mm
	Back	100±2mm

The optional retroreflective cross configuration on the back of a garment is not permitted for STMS garments.

The STMS sleeveless vest may be substituted by a long sleeved coat, overalls or miscellaneous garment design but must maintain the STMS badging and colour specification.

An STMS on all **Level 2** and **Level 3** roads must wear this garment.

This garment must also be worn by an STMS on **Level LV** and **Level 1** roads where there are three or more personnel on the site. Where there are less than three personnel on the site the STMS may wear a standard orange red garment.

B3.4.2.2 Optional MTC Garment Sleeve

The optional addition of fluorescent yellow material for the sleeve of the MTC STOP/GO operator is designed to provide additional visibility for this function when thought appropriate for the location.

The only item of difference to the standard compliant orange garment is the sleeve colour and the addition of retroreflective hoops around the arms to enhance this function when required at night. No additional changes may be included.

The sleeve colour must comply with the colour specified for the STMS Sleeveless vest (refer subsection B3.4.2.1 STMS sleeveless vest). Two compliant retro-reflective hoops must be positioned to comply with the pattern in Figure 2B. Each sleeve must have two retroreflective hoops, one positioned above the elbow and one below the elbow and close to the wrist.

Figure 2B: Optional MTC sleeve for Stop/Go operator (100-105cm test size)

B3.4.3 Long-sleeve coat

A worker, supervisor or visitor may, in some instances, find it necessary or practicable to wear a long-sleeve outer coat. If this garment is to act as a high visibility garment it must comply with the general requirements for the high visibility sleeveless vest specified in subsection B3.4.1 Sleeveless vest as well as the following additional subsections:

- the 150mm shirt tail design is to be deleted
- the minimum qualifying area measurement of background high visibility material for the recognised 100-105cm test size coat not covered by retro-reflective material or printing must be measured in the same way as the sleeveless vest specified in subsection B3.4.1 Sleeveless vest except that the measurement rectangle must extend a minimum of 830mm at the front and back. Sleeves are not included in this area
- the area of background material must be determined as follows:
    i. Front of garment **0.35m^2**
    ii. Rear of garment **0.35m^2**
- the sleeves of the garment must be the same fluorescent colour as the torso to a point between the elbow and the wrist
- compliant retro-reflective material must be positioned to comply with the pattern in Figure 3

- an optional cross configuration permitted for the back only must meet the front braces at the shoulder and the belt at the back vertically below the shoulder position to comply with the pattern in Figure 3
- a hoop of complying retro-reflective material must be located between the wrist and the elbow on each sleeve. This may be at the point of a colour change if the lower arm design includes a different colour.
  Note: An optional hoop of compliant retro-reflective material may be located on the sleeves above the elbow
- a strip of complying retro-reflective material must be located on the back of the garment from side seam to side seam positioned 50±5mm from the bottom hem.
  Note: An option permits this strip to completely encircle the garment.

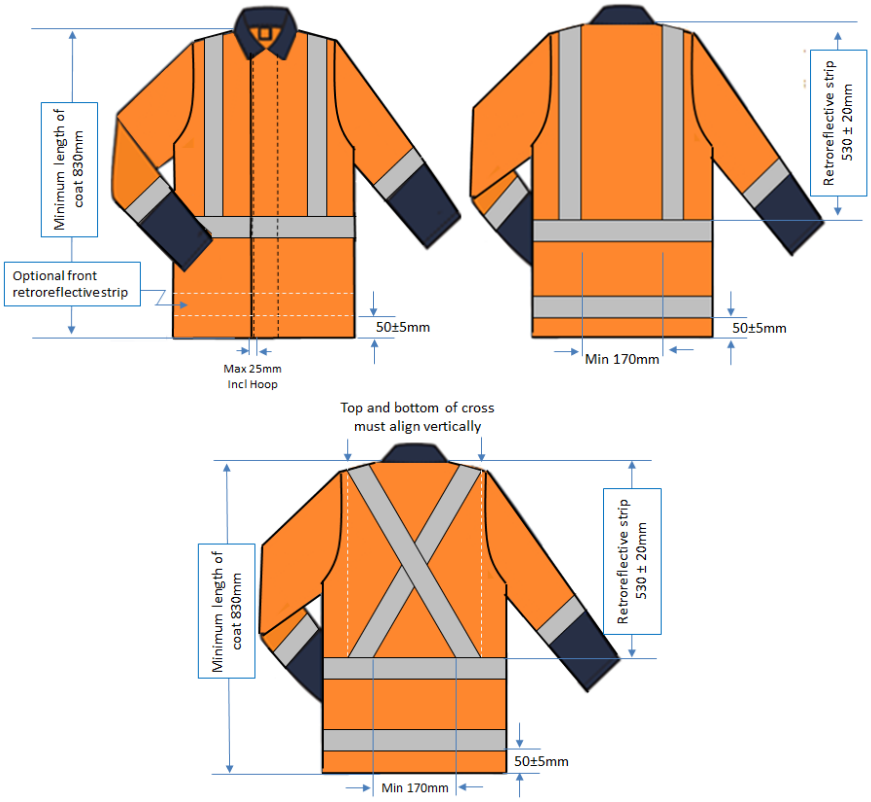


Figure 3: Long sleeve coat (100-105cm test size).

- non-compliant colours may not be located within the qualifying torso area as trim or pocket flaps. Collar material may be a non-compliant colour but any such material that covers qualifying high visibility material in its normal worn position must be deducted from the qualifying torso area
- to lessen the effect of wear discolouration, non qualifying material colours may be used:
  i. As noted above for the garment collar
  ii. Below the retro-reflective hoop at the midpoint between elbow and wrist.
- the long sleeve coat which may incorporate an underarm gusset as described in AS/NZS 4602.1:2011 may alternatively form a gusset using up to three 10mm (max) eyelets per sleeve to provide underarm ventilation for garments designed for wet weather. Gusset fabric need not be a compliant fabric but must be same colour as the garment. Eyelets should preferably match the colour of the garment.

B3.4.4 Overall garment

Where required, a worker may find it necessary or practicable to wear a one piece overall type garment. If this garment is to act as a high visibility garment it must comply with the general requirements for the high visibility sleeveless vest specified in subsection B3.4.1 Sleeveless vest as well as the following additional subsections:

- the 150mm shirt tail design is to be deleted
- the minimum qualifying area measurement of background high visibility material for the recognised 100-105cm test size garment not covered by retro-reflective material or printing must be measured in the same way as the sleeveless vest specified in subsection B3.4.1 Sleeveless vest except that the measurement rectangle must be extended to a point on the leg above the knee. Sleeves are not included in this area

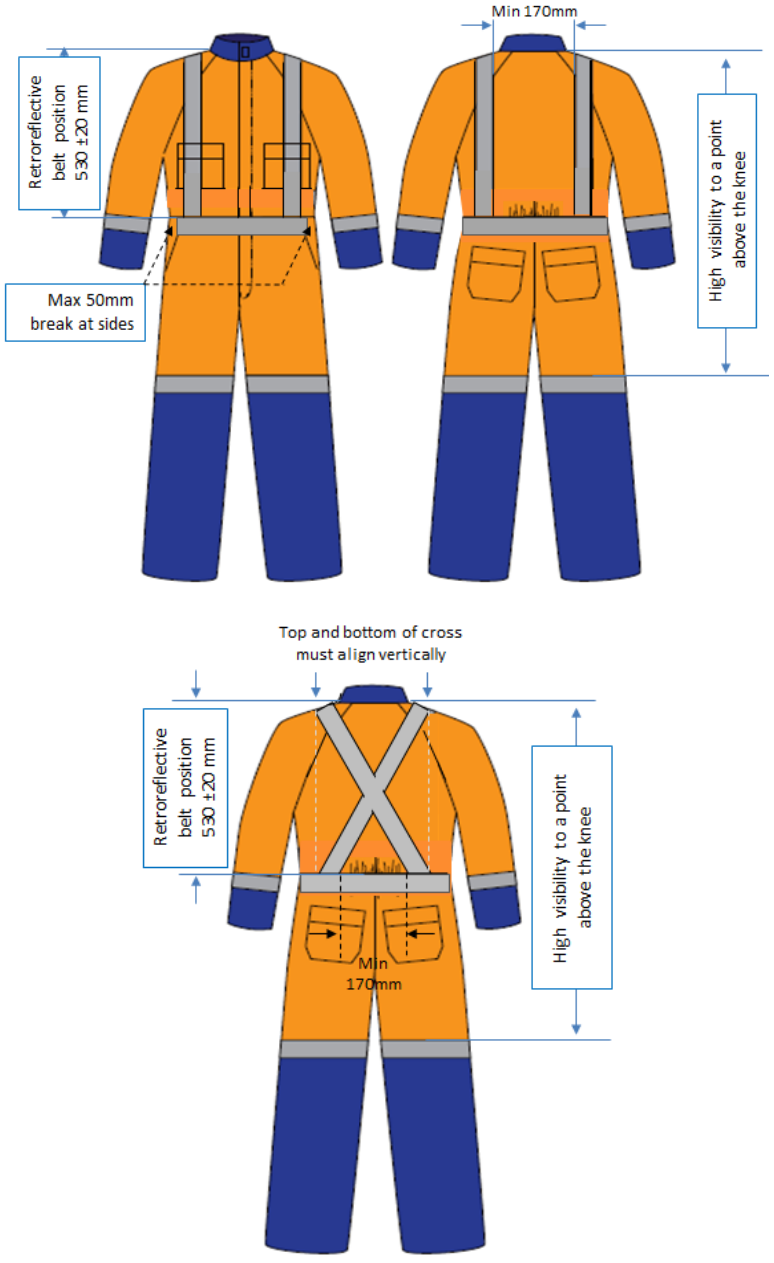


Figure 4: Overall garment (100-105cm test size).

- the minimum area of background material must be determined as follows:
    i. Front of garment **0.35m^2**
    ii. Rear of garment **0.35m^2**
- the sleeves of the garment must be the same high visibility orange colour as the torso to a point no less than midway between the elbow and the wrist
- compliant retro-reflective material on the torso must be positioned to comply with the pattern in Figure 4
  Note: A break in the 'waist' hoop of no more than 50mm on each side is permitted (refer subsection B3.3 Garment compliance)
- An optional cross configuration permitted for the back only must meet the front braces at the shoulder and the belt at the back vertically below the shoulder position to comply with the pattern in Figure 4
- a hoop of complying retro-reflective material must be located between the wrist and the elbow on each sleeve and above the knee on each leg to enhance long distance recognition of the wearer as outlined in Appendix B of AS/NZS 4602.1:2011. These hoops of retro-reflective may be located at a change of colour if a change is designed.
  Note: An optional hoop of compliant retro-reflective material may be located on the sleeves above the elbow and on the legs below the knee
- non-compliant colours may not be located within the qualifying area as trim or pocket flaps. Collar material may be a non-compliant colour but any such material that covers qualifying high visibility material in its normal worn position must be deducted from the qualifying torso area
- to lessen the effect of wear discolouration non qualifying material colours may be used:
    i. As noted above for the garment collar
    ii. Below the retro-reflective hoop between elbow and wrist on the arm and below the upper hoop on the leg of the overall.

B3.4.5 Miscellaneous garments

Garment types alternative to the primary garment specified in subsection B3.4.1 Sleeveless vest such as Polo shirts, woven shirts, 'T' Shirts and polar fleece garments may be granted compliance providing the following is met:

- the minimum qualifying area measurement of background high visibility material for the recognised 100-105cm test size garment not covered by retro-reflective material or printing must be:
  I. Front of garment 0.24m^2
  II. Rear of garment including the 150mm shirt tail 0.3m^2
  Note: Sleeves are not included in this area

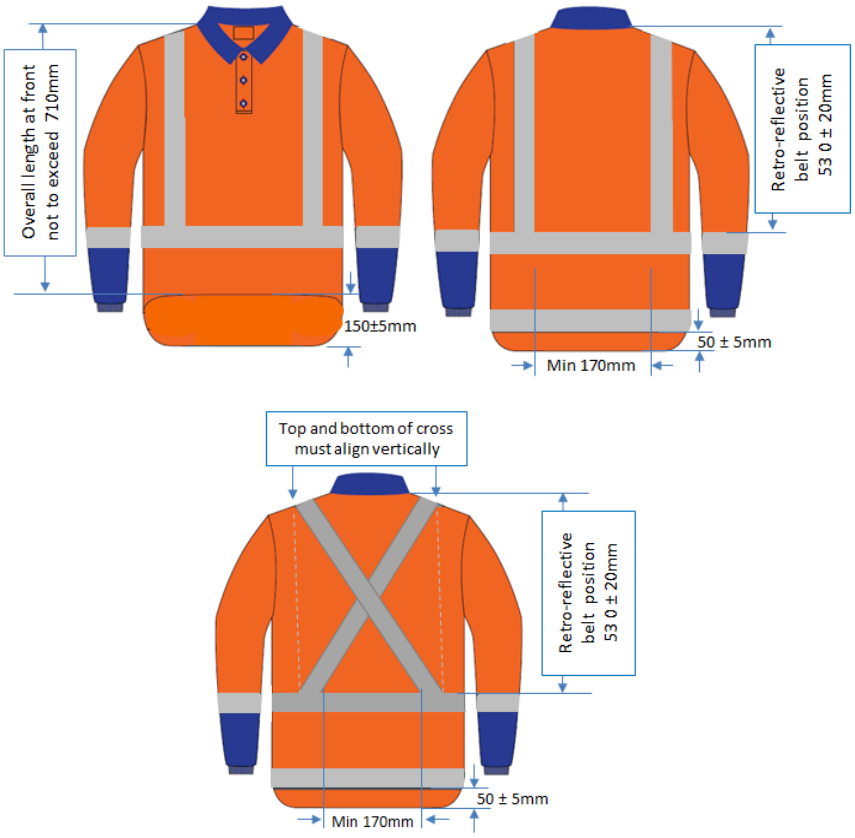


Figure 5: Miscellaneous garment Long Sleeved Polo (100-105cm test size).

- the configuration of compliant retro-reflective material complies with the configuration specified in subsection B3.4.1 Sleeveless vest including a strip on the shirt tail at the back
- An optional cross configuration permitted for the back only must meet the front braces at the shoulder and the belt at the back vertically below the shoulder position to comply with the pattern in Figure 5
- where the design includes short sleeves they must remain the same high visibility colour as the garment. If long sleeves they must remain the same high visibility colour to a point no less than midway between the elbow and wrist
- if the garment has long sleeves, placement of a compliant retro-reflective hoop on the arm between the elbow and the wrist is required as is specified in subsections B3.4.3 Long-sleeve coat and B3.4.4 Overall garment and Figures 3 and 4.
    - i. Material area in the sleeves must not be used to achieve area compliance for high visibility background colour
    - ii. An optional hoop of compliant retro-reflective material may be located on the sleeves above the elbow

- the area of compliant high visibility background material is measured from material that will be visible when the garment is worn in its normal manner.
  Note: Wearers should be aware that such garments will not comply when tucked into trouser type garments
- non-compliant colours may not be located within the qualifying torso area as trim or pocket flaps. Collar material may be a non-compliant colour but any such material that covers qualifying high visibility material in its normal worn position must be deducted from the qualifying torso area.

B3.4.6 Fire Service garments

The objective of this subsection is to recognise special requirements for firefighters while working on or near the road at a fire or other emergency where the wearing of safety garments must first meet the unique requirements of either AS/NZS 4967 *Garments for structural firefighting* or AS/NZS 4824 *Garments for Wildland firefighting.*

Whilst carrying out routine maintenance operations such as hydrant testing for a local council high visibility garments must be TTMC-W17 compliant.

Essential Fire Service related garment recognition patches or printing may exceed subsection B3.2 Logos specifications provided size and number are limited and do not risk overall visibility safety.

Background high visibility material may be yellow green Class F or Class NF conforming to the requirements of clause 2.3, Table 2.1 and Table 2.2 or Table 2.3 in AS/NZ1906.4:2010. Such material must comply in a dry and wet condition as noted in subsection B3.1.1 Colour.

Where practicable a high visibility vest complying with subsection B3.4.1 Sleeveless vest may be worn providing this is appropriate for the situation at hand and the wearing of such a garment does not become hazardous for the wearer.

Fire Service personnel attending such emergencies within the roading network are exempted from wearing TTMC-W17 compliant high visibility vests in the following circumstances:

- the fire service personnel are at the immediate fire or potential fire location
- high visibility is achieved by a garment that in addition to compliance with AS/NZS 4967 or AS/NZS 4824 Standards also complies with AS/NZS 4602.2 *High visibility safety garments Part 2: Garments for fire service personnel*
- high visibility is achieved by a garment that in addition to compliance with AS/NZS 4967 or AS/NZS 4824 Standards also complies with AS/NZS 4602.1 *High visibility safety garments Part 1: Garments for high risk applications.*

Fire service personnel carrying out traffic control support of an emergency are reminded of the need to be visible.

B3.4.7 Exemption for extra small size garments

Dispensation for an extra small fitting garment will be permitted provided it meets the requirements of the compliant recognised 100-105cm test size garment with the following exceptions:

- if any extra small garment in a compliant design range is unable to meet the minimum 0.21m^2 (front) and 0.24m^2 (rear) area of compliant high visibility background material the garment will be deemed to comply provided the design grading decreases proportionately without affecting the design integrity of the compliant 100-105cm test size of the garment range
- such extra small size garment must maintain the same configuration of compliant retro-reflective material as specified for the recognised 100-105cm test size of the design.

In addition, the following subsections also apply to extra small fitting garments:

- a card, which is clearly visible to a purchaser, must be included in the garment's packaging stating that this extra small fitting garment has reduced visibility in both day and night conditions and that, because of this limitation, those wearing the garment would normally avoid working in areas of high risk
- an additional separate sewn in label clearly visible to the wearer (refer to Figure 6) must alert the wearer to the reduced visibility of extra small fitting garments.

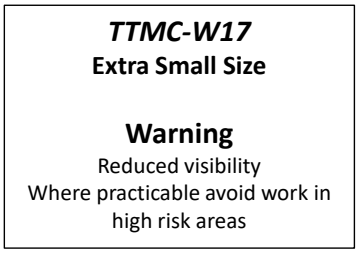


Figure 6: Extra small garment label

Management must ensure that any employee wearing an extra small fitting garment is aware of the potential hazards resulting from its lower visibility.

B3.5 Garment durability

Due care and maintenance of high visibility safety garments is recommended. Garment soiling, colour fading of background high visibility material, abrasion and damage to retro-reflective strips all affect the high visibility performance of safety garments.

Employers and wearers of high visibility safety garments must be aware of the condition of any such garment on the day it is being worn. Garments must be inspected on a regular basis and replaced if they are badly damaged, soiled or faded, or the retro-reflective material has ceased to function.
Note: Refer also to subsection C19.3.6 Evaluation guide: High visibility garments.

To maximise durability of high visibility garments:

- high visibility garments be kept clean by washing or cleaning as regularly as is practicable ensuring that manufacturer's instructions are noted and followed
- where ever practicable garments should be stored in such a way as to limit fading of high visibility background material especially fluorescent colours. When not in use place in a dark location away from natural light. High visibility background material colour, especially fluorescent colours, fade when left in natural daylight and especially in direct sunlight.

B3.6 Optional illuminated attachments

In specific circumstances within a worksite it may be appropriate to enhance personal night-time/low light retro-reflective garment conspicuity with the addition of a self illuminating system that will attach to an approved high visibility garment that already complies with one of the options specified in subsection B3.4 Garment design

Such circumstances would normally be limited to specific locations within a worksite where moving vehicles and or equipment do not have or may not be operating an appropriate head light system that is necessary to provide retro-reflective light back to the driver of such vehicles or equipment. In areas where headlights are active the retro-reflective performance provides worker conspicuity and this will typically overpower an illuminated attachment.

The wearer of any such approved system must be aware that its performance is limited and will only be visible to a vehicle or equipment operator when positioned within the driver's line of sight. The wearer must be instructed to be vigilant whenever working or moving behind operating vehicles that may be reversing and equipment that may swing through an operational circle.

Equally the wearer of an approved illuminated attachment must be responsible for ensuring it is fully charged and suitable for use at the time it is being used and that site management or the STMS is aware of its use on site.

Any such system must be approved by the NZ Transport Agency, Traffic and Safety, prior to being marketed for use in TTM sites within the roading network.

To be approved, a system must be adjudged suitable for purpose and comply with the following specifications:

- the illuminating system must be removable from the garment during daylight hours or when not in use
- no part of the system may cover any part of the garment's compliant retro-reflective configuration
- the illuminated area must be in the vertical plane and limited to the length of the vertical retro-reflective strips without crossing the retro-reflective hoop at the waist
- the colour when illuminated must be white or a close blue/white proximity. No other bold colours are permitted
- the illumination must be non flashing. If a flashing capability is possible it must not be activated on any TTM worksite
- to ensure compatibility with the retro-reflective strips the illuminated area must be not less than 10mm or more than 15mm in width
- during the hours of daylight no part of the illuminating attachment may cover any portion of the compliant area of day time high visibility material
- if the illuminating component of the system requires a permanently fixed attachment this must be transparent and not impair the compliant daytime background high visibility compliant area of the garment. Garments are only to be fitted with the attachment system where there is a high probability of regular use of the system. The permanently attached component must be no more than 10mm wider than the illuminating component
- the system design should ensure that, when attached, potential for the system to catch on machinery or structures is limited and or in case of the system being caught that it will release and not endanger the wearer
- any system approved must comply with subsection B3.2 Logos
- when tested the surface luminance must be no less than 15cd/m2 or greater than 25cd/m2 measured at 90 degrees to the illuminated surface
- the battery system must be specifically matched to the system's requirements, be robust, light weight and weather proof and held firmly into a compliant pocket of the garment
- the tested system must demonstrate that the battery has the ability to maintain a level of performance suitable for purpose for a minimum of eight hours and preferably include a warning indicator for low battery status
- any garment fitted with a permanent attachment component for an illumination system must include this in the garments care instructions on the label.

Should a visiting site safety engineer sight an illumination system currently in use to be exhibiting a performance deemed not suitable for the situation at hand such engineer may require the system to be withdrawn from use and retested to determine that performance qualifies to this specification.

B4 Logos, names and trademarks

B4.1.1 General

Logos, company names and other trademarks must **not** be displayed on the front of TTM signs. The logo, company name or trademarks of the sign's owner may be displayed on the back of signs provided they do not detract from the legibility or reflectivity of the sign.

No more than one logo is to be displayed on traffic signs, other traffic management devices and high visibility garments.

The requirements for high visibility garments are presented in subsection B3.2 Logos.

Traffic management devices, other than signs, and high visibility garments may have a logo displayed.

Stickers, or the like, used for sign-manufacturing purposes must not be reflective and they must be placed on the back of the sign.

B4.1.2 Area requirements for signs

Any logo displayed on a traffic sign must not exceed:

- 3000mm^2 (eg 30mm x 100mm) on signs less than 1m^2 or on any other traffic management devices
- 10,000mm^2 (eg 100mm x 100mm) on traffic signs larger than 1m^2.

B4.1.3 Area requirements for delineators

Cones, tubular delineators and barrels used for delineation purposes may have a company identifying logo not exceeding an area of 5000mm^2 (eg 50mm x 100mm).

The logo must not extend more than 200mm up the side of the delineator.

B4.1.4 Retro-reflectivity

Logos must not be retro-reflective.

B5 Portable traffic signals

B5.1 Single-lane signalised alternating flow

B5.1.1 General

Portable traffic signals must comply with the Australian Standard AS 4191–1994 *Portable traffic signal systems* (AS 4197-1994) and must only have two phases. Each phase permits a particular traffic movement and consists of a green period, a yellow period and an all-red period.

Portable signals are usually adequate for traffic control at worksites where their operation is supervised. Where they are required to operate outside working periods they must be regularly monitored to ensure they are continuing to function correctly. The frequency of monitoring is to be documented in the TMP.

The requirements for a portable traffic signal installation are normally less stringent than those for a normal signalised intersection. The minimum requirements for a portable traffic signal installation are:

- a power supply source
- two signal posts each with a three-aspect signal display
- a vehicle-actuated detection system, except where a fixed time or manually-operated signal operation is shown to be adequate
- a system to link each item of hardware
- a control mechanism
- an audio alarm system to alert worksite staff in the event of signal malfunction.

B5.1.2 Certification of portable traffic signals

Portable traffic signals must be certified as complying with AS 4191–1994.

Contractors are required to apply to the RCA to use portable traffic signals.

Application must be made with the TMP and the details of the system must be provided (manufacturer and model description/number).

RCAs must approve the use of all portable traffic signals before they are installed at a worksite.

A register of compliant systems is available on the NZTA's website.

The representative of the RCA must ensure that the system is listed as compliant before signing off the TMP.

New systems can be tested to AS 4191–1994 standards at either a qualified independent Australian laboratory or at Opus Central Laboratories in New Zealand. The Register of TTM equipment available on NZTA's website, outlines the process to be followed.

New approvals will be added as they pass testing. Testing is to be undertaken at own expense. For details of testing or to have a portable signal system tested apply to:

Principal CoPTTM Advisor
NZ Transport Agency
Private Bag 6995
Wellington 6141.

B5.1.3 Power supply

The power supply may be either mains or battery but the source and lamp combination must be able to produce the signal lantern light output required by the Austroads Guide to Traffic Management Part 10: Traffic Control and Communications Devices.

B5.1.4 Signal displays

At most worksites a single signal post with a three-aspect lantern display is sufficient. The display is normally positioned to the left, and adjacent, to a limit line that is located at a point where normal two-way traffic operation is restored.

The location of the signal displays in relation to the limit lines and adjacent carriageways must conform to the requirements of the Austroads Guide to Traffic Management Part 10: Traffic Control and Communications Devices.

B5.1.5 Detection system

Vehicle detection may be by microwave or infra-red detectors, or by induction loops cut in the road surface. The system must be set up to minimise false detections due to adjacent worksite activity and vehicles on the road that are leaving the controlled area.

B5.1.6 Linking

The linking between the signal displays on each approach to the controlled area may be provided by a hardwired cable system or by radio transmission.

Coordinated time clock systems are not recommended because a temporary failure on one approach will result in the loss of coordination. This is unacceptable under alternating flow conditions.

Where cable linking is used, and the cable must cross the trafficked carriageway within the controlled area, the cable is laid in a saw cut at the crossing point. If saw cutting is not feasible, vehicles may be ramped over the cable using an appropriate ramping system. In general the crossing is best positioned at the midpoint of the controlled area to minimise the effects of vehicle acceleration, braking and deceleration at the crossing point.

Radio linking must use a suitable frequency and be set up in such a manner that it is unaffected by interruptions to the line of sight between the signal equipment at each end of the controlled area.

In special circumstances linking cables may be suspended from securely-anchored wires. The cables must be at least 1m above the maximum legal vehicle height. Six metres is normally an adequate minimum clearance.

B5.1.7 Controller

The signal controller must provide a two-phase operation with each phase having the following features:

- a fixed minimum green period
- a variable or fixed maximum green period
- a variable or fixed gap timer
- a fixed yellow time which must not be less than three seconds, and
- a variable all-red time.

The preferred method of operation for a vehicle-actuated system is that, in the absence of a vehicle demand, it 'rests-in-green' on the last approach serviced.

Some portable controllers can generate a dummy opposing demand after a preset time, eg three minutes, to ensure a non-detected vehicle is never trapped on either approach.

B5.1.8 Maintenance and emergencies

A maintenance contract to ensure immediate priority attention to a fault in an alternating flow traffic signal system must be arranged prior to the installation of the system.

A person experienced in the operation of traffic signals undertakes the design and installation of the control and detection equipment.

The contractor must have access to a back-up system that can take over from the traffic signal operation in the event of unusual congestion or failure of the control system. The signal displays must be removed or securely covered before such a back-up system is implemented.

B5.2 Types of operation

The three modes of portable traffic signal operation are:

- vehicle actuated
- fixed time
- manual.

B5.2.1 Vehicle-actuated operation

Vehicle-actuated operation is the preferred operating mode and must be used wherever possible.

Vehicle-actuated operation allows the signals to automatically respond to vehicle demands. Phase lengths are adjusted automatically to suit the traffic flows and this ensures that traffic queues and delays are kept to a minimum.

For alternating flow under vehicle-actuated operation the signals must change automatically when either:

- there is a steady stream of vehicles and the maximum green timer has expired, or
- the gap between successive vehicles is greater than a predetermined interval and the minimum green timer has expired.

If the phase changes at the maximum green time, a new demand must be automatically generated for that phase. This ensures that any vehicles stopped by the signal change and undetected will be serviced, without the need for the system to detect the arrival of another vehicle on that approach.

B5.2.2 Fixed-time operation

Fixed-time operation is an automatic mode that cannot respond to varying vehicle demands. The traffic signal cycles are set according to predetermined timings and this is likely to result in vehicles being delayed for no apparent reason when the road is clear.

Fixed-time control must, therefore, only be used under the following conditions:

- a vehicle detector fails, and
- no manual signal operator is available.

B5.2.3 Manual operation

Manually-operated portable traffic signals are useful:

- when a detector fails in a vehicle-actuated system, and/or
- for the management of plant crossing the road at irregular intervals.

B5.3 Timing of signal displays

B5.3.1 Fixed minimum green

A fixed minimum green period of six seconds is normally sufficient to ensure that the traffic flow can start up and that detection of successive vehicles will activate the gap timer in the appropriate manner, which will extend the green period, up to the maximum green time set if necessary.

B5.3.2 Gap

This timer is activated by the detection system and times the gap between successive vehicles on the approach to the signal, when the signal is showing a green display. Its normal value is in the range two to six seconds but it is site specific and very much dependent on traffic speed.

Traffic flows when the signal is showing a green display must be observed at various times of the day. If the phase seems to regularly terminate before the maximum green time expires, and the distances between successive vehicles in the traffic flow are not excessive, the gap time may be increased, in one-half second increments.

Conversely, if the phase seems to regularly terminate at the maximum green time or the distances between successive vehicles in the traffic flow seem excessive, the gap time may be decreased. Minor adjustment to the gap time can have a major effect on the efficiency of a vehicle-actuated traffic signal operation.

B5.3.3 Maximum green

For a vehicle-actuated traffic signal operation, the maximum green timing starts as soon as the green signal is displayed if there is already a vehicle call for the other phase, or immediately a vehicle call for the other phase is received during the current phase, whichever is the sooner.

The green signal will continue to be shown provided there is constant stream of traffic and vehicle spacings are less than the gap time setting. The phase will terminate when the maximum green timer expires.

When a fixed-time traffic signal operation is employed, the green time for each phase will always be the maximum value set, irrespective of traffic demands. Maximum green time settings may, therefore, be changed for the peak hours, off peak times, weekends and nights, to avoid excessive delays. Changes may be made manually or by 'time of day' commands, depending on the type of signal controller being used. Fixed-time traffic signal operation is NOT recommended for TTM.

The following method may be used for setting maximum green times at short duration worksites where flows do not exceed 800 vehicles per hour (vph) and are roughly equal in each direction.

B5.3.3.1 Procedure

Step 1 - Measure the worksite length and set the maximum green time to the value shown the table below.

Maximum green settings

Worksite length (metres)	Maximum green time setting (seconds)
30 – 74	35
75 – 134	40
135 – 194	45
195 – 300	50

Step 2 - Observe the traffic queues at various times of the day. If the last vehicle in queue regularly takes more than one green period to reach the limit line, increase that approaches maximum green time setting by five seconds.

Where the traffic flows exceed 800vph a more precise calculation will be required to determine the appropriate maximum green time setting. A person familiar with traffic signal analysis must be employed to carry out this work.

B5.3.4 Fixed yellow

The fixed yellow time for alternating flow traffic signal worksites is four seconds.

B5.3.5 All-red

The length of the all-red period is a function of the length of the worksite, site conditions and the average speed of vehicles through the worksite. A very long all-red setting can result in long delays that cause road user frustration, which in turn can lead to a red signal being disregarded. A very short all-red signal, particularly where visibility is restricted, can be equally dangerous.

The all-red time must be at least five seconds. The all-red times recommended for straight level worksites are given in the table on the next page.

Straight level worksite length (metres)	Recommended all-red time (seconds)
Less than 50	5
50 – 99	10
100 – 149	15
150 – 199	20
200 – 249	25
250 – 300	30

Note: Worksite length is the distance between the traffic signal limit lines at each end of the worksite.

The all-red time may need to be adjusted where gradient, road surface condition or a high proportion of heavy vehicles affect travel times through the worksite. As activity progresses the all-red times are reviewed on a regular basis to ensure they are neither too long nor too short.

B5.3.6 Inter-green

The inter-green time is the period between successive green phases when all signals display a red aspect. The inter-green time is the sum of the yellow time and the red time for that phase, and allows vehicles to safely clear the controlled area.

B5.3.7 Start-up sequence

Portable traffic signals must start up with the following sequence:

- display a flashing yellow signal on all approaches for at least 10 seconds
- display a continuous yellow signal to all approaches for the preset yellow time
- display a red signal on all approaches for at least 10 seconds, and then
- display a green signal for the first approach in the phasing sequence.

Portable traffic signals that comply with the AS 4191–1994 will automatically start up with this sequence.

B5.3.8 Flashing yellow mode

In flashing yellow mode, the red and green signals remain blank and the yellow aspects on all approaches flash at a rate of approximately 60 flashes per minute.

Portable traffic signals must operate in a flashing yellow mode:

- during the start-up sequence, and
- automatically within a half a second of any of the following hazardous conditions occurring:
  - a green signal is shown simultaneously on both approaches of an alternating flow operation
  - a green or yellow signal is shown to one approach and red on the other approach of a haul route crossing control operation
  - if one approach shows a green signal and the other approach shows yellow signal
  - when any lamp fails
  - under fixed-time or vehicle-actuated operation a lamp fails to extinguish
  - under manual operation a green or yellow signal does not remain illuminated for the minimum green or yellow time
  - if more than one aspect is illuminated on a signal display
  - if the communication link between components in a system is disrupted for a continuous period of five seconds. This applies to any breakdown in data transmission
  - if a radio-linked system receives conflicting commands or status data from another signal installation within radio range.

The Traffic Regulations 1976 and *The Official New Zealand Road Code* include driving rules for the flashing yellow traffic signal display. When a traffic signal shows a flashing yellow display the give way rules apply.

Note: Flashing yellow will be displayed for a short period of time when traffic signals are starting up.

Portable traffic signals that comply with AS 4191–1994 must automatically display flashing yellows in accordance with this procedure.

B6 Safety fences

B6.1.1 General

Safety fences are required to prevent people from gaining access into a hazardous area. This is particularly important at unattended worksites.

B6.1.2 Design

B6.1.2.1 Safety fence requirements

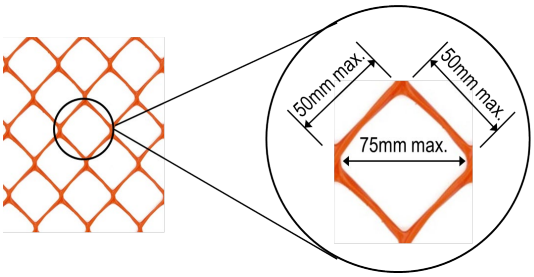
Safety fences must:

- have a secure supportive top and bottom rail
- have the top rail located a minimum of 1m above ground level
- have the bottom rail located a maximum of 100mm above ground level
- be continuous around the hazard
- be clipped or joined together, if in sections, to form a continuous fence surrounding the hazard
- have top and bottom rails that terminate with a vertical post
- have a child proof in-fill or solid panels that are difficult to climb
- have a child proof in-fill or solid panels that are difficult to climb and are fluorescent orange or alternating white, and fluorescent orange in colour
- remain upright and stable under all expected worksite conditions
- be free of sharp objects.

B6.1.2.2 Child proof in-fill

Where vertical members are used they must be no greater than 100mm apart.

Where netting mesh is used, the diagonal gap in the mesh must be no greater than 75mm, which is achieved by a 50mm x 50mm mesh as shown.



Effective date for this change is 1 July 2016.

B6.1.3 Night use

Amber-flashing warning lamps may be placed on safety fences and barricades refer to section C12.4.6. Amber flashing warning lamps.

On **all levels** of road where hazards parallel to the road are protected by safety fences, these fences must be fitted with suitable reflectorised delineators.

CoPTTM recommends the use of the 200mm x 150mm retro-reflective chevron delineators shown in subsection B12.1.4 Channelling traffic. These are to be installed at ten-metre spacings and at every change of direction of the safety fence or barricade.

B6.1.4 Plastic water-filled fences and barriers

Plastic water-filled fences and barriers that do not comply with the requirements of NZTA M23: Specification for road safety barrier systems must not be used as barriers.

However, plastic water-filled fences and barriers may be used as a safety fence under the following conditions:

- The design and installation must comply with the design requirements for safety fences listed above.
- Must be separated from any live lane by a minimum of a 1m lateral safety zone and a row of cones at the appropriate spacings.
- Must only be used in less than 65km/h speed environments.

B7 Barricades

B7.1.1 General

Barricades must only be used behind a line of delineation devices.

Barricades may be used to physically close roads.

Barricades must be lightweight, frangible and constructed from non-splintering plastic material. When in place on site the barricade, consisting of legs and a sight rail, must be joined together to form a one-piece unit.

Hurdles are **not** a recommended TTM device and CoPTTM discourages their use. Cones or barricades can usually be used instead of hurdles.

B7.1.2 Dimensions

Barricades must:

- have sight boards with a vertical dimension of 150mm to 300mm and horizontal lengths of 600mm to 1800mm, and
- the sight board must be mounted with the centre line of the uppermost rail 900mm, ± 120mm tolerance, above the ground surface.

B7.1.3 Colour

Barricades must be:

- a fluorescent orange colour that conforms to the chromaticity co-ordinates in table 2.5 AS/NZS 1906.1:2007, and
- conform to the minimum luminance factors specified with table 2.8 of AS/NZS 1906.1:2007.

Barricade sight boards must have alternating 100–150mm-wide white and fluorescent orange stripes that slope at 45 degrees to the vertical, with the lowest point of the stripes towards the live lane. The stripes must be at least class 1 retro-reflective material that conforms to table 2.2 AS/NZS 1906.1:2007 and must be applied to the full length of the sight board.

B8 Horizontal arrow boards and light arrow system

B8.1 General

Arrow boards are used to:

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

Arrow boards are used extensively for mobile operations but they may also be used for static operations.

B8.1.1 Types of arrow boards

There are two types of arrow board:

- light arrow system (LAS), and
- horizontal arrow board.

B8.1.2 When each are used

Level 2 and 3 roads:

- LAS or horizontal arrow boards must be used on all level 2 and 3 roads.
- LAS must be used on level 2 and 3 state highways.
- LAS or horizontal arrow boards must not be used to direct traffic into opposing traffic flows.

Level LV and level 1 roads:

- Horizontal arrow boards may be used for both static and mobile operations on **level LV and level 1** roads to increase levels of safety.
- Horizontal arrow boards must not be used to direct traffic into opposing traffic flows.

B8.2 Light arrow system (LAS)

B8.2.1 About the LAS

The LAS is used on level 2 and 3 state highways. The LAS is designed to operate as part of a gazetted sign R3-13.3 with:

- a red and white rear panel
- a xenon warning light system
- a 1500mm diameter RD6R or RD6L, and
- in conjunction with an advanced warning variable message sign (AWVMS).

The LAS design follows European best practice which has been proven to be more effective than the horizontal arrow board system.

It is recommended that all RCAs adopt this policy for level 2 and 3 roads.

B8.2.2 Effective dates

It is recommended new vehicles be fitted with the LAS.

All new NZTA contracts awarded, for level 2 and 3 roads, from 1 July 2010 will require use of LAS.

Existing level 2 and 3 truck-mounted attenuator (TMA) rear panels must be retrofitted to comply by 1 July 2012.

B8.2.3 Specifications

The details of the number and layout of lamps are shown in the following diagram.

The minimum number of lamps must be 24 with a maximum of 25.

The arrow lamps must comply with European Standard EN12352:2006 *Traffic control equipment - Warning and safety light devices for Class L8H warning lights* (EN12352:2006).

The following shows values for lights complying with EN12352:2006.

Class of warning light – L8H	
Characteristic	**Requirements**
Area of light emitting surface (cm^2)	>= 250
Diameter of light emitting surface (mm)	>= 180
Angle range - horizontal	+7.5° to -7.5°
Angle range - vertical	+5.0° to -5.0°
Luminous intensity (cd) for nominal voltage:	
• I_{Rmin} [minimum effective luminous intensity measured on the reference axis]	1500
• I_{Amax} [maximum effective luminous intensity measured at any point within angle range]	5000

The arrow lamps are required to pulse at a rate of 55 to 75 flashes per minute, with the on-period twice the length of the off-period.

When the arrow lamps are operating, the two synchronised Xenon flashing lights must only flash during the off-period of the arrow lamps.

All lenses must be amber in colour.

Adjustment of the light intensity of the lanterns for night-time operations must be controlled by an automatic light-sensitive multistage light dimming device.

The light intensity during hours of darkness must not exceed 800 candelas since this may cause glare and make the sign difficult to read.

Note: The LAS system is gazetted as a sign.

B8.3 Horizontal arrow boards

B8.3.1 General

Horizontal arrow boards must be legible at distances greater than 800m.

They must at least comply with the requirements of the joint Australian and New Zealand standard AS/NZS 4192:2006 (and amendments) *Illuminated flashing arrow signs* (AS/NZS 4192:2006) and preferably with the American Federal Highway Administration's Manual on uniform traffic control devices for streets and highways section 6F.61 Arrow boards and figure 6F-6 Advance warning arrow board display specifications.

B8.3.2 Design

Horizontal arrow boards must have the following features:

Lamp colour	Amber
Lamp diameter	At least 80mm
Flash rate	25 to 40 flashes per minute
Number of lamps	At least 25 and a minimum of 5 per chevron
Lamp dimming	Adjustable intensity with automatic and manual switching to not more than 50 percent of rated voltage

Pilot lights, or other controls, located in the vehicle **must** be used to confirm the operation and mode of a horizontal arrow board.

B8.3.3 Size

Horizontal arrow boards must be at least 1200mm wide by 600mm high.

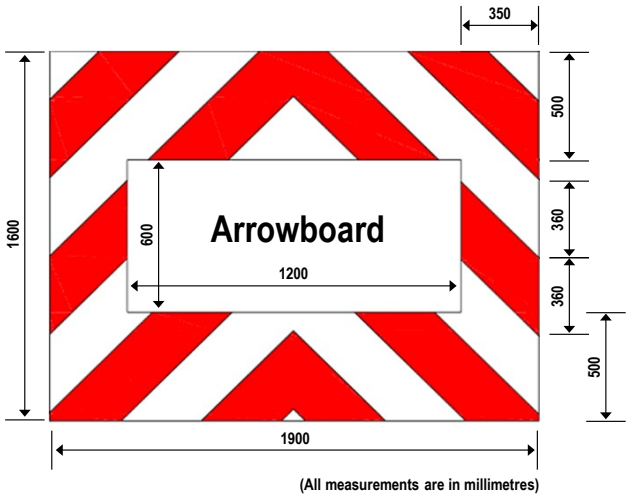
B8.3.4 Rear panel

A red and white rear panel, as specified below, will be required on all horizontal arrow boards with effective date of 1 July 2012:

- Primary strip – Red reflective class 1 retro-reflective.
- Alternate strip – White reflective class 1 retro-reflective.

These primary and alternate strips must be uniform in size and can be either 360mm or 140mm wide.

Note: The height and width measurements are minimums. Maximum measurements will be subject to legal vehicle widths and heights.



If the truck's tray width does not allow for the full red hatching to be displayed on each side of the horizontal arrow board, this hatching width may be decreased to the width of the tray. The red hatching must be maintained in the panels above and below the arrow board.

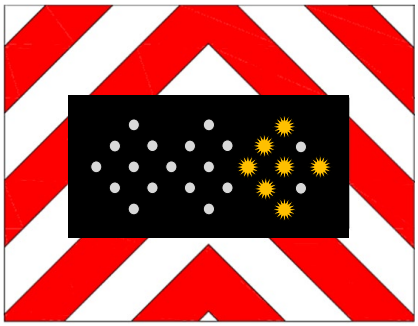
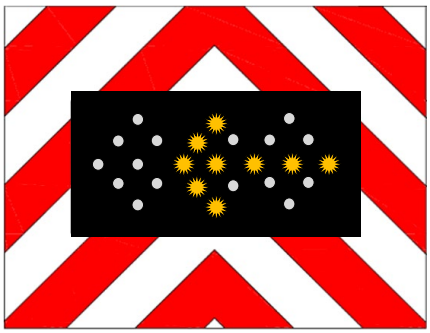
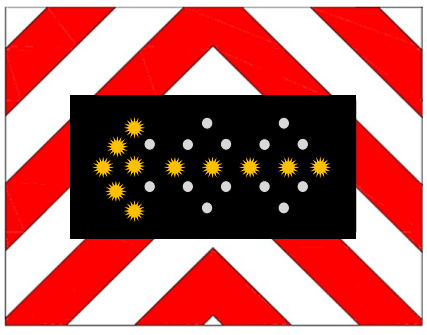
The TV4 PASS WITH CARE sign must be displayed either above or below the red hatching. The RD6L/R signs are not to be used.

B8.3.5 Display configurations

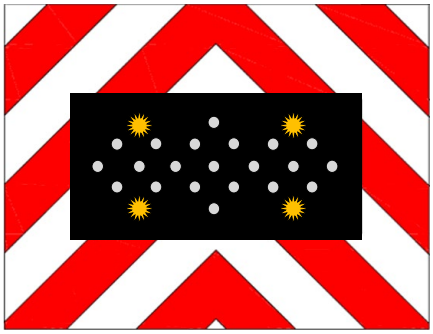
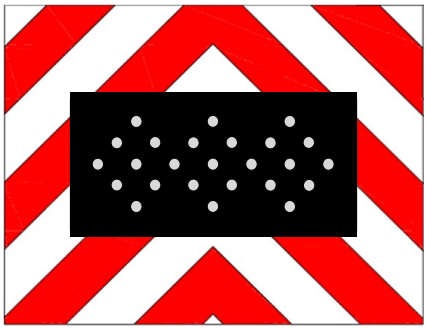
The position on the carriageway of the vehicle carrying the horizontal arrow board determines which of the two horizontal arrow board displays approved for TTM use on New Zealand roads is to be shown.

Details of these display modes are given below:

Mode	Display	Situation
Single sequential A=arrow (with tail)	Arrow head moving left or right depending on the direction road users are being directed to follow.	The horizontal arrow board vehicle is in a live lane but a minimum lane width is available for traffic to safely pass on one side of the vehicle.

Phase	Display
Phase 1	
Phase 2	
Phase 3 (after phase 3 the sequence returns to phase 1)	

Mode	Display	Situation
Caution	All four corner lights flash simultaneously as below.	The horizontal arrow board vehicle is in a live lane but a minimum lane width cannot be provided on either side of the vehicle. The horizontal arrow board vehicle is on a shoulder and the carriageway is entirely unaffected.

Phase	Display
Phase 1	
Phase 2 (after phase 2 the sequence returns to phase 1)	

Notes:

1. The operational requirements listed above vary from those shown in AS/NZS 4192:2006.
2. Horizontal arrow boards must not show a left and a right arrow at the same time.

B8.3.6 Location

When a horizontal arrow board is operating, all other vehicles with flashing beacons in the working area must be positioned such that the visual performance of the horizontal arrow board is not impaired.

B9 Advance warning variable message sign (AWVMS)

B9.1.1 Types of variable message signs (VMS)

There are two types of variable message signs (VMS):

- advance warning variable message sign (AWVMS) - covered in this section
- standard VMS - covered in the NZTA's P37 *Specifications for mobile variable message signs* (a draft of which is available on the NZTA's website).

The AWVMS is used in conjunction with the LAS on level 2 and 3 state highways.

B9.1.2 About the AWVMS

The AWVMS is designed to provide advance warning for either mobile or static level 2/3 operations. It is used as a substitute for the tail pilot vehicle and is best suited for this role when mounted on a light commercial vehicle such as a ute.

The AWVMS must be carried on either a class NA light goods vehicle, or a TA very light trailer with limited weights and dimensions. See weights and dimensions specified below.

Light goods vehicle (Maximums)	
Item	**Measurement**
Kerb weight (tare weight)	Max = 1950kg
Vehicle width (excluding mirrors)	Less than 1910mm
Total vehicle length	Less than 5250mm
Gross weight	Less than 2750kg

Very light trailer (Maximums)	
Item	**Measurement**
Kerb weight (tare weight)	Max = 750kg
Vehicle width (excluding mirrors)	Less than 1500mm
Total vehicle length	Less than 5000mm
Gross weight	Less than 1500kg

B9.1.3 Specifications

Detailed specifications for the AWVMS are listed in appendix E of the NZTA's P37 *Specifications for mobile variable message signs* (a draft of which is available on the NZTA's website).

The AWVMS must be capable of being operated from within the cab of its support vehicle. If it is to be used as a standard VMS it must comply with the relevant:

- legislation
- sections of this manual, and
- the NZTA's P37 *Specifications for mobile variable message signs* (a draft of which is available on the NZTA's website).

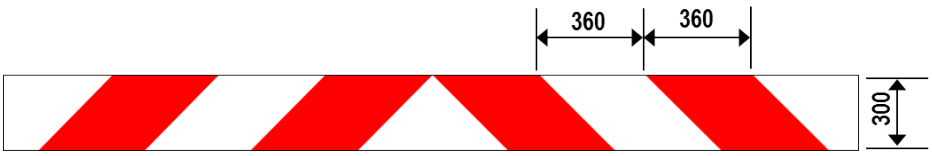
B9.1.4 Height

The bottom of the message panel must be positioned a minimum of 600mm above the ground surface.

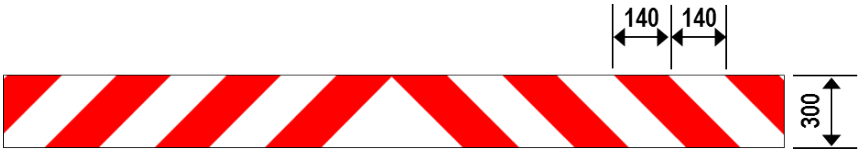
B9.1.5 Tailboard

The tailboard below the bottom text panel must be covered with red and white retro-reflective stripes (see the two options below).

Option 1



Option 2



B9.1.6 Effective dates

AWVMS may be used on level 2 and 3 state highways from 1 December 2008.

All new NZTA contracts awarded, for level 2 and 3 roads, from 1 July 2010 must use this style of AWVMS.

All NZTA contracts for level 2 and 3 roads from 1 July 2012 must use this style of AWVMS.

B10 Mobile variable message sign (VMS)

B10.1.1 Mobile variable message signs (VMSs)

Mobile VMS may be used, where they can be justified, instead of large temporary traffic information signs. They have particular value where messages, including a blank sign, are required to be changed throughout the course of the work. They are an additional form of traffic management and must not be used to replace the normal signs or devices used for TTM.

Mobile VMS must be located in a similar position to an equivalent conventional temporary traffic sign. Signs must be located behind an approved delineation device or be protected by an approved barrier system or a non-gating re-directive crash attenuator.

B10.1.2 Types of variable message signs (VMSs)

There are a number of different types of VMS, with different applications. Each type is briefly described below:

- AWVMS – Mounted on a small utility vehicle or small trailer. Used for:
  - taking the place of a tail pilot in mobile operations
  - setting up a worksite for a static operation
  - providing additional information for a static operation
- Mobile VMS – Mounted on a trailer. Used as a relocatable sign providing information ahead of worksites, blockages diversions, etc. While in operation it is stationary
- Regional VMS – Mounted (usually) on a fixed support structure beside high volume urban or rural roads. Used for:
  - incident management, diversions, delays, closures
  - adverse road or driving conditions
- Advanced Traffic Management System VMS – Mounted on overhead gantries above motorways. Used for similar applications to the regional VMS.

B10.1.3 Design

The NZTA has established design specifications that all new VMS and mobile VMS must comply with the NZTA's P37 *Specifications for mobile variable message signs* (a draft of which is available on the NZTA's website).

B10.1.4 Messages and operation

The NZTA has established three levels of documentation relating to the operation of all new and existing mobile, regional and ATMS VMSs. These comprise the following:

1. The NZTA's P34 *Variable message sign national operating policy* (in press)

   This national document outlines the overall operating policy relating to the control of messages on the NZTA's VMS and mobile VMS. It covers motorway, urban and rural locations, and has important links to the national operating procedure described below. Please refer to this document for direction on all policy aspects, including:

   - all message applications
   - responding to emergency services requests
   - blanking of signs
   - verification of information
   - whether the state highway number (eg SH1) should be included
   - a VMS's boundary of influence.

2. The NZTA's P35 *Variable message sign national operating procedure* (in press)

   This is a national document that addresses the operating procedures governing the NZTA's VMS and mobile VMS. It contains a menu of standard messages and outlines the best practice processes used to compose messages. The national operating procedure sits below and is consistent with the national operating policy.

3. Regional schedules (in press)

   These regional documents contain contact details of authorised consultants and contractors, approved message wording for commonly occurring events, frequently used local place names, and identify linked VMS for each common incident location.

   They also include the type of detailed information required for maintenance or asset management purposes.

   The collation and updating of these schedules is the responsibility of each region.

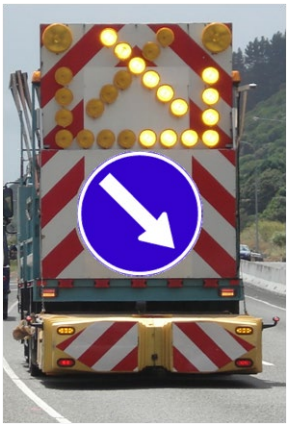
B11 Truck-mounted attenuator (TMA)

B11.1 Introduction

A TMA generally consists of an energy absorption cartridge, a rigid back-up and a steel support structure that attaches the crash cushion to the truck.

Their purpose is to evenly and gradually dissipate the kinetic energy of an impacting vehicle.

TMAs also prevent an impacting vehicle from under-riding the truck body, which can result in shearing the top off the impacting vehicle at the bonnet line.



B11.1.1 National Cooperative Highway Research Programme (NCHRP) report 350

TMAs must be certified for compliance with NCHRP report 350 tests 50 and 51. The standard for roads with a speed limit in excess of 70km/h is test level 3. This has yet to be introduced as a requirement.

TL2 is the basic test level for TMAs and they must meet this performance requirement. With positive TTM, TL2 has been shown to be effective for crashes at speeds greater than 70km/h.

Note that the compliance rating for TMAs must be displayed on both sides of the unit and at the truck-mounting end of the unit, in black 100mm-high lettering and reading as NCHRP 350: TL-2.

B11.1.2 Support vehicles

All support vehicles equipped with a TMA must:

- meet the minimum vehicle weight for the type of attenuator as detailed in the New Zealand register of compliant TMA systems, which is available on the NZTA's website
- meet all vehicle requirements recommended by the manufacturer of the TMA
- be legally permitted to travel on the road. Special approval may, however, need to be obtained from the NZTA for some TMAs, eg an over-width or over-length permit, and
- have fitted, as a minimum, a standard three-point seat belt for each person in the TMA cab.

B11.1.3 Application

TMAs are to be used on **all levels** of roads where required. Refer to sections C18 Temporary road safety barrier systems for static worksites and section D5 Mobile closures operational requirements for mobile operations.

All TMAs must at least comply with the requirements of NCHRP 350 TL 2 when used on roads with a permanent posted speed limit greater than 70km/h.

B11.2 Rear panel of attenuator vehicle

B11.2.1 Introduction

TMAs need to be highly visible and instantly recognisable.

For this reason, the red and white rear panel has been adopted, based on proven performance, to highlight the vehicle relative to its surroundings.

It is recommended that all RCAs adopt this policy for level 3 roads.

B11.2.2 Effective dates

B11.2.2.1 New TMA

TMA vehicles constructed after 1 July 2010 for use on level 2 and 3 roads must be fitted with the red and white colour and layout detailed in this section.

B11.2.2.2 Existing TMA

For use on Level 2 and 3 state highways

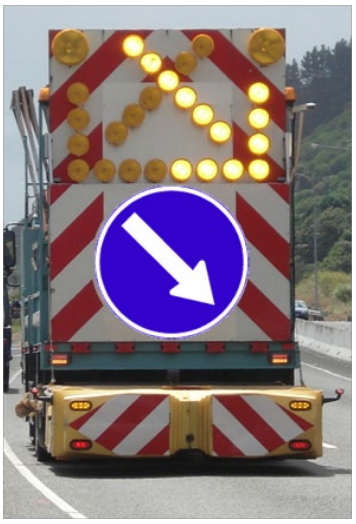
For all existing TMA, rear panels must comply by 1 July 2012.

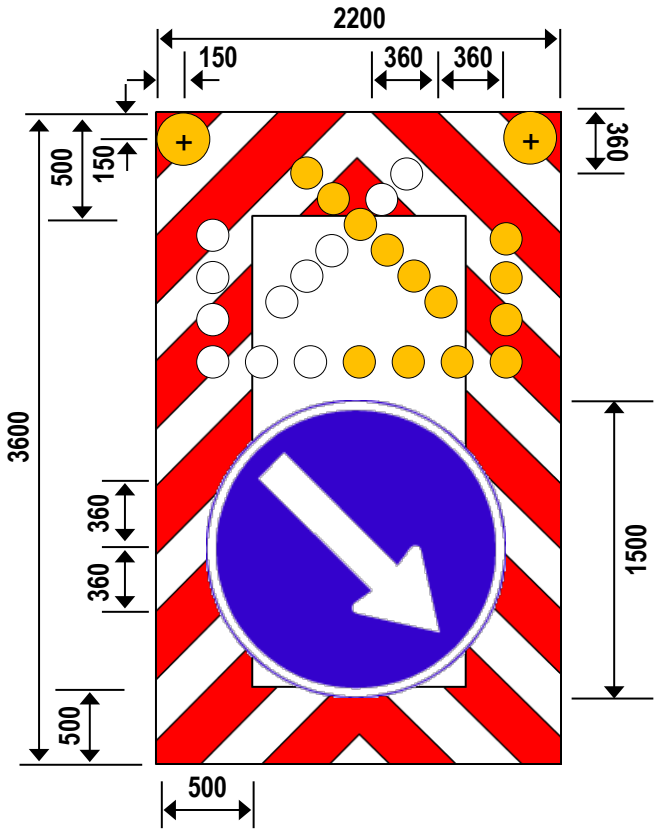
For use on roads other than state highways

The rear panels of existing TMA in use on level 3 roads must be retrofitted to comply by 1 July 2012 It is recommended that the rear panel of existing TMA used on level 2 roads are retrofitted to comply.

B11.2.3 Specification

Colour	Primary strip – Red reflective class 1 retro-reflective. Alternate strip – White reflective class 1 retro-reflective.
Height	The overall height of the panel must not exceed 4.25m above the road. The lower 500mm of the panel will need to be installed on the rear of the TMA to remain under the maximum height specified in law.
LAS	Refer to subsection B8.2.3 Specifications for LAS specifications.
Enlarged RD6L/R (RG-17/34)	1500mm diameter (± 50mm).
Xenon lights	340mm minimum diameter Xenon lights are to be installed in the top left and top right corners of the panel as per the drawing of a TMA for level 2 and 3 roads on the following page.
Equipment control	The rear panel must have a device installed to ensure that the arrow board and the RD6L are always aligned. A display must be visible to the operator to confirm orientation.
Deck-mounted up-lighting	A white up-light with a minimum output of 50 watt is to be attached to the deck to adequately illuminate the RD6L/R.
Amber-flashing beacons	One, preferably two, amber flashing beacons must be visible to the rear of the vehicle until such time as the LAS is fully deployed and the xenon lights are fully operational and at the correct height.
Organisations' signage or logos	Must not be installed on the rear panel of the TMA.





(All measurements are in millimetres)

B12 Temporary road safety barriers

B12.1.1 General

All temporary road safety barrier products must comply with the performance requirements of this section.

Section C18 Temporary road safety barrier systems provides direction and guidance for the design, selection and use of barrier systems and end treatments. The prime document is NZTA M23 Specification for road safety barrier systems.

Note: This section and section C18 Temporary road safety barrier systems cover the requirements for temporary road safety barrier systems used in New Zealand.

The NZTA M23: Specification for road safety barrier systems cover the requirements for permanent and temporary road safety barrier systems used in New Zealand.

B12.1.2 Performance standards

All temporary road safety barrier systems must be approved by the NZTA National Traffic and Safety Manager.

This approval will require that the product has complied or been deemed to comply (by the NZTA) with the NCHRP report 350 performance levels. The performance levels for the containment of crash impact energy are based on a 2000kg vehicle impacting the barrier at an angle of 25 degrees, at a specified speed.

From 1 November 2012 the NZTA has adopted the AASHTO Manual for Assessing Safety Hardware (MASH) as the nominal standard for road safety hardware systems installed on the state highway network.

From this date the NZTA requires that MASH testing results be used as the primary performance criteria in promoting any road safety hardware system.

This section of CoPTTM is currently under revision to align it to the new standard. Please address any enquiries in relation to this notification to the National Manager Traffic and Safety.

Table below summarises the required barrier system performance test levels for the permanent speed limit of the road.

Barrier system performance levels

Test level	Permanent speed
1	50km/h or less
2	50km/h to 70km/h
3	greater than 70km/h

Temporary road safety barrier hardware must meet or exceed the test level required for the permanent speed limit of the road.

B12.1.3 Approved temporary road safety barrier hardware

Only the road safety barrier hardware listed in the NZTA M23: Specification for road safety barrier systems appendices A and B is approved for use.

Any road safety barrier hardware not listed must be submitted to the NZTA National Traffic and Safety Manager for review and approval on a project or site specific basis.

The end treatments listed in appendix B of NZTA M23: Specification for road safety barrier systems are approved for temporary road safety barrier use.

Generally, different types of barrier systems must not be mixed without approved transitions.

The transitions listed in appendices A and B of NZTA M23: Specification for road safety barrier systems are approved for temporary road safety barrier use.

All products must be used in accordance with the manufacturer's or supplier's installation guidelines, including, but not limited, to the use of approved jointing and anchoring systems, and approved end treatments. All components must comply with the drawings and specifications.

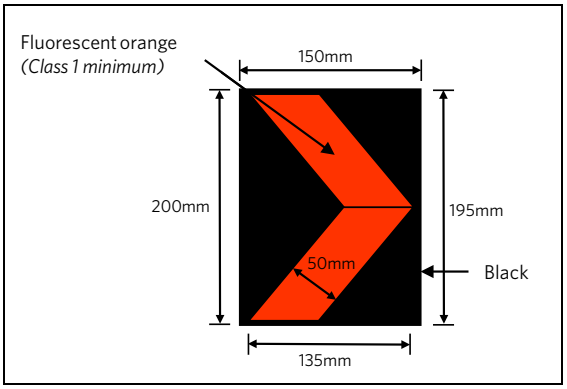
B12.1.4 Channelling traffic

The NZTA M23: Specification for road safety barrier systems compliant barrier systems that are used to channel traffic must be conspicuous.

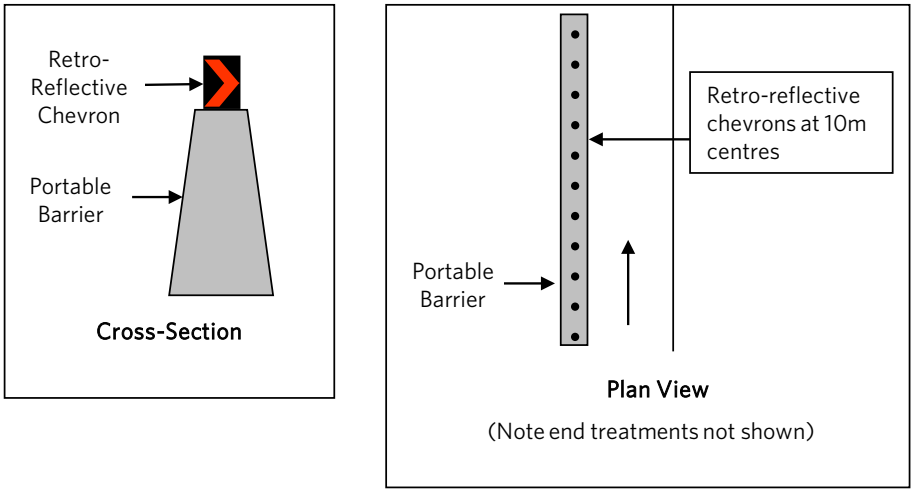
Complying plastic water-filled barrier systems that delineate traffic must be made conspicuous through having coloured sections. These colours may include orange, red and yellow.

Concrete or galvanised barrier systems must have either a natural concrete or galvanised face. If this is not possible they must have coloured sections as above.

Barrier systems must be fitted with reflective markers (chevrons) as shown over the page.



These are to be fitted along the top of the barrier as shown below.



The chevron must consist of a fluorescent orange arrowhead on a rectangular black background 150mm x 200mm. The chevron must point to the side of the barrier that traffic is to pass. Chevrons must be placed at 10m centres along the barrier.

B12.1.5 Visibility screens

Visibility screens are used to help prevent motorists being distracted by the works to facilitate improved and safer traffic conditions.

Visibility screens:

- Must be opaque (eg shade cloth, corrugated plastic or corriboard or other similar frangible materials). Rigid materials are not to be used unless it can be demonstrated (by crash testing or similar means) that such material will not cause injury when impacted
- Must provide a continuous screen a minimum of 2m in height above the pavement
- Must be designed to be attached to the rear of a temporary barrier or be free standing
- Must have a smooth and visually uncluttered surface of uniform colour. The same surface and colour must be used for the whole system.

The frames supporting visibility screens must be manufactured in such a manner so as not to present a hazard to worker, pedestrians or vehicle occupants when impacted.

All joints must be welded or similarly connected. Mechanical fixings (pipe clamp, bolted joints etc.) are not to be used. All tube bends or frame corners must have a radius of greater than 100mm.

Visibility screens and their supporting structures must be capable of accommodating all environmental loads imposed during normal operating conditions including wind loads and the wind load generated from all passing vehicles. Under such imposed loads the screens are not to move out of line or move in any way that may distract motorists.

No advertising or corporate marketing may be applied to a visibility screen. A single corporate logo not exceeding the maximum allowed under subsection B4.1.2 Area requirements for signs may be applied in the upper right-hand corner of the visibility screen.

B12.1.6 Application

All barrier systems and end treatments must comply with the above requirements for **all levels** of roads.

B13 Temporary speed humps

B13.1.1 General

Speed hump systems are designed to ensure that road users slow to the required speed at a road works site. There are special conditions under which these may be used. These are detailed in subsection C10.5 Temporary speed humps.

B13.1.2 Approval

Speed hump systems must be approved by the NZTA before use.

Details of testing criteria and independent testing are available from the NZTA:

Principal CoPTTM Advisor
NZTA National Office
Private Bag 6995
Wellington 6141.

A register of compliant systems is available on the NZTA website.

New approvals will be added to the register as they pass testing. Testing is to be undertaken at own expense.

B13.1.3 Physical characteristics

Dimensions:

- Height – less than 40mm (+10mm tolerance).
- Length – 3m or longer.
- Width – less than 500mm.
- Rise initial step no greater than 25mm, top profile curved.
- Colour – a bright, fluorescent type colour, orange is preferred but yellow may be used.
- Retro-reflectivity/lighting – at night they must be clearly visible by using either retro-reflective means or illumination. This is a legal requirement covered by the TCD Rule, section 7.9.

B14 Warning systems

B14.1 Flashing beacons

B14.1.1 General

Flashing or revolving amber beacons refer to roof mounted devices which consist of a light, encapsulated in a casing and may either flash (strobe) or appear to flash when circled by a rotating reflector. The beacon(s) are to be mounted on a vehicle in such positions as to give a 360° uninterrupted view in the horizontal plane.

Note: Vehicle hazard warning lights are not beacons.

B14.1.1.1 Land transport Rule: Vehicle lighting 2004

All flashing beacons used in New Zealand must comply with section 11 of the Land Transport Rule: Vehicle lighting 2004.

B14.1.1.2 ECE Regulation 65

The flash conditions, the amber colour coordinates and the light output of the beacon must comply with the criteria specified below which was identified from within ECE Regulation 65. Compliance with these conditions must be contingent on certification obtained from an IANZ accredited laboratory.

Note: The light output conditions permit beacons with a single light output level as well as those having dual (night/day) light output levels.

B14.1.2 Specification

Flash Rate		
		Colour amber
		Rotating or flashing sources
	max	4
Frequency f(Hz)	min	2
"ON" time (sec)	max	0.4f
"OFF" time (sec)	min	0.1

Light Output: (Table values are in candelas)			
			Colour - amber
Minimum value of the effective luminous intensity within the specified vertical angles and a horizontal angle of 360° around the reference axis.	0°	By day	230
		By night	100
	± 4°	By day	-
		By night	-
	± 8°	By day	170
		By night	70
Maximum value of the effective luminous intensity	Inside ± 2°	By day	1,700
		By night	700
	Inside ± 8°	By day	1,500
		By night	600
	Outside the above areas	By day	1,000
		By night	300

Chromaticity	
The trichromatic coordinates of light emitted through the filters used for special amber warning lamps shall lie within the following x and y boundaries of the CIE 1931 chromaticity diagram [reference CIE 15 – Colorimetry:2004):	
Limit towards green:	$y \leq x - 0.120$
Limit towards red:	$y \geq 0.390$
Limit towards white:	$y \geq 0.790 - 0.670x$

B14.2 Xenon warning lights

B14.2.1 General

The purpose of the xenon warning lights is to give advance warning to alert approaching road users. Lights must be fitted in accordance with the CoPTTM-specified height and alignment specifications.

Xenon warning lights are not intended to be used on level LV and level 1 roads, unless they are fitted to AWVMS signs or the latest TMA display in accordance with CoPTTM.

It is recommended that all RCAs adopt xenon lights for level 2 and 3 roads.

B14.2.2 Effective date

All TMAs used on level 2 and 3 state highways must be fitted with complying xenon warning lights by 1 July 2012.

It is recommended any new vehicle be fitted with xenon warning lights.

Level 2 and 3

All new NZTA contracts awarded from 1 July 2010 will require xenon warning lights.

Full implementation on level 2 and 3 state highways is required by 1 July 2012.

B14.2.3 Specification

The xenon warning lights must comply with EN12352:2006.

The following details are the values for lights complying with EN12352:2006.

Class of warning light – L9M (Xenon)	
Characteristic	**Requirements**
Area of light emitting surface (cm^2)	>= 700
Diameter of light emitting surface (mm) minimum	>= 300 (340mm desirable)
Angle range - horizontal	+1.5° to -1.5°
Angle range - vertical	+1.5° to -1.5°
Luminous intensity (cd) for nominal voltage:	
• I_{Rmin} [minimum effective luminous intensity measured on the reference axis]	2000
• I_{Amax} [maximum effective luminous intensity measured at any point within angle range]	8000

B14.2.3.1 Height

Minimum height of 3.5m to the centre of the light. Maximum clear height of 4.25m to the top of the light above the ground surface.

B14.2.3.2 Orientation

The reference axis of light emitted from each xenon warning lamp must not fall below a line parallel to the surface on which the vehicle is standing.

Note: EN12352:2006 uses the terms 'principal axis' and 'reference axis' which are defined as:

'Principal axis is the horizontal axis which lies on the vertical plane of symmetry of the lens and passes through the photometric centre of the warning light when it is in its normal operating position.

Reference axis, unless otherwise specified by the manufacturer, is the axis of maximum luminous intensity within 2° in any direction of the principal axis'.

The specified height and orientation is required to ensure that road users are not unduly affected by the operation of the Xenon warning lights.

Traffic Control Devices Manual
Part 8

Code of practice for temporary traffic management (CoPTTM)

manual number: SP/M/010

Section C

www.nzta.govt.nz

Fourth edition, Amendment 5 of
Code of practice for temporary traffic management

Date of issue: November 2018

Effective date: 1 February 2019

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)

Section C – Static operations

C1 General

C1.1.1 Definition

Static operations are activities contained within a fixed worksite.

Activities within a moving worksite are subject to the rules and guidelines in section D Mobile operations.

C1.1.2 Closure length

The length of any closure must be the minimum required to undertake the activity.

Closures should generally not be longer than 1km.

C1.1.3 Number of contractors at a worksite

A worksite must be under the control of only one contractor at a time.

If another contractor wishes to undertake activity on the same section of road they must request permission from the current worksite contractor, the engineer and/or the traffic management coordinator (TMC), or other road controlling authority (RCA) authorised person.

The TMC/engineer, or any other RCA-authorised person, must approve any amendment to the existing traffic management plan (TMP) if it has to be adjusted to accommodate another contractor's activity.

C1.1.4 Inclement weather conditions

When adverse weather conditions affect visibility to the signs and/or the worksite so that sign visibility distance to the first sign cannot be achieved, it may be necessary to cease the activity and clear the worksite of all personnel in the interests of safety.

In exceptional cases it may also be necessary to clear the carriageway of all obstructions caused by the works, if this can be done safely. A decision on the need to clear the carriageway should be based on consideration of all prevailing circumstances, including:

- the nature of the works
- traffic volumes, and
- weather conditions.

C2 Worksite layout

C2.1 Introduction

C2.1.1 General

For level low volume (LV) and level 1 roads the worksite measurements (except lane width) are based on the permanent speed limit or RCA-designated operating speed. Refer to section C2.8 Lane widths.

For levels 2 and 3 temporary traffic management (TTM) the approach sign distances and spacings, the initial taper(s) and any longitudinal safety zone associated with that taper must be based on the permanent speed limit. The layout distances of the remainder of the worksite, including any subsequent tapers, may be based on the TSL, provided the TSL is applied prior to the first taper.

C2.1.2 Sign visibility distance (A)

The uninterrupted sight distance from an approaching road user to the first advance warning sign is defined as the sign visibility distance, A. The higher the permanent speed limit, the greater the sign visibility distance required.

Sign visibility distances are given in the layout distance tables for levels LV, 1, 2 and 3.

C2.1.3 Warning distance (B)

The distance between the first advance warning sign and the start of the taper, or the start of the longitudinal safety zone if no taper is required (refer to subsection C6.2.2 Longitudinal (lead in) safety zones), is defined as the warning distance, B.

The warning distance is normally achieved by locating signs at the appropriate sign spacing. Where this cannot be achieved the sign spacing distances will need to be increased.

The warning distance has only been shown on drawings where the cumulative sum of sign spacing distances on an approach to a closure is less than, or equal to, the minimum warning distance required.

Warning distances are given in the layout distance tables for levels LV, level 1 and level 2.

C2.1.4 Sign spacing distance (C)

The sign spacing distance, C, is defined as the distance between two signs. Temporary warning and regulatory speed signs are required to be located at sign spacing distances to allow the road user to read, understand and comply with the sign's message.

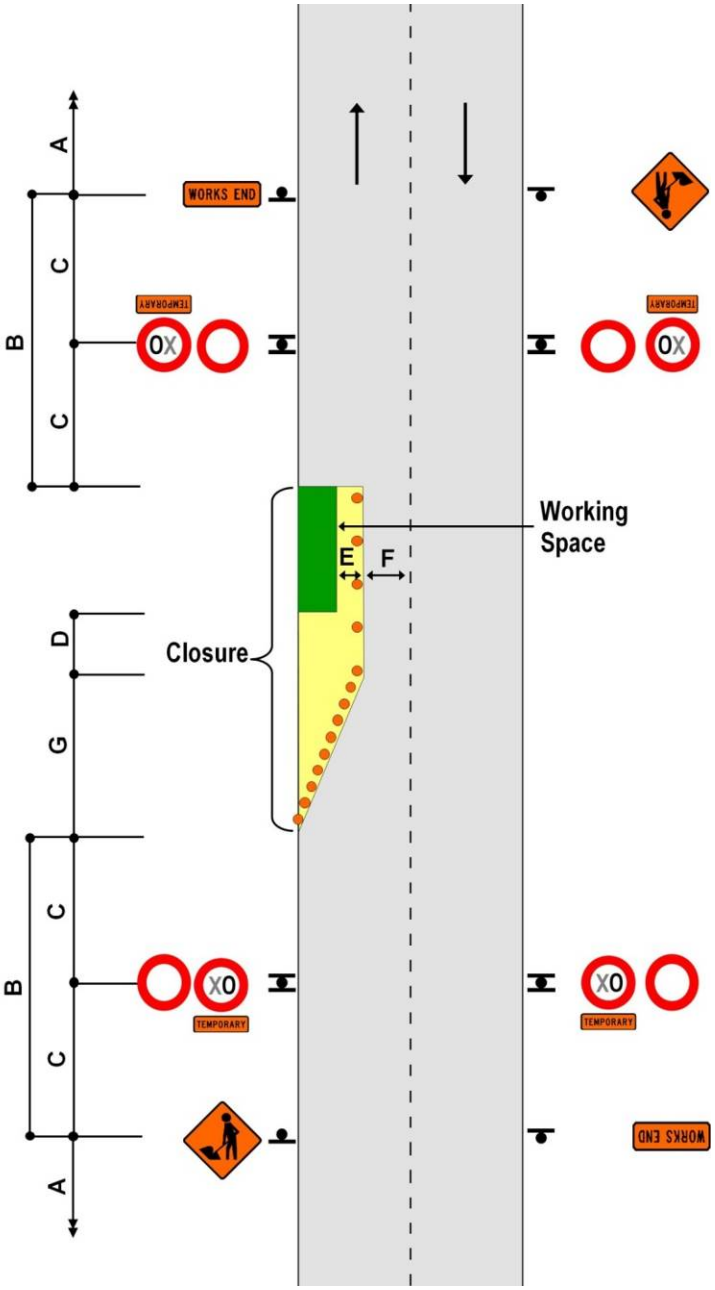
Signs that have a supplementary plate displaying a distance to a taper must be placed that specific distance in advance of the start of the taper or in advance of the longitudinal safety zone when no taper is required. If required, extend sign spacing to achieve minimum warning distance.

Where the cumulative sum of sign spacing distances on an approach to a worksite is less than the minimum warning distance required, the sign spacing will need to be increased such that the warning distance is achieved.

Sign spacing distances are given in the layout distance tables for levels LV, 1, 2 and 3.

C2.2 Explanation of dimensions in worksite layout distances tables

	Dimensions	Refer to
A	Sign visibility distance	C2 Worksite layout
B	Warning distance	C2 Worksite layout
C	Sign spacing	C2 Worksite layout
D	Longitudinal safety zone	C6.2.2 Longitudinal (lead in) safety zones **Note:** Apart from approved TTM equipment, this space must be maintained as a completely clear zone.
E	Lateral safety zone	C6.2.3 Lateral safety zones **Note:** Apart from approved TTM equipment, this space must be maintained as a completely clear zone.
F	Lane width	C2 Worksite layout
G	Taper length	**Note:** Apart from approved TTM equipment, this space must be maintained as a completely clear zone.



Working space – The area set aside for work.

Closure – The area of carriageway which road users are excluded from (eg the taper, longitudinal and lateral safety zones and any end taper).

C2.3 Level LV worksite layout distances

Permanent speed limit or RCA-designated operating speed (km/h)		≤50	60	70	80	90	100
Traffic signs							
A	Sign visibility distance (m)	50	60	70	80	90	100
B	Warning distance (m)	50 or 30*	80	105	120	135	150
C	Sign spacing (m)	25 or 15*	40	50	60	70	75
Safety zones							
D	Longitudinal (m)	0	0	0	0	0	0
E	Lateral (m)+	1	1	1	1	1	1
	Lateral behind barrier installation	As specified by the Installation Designer					
Tapers							
G	Taper length (m)#	25	30	35	40	45	50
Delineation devices							
Cone spacing in taper (m)		2.5	2.5	5	5	5	5
Cone spacing: working space (m)		10	10	20	20	20	20

* Larger minimum distances apply on all state highways. The smaller minimum distances may be applied on other roads to accommodate road environment constraints.

+ On LV roads, the lateral safety zone may be reduced or eliminated in order to retain a single lane width. Positive traffic management and an appropriate TSL must be used.

\# 1. On non-state highways with permanent speeds 50km/h or less, a **10m taper** (with cones at 1m centres) may be used when there are road environment constraints (eg intersections and commercial accesses).

2. On all roads where the shoulder width is less than 2.5m and the activity does not affect the live lane, a **10m shoulder taper** is permitted (with at least 5 cones at no greater than 2.5m centres).

3. A **taper of 30m** (with cones at 2.5m centres) **must** be used where manual traffic control (stop/go), portable traffic signals or priority give way are employed.

Lane widths (based on permanent speed or TSL if applied)

Speed (km/h)		30	40	50	60	70	80	90	100
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above tables are minimum values.

LV/low-risk roads (less than 250vpd - less than 20 vehicles per hour)

When on the shoulder:

- *If CSD **not** available*: Advance warning sign and base to be installed with sign visibility distance and warning distance in place
- *If CSD available:* Advance warning sign may be attached to the rear of a work vehicle which has an amber flashing beacon(s) and is visible to approaching road users from the rear.

When the activity encroaches onto a live lane consider alternating flow controls.

If the above requirements cannot be achieved, the operation must be modified to comply with the appropriate level LV or level 1 requirements.

C2.4 Level 1 worksite layout distances

Permanent speed limit or RCA-designated operating speed (km/h)		≤50	60	70	80	90	100
Traffic signs							
A	Sign visibility distance (m)	50	60	70	80	90	100
B	Warning distance (m)	50 or 30*	80	105	120	135	150
C	Sign spacing (m)	25 or 15*	40	50	60	70	75
Safety zones							
D	Longitudinal (m)	10 or 5*	15	30	45	55	60
E	Lateral (m)	1	1	1	1	1	1
	Lateral behind barrier installation	As specified by the Installation Designer					
Tapers							
G	Taper length (m)#	30	50	70	80	90	100
K	Distance between tapers (m)	40	50	70	80	90	100
Delineation devices							
Cone spacing in taper (m)		2.5	2.5	5	5	5	5
Cone spacing: Working space (m)		5	5	10	10	10	10

* Larger minimum distances apply on all state highways and also on all multi-lane roads. The smaller minimum distances may be applied on other roads to accommodate road environment constraints.

\# 1. On non-state highways with speeds 50km/h or less, a **10m taper** (with cones at 1m centres) may be used when there are road environment constraints (eg intersections and commercial accesses).

2. On all roads where the shoulder width is less than 2.5m and the activity does not affect the live lane, a **10m shoulder taper** is permitted (with at least 5 cones at no greater than 2.5m centres).
3. A **taper of 30m** (with cones at 2.5m centres) **must** be used where manual traffic control (stop/go), portable traffic signals or priority give way are employed.

Lane widths (based on permanent speed or TSL if applied)									
Speed (km/h)		30	40	50	60	70	80	90	100
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above tables are minimum values.

C2.5 Combined level LV and level 1 worksite layout distances

Permanent speed limit or RCA-designated operating speed (km/h)		≤50	60	70	80	90	100
Traffic signs							
A	Sign visibility distance (m)	50	60	70	80	90	100
B	Warning distance (m)	50 or 30*	80	105	120	135	150
C	Sign spacing (m)	25 or 15*	40	50	60	70	75
Safety zones							
D	Longitudinal (m)+	10 or 5*	15	30	45	55	60
E	Lateral (m)+	1	1	1	1	1	1
	Lateral behind barrier installation	As specified by the Installation Designer					
Tapers							
G	Taper length (m)#	30	50	70	80	90	100
G	LV roads taper length (m)#	25	30	35	40	45	50
K	Distance between tapers (m)	40	50	70	80	90	100
Delineation devices							
Cone spacing in taper (m)		2.5	2.5	5	5	5	5
Cone spacing: Working space (m)##		5	5	10	10	10	10

* Larger minimum distances apply on all state highways and also on all multi-lane roads. The smaller minimum distances may be applied on other roads to accommodate road environment constraints.

+ On LV roads the longitudinal and lateral safety zones may be reduced, or eliminated, in order to retain a single lane width. Positive traffic management and an appropriate TSL must be used.

\# 1. On non-state highways with speeds 50km/h or less, a **10m taper** (with cones at 1m centres) may be used when there are road environment constraints (eg intersections and commercial accesses).

2. On all roads where the shoulder width is less than 2.5m and the activity does not affect the live lane, a **10m shoulder taper** is permitted (with at least 5 cones at no greater than 2.5m centres).

3. A **taper of 30m** (with cones at 2.5m centres) **must** be used where manual traffic control (stop/go), portable traffic signals or priority give way are employed.

LV roads: double the cone spacing alongside working space (eg 5 = 10, 10 = 20).

Lane widths (based on permanent speed or TSL if applied)									
Speed (km/h)		30	40	50	60	70	80	90	100
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above tables are minimum values.

LV/low-risk roads (less than 250vpd - less than 20 vehicles per hour)

When on the shoulder:

- *If CSD **not** available*: Advance warning sign and base to be installed with sign visibility distance and warning distance in place
- *If CSD available:* Advance warning sign may be attached to the rear of a work vehicle which has an amber flashing beacon(s) and is visible to approaching road users from the rear.

When the activity encroaches onto a live lane consider alternating flow controls.

If the above requirements cannot be achieved, the operation must be modified to comply with the appropriate level LV or level 1 requirements.

C2.6 Level 2 worksite layout distances

Permanent/TSL (km/h)		≤50	60	70	80	90	100 /110
Traffic signs							
A	Sign visibility distance (m)	60/50+	70/60+	80	100	120	120
B	Warning distance (m)	100/75+	120/90+	140	160	200	200
C	Sign spacing (m)	50/35+	60/45+	70	80	100	100
Safety zones							
D	Longitudinal (m)*	15	20	30	45	60	60
E	Lateral (m)						
	1. Behind cones	1	1	1	1	1	1
	2. Behind barrier installations	As specified by the Installation Designer					
Tapers							
H	Initial taper length per lane (m)**	90/50+	100/60+	120	150	180	180
I	Subsequent taper length per lane (m)	50	60	70	80	100	100
K	Minimum distance between tapers (m)	50	60	70	80	100	100
Delineation device							
Spacing (centres)	All tapers (m)	2.5	2.5	2.5	2.5	2.5	2.5
	Cones parallel to the lane - eg between tapers and alongside working space (m)	5	5	10	10	10	10
	At merge and diverge points for ramps and slip lanes, intersecting road entry and exit points, and worksite access points	2.5m for 10m either side of a change in alignment		2.5m for 20m either side of a change in alignment			

* A longitudinal safety zone is not required when a barrier completely protects the approach end of the worksite.

** Taper length is based on a single lane shift of 3.5m.

\+ The longer distance is the desirable distance, the shorter distance is the minimum distance required. The longer distances must be used wherever possible. The shorter distances may only be used where there are road environment constraints.

Lane widths (based on permanent speed or TSL if applied)

Speed (km/h)		30	40	50	60	70	80	90	100/110
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above tables are minimum values.

Approach sign distances and spacings, the initial taper(s) and any longitudinal safety zone associated with that taper must be based on the permanent speed limit. The layout distances of the remainder of the worksite, including any subsequent tapers, may be based on the TSL, provided the TSL is applied prior to the first taper.

C2.7 Level 3 worksite layout distances

Permanent/TSL (km/h)		≤50	60	70	80	90	100/110
Traffic signs							
A	Sign visibility distance (m)	60/50+	70/60+	80	100	120	120
C +	Sign spacing (m) - **Desirable**	50	60	70	160	200	200
	Sign spacing (m) - **Minimum**	35	45	70	80	100	100
Safety zones							
D	Longitudinal (m)*	15	20	30	45	60	60
E	Lateral (m)						
	1. Behind cones etc	1	1	1	1	1	1
	2. Behind barrier installations	As specified by the Installation Designer					
Tapers							
H	Initial taper length per lane (m)**	90/50+	100/60+	120	150	180	180
I	Subsequent taper length per lane (m)	50	60	70	80	100	100
K	Minimum distance between tapers (m) ***	50	60	70	80	100	100
Delineation devices (all speeds)							
Spacing (centres)	All tapers (m)	2.5	2.5	2.5	2.5	2.5	2.5
	Cones parallel to the lane (eg between tapers and alongside the working space) (m)	5	5	10	10	10	10
	At merge and diverge points for ramps and slip lanes, intersecting road entry and exit points, and worksite access points	2.5m for 10m either side of a change in alignment		2.5m for 20m either side of a change in alignment			

\+ The longer distance is the desirable distance, the shorter distance is the minimum distance allowed. The desirable distances must be used wherever possible. The minimum distances may only be used where there are road environment constraints.

Where only one sign is erected in advance of a taper the distance from the sign to the taper is 2xC.

* A longitudinal safety zone is not required when a barrier completely protects the approach end of the worksite. Refer subsections H1.17 and H1.18.

** Taper length is based on a single lane shift of 3.5m.

*** Must be altered if required to meet the distance shown on the TLS supplementary plate.

Lane widths (based on permanent speed or TSL if applied)

Speed (km/h)		30	40	50	60	70	80	90	100/110
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above table are minimum values. Approach sign distances and spacings, the initial taper(s) and any longitudinal safety zone associated with that taper must be based on the permanent speed limit. The layout distances of the remainder of the worksite, including any subsequent tapers, may be based on the TSL, provided the TSL is applied prior to the first taper.

C2.8 Lane widths

The temporary lane width is a function of the speed limit applied at a worksite.

The temporary lane widths for TTM are:

Permanent/TSL (km/h)		30	40	50	60	70	80	90	100	110
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5	3.5

Temporary lane widths are measured as the available clear distance between delineation devices.

Temporary lane widths must not exceed 4m.

If the activity does not affect the traffic lane this table does not need to be applied.

C2.8.1 Heavy vehicles

Worksites with a high proportion of heavy vehicles may require lane widths greater than the values given in the table above.

C3 Signs and worksite zones

C3.1 Introduction

C3.1.1 General

All TTM signs must meet the design requirements in section B1 Signs.

C3.2 Worksite zones

C3.2.1 Three worksite zones

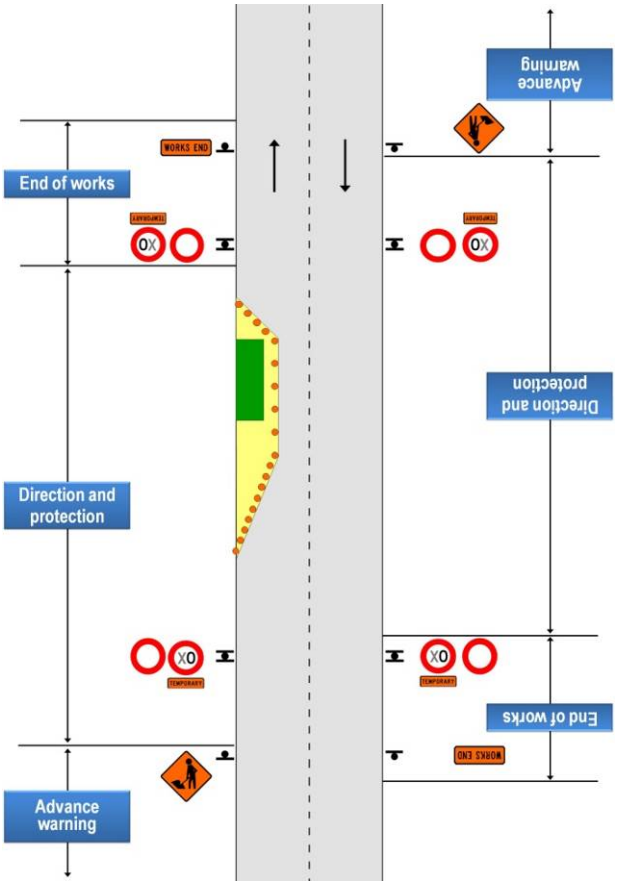
A standard worksite is divided into three distinct, but interrelated, zones. These are:

- advance warning
- direction and protection, and
- end of works.

C3.2.2 Signs in worksite zones

TTM signs provide the road user with information on:

Advance warning	The presence of the worksite and the type of hazard.
Direction and protection	The route they are required to travel to negotiate the worksite safely. The areas of the road which may and may not be used. The start and end of the TSL for the worksite.
End of works	The end of the hazard created by the worksite and the return of normal road operating conditions.



C3.2.3 Advance warning zone - signs

Advance warning signs **alert road users** to a hazard or activity on, or near, the road.

The signs indicate the nature of the hazard or activity. The signs must be placed at specific distances from the hazard to give road users sufficient time to slow down or to change their direction of travel.

Advance warning signs are required where the normal operating conditions of the road are changed due to the nature of the activity. Advance warning signs are required for traffic travelling in all directions for all activities on the carriageway, shoulder and footpath.

When the activity and associated safety zones are outside the edgeline and not on a sealed shoulder or footpath, advance warning signs are required in only one direction. For example, a power line maintenance activity outside the edgeline on a grass shoulder only requires advance warning signs in the direction of travel affected.

For level LV, level 1 and level 2 roads a reduced level of advance warning is acceptable. Refer subsections C8.1.2 Shoulder closures and roadside activities.

Advance warning signs, and their requirement for use, are described in subsection B1.4.1 Advance warning.

C3.2.4 Direction and protection zone - signs

The direction and protection signs advise road users that the normal traffic lanes are not available and that they are required to change lanes, or that manual traffic controllers (MTC) or portable traffic signals are operating.

A limited number of regulatory signs may also be used.

Direction and protection signs, and their requirement for use, are described in subsection B1.4.2 Direction and protection.

C3.2.5 End of works zone - signs

End of works signs advise road users that the worksite or temporary hazard has been passed. The signs further advise that the condition of the road and the speed limit are returned to normal operating conditions.

The end of works signs are placed as follows:

If a TSL has been in place the speed limit must be reinstated to the permanent speed limit.

Road users are also provided with any advisory information connected with the worksite.

If the advance warning is provided by a T1 type road works sign then the end of works sign is the TG2 WORKS END sign.

On two-way two-lane roads the TG2 WORKS END sign is erected on its own stand opposite the first advance warning sign for a road works worksite.

The TG2 WORKS END sign must be displayed on the left-hand side.

Where the first advance warning sign is installed on both sides of the road, the TG2 WORKS END sign may be placed on the back of each advance warning sign.

A TG31 THANK YOU sign may be erected immediately below the TG2 sign, when the additional message is considered desirable. The Land Transport Rule: Traffic Control Devices 2004 (TCD rule), part 3, schedule 1, number W7-7.1 allows a combined TG2/TG31 plate. This may be used in the dimensions given in the rule.

If the advance warning is anything other than a T1A/B then the end of works sign is the TG31 THANK YOU sign.

The TG31 THANK YOU sign is erected on its own stand opposite the first advance warning sign for the worksite.

If advance warning signs are located on both sides of the road a TG31 THANK YOU sign may be attached to the back of each sign.

End of works signs, and their use, is described in subsection B1.4.3 End of works.

C3.3 Position of signs

C3.3.1 Location of temporary warning and TSL signs

On **all roads** temporary warning and regulatory signs are required to be located on the left-hand side of the road for the direction of travel. On level 1, level 2 and level 3 multi-lane roads additional temporary warning and speed limit signs must be located on the right-hand side of the road. At all changes of speed, TSL signs **must** be gated (a TSL sign on each side of the road), except for roads with an annual average daily traffic (AADT) of less than 500vpd.

On **two-way two-lane roads** repeater TSLs are required at no more than 400m intervals on the left-hand side for each direction of travel.

On **multi-lane roads**, all repeater signs must be gated to ensure that vehicles in the offside lane can see a TSL sign.

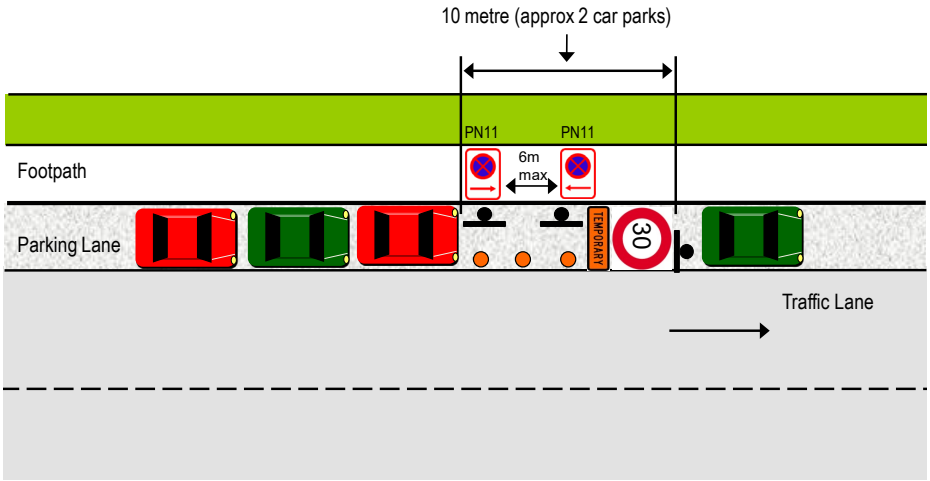
C3.3.2 Positioning of signs

Signs must be located in a manner such that the safety of road users, including pedestrians and cyclists, is not affected.

Signs must not be placed in a marked cycle lane or on a footpath unless it is safe to have them there (eg minimum width is maintained). A delineation device, such as a cone, must be placed next to a sign erected in a cycle lane or on a footpath so that the extent of encroachment of the sign base into the cycle lane or footpath is clearly delineated.

All traffic signs must be positioned to ensure they are:

- upright
- 0.5m clear of the travelled path, wherever possible, on **level LV** and **level 1** roads
- 1.25m clear of the travelled path wherever possible, on **level 2** and **level 3** roads
- not obscured by parked vehicles, trees or other obstructions. In a less than 65km/h area, a 10m clear space must be provided as shown in the diagram below



- not encroaching on a marked cycle lane unless safe to do so
- not encroaching on a footpath unless:
  - adequate footpath width remains as per section C13 Pedestrians and cyclists
  - any protruding edges of the sign and base are delineated by cones to aid sight-impaired pedestrians
- not a hazard to road workers or road users, including cyclists and pedestrians
- not obscuring view of other signs, devices or other traffic on the road
- not directing traffic into incorrect or dangerous situations
- kept clean in accordance with maintenance standards especially in dusty or muddy conditions
- removed or covered when the activity ceases, and
- sign bases must not be left in place, without signs attached, in a manner that will be a hazard to any road user, including pedestrians and cyclists.

All signs must be mounted on stands except as below:

- in the case of road closures, signs may be mounted on a barricade/barrier
- In the case of level LV/LR activities, advance warning signs may be mounted on a stationary vehicle with an amber flashing beacon if clear sight distance is available.

At least one delineation device must be placed at the base of each sign stand on the side closest to traffic:

- on levels 2 and 3 at all times
- on levels LV and 1 at night
- on any other roads when required by the RCA/TMC
- unless more are specified on the TMP.

Where worksite restrictions such as local topography, median barriers, or bridges preclude the placing of the required signs either:

- the signs must be moved away from the site restriction and additional signs provided, or
- smaller signs may be used, subject to the approval of the RCA and engineer.

Subject to application via a TMP and approval by the RCA, median barrier brackets may be used to support TTM signs.
Note: When a sign on a barrier is removed, the bracket must also be removed.

The standard spacing for permanently fixed no stopping (PN11) signs is 100 metres. This spacing can be extended to 500 metres on roads with a speed limit greater than 70km/h. RCAs may require a sign spacing less than 100 metres for a temporary situation.

There is no minimum legal mounting height for no stopping (PN11) signs. They must be installed so that they are visible to the approaching road users, legible and allow adequate time for the intended response from the road user.

Details of any variations to the standard placement of signs must be specified by the site traffic management supervisor (STMS) on the TMP where applicable, or associated on-site record and hazard identification form.

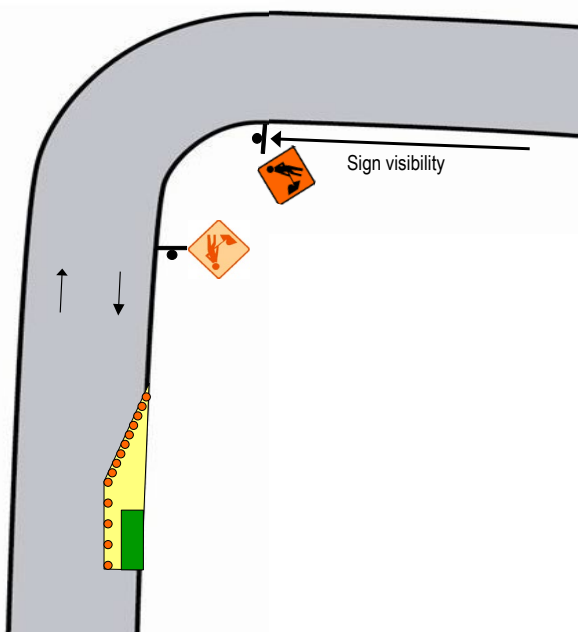
Minor variations to the normal placement of signs must be noted by the STMS/TC on the on-site record.

C3.3.3 Sign visibility

If a sign placement is required at a position where it does not meet the NZ Transport Agency's *Traffic control devices manual* part 8 Code of practice for temporary traffic management (CoPTTM) sign visibility distance (layout dimension A), the sign must be **advanced up to one sign spacing** (layout dimension C).

If it still does not meet the sign visibility distance requirements, a sign must be erected in the original position and an additional sign placed one sign spacing in advance of the original position.

The aim is to give road users sufficient warning when approaching the worksite.



C3.4 Sign height

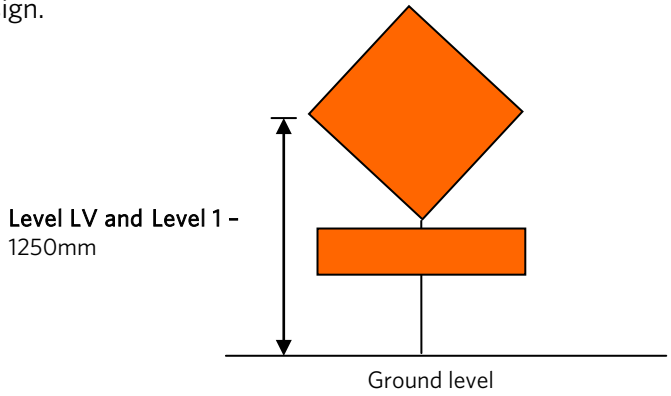
C3.4.1 Minimum height of signs

Signs must be installed to the minimum heights given in the following table.

Road level	Minimum height from ground level to lowest edge of sign	Minimum height from ground level to middle of main sign
Level LV and level 1	N/A	1250mm
Level 2 and level 3	1000mm	N/A

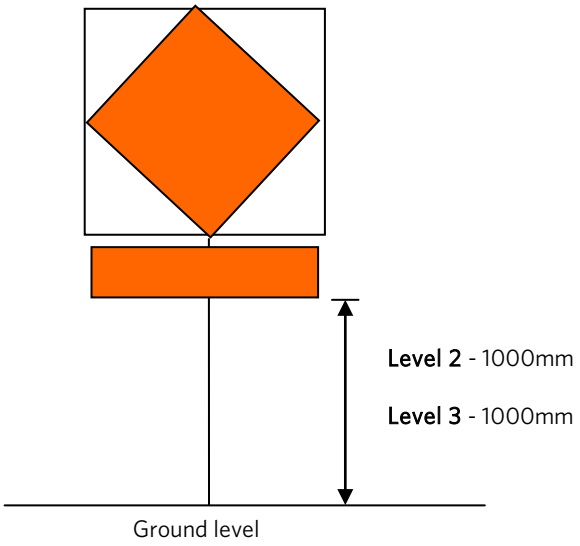
C3.4.2 Level LV and level 1

1250mm minimum height from ground level to **middle** of diamond-shaped sign.



C3.4.3 Level 2 and level 3

1000mm minimum height from ground level to **lowest edge** of sign.



C3.5 Quality of signs, stands and/or supports

Refer to section C19 Maintenance standards for details of the quality of signs, stands and/or supports.

C3.6 Covering permanent signs

C3.6.1 Covering existing signs

Road users could be confused if the information on existing signs is not applicable at a worksite.

The RCA may approve the altering, covering or replacing signs to suit the worksite circumstances. It is essential that any signs at the worksite visible to road users accurately represent the prevailing conditions at all times.

All permanent signs (including no stopping signs) that no longer apply during the activity phase must be covered, removed, or temporarily modified. However, for short-term operations, overhead gantry signs do not need to be covered unless required by the RCA.

Temporary signs must not be allowed to obscure existing permanent signs that still apply.

Permanent signs covered, removed or temporarily modified during the period of activity must be restored during uplift of the closure, unless the activity involves permanent removal or replacement of the permanent signs.

The material used to cover any permanent signs, which no longer apply during the activity, must prevent all road users viewing the sign and also reflection from vehicle's headlights at night.

Non-adhesive material must be used to cover permanent signs that are not applicable for the duration of the work. Adhesive material will damage the reflective material on the sign reducing its night time visibility.

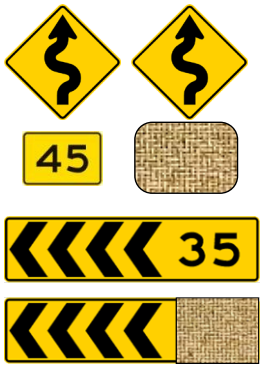
Note: Some materials that are non-breathable and/or plastic may cause heat damage or moisture damage to the reflective surface.

The material used to cover the signs must be:

- durable
- opaque
- breathable/non-condensation forming, and
- securely fastened.

Spray-on masking materials **must not** be used to cover up permanent signs because the removal process may damage the sign surface.

C3.6.2 Covering curve and chevron speed advisory signs



Curve and chevron speed advisory signs must only be covered where the advisory speed value is higher than the TSL imposed.

Ensure only the speed advisory is covered and that the curve advisory or chevron remains visible to road users.

An additional TSL sign RS1 and TG1 may be placed adjacent to any curve advisory sign that has been covered because the supplementary speed plate has higher speed value than that of the TSL at the worksite.

C4 Temporary speed limit (TSL)

C4.1 Introduction

C4.1.1 Purpose

The installation of a TSL helps to control traffic at temporary hazards and for special events.

C4.1.2 Land Transport Rule: Setting of Speed Limits 2017

The TSL requirements in CoPTTM are in accordance with the Land Transport Rule: Setting of Speed Limits 2017 and subsequent amendments.

C4.1.3 Authorising TSLs

The RCA, or a person with delegated authority, must authorise the setting of a TSL for a worksite.

The TSL is authorised when the TMP is approved. The TMP includes details of the TSL and the approximate length (eg TSL 30km/h for 70m).

Any change to the authorised TSL needs to be approved by the RCA or a person with delegated authority.

C4.1.4 General

The speed limit should not exceed the maximum safe travel speed for the conditions.

In determining a TSL, consideration should be given to:

- the danger to all road users
- the degree of pedestrian and vehicle activity
- the type and extent of the activity in progress
- the danger to road workers, and
- the characteristics of the road (eg the driving conditions of the site).

A TSL must:

- be authorised by the RCA or person with delegated authority
- be 80km/h or less and at least 10km/h below the permanent speed limit
- be reduced in multiples of 10km/h
- be appropriate to the condition of the road, and
- not be lower than 20km/h.

C4.2 Requirements

C4.2.1 When TSLs may be needed

TSLs must be appropriate for the type of worksite activity and the condition of the road surface.

TSLs may be needed where one or more of the following conditions exist:

- there are loose materials or stones on a sealed road which has been repaired or reconstructed
- the surface of the road is being sealed or resealed
- personnel or equipment, and their associated safety zones encroach on the existing lanes
- visibility is restricted while travelling through the worksite due to dust, work equipment, construction materials or abnormal weather conditions
- the alignment, width or road surface is reduced to a standard lower than adjacent sections of road
- the safety of road workers and road users could be affected
- emergencies, eg flooding, slips, crashes
- single-lane traffic operation of a two-lane two-way road
- a reduced number of lanes is available
- there is reduced lane width
- there are good technical reasons (eg the road might otherwise collapse)
- the surface has been damaged due to slip or subsidence
- non-useable shoulders that are completely out of character with the approaches and with the normal condition of the road
- there are road features such as extremely poor alignment or detours.

In these situations, the nature of the roadway deficiency (or the traffic control devices) should be evident to motorists so that they recognise the need to adjust their speed.

Note:

- This list is a guide only and does not include all possible activities.
- TSLs are not mandatory for warning signs for ice grit.

C4.2.2 TSL decision matrix worksheet

The TSL decision matrix worksheet can be used to determine if a TSL is required and, if so the, appropriate TSL. This can be attached to the TMP to justify the TSL selected. Refer to section E, appendix B Temporary speed limit (TSL) decision matrix worksheet.

C4.2.2.1 Procedure for using the TSL decision matrix worksheet

Start point

The potential need for a TSL is identified.

Process

For each of the four categories on the worksheet (1. Minimum lane width, 2. Pavement/surface condition, 3. Visibility and alignment and 4. Worksite clutter):

- rate the worksite and decide if it is excellent, average, below average or poor
- decide whether the worksite is in the upper or lower range of the rating you have selected
- record the possible TSL for that category in the circle provided on the right.

Transfer the lowest possible TSL to the bottom circle.

- The lowest TSL should be applied if it is 80km/h or less and at least 10km/h below the permanent speed limit

Use several worksheets if more than one TSL is required within a worksite.

Once the need for a TSL has been determined the following principles are to be used:

- The speed limit should not be so low that road users disregard it.
- The maximum safe speed is lowered by frequent hazards and potential worksite conflicts.
- Speed limits should encourage a uniform speed but should be low enough to allow road users time to react to unusual events or to directions from MTCs.
- Inappropriate use of TSLs leads to a reduction in compliance by road users. Their effectiveness is reduced when used in other situations where they could have a positive benefit to road safety.
- A speed limit set too low will result in higher speeds and a greater mix of speeds, both of which increase the safety risks to road users and personnel.

Refer to section C10 Positive traffic management for details of the positive traffic management to be used in conjunction with a TSL.

C4.2.3 Setting realistic TSLs

It is important that any TSL reflects the condition of the worksite at any given time. Therefore TSLs need to be realistic for the conditions.

If the TSL is not realistic, drivers will often ignore it. This can lead to reduced compliance with all TSLs.

In addition, the police may have difficulty justifying the enforcement of TSLs that are obviously not appropriate for the conditions.

To improve driver compliance, varying the TSL may be appropriate in the following circumstances:

- Within a long worksite (over 400m)

  For example, where a long worksite is established with say a 70km/h TSL, but activity is concentrated within a specific area and a lower TSL (say 30km/h) can be used for that stretch of road where the activity is concentrated

- Over the activity period

  Different stages of works may require different safety levels and therefore higher or lower TSLs may be appropriate for each stage

- Over a 24-hour period

  A higher TSL might be more appropriate within an established worksite during a period when workers are not at the worksite (eg at night).

C4.2.4 Avoid progressive speed limits (buffer zones)

Progressive speed limits (sometimes called 'buffer speed limits') in advance of a closure, eg 70km/h followed by 50km/h followed by 30km/h, that are not justified in terms of the surrounding activity have proven to be ineffective in reducing traffic speeds.

Progressive speed limits should not be used and, where necessary, repeater TSL signs should be used to reinforce the temporary speed message.

C4.3 Location of TSLs

C4.3.1 Sign location

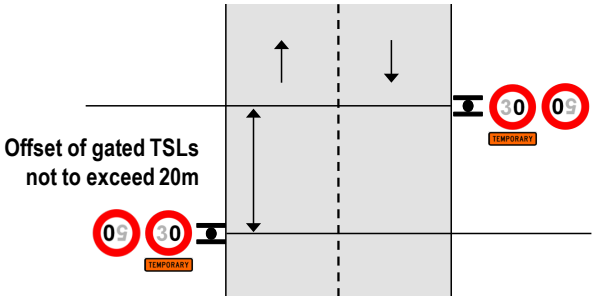
At every change in speed the speed signs must be gated (signs placed on both sides of the carriageway facing towards oncoming traffic).

Gated speed signs are not required on roads with an AADT of less than 500 vehicles.

Where the TSL begins, place the relevant RS1 and TG1 signs.

Where the TSL finishes, place the relevant RS1, RS2 or RS3 permanent speed signs.

Gated TSL signs must not be offset by more than 20m along the road.



Any side road entering an area subject to a TSL must also have a TSL and the relevant permanent speed limit installed to derestrict the TSL.

Signs for the return to the relevant permanent speed limit - RS1, RS2 or RS3:

- **On two-way two-lane roads** must be placed on each side of the road at the same point as the TSL for the opposite direction.
- **On one-way roads** may be placed with the Works End sign as a supplementary plate. The signs are to be placed a distance from the hazard as specified by the sign spacing distance for that level of road.

On **level 1** roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper or hazard area where no taper is installed (with cones at same spacing as along working space) if the speed is reduced by more than 30km/h.

On **levels 2 and 3** roads cones are required from the TSL sign to the start of the taper or hazard area where no taper is installed (with cones at same spacing as along working space). Where the edgeline is well defined (ie by a clean kerb and channel) this line of cones is not required.

Note: The police can be asked to legally enforce a TSL if road users are not obeying the restriction and are creating an unnecessary hazard for road workers, the road surface or other road users. The TSL can only be enforced if the worksite is set out to the requirements of the approved TMP.

C4.3.2 Road works on side road close to intersection

When road works on a side road are close to an intersection the TSL is often placed on the main road. This can cause unnecessary disruption for traffic travelling on the main road.

Where there is a **90 degree** turn that will slow turning vehicles to approximately **20km/h** the following may be used.

Location of the TSL on the intersection of a side road with permanent speed limit...	
50km/h or less	Provided a TSL can be placed 15m from the intersection and 15m from the worksite taper (total of 30m), a TSL would not be required on the main road.
60km/h	Provided a TSL can be placed 15m from the intersection and 25m from the worksite taper (total of 40m), a TSL would not be required on the main road.
70km/h or more	Provided a TSL can be placed 15m from the intersection and 40m from the worksite taper (total of 55m), a TSL would not be required on the main road.

C4.4 General requirements for TSLs

C4.4.1 Repeater signs

On long worksites TSL signs must be repeated at intervals no greater than 400m, as a reminder to road users of the maximum speed they may travel past, or through, the worksite.

On **two-way two-lane** roads these repeater signs need to be installed at 400m maximum intervals on the left-hand side of road users travelling through the worksite.

On **multi-lane roads**, all repeater signs must be gated to ensure that vehicles in the right-hand or centre lanes can see a TSL sign.

These signs must always be erected on the left-hand side of the road before additional signs are erected on the right-hand side of the road.

C4.4.2 Duration

TSLs must be removed as soon as the circumstances under which the speed restriction was imposed no longer exist.

TSLs cannot be installed for a continuous use of longer than 12 months.

Should a TSL be required for more than 12 months, the RCA must review the original decision for use of the TSL, and if it is still required, a new TMP must be approved. Suggested processes to install a bring-up can be found in section I-18: Guidance on TMP Monitoring Processes for Temporary Speed Limits.

C4.4.3 Long-term performance deficiencies

A TSL may be used where a road has a long-term deficiency not caused by road works (eg slippery surface).

In these circumstances it may be appropriate to also use a permanent warning sign with a yellow background (eg WR3).

C4.4.4 Covering existing speed limits

When placing a TSL, any existing speed signs within the TSL area that show a speed other than the TSL must be covered (except for an overhead gantry).

For short-term worksites involving a gantry, repeat the TSL after the gantry (as it is difficult to cover the speed sign).

Long-term worksites are treated on a case by case basis. The STMS must ensure their TMP covers any requirement to obscure larger permanent signs.

C4.4.5 Recording details of the placement of TSL

The placement of the TSL signs sets the speed limit. To be legally enforceable the location and time of placement of the TSL must be recorded.

Details of location of the TSL must be recorded in either the:

- on-site record, or
- company documentation (if it contains the same TSL information as the on-site record).

The details about location and placement of the TSL that must be recorded are:

- date and time TSL installed
- placement (route positions, house numbers or relative to a fixed point such as culvert or bridge marker)
- length of road (m) affected by the TSL
- date and time TSL removed.

The accuracy of details is to be within ±20m.

The details of the placement of the TSL must be retained for at least 12 months, or longer if the worksite is under investigation.

C4.4.6 Excessive or inappropriate use of TSLs

If during an audit of a worksite it is determined that there is excessive or inappropriate use of TSLs contravening section C4 Temporary speed limit (TSL) (eg leaving in place a 30km/h TSL once works have been removed or finished) **a non-conformance will be issued, regardless of the overall worksite condition rating**.

C5 Delineation devices

C5.1 Introduction

C5.1.1 General

All delineation devices must meet the requirements in section B2 Delineation devices.

For short-term worksites the form of devices should superimpose themselves on the permanent system to the extent that they dominate it by size, colour and reflectivity.

Permanent road markings should not be altered for short-term worksites.

For long-term worksites on **level 2** and **level 3** roads the permanent road markings may be modified to reflect the revised situation.

Cones and other delineation devices are used for a variety of applications within a worksite. These devices are usually placed in the direction and protection zone of a worksite.

Different types of devices should not be mixed or used over distances of less than 100m.

C5.2 Use and placement of delineation devices

C5.2.1 Use

Cones and tubular delineators are mainly used to mark tapers and to form temporary traffic lanes.

Barrels are used to convey bulk.

Delineators must not be installed in stacks of 2 or more for the following reasons:

- the maximum permitted weight (7kg) will be exceeded
- the stack of cones will be less flexible (which reduces frangibility).

Where barrels, cones or other delineation devices are used to separate road users from non-frangible objects, such as concrete barriers or parked plant, an RD6L RD6R sign must be placed alongside the first device in a row of devices to indicate the appropriate side on which road users are to pass.

The use of steel drums is prohibited.

C5.2.2 Placement

Delineation devices must be placed in accordance with the appropriate layout distance tables for levels LV, 1, 2 and 3 in C2 Worksite layout.

All cone spacings are measured from cone centre to centre, except for lane width where it is measured from cone edge to edge.

These devices must be installed in straight lines and/or smooth curves to help road users travel past the hazard.

On all **level 2 and 3 layouts** cones must be installed along the edgeline, from the first RS1 TSL sign to the start of the taper or working space where no taper is installed.

Where the edgeline is well defined (eg by a clean kerb and channel) this line of cones is not required.

C5.2.3 Edge delineation

Edge marker posts **do not** meet the requirements for temporary delineation and they must not be used for TTM.

Edge delineation with existing marker posts and/or raised pavement markers (RPMs) must be maintained where the edge of the carriageway remains unaltered during the roadwork activity.

Where traffic is required to deviate from their normal path of travel or the nature of the activity requires shoulder reconstruction and/or the removal of the edge marker posts, temporary delineation must be installed.

Where the edgeline is well defined (eg by a kerb and channel or a barrier) this line of cones is not required.

Where a hazard is created, side delineation must be used to guide the road user past the hazard.

Permanent edge marker posts and/or RPMs must be reinstated before the removal of the temporary delineation devices.

Edge marker posts that conflict with temporary delineation may either be covered or removed.

C5.2.4 Cone bars

Cone bars are light weight, striped orange and black, or yellow and black plastic poles with rings at each end to connect cones together.

They may be used to provide a channel for pedestrians on sites where workers are in attendance. These may be used for guidance but must not be used to replace a safety fence.

C5.3 Quality of delineation devices

Refer to section C19 Maintenance standards for details of the quality of delineation devices.

C6 Safety zones

C6.1 Introduction

C6.1.1 General

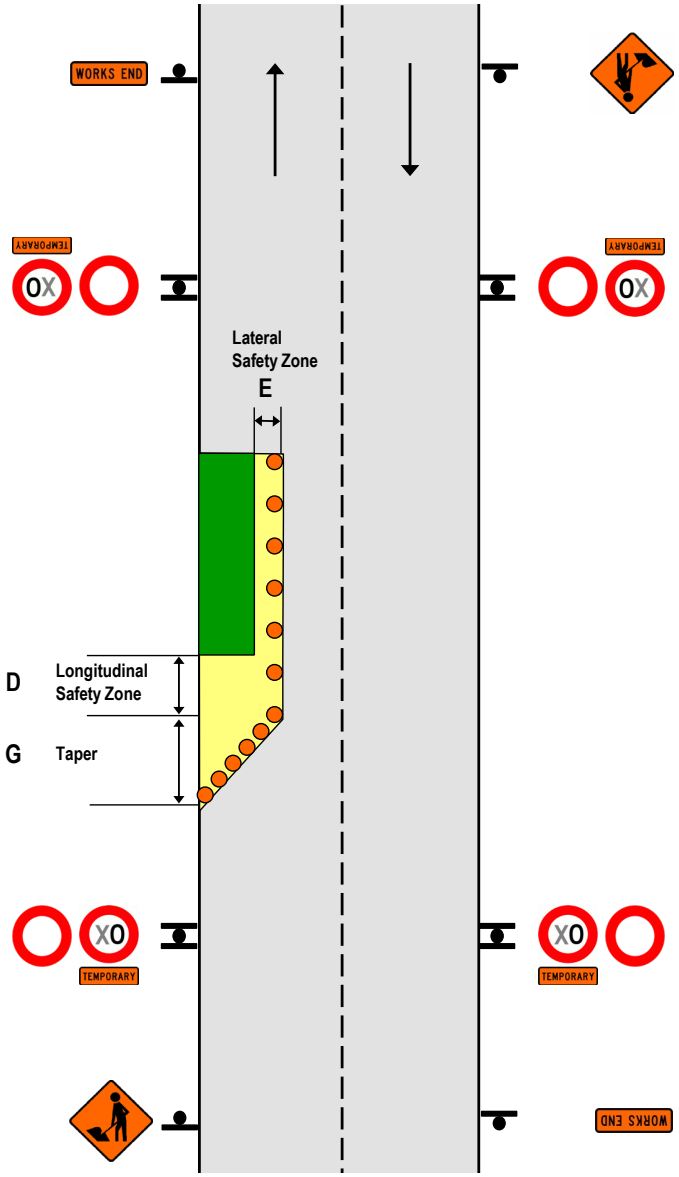
Safety zones provide additional protection for road workers and road users.

The safety zones are three dimensional extending from the front, the sides and above the working space.

The safety zones include the coned tapers, even though these areas are **not** included in the longitudinal safety zone dimension.

The safety zones (including coned tapers) must be clear zones. This means no truck-mounted attenuators (TMA), arrow boards, equipment storage, stockpiling, working or walking in the safety zones.

Signs and delineation devices are the only pieces of equipment allowed in the safety zones.



C6.2 Safety zone requirements

C6.2.1 Working space

An adequate working space must be provided within the closure to allow for the movement of workers, equipment, materials and vehicles, including sufficient waiting and storage space for the above items.

The working space may vary during the period of the activity and need not be a constant width.

C6.2.2 Longitudinal (lead in) safety zones

A longitudinal safety zone is the initial portion of a closed lane in advance of the working space.

Longitudinal safety zones are measured from the end of the taper leading into the working space to the start of the hazard.

Minimum lengths for longitudinal safety zones are given in the layout distance tables for levels LV, 1, 2 and 3 in section C2 Worksite layout.

Where longitudinal safety zones cannot be achieved on **level 2 and level 3** roads a TMA must be installed to provide safety for road users, road workers and equipment. This must be specified on the TMP and approved by the RCA.

C6.2.3 Lateral safety zones

Lateral safety zone is the minimum distance from the edge of the live lane to the edge of the working space.

There must be a safety zone between the working space and the edge of the live lane, except for the following situations:

- on LV roads where due to environment constraints they may be reduced or eliminated
- where there is a cycle lane next to the live lane.

C6.2.4 Overhead safety zones

At all worksites where activity is being carried out above the road, all road users must be adequately protected from falling objects by nets, platforms or other devices, or alternatively the respective part of the carriageway must be closed.

Where the activity will impose a temporary height restriction, eg a safety platform or falsework underneath a bridge soffit, the RCA must approve it. Road users must also be warned of the temporary height restriction.

The maximum legal vehicle height permitted on roads is 4.3m but road users often illegally exceed this limit.

C6.2.5 Working in safety zones

Under the control of a STMS/traffic controller (TC), personnel may enter a safety zone to place, maintain, replace and remove TTM equipment.

The protocols applying to the spotter in an inspection must be applied. Refer subsection D7.6.3 Basic requirements.

C6.2.6 Dimensions of safety zones

The dimensions of safety zones are given in section C2 Worksite layout.

C7 Tapers

C7.1 Introduction

C7.1.1 General

Tapers are used to move traffic from its normal travel path to a temporary travel path around, or through, a working space.

Tapers are created by placing a number of delineation devices, usually cones or other suitable delineation devices, in a straight line or smooth curve across the width of the lane that is no longer available for use.

C7.1.2 Taper devices

Devices used in tapers must meet the specifications described in section B2 Delineation devices.

C7.2 Types of taper

C7.2.1 Shifting tapers

Shifting taper is used where traffic is simply required to shift laterally without conflict with other traffic.

C7.2.2 Merging tapers

Merging taper is used on multi-lane roads where one lane of traffic must merge into another lane.

Merging must only be carried out one lane at a time. Where more than one merge is required, the subsequent merge(s) may use a taper rate greater than the initial taper, provided a TSL has been applied prior to the initial taper.

C7.2.3 Multiple tapers

Closures of more than one lane require multiple tapers. Lane closures must be effected one lane at a time. The distances between multiple tapers are given in the layout distance tables for levels 1, 2 and 3 in section C2 Worksite layout.

C7.2.4 Chicanes

A chicane involves merging multiple lanes of traffic into a single lane prior to a shift laterally around the working space.

Chicanes are only used on level 3 roads and passing lanes.

The benefits of chicanes are:

- better controlled merging of the various lanes particularly the higher speed right-hand lane
- worksite layout approaches are uniform
- traffic is calmed by lane merging and shifting well in advance of the working space
- optimum capacity and improved safety through the worksite.

When merging traffic on a passing lane the use of chicanes is essential unless the lane is completely closed.

Chicanes are used where there is a sufficient length of road free of intersections.

Chicanes are most frequently used when activity is being undertaken in the left lane but they may also be used in other situations.

C7.3 Taper visibility and length

C7.3.1 Taper visibility

Tapers should be located so that their full length is visible to approaching traffic.

Where this is not possible at least two thirds of the taper must be visible.

If this cannot be achieved the taper length must be extended so that the two thirds requirement can be achieved.

C7.3.2 Taper length

The length of taper depends on the speed limit and the lateral shift.

Tapers are specified as a taper length for all TTM levels and are given in the layout distance tables for levels LV, 1, 2 and 3 in section C2 Worksite layout.

Taper lengths shown on these tables are based on a lateral shift of 3.5m.

For level 2 and 3 roads the initial taper(s) and any longitudinal safety zone associated with that taper, are based on the permanent speed limit. After this, the layout distances of the worksite (including any subsequent tapers) are based on the TSL.

On **levels LV, 1 and 2**, two-lane two-way roads that have been reduced to one lane and are being used alternately by traffic in each direction, the taper must be reduced to 30m provided a TSL of 30km/h is imposed and cones are spaced at 2.5m centres.

MTCs, portable traffic signals, or priority give way signs (less than 1000vpd) are always used to control this situation.

C7.3.3 Lengths of tapers for a lateral shift of less than 3.5m

Taper lengths are based on a lateral shift of 3.5m, which generally equates to the width of a live lane.

On level 1, level 2 and level 3 roads with lateral shifts of less than 3.5m the length of the taper may be reduced. For low volume roads, no allowance can be given as the taper lengths have already been reduced.

The reduction in the length of the taper is calculated as follows:

(the lateral shift ÷ 3.5) x the taper length for a 3.5m shift.

Example: **level 1** road – 100km/h:

- lane width = 3.5m
- taper length for 3.5m shift = 100m
- lateral shift required = 2.7m.

  Revised taper length = (2.7m ÷ 3.5) x 100 = 77m

The following table shows conservative taper lengths for given lane shift widths.

C7.3.3.1 Shortened taper lengths for lane shifts/closures of less than 3.5m

Level 1 taper lengths in metres and (cone numbers)						
Closure or lane shift width	50km/h	60km/h	70km/h	80km/h	90km/h	100km/h
Cone spacing in taper	2.5	2.5	5	5	5	5
> 3.0	Apply the full taper length					
2.0 – 3.0	**25** (11)	**35** (15)	**50** (11)	**60** (13)	**70** (15)	**85** (17)
1.0 – 2.0	**15** (7)	**25** (11)	**30** (7)	**35** (8)	**40** (9)	**45** (10)
< 1.0	**5** (3)	**10** (5)	**15** (4)	**25** (6)	**30** (7)	**35** (8)

Numbers in brackets are the cone numbers required.

C7.3.4 Taper length where shoulder is less than 2.5m

On all levels of road 10m long shoulder tapers with at least 5 cones at no greater than 2.5m centres are permitted where shoulder width is less than 2.5m and works do not affect live lane.

C7.3.5 Taper length where there are road environment constraints

On level LV and level 1 roads Where there are road environment constraints (including intersections and commercial accesses) a 10m taper may be used for speeds 50km/h and under.

This does not apply on state highways or where portable traffic signals, MTC (stop/go) or priority give way are used.

If a 10m taper is used, delineators in the taper must be placed at 1m centres.

Note: Where MTC (stop/go), portable traffic signals or priority give way are used, tapers must be reduced to 30m.

C8 Shoulder and lane closures

C8.1 Shoulder and roadside activities

C8.1.1 General

Shoulder closure: The activity is outside the edgeline (or an inferred edgeline) on the trafficable area of the carriageway.

Roadside activity: The activity is outside the carriageway.

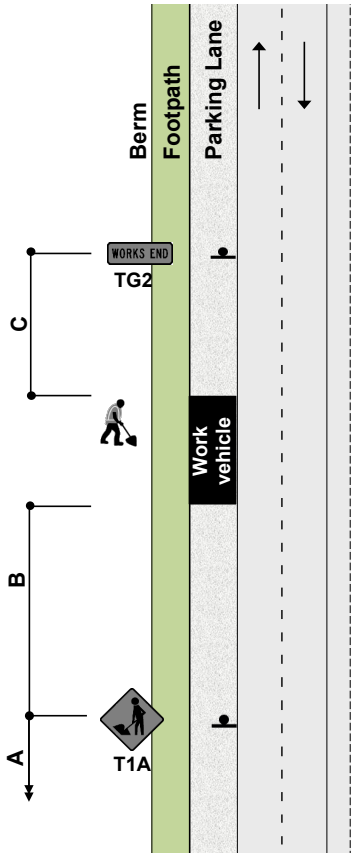
C8.1.2 Shoulder closures and roadside activities

If the activity is restricted to a sealed or unsealed shoulder, a T138 SHOULDER CLOSED supplementary plate attached to the T1A/T1B road works sign is used.

C8.1.2.1 Roadside activities on level LV, level 1 and 2 roads with speed limits of less than 65km/h

On level LV, level 1 and level 2 roads with speed limits of less than 65km/h, the activity may be carried out as follows:

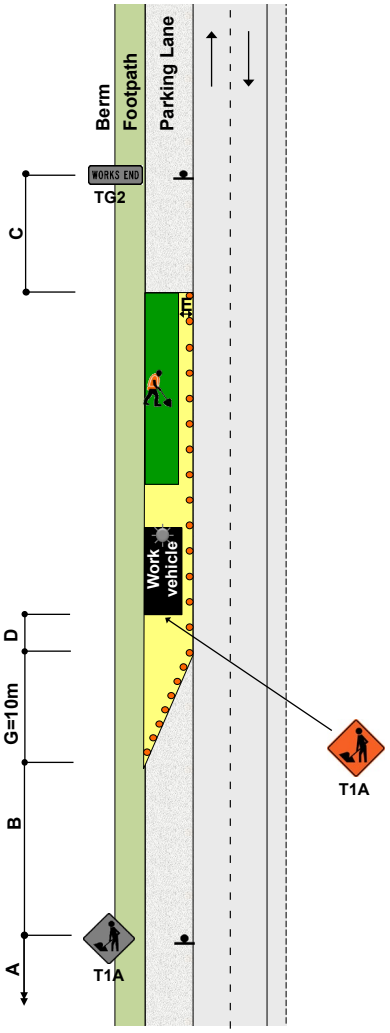
- Advance warning T1A/B and WORKS END TG2 are optional if:
  - the work vehicle (light truck or smaller) is parked in a legal parallel car park, and
  - vehicle is only accessed from the off traffic side
- Large plant and machinery must not be used in this situation; a more substantial closure is required
- Traffic management must be provided where pedestrians or cyclists are affected.



C8.1.2.2 Shoulder closures on level LV and level 1 roads with speed limits of less than 65km/h

Where activity is carried out in the legal parking lane, the following minimum standard of TTM must be provided:

- a 10m taper
- a longitudinal safety zone
- cones alongside the work vehicle and the working space
- a 1m lateral safety zone along the working space
- a T1A (or other appropriate advance warning sign) mounted on the back of the work vehicle
- the work vehicle is no larger than a light truck. Large plant and machinery must not be used in this situation; a more substantial closure is required.



T1A road works and TG2 WORKS END signs are optional.

These layouts must only be used during daylight hours.

C8.2 Lane closures/shifts

C8.2.1 General

Lane closures are used to protect the working space. Traffic is directed into another lane and guided past the working space.

C8.2.2 Lane closures

A lane should be closed to traffic whenever an activity is carried out:

- such that passing traffic is required to cross a lane line, or cross a centreline and it is not possible to retain the existing number of lanes
- where the air space up to 6m over the area is occupied by the activity or where there is a risk of objects falling from above
- in a location where the combination of signing and physical restriction created by the working space plus safety zone will not result in a satisfactory reduction in traffic speed to maintain a safe working space
- where there is insufficient room to maintain the same number of traffic lanes past the closure as is on the approach to the worksite while satisfying the minimum lane width requirements.

C8.2.3 Length

The length of shoulder and lane closures must be kept to a minimum while ensuring the longitudinal safety zones are still provided.

The length of the working space must not exceed 1km for shoulder and lane closures without specific approval from the RCA.

Shoulders and lane closures should be shortened as activity progresses along the road.

C8.2.4 Lane widths

Shoulder closures and lane closures must be such that the minimum lane widths given in the layout distance tables for level LV, 1, 2 and 3 roads in section C2 Worksite layout and in the lane width table in subsection C2.8 Lane widths are always provided.

These lane widths are the clear lane widths and are exclusive of delineation devices, safety zones and road markings.

Temporary lane widths must not exceed 4m.

Worksites with a high proportion of heavy vehicles may require lane widths greater than the minimum widths specified.

C8.2.5 Signs used for lane closure

Lanes must be closed with a TL2L/R, TL3L/TL33 or TL4 (L/R) lane closure sign, as detailed in subsection B1.4.2 Direction and protection to warn road users that normal lanes are not available.

Lane closure signs are only placed in advance of the start of the taper and are not required at the start of the taper.

C8.2.6 Level LV and level 1 lane closures

The lane closure sign **does not** require a supplementary sign displaying the distance to the lane closure.

The sign is placed in advance of the taper at the appropriate distance as per the layout distance tables for level LV and level 1 in section C2 Worksite layout.

C8.2.7 Level 2 lane closures

The lane closure sign **requires** a supplementary sign displaying the distance to the lane closure.

Depending on worksite requirements, the first lane closure sign is placed at least one sign spacing in advance of the start of the taper.

For multiple lane closures, the second lane closure must be signed at least one sign spacing in advance of the start of the second taper.

Multiples of 100m may be used instead of the sign spacing.

C8.2.8 Level 3 lane closures

There must be two lane closure signs. Each sign requires a supplementary sign displaying the distance to the lane closure.

The first lane closure sign must be placed 400m in advance of the start of the taper.

The second lane closure sign is placed at a distance of 200m from the start of the taper.

For multiple lane closures, the second lane closure must be signed 100m in advance of the start of the second taper.

C8.2.9 Centre lane closures

On roads with three or more lanes in one direction, centre lane closures are not permitted.

Exception

The only exception to this is a level 1 road which is not a state highway and has a permanent speed of 50km/h or less.

In this exception only, centre lane closures are permitted provided:

- traffic merges only in one direction
- there is a definite lane shift (either left or right), and
- tapers move traffic to the side of greatest capacity.

In all other cases, where activity must be conducted in a centre lane, the lane(s) on either the left **or** right must also be closed.

On **level 3** roads it is recommended that the right-hand lane be closed.

On **level 1** and **level 2** roads the other lane to be closed must be stipulated by the contractor in their TMP and reviewed by the RCA or delegated person who has the ultimate decision as to which lane is closed. Consideration should be given to intersections, including turning bays, when choosing the lane to be closed.

C8.2.10 Lane shifts

The signing of lane shifts follows a similar pattern to that for lane closures but implies simultaneous lateral shifts of lanes rather than merging of one lane with another.

Lane shifts are only signed when **two or more lanes in one direction must shift simultaneously** past a hazard.

Lane shifts are indicated with TL5L/R and TL6L/R signs.

Lane shift signs are not required for **two-lane two-way roads**. In these situations, an RD6L sign must be installed at the start of the row of delineation devices that separates the opposing traffic flows.

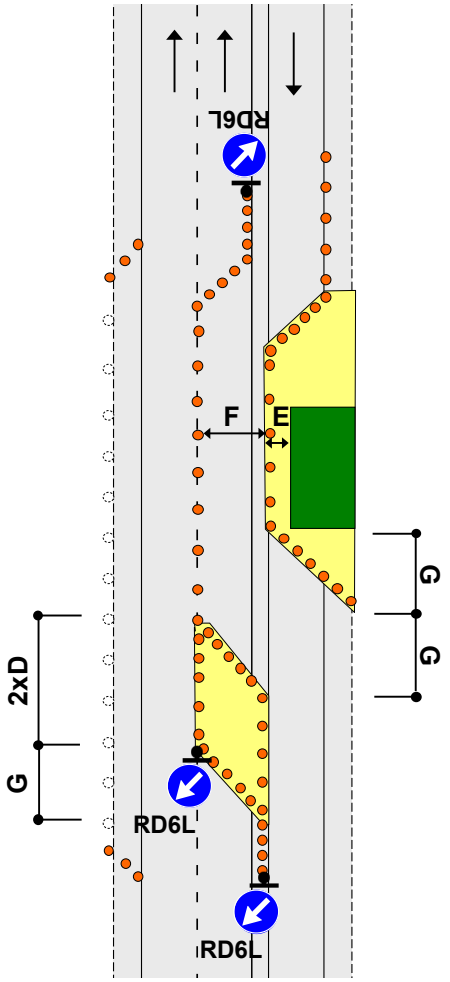
Delineation must be installed along a centreline for at least half a sign spacing prior to the start of a lane shift.

On **level 2** and **level 3** roads the lane shift signs require a supplementary sign displaying the distance to the lane shift. Where traffic has to shift twice it may not be appropriate to display the distance to the second shift, especially at short worksites.

C8.2.11 Contraflow on multi-lane road

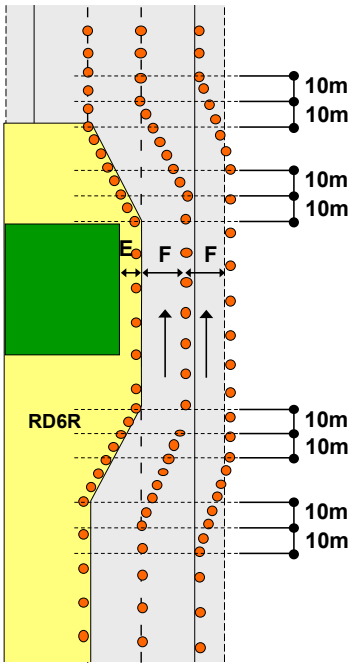
Where a contraflow is established on a multi-lane road, a longitudinal safety zone of 2xD is to be established to provide separation of vehicles.

See diagram below.

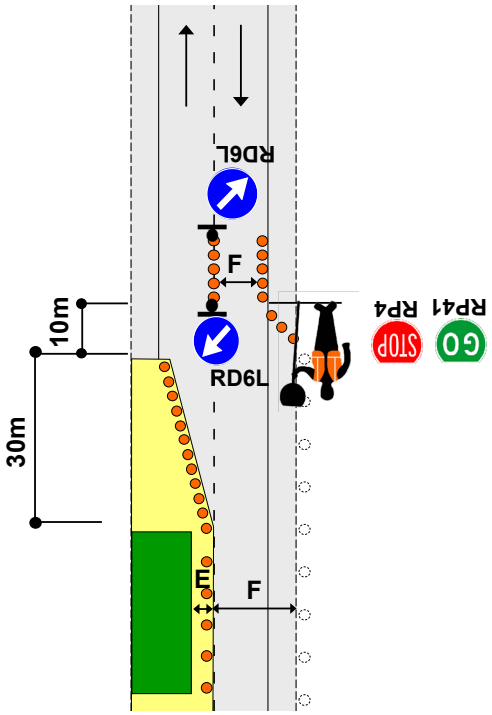


C8.2.12 Allowing heavy vehicles room to manoeuvre

Cones in a channel must be offset by a minimum of 10m where the direction changes to allow for heavy vehicles to manoeuvre without hitting the cones. See diagram below.



On all cone thresholds, 10m must be left between the closure and the cone threshold to allow for heavy vehicles to manoeuvre. See diagram below.



C8.2.13 Using the shoulder as a temporary lane

If the traffic demand expected is likely to exceed the capacity of the road during activities the shoulder may be used as a temporary lane.

A shoulder used as a temporary lane must:

- be safe for traffic to traverse at the given TSL
- be checked by the engineer to ascertain that the shoulder is strong enough to carry heavy vehicles
- be at least the minimum width for the speed through the worksite
- have adequate overhead clearance
- have adequate visibility along its length (vegetation may need to be trimmed and traffic signs moved, with the permission of the RCA)
- not have a surface level height difference of more than 25mm from the adjacent traffic lane for multiple lane situations where the shoulder is used as one of those lanes and
- be delineated on both sides unless travel paths are clear.

C8.2.14 Presence of intersecting roads and on and off ramps

C8.2.14.1 Work on level LV and level 1 roads – signs required on level 2 road

A level 1 sign can be used on a level 2 road when indicating that activity is on the level LV or level 1 road.

The signs may be placed on the level 2 road without the need for a mobile operation provided:

- the sign placement can be carried out safely from the footpath or berm
- no signs or cones are walked across the road unless a pedestrian crossing is used
- any vehicles involved are parked off the road, preferably around the corner on the level LV or level 1 roads.

A level 1 STMS (not a TC) must take charge of the worksite when the level 1 signs are placed on the level 2 road.

C8.2.14.2 Work on level 2 and 3 roads - signs required on level LV or level 1 roads

When the worksite is on a side road of a higher level (say level 2) than the road where the advance warning signs are required (say level 1) then the advance warning signs may be in accordance with the lower level.

C8.2.14.3 Level LV, 1, 2 and 3 roads

Where lanes are closed through intersections the delineation devices must allow for turning movements of the vehicles entering or leaving from side roads.

Lane merges must not take place through an intersection. Where an approach or exit lane is closed at an intersection, the corresponding approach or exit lane must also be closed.

Lane closure tapers should not start within 50m of an intersection on **level 2** roads. This distance is extended to 100m clear of any ramp or intersection on **level 3** roads measured from the point where the merge area finishes, or where the diverge area commences.

If the operation blocks a side road and a MTC cannot direct the traffic around the closure then a detour may be required, refer to section C9 Road closures and detours.

C8.2.15 Work at or near signalised intersections

Work that significantly alters approach speeds, traffic density, lane availability or approach alignment can significantly affect traffic signal operation.

Work that damages vehicle detection systems, hardware or cabling, or generates spurious demands, may also severely affect signal operation. Vehicle detector loops may extend up to 120m in advance of the painted limit line.

Therefore, the RCA must be consulted on the design strategies for temporary management of impacted traffic signals prior to the submission of the TMP for approval. The RCA must be advised at least five working days prior to commencement of any activity.

Where multiple signalised intersections occur close together the taper lengths may need to be altered or lane closures extended.

C8.2.16 Work at or near roundabouts

All or part of a roundabout should be closed whenever activity occurs on or adjacent to a roundabout if the required safety zones cannot be met.

On multiple lane roundabouts where the activity is confined to one lane, all entrances must be reduced to a single appropriate lane as for ordinary intersections and the respective lane on the roundabout closed except where required for exits.

Where entrances or exits are required to be closed the requirements of section C9 Road closures and detours must be followed.

C8.2.17 Passing lane/passing bay closure principles

Where activity occurs within a passing lane the following principles apply:

- If the start of the first taper is to be less than 600m from the start of the passing lane, the lane must be completely closed from its start point to the end of the working space.
- If the start of the first taper is more than 600m from the start of the passing lane, a taper should be installed in advance of the working space as for a normal lane closure.
- If the passing lane extends for 600m or more beyond the closure then the lane should be opened. If there is less than 600m of passing lane to travel, the lane should remain closed.

Note: The figure of 600m is based on the distance required to safely pass another vehicle at 100km/h whilst allowing for a safe sight distance ahead. This distance can be reduced in consultation with the RCA based on local conditions where traffic is travelling much slower, such as on steep gradients.

A passing lane must have signs placed on both sides of the road for both directions of travel.

C8.2.18 Working next to a flexible barrier

For short-term static activities the same approach will be adopted as for activity behind cones. This is to require a 1m lateral safety space between the wire-rope barrier and the working space.

For long-term activities allowance must be made for barrier deflection as detailed by the manufacturer.

C8.2.18.1 Examples of how to set up for activity next to flexible barrier

2 + 2 lane road

- Close lane each side (usually a mobile closure).

2 + 1 lane road

- Close one of two lanes. Complete activity from the closed lane with a coned 1m lateral safety zone.
- A TSL and positive traffic management must be applied to the single lane.

1 + 1 lane road

- Place a centreline type static closure with a TSL and positive traffic management.

C8.2.19 Separation of road users and construction plant and machinery during the reconstruction of an existing road surface

C8.2.19.1 Separation of road users from construction work

There are 2 methods of separating road users from construction work:

- delineation (or barriers)
- by ceasing work as the traffic proceeds through the working space.

C8.2.19.2 Use of MTC or portable traffic signals in a lane closure

For the purpose of construction or reconstruction of an existing road surface or during final trimming, where a single lane operation is required, the traffic must be separated by:

- cones or similar form of delineation, and
- using MTCs, portable traffic signals or priority give way signage - RP51/RP22 and RP52.

Where the traffic is not separated from the working space by delineation, for example during final trimming of the running surface prior to surfacing:

- the construction equipment must stop and activity cease while traffic is moving through the working space
- each work vehicle must be fitted with a TV4 PASS WITH CARE sign, and
- at all times construction equipment must travel in the same direction of normal traffic.

Even though the machinery is stopped it may be necessary to provide a pilot vehicle to lead traffic through the worksite.

C8.2.20 Lane delineation during sealing and resealing activities on level LV, 1 and 2 roads

For chip sealing and resealing activities under MTC's control with an installed 30km/h TSL the following cone spacings may be used in the lane delineation (excludes tapers and lane shifts):

- 5m spacing can be increased to 10m spacing
- 10m spacing can be increased to 20m spacing.

Note: This above exemption applies only to full width chip sealing and resealing worksites. It does not apply to chip sealing of patch repairs. It does not apply to the cone spacing in tapers.

C9 Road closures and detours

C9.1 Introduction

C9.1.1 General

A **road closure** is defined as the complete closure of all trafficable lanes to all road users. A total road closure should only be considered if there is no practical means of providing a safe worksite or by the scope of activity required.

A **detour** is a temporary route to guide road users around a worksite operation.

C9.2 Road closures

C9.2.1 Criteria for closing a road

In general there are four criteria for closing a road:

- An emergency
  For example, a traffic crash: closed immediately by emergency services and RCA notified immediately
- Unsafe road conditions
  For example, floods, slips, snow: closed immediately by the police, Civil Defence, etc in consultation with the RCA or engineer
- Road works (with delays of more than 15 minutes)
  Five (5) days notice is required, closed by the RCA
- Cultural or sporting events
  42 days notice is required, closed by the RCA.

All planned road closures and detours must be authorised in writing by the RCA.

C9.2.2 Emergency services may close a road

In the event of an emergency, emergency services may close a road to secure a worksite.

The RCA must be informed immediately if this type of situation arises. This is normally a requirement of the RCA's emergency strategy procedures.

C9.2.3 Notification

The RCA must notify other affected RCA's, the police, fire service, ambulance services and the New Zealand Automobile Association (AA) of any planned road closures or detours.

If the proposed detour route includes roads under the authority of another RCA, the RCA must ensure that the road has been approved for use as a detour route by the responsible RCA.

In addition to other required notification procedures, the following minimum advance notice must be provided prior to closing any length of road:

- By the engineer to the RCA
  Two (2) working days following receipt of TMP, in writing
- By the contractor to the public
  - five (5) working days before commencing activity where the activity is recognised as a road work activity, otherwise
  - 42 days before holding an event by advertisement in the appropriate daily newspaper. Refer to section E, appendix E Newspaper advertisement standard for a typical format, or
  - other specified media as detailed in the contract documents.

This notification will only be made after the RCA has agreed to the proposal to close the road. Any additional public notification requirements must be specified by the RCA. The media releases must be formatted to the approval of the RCA and approved as part of the proposed TMP procedure. Provision for these should be made in the contract documents (schedule of prices).

C9.2.4 Motorway Closures

In cases where the motorway is completely closed to traffic in one direction or both directions, the normal application of road closure signs, cones, barriers, fences or barricades at on and off ramps must be reinforced by a double line of cones at a normal warning distance from the working space.

TMA vehicles parked outside this inner cordon must be parked with their attenuators down and facing the expected direction of traffic. Vehicles inside the cordoned worksite are not subject to this requirement.

The double lines of cones must be either continuous or chicaned. At the beginning of the off-ramp the line of cones must be at 1m centres to ensure that vehicles are not driven through.

Examples of TMDs for motorway closures can be found in section H.

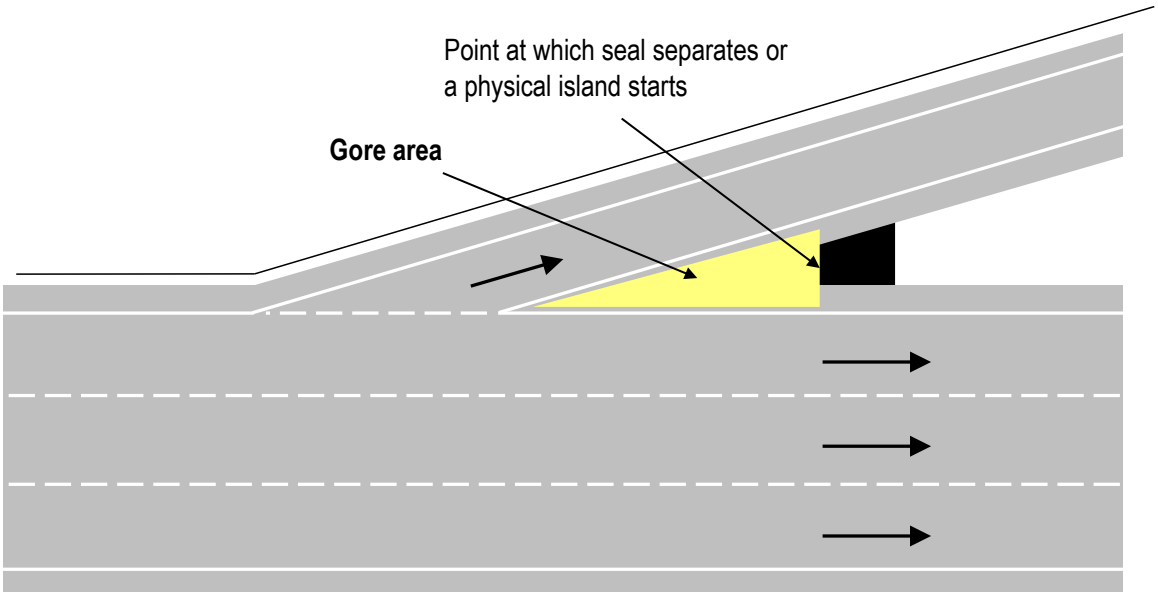
C9.2.5 Gore area and acceleration lane

A gore area is an area of seal at an on-ramp or off-ramp located outside the edgelines of the ramp.

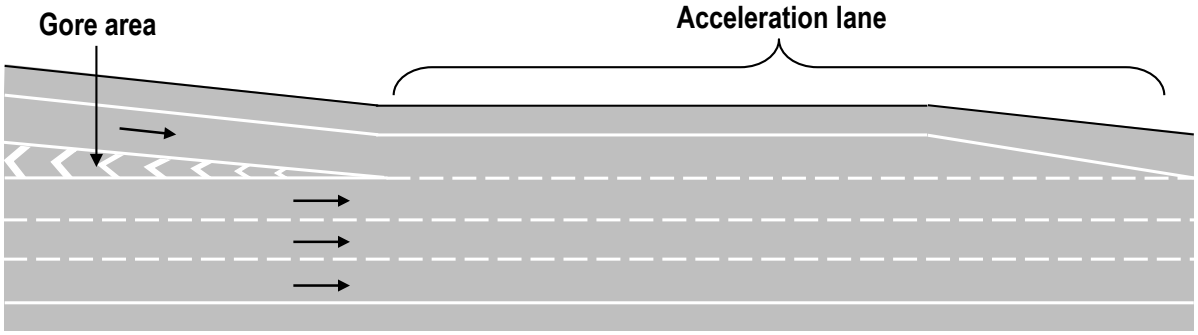
An acceleration lane is an area at an on-ramp which allows drivers to increase speed and safely merge with traffic.

When undertaking activity in the gore area or acceleration lane on **level 2** and **level 3** roads, the ramp on which the activity is being carried out must be closed.

C9.2.5.1 Gore area



C9.2.5.2 Acceleration lane



C9.3 Detours

C9.3.1 Detour routes

All detour routes must be agreed in advance with the affected RCA(s), and full information provided to all emergency services.

Detours must provide a clearly delineated route for road users around the road closure.

All detour routes must be designed using roads that are capable of handling the volume and type of traffic that normally would use the closed road.

Consideration needs to be given to the following points:

- pavement (strength, surface)
- geometry (width, terrain, intersections)
- environment (dust noise)
- political (different RCAs, funding).

The length of a detour versus the expected time of closure and the location of the activity determines the practicality of installing a detour. It is acknowledged that in some remote areas of New Zealand practicable detours do not exist.

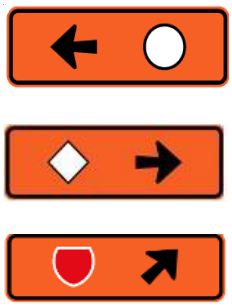
Signs used for all detours must comply with those shown in section B1 Signs.

Where a road closure affects more than one important destination, each destination should be individually signed with a different symbol on the signs, to ensure that road users can find their way to the correct destination.

This principle also applies to opposing traffic flows where both have been affected by the closure.

C9.3.2 Detour signs available for use

The TD3A DETOUR AHEAD FOLLOW symbol sign is used for advance warning of a detour.



The TDA 1 to 6, TDB 1 to 6, TDC 1 to 6, TDD 1 to 6 detour direction indicator signs guide and reassure road users along the route of a detour.

The sign ensures road users other than those following the detour are not misdirected.

The detour direction indicator signs are always mounted horizontally with the arrow either vertically upward, at 45 degrees upwards to the left or right, or horizontally to the left or right.

For multiple detours at one locality different symbols can be used for each detour. Recommended symbols include a square, circle and triangle. Symbols may be any colour provided that colour contrasts with the orange sign background.

C9.3.3 Detour signing principles

The principle of signing detour routes is to ensure that road users can safely and effectively navigate their way to their intended destinations without any confusion or excessive delay. The sign layout must not cause road users not affected by the closure to deviate from their intended route.

Sufficient signs must be erected along the detour route to direct road users to such a point where they can continue their journey using permanent route sign information. This usually involves directing road users back onto their original route of travel, at a point past the worksite.

C9.3.4 Detour signing

The TD3A DETOUR AHEAD FOLLOW symbol sign gives advance warning of a detour.

A TLS 100m, 200m, 300m, 400m supplementary distance plate may be attached to this sign and the distance shown must be no greater than 400m, rounded to the nearest 100m.

The TD3A sign may only be used if an RD3 ROAD CLOSED sign is installed at the closure. The TD3A sign is used to direct road users to a suitable alternative route.

At subsequent changes of direction along the route TDA 1 to 6, TDB 1 to 6, TDC 1 to 6, TDD 1 to 6 direction indicator signs should be used. Road users diverted from a closed section of road are advised to follow the specified symbol along the diversion route until the intended route is rejoined.

By employing this system, the entire detour route can be indicated ahead of time by the symbol chosen, which will be meaningless to road users who have not seen the sign at the start of the detour.

It is most important that a detour route is clearly and consistently signed throughout its length and that a TD5 DETOUR ENDS sign is erected at the end of the detour. The purpose of this sign is to indicate to road users that the special temporary signing terminates at that point and that the permanent signing should now be followed.

Detour signs have black legends on orange backgrounds. This is to distinguish them from permanent directional signs and to attract the road user's attention in the unusual surroundings of the detour route.

In general the following principles apply to detour signage:

- The first TDA 1 to 6, TDB 1 to 6, TDC 1 to 6, TDD 1 to 6 direction indicator sign should be located no more than 100m past the TD3A DETOUR AHEAD FOLLOW symbol sign.
- The frequency of subsequent TDA 1 to 6, TDB 1 to 6, TDC 1 to 6, TDD 1 to 6 signs will depend on the intersections encountered and route required. The road user must be confident that they are on the correct detour route at all times.

  On **level LV and level 1** roads marker arrows should not be placed more than 1km apart. On **level 2** and **level 3** roads they should be not more than 2km apart.
- TDA 1 to 6, TDB 1 to 6, TDC 1 to 6, TDD 1 to 6 signs should always be placed well before multi-lane intersections to allow the road user to select the appropriate lane necessary, and at the intersection.
- TDA 1 to 6, TDB 1 to 6, TDC 1 to 6, TDD 1 to 6 signs should also be placed at, or immediately after, important or complex intersections, irrespective of whether a change in direction was required, to confirm that the road user is on the correct detour route.

C10 Positive traffic management

C10.1 Introduction

C10.1.1 General

TSL signs alone will **not** ensure that vehicles will pass through a worksite at the correct speed.

Worksites need positive traffic management controls, in almost all circumstances, to reduce vehicle speeds to the TSL.

Positive traffic management is any additional measure/s that safely reduces traffic speed to the TSL. It does so by exerting a natural and acceptable restriction on traffic and highlights the reason for the need to slow down from the perspective of the driver. Refer to subsection C4.3.1 Sign location.

Positive traffic management measures must be used when installing TSLs of:

- **less than 80km/h** in areas with permanent speed limits of **110km/h**, or
- **less than 70km/h** in areas with permanent speed limits of **100km/h**, or
- **less than 50km/h** in areas with a permanent speed limit of **70** or **80km/h.**

Positive traffic management measures may also be applied where traffic is not complying with the TSL.

C10.1.2 Types of positive traffic management

The most effective means of reducing the speed of traffic through a worksite is to use **active** TTM measures, including, but not limited to:

- MTCs using stop/go paddles
- portable traffic signals, and pace vehicles (pilot).

Other means of effectively reducing the speed of traffic through a worksite are the use of **passive** TTM measures.

These include, but are not limited to:

- narrowing lane widths adjacent to the working space by the use of cones or other delineation devices to increase the phenomenon known as 'Side Friction'
- close spacing of delineation devices
- using approved traffic control devices (eg flashing beacons, flares, illuminated signs)
- using a speed information sign
- using temporary speed humps
- placing cones from the TSL to the taper
- cone offset delineation (where cones are placed either side of a lane(s), the cones on one side are placed longitudinally offset from the other by a half cone spacing)
- When approaching the MTC position, the cone threshold is an example of side friction.

Different levels of positive traffic management will be necessary depending on the nature of the activity, the **level** of road as specified by the RCA, sight distances and road alignment.

All positive traffic management measures must be detailed in the approved TMP.

C10.1.3 Control of two-way two-lane roads reduced to one lane

All two-way two-lane roads **reduced to one lane** require MTCs or portable traffic signals to manage traffic.

Special exemption may be granted by the RCA for roads carrying less than 1000vpd, in which case the TL9L/TL9S or TL9B ONE LANE sign must be used in conjunction with RP51/RP22 Single Lane - GIVE WAY and RP52 Single Lane - Priority signs.

The use of MTCs during the hours of darkness and during times of poor visibility should be avoided.

C10.2 Stop/go operations (manual traffic control)

C10.2.1 General

Stop /go operations must not be used where two-way traffic flow can be maintained past a worksite.

An MTC is a person employed by the contractor to manage traffic through a worksite. An MTC must receive a briefing and thorough training relating to the task from an STMS.

MTCs may be used for situations that include:

- stopping traffic to avoid a hazard
- allowing traffic from opposite directions to use one lane alternately (alternating flow)
- stopping all road traffic to allow construction traffic to cross or for blasting, or tree work
- slowing traffic where they need to travel very slowly, eg over new seal or in poor visibility, and
- giving road users verbal instructions or directions.

For long-term worksites, MTCs should be regarded as inappropriate.

The recommended device for traffic management at these worksites is portable traffic signals or barrier arm systems. A description of the use of portable traffic signals is in subsection C10.3 Portable traffic signals and their specifications and operational requirements are in section B5 Portable traffic signs.

C10.2.2 Equipment required

MTCs must use stop/go paddles except in unforeseen emergency situations when flag or hand signals may be used.

A cone threshold is installed to slow traffic and to separate the MTC position from passing vehicles. The minimum requirement is five cones placed at 2.5m centres under 65km/h and 5m centres over 65km/h. Where the speed exceeds 70km/h, this may be extended to 10 or more cones.

If the use of MTCs for activity at night cannot be avoided, the MTCs must be on an area illuminated by artificial lighting. An illuminated red wand must be used in conjunction with the stop/go paddle. If there is insufficient light then MTCs must not be used.

Additional delineation devices should be used to assist the MTC provided they do not create a hazard to road users.

The wearing of clothing that obscures an MTC's view of approaching vehicles (excluding PPE) and the use of devices that reduce the awareness of an MTC to the sound of approaching vehicles are forbidden.

C10.2.3 MTC's layout essentials

A typical layout for an MTC operation can be found in layout example diagram F2.14. The principles for layout for MTC operations are set out below:

Provide advance warning of road works ahead by either T1A or T1B signs at each end of the worksite.

A T144 30km/h ahead sign can also be used in conjunction with the T1 sign.

A TA2 sign (advance warning of MTC ahead) and the TA21 supplementary plate (PLEASE STOP ON REQUEST) are placed at each end of the worksite.

Note: These signs must be covered or removed immediately MTC operations cease.

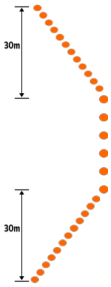
Place a TG1/RS1 30km/h TSL gated (except for LV roads) across the road.

The TSL can be placed before the TA2/TA21 flagman PLEASE STOP ON REQUEST sign if required.

Provide positive traffic management in the form of cones on the centreline and edgeline (at least 5 cones placed at 2.5m centres under 65km/h and 5m centres over 65km/h).

Assist heavy vehicles to manoeuvre by offsetting centreline delineation in the cone threshold by 10m.

A cone may be placed in front of the first vehicle once it has stopped. This prevents drive-offs.



Where tapers are required, these must be 30m (with cones at 2.5m centres).

An end taper is mandatory to prevent drivers who are queue jumping entering the end of the closure.

Activity at night

If the use of MTCs for activity at night cannot be avoided, the MTCs must be on an area illuminated by artificial lighting.

If there is insufficient light then MTCs must not be used.

C10.2.4 Visibility of MTC

MTCs should take particular care to ensure they are:

- visible at all times and in particular at dawn or dusk, against low morning or evening sun, when in shadow on a sunny day, or in dusty conditions
- well lit at night
- not obstructing a road user's view of other signs and devices
- not hidden by other signs and devices.

C10.2.5 Mandatory TSL for MTC

Worksites controlled with MTCs must have a TSL of **30km/h**.

Positive traffic management must be used to ensure speeds of approaching traffic are reduced.

C10.2.6 Location of MTC

MTCs must have a clear view of approaching road users for at least 120m.

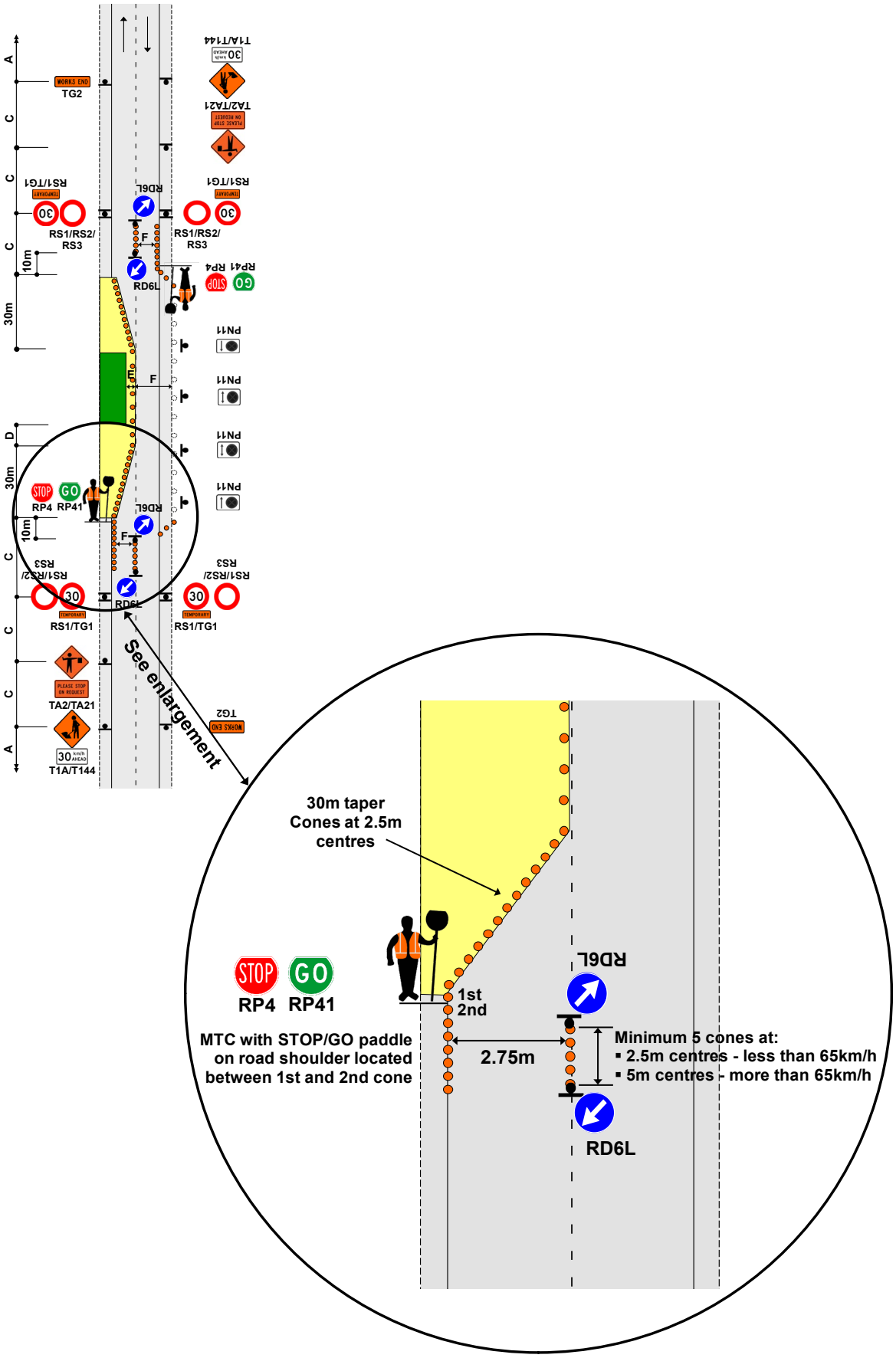
The STMS/TC must check that each MTC is stationed in the correct position.

Side roads intersecting a worksite under the management of MTCs must also have an MTC at the intersection to help side road traffic pass safely through the worksite. An MTC must never control more than one approach.

It is the STMS/TC's responsibility to ensure the TA2 sign (Advance warning of MTC ahead) and the TA21 supplementary plate (PLEASE STOP ON REQUEST) are set up before the MTCs begin operation and are taken away when the MTCs are no longer operating.

MTCs must stand facing oncoming traffic at the beginning of the cone taper on the left-hand shoulder or on the edge of the road and behind the cone threshold on the other lane.

Note: Under no circumstances may MTCs stand or operate unprotected in a live lane. If they need to communicate to a road user, they should do so from the shoulder once their vehicle has stopped.


A
C
C
C
10m
30m
D
30m
10m
C
C
C
A
WORKS END
TG2
RS1/TG1
RS1/RS2/
RS3
RD6L
F
RP4
RP41
STOP
GO
PN11
RS1/RS2/
RS3
RS1/TG1
TA2/TA21
T1A/T144
See enlargement
30m taper
Cones at 2.5m
centres
RP4 RP41
MTC with STOP/GO paddle
on road shoulder located
between 1st and 2nd cone
1st
2nd
2.75m
Minimum 5 cones at:
▪ 2.5m centres - less than 65km/h
▪ 5m centres - more than 65km/h
RD6L

C10.2.7 Number of MTCs required

Normally two MTCs will be needed (one at each end of the worksite).

On **all level LV** roads or **level 1 roads under 1,000vpd** with a working space of less than 30m, one MTC operating opposite the centre of the closure may be used.

Single operators must be protected from working space and traffic hazards, and must not manage traffic unless it is safe to do so.

Work around intersections may require the use of three or more MTCs.

C10.2.8 Working with multiple MTCs

Where multiple MTCs are used they must:

- ensure that road users cannot see a conflicting message from the MTC at the opposite end of the worksite
- be in continuous radio contact with each other when they are not visible to each other.

C10.2.9 MTC procedures

MTCs should:

- maintain eye contact with the driver of the first approaching vehicle
- give definite and clear signals as shown below
- ensure they have an escape path ready in the event of a vehicle appearing not to stop
- be courteous at all times in dealing with the public, and
- maintain direct control of the stop/go paddle at all times (ie the MTC must not insert the paddle in a cone and walk away)
- remain in place until directed by the STMS/TC to leave, or be relieved by another worker.

To stop traffic

To stop traffic turn the paddle to stop and facing the traffic raise the other hand into the stop position with the palm towards the traffic.

To move traffic

To move traffic, turn sideways then turn the paddle to go and use the arm nearest the traffic to wave road users on with a sweeping movement across the body in the direction of travel.

C10.2.10 Cyclists impacted by MTC operation

Cyclists tend to move slower and in a manner different to other traffic. If the route is narrow or rough, consider one of the following options for dealing with cyclists impacted by the MTC operation:

- **Create a temporary cycle lane.** If there is sufficient road width a temporary cycle lane may be established for the cyclists
- **Separate cyclists from the other traffic by time.** This can be achieved by releasing the other traffic first with the cyclists following and ensuring that no traffic follows behind them until they have cleared the area of stop/go operation. This will require additional communication between the MTC and the cyclists/drivers to ensure they understand the process.

C10.3 Portable traffic signals

C10.3.1 General

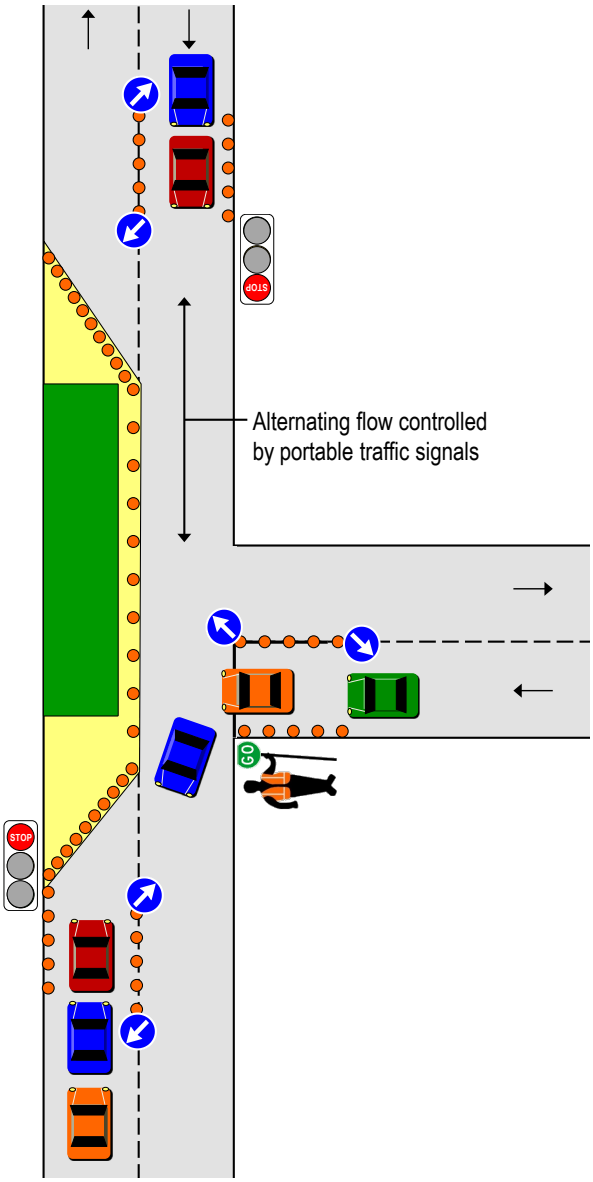
Portable traffic signals must not be used where two-way traffic flow can be maintained past the closure.

Portable traffic signals are used for TTM where alternating traffic flows are required on temporary single lane, bidirectional roads.

Where portable traffic signals are used on a road where a side road(s) intersects the worksite, MTCs may only be used on side roads if they have control of the signals and can ensure both signals are on stop before releasing traffic from the intersection. If they do not have this control then portable traffic signals must not be used.

Portable traffic signals are used to:

- allow traffic from opposite directions to use one lane alternately (alternating flow), and
- stop all traffic to allow construction traffic to cross or for blasting.



C10.3.2 Requirement

Portable traffic signals are intended for activities of relatively short duration.

Where activities continue for more than two months without the location of the working space changing, temporary fixed traffic signals must be installed.

Portable traffic signals must not be used where there is still sufficient road width to allow traffic to flow in both directions at once except where two-way traffic is controlled to allow construction vehicles to manoeuvre in and out of a working space.

C10.3.3 Use of compliant systems

Application to use portable traffic signals must be made on the TMP and the details of the system must be provided in the TMP (manufacturer and model description/number).

Refer to subsection B5.1.2 Certification of portable traffic signals for further details.

C10.3.4 Training

Where portable traffic signals are used, the operator must:

- be a qualified TC, and
- understand and be able to implement contingency plans.

C10.3.5 Mandatory TSL for portable traffic signals

Worksites controlled with portable traffic signals must have a TSL of **30km/h**.

Positive traffic management must be used to ensure speeds of approaching traffic are reduced.

C10.3.6 Worksite layout

Normally portable traffic signals must be located on the left-hand side of each approach. If they are not readily visible in that location they may be placed in a more visible position.

The TA1 traffic signals temporary sign must be placed in advance of the signals and at the spacing specified in the layout distance tables for level LV, 1, 2 and 3 in section C2 Worksite layout.

Temporary limit lines (these must be able to be removed upon completion) must be installed at the appropriate locations when using portable traffic signals.

When it is impracticable to mark a limit line on the road surface the following signs must be used to emphasise where drivers are to stop:

- RP61 STOP ON RED SIGNAL mounted on the primary traffic signal pole immediately below the traffic signal head
- RP62 STOP HERE ON RED SIGNAL mounted at the point where vehicles are required to stop.

Multiple lane approaches must be reduced to a single lane, using the appropriate taper lengths, at least 100m in advance of signals.

120m of unobstructed visibility must be provided to all traffic signals.

C10.3.7 Operational checks

Portable traffic signals must be regularly inspected to ensure:

- the settings are appropriate
- the alignment of the signal displays is correct
- the associated signs are intact and properly displayed
- detectors are functioning correctly
- there are no burnt out lamps and
- batteries are charged.

C10.3.8 Haul route crossing

C10.3.8.1 Traffic signal design

The general layout and installation of this type of traffic signal is similar to that of a normal signalised intersection. The design may, therefore, comply with the requirements of the Austroads Guide to Traffic Management Part 10: Traffic Control and Communications Devices.

A primary and secondary signal display is generally sufficient for the haul route approaches and tertiary displays may normally be omitted.

Notes detailing the method of signal operation must be shown on the intersection design drawings.

C10.3.8.2 Vehicle actuation

Vehicle actuation is the preferred mode of operation and if used, vehicle detection is provided on all approaches. A permanent recall is to be provided for the public road approaches, to ensure the signals return to green on the public road on the termination of the haul route phase and in the event of a detector failure on the public road.

If a detector ceases to function on the haul route, that phase may be manually controlled until the detector is repaired.

C10.3.8.3 Fixed-time operation

This mode of operation must not be used for the public road phase at haul route crossings. It may, however, be used for the haul route phase.

C10.3.8.4 Manual control

Local site conditions or the nature of the haul route traffic may preclude the use of normal vehicle detectors. Microwave detectors must not be used where worksite operations in the vicinity of the crossing may generate spurious demands. Also, very slow moving vehicles may not activate microwave detectors. Under these conditions and where, in the opinion of the RCA, vehicle actuation is not practicable, manual control may be used.

For manual control it is essential that the operator can clearly observe traffic conditions on all approaches and that they ensure delays to the traffic on the public road are minimised. The signals must also rest in green for the public road phase when there is no demand for the haul route phase.

C10.3.8.5 Partial manual control

Partial manual control is preferred to full manual control. Under this system the public road approaches are controlled by a detection system and demands for the haul route approaches are made manually. The haul route phase is also extended by a manual operation, up to the maximum green time set for that phase.

C10.3.9 Signal-controlled site access

C10.3.9.1 Leaving a signal-controlled site access

Vehicles leaving a site through a red signal at a signal-controlled intersection will be deemed to be entering the public road illegally.

Where vehicles may be required to leave such a site and the intersection operates under manual or partial manual control, and there are no manual controllers on site, an alternative exit point must be provided. This point must be located well away from the signal-controlled intersection.

C10.4 Pace vehicles (pilot) method

C10.4.1 Use of pace vehicles (pilot)

The pace vehicle (pilot) method is very useful in restricting vehicle speeds through a long worksite.

This method involves a pilot car leading a queue of vehicles through the worksite.

MTCs are positioned at each end of the closure to stop traffic until a pilot car is available. The TV1 sign is mounted on the rear, or the roof, of the pilot car.

C10.5 Temporary speed humps

C10.5.1 Use of compliant systems

A register of compliant systems is available on the NZ Transport Agency's website. Refer to subsection B13.1.2 Approval for more details about compliant systems.

C10.5.2 Installation of speed hump

The use of speed humps must be approved by the RCA.

A temporary speed hump must only be used at attended worksites with other positive traffic management measures in place.

The speed hump must be positioned a minimum of a sign spacing after a 30km/h TSL.

For example, within a permanent speed limit of 100km/h the speed hump must be positioned at least 75m after the 30km/h sign.

Both the edgeline and centreline must be coned from the 30km/h TSL to the speed hump. It is essential to give adequate warning to motorists.

If a cycle lane exists it must **not** be closed by the speed hump.

The recommended method of installation is to set up the positive traffic control first and then, using MTC to protect the workers, roll out the speed hump and leave in position.

C11 Temporary traffic management (TTM) installation, management and removal

C11.1 Introduction

C11.1.1 General

Traffic management measures must be installed, maintained and removed in a planned and safe manner consistent with this section or as detailed in the approved TMP.

The installation of traffic management signs and devices must be undertaken so that it:

- does not conflict with information on any signs already erected
- does not create an unavoidable hazard for road users or workers, and
- is efficient, logical and quickly isolates the working space from road users.

Short-term static worksites will usually require a mobile operation to install and remove them.

Long-term static worksites on **level 2** and **level 3** roads must use a short-term static closure to install and remove barrier systems.

On state highways and **level 2** and **level 3** roads, the TMP must specify the different stages of operation (eg including the mobile operation to install the static closure). Prior to commencing, the STMS must check and review the approved TMP, the worksite and the proposed activity to ensure they are complementary and are appropriate. The STMS must check the road environment especially including the on the day traffic flows to ascertain that they are at an appropriate level for the TTM intended.

If the worksite and approved TMP are not complimentary, before occupying the worksite the STMS/TC must:

- make CoPTTM compliant minor changes (eg lengthen taper), or
- contact the TMC to reach agreement on actions to be taken (eg change in TSL), or
- postpone works and re-submit a revised TMP for approval.

All changes and decisions are to be recorded on the TMP or on-site record.

C11.2 Set-up and removal of worksite

C11.2.1 Order of worksite establishment

On single direction carriageways signs may be deployed on either:

- the left-hand side of the road first then on the right-hand side of the road
- the right-hand side of the road first then on the left-hand side of the road.

The deployment option chosen must reflect the safety of the installation crew and the safety of road users when approaching the signs and installation vehicles.

On bi directional carriageways, signs should be erected by travelling around the road network in a clockwise direction taking in each side road as they are passed. In this way all turns in and out will be to the left which is easier and safer:

a. The first sign erected must be the advance warning sign.

b. Remaining signs are placed in order from the advance warning sign until the works end sign is reached. The vehicle then makes a loop on a single direction carriageway or simply turns around on a bidirectional carriageway to make the next run. This process is continued until the sign network is complete.

c. Tapers and delineation devices must only be placed once all signs have been installed.

d. Before any construction equipment or materials are brought onto the worksite a drive through check of the worksite must be made in all directions including all side roads. This check must confirm that the worksite is:

   - safe
   - to the minimum standard shown in the TMP and that:
     - the restriction to traffic flow is reasonable
     - the signs and delineation devices give clear messages to road users, and
     - the signs and delineation devices are securely erected and will remain in their correct position under the expected traffic volumes and weather conditions.

C11.2.2 Removing the worksite

The removal of TTM measures must be in the reverse order of establishment, ie reverse order for removal as per (c), (b), (a).

For level 2 and level 3 roads where an AWVMS is used to replace the advance warning sign, all signs on one side of the road may be removed in a single pass.

C11.2.3 Installation requirements for signs

Signs must comply with the requirements of section B1 Signs and the operational requirements of section C3 Signs and worksite zones.

C11.2.4 Installing signs on level LV and level 1 roads

Vehicles used to install TTM equipment on level LV and level 1 roads must have:

- amber flashing beacon(s) visible to all approaching traffic
- signs, either T1A and RD6R/L, or TV4 and RD6L/R.

TTM equipment must be unloaded from:

- the non-traffic side of a stationary work vehicle
- the rear of a stationary work vehicle with a shadow vehicle in place.

TTM equipment is installed either:

- to the non-traffic side of a work vehicle
- 10m in front of the work vehicle
- to the rear of a work vehicle with a shadow vehicle in place.

Under no circumstances should signs be erected or any activity carried out by personnel behind a work vehicle exposed to oncoming traffic.

Signs are to be installed so that:

- the nearest edge is at least 500mm clear of the travelled path of vehicles
- the reflective face of the sign is angled at approximately 95 degrees from the road centreline so that light is reflected away from the road user
- they are clearly visible to oncoming road users, and
- they are well ballasted and stable in reasonably expected weather and traffic conditions.

C11.2.5 Installing signs on level 2 and 3 roads

Installing and removing signs on level 2 and level 3 roads for static closures must be implemented using mobile operations.

These mobile operations use advance warning, shadow vehicles and work vehicles.

While maintaining the full complement of vehicles, the roles of the vehicles may be rotated, providing that there are no workers on the back of the advance warning or shadow vehicles.

Signs are to be installed so that:

- the nearest edge is at least 1250mm clear of the travelled path of vehicles
- the reflective face of the sign is angled at approximately 95 degrees from the road centreline so that light is reflected away from the road user
- they are clearly visible to oncoming road users, and
- they are well ballasted and stable in reasonably expected weather and traffic conditions.

C11.2.6 Installation of channelling and delineation devices

All equipment used must comply with the requirements of section B2 Delineation devices.

The spacing of delineation devices should be to the requirements of the layout distance tables for level LV, 1, 2 and 3 roads in section C2 Worksite layout. Delineation devices are to be installed in straight lines or smooth curves, to give clear direction to the road users.

On **level LV** and **level 1** roads delineation devices can be installed and removed by personnel on foot.

A mobile operation must be used when installing or removing delineation devices at a static closure on level 2 and 3 roads. This must be described in the TMP.

C11.2.7 Installation requirements for barrier systems

Barrier systems are used to provide continuous protection for the working space.

Acceptable forms of barrier system must comply with the design requirements of section B12 Barrier systems.

The layout must conform to the approved TMP and the barrier system must be installed in accordance with the manufacturer's recommendations.

During installation, modification and removal of the barrier system, exposure of unprotected ends must be minimised and, where necessary, protection must be provided.

Long-term static worksites on level 2 and level 3 roads must use a short-term static closure to install and remove barrier systems.

C11.2.8 Redundant TTM equipment

All redundant TTM equipment must be removed from the site or placed in a safe secure location.

Redundant equipment is defined as that TTM equipment not in current use for TTM. This includes TTM equipment not required when the site is left unattended.

Redundant TTM signs, sign supports, sign bases and delineators, may be stored on site provided that:

- the equipment does not remain on-site and unused for a period greater than 48 hours
- the equipment is stored in a safe location where it will not pose a hazard to any person or property
- STMS's identify and appropriately manage the site specific hazards as they apply to this matter
- the equipment must not be stored or placed on an open footpath or cycle way
- the equipment must be stored at least 5m from edge line where no footpath exists or, where one exists, in the back berm area (ie between footpath and boundary)

Redundant TTM equipment must not be left standing nor deployed.

C11.2.9 Minimising the effect of ghost markings

Care must be taken to ensure that old or temporary markings are adequately erased to avoid misleading road-users with ghost markings during wet and low-light conditions.

The standard for line removal is detailed in the NZ Transport Agency's State highway maintenance contract proforma manual (SM032). This references the New Zealand Roadmarkers Federation's Line removal guide which provides detailed advice on this subject.

The SMO32 states:

Using the principles outlined in the NZRF Line Removal Guide, the Contractor must remove all:

(a) Paint that has been applied outside the specified tolerances, including all run-ins and runouts

(b) If instructed by the Engineer, existing markings so:

- *A satisfactory level of removal is achieved in accordance with the NZRF Line Removal Guide. Only sufficient marking material shall be removed so that it cannot be distinguished from the driver's eye height (nominal 1.2 m). (Note: it is acceptable for some marking material to remain in the interstices of the pavement surface)*
- *The final surface texture is similar to the surrounding pavement.*

Blacking out markings (using a paint marking system) prior to a permanent removal method may be used (with the Engineer's approval) as a temporary measure until permanent removal can be completed.

When required the Contractor shall mill existing profiled markings prior to remarking. It may be desirable to leave a thin layer of old marking material on the road prior to remarking so as not to damage the pavement surfacing.

C11.2.10 Courtesy tow of vehicle

RCAs have different policies and procedures for courtesy towing of a vehicle.

Notification to the vehicle owner of the courtesy tow requirement, in advance of the installation of TTM, may be required.

Contact the RCA to confirm local policies and procedures.

C11.3 Monitoring of the worksite

C11.3.1 Monitoring frequency

For details of the monitoring frequency for worksites refer to subsection C19.5.1 Monitoring frequency for TTM measures.

C12 Unattended worksites and activity at night

C12.1 Introduction

C12.1.1 General

Yearly studies by the NZ Transport Agency on injury crashes at road works worksites between 2005 and 2010 show that approximately 85 percent of crashes resulting in injury occur when the worksite is unattended.

Unattended layouts must be carefully considered and planned.

C12.2 Unattended worksites

C12.2.1 Unattended worksites

The layout of the unattended worksite must be covered in the approved TMP.

Unattended worksites must be:

- safe
- secure, and
- stable.

All equipment and materials must be positioned well clear of the live lanes and adequate protection for road users must be maintained at all times refer to subsection C14.1.4 Parking and storage of vehicles, plant and materials.

Where pathways exist and there is insufficient lighting to highlight the approach to any hazards on the path, then amber flashing warning lamps must be installed.

C12.3 Excavations

C12.3.1 Legal requirement for excavations

According to the Health and Safety in Employment Regulation 1995, regulation 25:

Every employer must take all practicable steps to ensure, where any excavation is:

(a) readily accessible to any person; and

(b) likely to collect or retain water of such a depth as to constitute a danger to any person,

– that

(c) any such excavation is covered or fenced, when no employee is in the immediate vicinity to prevent access to it by any person; and

(d) any such excavation created in the course of the work is covered, fenced or filled at the completion of the work.

C12.3.2 Excavations left unattended

Any excavation capable of holding water must be protected in terms of the Health and Safety in Employment Regulation 1995, regulation 25 (Excavations of Hazardous Depth).

Excavations greater than 1.5m deep must comply with regulation 24: Excavations with a face more than 1.5m high.

Further information may be found in the *Approved code of practice for safety in excavations and shafts for foundations* (1995) published by the Ministry of Business, Innovation and Employment (Labour).

Any excavation left unattended must be made safe by either:

- plating, or
- fully enclosing with a safety fence, or
- backfilling

to prevent road users, such as pedestrians and cyclists from falling into them.

Barricades, cones, plastic mesh netting not supported by a solid frame and hurdles are **not** sufficient to adequately protect road users from excavations.

Guideline specifications for suitable safety fences to protect excavations are detailed in section B6 Safety fences.

As part of preparing the worksite to be left unattended, also consider the following actions:

- reduce the size of the worksite as much as possible
- if TSLs have been installed, consider whether these are still required or whether the TSL should be changed (remember that changes to the TSL must be approved)
- sweep any loose material from the sealed road surface
- check that all signs are ballasted and positioned correctly
- check that all delineation devices are clean and positioned correctly.

If the worksite is to be left unattended overnight, consider the following additional actions:

- place amber flashing lamps on each corner of any barricade/fence, to help make the worksite and hazard more identifiable
- ensure there is enough guidance for road users as they pass by or through the worksite – add additional cones if required (for example if the closure is on a corner or over a hill, extend the cones further towards the oncoming traffic to provide more guidance).

C12.4 Activity at night

C12.4.1 General

Undertaking activity at night is effective in reducing delays to traffic because traffic volumes are lighter than during most daylight hours.

Activity at night must be subject to careful additional planning and inspection.

C12.4.2 Additional considerations

When planning night-time traffic management measures the STMS will need to consider that:

- traffic density will be less and hence traffic speed may increase
- road user's visibility is reduced
- road user's awareness may be reduced
- positive traffic management measures may be different
- additional lighting for working spaces, safety zones, MTCs, pedestrian and cycle lane detours, and for mobile working plant is required. These should always be chosen and mounted so that they direct light downward. **Light sources that produce glare that could dazzle road users are not permitted**, and
- Use of illuminated wands is optional and may only be used when overhead lighting for MTCs is provided.

C12.4.3 Traffic signs

On **all levels** of road the first temporary warning sign encountered by road users must have a retro-reflective fluorescent orange material background.

All signs must have a delineation device placed at the base of each sign on the traffic side.

C12.4.4 Delineation devices

On **all levels** of road, suitable reflectorised delineation devices parallel to the direction of traffic must be installed.

For barricades and fences the recommended reflectorised delineation device is the 200mm x 150mm retro-reflective chevron as detailed in subsection B12.1.4 Channelling traffic. These devices should be installed at 10m spacing and at every corner.

C12.4.5 Amber flashing warning lamps

On level LV, level 1 and level 2 roads where there is a hazard on a footpath or cycle lane, amber flashing warning lamps may be placed on any barricades and fences.

A lamp may also be placed on each corner of the barricade/fence, to help make the worksite and hazard more identifiable.

If there is insufficient lighting to highlight the approach pathway and any hazards on the path, then amber flashing warning lamps must be installed.

Amber flashing warning lamps must be capable of maintaining their flashing mode throughout the night.

Amber flashing warning lamps must be clearly visible from a height of 1.1m to 2.4m over a distance ranging from 0m to 600m from the light.

Amber flashing warning lamps may also be used as part of the advance warning for the worksite.

When used in this manner they must be placed so that the nearest edge is at least 500mm clear of the travelled path of vehicles for level LV and level 1 roads, and at least 1250mm clear of the travelled path of vehicles for level 2 and 3 roads.

Note: Whatever is holding the lamp must be frangible.

Long length worksites delineated entirely with amber flashing lamps may confuse approaching road users. Delineation with reflective type devices reduces confusion for long worksites.

C12.4.6 Artificial lighting

Artificial overhead lighting must be used for the safety of personnel and road users at all attended night time worksites. The contractor must indicate in the TMP the type of lighting to be used.

Lighting is to be used to illuminate:

- the working space, and
- MTCs where it has not been possible to avoid their use.

Lighting must not create a disabling glare for road users. A drive through the worksite from all approaches immediately after the lighting is installed to check for glare must be undertaken by the STMS/TC.

Pedestrian and cyclist detours or temporary paths must be adequately lit, especially when the worksite is unattended.

C13 Pedestrians and cyclists

C13.1 Introduction

C13.1.1 General

Consult with RCA(s) for local requirements relating to the management of pedestrians and cyclists.

Where activities affect pedestrians or cyclists, the TTM must ensure that:

- pedestrians or cyclists are not led into direct conflict with the operation or traffic moving through or around the worksite
- if cyclists or pedestrians are directed into live lanes they should be adequately protected from traffic by delineation and/or barriers and suitable warning signs
- safe and impediment free temporary paths are provided where footpaths and/or marked cycle lanes are blocked by the activity.

C13.2 Pedestrian requirements

C13.2.1 General

Provisions for footpath users with sight, hearing or mobility issues must be included in the design, preparation, approval and implementation of the TMP.

C13.2.2 Footpath widths

Set out below are the minimum footpath widths.

Location	Minimum width	Comments
Residential/Rural /Suburban centre	1.2m	An existing footpath width may be used when it is narrower than the minimums shown. Where the length of the temporary footpath exceeds 20m a pedestrian passing bay may be required.
Central business district (CBD) and commercial zones. Commercial zones include shops, schools, aged persons homes or facilities, hospitals, tourist attractions, bus stops, libraries.	2.0m	

C13.2.3 Alternative routes

Where the activity impacts a footpath and minimum footpath widths cannot be maintained, alternative routes with a firm smooth surface and no trip hazards are to be provided in the following order of preference:

1. onside of road reserve away from the carriageway
2. between the working space and carriageway (but not into the live lane)
3. into the carriageway (either in a parking lane or a suitably delineated and protected section of the existing traffic lane)
4. use footpath controllers to guide pedestrians around the operation

   Note: This option may be combined with any of the other options to increase safety for pedestrians
5. across the carriageway to a footpath on the opposite side with delineation of the crossing points and kerb ramps to assist mobility vehicles and pushchairs

   Note: This option is strongly discouraged and is not to be used if options 1, 2, 3 or 4 are feasible (only use where there is a pedestrian or a signalised crossing **or** on a level LV or level 1 road with a speed of less than 65km/h).

C13.2.4 Footpath controller

The role includes the following:

- stopping pedestrians until the way is clear and safe for them to proceed
- guiding pedestrians past or through the site
- managing pedestrians, cyclists, other road users and road workers entering and leaving working spaces (including people involved in events)
- giving information to interested parties relating to the activity (being an ambassador for the site).

Where there is a low number of pedestrians the footpath controller may carry out another role relative to the work activity but must be available to carry out the footpath controller role when required.

Note: Footpath controller's duties do not include duties of an MTC. A footpath controller is suitable for footpath duties alongside a level LV or level 1 road but must have a minimum of a level 1 TC qualification for level 2 footpath controller duties.

RCAs may require footpath controllers to be used if there are known to be school age children, the elderly, mobility impaired persons and sight impaired persons in the area.

The footpath controller must be briefed by the STMS/TC.

The briefing must cover:

- all duties required of the person
- a record for any incidents observed
- use of two way radios where these are necessary, and
- any hazards on site and mitigation methods.

The briefing is to be recorded and both parties are to sign to the effect that the briefing has been delivered satisfactorily and fully understood.

The person selected for this duty must be someone with satisfactory people skills, sufficient competency for the task described and a mature attitude.

C13.2.5 Protecting pedestrians from the working space

If pedestrians could otherwise gain access to the working space then the contractor must protect pedestrians by installing:

Option	When used
Safety fences	Long-term or unattended worksites or where a significant risk is present
Cones connected with cone bars	Attended worksites where: • no significant risk has been identified as being present, or • access to all identified significant risk is managed by a person who is in the immediate vicinity of and in control of the risk(s). **Note:** Cone bars are not recommended where heavy equipment (eg a digger) is being used. A safety fence is preferred in these cases.

C13.2.6 Footpath diverted into carriageway

If the footpath is to be diverted into the carriageway, then the traffic side of the footpath must be delineated by either:

Option	When used	Lateral safety zone required with delineation
Barriers	Long-term worksites.	0.5m
Safety fences	All worksites where barriers are not required.	1m
Cones connected with cone bars	Attended worksites on level LV and L1 roads (not for use on state highways). Attended worksites on level 2 roads less than 65km/h (not for use on state highways).	1m

C13.2.7 Ramps

Kerb ramps and any other footway ramps must meet minimum footpath width requirements and be not steeper than one vertical in eight horizontal.

C13.2.8 Pedestrian crossings

Where a pedestrian crossing becomes unusable or where the zebra road markings are removed or obliterated, the belisha beacons, discs and any other indication of the crossing must be covered and barricades or safety fences placed across all the pedestrian access to the crossing (on both sides of road).

An alternative pedestrian crossing system must be provided when the following pedestrians are impacted by the closure of a pedestrian crossing; school age children, the elderly, mobility impaired persons and sight impaired persons.

C13.2.9 Covered footpaths

A covered footpath must be provided where falling debris is a concern, refer to subsection C6.2.4 Overhead safety zones.

C13.2.10 Lighting

Temporary paths and covered footpaths must be adequately illuminated at night, refer to subsection C12.4.6 Artificial lighting.

This may mean that artificial lighting to the appropriate level required by Australian and New Zealand Standard 1158.1.1:1997 *Road lighting - Vehicular traffic (Category V) lighting - Performance and installation design requirements* (AS/NZS 1158.1.1:1997) has to be installed.

C13.2.11 Signage for temporary paths and detours

Suitable detours and their applicable signs are:

Pedestrian crossing closed

TU1 CROSSING CLOSED PLEASE USE ALTERNATIVE CROSSING.

Note: Whenever this sign is installed, there must be an alternative crossing available.

Footpath closed and pedestrians are to be directed across the road to an alternative footpath

TU2 - FOOTPATH CLOSED PLEASE USE OTHER SIDE.

Pedestrians must not be required to cross more than 2 lanes without a central pedestrian refuge.

Note: This sign can only be erected on level LV and level 1 roads with a posted speed limit of less than 65km/h. Care must be taken when using this method above 50km/h.

When this sign is used, pedestrians must have the following minimum sight distance to approaching vehicles:

- 75m at 50km/h
- 100m at 60km/h.

This sight distance must be shown in the TMP.

Directional arrows for temporary footpaths

TU31 to TU36 Pedestrian Direction sign.

C13.3 Cyclist requirements

C13.3.1 General

Cyclists must be accommodated in the TMP.

C13.3.2 Temporary paths and detours

Wherever cycle lanes are installed on a road they must be replaced with temporary lanes if the cycle lane is affected by the worksite activity.

Where, because of road environment constraints, there is insufficient width to fit a replacement cycle lane while maintaining existing traffic lanes a contractor may consider merging the cyclists into the traffic lane. To use this option the contractor must have TMP approval and must provide a threshold treatment including a TSL to enable the cyclists to merge into the traffic lane.

A CYCLE LANE CLOSED sign must be used to alert cyclist to the merge ahead. A 30km/h TSL must be used in advance of the merge to alert motorists.

The merge must be coned.

Refer to section F for example of layout for cycle lane closed.

C13.3.3 Cycle lane and shared temporary footpath/cycle way widths

Set out below are the minimum temporary cycle lane widths.

Type of lane	Speed	Minimum Width (m)
Single direction cycle lane	Speed limit does not exceed 50km/h	1.0m *
Single direction cycle lane	Speed limit exceeds 50km/h	1.5m
Two-way cycle lane	Any speed	2.0m
Shared footpath and cycle way	Any speed	2.2m #

***Note:** A minimum lane width of 1.5m is required if the temporary cycle lane is uphill as riders tend to pump their cycles from side to side as they climb the hill.

#Note: Where a shared footpath and cycle way is reduced to less than 2.2m wide, cyclists should be excluded by closing the cycle way.

C13.3.4 Signs to be used for temporary cycle lanes and detours

Suitable detours and their applicable signs are:

Cycle lane needs to be closed and cyclists are to be directed into the live lane

Cycle Lane Closed sign.

Directional arrows for temporary cycle lanes adjacent to the working space

TU41 to TU46– Cyclist Direction sign.

C14 Work vehicles, equipment and materials

C14.1 Use of vehicles

C14.1.1 Vehicle movement

Work vehicles must not travel, stop or park:

- against the flow of traffic outside the working space, or
- within the associated safety zones.

Operators should be aware that road users may follow work vehicles into a working space. They must check carefully before reversing or opening doors after entering the working space.

C14.1.2 Loading and unloading

The loading and unloading of materials must be conducted in the working space and not within the associated safety zones or live lanes.

On **level 3** roads vehicles must not stop in live lanes and engage in loading or unloading activities, even with the assistance of TMA. Such activities interfere unnecessarily with traffic flows and create hazards.

C14.1.3 Vehicle-mounted flashing beacons

Work vehicles must have at least one, and preferably two, vehicle mounted flashing beacons that are visible to road users from all directions at all times.

Vehicle-mounted flashing beacons:

- must be switched on prior to a work vehicle entering or leaving a working space
- must be switched off once the vehicle has left the working space
- may be switched off once the work vehicle is within the boundaries of the working space.

Vehicle-mounted flashing beacons must be amber.

C14.1.4 Parking and storage of vehicles, plant and materials

C14.1.4.1 Parking of vehicles, plant and materials

No vehicles, plant or materials are to remain at an unattended site in any of the safety zones including the taper, nor should these items be placed on curves or any similar place where they may be struck by an out-of-control vehicle.

C14.1.4.2 Sites with permanent speed limit under 65km/h

For unattended worksites on roads with a permanent posted speed limit of less than 65km/h which require levels LV, level 1 or level 2 TTM the following applies to the parking of plant:

- where possible (reasonably practicable) all plant must be parked at least 5m outside the edgeline and on the same side of the road as the working space

- where this is not possible plant may be parked in what is normally a parking area subject to the following conditions:
  - the plant must be registered for on road use
  - the plant must be parked on the same side of the road as the working space
  - plant must not be parked on a central median
  - the location where the plant is to be parked must have at least clear sight distance (eg 3 x the posted speed limit in metres) visibility for approaching road users
  - a shoulder closure with advance warning signs, TSL if required by site conditions, a cone taper with an RD6R sign at the widest point of the taper, cones along the site and parked plant and lateral and longitudinal safety zones must be installed around the parked plant
  - the plant should if possible be parked under street lighting
  - the parking of plant in such situations is subject to the RCA approval via a signed TMP.

C14.1.4.3 Sites with permanent speed limit over 65km/h

All plant must be parked at least 5m outside the edgeline and on the same side of the road as the working space.

C14.2 Other requirements

C14.2.1 Mud and other debris

The contractor must ensure that all operations do not deposit debris or material on a road surface open to traffic. Any material on the road surface of a worksite must be cleaned off at the earliest opportunity.

C14.2.2 Operating mobile operations within an established static site

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

This dispensation will apply to mobile activities such as:

- sweeping excess chip from a chip seal/reseal site
- 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 be applied.

This dispensation must only be applied to sites with a minimum of clear sight distance visibility to the work vehicle at all times during the operation.

C14.2.3 Redundant TTM equipment

Refer to C11.2.8 Redundant TTM equipment for further information about redundant TTM equipment at worksites.

C15 Worksite access

C15.1 Introduction

C15.1.1 General

Vehicles must only enter and exit a closure in the direction of traffic flow. Vehicles are not allowed to stop in a live lane and reverse into a closure, except when the worksite is classified as an emergency and is under the control of emergency services.

Vehicle-mounted flashing beacons must be switched on prior to a work vehicle entering or leaving a closure. Refer to subsection C14.1.3Vehicle-mounted flashing beacons.

TTM must be designed to allow the safe and efficient movement to and from the closure of visitors or workers either in work vehicles or on foot.

Maintaining the safety of the site access is the responsibility of the STMS.

C15.1.2 Access and exit points

Except for sealing and paving activities, which are typically moving operations within a larger worksite, clearly defined access and exit points are required for closures on **level 2** and **level 3** roads where the working space is delineated and separate from the live lanes.

Special access and exit points for construction and associated work vehicles may be required if these vehicles have difficulties entering and leaving the closure at the normal access point.

C15.2 Access points

C15.2.1 Signing of access points

The site access must be identified by the TZ1L/R SITE ACCESS _m advance warning sign and the TZ2L/R Access Direction sign.

C15.2.2 MTCs at site access points

MTCs may be used on **level LV, level 1** and **level 2** roads to control the flow of vehicles into and out of the closure. MTCs are permitted on **level 3** roads but they cannot slow or stop traffic in live lanes on these roads.

Entry and exit to the closure should be via a clearly signed and delineated site access point.

C15.2.3 Location

The table below details the minimum distances a site access point must be located from any intersection, on- or off-ramp, taper, or obstruction that could restrict visibility to the access point.

Where necessary, multiple access/exit points may be provided. However, the location of these should always be in accordance with the provisions of CoPTTM.

The provision of the appropriate acceleration and deceleration areas either side of a site access is desirable, particularly in high-speed situations. Site accesses must not be placed on curves.

Location of site access

*Permanent/temporary speed limit	50 km/h	60 km/h	70 km/h	80 km/h	90 km/h	100/110 km/h
Minimum distance between a site access and any intersection, on- or off-ramp, taper or obstruction.	50m	60m	70m	80m	90m	100m

* C2 Worksite layout details where TSLs are used to set up worksite layouts.

C15.2.4 Delineation of site access

The site access opening must be identified with delineators spaced 2.5m for:

Road level and speed	Delineation
Level 3 roads	**20m** either side of the opening
Level 1 and level 2 roads **>65km/h**	**20m** either side of the opening
Level 1 and level 2 roads **<65km/h**	**10m** either side of the opening

C15.2.5 Removal of delineation devices to provide site access

To allow work vehicles to gain access to a closure, delineating devices may need to be removed.

These devices must be replaced immediately to ensure other road users do not enter the closure. Delineation devices must be placed according to the appropriate layout distance table in section C2 Worksite layout.

C16 Managing traffic queues

C16.1 Introduction

C16.1.1 General

Activities on a road often disrupt traffic and result in delays to road users. Road users should be disrupted or delayed as little as possible and delays must be kept to a minimum.

Note: Each RCA can set the timeframe acceptable for delays on their network. Many RCAs set a maximum timeframe of five minutes for delays to traffic.

C16.2 Queuing and delays

C16.2.1 Queuing

Rear end crashes are a major concern at worksites. Approximately 20 percent of crashes at worksites are queuing related crashes.

The STMS/TC is responsible for monitoring the queue length. On roads with a permanent speed limit greater than 50km/h it is important to ensure that the first advance warning sign is always located where an approaching road user can see the sign before the end of the maximum queue.

This can be a problem on one-way multi-lane divided roads through a worksite and where the road alignment has significant vertical and/or horizontal curvature.

Additional reminder signs may need to be erected closer to the closure when queues and/or visibility restrictions are excessive.

Refer to subsection C3.3.2 Positioning of signs for information about placement of advance warning signs.

C16.2.2 Delays

TMPs must address any delays anticipated by worksite activities, including simple calculations to determine if delays of more than the maximum time allowed by the RCA are likely (normally five minutes). The contractor/TMP applicant must supply this information for **level 2** and **level 3** roads.

The RCA must be informed if delays of more than the maximum time limit are likely. The RCA is responsible for verifying the calculations and determining, in negotiation with the contractor/TMP applicant, the appropriate action, eg allow the predicted delays to be imposed, restrict hours of activity, periodically pause activity to allow queues to disperse.

Where substantial queuing is expected, and alternative routes are available, consideration should be given to the use of those routes.

C16.2.3 Delay calculations

From time to time, delay calculations may be required by the RCA.

C16.2.4 Capacity

The maximum traffic capacity through a worksite should be provided with due consideration of safety. Delays are unavoidable at times.

Simple delay calculations can be done for closing one lane on **a two-way two-lane** road on the assumption that delays of more than five minutes occur when the following thresholds are exceeded:

- if a lane more than 200m from an intersection carries more than 1000vph, and
- if a lane within 200m of an intersection carries more than 500vph.

Delays can be assessed as follows:

1. Find the peak hourly traffic volume for each lane past the closure. (If the peak hourly traffic volume per lane is not known it can be estimated using half the AADT divided by 8).
2. Add the peak hourly traffic volume for both lanes.
3. If the total is greater than 500vph and the worksite is within 200m of an intersection then five minute delays are expected.
4. If the total is greater than 1000vph and the worksite is further than 200m from an intersection then five minute delays are expected.
5. If the thresholds in (3) or (4) are not exceeded then delays in excess of five minutes are not expected.

These traffic volume thresholds may need to be reduced if:

- the road is rough or unsealed
- the horizontal geometry restricts speeds to less than 40km/h, or
- the proportion of heavy vehicles exceeds 12 percent.

The information required for these calculations must be supplied to the contractor by the RCA.

The delay calculation method described above is only applicable to two-way two-lane roads. Other types of road require more elaborate queuing and delay calculations.

Guideline capacities in the table below indicate when delays can be expected.

Guideline capacities

Road type	Single lane flow	Two-lane to one-lane merge on a one-way carriageway (ie one direction on a divided carriageway road)	Two-way flow on a one-lane section of road (based on a 500m closure and a two to five minute signal cycle)
Interrupted traffic flows and queuing is likely to occur at about	1500vph	1300vph	600-800vph (two-way)

C16.2.5 Examples of simple delay calculations

Example 1

One lane is to be closed on a two-lane two-way road. The lane closure is within 200m of an intersection. The estimated traffic volumes (provided by RCA) for the planned activity times are 300vph (southbound) and 250vph (northbound).

The total traffic volume required to use one lane is 550vph (300 + 250) and this traffic volume is greater than 500vph, ie the threshold for lanes within 200m of an intersection.

From this information the contractor would decide that delays of more than five minutes were reasonably expected because the 500vph threshold is exceeded.

Example 2

One lane is to be closed on a two-lane one-way road. The peak hourly traffic volumes are unknown but the AADT is 6000. The lane closure is not within 200m of an intersection.

Peak hourly traffic per lane is 6000/2 = 3000/8 = 375vph.

The sum for the 2 lanes is 750vph (375 +375).

Delays of more than five minutes are not expected while the activity is in progress because the threshold of 1000vph for lanes more than 200m from an intersection is not likely to be exceeded.

C17 Light arrow system (LAS), horizontal arrow board, truck-mounted attenuator (TMA) and variable message sign (VMS)

C17.1.1 Requirements

The light arrow system (LAS) and horizontal arrow board are primarily used for mobile operations, but they may also be used for static operations where additional safety is required.

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

The horizontal arrow board may be used on non-state highway level 2 roads and also on level LV and level 1 roads.

LAS or horizontal arrow boards must not be used to direct traffic in alternating flow situations.

LAS or horizontal arrow boards must not be used to direct traffic into opposing traffic flows.

C17.1.2 Location

Arrow boards for static operations must be positioned in the centre of the closed lane and longitudinal and lateral safety zones must be provided in advance of the arrow board and between the arrow board and live traffic lane respectively.

C17.1.3 Operating instructions for arrow boards

When operating LAS or horizontal arrow board on a static site, use the permitted displays detailed in subsection D1.7.1 LAS requirements and subsection D1.8.3 Permitted display for horizontal arrow board.

C17.1.4 Use of TMAs

TMAs must be used in accordance with the manufacturer's recommendations and the NZ Transport Agency's standards.

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

For static operations TMAs:

- are generally only considered for sites occupied by personnel or objects that will present a hazard to road users, and
- are generally only justified on **level 2** and **level 3** roads for lane closures.

They may also be used for working spaces on the shoulder to increase road worker and road user safety.

C17.1.5 Location of TMA

Work vehicles are often used to shield personnel from passing traffic. However, if a vehicle crashes into the back of the vehicle serious injuries can result, especially at high approach speeds.

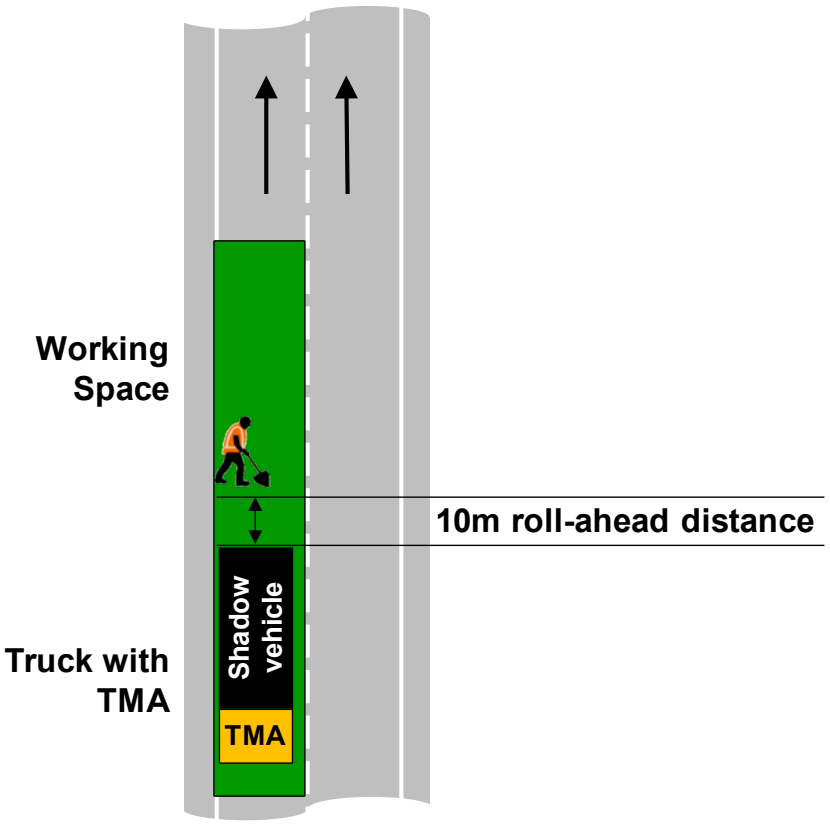
When a TMA is impacted it is possible that the truck will roll forward. This roll-ahead distance is dependent on many factors including:

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

There must be a clear distance of at least 10m in front of a truck mounted with an attenuator to allow the truck to safely move forward if impacted by a light vehicle travelling at a speed of less than 100km/h.

This space must be kept clear of personnel and equipment.

The lateral safety zone must be provided between the TMA and live traffic lane.



C17.1.6 Operating instructions for TMA

When operating a TMA on a static site, the requirements of subsection D1.10 Truck-mounted attenuator (TMA) must be met.

C17.1.7 Variable message signs

Variable message signs are optional devices that can be used to highlight specific hazardous situations (eg where visibility is restricted or where additional useful messages need to be shown to road users).

They are an additional form of traffic management and must not be used to replace the normal signs and/or devices used for TTM.

Details of acceptable equipment are given in section B10 Mobile variable message signs (VMS).

With the RCA's approval, permanently installed Automatic Traffic Management Systems (ATMS) signs may be utilised to advise road users of worksite operations or specific hazards on the road ahead, and to guide traffic around those operations or hazards.

Variable message signs must be used as per the NZ Transport Agency's P37 *Specifications for mobile variable message signs* (a draft of which is available on the NZTA's website).

C18 Temporary road safety barrier systems

C18.1 Introduction

C18.1.1 General

Temporary road safety barrier systems are designed to provide protection through a physical separation between traffic and an adjacent area. Their purpose is to redirect an impacting vehicle and minimise occupant injury, while providing protection to those people and/or the protected area behind the barrier.

Temporary road safety barrier systems can be used:

- where a working space must be shielded from adjacent traffic, or
- when the traffic must be shielded from worksite hazards (eg deep excavations), or
- when there are no other options to safely channel vehicle and pedestrian movements.

Generally, road safety barriers should only be used for physical protection and to reduce the severity of potential crashes, as they are a significant hazard themselves. It is preferable that traffic be safely channelled through or around a worksite without the use of barriers.

C18.1.2 Considerations that influence whether barrier should be used

The following considerations influence whether a longitudinal barrier should be used for protection:

- Traffic volume

  Generally only level 2 and level 3 roads will justify the installation of barriers. Their use may improve productivity through physical separation, and reduce traffic delays through avoiding more restrictive temporary speeds. Barrier systems may be considered for longer-term worksites on level LV and level 1 roads.

- Traffic speed

  Generally barriers are only justified on roads with speed limits greater than 65km/h. However, barrier protection for pedestrians may be justified at lower speeds (eg when a temporary footpath makes use of a road shoulder).

- Worksites restrictions

  Generally barrier protection may be justified where there is insufficient width to provide an adequate lateral separation between the protected area and adjacent traffic. However, the deflection of the barrier system must be accommodated in the area immediately behind the barrier.

- Duration

  Generally only a longer-term operation will justify the installation of barriers. As a rule of thumb the duration is usually more than one day on level 2 and level 3 roads.

C18.2 Barrier hardware selection considerations

C18.2.1 General

Road safety barrier performance levels used in New Zealand are based on the United States National Cooperative Highway Research Program (NCHRP) 350 performance regime. More recently the Federal Highway Administration (FHWA) has instituted the Manual of Associated Safety Hardware (MASH) standard. Any new barriers and delineation will need to be tested to the MASH standard.

The design, selection and installation of a road safety barrier system must reflect the critical vehicle mass, impact speed, and angle of impact. Each of the input variables contributes to the impact energy and the consequent barrier performance.

For example, a significant presence of heavy vehicles, higher speeds, or steeper angles of impact (eg on the outside of curve) will require higher performing road safety barrier systems.

Barrier system performance test levels related to the adjacent permanent posted speed limit are summarised in the table below.

Barrier system performance levels

Test level	Permanent posted speed
1	50km/h or less
2	50km/h to 70km/h
3	greater than 70km/h

Typically these performance test levels are based on the crash performance of a 2000kg vehicle hitting the barrier at an angle of 25 degrees, at the respective operating speeds.

The correct design, hardware selection and installation will limit the potential penetration of the protected area by an out of control vehicle.

The selected system or component must have complied with a test level that meets or exceeds the permanent posted speed limit of adjacent traffic.

Higher barrier performance levels will also provide increased protection for the area behind the barrier, from errant vehicles that are heavier, faster or impacting at an angle steeper than 25 degrees.

All barrier systems must be installed in accordance with the manufacturer's or supplier's installation guidelines. Failure to do so can result in the failure of the system through unconstrained deflection of the barrier into the protected area, differential movement of the units causing snagging and pocketing hazards, or the rupture of the system and the entry of an errant vehicle into the protected area.

Freestanding units will either slide or roll into the protected area posing a hazard to workers, pedestrians or adjacent traffic.

Different types of barriers cannot be joined together without an approved transition. The mixing of different barrier types with variable deflection and cross-section characteristics will lead to unpredictable crash containment outcomes.

C18.2.2 Water filled plastic barriers

Crash impact energy is managed through the plastic sections being filled and ballasted with water and being properly jointed and anchored.

The plastic barrier sections must be jointed by the approved system over the minimum length specified by the manufacturer or supplier for the system to perform adequately.

Test results have shown that the deflection of some types of water filled plastic barrier systems can be substantial.

Modular plastic barrier sections are light and easily transportable and installed when empty.

Water levels in the plastic units must be monitored and refilled to maintain the design performance level. Water leaking from a unit can also cause slippery conditions and potentially loss of control crashes. Faulty units must be repaired or replaced as soon as possible.

C18.2.3 Concrete barriers

Concrete barriers are appropriate at locations where deflections must be limited.

Transportable concrete barriers may only be considered to be a rigid barrier system with zero deflection when the sections are jointed by an approved system and keyed or pinned to the road surface, to prevent any lateral movement under impact.

If an installation does not meet these requirements it will be considered to be semi-rigid system. The resulting deflection must be accommodated in the design of the working space or protected area.

The minimum length of barrier must be installed for the system to perform adequately.

C18.2.4 Steel barriers

Transportable steel barriers sections are similar in cross section to concrete barriers, but are about 10 percent of their weight. Anchors are required at the end of each run.

All transportable steel sections must be installed in accordance with the manufacturer's and supplier's installation guidelines.

C18.3 Lateral placement

C18.3.1 Barrier system placement

Increasing the distance between a barrier and the traffic lane:

- reduces drivers' shy line reaction to the barrier
- increases the space available for vehicles to regain control before impacting the barrier
- increases sight distances, and
- reduces the length of barrier required to shield a particular hazard.

Barrier system placement is a trade-off between having barriers as far from the traffic lanes as conditions permit, while ensuring that there is adequate room behind the barrier to accommodate its dynamic deflection under impact.

The barrier designer and worksite management personnel must consider the orientation of the barrier relative to the speed and approach angle when considering barrier selection options and placement.

Barrier systems are designed to deflect on impact and sufficient space for this to occur must be provided behind the barrier. The distance between the working space occupied by personnel or the protected area and the barrier must be sufficient for the likely dynamic deflection of the barrier to occur. This area must be kept clear of material and equipment to enable the deflection and containment to occur.

C18.3.2 Deflection space

The amount of deflection space required is dependent on the type of barrier system being used. Rigid, semi-rigid and flexible systems vary greatly in their expected deflection upon impact.

Typically a semi-rigid concrete system will deflect up to 2.5m for a TL-3 impact. A water filled system will deflect up to 4m for a TL-2 impact and 6.9m for a TL-3 impact.

Recommended design deflections for specific temporary road safety barrier systems are available from the manufacturers or suppliers.

Given the high deflections of some water filled barrier systems they may not be an appropriate choice in a high speed application, or where the barrier is likely to be struck at a high impact angle, or when there is limited room behind the barrier to accommodate deflection without compromising the protected area or working space.

In situations where a working space is protected by a permanent road safety barrier system, sufficient space to accommodate deflection must also be provided.

The design deflection for most permanent road safety barrier systems can be found in the NZTA M23: Specification for road safety barrier systems appendix A.

Details for temporary barriers can be found in NZTA M23: Specification for road safety barrier systems appendix B.

C18.3.3 Shy line

Drivers tend to shy away from objects placed close to the edgeline of the road. Obstacles located within this shy line distance will affect driver behaviour and tracking.

Shy line offsets

The minimum shy line offset for temporary worksites must be not less than 1m.

It is preferable that the barrier or end treatment be placed outside of the Shy line distance to avoid this potentially dangerous driver behaviour. Offsets greater than 1m should be provided wherever possible.

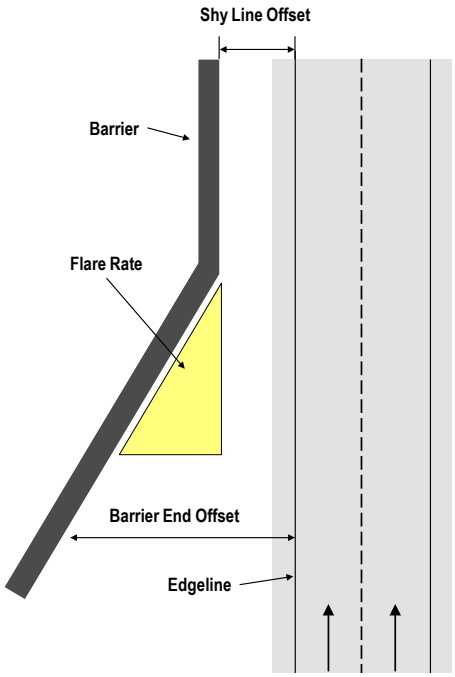
The additional space provides additional recovery area for errant vehicles, and will improve driver sight distance on curvilinear alignments. On worksites where space is severely limited, smaller shy line offsets may be requested in the TMP.

Barriers placed close to the edgeline will suffer from more nuisance hits and require more maintenance. Barrier systems should not be installed more than 4m from the edgeline to decrease the potential impact angles.

All barrier systems must be installed, such that there is a continuous smooth surface, to reduce the possibility of a vehicle snagging on impact.

Barriers must not be placed where they will restrict sight distance for vehicles entering, exiting, crossing or moving through the worksite.

Offset and flare reference locations



C18.4 End treatments

C18.4.1 General

The principles and best practice for permanent road safety barrier system design, selection and installation also apply to temporary installations. If a barrier system is required for a protected area or working space it must provide adequate shielding to ensure that an errant vehicle cannot enter the area.

All unprotected barrier ends pose a significant hazard to vehicles. The options are to:

- provide an approved end treatment
- flare the barrier system away from the road such that the end cannot be hit, or
- connect the barrier onto or start the barrier line behind the trailing end of a permanent barrier/guardrail system.

Unprotected barrier ends require an approved end terminal if they are located within the minimum offset distance measured from the edgeline, as shown in the offset and flare reference locations diagram on the previous page. The table below summarises these requirements.

Minimum barrier end offsets

Permanent speed (km/h)	50	60	70	80	90	100	110
Distance between unprotected barrier end and edgeline (m)	3	4	6	8	9	9	10

Where the end of a barrier can be impacted by an errant vehicle it must be protected by an approved end treatment and transition that is securely attached to the barrier. These are generally temporary plastic water filled crash cushions, or permanent type crash cushions used in longer term worksites.

Approved temporary end treatments are listed in NZTA M23 Appendix C Temporary Barrier Systems. Approved permanent end treatments listed in the NZTA M23: Specification for road safety barrier systems appendix A may be used in temporary applications.

End treatments must be installed and be immediately operational as part of the installation of the barrier system.

Temporary end terminals will generally be gating systems. If a gating end treatment is used, a 22.5m long X 6m wide clear zone on a maximum slope of 1:10 must be provided behind the end treatment to allow the gating to occur.

The manufacturer and supplier will provide the necessary installation information.

C18.4.2 Flares

Flares are used to locate the end of a barrier further away from a traffic lane, as shown in the offset and flare reference locations diagram.

A barrier end installed on a flare at a location where it cannot be hit by an errant vehicle will not require an end treatment. However, if the area in the front of a barrier end is traversable it must be protected.

Generally, a barrier system should be installed to minimise the angle of impact to reduce the crash impact energy. This will reduce the impact severity and the dynamic deflection into the working space or protected area.

Applicable barrier flare rates must not be exceeded such that the flared barrier is hit at a steep angle. A barrier impact angle in excess of 25 degrees exceeds the tested performance level.

Recommended flare rates for barrier system types are given in the table below.

Recommended flare rates

Permanent speed (km/h)	50	60	70	80	90	100	110
Barrier inside shy line	1:20	1:20	1:20	1:25	1:25	1:30	1:30
Rigid barrier outside shy line	1:15	1:15	1:15	1:20	1:20	1:20	1:20
Non-rigid barrier outside shy line	1:10	1:10	1:10	1:15	1:15	1:15	1:15

Lower flare rates that are provided by the manufacturer or supplier of a system must govern over these values.

C18.5 Barrier length

C18.5.1 Length of need

The barrier length requirement assures that a sufficient length of barrier is installed to prevent a vehicle leaving the road and entering the working space or protected area. Out of control vehicles typically leave the road at angles of less than 25 degrees and may travel considerable distance before impacting a hazard.

The length of need is the length of approach barrier needed to shield an errant vehicle from passing behind the barrier and entering the working space or protected area.

Factors influencing the length of need include:

- the length and width of the area personnel are occupying or the hazard to be protected
- the probable path and stopping distance for a vehicle leaving the roadway to avoid hitting objects in the protected area
- the layout of the barrier, including its lateral placement
- the location of the start of the flare (if any) and its flare rate, and
- the minimum length of barrier for the barrier to develop its ribbon strength.

The length of need may be determined using the simplified angle of departure method. The typical angles of departure for vehicles leaving the road are summarised in the table below.

Angles of departure

Permanent posted speed (km/h)	Leading angle (a) (Ratio 1: Forward distance)	Trailing angle (b) (Ratio 1: Forward distance)
less than 75	6° (1:10)	22° (1:2.5)
75 to 95	4° (1:15)	22° (1:2.5)
greater than 95	3° (1:20)	22° (1:2.5)

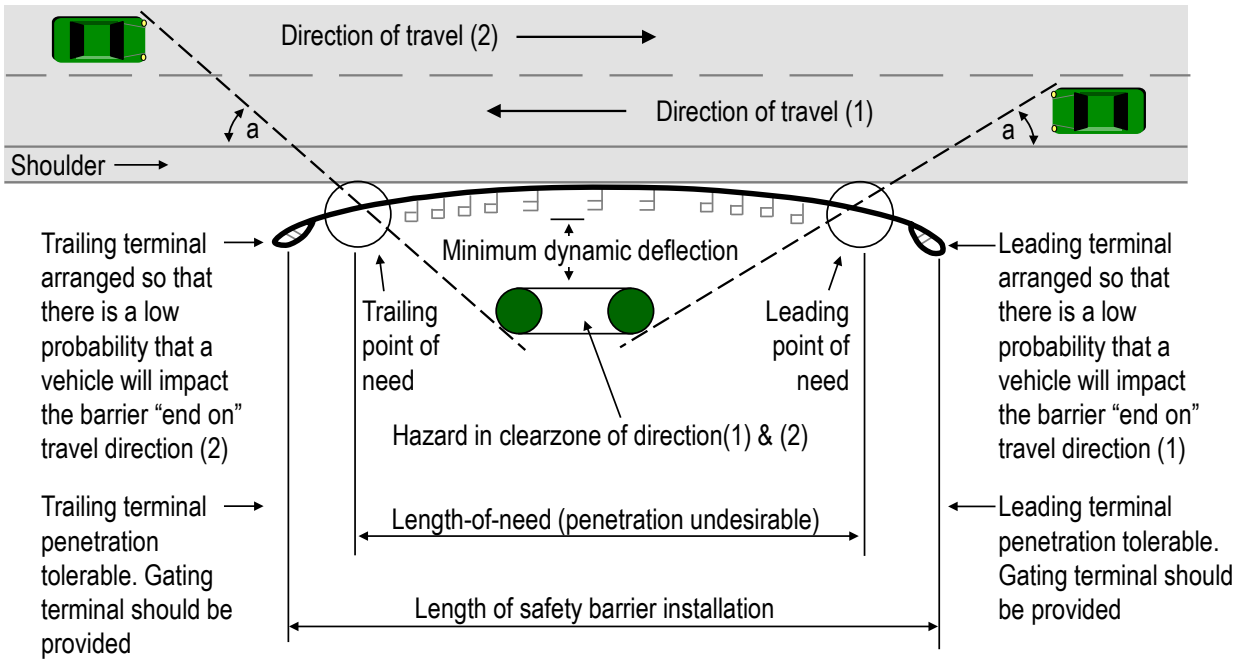
The graphical angle of departure method is summarized in the figure on the page.

The leading and trailing angles should be measured from a tangent on the outside lane edgeline.

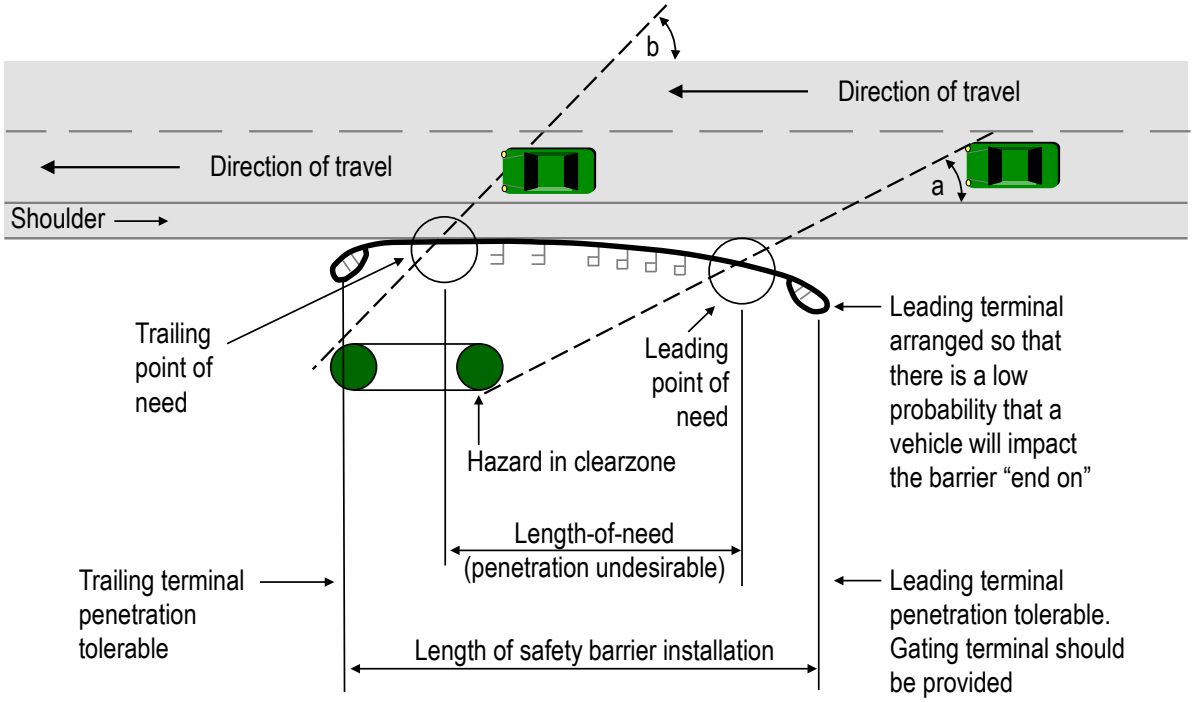
On the inside of a horizontal curve on a one-way carriageway the leading point of the length of need is established from a chord at the back of the hazard perpendicular to the centre of the curve.

The trailing point of the length of need is established using the trailing angle of departure. On a two-way carriageway the leading and trailing ends are established by the intersection of the long chord with the lane edgeline.

C18.5.2 Length of need – tangents



(a) Two-lane two-way road



(b) Wide multi-lane carriageway or one-way carriageway

C18.5.3 Minimum length

The length of need for barrier must be longer than the hazard itself.

The minimum length of a barrier system exclusive of end treatments will be the greater of the length of need or the minimum length for a particular system to perform as tested.

The minimum length for proprietary systems will be available from the manufacturer or supplier.

A user must ensure they understand the distinction between the minimum system length for containment, and the additional length for end treatments.

C18.6 Ground shape

Barrier systems are designed for impacts by vehicles with all four wheels on the ground and the suspension components in their normal position. The ground between the traffic lane and the barrier should therefore, be as level as possible, but no greater than the adjacent lane cross fall.

Any kerb(s) between the barrier and the traffic lane should be removed where the distance to the face of the kerb is greater than:

- 1.5m where the speed is 60km/h or less
- 2.1m where the speed is 70km/h, and
- 2.7m where the speed is 80km/h or more.

Barrier systems should not be installed on embankments with slopes steeper than 1:6, and preferably not steeper than 1:10.

All temporary barrier installations must allow surface drainage to pass unimpeded, to avoid surface ponding.

C18.7 Delineation

Temporary barrier systems should be conspicuous and have adequate delineation installed.

At night or during inclement weather this will improve the driver's ability to see the barrier and be guided past the protected area or working space. Maintenance and cleaning of the delineation and barrier face will enhance safety.

Barrier systems must not be the primary type of delineation for tapers, except on roads with permanent speed limits of 65km/h or less.

Where barrier systems are used on roads with permanent speed limits higher than 65km/h the primary means of delineation must be chevrons at 10m centres. The chevrons must be accompanied by road marking or other delineation (eg cones) placed on the traffic side of the barrier.

When barriers are installed complete with chevrons at 10m centres and with temporary road markings in place, the need to also install other delineation (eg cones) is removed.

When the barrier is removed the temporary road markings must be removed by water blasting, or another removal technique approved by the engineer.

Section B12 Barrier systems provides the required chevron layout.

C18.8 Visibility screens

Visibility screens must only be used when it can be demonstrated that there are safety benefits to be gained by their use.

Visibility screens may be used to help prevent motorists being distracted by the works to facilitate improved traffic conditions.

When installed they:

- must provide a continuous screen a minimum of 2m in height above the pavement being travelled by the passing vehicles and may be attached securely to or be free standing behind the temporary barriers must have welded or similarly connected joints. Mechanical fixings (pipe clamp, bolted joints etc.) are not to be used
- must not be attached to the front face of any temporary road safety barrier system
- must be capable of accommodating all environmental loads imposed during normal operating conditions including wind loads and the wind load generated from all passing vehicles. Under such imposed loads the screens are not to move out of line or move in any way that may distract motorists.

Where signs are present or placed behind the barrier, it may be necessary to remove one or more screens so that the signs are visible to the road user.

Any graffiti is to be painted over within **24** hours, or the visibility screen replaced.

C18.9 Approval requirements

Barrier system installation issues that are not covered by the manufacturer's or supplier's guidelines must be referred to the supplier and the road authority for resolution. These referrals and outcomes must be documented. Any outstanding issues should be referred to the NZ Transport Agency's National Traffic and Safety Manager for resolution.

The TMP must include a copy of the approved current barrier placement plan and the completed product specific installation checklists. The documented installation issue resolutions must also be included. A copy of the applicable product specific installation guidelines must also be kept at the worksite.

Any barrier placement changes done in the course of activity must be reflected in the approved current barrier worksite plan and checklists.

A temporary road safety barrier system must be monitored to ensure that the placement and condition remains acceptable. Any modification in the course of the activity requires that the modified system still comply with length of need, deflection, and the manufacturer's or supplier's installation guidelines.

C18.10 Design, installation and inspection of temporary barrier systems

NZTA currently provides a series of 3 barrier workshops:

1. Road safety barrier installation maintenance and inspection workshop (RSBIMI)
2. Temporary road safety barrier workshop (TRSB)
3. Road safety barrier design workshop (RSBD)

An assignment must be completed and passed to gain the qualification for each of the three barrier workshops.

The RSBIMI is a pre-requisite for the RSBD workshop.

From 1 January 2016, a person qualified on the TRSB workshop will be required to prepare TMPs involving barrier systems and to supervise the installation and maintenance of the temporary barrier system. They are responsible for signing off the temporary barrier section of the TMP as the **Installation Designer**.

Currently NZTA is working with Australian state roading authorities to introduce an installer certification system. Should this become available it will become the new accreditation standard.

All installations of temporary barrier systems must be undertaken by a suitably qualified System Installer who has qualified on the NZTA TRSB workshop. The System Installer is responsible for installing the road safety hardware and/or devices in accordance with the installation manual(s).

Barrier inspectors must be accredited by NZTA and the manufacturer of the barrier system.

C19 Maintenance standards

C19.1 General

The normal use of TTM equipment subjects it to wear and tear that does not occur with permanently installed equipment or devices.

Much of this wear and tear occurs during the storage, travel, installation, relocation and removal phases of TTM and causes deterioration in the appearance and effectiveness of the equipment and devices.

Whenever a high number of these worn and damaged devices are installed on a worksite the general appearance of the worksite deteriorates, reducing the level of safety for both road workers and road users.

C19.2 Quality classifications and requirements

The quality of TTM devices is divided into three categories: **acceptable**, **marginal** and **unacceptable**.

At the **time of the initial installation**, or at the time of any major changes to the worksite, **100 percent** of each type of device must be in an **acceptable** condition.

Types of devices include cones, tubular markers, barrels, barricades, barrier delineators, barriers, fence delineators, signs, variable message signs, arrow boards, temporary pavement markings, raised pavement markings and high-visibility clothing.

Equipment that must be in an **acceptable** condition at all times are:

- delineation devices at changes in direction including cone tapers, lateral lane shifts and chicanes
- T1'_', T2'_', TR1L/R, TR2'_', TR3'_', RS1, RS2, RS3, TG1 and TA2'_' signs
- high-visibility safety garments.

Up to 25 percent of other equipment and devices may be in a **marginal** condition.

Once more than 25% of devices at a worksite are identified as being in a **marginal** condition the equipment and devices must be cleaned to an **acceptable** standard, or replaced with **acceptable** equipment and devices within 12 hours.

Equipment and devices that are identified as being in an **unacceptable** condition are not permitted on the worksite and must be replaced immediately.

C19.2.1 Acceptable classification

Devices that meet the quality requirements as described in subsection C19.2 Quality classifications and requirements for this classification, and all other requirements such as design, size, colour, weight in the plans and specifications, must be considered to be acceptable for use as a traffic management device at worksites.

C19.2.2 Marginal classification

The term 'marginal' means marginally acceptable or at the lower end of acceptability. Devices that meet the quality criteria for marginal as described in subsection C19.2 Quality classifications and requirements for this classification, may remain on the worksite until 25 percent of the devices on the worksite are classified as marginal, or until it is determined that they have become unacceptable. When devices in the marginal category reach 25 percent those devices must be cleaned or replaced to the acceptable standard within 12 hours.

C19.2.3 Unacceptable classification

Devices in this category must not be delivered to the worksite. When found at a worksite, they must be replaced or repaired immediately.

C19.3 Evaluation for classification of TTM devices

C19.3.1 Evaluation guide: Traffic signs

Acceptable

A sign is acceptable if:

- there are abrasions on the surface but very little on the lettering or symbol
- there has been no touch-up of the lettering or symbol
- the message is legible and matches the approved design as per section B1 Signs.

Marginal

A sign is marginal if:

- there are many surface abrasions throughout the sign face and many are within the individual letters or symbol of the message
- the surface is marked by material (such as asphalt, bitumen, cement slurry or dirt) not obscuring the lettering or symbol
- some colour fading is evident, the background colour and reflectivity are still apparent
- the message is legible and matches the approved design as per section B1 Signs.

Unacceptable

A sign is unacceptable if:

- there is material (such as asphalt splattering, bitumen, cement slurry or dirt) obscuring the lettering or symbol
- the symbol and/or some letters have a loss of more than 50%
- there is a significant colour fading
- the message is illegible and does not match the approved design as per section B1 Signs.

C19.3.2 Examples of sign quality

	Daytime	Night-time
Acceptable		
Marginal		
Unacceptable		

C19.3.3 Evaluation guide: Sign stands and/or supports

The stands and/or supports upon which signs are mounted are evaluated in terms of their:

- stability
- effectiveness in holding sign panels, and
- potential for damaging sign panel faces or injuring workers while being handled or transported.

Acceptable

Stands and/or supports should be evaluated as being in acceptable condition if they:

- have minor buckling or bending but are still able to stand upright.

Marginal

Stands and/or supports should be evaluated as being in marginal condition if they:

- are buckled or bent such that the sign panel cannot be correctly connected to the stand and/or support
- allow panels to be deformed by wind or other loading
- allow round panels to be rotated within their frame.

Unacceptable

Stands and/or supports must be evaluated as being in unacceptable condition if they:

- have hanging weights of any type attached to the frame
- have bases that will roll
- are non-frangible
- unable to be placed/disassembled to a height equal to or less than 150mm
- are not able to hold the sign in a stable upright position (eg stand has buckled, stand has uneven legs and rocks from side to side).

C19.3.4 Evaluation guide: Cones and tubular delineators

Acceptable

A cone is acceptable if:

- the shape of the delineation device remains clearly identifiable with no significant distortion and is free standing in its normal position
- the surface is free of punctures and abrasions
- the surface is free of material (such as asphalt, cement slurry or other material) and will readily clean-up by washing
- the reflective bands have little or no loss of reflectivity with only minor tears and scratches.

Marginal

A cone is marginal if:

- the surface is marked by material (such as asphalt, bitumen, cement slurry or dirt) and cannot be readily cleaned
- the reflective bands have numerous tears and scratches
- the reflective bands are largely free of residue.

Unacceptable

A cone is unacceptable if:

- punctures and large areas of staining (due to materials such as asphalt, bitumen, cement slurry or dirt) make the device an unlikely candidate for improvement
- there is a significant area of missing or stained reflective material.

C19.3.5 Examples of cone quality

	Daytime	Night-time
Acceptable		
Marginal		
Unacceptable		

C19.3.6 Evaluation guide: High-visibility garments

Section B3 High-visibility garments details the design requirements for high-visibility clothing.

All high-visibility garments must be:

- in acceptable condition, and
- done up at all times when working on the road.

The quality is assessed for suitability for both daytime and night-time use of the high-visibility garment.

Acceptable

A high-visibility garment is acceptable if:

- the garment has only minor tears and scratches
- any abrasions do not seriously reduce the reflectivity or daytime impact.

Marginal

A high-visibility garment is marginal if:

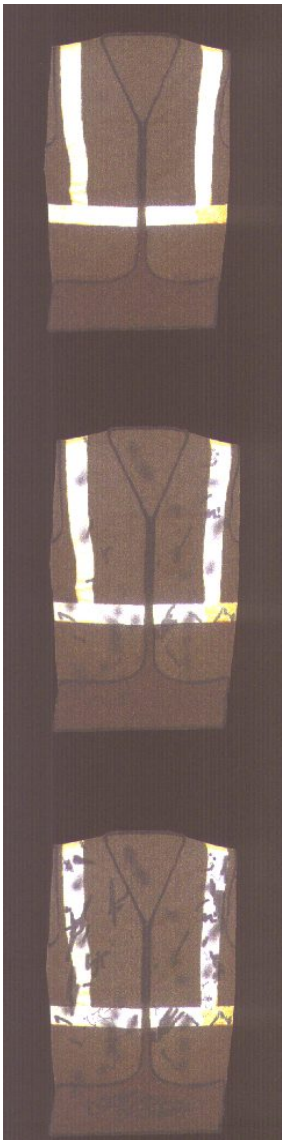
- the garment has numerous tears and scratches
- the garment has some marks (from materials such as asphalt splattering, bitumen, dirt or cement slurry) and may not be readily cleaned due to abrasion or discoloration. However, it is free of large areas of residue or missing reflective material.

Unacceptable

A high-visibility garment is unacceptable if:

- there are large areas of missing reflective material or asphalt splatter, bitumen, dirt or cement slurry
- there is missing and/or covered reflective material
- the garment is **not** done up. Jackets that are undone reduce the target value and are classified as unacceptable.

C19.3.7 Examples of high-visibility garment quality

	Daytime	Night-time
Acceptable		
Marginal		
Unacceptable		

C19.4 Personal safety

C19.4.1 Personal protective equipment (PPE)

Everyone on a worksite must:

- take reasonable care for his or her own personal safety; and
- take reasonable care that his or her acts or omissions do not adversely affect the health and safety of other persons; and
- comply with any reasonable instruction that is given in relation to health and safety; and
- cooperate with any reasonable policy or procedure relating to health or safety that they have been notified of.

PPE is essential for the safety of workers on site.

Wearing a high-visibility garment is a critical element of personal safety.

Other PPE that may be required includes (but is not limited to):

- hard hats
- reinforced toe cap boots
- ear muffs
- lanterns
- wet weather clothing.

C19.4.2 High-visibility garments

All high-visibility garments must meet the requirements of section B3 High-visibility garments.

Everyone on the worksite must wear a high-visibility garment. This garment must be put on before entering the worksite.

High-visibility garments must **always** be done up and in acceptable condition when being worn on a worksite.

The high-visibility garment must be the outer layer of clothing (eg not covered by a non-compliant rain coat in bad weather).

C19.4.3 STMS high-visibility garment

The STMS on all level 2 and level 3 roads must wear the STMS high-visibility garment when on site.

The STMS garment must also be worn by an STMS on level LV and level 1 roads where there are three or more, personnel on the worksite.

Where there are less than three personnel on the worksite, the level 1 STMS may wear an orange standard garment.

The STMS garment is not worn by a site traffic management supervisor – non-practising (STMS-NP). When on the worksite they wear a standard high-visibility garment.

C19.5 Monitoring of traffic management measures

C19.5.1 Monitoring frequency for TTM measures

Traffic management measures provided in the TMP must be monitored to ensure they remain:

- fit for purpose; and
- suitable for the nature and duration of the work; and
- installed, set up and used correctly.

Monitoring frequency is included in the approved TMP. The frequency will depend on individual worksite conditions and traffic volumes.

Crashes or near crashes, skid marks, traffic queues, unusually high or low speeds, any change in the work environment that is likely to give rise to a new or different risk, or the identification of a new hazard risk are indicators that traffic management measures may need to be reviewed.

If actions are required each time traffic management measures are monitored, then the monitoring frequency should be increased.

Minimum inspection frequency for traffic management devices such as portable traffic signals at unattended worksites should be worksite specific and stated in the TMP.

The maintenance measures contained in this section are mandatory for level 2 and level 3 roads and recommended for level LV and level 1 roads.

Checklists derived from the contractor's quality plan should be provided in advance and completed following each inspection.

The contractor must ensure that:

- all traffic management devices function properly for the full duration of their installation
- the visibility and effectiveness of all devices and signs is maintained
- damaged equipment is repaired or replaced, as appropriate, and
- suitable equipment is available at short notice in case of un-programmed removal, alteration or installation of a closure is necessary.

At attended worksites the STMS/TC must carry out the checks listed below.

Minimum Inspection frequency for traffic management devices

Device	Minimum inspection frequency
Sign: position and cleanliness	Two (2) hourly
Portable channelling and delineation devices: position and cleanliness	Two (2) hourly
Flashing beacons on vehicles	Daily
Wearing of safety jackets	Continuously
Safety jacket cleanliness	Daily
Arrow board operation in mobile closures	Prior to start of operation and 2 hourly thereafter
Arrow board operation in static closures	Two (2) hourly
Non-portable equipment	Daily

The first inspection must take place as soon as the equipment has been installed. This verifies that all devices are correctly in place, no item has been omitted, all equipment meets its condition requirements and no conflicting messages exist between permanent signs, temporary signs or other devices.

To facilitate worksite maintenance adequate stockpiles of equipment must be available, to ensure that response times can be achieved.

C19.5.2 Proprietary barrier and impact-absorbing systems

Where the surfaces of these devices are intended to aid delineation, because of their colour, they must be kept clean and be to at least the acceptable standard defined in subsection C19.3.4 Evaluation guide: Cones and tubular delineators.

The following must be inspected immediately after installation, every alternate working day and immediately after any involvement in a traffic crash.

- alignment
- barrier continuity
- linkage systems
- tensioning systems
- ballast fill levels
- ballast leakage
- damage due to impacts or wear and tear
- condition of frangible or crushable components, and
- cracked barriers (these are to be replaced).

Repairs and adjustments must be made to alignment faults greater than 30mm within one hour of occurrence, or within one hour of inspection, whichever allows the earliest remedial repairs to be undertaken. Other faults must be rectified within one working day.

Traffic Control Devices Manual
Part 8

Code of practice for temporary traffic management (CoPTTM)

manual number: SP/M/010

Section D

www.nzta.govt.nz

Fourth edition, Amendment 5 of
Code of practice for temporary traffic management

Date of issue: November 2018

Effective date: 1 February 2019

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)

Section D – Mobile operations

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 D5.4.6. Summary of requirements for level 3 mobile 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:

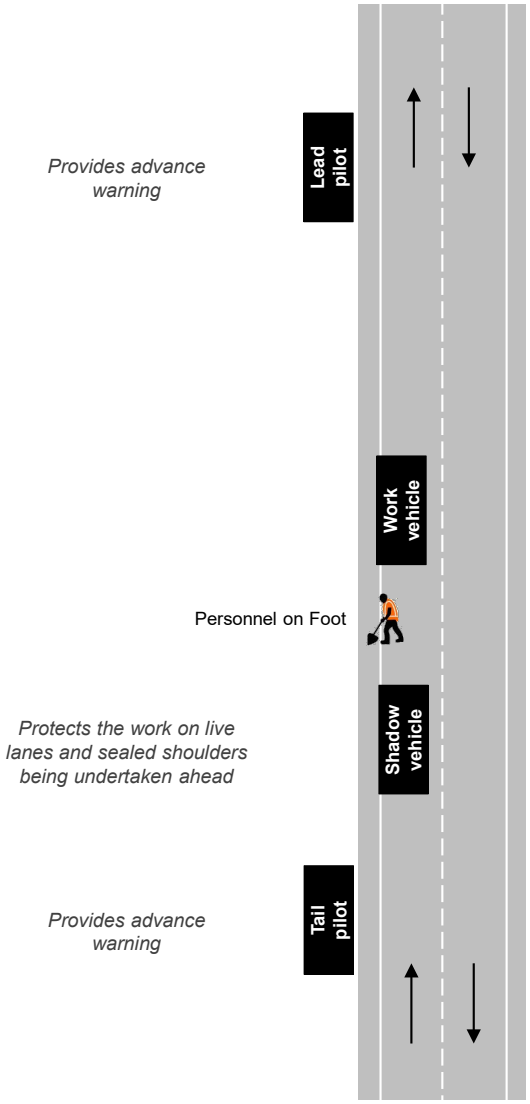
- road marking
- installing or removing raised pavement markers
- road inspections
- pavement testing
- mowing
- weed spraying
- shoulder grading
- pavement sweeping
- cesspit, sump or manhole cleaning
- marker post maintenance
- installation of road closures
- sight rail and road safety barrier repairs
- 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
- GRADER – T132
- MOWER – T136
- SKID TESTING – T133
- ROAD MARKING – T134
- vulnerable road users – T227 or T228 or T229
- stock – TF1 or TF2
- ROAD INSPECTION– TV3
- ROAD WORKS – TV2
- keep left – RD6L and keep right – RD6R
- PASS WITH CARE – TV4, 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 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 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 or RD6L sign.

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

  or

- the TV4 PASS WITH CARE 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 signs can be omitted from the TV4 PASS WITH CARE sign

Where a horizontal arrow board is used in a mobile operation the TV4 PASS WITH CARE sign will be retained but the RD6L/R 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 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. Indicator lights are not to be used as hazard warning lights while amber flashing beacons are operating. The indicator lights should be reserved for indicating changes of direction.

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 be kept on at all times.

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 must 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.

Arrow boards must not be used to direct traffic into opposing traffic flows. 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.

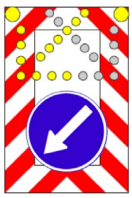
LAS must not be used to direct traffic in alternating flow situations. LAS must not be used to direct traffic into opposing traffic flows.

Where a LAS is in use, the RD6L/R must be used to direct traffic where there is at least 3m of clear road 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 must not be displayed. Where the RD6L/R is not to be used, the arrow component is not to be visible to road users.

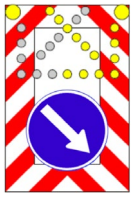
Retrofit covers which partially obscure the arrow may be used until 31 December 2020, after which date the NZTA would require them to be replaced by a system that does not adopt the down arrow position.

LAS is operated as follows:



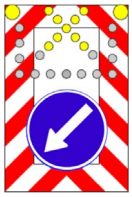
Arrow left

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



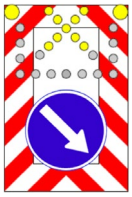
Arrow right

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



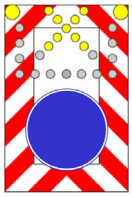
Caution mode left

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



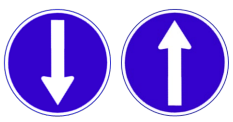
Caution mode right

A part of the roadway which is not used for driving is closed (usually a shoulder). Road users may pass on to the right 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 not gazetted signs and **must not** be used.

An RD6L or RD6R sign must not be visible when a 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* (a draft of which is available on the NZTA's website) 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.

Horizontal arrow boards must not be used to direct traffic into opposing traffic flows.

Where horizontal arrow boards are being used in a mobile operation the TV4 PASS WITH CARE sign will be retained but the RD6L/R 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.

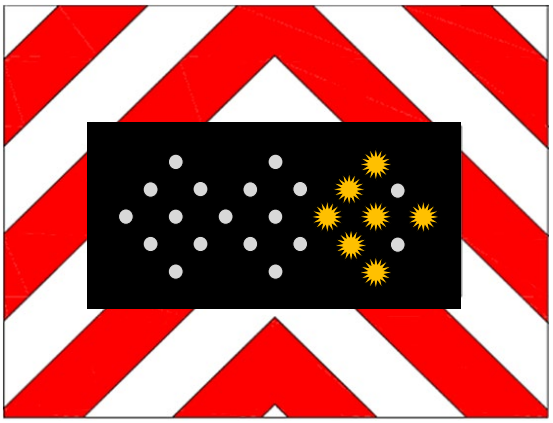
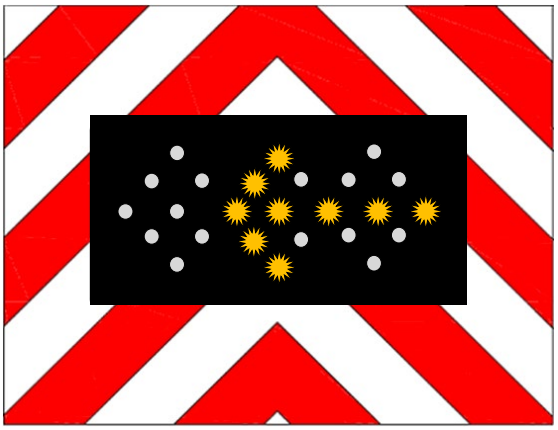
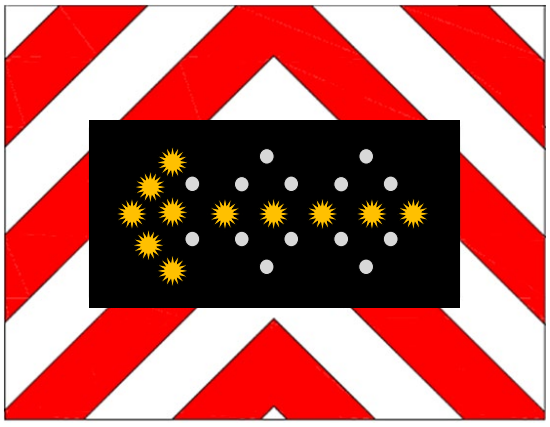
D1.8.2 Operation of horizontal arrow board

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.

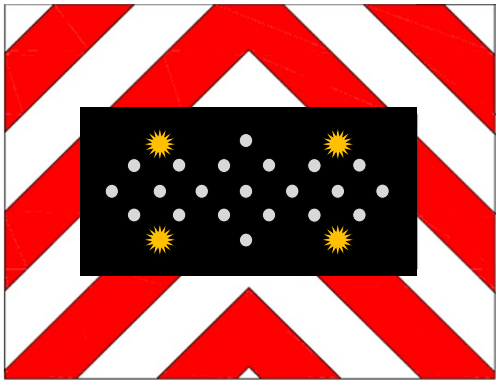
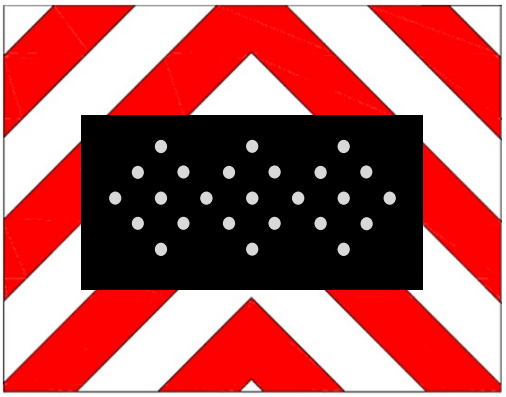
D1.8.3 Permitted display for horizontal arrow board

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 AWVMS. 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 AWVMS 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 AWVMS within 1600m of a shadow vehicle.

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

To avoid lamps shining directly at drivers of approaching vehicles, an AWVMS must not be located on a sag curve. The AWVMS 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 AWVMS 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* (a draft of which is available on the NZTA's website) 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* (a draft of which is available on the NZTA's website).

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 AWVMS 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 AWVMS.

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.

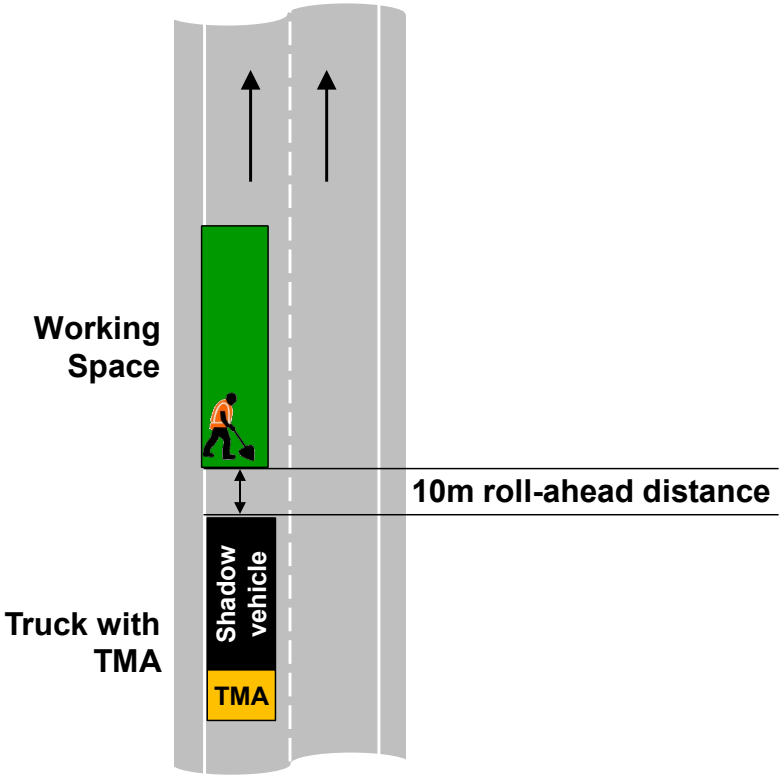
D1.10.3 Allow for roll ahead

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

All roads have vertical or horizontal curves which will momentarily interfere with visibility.

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

CSD can be deemed to be present if it is achieved within a distance of 1Km.

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 D4.2 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 on 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.

Operations such as mowing and sweeping may be carried out next to a wire rope barrier.

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:

- AWVMS, 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 AWVMS 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 D4.2 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. In addition, if the operation is on the lane, then static advance warning signs must also be placed on any intersecting roads.

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 D4.2 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. Static signs are not required on side roads when pilot vehicles are used (except for semi-static operations, refer subsection D6.1.2.5 Side roads).

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 live lane, 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 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 vehicle and shadow vehicle (metres)	Position on road
Under 65	Between 15 and 40 behind the work vehicle(s)	In the same lane
Over 65	Between 15 and 60 behind the work vehicle(s)	In the same lane

If a mobile operation comes to an intersection, on/off ramp, or side road the shadow vehicle may have to move closer to the work vehicle to compensate for turning traffic.

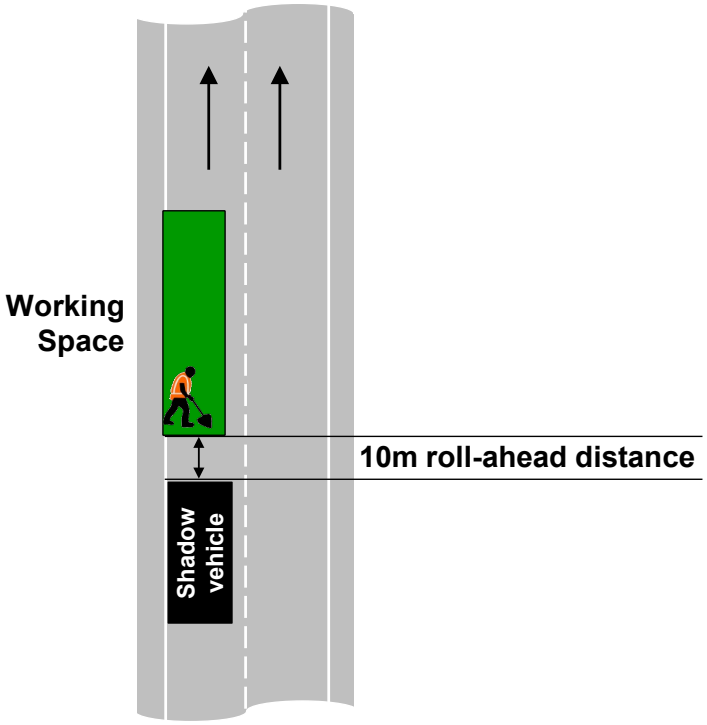
The rear visibility required for a shadow vehicle is at least:

- 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)
- 100m on **level 2** and **level 3** roads.

Where rear visibility cannot be achieved an additional shadow vehicle(s) may be added.

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.



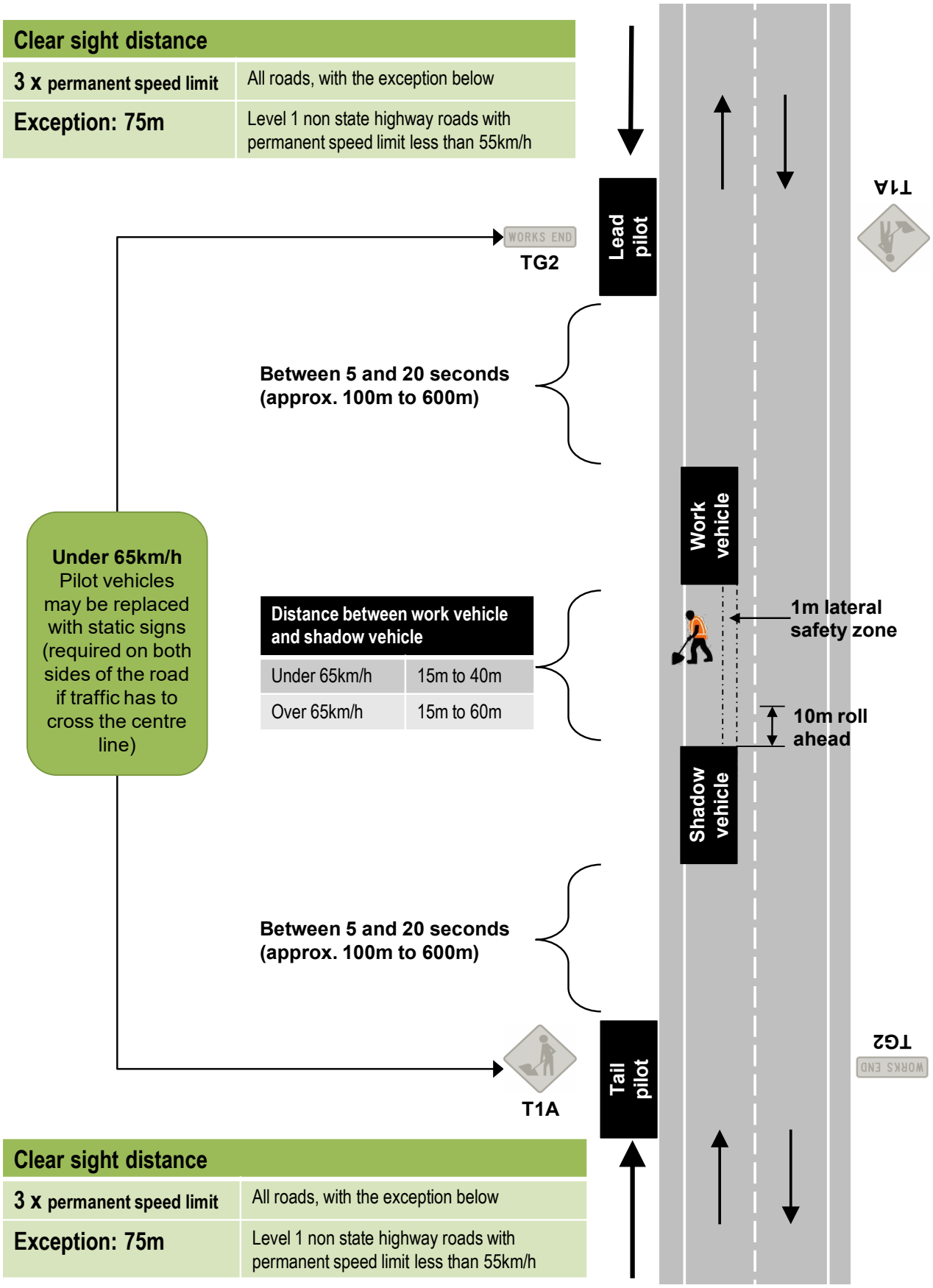
D4.1.5 Braking of vehicles

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 D4.2 Summary of key distances for level 1 mobile operation.

D4.2 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

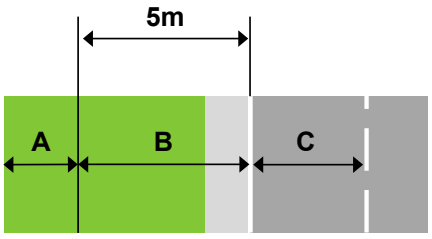
- Mobile operations for this level utilise rear mounted advance warning T1 type signs or TV4 PASS WITH CARE sign and the RD6R sign.
- Each vehicle has at least one (preferably two) amber flashing beacon(s).
- The minimum rear CSD required is 3 x the permanent speed limit (or operating speed if declared 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 15m and 60m (or between 15m to 40m if the permanent speed limit is under 65km/h).

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 sign or • the TV4 PASS WITH CARE sign and the RD6R 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 road works sign, and any relevant supplementary plate, must be erected in advance of the worksite – additional T1A 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 PASS WITH CARE sign and an RD6R/L keep right/left sign must be mounted on the work vehicle(s) – a TG2 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 road works sign and any relevant supplementary plate and an RD6R keep right sign, or an RD6L keep left sign is required – the work vehicle(s) must be fitted with rear TV4 PASS WITH CARE sign(s) and an RD6R/L 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 road works sign, and any relevant supplementary plate, must be erected in advance of the worksite
   - a shadow vehicle fitted with a TV4 PASS WITH CARE sign and an RD6R keep right sign or an RD6L keep left sign is required when personnel are on foot within the worksite
   - the work vehicle(s) must be fitted with rear-mounted TV4 PASS WITH CARE sign and an RD6R keep right sign or an RD6L keep left sign
   - a TG2 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 road works sign with any relevant supplementary plates and an RD6R keep right sign or an RD6L keep left sign is required
   - a shadow vehicle fitted with a TV4 PASS WITH CARE sign and an RD6R keep right sign or an RD6L 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 PASS WITH CARE signs with RD6R keep right signs or RD6L keep left signs
   - the leading work vehicle must be fitted with a front-mounted TV2 ROAD WORKS sign, unless a lead pilot vehicle is required
   - where the activity is on a two-lane two-way 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 ROAD WORKS sign is required.

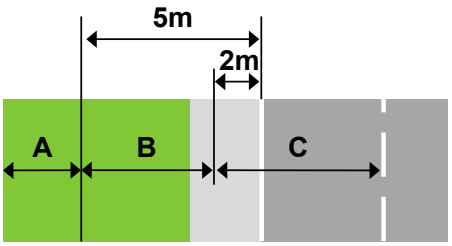
D5.2 Level 2 roads

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 15m and 60m (or between 15m 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)

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 sign

  or
- the TV4 PASS WITH CARE sign and the RD6R sign.

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 road works sign and any relevant supplementary plate, must be erected in advance of the worksite
   - additional T1B 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 PASS WITH CARE sign and an RD6R/L keep right/left sign must be mounted on the work vehicle(s)
   - a TG2 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:
     - the requirements of 3(a) above apply
   - the permanent speed limit is greater than 65km/h:
     - a tail pilot vehicle fitted with a T1B road works sign and any relevant supplementary plate and an RD6R keep right sign or an RD6L keep left sign is required – located at least 2m from edgeline at all times
     - the work vehicle(s) must be fitted with a rear-mounted TV4 PASS WITH CARE sign(s) and RD6R 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:
     - a T1B road works sign and any relevant supplementary plate must be erected in advance of the worksite
   - Shadow vehicle:
     - 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 is required
     - 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 (blue disk/white arrow)
   - Work vehicle:
     - the work vehicle(s) must be fitted with a rear-mounted TV4 PASS WITH CARE sign and the relevant RD6L/R keep left, keep right signs
     - where the activity is on a two-way two-lane road the leading work vehicle must be fitted with a front-mounted TV2 ROAD WORKS sign unless a lead pilot is required
   - Works end:
     - a TG2 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):
     - either a light goods vehicle (or light trailer) mounted AWVMS displaying a T1 road works sign and direction and protection signs
     - 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 (blue disk/white arrow), and the T1B road works sign and any supplementary plates
   - Shadow vehicle:
     - 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 is required
     - 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 (blue disk/white arrow)
   - Work vehicle:
     - the work vehicle(s) must be fitted with a rear-mounted TV4 PASS WITH CARE sign and the relevant RD6L/RD6R keep left, keep right signs

- Lead pilot vehicle:
  - where the activity is on a two-lane two-way road the leading work vehicle must be fitted with a front-mounted TV2 ROAD WORKS sign unless a lead pilot is required
  - 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 ROAD WORKS sign is required.

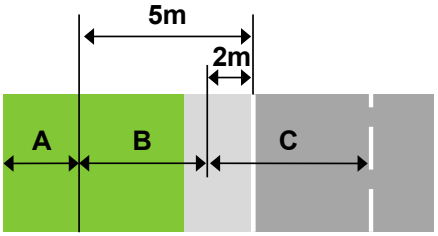
D5.3 Level 3 roads

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 15m 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)

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 sign

  or

- the TV4 PASS WITH CARE sign and the RD6R sign.

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 road works sign and any relevant supplementary plate must be erected in advance of the worksite – additional T1B 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 PASS WITH CARE sign and an RD6R keep right sign must be mounted on the work vehicle(s) – a TG2 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 T1 road works sign and direction and protection signage plus distance ahead – the work vehicle(s) must be fitted with a rear-mounted TV4 PASS WITH CARE sign and the relevant RD6L/R (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 T1 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 is required. • The work vehicle(s) must be fitted with a rear-mounted TV4 PASS WITH CARE sign and the relevant RD6L/R (keep left, keep right signs).

D5.4 Summary of requirements for mobile closures

D5.4.1 Introduction

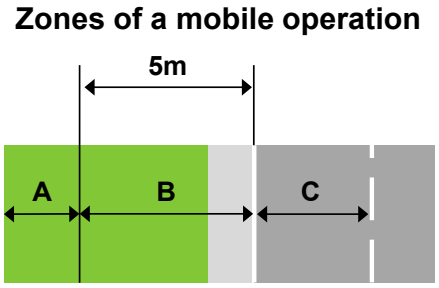
The summaries of requirements for each level of road are set out on the following pages.

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:



A Greater than 5m from edgeline

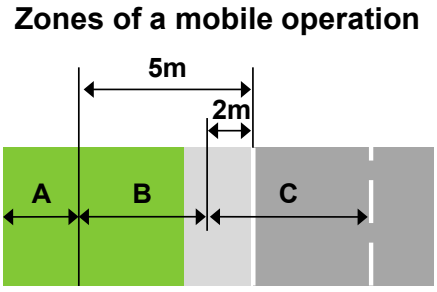
B Within 5m of edgeline and not on live lane

C On live lane

Refer to the figure D4.2 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:



A Greater than 5m from the white edgeline

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

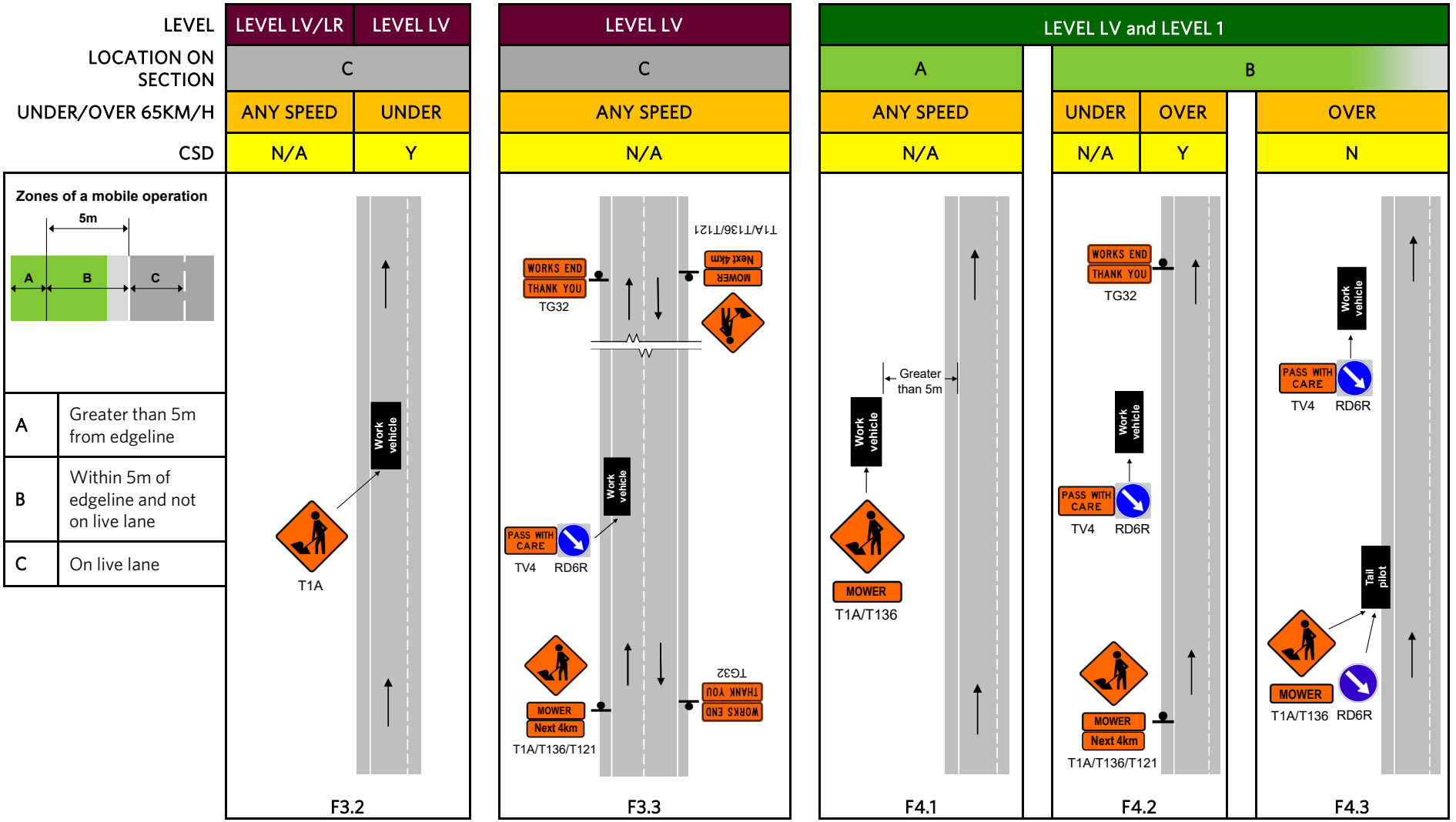
C On the live lane and the first 2m outside the white edgeline on the road shoulder

D5.4.3 CSD

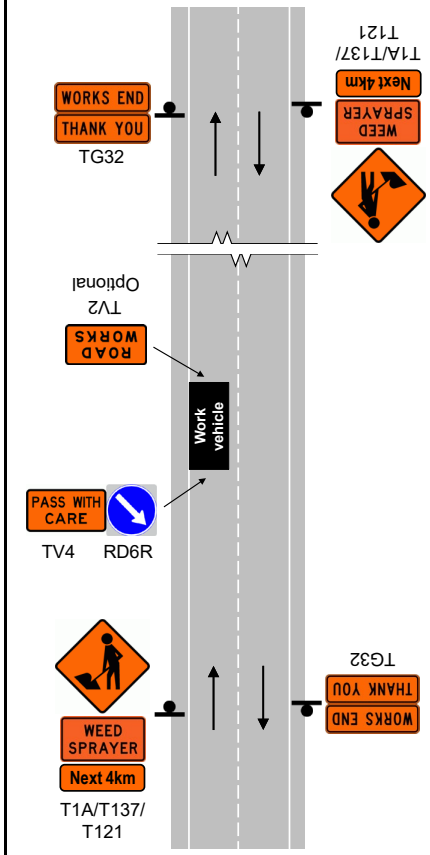
The key to interpreting the CSD requirements is:

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

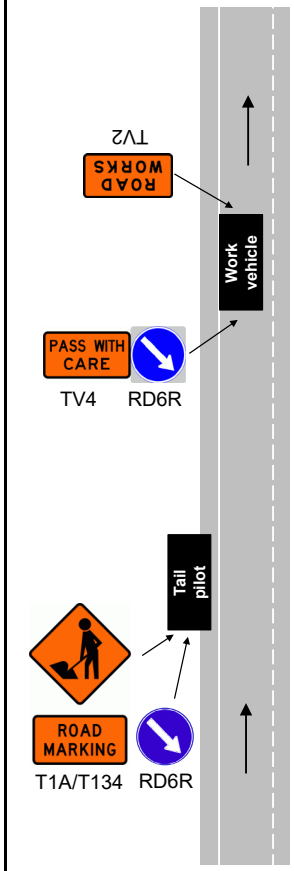
D5.4.4 Summary of requirements for level LV and level 1 mobile closures



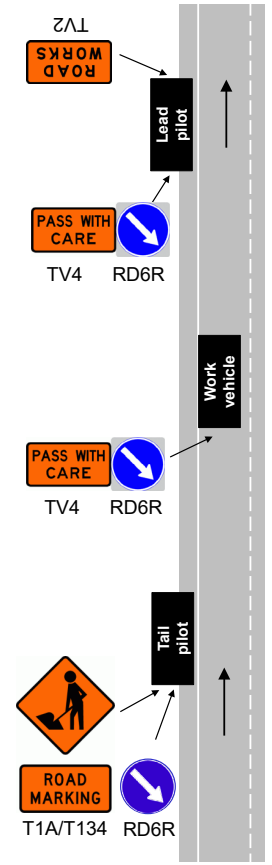
LEVEL	LEVEL LV and LEVEL 1			
LOCATION ON SECTION	C			
UNDER/OVER 65KM/H	UNDER	OVER	OVER	ANY SPEED
CSD	N/A	Y	N*	AS NOTED*



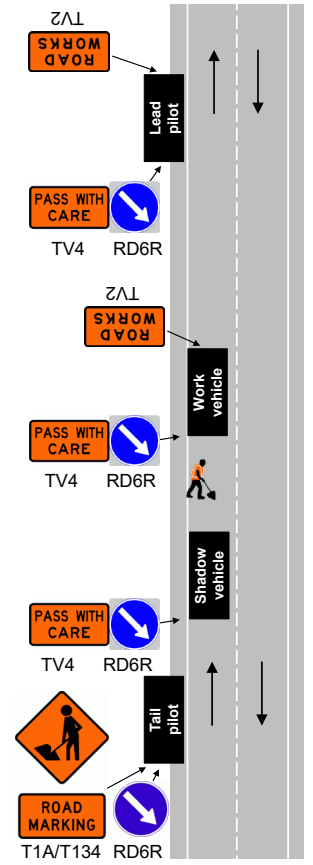
F4.4



F4.5



F4.6



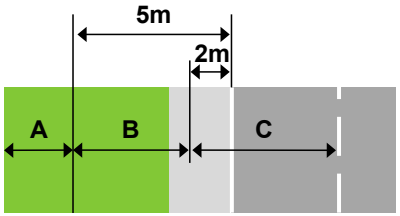
F4.7

*Lead pilot only required if CSD not available to the work vehicle for 1km or more in advance of the operation. TV2 on lead work vehicle not required if speed under 65km/h.

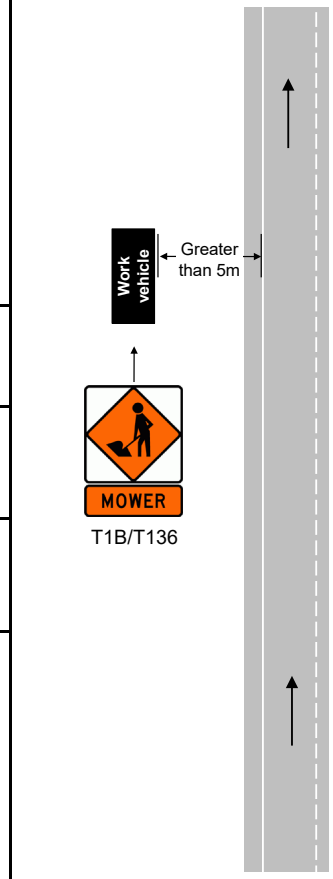
D5.4.5 Summary of requirements for level 2 mobile closures

LEVEL	LEVEL 2			
LOCATION ON SECTION	A	B		
UNDER/OVER 65KM/H	ANY SPEED	UNDER	OVER	OVER
CSD	N/A	N/A	Y	N

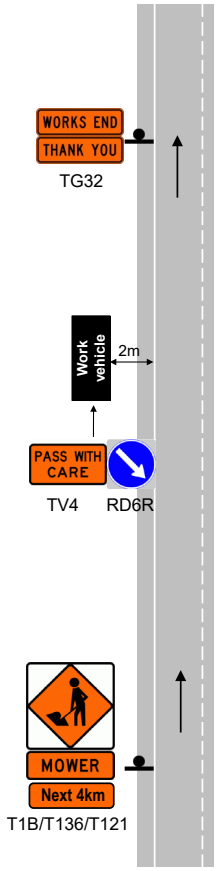
Zones of a mobile operation



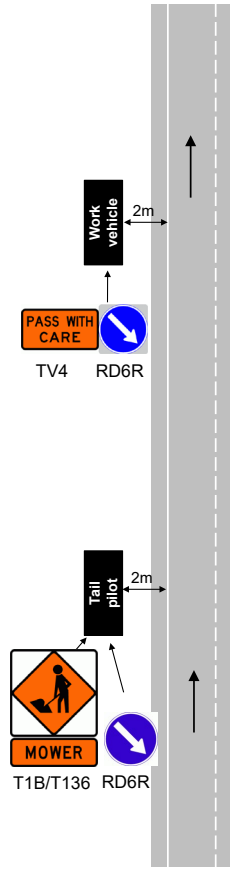
A	Greater than 5m from the white edgeline
B	From 2m outside the white edgeline to a point 5m outside the white edgeline
C	On the live lane and the first 2m outside the white edgeline on the road shoulder



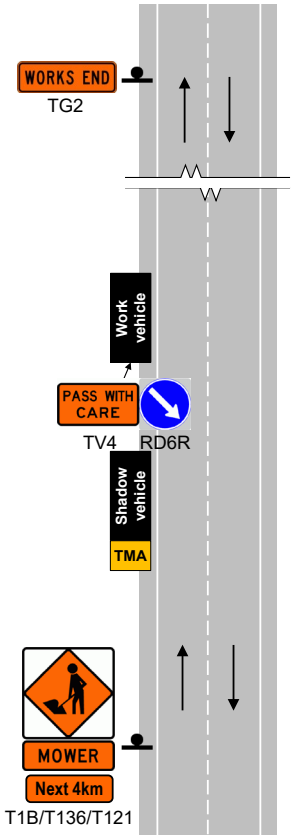
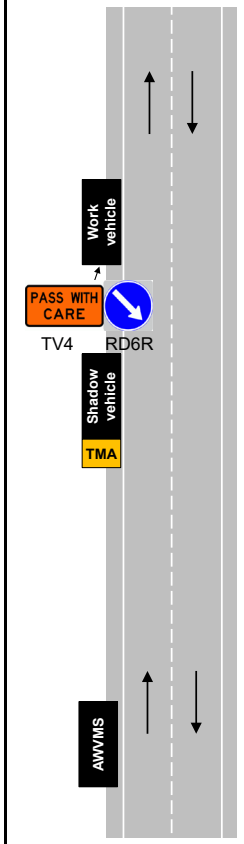
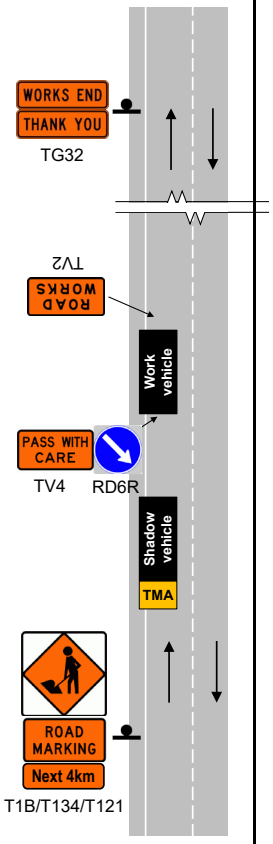
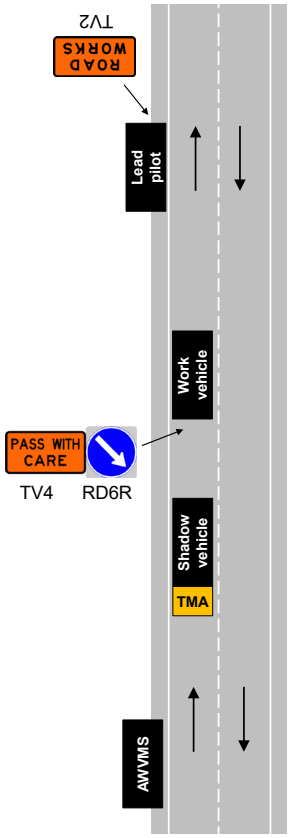
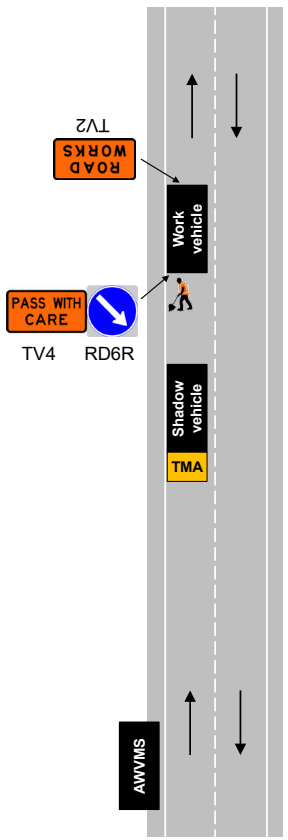
G2.1

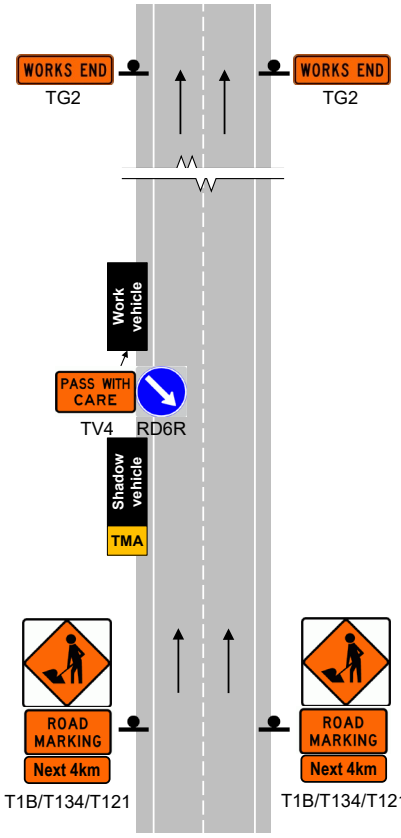
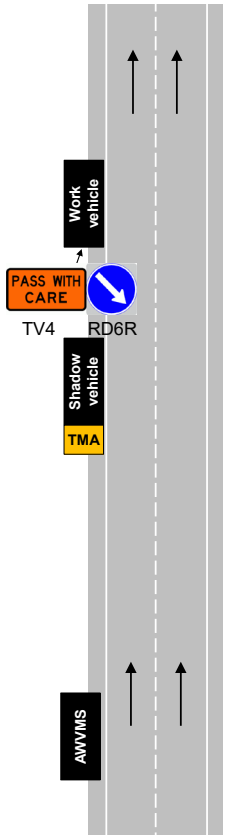
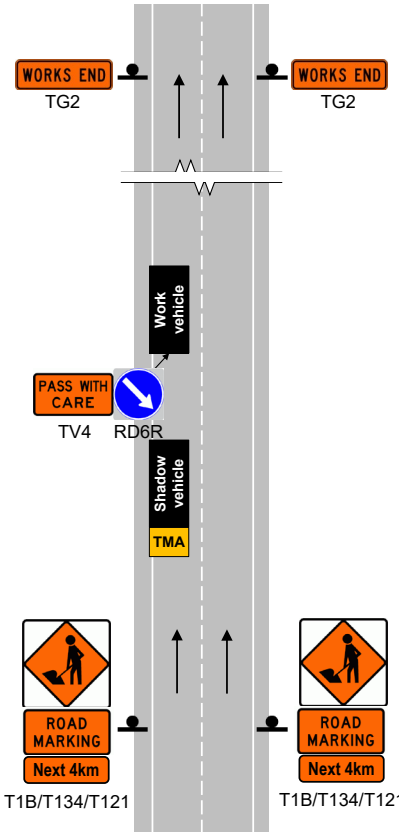
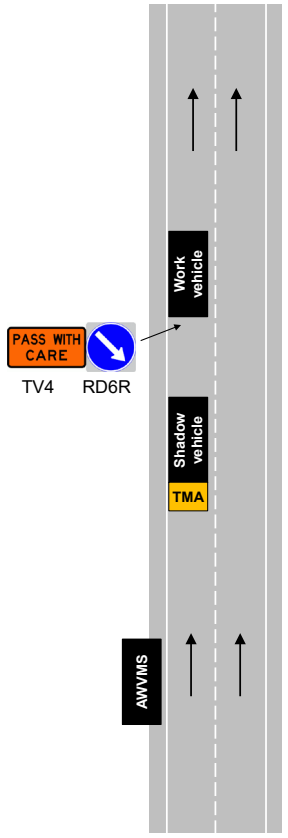


G2.2



G2.3

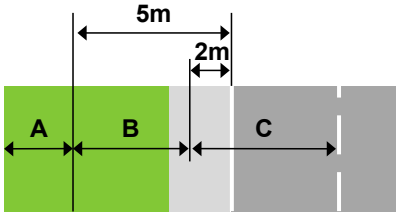
LEVEL	LEVEL 2				
LOCATION ON SECTION	C				
UNDER/OVER 65KM/H	UNDER	OVER	UNDER	OVER	OVER
CSD	N/A	Y	N/A	AS NOTED*	AS NOTED*
	 G2.4	 G2.5	 G2.6	 G2.7	 G2.8
			TV2 ROAD WORKS sign required on the lead vehicle if on a two-way road.	*Lead pilot required if CSD not available to the work vehicle for 1km or more in advance of the operation.	*Lead pilot **not** required if CSD to the work vehicle available for 1km or more in advance of the operation.

LEVEL	LEVEL 2			
LOCATION ON SECTION	C			
UNDER/OVER 65KM/H	UNDER	OVER	UNDER	OVER
CSD	N/A	Y	N/A	Y
				
	G2.9	G2.10	G2.11	G2.12

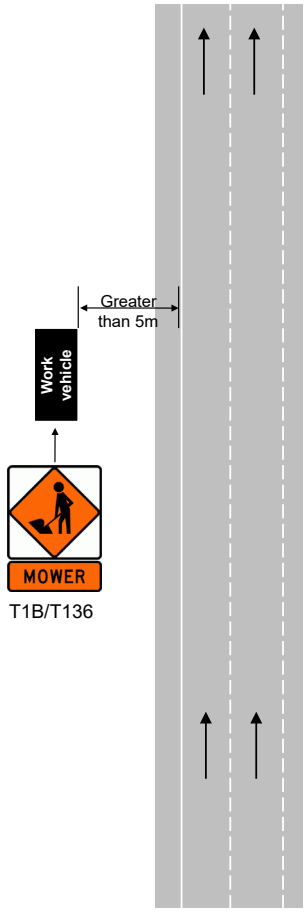
D5.4.6 Summary of requirements for level 3 mobile closures

LEVEL	LEVEL 3	
LOCATION ON SECTION	A	B
CSD	N/A	Y

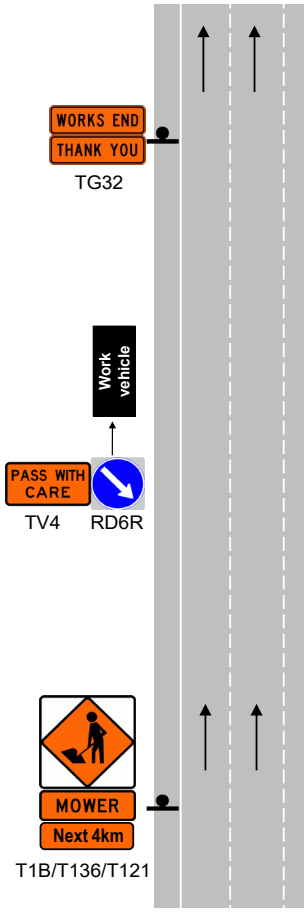
Zones of a mobile operation



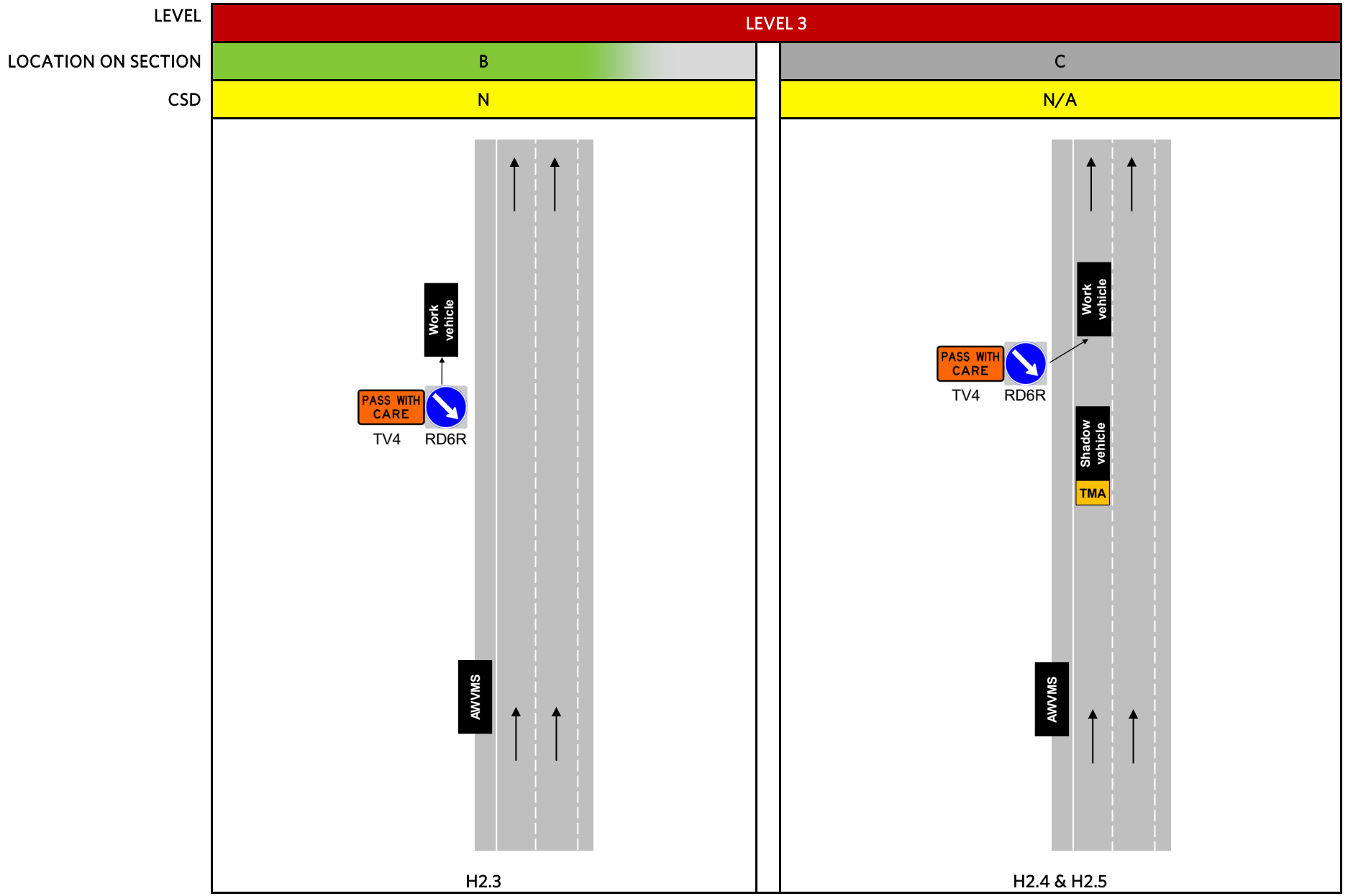
A	Greater than 5m from the white edgeline
B	From 2m outside the white edgeline to a point 5m outside the white edgeline
C	On the live lane and the first 2m outside the white edgeline on the road shoulder



H2.1



H2.2


LEVEL
LEVEL 3
LOCATION ON SECTION
B
C
CSD
N
N/A
Work vehicle
PASS WITH CARE
TV4
RD6R
AWVMS
H2.3
Work vehicle
PASS WITH CARE
TV4
RD6R
Shadow vehicle
TMA
AWVMS
H2.4 & H2.5

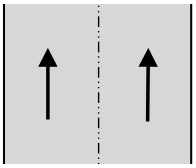
D6 Semi-static closures

D6.1 General

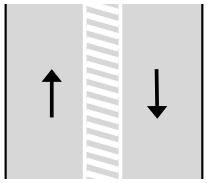
Where a mobile closure on the carriageway of the road cannot be completed within 10 minutes, it becomes a semi-static closure, by definition.

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.

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.

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

D6.1.1 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 semi-static closures:

- Advance 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 at the rear of the shadow vehicle.

  Note: If an AWVMS is used, the cone taper is not required at the rear of the initial shadow vehicle.
- Cone spacings must conform to the requirements given in the appropriate layout distance table in section C2 Worksite layout.

D6.1.2 Signs

D6.1.2.1 On one-way multi-lane roads

On one-way multi-lane roads T1A or T1B type road works signs must be placed in advance of the closure and on both sides of the carriageway.

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.

D6.1.2.2 For two-way two-lane roads

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

D6.1.2.3 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.

D6.1.2.4 AWVMS

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

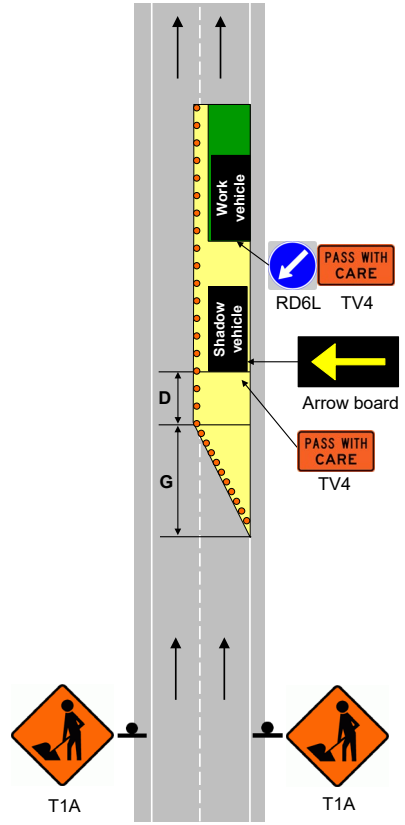
- If there are three or less traffic lanes in the same direction, there is no need for a static sign(s) to be erected on the shoulder, opposite the AWVMS on the other side of the road.
- If there are four or more traffic lanes in the same direction, a static sign(s) must be erected on the shoulder, opposite the AWVMS on the other side of the road, or the operation must revert to a static closure.
- The initial approach taper to the rear of the shadow vehicle is not required. Refer to the semi-static closure diagrams in section H.

D6.1.2.5 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.

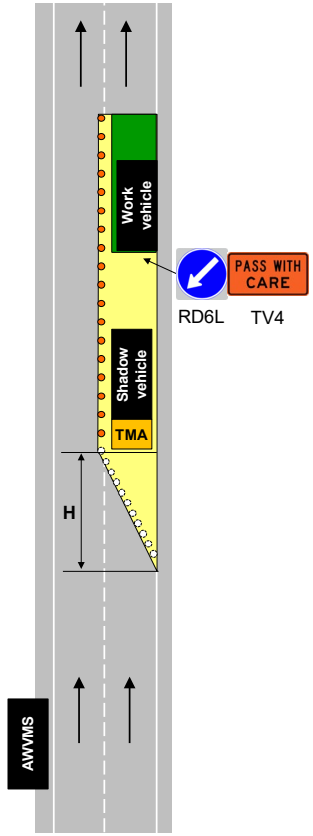
D6.1.3 Summary of requirements for semi-static closures (work for more than 10 minutes but less than one hour)

LEVEL	LEVEL 1	LEVEL 2
LOCATION ON SECTION	C	C
UNDER/OVER 65KM/H	ANY SPEED	ANY SPEED
CSD	N/A	N/A



F4.9

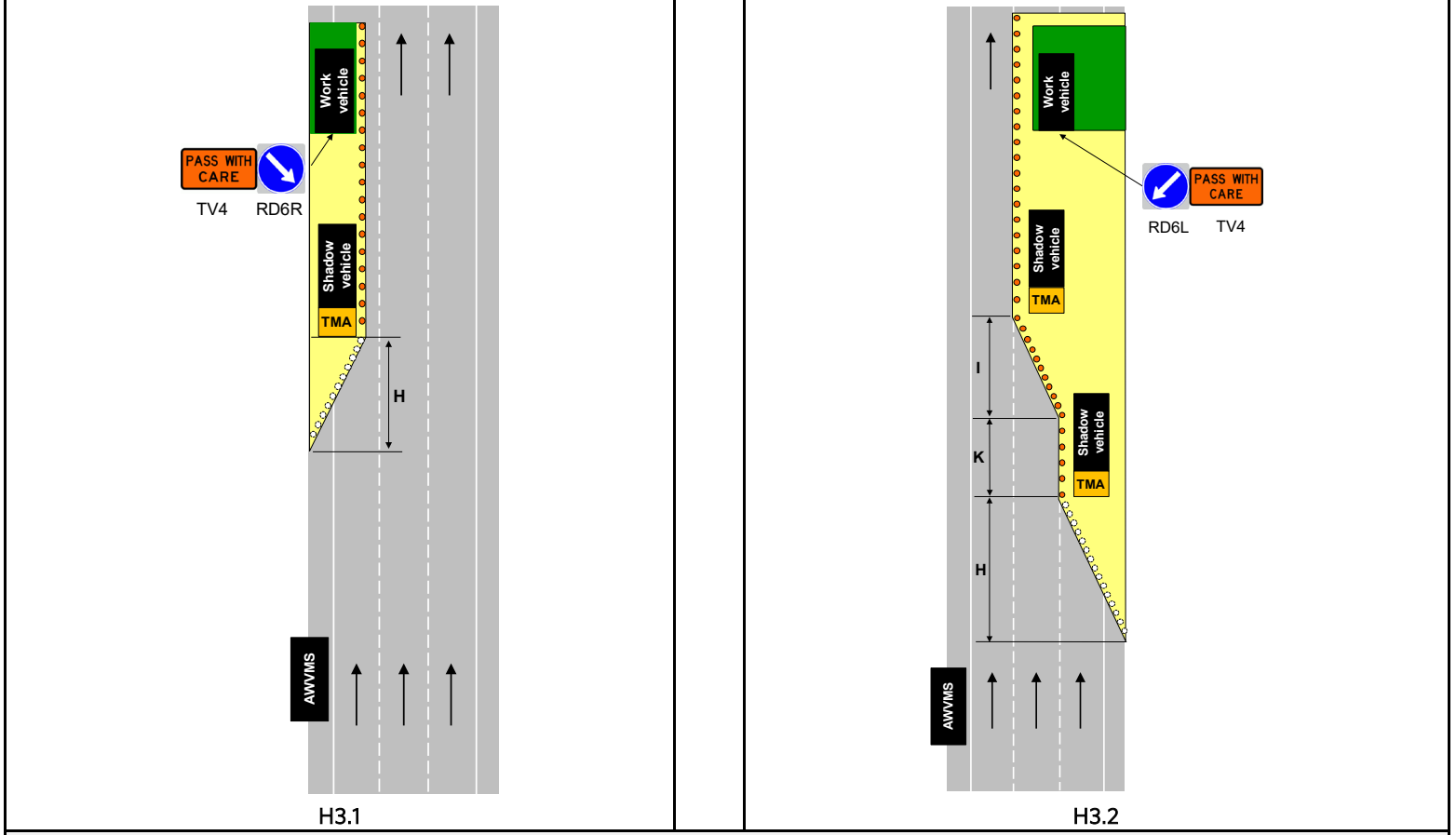
One of the T1A signs could be mounted on a tail pilot vehicle.



G2.14

Where an AWVMS is used, a cone taper (H) is not required.

LEVEL	LEVEL 3
LOCATION ON SECTION	C
CSD	N/A



If an AWVMS is not used, signs are required on both sides of the road. Where an AWVMS is used, cone taper H is not required.
On four-lane roads an additional advance warning sign is required opposite the AWVMS.

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 subsection I.2: Road marking standard TMPs which is only available electronically.

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 road 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

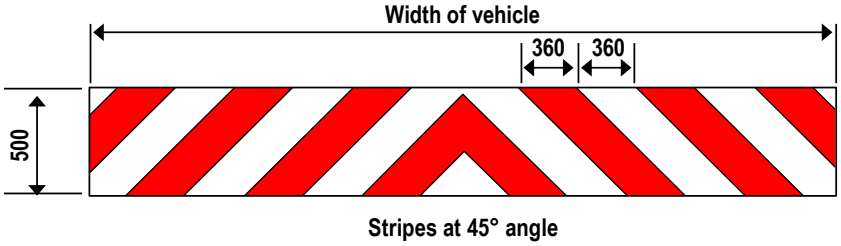
D7.3.1 Kerbside refuse and recycle collections

Kerbside collection is a service provided to households and businesses, typically in urban and suburban areas, where households' and businesses' refuse and recyclables, left at the kerbside in wheeled bins, crates or bags, are collected by personnel.

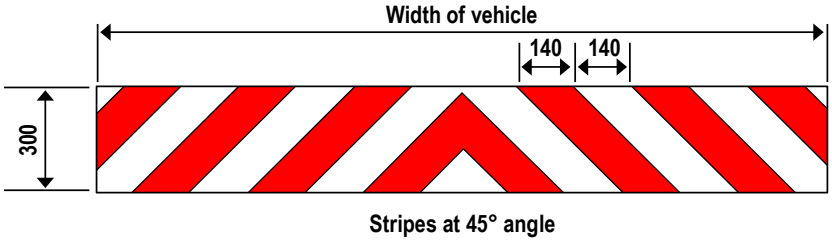
For kerbside refuse and recycle collections the following applies:

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 kerbside collection traffic leader (KCTL). 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 KCTL.
5. Training for a KCTL is available through the CoPTTM training system. KCTL is a unique qualification for the Waste Collection Industry and must be renewed every three years.
6. All KCTLs 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 KCTL 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 retro-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 ie 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 KCTL qualification and carry their warrant card when operating a kerbside collection vehicle.
17. All new drivers must obtain a KCTL 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 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. Methods available include using the traffic signals, or a semi-static closure.
- They may only be implemented where delay calculations indicate that any queues forming during a rolling block of five minutes, can be readily 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 AWVMS 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, level 1 and level 2 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 and level 2 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.

For inspection activities that are carried out by a TC on level LV and level 1 roads the STMS must be immediately contactable but does not have to be within 30 minutes travel time of the worksite.

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

There must be CSD to the inspector when on the live lane.

If this cannot be achieved, a spotter must be placed in a position where CSD can be attained and give verbal instructions to the inspector. If this is not possible, a static or mobile operation 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 (ie by a barrier or closure both sides).

Inspection activities are not permitted on a live lane of level 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 ROAD INSPECTION indicating the type of activity taking place and to give advance warning (of more than CSD) for approaching drivers. The following exemptions apply:

- A vehicle is not required on a level LV, level 1 or level 2 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 roads.

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 or TC Inspector.

D7.6.5.2 Level 2 or level 3 roads

For level 2 and level 3 roads where the activity is totally outside the edgeline, the inspection activity must be under the control of:

- a level 2/3 STMS, or
- a STMS-NP, or
- a TC Inspector.

For level 2 roads under 65km/h where the activity is on the lane of a road, the onsite control must be by an STMS L2/3, or an STMS-NP or a TC Inspector.

For level 2 roads, over 65km/h where the activity is on the lane of a road, the onsite control must be by an STMS L2/3 or an STMS-NP. The inspection must only be carried out with RCA approval and may be subject to RCA conditions (eg locations, times).

D7.7 Summary of requirements for inspections

<table>
<tr><th>Type of road</th><th>On shoulder, berm or footpath – no time limit</th><th>On live lane – up to 5 minutes</th><th>Over 5 minutes</th></tr>
<tr><td>Level LV</td><td colspan="2">Spotter optional – can be one person activity:
• Working under the approved TMP, following the STMS' briefing
• Onsite control must be by an STMS, or a TC or a TC Inspector.</td><td rowspan="5">Inspection not permitted.

Must use a mobile, semi-static, or static closure.</td></tr>
<tr><td>Level 1</td><td rowspan="4"></td><td>Spotter required – minimum two person activity:
• Working under the approved TMP, following the STMS' briefing
• Onsite control must be by an STMS, or a TC or a TC Inspector.</td></tr>
<tr><td>Level 2 under 65km/h</td><td>Spotter optional – can be one person activity:
• Working under the approved TMP, following the STMS' briefing
• Onsite control must be by an STMS L2/3, or an STMS-NP or a TC Inspector.</td><td>Spotter required – minimum two person activity:
• Working under the approved TMP, following the STMS' briefing
• Onsite control must be by an STMS L2/3, or an STMS-NP or a TC Inspector.</td></tr>
<tr><td>Level 2 over 65km/h</td><td>Inspection must only be carried out with RCA approval and may be subject to RCA conditions (eg locations, times).
Spotter required – minimum two person activity:
• Working under the approved TMP, following the STMS' briefing
• Onsite control must be by an STMS L2/3 or an STMS-NP.</td></tr>
<tr><td>Level 3</td><td>Inspection not permitted.
Must use a mobile, semi-static, or static closure.</td></tr>
</table>

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.

There must be CSD to the inspector when on the live lane.

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 preferably 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.

Unless otherwise approved by the RCA, all inspections on the live lane of level 1 and level 2 roads require a spotter. The RCA may provide a list of level 1 roads, times and/or activities suitable for inspection by a single inspector (eg where no level LV roads have been declared by the RCA)

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

Traffic Control Devices Manual
Part 8

Code of practice for temporary traffic management (CoPTTM)

manual number: SP/M/010

Section E

www.nzta.govt.nz

Fourth edition, Amendment 4 of
Code of practice for temporary traffic management

Date of issue: November 2018

Effective date: 1 February 2019

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)

Section E – Standard forms and descriptions

E1 Appendix A: Traffic management plans

E1.1 General

There are two traffic management plan (TMP) forms. Each form has been designed for a specific use.

Type of form	When to use	Guidelines for completion
Example of traffic management plan (TMP) – short form	Complete short form if simple activity and the road controlling authority (RCA) allow use of the form.	Guidelines for completion of TMP – short form
Example of TMP – full form	Use full form for activities involving a number of phases and/or delays (eg resealing, shoulder widening, road reconstruction) and any activities as required by the RCA.	Guidelines for completion of TMP – full form

Word versions of each form are available from the NZ Transport Agency's (NZTA) website.

E1.2 Example of traffic management plan (TMP) – short form

RCA consent (eg CAR/WAP) and/or RCA contract reference	

TRAFFIC MANAGEMENT PLAN (TMP) – SHORT FORM						
*Complete **short form** if simple activity and RCA permits. Refer to the NZ Transport Agency's Traffic control devices manual, part 8 Code of practice for temporary traffic management (CoPTTM), section E, appendix A for a guide on how to complete each field.*						
Organisation/ TMP reference	**TMP reference:**	**Contractor (Working space):**	**Principal** *(Client)*:			
		Contractor (TTM):	**RCA:**			
Location details and road characteristics	**Road names and suburb**		**House no. / RPs** *(From and to)*	**Road level**	**Permanent speed**	**AADT/Peak flows**
Description of work activity						

Planned work programme							
Start date		**Time**		**End date**		**Time**	
Consider significant stages, for example: • road closures • detours • no activity periods.							
Alternative dates if activity delayed							

Road aspects affected *(delete either Yes or No to show which aspects are affected)*							
Pedestrians affected?	Yes	No	**Property access affected?**	Yes	No	**Traffic lanes affected?**	Yes No
Cyclists affected?	Yes	No	**Restricted parking affected?**	Yes	No	**Delays or queuing likely?**	Yes No

TSL/ Diagram *(see TSL decision matrix for guidance)*	**TSL details as required** Approval of Temporary Speed Limits (TSL) are in terms of Section 6 of Land Transport Rule: Setting of Speed Limits 2017, Rule 54001/2017 *(List speed, length and location)*	**Times** *(From and to)*	**Dates** *(Start and finish)*	**Diagram ref. no.s** *(Layout drawings or TMDs)*

Attended day/ night	A temporary maximum speed limit of km/h is hereby fixed for motor vehicles travelling over the length of m situated between (House no./RP) and (House no./RP) on (street or road name)			
Unattended day/ night	A temporary maximum speed limit of km/h is hereby fixed for motor vehicles travelling over the length of m situated between (House no./RP) and (House no./RP) on (street or road name)			
TSL duration	Will the TSL be required for longer than 12 months? ***If yes**, attach the completed checklist from section I-18: Guidance on TMP Monitoring Processes for TSLs to this TMP.*			Yes No

Contingency plan		
If long queues form or delays exceed 5mins *(or any other period required by RCA)*, site to be disestablished or additional lanes made available.	Adjust TMD to suit unforeseen circumstances *(eg weather or site overlaps with another work site)*.	Emergency services will be accommodated and access provided through the site as required.
Add additional contingencies:		

Contact details						
	Name		**24/7 contact number**	**CoPTTM ID**	**Qualification**	**Expiry date**
Principal						
TMC						
Engineers' representative						
Contractor						
STMS						
TC						
Others as required						

TMP preparation (or approval if STMS delegated authority to approve TMPs) *Delete the option that does not apply (either prepared or approved)*						
Prepared / Approved						
	Name	Date	*Signature*	*ID no.*	*Qualification*	*Expiry date*
This TMP meets CoPTTM requirements			**Number of diagrams attached**			
TMP returned for correction						
	Name	Date	*Signature*	*ID no.*	*Qualification*	*Expiry date*

Engineer/TMC to complete following section when approval or acceptance required						
Approved by TMC or engineer *(delete one)*						
	Name	Date	*Signature*	*ID no.*	*Qualification*	*Expiry date*
Acceptance by TMC *(only required if TMP approved by engineer)*						
	Name	Date	*Signature*	*ID no.*	*Qualification*	*Expiry date*

Qualifier for engineer or TMC approval

Approval of this TMP authorises the use of any regulatory signs included in the TMP or attached traffic management diagrams.

This TMP is approved on the following basis:

1. To the best of the approving engineer's/TMC's judgment this TMP conforms to the requirements of CoPTTM.
2. This plan is approved on the basis that the activity, the location and the road environment have been correctly represented by the applicant. Any inaccuracy in the portrayal of this information is the responsibility of the applicant.
3. The TMP provides so far as is reasonably practicable, a safe and fit for purpose TTM system.
4. The STMS for the activity is reminded that it is the STMS's duty to postpone, cancel or modify operations due to the adverse traffic, weather or other conditions that affect the safety of this site.

E1.3 Guidelines for completion of TMP – short form

RCA consent (eg CAR/WAP) and/or RCA contract reference	*Add the appropriate RCA consent reference, for example the corridor access request (CAR) or work access permit (WAP) and/or any RCA contract reference.*

TRAFFIC MANAGEMENT PLAN (TMP) – SHORT FORM							
*Complete **short form** if simple activity and RCA permits. Refer to the NZ Transport Agency's Traffic control devices manual, part 8 Code of practice for temporary traffic management (CoPTTM), section E, appendix A for a guide on how to complete each field.*							
Organisation/ TMP reference	**TMP reference:** *Add the RCA's and contractor's reference numbers*	**Contractor (Working space):** *State the name of the contractor responsible for the working space*	**Principal** *(Client)*: *State the name of the principal or client for this project (eg NZTA or Chorus)*				
		Contractor (TTM): *State the name of the contractor responsible for the TTM*	**RCA:** *State the name of the RCA who controls the road that the worksite will be on.* ***Note:*** *There can be more than one RCA*				
Location details and road characteristics	**Road names and suburb**		**House no. / RPs** *(From and to)*	**Road level**	**Permanent speed**	**AADT/Peak flows**	
	Include the road name/s and any affected intersections, also include the suburb		*Enter house numbers, route positions or power pole numbers where applicable*	*Enter RCA desig-nation*	*Enter highest permanent limit*	*Include AADT and/or peak hour and heavy vehicle counts where avail-able.* *The RCA or engineer must provide this information if available.*	
	As above		*As above*	*As above*	*As above*	*As above*	
	As above		*As above*	*As above*	*As above*	*As above*	
Description of work activity	*Briefly describe the main work activity (eg repairs to median barrier). Use the 'Aspects affected' field to identify if the activity will affect the road. These effects will need to be covered in the layout drawings/traffic management diagrams.*						
Planned work programme							
Start date	*Enter earliest date activity may start*	**Time**	*Enter earliest time activity may start*	**End date**	*Enter latest date activity may finish allowing for unforeseen issues*	**Time**	*Enter latest time activity may finish allowing for unforeseen issues*

Consider significant stages, for example: • road closures • detours • no activity periods.	*Provide details of any significant stages*
Alternative dates if activity delayed	*For larger activities, identify any alternative dates that can be scheduled if the work is delayed*

Road aspects affected *(delete either Yes or No to show which aspects are affected)*							
Pedestrians affected?	Yes No	**Property access affected?**	Yes No	**Traffic lanes affected?**	Yes No
Cyclists affected?	Yes No	**Restricted parking affected?**	Yes No	**Delays or queuing likely?**	Yes No

TSL/ Diagram *(see TSL decision matrix for guidance)*	**TSL details as required** Approval of Temporary Speed Limits (TSL) are in terms of Section 6 of Land Transport Rule: Setting of Speed Limits 2017, Rule 54001/2017 *(List speed, length and location)*	**Times** *(From and to)*	**Dates** *(Start and finish)*	**Diagram ref. no.s** *(Layout drawings or TMDs)*
Attended day/ night	**A temporary maximum speed limit of km/h is hereby fixed for motor vehicles travelling over the length of m situated between (House no./RP) and (House no./RP) on (street or road name)** *If a TSL is appropriate, add the TSL details - temporary speed (eg 70km/h), approximate length (eg 200m) and the location (eg RP 01N-0260/0.50 or 23-53 Chews Lane).* *Add additional rows into this section if required.* ***Note:** When the worksite is set up, the actual location of the TSL signs will need to be recorded on the on-site record or the equivalent company sheet that records the same information.* *For legal purposes (eg speed enforcement), this information must be retained for 12 months and be provided on request.*	*Include the hours that the activity will take place.* ***Note:** Activity hours may be restricted by the RCA or contract documents.*	*Add the date or date range for this activity.*	*List the reference for either:* • *the site specific layout drawing(s) that are attached to the TMP (eg layout drawing 1, 2), or* • *the appropriate traffic management diagrams from the TTM handbook, if worksite is on a level LV or level 1 road where the RCA has approved the use of generic traffic management diagrams.*
Unattended day/ night	**A temporary maximum speed limit of km/h is hereby fixed for motor vehicles travelling over the length of m situated between (House no./RP) and (House no./RP) on (street or road name)** *As above.*	*As above*	*As above*	*As above*
TSL duration	Will the TSL be required for longer than 12 months? ***If yes**, attach the completed checklist from section I-18: Guidance on TMP Monitoring Processes for TSLs to this TMP.*			Yes No *Delete either Yes or No to indicate whether the TSL will be required for longer than 12 months. If yes, attach the completed checklist from section I-18*

Contingency plan		
If long queues form or delays exceed 5mins *(or any other period required by RCA)*, site to be disestablished or additional lanes made available.	Adjust TMD to suit unforeseen circumstances *(eg weather or site overlaps with another work site)*.	Emergency services will be accommodated and access provided through the site as required.

Add additional contingencies:

Listed above are some common contingencies for worksites. Strike out any contingencies that are not applicable to the worksite.

Record additional contingencies for the worksite in this field.

Contact details					
	Name	**24/7 contact number**	**CoPTTM ID**	**Qualification**	**Expiry date**
Principal	*Organisation named on permit*	*24/7 contact number*	*Optional*	*Optional*	*Optional*
TMC	*Name*	*24/7 contact number*	*Optional*	*Optional*	*Optional*
Engineers' representative	*Detail optional - Independent person employed by engineer whose responsibilities include TTM*	*24/7 contact number*	*Optional*	*Optional*	*Optional*
Contractor	*State name of the contracting company and the name of their contact person*	*24/7 contact number*	*Optional*	*Optional*	*Optional*
STMS	*Name*	*24/7 contact number*	*CoPTTM ID number*	*Level of qualification*	*Date of expiry*
TC	*Name*	*24/7 contact number*	*CoPTTM ID number*	*Level of qualification*	*Date of expiry*
Others as required	*Name*	*24/7 contact number*	*Optional*	*Optional*	*Optional*

TMP preparation (or approval if STMS delegated authority to approve TMPs) *Delete the option that does not apply (either prepared or approved)*						
Prepared / Approved	*Name of the STMS who prepared/approved the TMP. If STMS has been delegated authority to approve TMPs, it may not need to be submitted to the RCA.*	*Date actioned*	*STMS signature*	*CoPTTM ID number*	*Level of qualification*	*Date of expiry*
	Name	Date	*Signature*	*ID no.*	*Qualification*	*Expiry date*
This TMP meets CoPTTM requirements				**Number of diagrams attached**		
TMP returned for correction		*Date actioned*	*Signature*	*CoPTTM ID number*	*Level of qualification*	*Date of expiry*
	Name	Date	*Signature*	*ID no.*	*Qualification*	*Expiry date*

Engineer/TMC to complete following section when approval or acceptance required						
Approved by TMC or engineer *(delete one)*		*Date actioned*	*Signature*	*CoPTTM ID number*	*Level of qualification*	*Date of expiry*
	Name	Date	*Signature*	*ID no.*	*Qualification*	*Expiry date*
Acceptance by TMC *(only required if TMP approved by engineer)*		*Date actioned*	*Signature*	*CoPTTM ID number*	*Level of qualification*	*Date of expiry*
	Name	Date	*Signature*	*ID no.*	*Qualification*	*Expiry date*

Qualifier for engineer or TMC approval

Approval of this TMP authorises the use of any regulatory signs included in the TMP or attached traffic management diagrams.
This TMP is approved on the following basis:

1. To the best of the approving engineer's/TMC's judgment this TMP conforms to the requirements of CoPTTM.
2. This plan is approved on the basis that the activity, the location and the road environment have been correctly represented by the applicant. Any inaccuracy in the portrayal of this information is the responsibility of the applicant.
3. The TMP provides so far as is reasonably practicable, a safe and fit for purpose TTM system.
4. The STMS for the activity is reminded that it is the STMS's duty to postpone, cancel or modify operations due to the adverse traffic, weather or other conditions that affect the safety of this site.

E1.4 Example of TMP – full form

RCA consent (eg CAR/WAP) and/or RCA contract reference	

TRAFFIC MANAGEMENT PLAN (TMP) – FULL FORM

Use this form for complex activities. Refer to the NZ Transport Agency's Traffic control devices manual, part 8 Code of practice for temporary traffic management (CoPTTM), section E, appendix A for a guide on how to complete each field.

Organisations /TMP reference	**TMP reference:**	**Contractor (Working space):**	**Principal** *(Client)*:		
		Contractor (TTM):	**RCA:**		
Location details and road characteristics	**Road names and suburb**		**House no./RPs** *(from and to)*	**Road level**	**Permanent speed**
Traffic details (main route)	**AADT**		**Peak flows**		

Description of work activity

Planned work programme							
Start date		**Time**		**End date**		**Time**	
Consider significant stages, for example: • road closures • detours • no activity periods.							
Alternative dates if activity delayed							

Road aspects affected *(delete either Yes or No to show which aspects are affected)*								
Pedestrians affected?	Yes	No	**Property access affected?**	Yes	No	**Traffic lanes affected?**	Yes	No
Cyclists affected?	Yes	No	**Restricted parking affected?**	Yes	No	**Delays or queuing likely?**	Yes	No

Proposed traffic management methods	
Installation *(includes parking of plant and materials storage)*	
Attended (day)	
Attended (night)	
Unattended (day)	
Unattended (night)	
Detour route	
	Does detour route go into another RCA's roading network? Yes No *(delete either Yes or No)* *If Yes, has confirmation of acceptance been requested from that RCA?* Yes No *(delete either Yes or No)* ***Note:*** *Confirmation of acceptance from affected RCA must be submitted prior to occupying the site.*
Removal	

Proposed TSLs *(see TSL decision matrix for guidance)*				
	TSL details as required Approval of Temporary Speed Limits (TSL) are in terms of Section 6 of Land Transport Rule: Setting of Speed Limits 2017, Rule 54001/2017 *(List speed, length and location)*	**Times** *(From and to)*	**Dates** *(Start and finish)*	**Diagram ref. no.s** *(Layout drawings or traffic management diagrams)*
Attended day/night	A temporary maximum speed limit of km/h is hereby fixed for motor vehicles travelling over the length of m situated between (House no./RP) and (House no./RP) on (street or road name)			
Unattended day/night	A temporary maximum speed limit of km/h is hereby fixed for motor vehicles travelling over the length of m situated between (House no./RP) and (House no./RP) on (street or road name)			
TSL duration	Will the TSL be required for longer than 12 months? ***If yes**, attach the completed checklist from section I-18: Guidance on TMP Monitoring Processes for TSLs to this TMP.*			Yes No

Positive traffic management measures

Contingency plans		
Generic contingencies for: • major incidents • incidents • pre planed detours. *Remove any options which do not apply to your job*	**Major Incident** A major incident is described as: • Fatality or notifiable injury - real or potential • Significant property damage, or • Emergency services (police, fire, etc) require access or control of the site.	**Actions** The STMS must immediately conduct the following: • stop all activity and traffic movement • secure the site to prevent (further) injury or damage • contact the appropriate emergency authorities • render first aid if competent and able to do so • notify the RCA representative and / or the engineer • under the guidance of the officer in charge of the site, reduce effects of TTM on the road or remove the activity if safe to do so • re-establish TTM and traffic movements when advised by emergency authorities that it is safe to do so • Comply with any obligation to notify WorkSafe.

<table>
<tr><td></td><td>Incident
An incident is described as:
excessive delays - real or potential
minor or non-inquiry accident that has the potential to affect traffic flow
structural failure of the road.</td><td>Actions
The STMS must immediately conduct the following:
stop all activity and traffic movement if required
secure the site to prevent the prospect of injury or further damage
notify the RCA representative and / or the engineer
STMS to implement a plan to safely remove TTM and to establish normal traffic flow if safe to do so
re-establish TTM and traffic movements when it is safe to do so and when traffic volumes have reduced.</td></tr>
<tr><td></td><td>Detour
If because of the on-site activity it will not be possible to remove or reduce the effects of TTM once it is established a detour route must be designed. This is likely for:
excessive delays when using an alternating flow design for TTM
redirecting one direction of flow and / or
total road closure and redirection of traffic until such time that traffic volumes reduce and tailbacks have been cleared.
The risks in the type of work being undertaken, the risks inherent in the detour, the probable duration of closure and availability and suitability of detour routes need to be considered.
The detour and route must be designed including:
pre- approval form the RCA's whose roads will be used or affected by the detour route
ensure that TTM equipment for the detour - signs etc are on site and pre-installed.</td><td>Actions
When it is necessary to implement the pre-planned detour the STMS must immediately undertake the following:
Notify the RCA and / or the engineer when the detour is to be established
Drive through the detour in both directions to check that it is stable and safe
Remove the detour as soon as it practicable and safe to do so and the traffic volumes have reduced and tailbacks have cleared
Notify the RCA and / or the engineer when the detour has been disestablished and normal traffic flows have resumed.</td></tr>
<tr><td></td><td colspan="2">Note also the requirements for no interference at an accident scene:
In the event of an accident involving serious harm the STMS must ensure that nothing, including TTM equipment, is removed or disturbed and any wreckage article or thing must not be disturbed or interfered with, except to:
save a life of, prevent harm to or relieve the suffering of any person, or
make the site safe or to minimise the risk of a further accident; or
maintain the access of the general public to an essential service or utility, or
prevent serious damage to or serious loss of property, or
follow the direction of a constable acting in his or her duties or act with the permission of an inspector.</td></tr>
<tr><td>Other contingencies to be identified by the applicant
(i.e. steel plates to quickly cover excavations)</td><td colspan="2"></td></tr>
</table>

Authorisations				
Parking restriction(s) alteration authority	**Will controlled street parking be affected?**	Yes No	**Has approval been granted?**	Yes No
Authorisation to work at permanent traffic signal sites	**Will portable traffic signals be used or permanent traffic signals be changed?**	Yes No	**Has approval been granted?**	Yes No
Road closure authorisation(s)	**Will full carriageway closure continue for more than 5 minutes (or other RCA stipulated time)?**	Yes No	**Has approval been granted?**	Yes No
Bus stop relocation(s) – closure(s)	**Will bus stop(s) be obstructed by the activity?**	Yes No	**Has approval been granted?**	Yes No
Authorisation to use portable traffic signals	**Make, model and description/number**			
	NZTA compliant?	Yes No *(delete either Yes or No)*		

EED			
Is an EED applicable?	Yes No *(delete either Yes or No)*	**EED attached?**	Yes

Delay calculations/trial plan to determine potential extent of delays

Public notification plan

Public notification plan attached?	Yes No *(delete either Yes or No)*

On-site monitoring plan	
Attended *(day and/or night)*	
Unattended *(day and/or night)*	

Method for recording daily site TTM activity *(eg CoPTTM on-site record)*

Site safety measures

Other information

Site specific layout diagrams	
Number	**Title**

Contact details					
	Name	**24/7 contact number**	**CoPTTM ID**	**Qualification**	**Expiry date**
Principal					
TMC					
Engineers' representative					
Contractor					
STMS					
TC					
Others as required					

TMP preparation						
Preparation						
	Name (STMS qualified)	*Date*	*Signature*	*ID no.*	*Qualification*	*Expiry date*
This TMP meets CoPTTM requirements				**Number of diagrams attached**		
TMP returned for correction *(if required)*						
	Name	*Date*	*Signature*	*ID no.*	*Qualification*	*Expiry date*
Engineer/TMC to complete following section when approval or acceptance required						
Approved by TMC/engineer *(delete one)*						
	Name	*Date*	*Signature*	*ID no.*	*Qualification*	*Expiry date*
Acceptance by TMC *(only required if TMP approved by engineer)*						
	Name	*Date*	*Signature*	*ID no.*	*Qualification*	*Expiry date*

Qualifier for engineer or TMC approval

Approval of this TMP authorises the use of any regulatory signs included in the TMP or attached traffic management diagrams.

This TMP is approved on the following basis:

1. To the best of the approving engineer's/TMC's judgment this TMP conforms to the requirements of CoPTTM.
2. This plan is approved on the basis that the activity, the location and the road environment have been correctly represented by the applicant. Any inaccuracy in the portrayal of this information is the responsibility of the applicant.
3. The TMP provides so far as is reasonably practicable, a safe and fit for purpose TTM system.
4. The STMS for the activity is reminded that it is the STMS's duty to postpone, cancel or modify operations due to the adverse traffic, weather or other conditions that affect the safety of this site.

Notification to TMC prior to occupying worksite/Notification completed			
Type of notification to TMC required		**Notification completed**	Date Time

E1.5 Guidelines for completion of TMP – full form

RCA consent (eg CAR/WAP) and/or RCA contract reference	*Add RCA consent reference, for example the corridor access request (CAR) or work access permit (WAP) and/or any RCA contract reference.*

TRAFFIC MANAGEMENT PLAN (TMP) – FULL FORM

Use this form for complex activities. Refer to the NZ Transport Agency's Traffic control devices manual, part 8 Code of practice for temporary traffic management (CoPTTM), section E, appendix A for a guide on how to complete each field.

Organisations /TMP reference	**TMP reference:** *Add the RCA's and contractor's reference number*	**Contractor (Working space):** *State the name of the contractor responsible for the working space*	**Principal** *(Client): State the name of the principal or client for this project (eg NZTA or Chorus)*			
		Contractor (TTM): *State the name of the contractor responsible for the TTM*	**RCA:** *State the name of the RCA who controls the road that the worksite will be on.* ***Note:*** *There can be more than one RCA.*			
Location details and road characteristics	**Road names and suburb**		**House no./RPs** *(from and to)*	**Road level**	**Permanent speed**	
	Include the road name/s and any affected intersections. Also include the suburb		*Enter house numbers, route positions or power pole numbers where applicable*	*Enter RCA designation*	*Enter highest permanent limit*	
	As above		*As above*	*As above*	*As above*	
Traffic details *(main route)*	**AADT** *Include AADT where available.* *The RCA or engineer must provide this information if available.*		**Peak flows** *Include peak hour and heavy vehicle counts where available.* *The RCA or engineer must provide this information if available.*			

Description of work activity
Briefly provide an accurate and complete description of the work or activity eg repairs to median barrier

Planned work programme							
Start date	*Enter earliest date activity may start*	**Time**	*Enter earliest time activity may start*	**End date**	*Enter latest date activity may finish allowing for unforeseen issues*	**Time**	*Enter latest time activity may finish allowing for unforeseen issues*
Consider significant stages, for example: • road closures • detours • no activity periods.	*Provide details of any significant stages*						
Alternative dates if activity delayed	*For larger activities, identify any alternative dates that can be scheduled if the work is delayed*						

Road aspects affected *(delete either Yes or No to show which aspects are affected)*								
Pedestrians affected?	Yes	No	**Property access affected?**	Yes	No	**Traffic lanes affected?**	Yes	No
Cyclists affected?	Yes	No	**Restricted parking affected?**	Yes	No	**Delays or queuing likely?**	Yes	No
Use the 'Aspects affected' field to identify how the activity will affect the road. These effects will need to be covered in the layout drawings/TMDs or later in your TMP								

Proposed traffic management methods	
Installation *(includes parking of plant and materials storage)*	*Provide full description of all installation procedures for operations that involve TTM*
Attended (day)	*Provide full description of all procedures for operations that involve TTM or impact upon TTM for operation where the activity is underway*
Attended (night)	*Provide full description of all procedures for operations that involve TTM or impact upon TTM for operation where the activity is underway* *Provide details of night overhead lighting*
Unattended (day)	*Provide full description of all procedures for operations that involve TTM or impact upon TTM for operation where the activity is incomplete but there is a hazardous situation remaining that requires TTM to protect road users*
Unattended (night)	*Provide full description of all procedures for operations that involve TTM or impact upon TTM for operation where the activity is incomplete but there is a hazardous situation remaining that requires TTM to protect road users*
Detour route	*Include details of the route of the detour (provide a map if detour is complex)*
	Does detour route go into another RCA's roading network? Yes No *(delete either Yes or No)* *If Yes, has confirmation of acceptance been requested from that RCA?* Yes No *(delete either Yes or No)* ***Note:*** *Confirmation of acceptance from affected RCA must be submitted prior to occupying the site.* *If the detour transfers road users to another RCA's roading network, request confirmation of acceptance from that RCA. The confirmation of acceptance from affected RCA must be submitted prior to occupying the site.*
Removal	*Provide full description of all removal procedures for operations that involve TTM*

Proposed TSLs *(see TSL decision matrix for guidance)*				
	TSL details as required Approval of Temporary Speed Limits (TSL) are in terms of Section 6 of Land Transport Rule: Setting of Speed Limits 2017, Rule 54001/2017 *(List speed, length and location)*	**Times** *(From and to)*	**Dates** *(Start and finish)*	**Diagram ref. no.s** *(Layout drawings or traffic management diagrams)*
Attended day/night	A temporary maximum speed limit of km/h is hereby fixed for motor vehicles travelling over the length of m situated between (House no./RP) and (House no./RP) on (street or road name) *If a TSL is appropriate, add the TSL details - temporary speed (eg 70km/h), approximate length (eg 200m) and the location (eg RP 01N-0260/0.50 or 23-53 Chews Lane).* *Add additional rows into this section if required.* ***Note:** When the worksite is set up, the actual location of the TSL signs will need to be recorded on the on-site record or the equivalent company sheet that records the same information.* *For legal purposes (eg speed enforcement), this information must be retained for 12 months and be provided on request.*	*Include the hours that the activity will take place* ***Note:** Activity hours may be restricted by the RCA or contract documents.*	*Add the date or date range for this activity*	*List the reference for either:* • *the site specific layout drawing(s) that are attached to the TMP (eg layout drawing 1, 2), or* • *the appropriate traffic management diagram(s) from the TTM handbook, if worksite is on a level LV or level 1 road where the RCA has approved the use of generic TMDs.*
Unattended day/night	A temporary maximum speed limit of km/h is hereby fixed for motor vehicles travelling over the length of m situated between (House no./RP) and (House no./RP) on (street or road name) *As above*	*As above*	*As above*	*As above*
TSL duration	Will the TSL be required for longer than 12 months? ***If yes**, attach the completed checklist from section I-18: Guidance on TMP Monitoring Processes for TSLs to this TMP.*			Yes No *Delete either Yes or No to indicate whether the TSL will be required for longer than 12 months. If yes, attach the completed checklist from section I-18*

<table>
<tr><th colspan="3">Positive traffic management measures</th></tr>
<tr><td colspan="3">Refer to section C10.1.1
Positive traffic management measures must be used when installing TSLs of:
• less than 70km/h in areas with permanent posted speed limits of 100km/h, or
• less than 50km/h in areas with a permanent posted speed limit of 70 or 80km/h.
Detail the extent of positive traffic management to be undertaken when:
• temporary speed restrictions below 70km/h in areas with existing permanent speed limits of 100km/h, or below 50km/h in areas with existing permanent speed limits of 70km/h or 80km/h, or less than 30km/h in a 50km/h area
• traffic is stopped to allow work to proceed
• traffic is reduced to one lane.</td></tr>
<tr><th colspan="3">Contingency plans</th></tr>
<tr><td rowspan="3">Generic contingencies for:
• major incidents
• incidents
• pre planed detours.
Remove any options which do not apply to your job</td><td colspan="2">Record the contingencies for the worksite. Consider the items listed and add or amend as required. Also add additional contingencies appropriate to the worksite</td></tr>
<tr><td>Major Incident
A major incident is described as:
• Fatality or notifiable injury - real or potential
• Significant property damage, or
• Emergency services (police, fire, etc) require access or control of the site.</td><td>Actions
The STMS must immediately conduct the following:
• stop all activity and traffic movement
• secure the site to prevent (further) injury or damage
• contact the appropriate emergency authorities
• render first aid if competent and able to do so
• notify the RCA representative and / or the engineer
• under the guidance of the officer in charge of the site, reduce effects of TTM on the road or remove the activity if safe to do so
• re-establish TTM and traffic movements when advised by emergency authorities that it is safe to do so
• Comply with any obligation to notify WorkSafe.</td></tr>
<tr><td>Incident
An incident is described as:
• excessive delays - real or potential
• minor or non-inquiry accident that has the potential to affect traffic flow
• structural failure of the road.</td><td>Actions
The STMS must immediately conduct the following:
• stop all activity and traffic movement if required
• secure the site to prevent the prospect of injury or further damage
• notify the RCA representative and / or the engineer
• STMS to implement a plan to safely remove TTM and to establish normal traffic flow if safe to do so
• re-establish TTM and traffic movements when it is safe to do so and when traffic volumes have reduced.</td></tr>
</table>

	Detour If because of the on-site activity it will not be possible to remove or reduce the effects of TTM once it is established a detour route must be designed. This is likely for: • excessive delays when using an alternating flow design for TTM • redirecting one direction of flow and / or • total road closure and redirection of traffic until such time that traffic volumes reduce and tailbacks have been cleared. The risks in the type of work being undertaken, the risks inherent in the detour, the probable duration of closure and availability and suitability of detour routes need to be considered. The detour and route must be designed including: • pre- approval form the RCA's whose roads will be used or affected by the detour route • ensure that TTM equipment for the detour - signs etc are on site an pre-installed.	**Actions** When it is necessary to implement the pre-planned detour the STMS must immediately undertake the following: • Notify the RCA and / or the engineer when the detour is to be established • Drive through the detour in both directions to check that it is stable and safe • Remove the detour as soon as it practicable and safe to do so and the traffic volumes have reduced and tailbacks have cleared • Notify the RCA and / or the engineer when the detour has been disestablished and normal traffic flows have resumed.
	Note also the requirements for no interference at an accident scene: In the event of an accident involving serious harm the STMS must ensure that nothing, including TTM equipment, is removed or disturbed and any wreckage article or thing must not be disturbed or interfered with, except to: • save a life of, prevent harm to or relieve the suffering of any person, or • make the site safe or to minimise the risk of a further accident; or • maintain the access of the general public to an essential service or utility, or • prevent serious damage to or serious loss of property, or • follow the direction of a constable acting in his or her duties or act with the permission of an inspector.	
Other contingencies to be identified by the applicant *(i.e. steel plates to quickly cover excavations)*	*Add additional contingencies appropriate to the worksite*	

Authorisations				
Parking restriction(s) alteration authority	**Will controlled street parking be affected?**	Yes No	**Has approval been granted?**	Yes No
	If no approval has been granted, make application			
Authorisation to work at permanent traffic signal sites	**Will portable traffic signals be used or permanent traffic signals be changed?**	Yes No	**Has approval been granted?**	Yes No
	If no approval has been granted, make application			
Road closure authorisation(s)	**Will full carriageway closure continue for more than 5 minutes (or other RCA stipulated time)?**	Yes No	**Has approval been granted?**	Yes No
	If no approval has been granted, make application			
Bus stop relocation(s) – closure(s)	**Will bus stop(s) be obstructed by the activity?**	Yes No	**Has approval been granted?**	Yes No
	Required where a bus stop/s is obstructed by activity. If no approval has been granted, make application			

Authorisation to use portable traffic signals	**Make, model and description/number**	*Include make, model and description number of the portable traffic signals*	
	NZTA compliant?	Yes No *(delete either Yes or No)* *Confirm that the signals are approved for use by the NZTA.*	
EED			
Is an EED applicable?	Yes No *(delete either Yes or No)* *Indicate if an EED has been agreed for this worksite*	**EED attached?**	Yes *If yes then attach the EED to the TMP*
Delay calculations/trial plan to determine potential extent of delays			
Required where potential delays may occur. RCA will define when these are required once draft plan is submitted.			
Public notification plan			
Required where activity may cause disruption to community. RCA to define when these are required *Include details of notices proposed to be advertised via local radio or newspapers or distributed to local residents. Refer contract documentation and RCA requirements*			
Public notification plan attached?	Yes No *(delete either Yes or No)*		
On-site monitoring plan			
Attended *(day and/or night)*	*Identify the frequency of monitoring the continued effectiveness of the traffic management measures* *Detail the monitoring of attended and unattended worksites both overnight and during weekends or holiday breaks* *For example, at an attended static worksite with the STMS or TC on-site, the inspection frequency may be:* • *2 hourly for signs, portable channelling and delineation devices and arrow boards* • *Daily for cleanliness of safety garments, non-portable equipment and flashing beacons on vehicles* • *Continuously for wearing of safety jackets.*		
Unattended *(day and/or night)*	*This field must be completed for any unattended sites* *On unattended worksites (overnight, weekends etc,) the STMS assesses the needs of that site and includes details of monitoring in the TMP*		

Method for recording daily site TTM activity (eg CoPTTM on-site record)

State how on-site TTM activity will be recorded.
This could be the CoPTTM on-site record or the equivalent company document provided it covers the following information:

- *details of the STMS who is in charge of the worksite (name, qualification, ID and expiry date of qualification)*
- *If worksite delegated to a TC (level 1) or STMS-NP (only on limited level 2 worksites), details of the TC/STMS-NP who is in charge of the worksite (name, qualification, ID and expiry date of qualification)*
- *the worksite monitoring including:*
  - *site set-up*
  - *2-hourly monitoring*
  - *site removal*
- *details of any TSLs installed:*
  - *date installed*
  - *time installed*
  - *placement (RPs or street numbers)*
  - *length of TSL (in metres)*
  - *date removed*
  - *time removed.*

If using a company on-site record instead of the CoPTTM on-site record, you must attach that document to the TMP.

Site safety measures

In this section include special items such as overhead lighting for night time MTC

Other information

Further details may be required as a result of specific site conditions or contractual requirements.
In addition, TMPs should also include the following as appropriate:

- *liaison with emergency services and public transport operators (if they could be affected by the worksite)*
- *changes to parking controls*
- *traffic environment details of speed limit, parking, traffic signals, pedestrian crossings, road alignment and hierarchy*
- *specialised equipment such as pilot vehicles, use of temporary traffic signals*
- *materials storage*
- *pedestrian barriers and equipment to be used*
- *queuing*
- *plant operational requirements, eg truck waiting and filling areas.*

TMPs for mobile operations should also include the following additional information:

- *the type and function of each vehicle in the mobile operation*
- *the vehicles that will be equipped with attenuators and arrow boards and their location within the worksite*
- *the number, location and, duration of exposure and tasks of personnel who are permitted to leave their vehicles*
- *the method of inter-vehicle communication.*

Site specific layout diagrams	
Number	**Title**
Enter applicant diagram number. *Also consider whether a layout diagram is required for set-up /removal of the worksite.*	*Enter name of attached diagram*
As above	*As above*
As above	*As above*
As above	*As above*

Contact details					
	Name	**24/7 contact number**	**CoPTTM ID**	**Qualification**	**Expiry date**
Principal	*Organisation named on permit*	*24/7 contact number*	*Optional*	*Optional*	*Optional*
TMC	*Name*	*24/7 contact number*	*Optional*	*Optional*	*Optional*
Engineers' representative	*Detail optional - Independent person employed by engineer whose responsibilities include TTM*	*24/7 contact number*	*Optional*	*Optional*	*Optional*
Contractor	*State name of the contracting company and the name of their contact person*	*24/7 contact number*	*Optional*	*Optional*	*Optional*
STMS	*Name* *Where multiple names are included in the TMP, the name of the STMS in charge must be written on the On-site record*	*24/7 contact number*	*CoPTTM ID number*	*Level of qualification*	*Date of expiry*
TC	*Name*	*24/7 contact number*	*CoPTTM ID number*	*Level of qualification*	*Date of expiry*
Others as required	*Name*	*24/7 contact number*	*Optional*	*Optional*	*Optional*

TMP preparation						
Preparation	*STMS signature*	*Date prepared*	*STMS signature*	*CoPTTM ID number*	*Level of qualification*	*Expiry date*
	Name (STMS qualified)	*Date*	*Signature*	*ID no.*	*Qualification*	*Expiry date*
This TMP meets CoPTTM requirements			**Number of diagrams attached**			
TMP returned for correction *(if required)*	*Name of TMC or engineer returning TMP*	*Date accepted*	*Signature*	*CoPTTM ID number*	*Level of qualification*	*Expiry date*
	Name	*Date*	*Signature*	*ID no.*	*Qualification*	*Expiry date*
Engineer/TMC to complete following section when approval or acceptance required						
Approved by TMC/engineer *(delete one)*	*Name of TMC or engineer approving TMP*	*Date accepted*	*Signature*	*CoPTTM ID number*	*Level of qualification*	*Expiry date*
	Name	*Date*	*Signature*	*ID no.*	*Qualification*	*Expiry date*
Acceptance by TMC *(only required if TMP approved by engineer)*	*Name of TMC*	*Date accepted*	*Signature*	*CoPTTM ID number*	*Level of qualification*	*Expiry date*
	Name	*Date*	*Signature*	*ID no.*	*Qualification*	*Expiry date*

Qualifier for engineer or TMC approval

Approval of this TMP authorises the use of any regulatory signs included in the TMP or attached traffic management diagrams.

This TMP is approved on the following basis:

1. To the best of the approving engineer's/TMC's judgment this TMP conforms to the requirements of CoPTTM.
2. This plan is approved on the basis that the activity, the location and the road environment have been correctly represented by the applicant. Any inaccuracy in the portrayal of this information is the responsibility of the applicant.
3. The TMP provides so far as is reasonably practicable, a safe and fit for purpose TTM system.
4. The STMS for the activity is reminded that it is the STMS's duty to postpone, cancel or modify operations due to the adverse traffic, weather or other conditions that affect the safety of this site.

Notification to TMC prior to occupying worksite/Notification completed				
Type of notification to TMC required	*Describe the notification procedure to be used*	**Notification completed**	Date	*Record date notification was completed*
			Time	*Record time notification was completed*

E1.6 Example of on-site record

TMP or generic plan reference	

ON-SITE RECORD On-site record must be retained with TMP for 12 months.			**Today's date**	
Location details	**Road names(s):**	**House number/RPs:**	**Suburb:**	

Working space		
Person responsible for working space		
	Name	*Signature*
Where the STMS/TC is responsible for both the working space and TTM they sign above and in the appropriate TTM box below		

TTM					
STMS in charge of TTM					
	Name	*TTM ID Number*	*Warrant expiry date*	*Signature*	*Time*
Worksite handover accepted by replacement STMS					
	Name	*ID Number*	*Warrant expiry date*	*Signature*	*Time*
	Tick to confirm handover briefing completed				

Delegation					
Worksite control accepted by TC/STMS-NP					
	Name	*ID Number*	*Warrant expiry date*	*Signature*	*Time*
	Tick to confirm briefing completed				

Temporary speed limit						
Street/road name (RPs or street numbers):		**TSL action**	**Date:**	**Time:**	**TSL speed:**	**Length of TSL (m):**
		TSL installed				
		TSL remains in place				
From:	To:	TSL removed				

Street/road name (RPs or street numbers):		**TSL action**	**Date:**	**Time:**	**TSL speed:**	**Length of TSL (m):**
		TSL installed				
		TSL remains in place				
From:	To:	TSL removed				

Street/road name (RPs or street numbers):		**TSL action**	**Date:**	**Time:**	**TSL speed:**	**Length of TSL (m):**
		TSL installed				
		TSL remains in place				
From:	To:	TSL removed				

Worksite monitoring

TTM to be monitored and 2 hourly inspections documented below.

Items to be inspected	TTM set-up	2 hourly check	2 hourly check	2 hourly check	2 hourly check	2 hourly check	TTM removal
High-visibility garment worn by all?							
Signs positioned as per TMP?							
Conflicting signs covered?							
Correct delineation as per TMP?							
Lane widths appropriate?							
Appropriate positive TTM used?							
Footpath standards met?							
Cycle lane standards met?							
Traffic flows OK?							
Adequate property access?							
Add others as required							
Time inspection completed:							
Signature:							

Comments:

Time	Adjustment made and reason for change

E1.7 Engineering exception decision

ENGINEERING EXCEPTION DECISION				
Name of RCA			**EED No**	
Basic description of the activity associated with EED				
Location detail and scheduled dates				
Location	This EED relates to TTM activities at:	**Dates**:	From:	
			To:	
It is proposed to vary the requirements of CoPTTM.				
WHAT the problem is: (a) describe the road environment constraint, (b) state CoPTTM requirements for the proposed activity.				
a. The road environment constraint				
b. CoPTTM requirements for the proposed activity				
WHY CoPTTM compliant TTM should not/cannot be installed.				
HOW will safety be ensured?				
This EED must be attached to the TMP. Any generic EEDs must be forwarded to the NZ Transport Agency.				
EED – Proposal				
Signed for and behalf of:				
	Insert contractor's name			
Signed by:				
	Name	*Designation*	*ID number*	*Expiry date*
	Signature		*Date*	
EED – Approved by				
Signed for and behalf of:				
	Insert RCA name			
Signed by:				
	Name	*Designation*	*ID number*	*Expiry date*
	Signature		*Date*	

E1.8 Example of checking process for generic traffic management plans (TMPs)

Checking process for generic TMPs					
This form, or a similar company record, must be completed prior to set up of a worksite where a generic TMP is used.					
Location details					
Road name(s)		**House number/RP(s)**		**Suburb**	
Road name(s)		**House number/RP(s)**			
Generic TMP reference no.		**TMD no(s).**		***Note:*** *The checking process must include all the TMDs to be used*	

Category	Points to consider	Y	N	Comment/Mitigation
Road level	Is this at the correct road level?			
Shape	Are the following catered for in the generic TMP? • Intersections • Vertical Curves (hills) • Horizontal Curves (corners) • Sufficient advance warning			
Direction and protection	Check that there is: • sufficient length to place the planned direction and protection • sufficient road width to place the planned direction and protection ie minimum lane width is 2.75m • adequate sight distance on both sides • sufficient room to accommodate required positive traffic control			
Proposed speed restrictions	Is a TSL required? Refer to the TSL decision matrix in CoPTTM (section E Appendix B)			
Plant and equipment	Will your plant and equipment fit within the designated working space?			
Personal safety	Are all workers able to carry out their work within the designated working space? If not are they covered by the rules for inspections?			
Layout diagrams	Is diagram(s) detailed in the generic TMP? Does the diagram(s) match the written section of the TMP?			
RCA notification	Has the RCA been notified?			

Completed by:					
STMS/TC in charge of worksite (All names to be entered before site set-up)					
	Name	*Signature*	*Date*	*Qualification*	*ID number*
	Name	*Signature*	*Date*	*Qualification*	*ID number*

E1.9 Additional information about completion of traffic management plans (TMPs)

E1.9.1 Generic TMPs

Generic TMPs should, in addition to the above requirements:

- allow for an annual review by the RCA
- be readily changeable at any time over the term to allow for worksite and personnel changes
- allow for the conditions under which the RCA may be prepared to delegate authority to fix temporary speed limits.

E1.9.2 Mobile operation TMPs

TMPs for mobile operations should also include the following additional information:

- the type and function of each vehicle in the mobile team
- the vehicles that will be equipped with attenuators and arrow boards, and their location within the closure
- the number, location and duration of exposure, and tasks of personnel who are permitted to leave their vehicles
- the method of inter-vehicle communication.

E1.9.3 Additional information

In addition, TMPs should also include the following as appropriate:

- liaison with emergency services and public transport operators (if they could be affected by the worksite)
- changes to parking controls
- traffic environment details of speed limit, parking, traffic signals, pedestrian crossings, road alignment and hierarchy
- specialised equipment such as pilot vehicles, use of portable traffic signals
- materials storage
- pedestrian safety fences and delineation and equipment to be used
- queuing
- plant operational requirements, eg truck waiting and filling areas.

E1.10 Example of schedule of specific job requirements for traffic management and safety

SCHEDULE OF SPECIFIC JOB REQUIREMENTS FOR TRAFFIC MANAGEMENT AND SAFETY

To be included in contract documents.

Contract number	
Contract name	

Operational requirements

1. Level of temporary traffic management

The temporary traffic management must be to*: (delete those that do not apply)*

- Level LV
- Level 1
- Level 2
- Level 3

2. Hours of work

The contractor must programme work to ensure that contract activities affecting traffic flow are not carried out on-site between the hours specified below, Monday to Friday inclusive.

No work other than emergency or maintenance work must be undertaken on weekends without prior approval of the engineer. Hours/days when work is prohibited or restricted.

3. Project specific conditions

4. Excessive traffic delays

The steps outlined in the traffic management plan to deal with excessive traffic delays must be implemented once the traffic delay exceeds minutes. The contractor is responsible for monitoring of traffic delay.

5. Advice to other parties

Public notification is not required/is required. If required, the details are:

Parties with access affected

6. Temporary traffic management

Temporary traffic management must conform to the CoPTTM.

7. Condition of road surface

Deduction made for temporary road not being sealed and maintained for greater than days at $ calendar day

8. Basis of payment

Payment must be in accordance with:

- lump sum $
- daily rate $ per 24 hours
- provisional sum $ per 24 hours

9. Positive traffic management - specific requirements

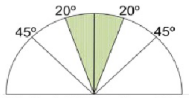
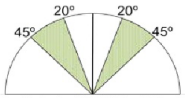
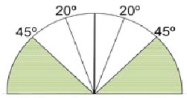
E2 Appendix B: Temporary speed limit (TSL) decision matrix worksheet

TEMPORARY SPEED LIMIT (TSL) DECISION MATRIX WORKSHEET

INSTRUCTIONS
Select the appropriate road condition description for each of the four factors, and in the right hand circle list the chosen TSL for that road condition. Transfer lowest TSL to the bottom circle.

Appendix B

Possible Temporary Speed Limit

	EXCELLENT (110, 100, 90)	AVERAGE (80, 70)	BELOW AVERAGE (60, 50)	POOR (40, 30, 20)
1. Minimum Lane Width	3.5m	3.25m	3.00m	2.75m
2. Pavement / Surface Condition	The shoulder and lane is clear of loose or greasy material and the traveled way is smooth	The road is close to normal condition except for a few minor defects (eg small pot holes or a few pieces of loose aggregate) **70km/h** where new seal has been swept but not marked	Defects and / or loose material on the lane (eg unattended reseals) **50km/h** for protection of a new seal	There are major defects and / or significant loose material on the lane (eg recently milled surface , large stones, steel plates)
3. Visibility and Alignment	There is greater than 140m visibility to the first cone in taper, **and** the worksite has not imposed a change in alignment	There is less than 140m visibility to the first cone in taper, **or** vehicles are deflected by 20 degrees or less from the original direction of travel  Deflected by less than 20°	There is less than 60m visibility to the first cone in taper, **or** vehicles are deflected by 20-45 degrees from the original direction of travel  Deflected by 20° to 45°	There is less than 30m visibility to the first cone in taper, **or** vehicles are deflected by more than 45 degrees from the original direction of travel  Deflected more than 45°
4. Site Clutter	Low site clutter, clear vehicle lanes, cycle lanes and footpaths	Some site clutter either plant or materials, vehicle lanes, cycle lanes and footpaths are lightly trafficked	Considerable site clutter requires additional management to guide vehicles though the site. Some queues of road users	Has numerous driver distractions including construction traffic. Cycle lanes or footpaths are closed. **30km/h** for portable traffic signals, MTC operations or where traffic has to traverse the actual active working space (either in a delineated single lane or where traffic is not separated from the working space)

Is the lowest speed 80km/h or less and at least 10km/h below the permanent speed?

Yes → Use this Temporary Speed Limit

No → No Temporary Speed Limit Required

E3 Appendix C: Procedures for safety audit/review of worksites

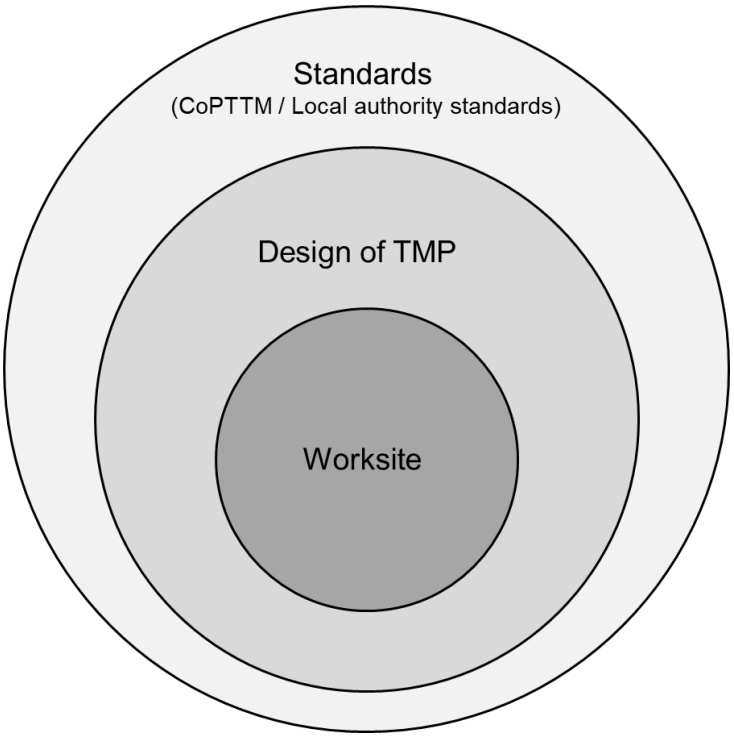
E3.1 Introduction

E3.1.1 Focus for auditor/reviewer

The initial focus for the auditor/reviewer is the worksite.

The auditor/reviewer also assesses:

- the design of the TMP
- application of CoPTTM and Local authority standards.



E3.1.2 Audit principles

Key principles that underpin all audits/reviews are:

- auditors/reviewers are consistent in their approach
- audits/reviews are fair
- where required, auditors/reviewers reference the relevant standard (either CoPTTM or local authority standards) when explaining issues
- auditors/reviewers take time to educate and encourage high standard/acceptable TTM work activities.

E3.1.3 Audit/review resources

Audit/review forms are available from the CoPTTM pages of the NZTA website (refer to Forms used for traffic management).

Audit/review resources are also available in section I: 21 Audit/review resources of the CoPTTM pages of the NZTA website.

E3.2 TTM safety audit/review methodology

E3.2.1 General methodology

An audit/review includes the following:

- a review of the worksite
- completion of the site condition rating (SCR) form
- a review of the TMP and onsite record (where required).

The general methodology recommended for using these procedures is:

- proceed through the worksite (including intersecting roads) making note of issues and recording them on the SCR form. Photographs or videos are recommended to record items of interest

  If at any stage the auditor/reviewer considers the worksite to be of high risk to road users/workers, immediate corrective action must be initiated

- review the on-site documentation (TMP and on-site record) as required. Refer to appendix C, subsection E3.4 Sighting TMPs rework the SCR to reflect any approved variances to the CoPTTM and local authority standards
  Note: Where there are issues with the design and/or approval of the TMP, these are recorded on the SCR for follow-up
- establish the site condition rating:
  - for the full audit/review:
    - SCR is based on the total accumulated points for the worksite and other worksite aspects
  - for the short audit:
    - total the number of scores for each rating given against each standards category
- take appropriate actions with respect to SCR outcomes (refer appendix C, subsection E3.5 Actions following SCR).

A copy of the SCR is to be provided to the STMS and the company responsible for the TTM. A copy may also be provided to the company responsible for the working space and the principal if required.

E3.3 SCR for full and short audit/review

E3.3.1 Full audit/review - site condition rating

The SCR evaluates temporary traffic management (TTM) compliance with the minimum requirements of the CoPTTM and Local Authority standards.

Each element of non-compliance is given a value that reflects its importance in terms of TTM at the worksite and is tallied to give the SCR.

E3.3.1.1 SCR categories

High standard	Acceptable	Needs improvement
0 - 10	11 - 25	26 - 50

Unacceptable (Other)	Unacceptable	Unacceptable (multiple issues)
SCR **under 51** and item(s) in OTHER WORKSITE ASPECTS are **marked N**	SCR **51+** and Item(s) in OTHER WORKSITE ASPECTS are **marked Y**	SCR **51+** and item(s) in OTHER WORKSITE ASPECTS are **marked N**

Dangerous
51+ and LOW RISK? is **rated No**

A notice of non-conformance may be issued when the worksite is rated Unacceptable (Other), Unacceptable, Unacceptable (multiple issues) or Dangerous. Refer to appendix C, subsection E3.4 Sighting TMPs and subsection E3.6 Notice of non-conformance.

E3.3.2 Short audit - site condition rating

The SCR evaluates TTM compliance with the minimum requirements of the CoPTTM and Local Authority standards.

Short audit ratings are as follows:

- Acceptable
- Needs improvement
- Dangerous.

If an item is rated dangerous it must be rectified at once.

If there are one or more dangerous ratings the auditor/reviewer must consider issuing a notice of non-conformance.

In the case of issuing a notice of non-conformance, the auditor/reviewer must either provide a detailed report, and if possible photographs, or a SCR using the full audit/review.

E3.4 Sighting TMPs

E3.4.1 When to site onsite documentation

Reviewing the onsite documentation (TMP and on-site record) confirms that:

- there is an approved TMP for the worksite
- the worksite layout complies with the approved TMP (including any engineering exception decisions (EEDs) approved for the worksite)
- the TMP, which may include an EED, is appropriate to the actual situation
- any authorised TSLs are appropriate to the worksite and activity
- the on-site record has been completed and is correct.

Guidelines for when to review the onsite documentation are set out below:

For both attended and unattended worksites	
High standard (0 – 10)	**Optional**
Acceptable (11 – 25)	**Optional** (unless worksite SCR is high risk)
Needs improvement (26 – 50)	**Optional** (unless worksite SCR is high risk)
Unacceptable	**Must check documentation**
Dangerous	**Must check documentation**

RCAs may establish their own policies for when onsite documentation is to be reviewed.

E3.5 Actions following SCR

E3.5.1 SCR of high standard or acceptable

The auditor/reviewer need not take any action on site when the SCR is either within the High Standard or Acceptable categories. It is recommended however, that the STMS be advised of these good audit/review results at the time of the audit/review.

E3.5.2 SCR of needs improvement

Where the SCR is Needs improvement, the STMS must be informed of the audit/review result immediately. The auditor/reviewer must discuss the TTM features that are non-complying with the STMS and make recommendations as to how the worksite safety can be improved.

The STMS must undertake remedial action as soon as possible and has a maximum of four hours to bring the SCR to an Acceptable standard or better.

E3.5.3 SCR of Unacceptable (Other)

Where the SCR is Unacceptable (Other) the STMS and/or organisation must be informed of the audit/review result immediately. The auditor/reviewer will advise the STMS/Contractor as to expected actions. This may include anything from the STMS implementing immediate remedial actions through to the ceasing of all activity/work and making the site safe until such time as the TTM is improved to Acceptable SCR or better.

A stop works order (SWO) may be issued in some circumstances such as where no approval exists for the activity/TMP.

E3.5.4 SCR of Unacceptable, Unacceptable (multiple issues) and Dangerous

Where the SCR is Unacceptable, Unacceptable (multiple issues) or Dangerous the STMS and/or organisation must be informed of the audit/review result immediately.

A rating of Dangerous is grounds for the issuing of a SWO. In some circumstances, a rating of Unacceptable, or Unacceptable (multiple issues) could also result in the issuing of a SWO such as where the STMS and/or organisation is unable to or unwilling to voluntarily implement the required corrective actions.

Where a SWO has been issued, the activity/work may not recommence at the worksite until the auditor/reviewer (or appropriately RCA authorised person) is satisfied that the site TTM is appropriately managed and releases the SWO. During the period the SWO is in effect, the contractor may only undertake actions that maintain or improve the safety of the site.

Where no SWO has been issued, all work activity must cease immediately and the TTM be improved to an Acceptable SCR or better as determined by the STMS in consultation with the auditor/reviewer. If the TTM cannot be improved to the required rating, the worksite must be cleared and the road left in a safe condition.

A notice of non-conformance may be issued against the STMS and/or any other responsible party for worksites with an SCR of Unacceptable (Other), Unacceptable, Unacceptable (multiple issues) or Dangerous.

Where there are widespread and/or consistent issues with the TTM provided by an organisation an Organisational NNC may be applied (see E3.6.2 About Org NNC).

It may be necessary to supplement the SCR form with an attached memo or coversheet on which the auditor/reviewer may add additional comments regarding the audit/review.

Where an auditor/reviewer issues a notice of non-conformance a copy of the NNC and of the SCR form must be forwarded to the Principal CoPTTM Advisor for consideration and be recorded in the NZTA's database.

E3.5.5 Non-compliance with TMP principles

Where non-compliance with TMP principles is recorded and forwarded to the contractor (and principal if required) in accordance with appendix C, subsection E3.2 TTM safety audit/review methodology, the contractor must either make prompt changes to address the issues raised or forward reasons why the issues should not be addressed to the TMC within 24 hours.

E3.5.6 Appropriate action for non-complying TTM

E3.5.6.1 If the TTM is being completed under contract

Appropriate action for identified non-complying and/or unsafe TTM may include the following:

- issue a NNC to contractor detailing non-compliance(s) and expected corrective action(s)
- replacement of the contractor's nominated STMS
- arrange for another TTM contractor to make the worksite safe
- apply liquidated damages
- close the worksite down.

E3.5.6.2 If the activity is not being completed under contract to the RCA

Safety standards must still be met. The authorisations for activities on roads must require the appropriate standard for traffic management to be met.

Actions for identified non-compliance may include the following:

- issue an advisory note requiring a corrective action plan
- issue a notice to the person carrying out the activity detailing the non-compliance and expected corrective action
- close down the worksite as an unauthorised worksite
- lay a complaint with the police
- lay a complaint with WorkSafe NZ
- arrange for another contractor to make the worksite safe.

E3.6 Notice of non-conformance

E3.6.1 Who can be issued a notice of non-conformance (NNC)

A rating of Unacceptable (Other), Unacceptable, Unacceptable (multiple issues) or Dangerous is grounds for the issue of a notice of non-conformance.

A NNC can be issued to:
- The STMS and/or delegate in charge of the worksite
- The designer of the TMP

Continued non-conformance from a company/organisation may result in the issue of an organisational NNC (Org NNC).

E3.6.2 About Org NNC

An Org NNC applies if there are widespread and/or consistent issues with the TTM provided by an organisation. The RCA may issue an Org NNC for a one-off incident or for multiple failures.

A 3 strikes approach is used with sanctions being applied if 3 strikes have been issued within 12 months of the issue of the first strike. Strikes 1 and 2 will lapse if no further strike is issued within 12 months of the issue of the first strike.

Any warnings and sanctions may be applied:
- at the branch level of a company
- within an RCA boundary.

Where subcontractors receive an Org NNC a 'please explain' letter will be sent to the principal contractor asking how they propose to overcome the failure(s).

Appeals may be submitted to the Principal CoPTTM Advisor, NZ Transport Agency National Office, Private Bag 6995, Wellington 6141.

E3.6.3 Org NNC 3 strikes process

Strike 1 Org NNC Warning	• The RCA notifies the company/organisation that it will be applying a **Strike 1 Org NNC**. Notification is also sent to NZTA. • On receipt of **Strike 1 Org NNC**, NZTA registers the event and sends a warning letter to the company/organisation/subcontractor to warn of the consequences of continued non-compliant activity • The company/organisation submits a plan to the RCA detailing actions to prevent reoccurrence of the non-compliant activity
Strike 2 Org NNC Final warning	• A similar process is followed for the issue of a **Strike 2 Org NNC**. • On receipt of a **Strike 2 Org NNC** within 12 months of the issue of the first strike, NZTA sends a final warning letter to the company/organisation/subcontractor also outlining the consequences of continued non-compliant activity • The company/organisation submits a plan detailing actions to prevent reoccurrence of the non-compliant activity

Strike 3 Org NNC Apply sanctions	• On receipt of **Strike 3 Org NNC** within 12 months of the issue of the first strike, NZTA sends a letter detailing the sanctions to be applied and the time period for these sanctions to the branch manager and CEO of the company/organisation/subcontractor. A copy of the letter is also sent to the relevant RCA **Specific NZTA sanctions** • This non-conformance will affect an organisation's NZTA Pre-Qualification status • The information will be forwarded to the appropriate standards organisation and may affect the company/organisation's ISO9000 or TQS1 quality rating. **Other sanctions which may be applied by RCAs include but are not limited to the following** • Denied access to the road network for a period of time • The company/organisation may not be allowed to provide their own TTM for their and their clients worksites and will be required to employ an RCA approved TTM provider for their and their client's worksites on the network for a period of time • Undergo retraining for CoPTTM warrants

E3.7 Example of site condition rating (SCR) form – full audit/review

TTM SITE CONDITION RATING FORM

SITE DETAILS			
RCA			
Suburb			
Road name			
CAR/WAP number		Road ID	
Date/Time		TTM level	

OPERATIONAL DETAILS	
Activity description	
TTM method	
TTM Contractor	
Contractor- working space	
Client / Principal	

SIGNS			Weighting	Tally	Total
A1	Missing	Sign	5		
A2	Position	Sign	2		
A3	Not visible/fallen over	Sign	5		
A4	Wrong sign	Sign	5		
A5	Condition unacceptable	Sign	4		
A6	Permanent sign	Sign	5		
A7	Unapproved sign used / too small	Sign	4		
A8	Non-compliant support / sign too low	Support	2		
				Subtotal	

MOBILE & SEMI STATIC			Weighting	Tally	Total
B1	Tail pilot vehicle/AWVMS omitted or incorrect location	Vehicle	30		
B2	Lead pilot vehicle omitted or incorrect location	Vehicle	20		
B3	Shadow vehicle omitted or incorrect location	Vehicle	26		
B4	TMA missing or non compliant	TMA	26		
B5	AWVMS/arrowboard non compliant	Vehicle	26		
				Subtotal	

PEDESTRIANS / CYCLISTS			Weighting	Tally	Total
C1	Inadequate provision for pedestrians	Feature	10		
C2	Inadequate provision for cyclists	Feature	10		
				Subtotal	

DELINEATION			Weighting	Tally	Total
D1	Missing or ineffective taper	Leading taper	26		
D2	Tapers too short	Leading taper	15		
D3	Taper too short or missing	Trailing taper	5		
D4	Spacing in taper	Taper	5		
D5	Spacing along lanes	Per 100m	3		
D6	Missing or ineffective delineation along lanes	Per section	10		
D7	Condition unacceptable	Device	2		
D8	Using non-approved device	Device	4		
D9	Road marking incorrect at long term level 2 or 3 roads	Site	30		
D10	Inadequate/missing site access	Access	10		
				Subtotal	

MISCELLANEOUS			Weighting	Tally	Total
E1	Working in live lanes	Individual	20		
E2	Missing or ineffective controller	Individual	20		
E3	Safety zone compromised	Individual	10		
E4	High visibility garment not acceptable	Individual	5		
E5	Marginal surface condition (carriageway only)	Occasion	15		
E6	Unacceptable surface condition (peds, cyclists or carriageway)	Occasion	30		
E7	Barrier defects (missing or incorrect components)	Component	10		
E8	Unsafe or redundant TTM	Equipment	5		
E9	VMS message incorrect or inappropriate	VMS	15		
E10	Flashing beacons / indicator lights not used or ineffective	Vehicle	3		
E11	Parking / stopping features not relocated	Feature	5		
E12	Unsafe and illegal parking of plant/equip.	Feature	20		
E13	Marginal items (signs, delineators, Hi vis garments)	Feature	1		
				Subtotal	

OTHER WORKSITE ASPECTS		
G1	Qualified person on site *[refer to A5 of CoPTTM]*	Yes / Unacceptable
G2	TSL appropriate *[refer to C4 of CoPTTM]*	Yes / Unacceptable
G3	Road user flow acceptable	Yes / Unacceptable
G4	On-site record *[form must include STMS authority, 2 hourly checks and TSL details]*	Yes / Unacceptable
G5	TMP approved?	Yes / Unacceptable
G6	Approved TMP sighted?	Yes / Unacceptable
G7	Approved TMP applicable?	Yes / Unacceptable
G8	TTM in accordance with approved TMP?	Yes / Unacceptable

FINAL RESULT				
Score	✓ Rating		✓ Rating	
		High standard (0-10)		**Unacceptable** (51+ **only**)
		Acceptable (11-25)		**Unacceptable – Multiple** (both 51+ and Other Aspects)
		Needs Improvement (26-50)		**DANGEROUS** (LOW RISK? rated NO)
		Unacceptable - **Other** (Other Aspects **only**)		
Actions planned by STMS			**Site activity ceased by**	
Site fixed?	Yes / No			

KEY POINTS	Complaint callout?	Site activity status	Attended/Unattended	Notification to RCA *[does not affect score]*	Yes/No	TMP design issues?	LOW RISK?	Yes / No
	Yes / No	Audit/review	Planned/Unplanned	Good site induction? *[does not affect score]*	Yes/No	Yes / No		

ACTIONS TO BE TAKEN

AUDITED / REVIEWED BY			
Signature			
Auditor/Reviewer name			
Qualifications		NZTA ID No.	
Auditor mobile number			

STMS DETAILS			
Received by / signed		SCR left onsite?	Yes / No
STMS name			
Qualifications		NZTA ID No.	
STMS mobile number			

In submitting this form, the auditor/reviewer specified above agrees that they have explained the significant issues and proposed remedies to the relevant parties specified above and have provided these parties a physical copy of the audit (does not apply for unattended sites)

E3.8 Full audit/review site condition rating (SCR) – defect descriptions

Multiple deficiencies relating to one item of TTM may only be recorded as a single defect assigned against the rating that is the highest. For example, a sign which is concealed by a tree and is in the wrong position is to be assigned as 'Not visible/fallen over' as this item has a rating higher than the 'Position' item.

E3.8.1 Signs

A1	**Missing**	Any signs that should have been erected that are missing. A sign and supplementary plate combination is to be counted as one sign eg T1A plus T144. If either the sign or a supplementary plate is missing from a combination when required, then, it is counted as one sign missing.
A2	**Position**	Any signs where the spacing is too close or too far from other signs or the working space. Refer to CoPTTM worksite layout distance tables. Also includes signs that are too close or too wide apart across the road (eg gated speed signs that are placed on the back berm); signs that are offset by more than the approved allowance (eg TSL signs offset by more than 20m); signs blocking bus stops, cycle lanes or footpaths. Minor amendments should be noted on the TMP. Movement of TSL signs should be notified to RCA to maintain legality.
A3	**Not visible / fallen over**	Any TTM sign that should be erected at the worksite, which is not visible (eg knocked down or visibility blocked by a parked vehicle, vegetation or street furniture). If obstruction is noted in on-site record and best endeavours have been made, do not include in tally.
A4	**Wrong sign**	The wrong sign has been used, eg TL2L or TL2R sign showing the wrong lane being closed. Inappropriate signage. Incorrect TSL signage (eg TSL reinstatement incorrect for permanent speed limit). Wrong use of the sign from its intended purpose including detour arrows, NO ENTRY instead of ROAD CLOSED, or use of a sign with similar message but not the correct sign as per CoPTTM definition of use. Non-standard signs should be approved as part of TMP.
A5	**Condition unacceptable**	Refer to CoPTTM Section C19 Maintenance Standards. Includes signs unreadable at sign visibility distance and graffiti affecting the message of the sign. Marginal signs not included in the tally but must be advised to STMS.
A6	**Permanent sign**	Permanent signs that have not been covered and are no longer relevant to road users because of the activity. Includes curve advisory if advisory speed higher than TSL (chevron must be left visible), permanent speed limits, permanent lane advisory signs, passing lane advisory signs and permanent signs removed from site to facilitate works but still required. Consider suitability of sign coverage (eg must not affect the reflectivity of the sign when cover is removed). Includes permanent signs blocked by temporary signs. Parking features when relocated but signs not covered recorded under E11.

A7	**Unapproved sign used / too small**	Signs used that are not approved for use at worksites, includes using level 1 signs at level 2 and 3 TTM worksites. Also includes using signs not approved in TMP (excludes applicable CoPTTM sign where appropriate) and use of a small sign when full sign could be implemented when not approved on TMP or use of small sign in combination with full sized sign (eg small main sign with full size supplementary plate). RD6 sign - CoPTTM does not include use of cone mounted single arrow, twin disc preferred, not counted in SCR but advise TTM provider to phase out use. If smaller sign is required due to environmental factor this should be approved in the TMP.
A8	**Non-compliant support / sign too low**	Using supports that fail to meet the requirements of subsection B1.3.4 Sign stands and supports. Also includes signs mounted lower than the accepted minimum as described in the CoPTTM, stop/go paddles not in direct physical control by the MTC, attaching a sign to a regulatory sign pole or street furniture where it will cause obstruction or damage to the asset. Also includes signs not being appropriately delineated.

E3.8.2 Mobile & semi static

B1	**Tail pilot vehicle / AWVMS omitted or incorrect location**	Missing when required or location (lateral or longitudinal) is incorrect. **Note:** If arrow is incorrect record under E9.
B2	**Lead pilot vehicle omitted or incorrect location**	Missing when required or location (lateral or longitudinal) is incorrect.
B3	**Shadow vehicle omitted or incorrect location**	Missing when required or location (lateral or longitudinal) is incorrect. **Note:** If arrow is incorrect record under E9. When shadow vehicle is missing and requires a TMA record in both B3 and B4.
B4	**TMA missing or non compliant**	TMA not on mobile operation vehicle(s) when required. TMA is being used correctly but does not meet the certification for compliance as per the test level stated in NCHRP 350 and section B11 Truck mounted attenuators including the tare weight requirements for the vehicle. Crash cushion not deployed when required. Also includes TMA in centre lane with no additional TMAs to close adjacent lanes.
B5	**AWVMS / arrowboard non compliant**	AWVMS, European arrow board or horizontal arrow board not displaying the correct message (eg the right lane is closed but the arrow is directing traffic to the right). Also includes arrow board not fitted or is not used on mobile operation vehicles when it is required.

E3.8.3 Pedestrians/ cyclists	C1	**Inadequate provision for pedestrians**	Footpath obstructed by activity and neither temporary path nor direction to alternative pedestrian facilities provided. Features (recorded individually) include footpath width, ramps, gradient (including cross fall), visibility, location, any obstructions from exiting environment (low hanging tree branches, street furniture blocking path etc.). Ramp surface must be non-slip, must not move around and must be of sufficient width. Surface of footpath to be recorded under E6. Signs and delineation for pedestrian management covered under the other relevant sections in A and B.
	C2	**Inadequate provision for cyclists**	Work in a cycle lane or a high cycle use area and temporary facilities for cyclists have not been provided. Features (recorded individually) include cycle lane width, ramps, gradient (including cross fall), visibility, location, any obstructions from existing environment (low hanging tree branches, street furniture blocking etc.). Surface of cycle lane to be recorded under E6. Signs and delineation for cyclist management covered under the other relevant sections in A and B.
E3.8.4 Delineation	D1	**Missing or ineffective taper – leading taper (including chicane)**	Where leading taper delineation is missing which is required for traffic to shift from normal alignment. If due to environmental factors a short taper is required (but not allowed by the layout distances tables) then it must be included in the approved TMP with appropriate EED and mitigation measures. If 75% of the taper is installed it would be marked as too short rather than ineffective. Any less than 75% installed is ineffective. Also includes if there are too few cones installed to form the taper.
	D2	**Tapers too short – leading taper**	Taper has been formed but is too short. CoPTTM requires that two thirds of a taper must be visible. Refer to spacing tables for length requirements.
	D3	**Taper too short or missing – trailing taper**	Taper has been formed but is too short. CoPTTM requires that two thirds of a taper must be visible. Refer to spacing tables for length requirements.
	D4	**Spacing in taper**	Taper has been formed but spacing of delineation devices is too great (eg 1 to 1.5 x the spacing required in CoPTTM). If more than 1.5 x record under ineffective. Refer to spacing table for requirements.
	D5	**Spacing along lanes**	Delineation placed in rows, which are generally parallel to the centreline, but spacing of delineation devices is too great (eg 1 to 1.5 x spacing required in the CoPTTM). If stop/go centreline delineation is missing record in D6. Refer to spacing tables for requirements. Refer to D6 for ineffective where spacing is greater than 1.5 x spacing required.
	D6	**Missing or ineffective delineation along lanes**	Where delineation is missing or where the delineation is ineffective at separating lanes or ensuring the road user continues on the desired travel path, misleads traffic or provides conflicting message (eg traffic is required to travel on right but left side appears open and delineation does not effectively keep traffic in the correct lane). Refer to spacing tables for requirements. Refer to D5 for spacing in lanes. **Note:** Requirements for chip seal and paving operations allows double cone spacing.

D7	**Condition unacceptable**	Refer to section C19 Maintenance Standards, specifically C19.3.4. Includes punctures, large areas of staining, and significant area of missing or stained reflective material. **Note**: Non-compliant logos may be considered unacceptable if visible to vehicles. Auditor/reviewer to note marginal devices and advise STMS but not include in the SCR result.
D8	**Using non-approved device**	Delineation or channelling devices that fail to meet the criteria specified in the CoPTTM. Includes marker posts, drums and barriers or other devices used in the place of compliant delineators.
D9	**Road marking incorrect at long term level 2 or 3 roads**	Road marking not correctly adjusted at long term level 2 and 3 TTM static worksites where alterations are required as part of the approved TMP and other delineation is not implemented. **Note:** Consider if TTM is applicable for the construction methodology in which case record in "other checks". Where it is not identified in the TMP, a worksite will be considered as long term where the closure is in a continuous configuration for more than 72 hours.
D10	**Inadequate / missing site access**	Inadequate site access where required as defined in the CoPTTM. No site access visible for level 2 and 3 sites (exception is re-surfacing operations where site access is frequently moved). Site access in poor location. Vehicles accessing site in unapproved manner including against the flow of traffic or impeding traffic flow in unacceptable manner. Signs missing recorded under missing signs. Delineation of site access recorded under D5. Location and spacing of access gap recorded in D10.

E3.8.5 Miscellaneous

E1	**Working in live lanes**	Personnel associated with the activity are in the live lane outside the established working space and established safety zones. **Note:** If personnel cross the road without any equipment this is not classified as working in live lane but if carrying or moving equipment/materials from one side of the carriageway to the other, then this is classified as working as their full focus is not on task of crossing road. If there is no traffic flowing, then it is permissible for personnel to cross the road (not allowed on a level 3 road). **Note:** Consider proximity to pedestrian crossing if available but not used. Traffic must not be expected to slow down or stop for personnel to cross the road. If under stop/go operation and MTCs change flow to stop/stop for all traffic approaches then lanes are not to be considered as live. If MTC needs to speak to motorist this should be done via the vehicle passenger side.
E2	**Missing or ineffective controller**	Manual traffic controller not at stop/go position, footpath controllers not available to manage pedestrian movements where identified as required in the TMP, or spotter not being used when required for inspection activities. Also includes where the MTC is on the right hand side of approaching traffic rather than the left hand side to stop traffic. **Note:** It is acceptable for a cone to be placed in front of the first vehicle provided the MTC remains on the left hand side of the road until the vehicle has come to a complete stop prior to positioning the cone. The cone must only be retrieved whilst the stop paddle remains in place. The MTC must be able to easily reach the paddle if required (eg to prevent the paddle from turning in the wind). If SCR result is High Standard or Acceptable consideration to be given to "road user flow acceptable" in Other Checks.

E3	**Safety zone compromised**	Where either the lateral or longitudinal safety zone is insufficient (eg too small or missing). Tally each zone compromised for each occasion whether for plant, materials or personnel. **Note:** This is not applicable if under a stop/go operation and all traffic flows are on stop.
E4	**High visibility garment not acceptable**	Refer to section C19 Maintenance Standards, specifically B3, C19.3.6, C19.3.7, C19.4.2 and C19.4.3. Includes garments not done up, torn garments, large areas of staining, and significant area of missing or stained reflective material. Also includes STMS not wearing STMS garment (exception A5.8.7).
E5	**Marginal surface condition (carriageway only)**	Surface is rough and likely to be dangerous for any type of road user for the temporary or permanent speed limit at the worksite. Marginal to be applied if advised speed on site is 1 step higher than the speed determined by using the TSL decision matrix. **Note:** If a TSL is not implemented when required due to surface condition, record in this section but if a TSL is implemented when it is not required record in G2. For example, record in E5 as marginal surface condition a 100km/h rural road with chip seal surface not swept with no TSL. Record in G2 a 100km/h rural road with swept chip seal and line marked with 50km/h TSL in place. Also includes steel plates used to protect excavation but not appropriately secured in place.
E6	**Unacceptable surface condition (peds, cyclists or carriageway)**	Surface is unacceptably rough and likely to be dangerous for any type of road user for the temporary or permanent speed limit at the worksite. Unacceptable if advised speed on site is 2 steps higher than the speed determined by using the TSL decision matrix. For pedestrians and cyclists this includes trip hazards, wet concrete, obstructions, or soft/impaired surfaces (including weather affected).
E7	**Barrier defects (missing or Incorrect components)**	Includes missing or incorrect end treatments on barriers, non-compliant barriers, end flares too sharp, barrier too close to live lane, barriers not linked, barriers not pinned where required and barrier not used when required. **Note:** Multiple defects for this item must be counted individually. Also includes device that is being used as a barrier but does not meet the CoPTTM requirements and barriers deployed not in accordance with manufacturer's specifications (eg water filled barriers not filled with water). Component are defined as leading terminal, trailing terminal (if required), flare if not terminal end, barrier alongside work site, linkage of barriers, installation in accordance with manufacturers specifications, damage to individual units (eg Leaking water filled barrier, cracked concrete barrier sufficient to compromise integrity of barrier etc.). Consideration should also be given to the surface the barriers are installed on if the surface would prevent the barrier performing as expected (eg on or in front of a kerb). Delineation of barriers to be recorded under delineation. If barriers not needed but deployed incorrectly record as redundant TTM.

E8	**Unsafe or redundant TTM**	Redundant TTM to be removed from site if not to be used within 48 hours (eg site reviewed on Friday with signs not required for unattended site stored on site, but further works taking place Sunday night, therefore time between active sites extends past the 48 hours permitted so signs should be removed). TTM equipment stored inappropriately on site when not required for an active closure. Also includes when TTM equipment is stored in front berm, frame and base left upright with sign panel on ground, or frame and base left upright with signs turned to have back panel facing traffic or the sign turned 90° to the travelled path. Includes signs/stands/bases in cycle lanes or footpaths, cones stacked to side not required for unattended sites, TTM equipment left in manner which causes hazard to road user (eg equipment not delineated). Hierarchy for storing TTM equipment: remove from site, then back berm, finally front berm if permanent speed limit is under 65km/h and there is a kerb and channel. Footpaths must not be impacted by the storage of equipment regardless of the width of the footpath available. Storage is only permitted in suburban or commercial areas but not near schools or shopping areas. To be recorded for each sign/stand/base that is unsafe or redundant and once for every 10 delineation devices. Also includes barriers when deployed but not needed.
E9	**VMS message incorrect or inappropriate**	VMS displaying incorrect messages in relation to activities or VMS board message not approved by RCA.
E10	**Flashing beacons / indicator lights not used or ineffective**	Amber flashing beacons are not in operation or have been omitted from vehicles where required or do not comply with the CoPTTM requirements. Record in E10 if vehicle indicator lights used in hazard mode to access/exit site. **Note:** Vehicle indicators should only be used to give direction to road users of a pending site access movement.
E11	**Parking / stopping features not relocated**	Work encroaches on parking or stopping feature which has not been relocated to a position clear of the worksite. Such features could include bus/transit lane, clearway (during enforceable timeframes), taxi stands, bus stops, bus parking locations, loading zones, mobility spaces and/or drop off areas. This SCR element is different to E12 where the feature is being used to park in but not as part of work site. E11 refers to feature being within work site but not appropriately relocated.

E12	**Unsafe and illegal parking of plant / equipment**	Plant and equipment is unsafely parked or illegally parked. Includes plant and equipment parked outside of designated work area on footpaths, cycle lanes, broken yellow lines, clearways, bus/transit lanes, bus stops, bus parking spaces, loading zones, taxi stands, mobility spaces, or restricted parking spaces. Also includes plant and equipment on site when unattended and not appropriately protected from public (for example milling machine with no shoulder closure protection). Consideration to be given to the manner in which plant or equipment is parked eg if forcing road user across a centreline. Vehicles must be parked in the direction of traffic flow. Shoulder closures to protect parked plant/equipment must be approved as part of the TMP. Parked plant and equipment must be visible to drivers of vehicles, cyclists and pedestrians so they can see the hazard. **Note:** While a vehicle may be legal under the Land Transport Rule to be on the road it may be classified differently under the Health and Safety at Work Act.
E13	**Marginal items (signs, delineators, Hi vis garments)**	Refer to section C19.3 Evaluation for classification of TTM devices. **Note:** Non-compliant logos may be considered unacceptable if visible to approaching road users. A sign is marginal if there are many surface abrasions throughout the sign face and many are within the individual letters or symbol of the message; the surface is marked by material (such as asphalt, bitumen, cement slurry or dirt) not obscuring the lettering or symbol; some colour fading is evident, the background colour and reflectivity are still apparent; the message is legible and matches the approved design as per section B1 Signs. A delineator is marginal if the surface is marked by material (such as asphalt, bitumen, cement slurry or dirt) and cannot be readily cleaned; the reflective bands have numerous tears and scratches; the reflective bands are largely free of residue. A high-visibility garment is marginal if the garment has numerous tears and scratches; the garment has some marks (from materials such as asphalt splattering, bitumen, dirt or cement slurry) and may not be readily cleaned due to abrasion or discoloration. However, it is free of large areas of residue or missing reflective material.

E3.8.6 Other worksite aspects

G1	**Qualified person on site [refer to A5 of CoPTTM]**	The worksite must be under the control of an STMS or briefed TC for level Low Volume and level 1 sites and an STMS L2/3 Practising or a briefed STMS NP (where allowed) for level 2 and 3 sites. If control of the worksite has been delegated by the STMS, there must be correct documentation of the delegation and or handover including time and briefing. Briefing must include reference to site specific details such as delivery movements or any minor amendments made to the TMP. Delegated STMS-NP/TC must be satisfied with the site condition they are taking responsibility for prior to accepting delegation. STMS delegating the site must ensure that the person they are delegating to is suitably qualified. Auditor/reviewer should allow some flexibility if the physical handover of the site has not been possible, eg if the STMS in control of the site has gone home sick. Auditor/reviewer should allow time for the STMS to be away for auditing purpose (to gain access to the start of the site and while conducting site checks).
G2	**TSL appropriate [refer to C4 of CoPTTM]**	The TSL must be appropriate in accordance with the CoPTTM TSL decision matrix. The speed limit, including de-restriction, is not appropriate for the physical works or correct for permanent speed limit derestriction. If the TSL is too low (refer to subsection G4.4.6 Excessive or inappropriate use of TSLs), a notice of non-conformance is issued. Consideration should also be given if the speed limit is too high (eg if a 70km/h TSL has been installed however the CoPTTM TSL decision matrix determines a 50km/h is appropriate). Also refer to notes under E5.
G3	**Road user flow acceptable**	Road users are flowing appropriately through the site; any queues do not extend past first advance warning sign and there are no unreasonable delays or delays in excess of five minutes or durations as approved in the TMP. Unacceptable flows include any instances of vehicular conflict eg two directions of traffic sent on "go" during a stop/go operation or where minimum lane widths are not maintained. G3 can be used to record where access for residents or businesses are not maintained or alternative solutions have not been agreed with the relevant parties, including the RCA. **Note:** 5 minute delay is to be in addition to the normal traffic flow on the road for that time period.
G4	**On-site record [form must include STMS authority, 2 hourly checks and TSL details]**	On-site record available on site which includes information required under the CoPTTM example form. **Note:** This does not need to be the CoPTTM form. Required checks have been conducted in accordance with approved TMP and CoPTTM and are appropriate to the time of the audit/review (eg not completed ahead of the time of the audit/review). Site checks should be robust and provide a high level of confidence in the effective management of the site. Any TSL implementation must be recorded correctly including the installation start time and all individual street names with defined TSL and derestriction sign locations recording where the TSL signs are positioned on that street (eg driveway for a street number or fixed identifying location). If a TSL is not required the STMS should record N/A for the TSL section of the documentation.

G5	**TMP approved?**	TTM documentation must be at all attended worksites and include TMP proforma, diagrams and other attachments eg the WAP including RCA conditions. Documents must be stamped with the CAR approval stamp and the CAR reference applicable to the TMP must match for all documents. Where applicable documentation must be available for time extensions. Verifiable information is acceptable (eg if approval is via a phone call and there is a record of the date, time and who was involved in the conversation thus allowing confirmation of the approval to take place where required).
G6	**Approved TMP sighted?**	TTM documentation must be at all attended worksites and include the TMP proforma, diagrams and other associated documents eg the WAP including RCA conditions. A copy of the TMP must be available on site (within 30 minutes of request from auditor/reviewer). Hard copies or electronic copies are acceptable however if using electronic format consideration should be given to a charging device and a mechanism for being able to record information including induction information, on-site record and TSL requirements etc.
G7	**Approved TMP applicable?**	The approved TMP accurately reflects the road environment including lane configurations, pedestrian features (including signalised crossings, zebra crossings and refuge islands), bus stops, parking features and other site specific features. If not, minor amendments are accurately recorded and notified to the RCA with evidence available of this notification (eg email or phone call with record of who was spoken to, time of conversation and agreed mitigation). Amendments of a significant nature may require submission of a revised TMP for approval. If the TMP is not applicable this is followed up off site with the TMP designer and/or CAR Manager who approved the TMP.
G8	**TTM in accordance with approved TMP?**	The TTM measures implemented on site match the approved TMP. Minor amendments, as long as they are noted on TMP, with the date, time and signature are acceptable if for reasons of improving road user safety or traffic flow. Minor amendments must not be for benefit of cost or ease of construction. Any significant changes must have been agreed with the RCA and correctly documented and approved (refer G7). **Note:** Example of an unacceptable amendment being a shoulder closure upgraded to contraflow with no documented evidence of approval. Significant changes must be agreed following consultation with the RCA/TMC/CAR Manager prior to implementation.

E3.9 Example of site condition rating (SCR) form – short audit

SITE CONDITION RATING FORM (SHORT AUDIT)						
Street name(s)		**RCA permit reference**		**Attended / Unattended**		
Number *(from/to)*		**Principal**				
Employer of site STMS		**Audit commences**	am / pm	**Date**		
Rating	**A** = Acceptable	**NI** = Needs improvement		**D** = Dangerous		

SUMMARY OF STANDARDS		**A**	**NI**	**D**	**ACTION NEEDED**
1. Responsible party	**STMS / TC at attended site?** Name: Registration number:				
2. TMP	On site? Appropriate to situation?				
3. High-visibility garments	Worn by all? Done up? Condition acceptable?				
4. Signs	All necessary signs present? Correct positions? Sand bagged for expected wind? Conflicting signs covered? Signs in good condition? Other:				
5. Delineation	Protects working space/other features? Taper lengths compliant? Correct spacing of cones? Sufficient positive traffic control? Other:				
6. Pedestrian needs	Footpath widths OK? Safe passage for pedestrians? Surfaces / ramps OK? Other:				
7. Cyclist needs	Cycle widths OK? Safe passage for cyclists? Surfaces OK? Other:				
8. Traffic needs	Lane widths OK? Speed limit appropriate? No significant delays? Surfaces OK? Other:				
9. Property access	Property access OK?				
10. Site scores	**Number in each rating**				
		A	**NI**	**D**	
Action agreed by STMS/TC					

Auditor				**STMS/TC**
	(Name)	*(Warrant Number)*	*(Signature)*	*(Signature)*

CONTRACTOR COPY *– Hand to contractor once audit has been completed* **Audit finished** **am / pm**

E3.10 Examples of ratings (short audit)

EXAMPLES OF RATINGS (SHORT AUDIT)			
ASPECT	**A = Acceptable** (Standard met)	**NI = Needs improvement** (Moderate risk)	**D = Dangerous** (High risk)
1. Responsible party	• STMS/TC is at attended site	• TC at attended site but STMS arrives after allowed time limit	• No STMS/TC at attended site, or • No STMS responsible for the site
2. TMP (only for attended sites)	• TMP on site, and • Appropriate to the situation	• TMP on site, and • Appropriate to the situation, but • There are some safety issues	• TMP not on site, or • TMP not appropriate to situation
3. High-visibility garment	• Worn by all • Done up • Condition acceptable	• Worn by all, and • All high-visibility garments done, and • Condition of high-visibility garments marginal	• Not everyone wearing high-visibility garments, or • Some high-visibility garments not done up, or • High-visibility garments have unacceptable condition
4. Signs	• All necessary signs present • Correct order and distances • Conflicting signs covered	• Some signs are either missing, of poor quality, or inadequate distance and visibility, but • An adequate message given to motorists, or • Some conflicting signs not covered, or • Some signs not well supported	• Some signs are either missing, not visible or conflict with other signs, or blown over, or • Motorists are not reasonably warned; causing a hazard to road users
5. Delineation	• Protects working space/other features • Taper lengths compliant • Spacings of cones close enough • Sufficient positive traffic control	• Protects working space/other features but could be better, or • Taper lengths should be longer, or • Cone spacings need to be reduced, or • Not sufficient positive traffic control	• Does not protect working space/other features, or • Does not provide sufficient positive traffic control
6. Pedestrian needs	• Footpath widths OK • Surfaces and ramps in place • Appropriate protection provided	• Safe passage for pedestrians but footpath width could be greater, ramps and surfaces could be better, entry point could be more obvious	• Insufficient footpath widths, or • No safe passage for pedestrians, or • Surfaces not suitable for pedestrians, or • Pedestrians forced onto road close to fast traffic or past a dangerous site without sufficient protection • Pedestrians not using option provided
7. Cyclist needs	• Cycle widths OK • Surfaces OK • Safe passage provided	• Safe passage provided for cyclists, but • Widths need to be greater, or • Surfaces need to be better, or • Signage more appropriate	• Cycle widths not acceptable, or • No safe passage for cyclists provided, or • Surfaces not suitable for cyclists, or • No positive traffic management to enable cyclists to merge
8. Traffic needs	• Sufficient lane widths OK • Speed limit appropriate • No significant delays • Surfaces OK	• Lane widths not narrow enough for positive traffic management needs, or • Too narrow and causing a nuisance, or • Some unnecessary delays • Surfaces rough and uneven	• Lane widths causing hazard by failing to positively control traffic, or • Speed limit not appropriate to site, or • Surfaces unacceptably rough
9. Property access	• Occupants well catered for and informed	• Some minor access difficulties	• Serious access difficulties

E4 Appendix D: Measure and payment for traffic management (guidelines only)

E4.1.1 Installation, uplift and removal

Payment will be made on a lump-sum basis for the following:

- Preparation and approval of the TMP, and all advertising and notifications necessary.
- Establishment on worksite of all vehicles, equipment, materials and personnel sufficient to undertake the installation of all traffic management as per the approved TMP.
- Establishment on worksite of all vehicles, equipment, materials and personnel sufficient to undertake the uplifting and reestablishment of any traffic management measures required as part of the changing road works operation throughout the project.
- Establishment on worksite of all vehicles, equipment, materials and personnel sufficient to remove all traffic management measures on final completion as per the approved TMP, and leave the worksite in an equivalent or better condition than originally.

Fifty percent of the lump-sum payment will be made on successful installation of the first phase of the TMP. The remaining payment will be made on completion of all traffic management activities and tidy up of the worksite.

E4.1.2 Maintenance of the TTM

Payment will be made on a daily basis for the duration of the traffic management services. This payment must cover all costs associated with:

- the daily maintenance of **conforming traffic management** at the worksite including the supply of all vehicles, equipment, materials and personnel sufficient to maintain the traffic management measures as specified in the accepted TMP
- inspections and maintenance of quality assurance records
- any other costs associated with traffic management on site that have not otherwise been allowed for.

There will be no payment for any day or days when traffic management occurs on worksite that does not conform to the approved TMP.

Non-conforming traffic management is deemed to occur when signs, delineation devices and/or any other traffic management equipment are not positioned or used as required by the accepted TMP for any period exceeding the inspection cycle as specified in subsection C19.5.1 Monitoring frequency for TTM measures.

E5 Appendix E: Newspaper advertisement standard

Advert format to be as follows:

Width:	Double column
On top:	Road controlling authority logo
Title:	Brief description of the activity
Wording	'(RCA) **wishes to advise that, weather permitting**, (if appropriate) the (local description of affected road including start and finish points if necessary) will be closed between the hours of ..... (time format to be 9.00 am) and ..... (time format to be 7.00 pm) on ..... (date format to be 11 April 2012) for ..... (brief description of activity). Where activity could be delayed the following provision may also be added: ***However if .....*** (give reasons for possible delay) ***prevents activity at these times, the activity will be carried out on the next available day/night*** (give alternative dates and times as detailed above)***road users are requested to follow the sign posted detours whilst the closure is in operation.*** (RCA) ***regrets any inconvenience caused.*** ***(Name of RCA representative)'***

E6 Appendix F: Example of notice of non-conformance

NOTICE OF NON-CONFORMANCE			
Date of audit		**Time**	
Audited by		**of**	
Contractor		**Contract/consent number**	

STMS/Responsible parties:

This notice is to inform you that the temporary traffic management at the following worksite is not in accordance with accepted traffic management practices:

Roads:

Location: RS: RP:

This notice of non-conformance is issued in respect of the following temporary traffic management defects *(delete those that do not apply)*:

- STMS nominated in TMP not on worksite
- TC nominated in TMP and briefed by STMS (level LV and level 1) not on worksite
- Copy of signed and approved TMP not on worksite
- Safety audit of temporary traffic management site condition rating 'dangerous'
- Temporary traffic management not in accordance with the CoPTTM
- Inappropriate or excessive TSL

The details of non-conforming temporary traffic management are:

The actions required to be implemented are:

Notice handed / mailed / faxed *(delete those that do not apply)* to

on at

Note: For attended sites, notification must be given to the site STMS or TC before auditor leaves the worksite

Signed: **Received:**

Engineer: Contractor:

E7 Appendix G: Example of notification of road closure/lane closure of state highways/local authority road

NOTIFICATION OF ROAD CLOSURE/LANE CLOSURE OF STATE HIGHWAYS/LOCAL AUTHORITY ROADS							
RCA				**Road/State highway**			
Locality						**RP**	
Closed at		am / pm	**Date**				
Reason *(add Yes as appropriate)*							
Snow		Drop out		Vehicle blockage/crash		Fatal crash	
Ice		Wash out		Toxic spill		Planned closure	
Slip		Flooding					
Other:							
Estimated duration closure *(add Yes as appropriate)*							
<2 hours		<12 hours					
<6 hours		>12 hours (see below)					
Closed by *(add Yes as appropriate)*							
Police		Fire Service					
RCA		Other					
Alternative route/s available and conditions that apply							
Reporting officer							
For closures >12 hours AND crashes/spills							
Open at:		am / pm	Date:				
Remaining restrictions:		No / Yes (specify):					
Work outstanding:		No / Yes (specify):					
Reporting officer:				Lane km closed: *(divided carriageways only)*			
Head Office use only: cc							
HCM	**CE**	**File**					

E8 Appendix H: (Ex-LRS – only applies to STMS-delegated authority to self-approve) Example of application for delegated authority to approve TMPs for selected level LV and level 1 roads

APPLICATION FOR DELEGATED AUTHORITY TO APPROVE TMPS FOR SELECTED LEVEL LV AND LEVEL 1 ROADS *(Ex LRS – only applies to STMS delegated authority to self-approve)*			
To the traffic management coordinator			
RCA name		**Date**	
RCA address			
I agree to comply with the requirements of the CoPTTM and I apply for delegated authority to approve TMPs on RCA selected level LV and level 1 roads in the manner outlined in the CoPTTM.			
Signed by			
	Signature	*Full name*	
STMS ID number			
	ID number	*Expiry date (CoPTTM qualification expiring)*	
Company			
	Name		
	Postal address		
	Contact telephone number	*After hours contact details*	

Road controlling authority response (should delegation be considered appropriate)

The traffic management coordinator hereby delegates the power to approve traffic management plans and TSLs in accordance with the procedures and requirements set out in the CoPTTM.

Please note that TMC approval is still required for:

1. Those situations stated in the CoPTTM section A7.2.1 STMS delegated authority – situations for TMC approval (these situations are repeated in the TMC approval required section of the level LV and level 1 TTM handbook) and the following extra situations/circumstances of this RCA
2.
3.

The delegation of this power must only continue in effect while you remain in the employment of the above Company or until:

1. Your STMS qualification expires, or is withdrawn as a result of non-conformance, or
2. The RCA specifically revokes this delegation, or
3. years from the date of this delegation (to a maximum of 5 years), or
4. (date to be entered by TMC no more than 5 years from date of this delegation), whichever is soonest.

Signed by			
	Signature	*Full name*	*Date*
On behalf of			
	RCA name		

E9 Appendix I: (Ex-LRS – only applies to STMS-delegated authority to self-approve) Example of application for traffic management coordinator's (TMC) approval of traffic management plan (TMP)

APPLICATION FOR TRAFFIC MANAGEMENT COORDINATOR'S (TMC) APPROVAL OF TRAFFIC MANAGEMENT PLAN (TMP) ***(Ex LRS)***			
This is a cover letter explaining why a TMP is submitted for approval. Behind this form attach a TMP form. Also include any site specific layout drawings.			
TO			
RCA name		**Date**	
From			
Company			
Return address			
Email		**Fax**	

TMP form attached Yes / No

Site specific layout drawings attached (Please provide a separate reference numbers/names for each page attached) Yes / No

Number of pages attached:

TMC approval of this traffic management plan is needed for the following reason(s): *(mark appropriate options with an X)*

- Approval has been requested by the RCA as part of planning process
- A STMS person with delegated authority is not available within the organisation to approve the plan
- There is no TMD in the level LV and level 1 handbook to represent the worksite
- A road needs to be closed or traffic delays for more than 5 minutes at any one time during the day or for a cumulative period of 30 minutes in any 1 hour period (except where otherwise specified by the RCA)
- A footpath will be closed and users will have to cross a live lane
- A cycle lane will be closed
- A pedestrian crossing or traffic signal installation is affected
- Restricted parking, bus stop, loading zones and/or taxi stands will be affected
- Portable traffic signals are to be used

  State model details (maker and model description/number):
- A lane closure is required at an intersection
- Signs need to be placed on a flush median
- Traffic moving in one direction is split around a closure
- Mobile operations are on roads with posted speed limit exceeding 50km/h (except for grading operations)
- The activity is an event
- Other:

Comments

The information provided correctly represents all phases of the works, plans for contingencies, and identifies accurately the location and road environment. Any inaccuracy in portrayal of this information is the responsibility of the applicant.

It is the responsibility of the STMS to postpone, cancel or modify operations due to adverse traffic, weather or other conditions that may affect the safety of this site.

STMS/Applicant signature

Signature	*Full name*

E10 Appendix J: (Ex-LRS – only applies to STMS-delegated authority to self-approve) Database to record delegations to STMS

A Microsoft Excel spreadsheet using these column headings is available on the NZTA's website.

The list below details personnel who are permitted to approve TMPs on roads within (*name RCA road network*) that are designated as levels LV and 1, and where the exceptions listed in subsection A7.2.1 STMS-delegated authority – situations for TMC approval and any additional conditions set out in the (*name RCA*) TTM operating manual *(refer to page)* do not apply. The delegation is conditional on the following:

- The STMS remaining in the employ of the employer named below.
- The STMS maintaining his/her qualification in accordance with CoPTTM where the period extends beyond their qualification expiry date.
- The authority given to the STMS not being revoked by (*name RCA*).
- The STMS developing the TMP.
- The STMS being paid by his/her employer to develop, consider and approve the TMP, and
- The STMS's employer having current professional indemnity insurance in place to indemnify the RCA of consequent actions arising from the approval of the TMP to the value of $X,XXX,XXX *(RCA to complete)* except as required by New Zealand law.

Name	ID	Qualification	Expiry date	Employer	Contact details (including after hours contact)	Authority granted on	Period (years)	Authority expires
Example - Joe Bloggs	100000	L1 STMS	10/1/11	ABC Contractors Ltd	027 432XXXX	11/1/11	4	10/1/16

E11 Appendix K: Report on incident at roadworks site

Reporting company reference:	***CoPTTM.Incident reference:***
Reference added by reporting company	*Reference added by the CoPTTM.Incident database administrator*

REPORT ON INCIDENT AT ROADWORKS SITE

Send to: ***CoPTTM.Incident@nzta.govt.nz*** ***and*** *the RCA in charge of the network (including NZTA for state highways)*

Date of incident		**Time of incident**		
Reported by		**Company**		
STMS name		**STMS No.**		
Contractor /TTM Company		**Contact number**		
Road location *(include direction and lane)*				
Description of work being undertaken				

Incident type	**Near miss**	**Vehicle entered TTM**	**Vehicle entered working space**	**TMA hit**	**Other**
Operation type	**Static**	**Mobile**	**Semi-static**	**Shoulder**	**Unattended**

Phase of operation	**Install**	**Static, mobile, semi-static**	**Removal**
Damage to	**Vehicles**	**Plant**	**TTM equipment**

Injuries	**Number of people in each injury category**	*Enter the number of people in each injury category*	**Minor**	**Notifiable**	**Fatal**
		Road workers			
		Road users			

Crash code	**From Appendix 1 attached**	**Road user**	**Vehicle/road user type**	**Reg. number**
If TMA hit, which TMA		**Which lane**		
Police attended	*(Officer name/number)*	**Further information**	*For a more detailed internal report (contact)*	
Description of events				

Crash diagram *(or scan and attach) - photos can also be attached*

NZ TRANSPORT AGENCY WAKA KOTAHI

Safer Journeys

Appendix 1: Vehicle movement coding sheet

	TYPE	A	B	C	D	E	F	G	O
A	OVERTAKING AND LANE CHANGE	PULLING OUT OR CHANGING LANE TO RIGHT	HEAD ON	CUTTING IN OR CHANGING LANE TO LEFT	LOST CONTROL (OVERTAKING VEHICLE)	SIDE ROAD	LOST CONTROL (OVERTAKEN VEHICLE)	WEAVING IN HEAVY TRAFFIC	OTHER
B	HEAD ON	ON STRAIGHT	CUTTING CORNER	SWINGING WIDE	BOTH OR UNKNOWN	LOST CONTROL ON STRAIGHT	LOST CONTROL ON CURVE		OTHER
C	LOST CONTROL OR OFF ROAD (STRAIGHT ROADS)	OUT OF CONTROL ON ROADWAY	OFF ROADWAY TO LEFT	OFF ROADWAY TO RIGHT					OTHER
D	CORNERING	LOST CONTROL TURNING RIGHT	LOST CONTROL TURNING LEFT	MISSED INTERSECTION OR END OF ROAD					OTHER
E	COLLISION WITH OBSTRUCTION	PARKED VEHICLE	CRASH OR BROKEN DOWN	NON VEHICULAR OBSTRUCTIONS (INCLUDING ANIMALS)	WORKMANS VEHICLE	OPENING DOOR			OTHER
F	REAR END	SLOWER VEHICLE	CROSS TRAFFIC	PEDESTRIAN	QUEUE	SIGNALS	OTHER		OTHER
G	TURNING VERSUS SAME DIRECTION	REAR OF LEFT TURNING VEHICLE	LEFT TURN SIDE SIDE SWIPE	STOPPED OR TURNING FROM LEFT SIDE	NEAR CENTRE LINE	OVERTAKING VEHICLE	TWO TURNING		OTHER
H	CROSSING (NO TURNS)	RIGHT ANGLE (70° TO 110°)							OTHER
J	CROSSING (VEHICLE TURNING)	RIGHT TURN RIGHT SIDE	OPPOSING RIGHT TURNS	TWO TURNING					OTHER
K	MERGING	LEFT TURN IN	RIGHT TURN IN	TWO TURNING					OTHER
L	RIGHT TURN AGAINST	STOPPED WAITING TO TURN	MAKING TURN						OTHER
M	MANOEUVRING	PARKING OR LEAVING	"U" TURN	"U" TURN	DRIVEWAY MANOEUVRE	ENTERING OR LEAVING FROM OPPOSITE SIDE	ENTERING OR LEAVING FROM SAME SIDE	REVERSING ALONG ROAD	OTHER
N	PEDESTRIANS CROSSING ROAD	LEFT SIDE	RIGHT SIDE	LEFT TURN LEFT SIDE	RIGHT TURN RIGHT SIDE	LEFT TURN RIGHT SIDE	RIGHT TURN LEFT SIDE	MANOEUVRING VEHICLE	OTHER
P	PEDESTRIANS OTHER	WALKING WITH TRAFFIC	WALKING FACING TRAFFIC	WALKING ON FOOTPATH	CHILD PLAYING (INCLUDING TRICYCLE)	ATTENDING TO VEHICLE	ENTERING OR LEAVING VEHICLE		OTHER
Q	MISCELLANEOUS	FELL WHILE BOARDING OR ALIGHTING	FELL FROM MOVING VEHICLE	TRAIN	PARKED VEHICLE RAN AWAY	EQUESTRIAN	FELL INSIDE VEHICLE	TRAILER OR LOAD	OTHER

* = Movement applies for left and right hand bends, curves or turns

New Zealand Government

E11.1 Appendix K: Guidelines for completion of Report on incident at roadworks site

Reporting company reference: *Reference Number which associates this report to an internal Job number/Contract number/Incident number*	***CoPTTM.Incident reference:*** *NZTA OFFICE USE ONLY*
Reference added by reporting company	*Reference added by the CoPTTM Incident database administrator*

REPORT ON INCIDENT/CRASH AT ROADWORKS SITE

Send to: ***CoPTTM.Incident@nzta.govt.nz*** ***and*** *the RCA in charge of the network (including NZTA for state highways)*

Date of incident	*This is the date of the incident/crash NOT the date when this form is completed*	**Time of incident**	*This is the time of the incident/crash NOT the date when this form is completed. If no-one on site to record the time, please state this was the case*
Reported by	*This is the name of the person who has access to all of the details of the incident/crash and is completing this form*	**Company**	*This is the name of the company who was directly involved with the incident/crash:* • *The owner of the worksite* • *The owner of vehicle/plant involved* • *The employer of the person or persons involved* *If sub-contractor to main contractor give both names and identify which was directly involved*
STMS name	*Give the full name of the STMS in charge of the TTM at the worksite at the time of the incident/crash*	**STMS No.**	*Give the CoPTTM ID number of the STMS in charge of the TTM at the worksite at the time of the incident/crash*
Contractor /TTM Company	*Give the name of the company/ contractor carrying out the work activity within the working space* *Give the name of the TTM contractor supplying the TTM at the time of the incident/crash*	**Contact number**	*Give the telephone contact number(s) for the company/contractor carrying out the work activity within the working space* *Give the telephone contact number(s) for the TTM contractor supplying the TTM at the time of the incident/crash*
Road location *(include direction and lane)*	*Wherever possible give GPS positioning of the worksite/incident/crash* *Give the name of the road on which the incident/crash happened and the name of any side road(s) affected by the incident/crash* *Give the suburb and region of where the road is located* *Identify the direction of travel and the lane(s) vehicle(s) were travelling in prior to the incident/crash*		
Description of work being undertaken	*Describe the work activity being carried out, and how the road environment was affected by the work activity and installed TTM at the time of the incident/crash* *Attach a copy of the TMP being used at the time of the incident/crash to this form when submitted* *Attach a copy of the On-Site Record being used at the time of the incident/crash to this form when submitted* *Attach a copy of the Hazard ID form being used by the working space contractor at the time of the incident/crash to this form when submitted* *Attach photographs of the worksite layout showing all TTM equipment installed at the time of the incident/crash to this form when submitted* *Attach a drawing of the worksite layout showing all TTM equipment installed at the time of the incident/crash and the position of the vehicle(s)/road users involved to this form when submitted* *If a video is available of the incident occurring or of the incident/crash site following the incident/crash then include when the form is submitted – NOTE the video is not to replace the required photographs*		

Incident type	**Near miss**	**Vehicle entered TTM**	**Vehicle entered working space**	**TMA hit**	**Other**

	Indicate either YES or NO – further detail to be given below in Description of events box	*Indicate either YES or NO – further detail to be given below in Description of events box*	*Indicate either YES or NO – further detail to be given below in Description of events box*	*Indicate either YES or NO – further detail to be given below in Description of events box*	*Indicate either YES or NO – further detail to be given below in Description of events box*
Operation type	**Static**	**Mobile**	**Semi-static**	**Shoulder**	**Unattended**
	Confirm if the operation at the time of the incident/crash was Static TTM	*Confirm if the operation at the time of the incident/crash was Mobile TTM*	*Confirm if the operation at the time of incident/crash was Semi- Static TTM*	*Confirm if the operation at the time of the incident/crash was a TTM Shoulder closure*	*Indicate either YES or NO – further detail to be given below in Description of events box*

Phase of operation	**Install**	**Static, mobile, semi-static**	**Removal**
	Indicate either YES or NO – further detail to be given below in Description of events box	*Indicate either YES or NO – further detail to be given below in Description of events box*	*Indicate either YES or NO – further detail to be given below in Description of events box*
Damage to	**Vehicles**	**Plant**	**TTM equipment**
	Indicate either YES or NO – further detail to be given below in Description of events box	*Indicate either YES or NO – further detail to be given below in Description of events box*	*Indicate either YES or NO – further detail to be given below in Description of events box*

Injuries	**Number of people in each injury category**	*Enter the number of people in each injury category*	**Minor**	**Notifiable**	**Fatal**
		Road workers	*Confirm the number of persons injured*	*Confirm the number of persons injured*	*Confirm the number of persons injured*
		Road users	*Confirm the number of persons injured*	*Confirm the number of persons injured*	*Confirm the number of persons injured*

Crash code	**From Appendix 1 attached**	**Road user**	**Vehicle/road user type**	**Reg. number**
	Use the associated coding sheet to confirm type of crash		*Give the type of road user i.e. car; truck; motorbike; bus; cycle; pedestrian*	*Give registration numbers of all vehicles involved*
If TMA hit, which TMA	*Give the position of the TMA in relation to any other TTM vehicles and any installed TTM signs or electronic signs being used at the time of the incident/crash*	**Which lane**	*Confirm which lane the TMA was operating in and where the work vehicle/work activity was being carried out* *Confirm the position of the Tail pilot vehicle, in relation to the TMA that was hit, at the time of the incident/crash*	
Police attended	*Please indicate either YES or NO – If YES then give the in charge Police officers' name/number and any contact details available – mobile number/email address*	**Further information**	*If there is to be more information added or is available through another source, then give the name and contact details – mobile number/email address - of the person to contact for that further information*	
Description of events	*Where you have indicated YES in any of the boxes above give further details to confirm and collaborate your decision* *Explain your understanding of what happened or what you witnessed of the incident/crash. If you have other company forms to assist you with recording the detail, then attach that form to this form as your explanation* *Record as much detail as possible of what happened. It is important to give as much information as you can as this will assist with the understanding of the incident/crash and will help with the development of safe operating procedures into the future* *The information supplied is used to look at how we can improve in the road safety and temporary traffic management area*			

Traffic Control Devices Manual
Part 8

Code of practice for temporary traffic management (CoPTTM)

manual number: SP/M/010

Section F

www.nzta.govt.nz

Fourth edition, Amendment 5 of
Code of practice for temporary traffic management

Date of issue: November 2018

Effective date: 1 February 2019

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

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

More information

Published 2013

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

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

DIAGRAMS LIST

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TWO-WAY TWO-LANE ROAD		
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DIAGRAMS LIST

STATIC OPERATIONS

No.	LEVEL 1 ROADS	
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DIAGRAMS LIST

MOBILE OPERATIONS

No.	LOW-VOLUME ROADS	
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F3.1	Road inspection activities	
F3.2	Work vehicle is in a lane	With CSD - on LV Low-risk roads (any speed) and LV roads under 65km/h
F3.3	Work vehicle is on berm, shoulder or lane	No CSD
F3.4	Work vehicle on shoulder or berm - clear of live lane	CSD not required
F3.5	Inspection activities and non-invasive works	On shoulder and on the live lane
No.	**LEVEL 1 ROADS**	
TWO-WAY TWO-LANE ROAD		
F4.1	Work vehicle is more than five (5) metres from the	Any speed
F4.2	Work vehicle is within five (5) metres of the edgeline	CSD to work vehicle: ■ not required under 65km/h ■ required over 65km/h
F4.3	Work vehicle is within five (5) metres of the edgeline	Speed limit over 65km/h The rear visibility is less than CSD
F4.4	Work vehicle is in a lane	Permanent speed under 65km/h
F4.5	Work vehicle is in a lane	Permanent speed over 65km/h CSD forward visibility to work vehicle
F4.6	Work vehicle is in a lane	Permanent speed over 65km/h No CSD to work vehicle
F4.7	Personnel on the road	Any speed
TWO-LANE DIVIDED OR TWO-LANE ONE-WAY ROAD		
F4.8	Work vehicle in the right lane	Permanent speed over 65km/h
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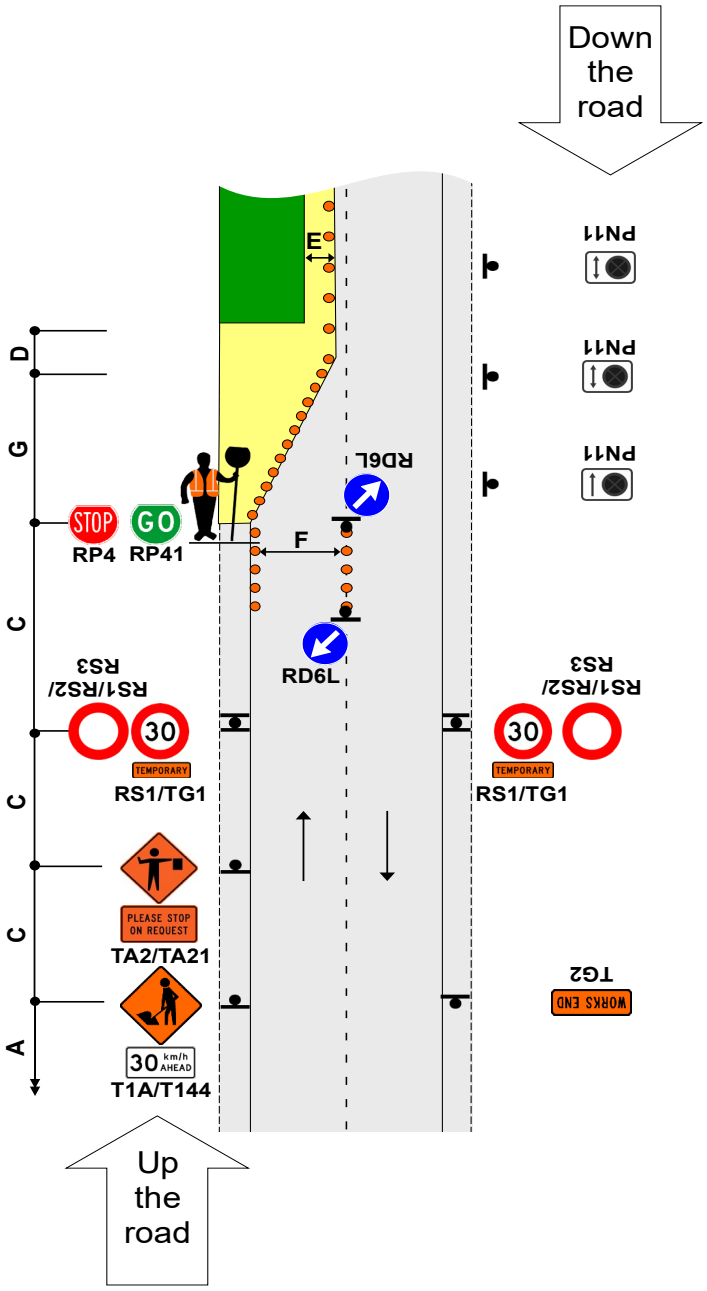
INSPECTION ACTIVITIES		
F4.10	Inspection activities and non-invasive works	On shoulder and on the live lane

READING A TRAFFIC MANAGEMENT DIAGRAM (TMD)

Usually contractors place the signs on left-hand side of the road first with the TMD the right way up. When signs are placed for the right-hand side of the road the contractor tips the TMD upside down and reads which signs have to be placed for that side of the road.

To make this process easier:

- Signs going up the page are shown closest to the road
- Signs going down the page are shown further away from the road
- Sign icons and sign numbers for layout down the road (from top to bottom of the TMD) are



LEGEND FOR DIAGRAMS

Working space	**Mandatory:** • Cones • Signs
Safety zones	**Optional:** • Cones • Signs
Edgeline or edge of trafficable lane (indicated by solid black line) Edgeline or edge of trafficable lane Edgeline or edge of trafficable lane	**Hazard area** **Manhole**
Edge of Seal (indicated by dotted line next to solid black line) Edge of seal Edgeline Edgeline Edge of seal	**Barrier, safety fence or cone bars** **Ramp**

LEVEL LV LAYOUT DISTANCES TABLE

Permanent speed limit or RCA-designated operating speed (km/h)		≤50	60	70	80	90	100
Traffic signs							
A	Sign visibility distance (m)	50	60	70	80	90	100
B	Warning distance (m)	50 or 30*	80	105	120	135	150
C	Sign spacing (m)	25 or 15*	40	50	60	70	75
Safety zones							
D	Longitudinal (m)	0	0	0	0	0	0
E	Lateral (m)+	1	1	1	1	1	1
	Lateral behind barrier installation	As specified by the Installation Designer					
Tapers							
G	Taper length (m)#	25	30	35	40	45	50
Delineation devices							
Cone spacing in taper (m)		2.5	2.5	5	5	5	5
Cone spacing: working space (m)		10	10	20	20	20	20

* Larger minimum distances apply on all state highways. The smaller minimum distances may be applied on other roads to accommodate road environment constraints.

\+ On LV roads, the lateral safety zone may be reduced or eliminated in order to retain a single lane width. Positive traffic management and an appropriate TSL must be used.

\# 1. On non-state highways with permanent speeds 50km/h or less, a **10m taper** (with cones at 1m centres) may be used when there are road environment constraints (eg intersections and commercial accesses).

2. On all roads where the shoulder width is less than 2.5m and the activity does not affect the live lane, a **10m shoulder taper** is permitted (with at least 5 cones at no greater than 2.5m centres).
3. A **taper of 30m** (with cones at 2.5m centres) **must** be used where manual traffic control (stop/go), portable traffic signals or priority give way are employed.

Lane widths (based on permanent speed or TSL if applied)

Speed (km/h)		30	40	50	60	70	80	90	100
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above tables are minimum values.

LV/low-risk roads (less than 250vpd - less than 20 vehicles per hour)

When on the shoulder:

- *If CSD **not** available*: Advance warning sign and base to be installed with sign visibility distance and warning distance in place
- *If CSD available:* Advance warning sign may be attached to the rear of a work vehicle which has an amber flashing beacon(s) and is visible to approaching road users from the rear.

When the activity encroaches onto a live lane consider alternating flow controls.

If the above requirements cannot be achieved, the operation must be modified to comply with the appropriate level LV or level 1 requirements.

LEVEL 1 LAYOUT DISTANCES TABLE

Permanent speed limit or RCA-designated operating speed (km/h)		≤50	60	70	80	90	100
Traffic signs							
A	Sign visibility distance (m)	50	60	70	80	90	100
B	Warning distance (m)	50 or 30*	80	105	120	135	150
C	Sign spacing (m)	25 or 15*	40	50	60	70	75
Safety zones							
D	Longitudinal (m)	10 or 5*	15	30	45	55	60
E	Lateral (m)	1	1	1	1	1	1
	Lateral behind barrier installation	As specified by the Installation Designer					
Tapers							
G	Taper length (m)#	30	50	70	80	90	100
K	Distance between tapers (m)	40	50	70	80	90	100
Delineation devices							
Cone spacing in taper (m)		2.5	2.5	5	5	5	5
Cone spacing: Working space (m)		5	5	10	10	10	10

* Larger minimum distances apply on all state highways and also on all multi-lane roads. The smaller minimum distances may be applied on other roads to accommodate road environment constraints.

\# 1. On non-state highways with speeds 50km/h or less, a **10m taper** (with cones at 1m centres) may be used when there are road environment constraints (eg intersections and commercial accesses).

2. On all roads where the shoulder width is less than 2.5m and the activity does not affect the live lane, a **10m shoulder taper** is permitted (with at least 5 cones at no greater than 2.5m centres).
3. A **taper of 30m** (with cones at 2.5m centres) **must** be used where manual traffic control (stop/go), portable traffic signals or priority give way are employed.

Lane widths (based on permanent speed or TSL if applied)

Speed (km/h)		30	40	50	60	70	80	90	100
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above tables are minimum values.

COMBINED LEVEL LV & LEVEL 1 LAYOUT DISTANCES TABLE

Permanent speed limit or RCA-designated operating speed (km/h)		≤50	60	70	80	90	100
Traffic signs							
A	Sign visibility distance (m)	50	60	70	80	90	100
B	Warning distance (m)	50 or 30*	80	105	120	135	150
C	Sign spacing (m)	25 or 15*	40	50	60	70	75
Safety zones							
D	Longitudinal (m)+	10 or 5*	15	30	45	55	60
E	Lateral (m)+	1	1	1	1	1	1
	Lateral behind barrier installation	As specified by the Installation Designer					
Tapers							
G	Taper length (m)#	30	50	70	80	90	100
G	LV roads taper length (m)#	25	30	35	40	45	50
K	Distance between tapers (m)	40	50	70	80	90	100
Delineation devices							
Cone spacing in taper (m)		2.5	2.5	5	5	5	5
Cone spacing: Working space (m)##		5	5	10	10	10	10

* Larger minimum distances apply on all state highways and also on all multi-lane roads. The smaller minimum distances may be applied on other roads to accommodate road environment constraints.

\+ On LV roads the longitudinal and lateral safety zones may be reduced, or eliminated, in order to retain a single lane width. Positive traffic management and an appropriate TSL must be used.

\# 1. On non-state highways with speeds 50km/h or less, a **10m taper** (with cones at 1m centres) may be used when there are road environment constraints (eg intersections and commercial accesses).

2. On all roads where the shoulder width is less than 2.5m and the activity does not affect the live lane, a **10m shoulder taper** is permitted (with at least 5 cones at no greater than 2.5m centres).
3. A **taper of 30m** (with cones at 2.5m centres) **must** be used where manual traffic control (stop/go), portable traffic signals or priority give way are employed.

\## LV roads: double the cone spacing alongside working space (eg 5 = 10, 10 = 20).

Lane widths (based on permanent speed or TSL if applied)

Speed (km/h)		30	40	50	60	70	80	90	100
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above tables are minimum values.

LV/low-risk roads (less than 250vpd - less than 20 vehicles per hour)

When on the shoulder:

- *If CSD **not** available*: Advance warning sign and base to be installed with sign visibility distance and warning distance in place
- *If CSD available:* Advance warning sign may be attached to the rear of a work vehicle which has an amber flashing beacon(s) and is visible to approaching road users from the rear.

When the activity encroaches onto a live lane consider alternating flow controls.

If the above requirements cannot be achieved, the operation must be modified to comply with the appropriate level LV or level 1 requirements.

SHOULDER AND BERM
Shoulder closure

F1.1
Level LV

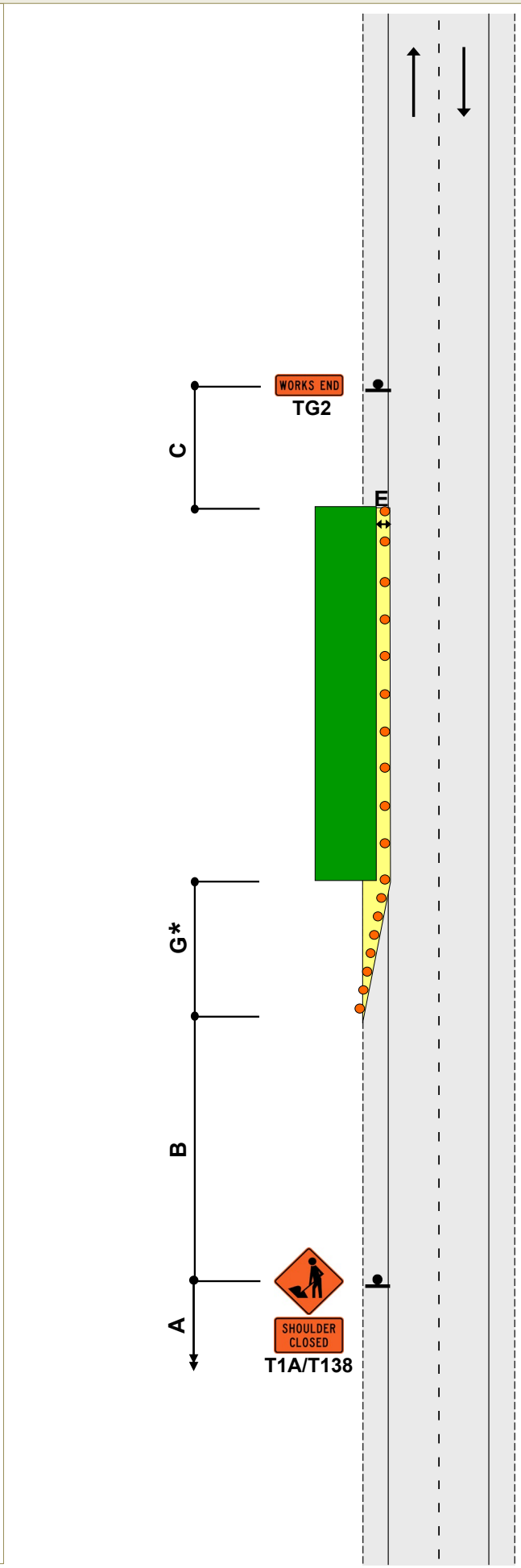
Notes

1. Cone spacing along side of working space on roads:
   - over 65km/h = 20m
   - under 65km/h = 10m
2. A 10m taper is allowed where shoulder width is less than 2.5m
3. *For shoulders exceeding 2.5m width, apply the following calculation; calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times G}{3.5}$$

   W = Width of shoulder

   G = Taper length in metres from the level LV layout distance table



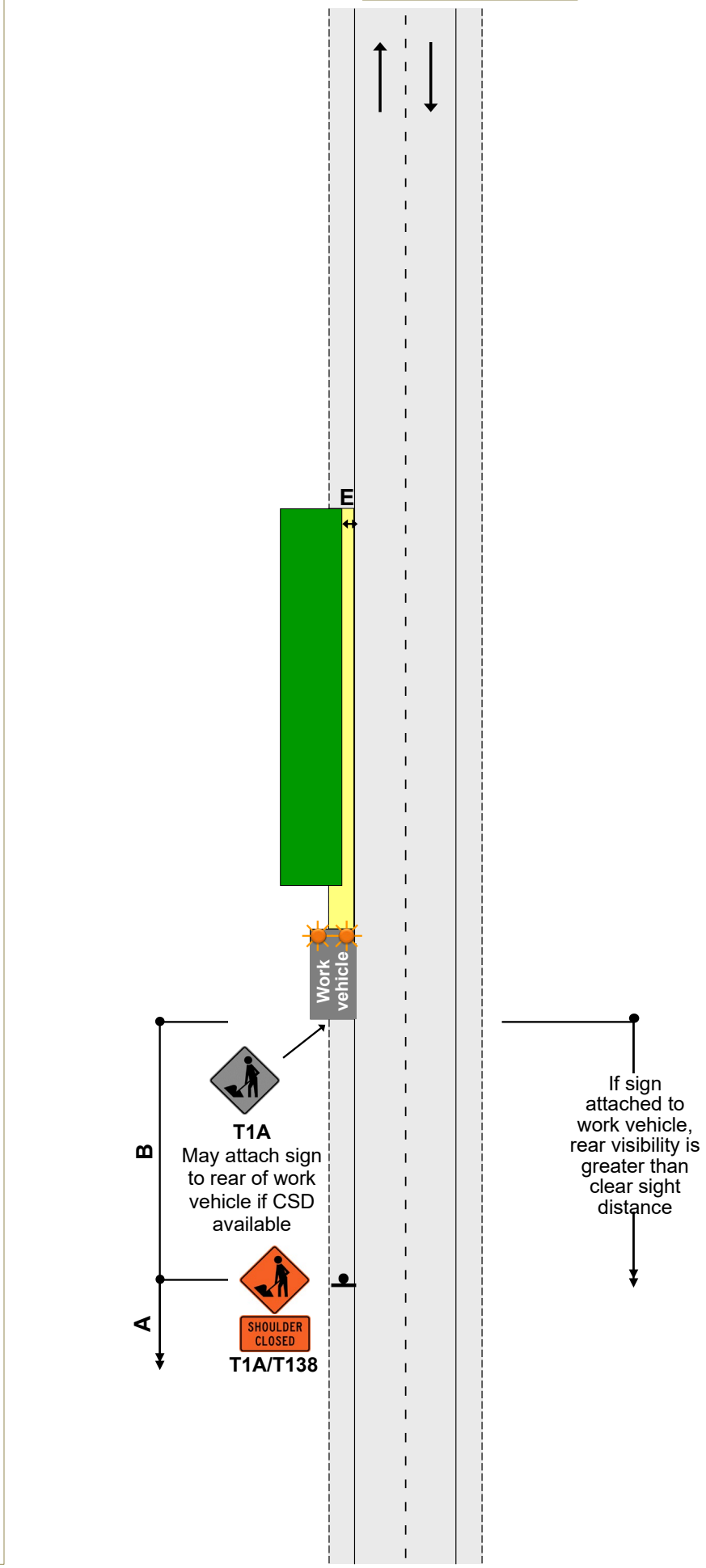
SHOULDER AND BERM
Shoulder closure - low-risk (under 250vpd)

Low-risk Under 250vpd

F1.2 Level LV

Notes

1. If CSD is not available, advance warning sign and base to be installed with sign visibility and warning distance
2. If CSD is available, advance warning sign may be attached to rear of a work vehicle which has an amber flashing beacon(s)
3. CSD is 3 X permanent speed in meters, or 75m on a level LV or level 1 non state highway with a permanent speed limit of less than 55km/h



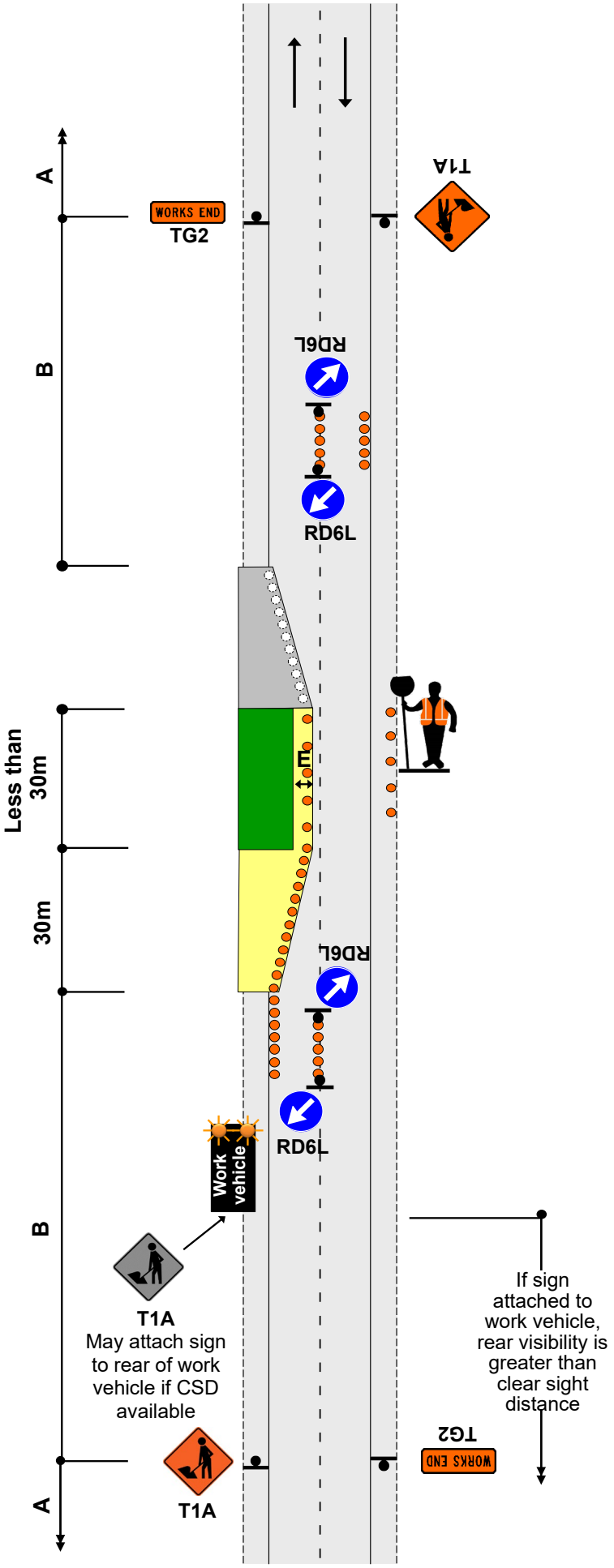
TWO-WAY TWO-LANE ROAD
Lane closure
Under 65km/h - must have CSD in both directions

Low-risk
Under 250vpd

F1.3
Level LV

Notes

1. If a static advance warning sign is installed, use sign visibility and warning distance from the layout distances table
2. Advance warning sign may be attached to rear of work vehicle if CSD is available
3. CSD is 3 X permanent speed in meters, or 75m on a level LV or level 1 non state highway with a permanent speed limit of less than 55km/h
4. If the working space is very short (less than 30m) then one MTC operating in the middle of the worksite may be used
5. Minimum 5 cones in cone threshold at:
   - 2.5m centres - less than 65km/h
   - 5m centres - more than 65km/h
6. STOP/GO control may be replaced by GIVE WAY control
7. For closures of more than 1 day at same location use diagram F1.5 or similar
8. When road users are passing the working space in alternating flow, all construction equipment must be stopped on same side of the road if there is no separation from the live lane

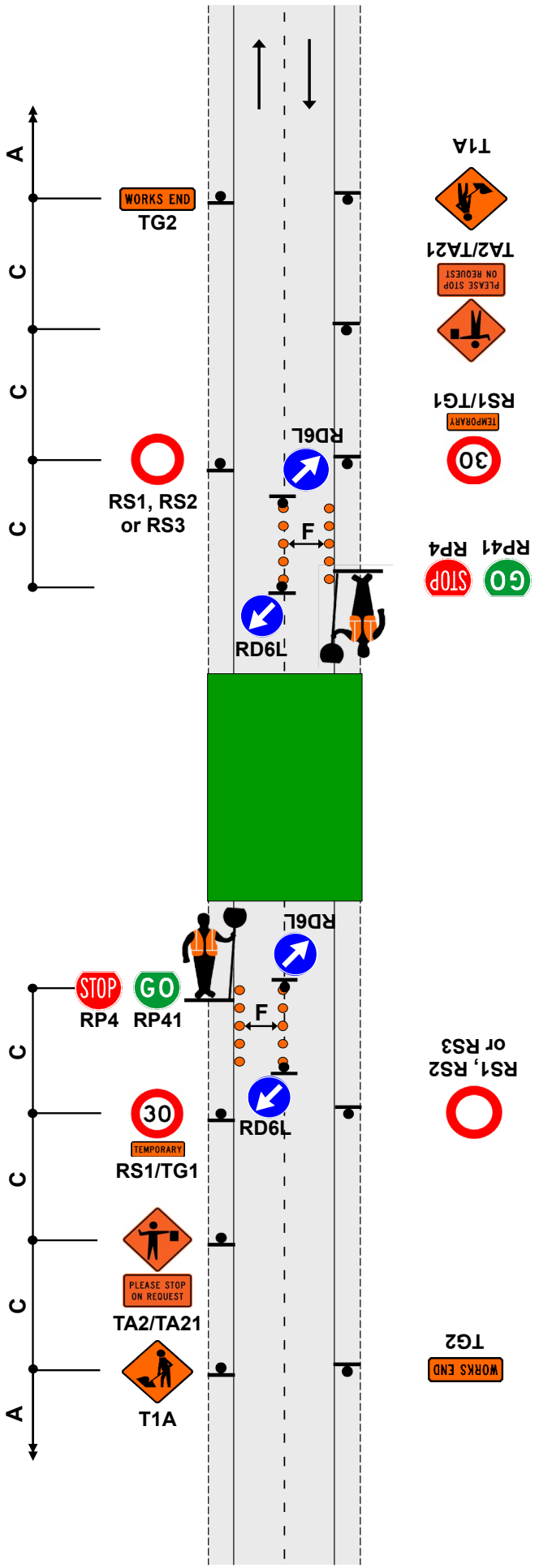


TWO-WAY TWO-LANE ROAD
All traffic stopped temporarily
Manual traffic control

F1.4
Level LV

Notes

1. Temporary delay period not to exceed the limit set or approved by the RCA
2. MTC with RP4/RP41 STOP/GO or RP4/RP42 STOP/SLOW paddle on road shoulder located between 1st and 2nd cone in the cone threshold closest to the working space
3. Minimum 5 cones in cone threshold at:
   - 2.5m centres - less than 65km/h
   - 5m centres - more than 65km/h
4. MTCs must show same message to oncoming traffic (eg STOP/STOP or GO/GO)
5. Refer to C10.2.3 MTC essentials for further information
6. Traffic must be temporarily stopped in both directions of travel where the width of road is too narrow to cater for:
   - the work
   - delineation
   - safety zones, and
   - road user traffic

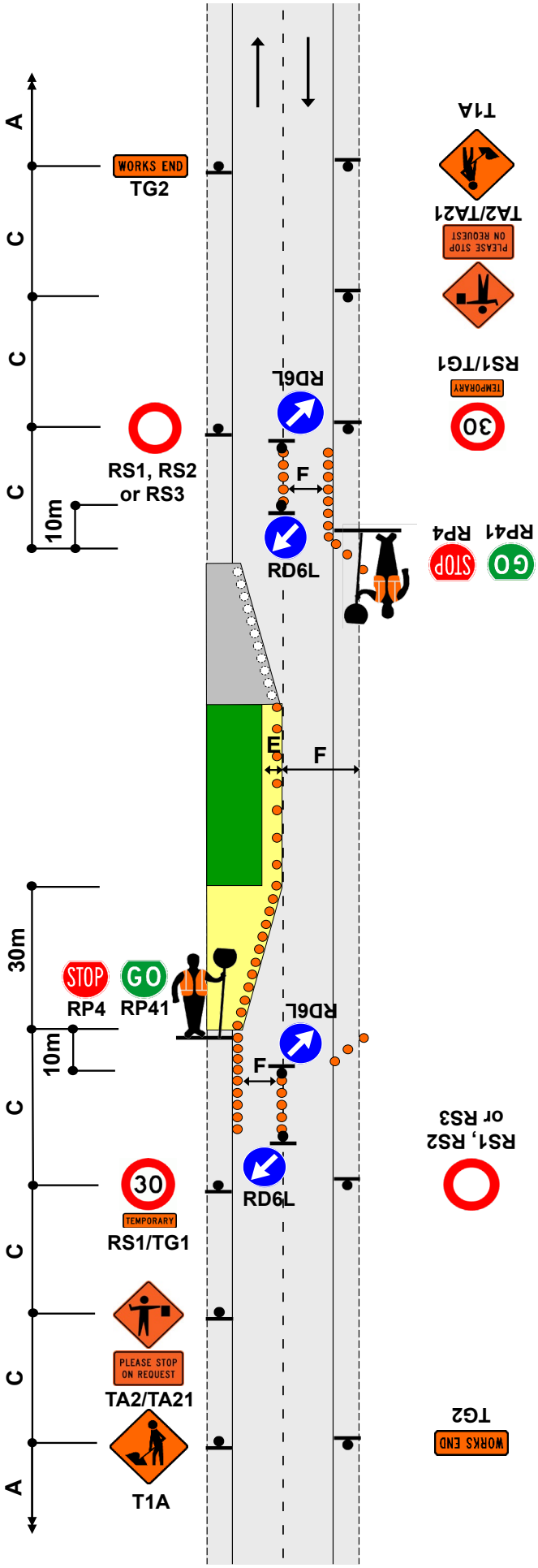


TWO-WAY TWO-LANE ROAD
Single-lane alternating flow
Manual traffic control

F1.5
Level LV

Notes

1. Temporary delay period not to exceed the limit set or approved by the RCA
2. A 30m return taper at the end of the closure is optional
3. MTC with RP4/RP41 STOP/GO or RP4/RP42 STOP/SLOW paddle on road shoulder located between 1st and 2nd cone in the cone threshold closest to the working space
4. Minimum 5 cones in cone threshold at:
   - 2.5m centres - less than 65km/h
   - 5m centres - more than 65km/h
5. When road users are passing the working space in alternating flow, all construction equipment must be stopped on same side of the road if there is no separation from the live lane
6. Refer to C10.2.3 MTC essentials for further information



TWO-WAY TWO-LANE ROAD
Single-lane alternating flow
Portable traffic signals

F1.6
Level LV

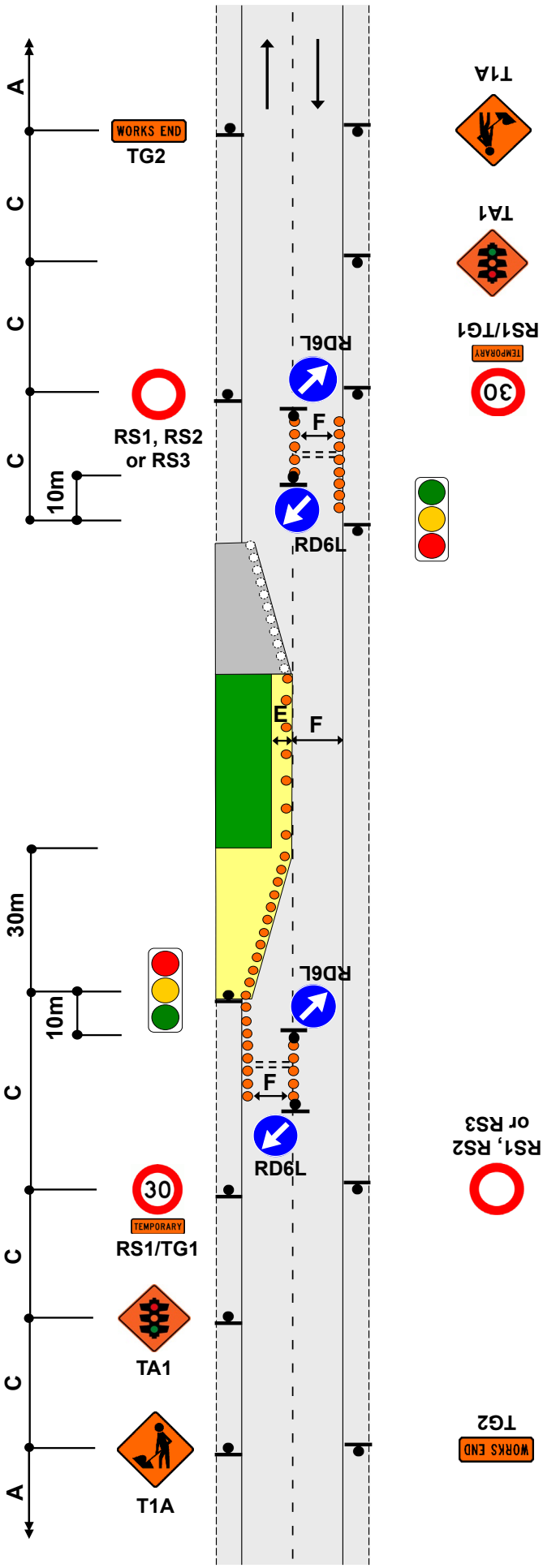
Notes

1. Use a full TMP form for this operation as it includes details of the portable traffic signals to be used
2. Install temporary limit lines or use RP61/RP62 signs

STOP ON RED SIGNAL

STOP HERE ON RED SIGNAL

3. A 30m return taper at the end of the closure is optional
4. Minimum 5 cones in cone threshold at:
   - 2.5m centres - less than 65km/h
   - 5m centres - more than 65km/h

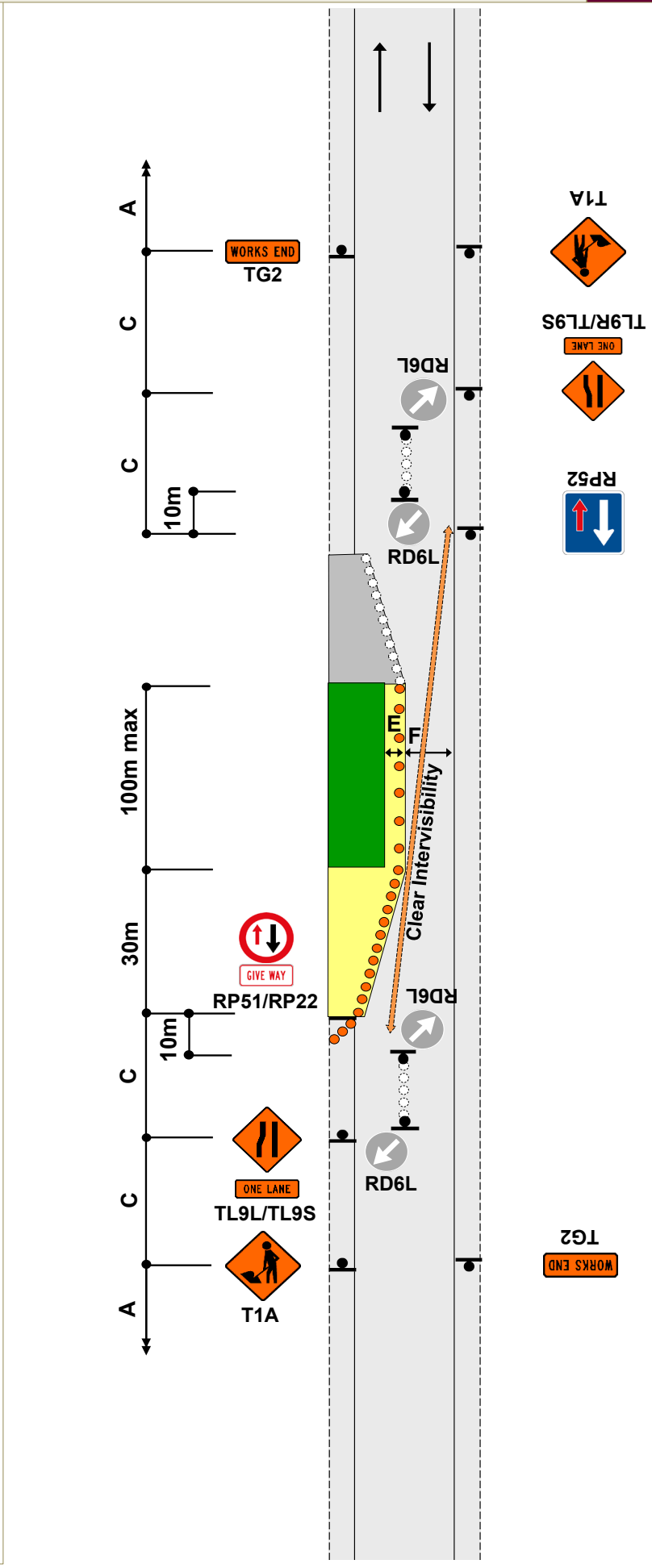


TWO-WAY TWO-LANE ROAD
Single-lane
Give way control

F1.7
Level LV

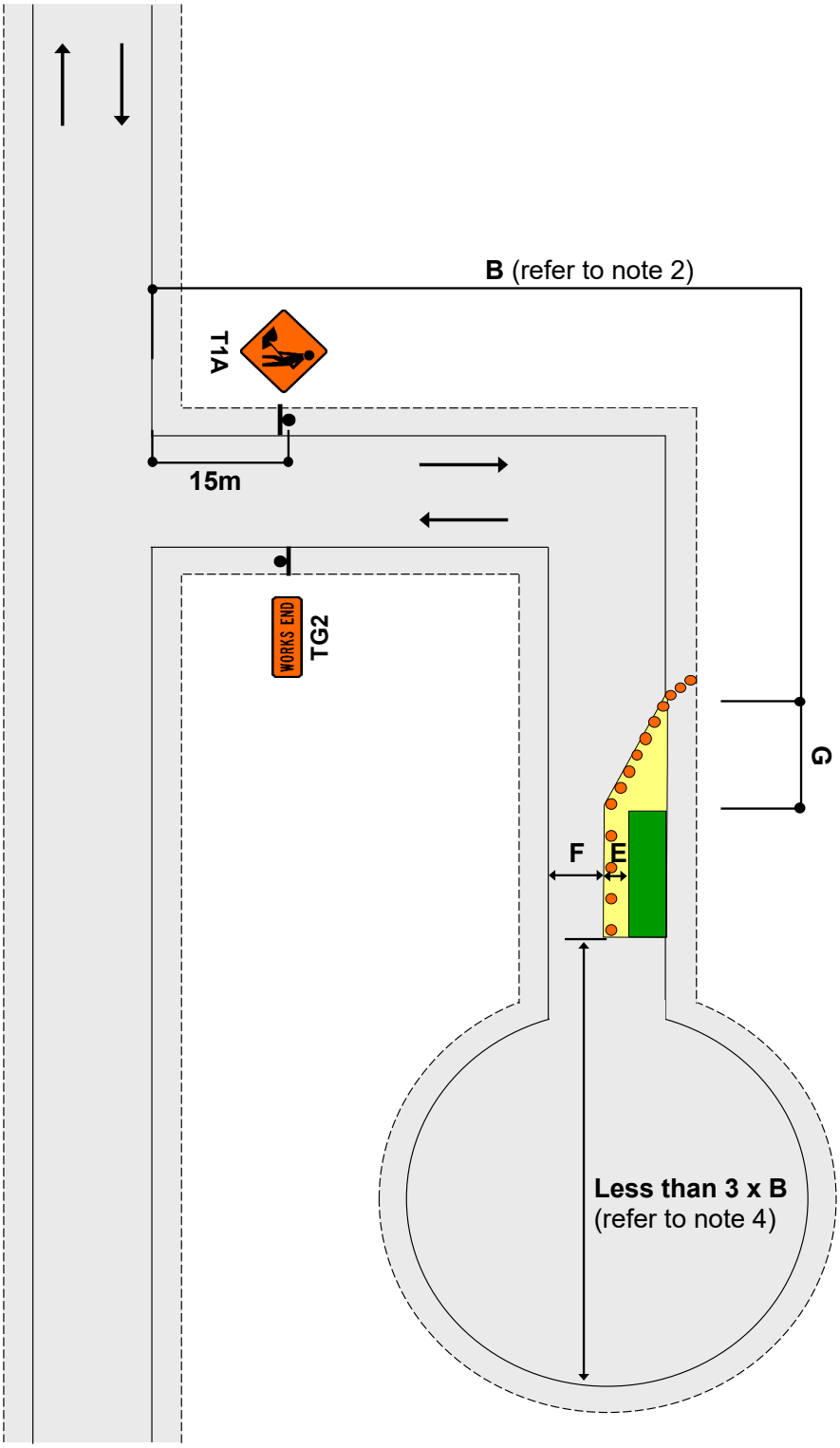
Notes

1. The RP51/RP22 and RP55 controls must be placed in the following priority order:
   - downhill traffic must give way to uphill traffic
   - traffic that has to cross into the opposing lane gives way
2. RS1/TG1 TSL signs and RS1/RS2/RS3 TSL derestriction signs may be installed if required
3. Working space to be less than 100m
4. Intervisibility is required as indicated on diagram. This means that a road user stopped at one priority sign has unimpeded line of sight to a road user at the other priority sign
5. A 30m return taper at the end of the closure and cones on the centre line are optional



TWO-WAY TWO-LANE ROAD
Short no exit road

F1.8
Level LV



Notes

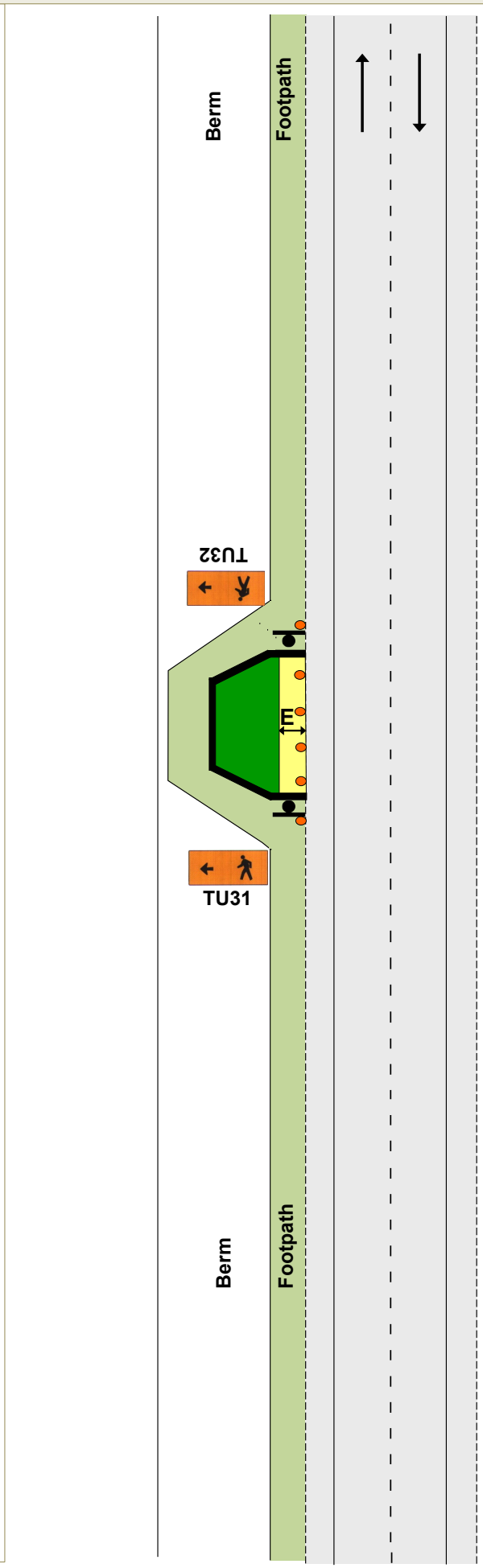
1. T1A sign to be placed at least 15m from the intersection
2. Where less than B, T1A/T135 and TG2 signs required on main road
3. Working space to be less than 100m
4. Signage is not required past the worksite where there is less than 3 x B from the end of the working space to the end of the road

FOOTPATH
Footpath diverted onto berm behind working space
First preference

F2.1
Level 1

Notes

1. Minimum pedestrian footpath widths:
   - Residential/Rural/Suburban Centre - 1.2m
   - CBD - 2m
2. Where the length of the temporary footpath exceeds 20m, these widths may have to be increased so footpath users do not have to wait to pass
3. Temporary footpath surfaces must be suitable for footpath users
4. Use safety fence to enclose the working space, or at **attended** worksites, cones connected with cone bars can be used to enclose the working space but only for a short period of time
   Note: Cone bars are not recommended where heavy equipment (eg a digger) is being used. A safety fence is preferred in these cases
5. This TMD must be used in conjunction with appropriate TTM for any work carried out on the shoulder or in the live lane

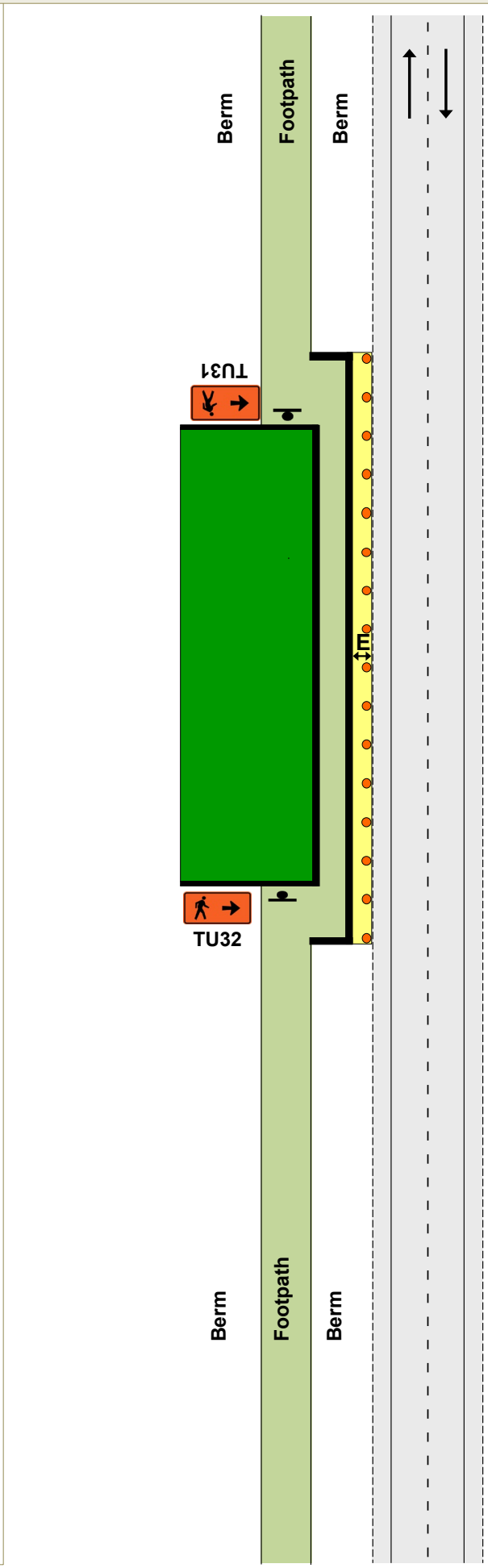


FOOTPATH
Footpath diverted onto berm between working space and carriageway
Second preference

F2.2
Level 1

Notes

1. Minimum pedestrian footpath widths:
   - Residential/Rural/Suburban Centre - 1.2m
   - CBD - 2m
2. Where the length of the temporary footpath exceeds 20m, these widths may have to be increased so footpath users do not have to wait to pass
3. Temporary footpath surfaces must be suitable for footpath users
4. Use safety fence to enclose the working space, or at **attended** worksites, cones connected with cone bars can be used to enclose the working space but only for a short period of time
   Note: Cone bars are not recommended where heavy equipment (eg a digger) is being used. A safety fence is preferred in these cases
5. Use barrier or safety fence to delineate the traffic side of the footpath, or at **attended** worksites cones connected with cone bars can be used to delineate the traffic side of the footpath for a short period of time (not for use on state highways)
6. There must be a lateral safety zone between the traffic side of the footpath and the live lane:
   - **0.5m** for barrier
   - **1m** for safety fence or cone bars
7. This TMD must be used in conjunction with appropriate TTM for any work carried out on the shoulder or in the live lane

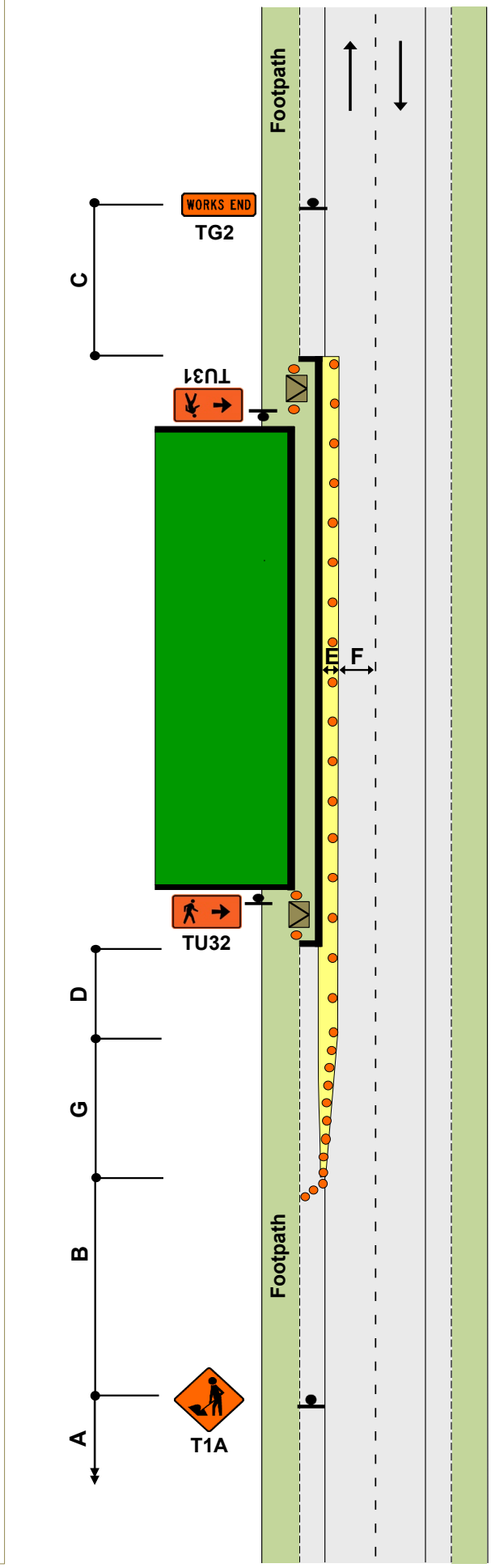


FOOTPATH
Footpath diverted onto carriageway
Third preference

F2.3
Level 1

Notes

1. Minimum pedestrian footpath widths:
   - Residential/Rural/Suburban Centre - 1.2m
   - CBD - 2m
2. Where the length of the temporary footpath exceeds 20m, these widths may have to be increased so footpath users do not have to wait to pass
3. Use safety fence to enclose the working space, or at **attended** worksites, cones connected with cone bars can be used to enclose the working space but only for a short period of time
   Note: Cone bars are not recommended where heavy equipment (eg a digger) is being used. A safety fence is preferred in these cases
4. Use barrier or safety fence to delineate the traffic side of the footpath, or at **attended** worksites cones connected with cone bars can be used to delineate the traffic side of the footpath for a short period of time (not for use on state highways)
5. There must be a lateral safety zone between the traffic side of the footpath and the live lane:
   - **0.5m** for barrier
   - **1m** for safety fence or cone bars
6. Use kerb ramps to assist mobility vehicles, pushchairs, etc
7. At night-time, corners of safety fence may be illuminated with flashing amber warning lights
8. This TMD must be used in conjunction with appropriate TTM for any work carried out on the shoulder or in the live lane

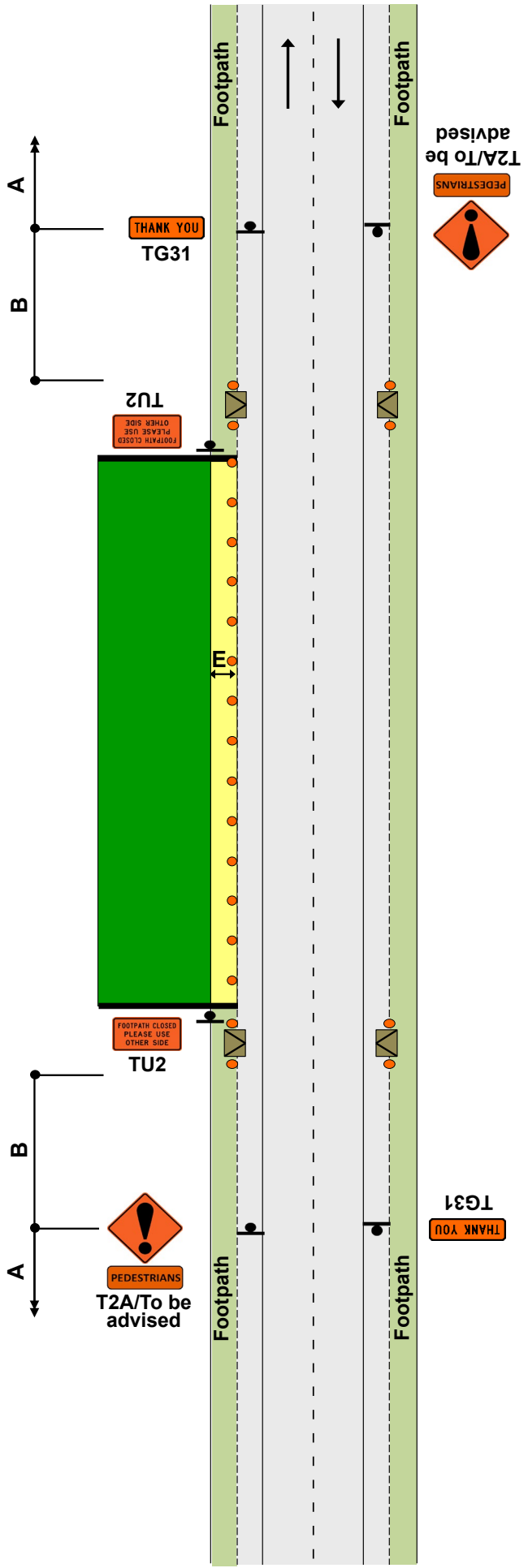


FOOTPATH
Footpath closed - permanent speed less than 65km/h
Fourth preference

F2.4
Level 1

Notes

1. Use T2A and PEDESTRIANS supplementary plate to alert road users to the potential of footpath users crossing the carriageway
2. Use safety fence at each end of working space
3. Use kerb ramps
4. Use another TMD as well, where working space/safety zone encroaches on live lane
5. This TMD must be used in conjunction with appropriate TTM for any work carried out on the shoulder or in the live lane

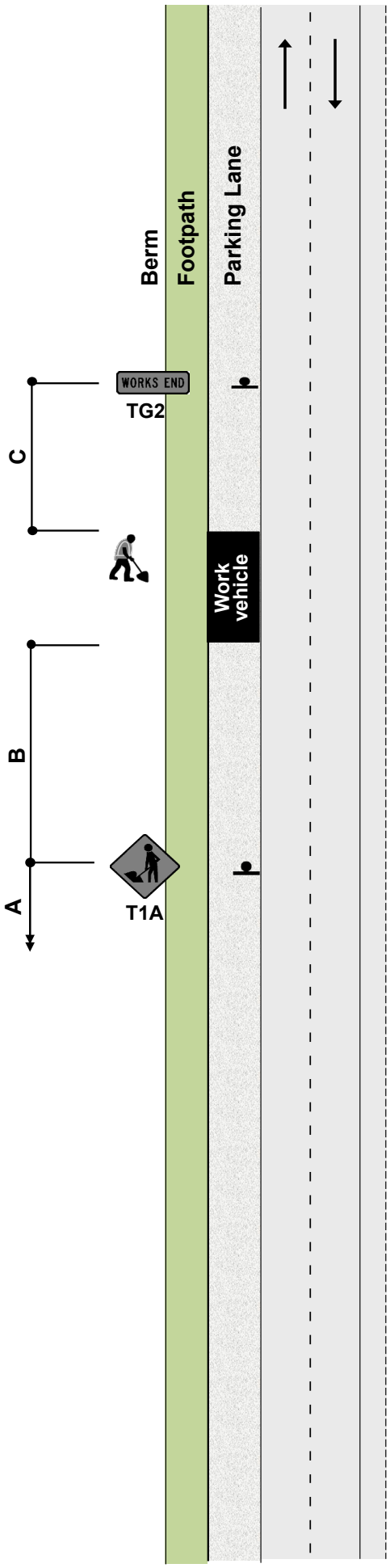


SHOULDER AND ROADSIDE ACTIVITIES
Work on berm and/or footpath
Permanent speed less than 65km/h

F2.5
Level 1

Notes

1. Where work is carried out on the berm or footpath and a work vehicle is parked in a legal parallel car park, provided the vehicle is only accessed from the off traffic side, advance warning T1A road works and TG2 WORKS END are optional
2. Traffic management must be provided where footpath users or cyclists are affected
3. This layout may only be used during daylight hours
4. Large plant and machinery must not be used in this situation, a more substantial closure is required

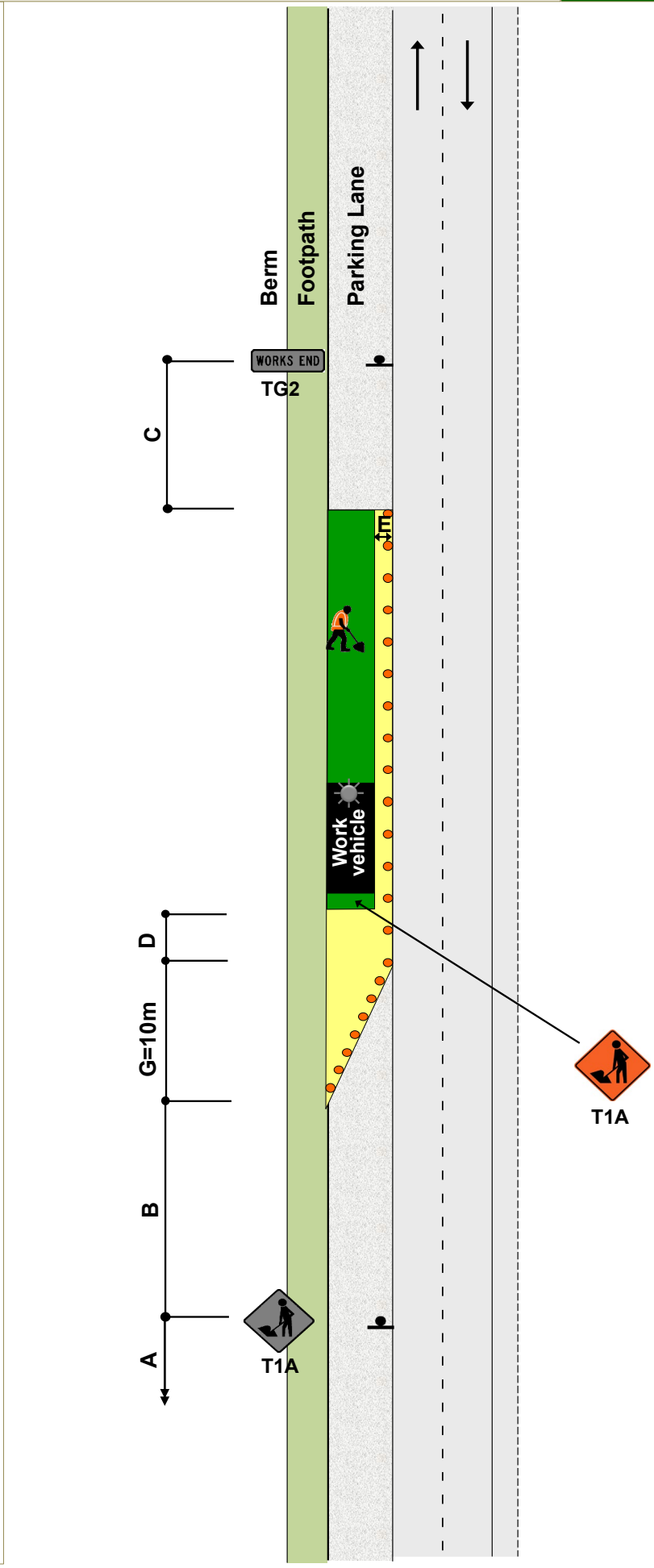


SHOULDER AND ROADSIDE ACTIVITIES
Work in parking lane
Permanent speed less than 65km/h

F2.6
Level 1

Notes

1. Where work is carried out in the legal parking lane (a place where a vehicle would normally park with a footpath and/or kerb and channel alongside), the following minimum standard of TTM must be provided:
   - a 10m taper in front of the work vehicle
   - cones alongside the work vehicle and the working space
   - a longitudinal safety zone
   - a 1m lateral safety zone along the working space
   - a T1A (or other appropriate advance warning sign) mounted on the back of the work vehicle
2. T1A road works and TG2 WORKS END signs are optional
3. The work vehicle must be no larger than a light truck and may have an amber flashing beacon
4. Traffic management must be provided where footpath users or cyclists are affected
5. This layout may only be used during daylight hours
6. Large plant and machinery must not be used in this situation, a more substantial closure is required



SHOULDER AND ROADSIDE ACTIVITIES
Shoulder closure

F2.7
Level 1

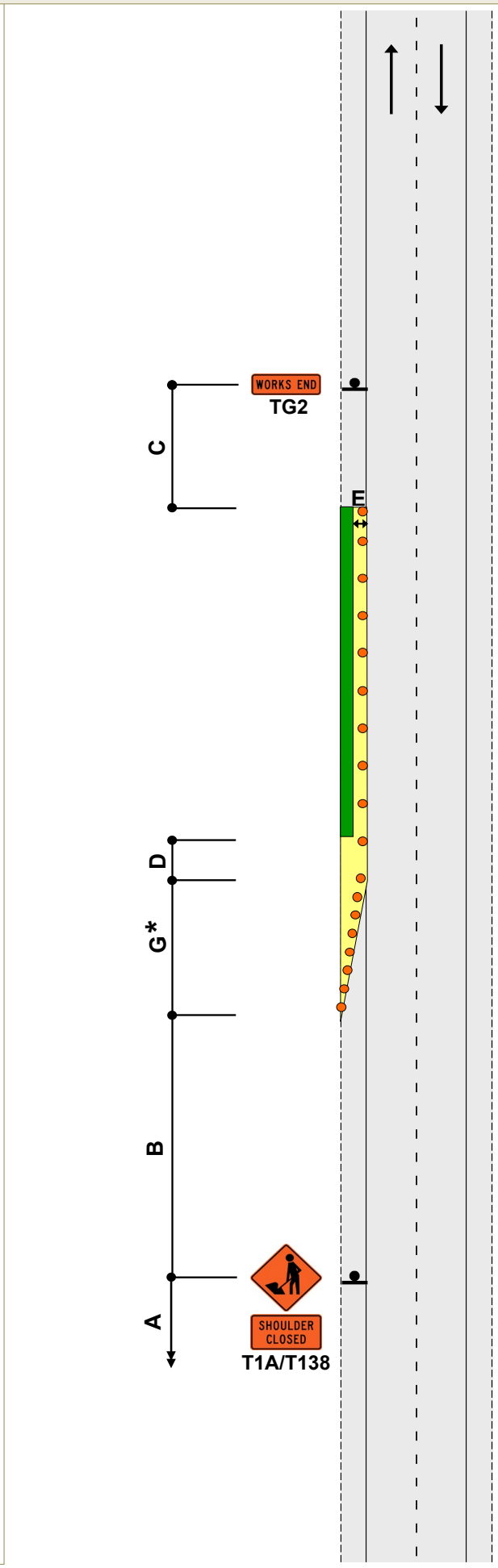
Notes

1. A 10m taper is allowed where shoulder width is less than 2.5m
2. *For shoulders exceeding 2.5m width, apply the following calculation; calculation of taper length for lateral shift of less than 3.5m is:

$$\frac{W \times G}{3.5}$$

W = Width of shoulder

G = Taper length in metres from the level 1 layout distance table



CYCLE LANE
Traffic not crossing road centre
Diverted cycle lane

F2.8
Level 1

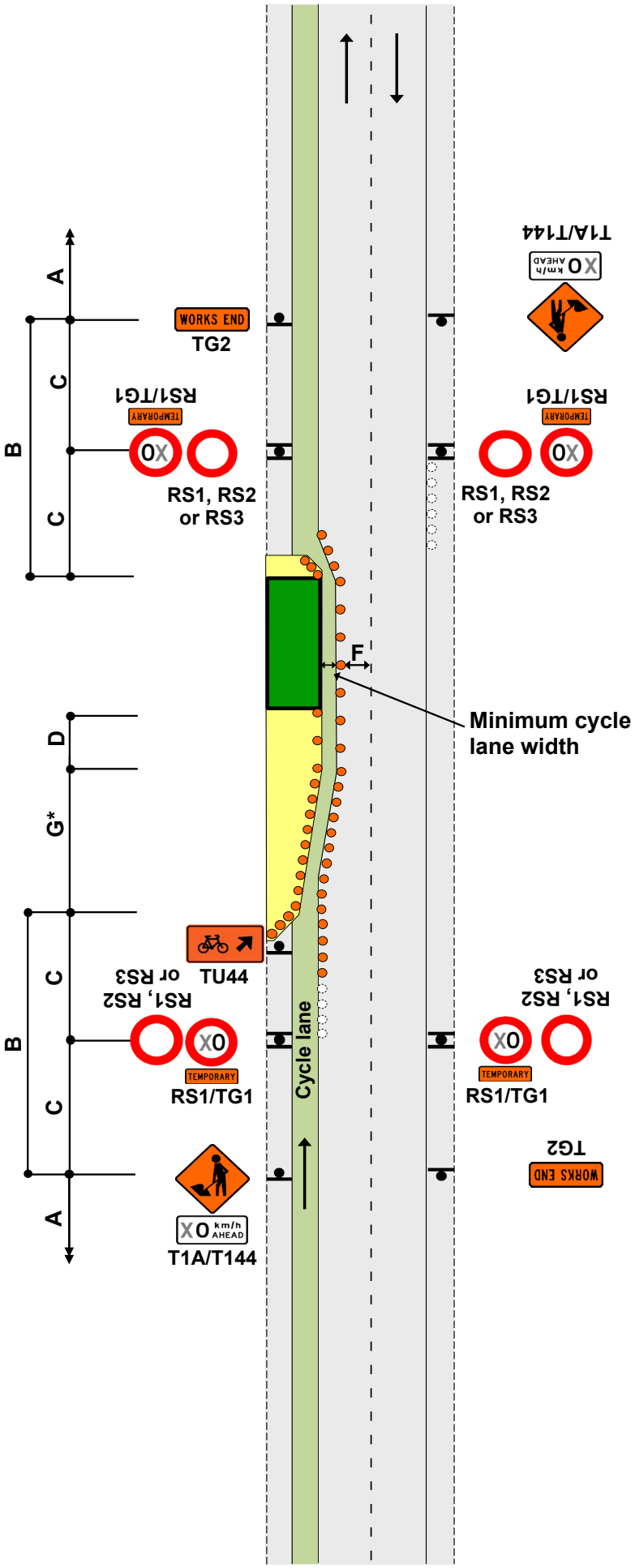
Notes

1. Minimum cycle lane width must be:
   - 1m - 50km/h or less
   - 1.5m - 60km/h or more
2. A minimum cycle lane width of 1.5m is required if the temporary cycle lane is uphill
3. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times G}{3.5}$$

   W = Width of lateral shift

   G = Taper length in metres from the level 1 layout distance table
4. Use TSLs if required by TSL decision matrix
5. The T144 X0km/h AHEAD sign is optional



CYCLE LANE
Traffic crossing road centre
Diverted cycle lane - coned lane control

F2.9
Level 1

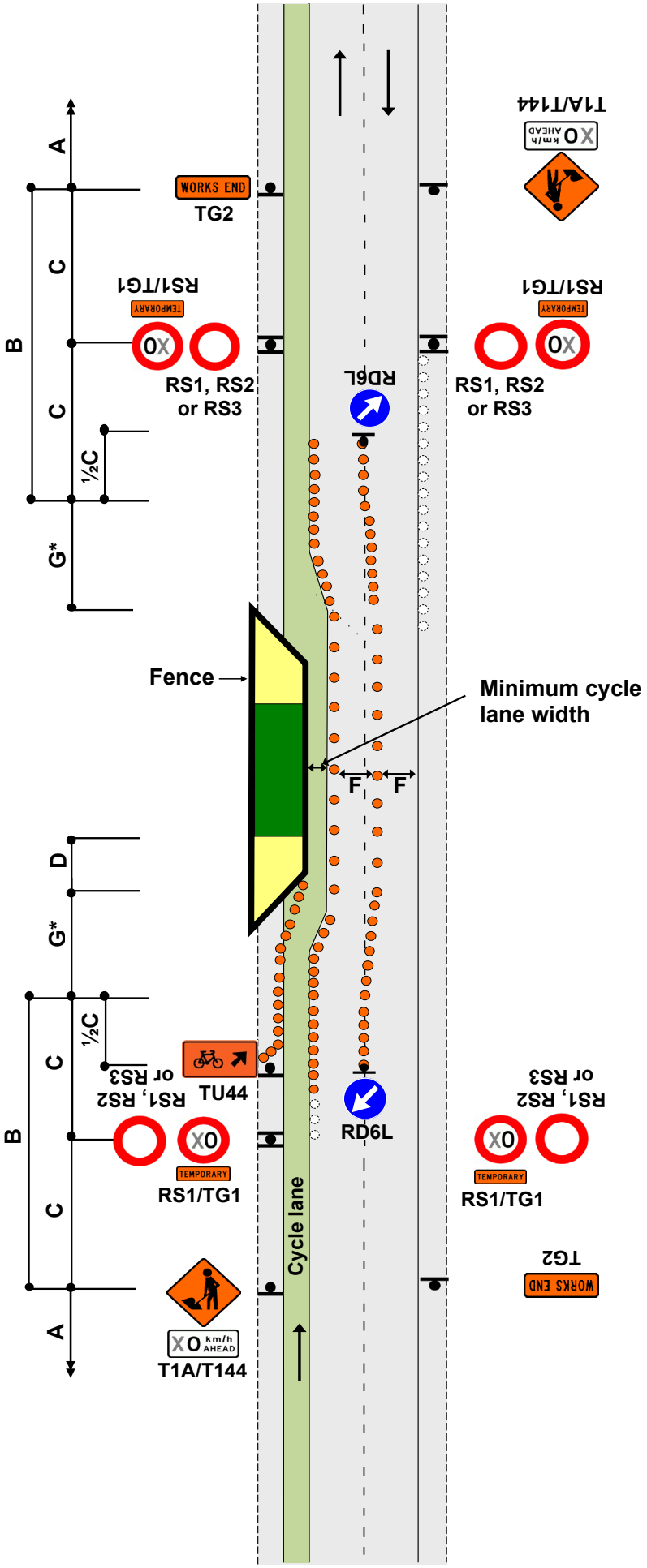
Notes

1. Minimum cycle lane width must be:
   - 1m - 50km/h or less
   - 1.5m - 60km/h or more
2. A minimum cycle lane width of 1.5m is required if the temporary cycle lane is uphill
3. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times G}{3.5}$$

   W = Width of lateral shift

   G = Taper length in metres from the level 1 layout distance table
4. To allow heavy vehicles to manoeuvre, cones in the channel must be offset by at least 10m where the direction changes. Refer C8.2.12
5. Use TSLs if required by TSL decision matrix
6. The T144 X0km/h AHEAD sign is optional



CYCLE LANE
Traffic not crossing road centre
Cycle lane closed

F2.10
Level 1

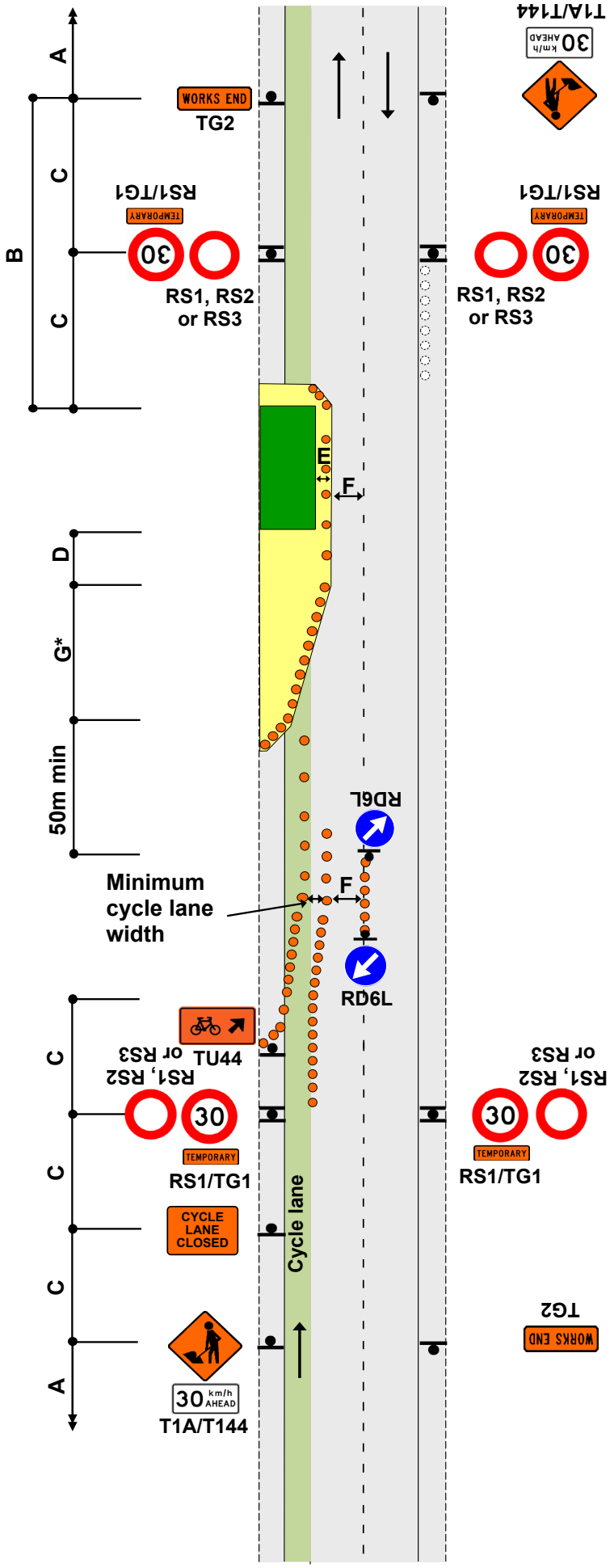
Notes

1. Only use this TMD if there is insufficient width to fit a replacement cycle lane
2. Minimum cycle lane width must be:
   - 1m - 50km/h or less
   - 1.5m - 60km/h or more
3. A minimum cycle lane width of 1.5m is required if the temporary cycle lane is uphill
4. Merge of cycle lane with live lane must be delineated
5. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times G}{3.5}$$

   W = Width of lateral shift

   G = Taper length in metres from the level 1 layout distance table
6. The T144 30km/h AHEAD sign is optional



TWO-WAY TWO-LANE ROAD
Traffic not crossing road centre

F2.11
Level 1

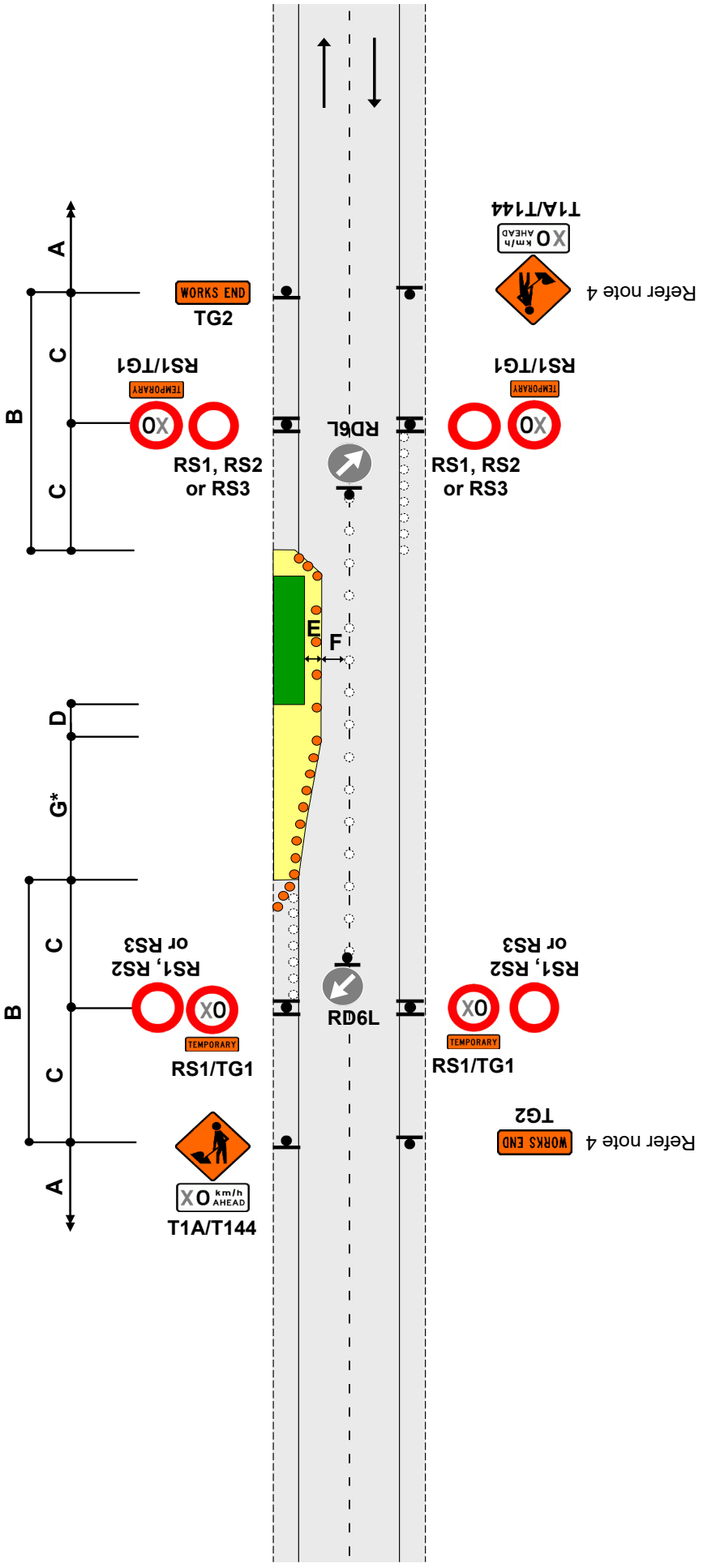
Notes

1. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times G}{3.5}$$

   W = Width of lateral shift

   G = Taper length in metres from the level 1 layout distance table
2. If traffic likely to cross the centreline, place cones on the centreline with RD6L signs at each end
3. Use TSLs if required by TSL decision matrix
4. If TSLs not required, the T1A and TG2 signs on the right hand side of the road are also not required
5. The T144 X0km/h AHEAD sign is optional



TWO-WAY TWO-LANE ROAD
Traffic not crossing road centre
Signs on median

F2.12
Level 1

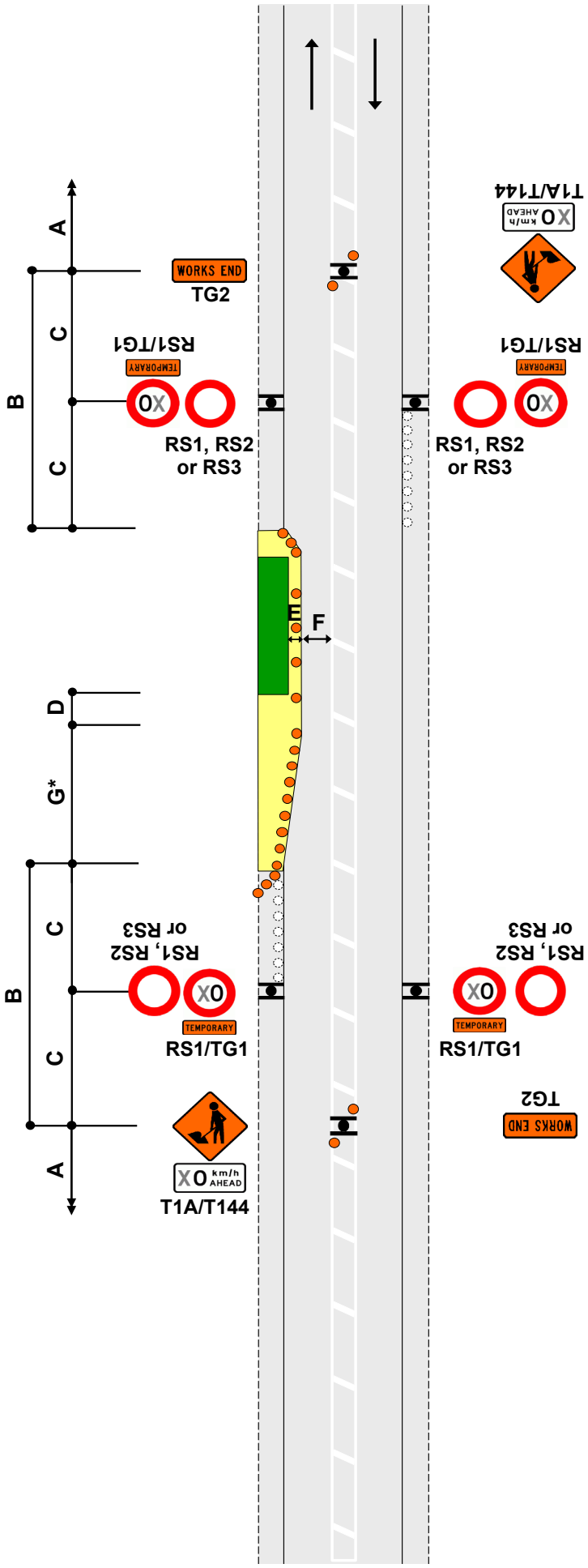
Notes

1. Use this diagram if signs will not be visible on left-hand side of road, or if it is safer to place signs on median and this will not interfere with turning traffic movements
2. Where a median exists which is more than 2m wide, the signs may be positioned on the median. Signs must be placed back-to-back unless on a solid median
3. Where there is a solid median, signs are not required in the opposing direction
4. *Calculation of taper length for lateral shift of less than 3.5m is:

   $\frac{W \times G}{3.5}$

   W = Width of lateral shift

   G = Taper length in metres from the level 1 layout distance table
5. Use TSLs if required by TSL decision matrix
6. The T144 X0km/h AHEAD sign is optional



TWO-WAY TWO-LANE ROAD
Traffic crossing road centre
Two lane diversion

F2.13
Level 1

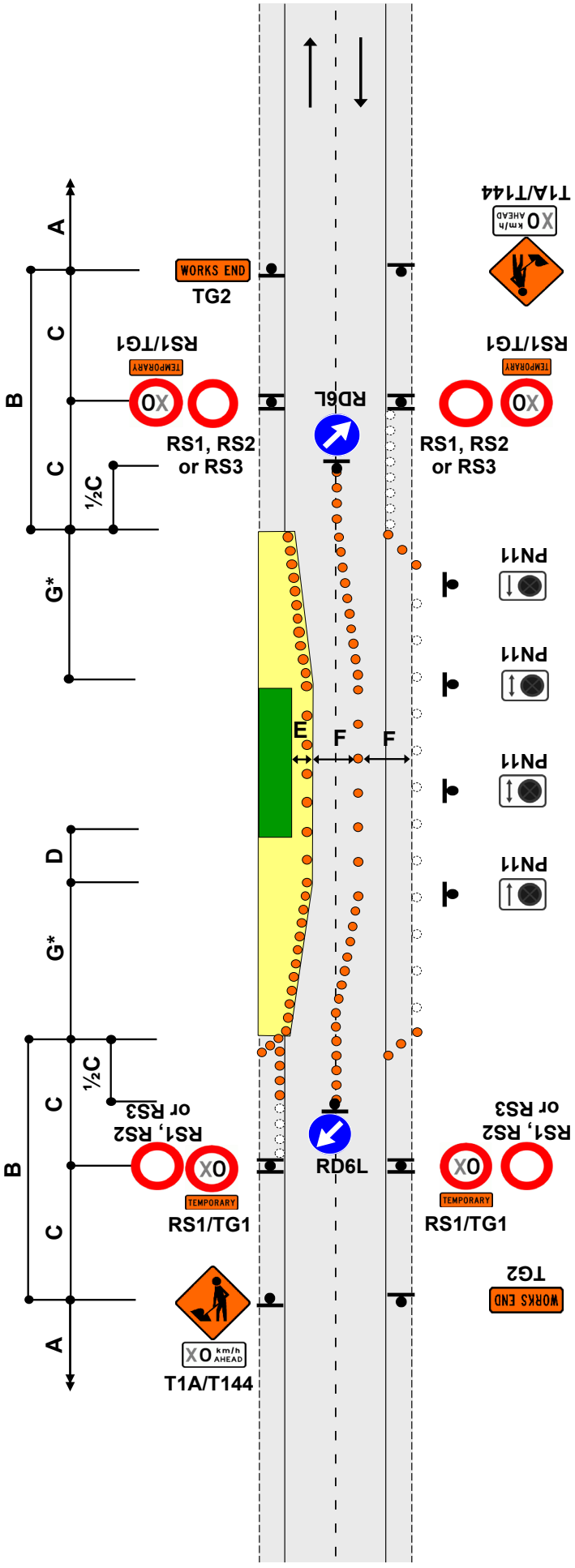
Notes

1. Cones are required on edge of the temporary lane opposite closure if road is not well defined
2. Return taper at end of closure may be shortened
3. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times G}{3.5}$$

   W = Width of lateral shift

   G = Taper length in metres from the level 1 layout distance table
4. To allow heavy vehicles to manoeuvre, cones in the channel must be offset by at least 10m where the direction changes. Refer C8.2.12
5. Use PN11 No Stopping signs, if necessary
6. Use TSLs if required by TSL decision matrix
7. The T144 X0km/h AHEAD sign is optional

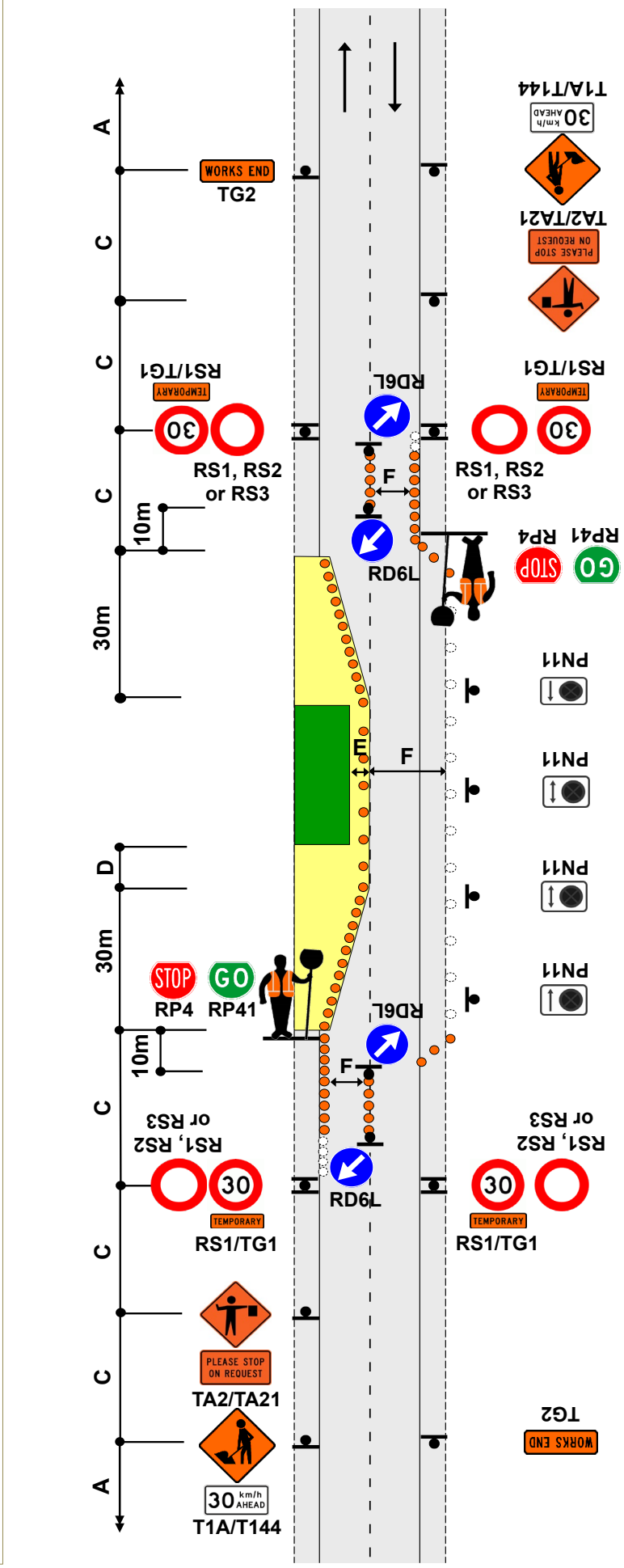


TWO-WAY TWO-LANE ROAD
Single-lane alternating flow
Manual traffic control (STOP/GO or STOP/SLOW)

F2.14
Level 1

Notes

1. Extend or place extra advance warning signs towards on-coming traffic beyond any expected traffic queues
2. A 30m return taper at the end of the closure is mandatory
3. Cones are required on edge of the temporary lane opposite closure if road is not well defined
4. To allow heavy vehicles to manoeuvre, cones in the channel must be offset by at least 10m where the direction changes. Refer C8.2.12
5. Use PN11 no stopping signs, if necessary
6. MTC with RP4/RP41 STOP/GO or RP4/RP42 STOP/SLOW paddle on road shoulder located between 1st and 2nd cone in the cone threshold closest to the working space
7. Minimum 5 cones in cone threshold at:
   - 2.5m centres - less than 65km/h
   - 5m centres - more than 65km/h
8. Refer to C10.2.3 MTC essentials for further information
9. Delays cannot exceed the time approved by the RCA (normally 5 to 10 minutes)
10. The T144 30km/h AHEAD sign is optional

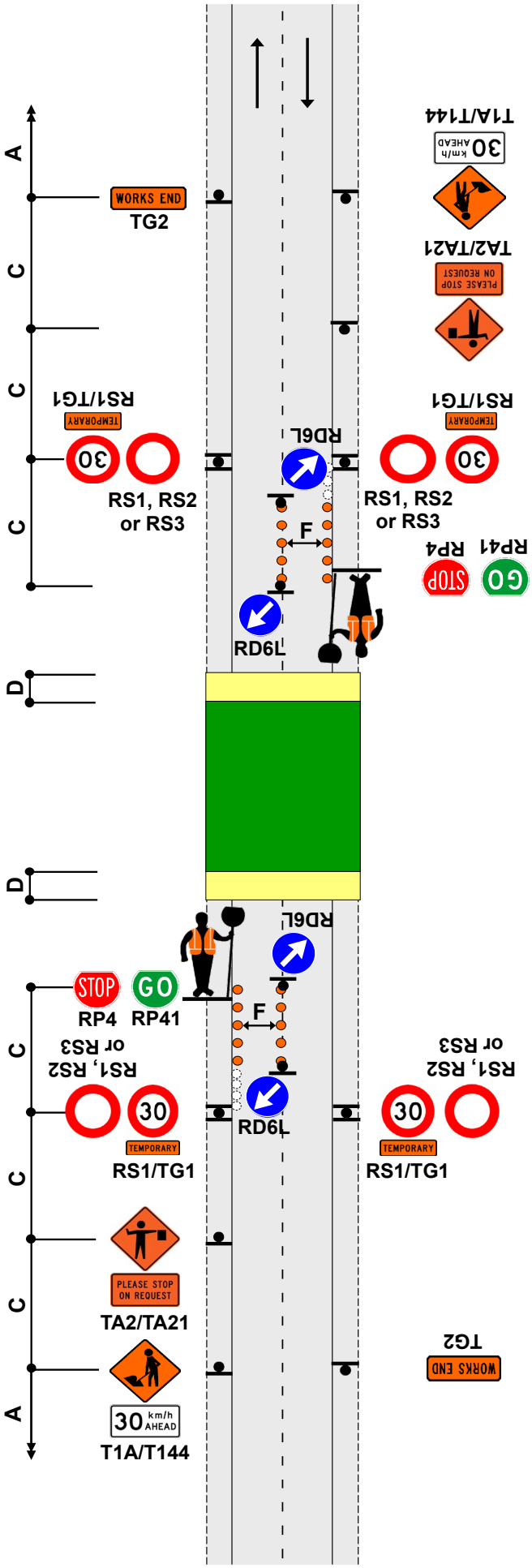


TWO-WAY TWO-LANE ROAD
All traffic stopped temporarily
Manual traffic control (STOP/GO or STOP/SLOW)

F2.15
Level 1

Notes

1. Closure period not to exceed the limit set or approved by the RCA
2. Extend advance warning signs towards on-coming traffic beyond any expected traffic queues
3. MTC with RP4/RP41 STOP/GO or RP4/RP42 STOP/SLOW paddle on road shoulder located between 1st and 2nd cone in the cone threshold closest to the working space
4. Minimum 5 cones in cone threshold at:
   - 2.5m centres - less than 65km/h
   - 5m centres - more than 65km/h
5. MTCs must show same message to oncoming traffic (eg STOP/STOP or GO/GO)
6. Refer to C10.2.3 MTC essentials for further information
7. When road users are passing the working space in alternating flow, all construction equipment must be stopped on same side of the road if there is no separation from the live lane
8. Where damage is likely to occur to passing traffic eg during sealing, traffic must be stopped in both directions
9. The T144 X0km/h AHEAD sign is optional

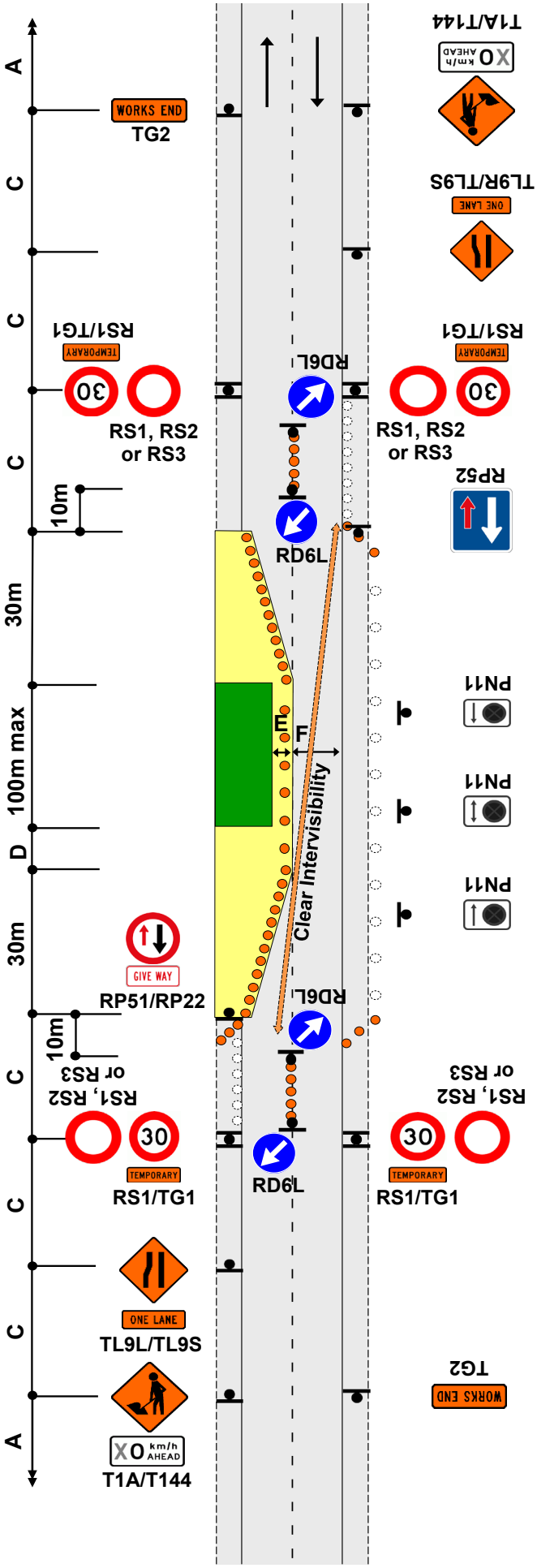


TWO-WAY TWO-LANE ROAD
Single-lane (traffic volume less than 1000vpd - 80vph)
Give way control

F2.16
Level 1

Notes

1. The RP51/RP22 and RP52 controls must be placed in the following priority order:
   - downhill traffic must give way to uphill traffic
   - traffic that has to cross into the opposing lane gives way, however where visibility for this vehicle is marginal the contractor may require the other vehicle with better visibility to give way
2. Intervisibility is required as indicated on diagram. This means that a vehicle at one sign is able to see whether the way ahead is clear
3. A 30m return taper at the end of the closure is mandatory
4. Use PN11 No Stopping signs, if necessary
5. Cones are required on edge of the temporary lane opposite closure if road is not well defined
6. The T144 X0km/h AHEAD sign is optional



TWO-WAY TWO-LANE ROAD
Single-lane alternating flow
Portable traffic signals

F2.17
Level 1

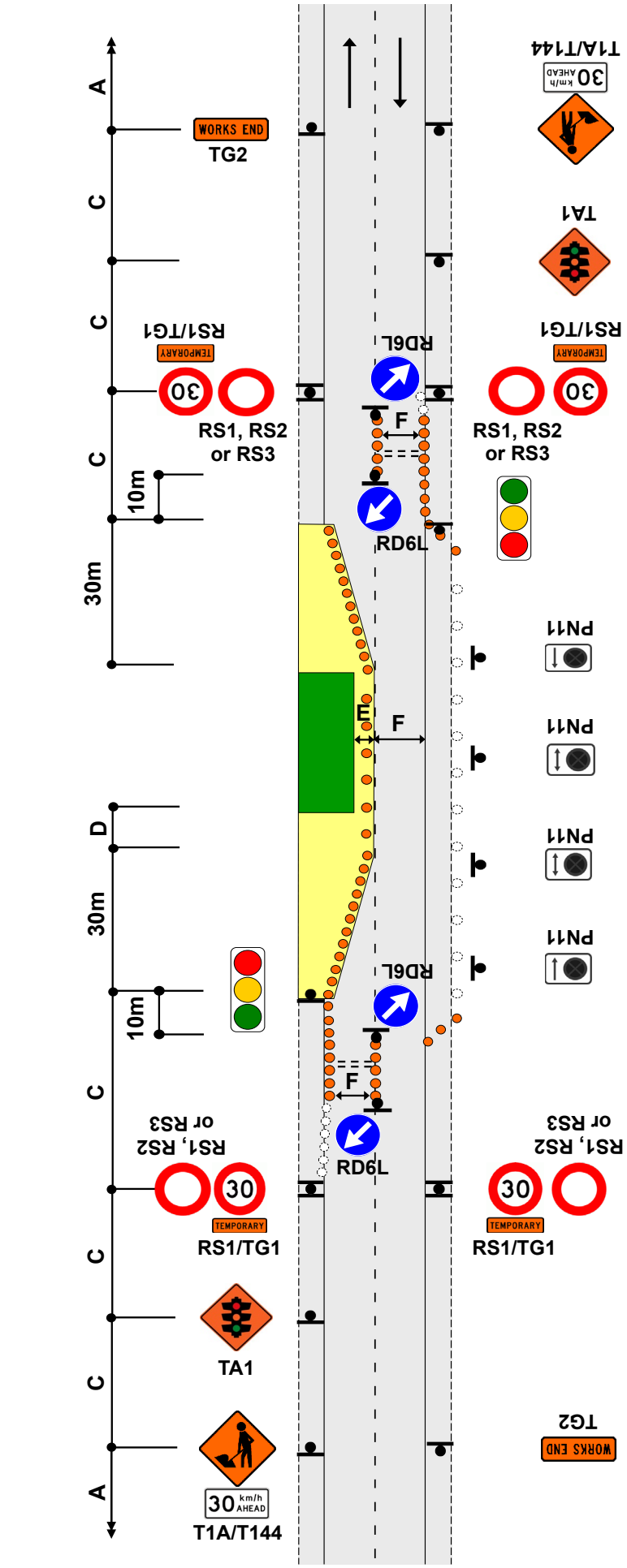
Notes

1. Provide details of make and model of portable traffic signals in the TMP
2. Install temporary limit lines (must be able to be removed upon completion) or use RP61/RP62 signs

STOP ON RED SIGNAL

STOP HERE ON RED SIGNAL

3. Approved temporary speed humps may also be used. Consider use of MTC while speed humps are installed
4. A 30m return taper at the end of the closure is mandatory
5. Cones are required on edge of the temporary lane opposite closure if road is not well defined
6. Extend or place extra advance warning signs towards on-coming traffic beyond any expected traffic queues
7. Use PN11 No Stopping signs, if necessary
8. Minimum 5 cones in cone threshold at:
   - 2.5m centres - less than 65km/h
   - 5m centres - more than 65km/h
9. The T144 30km/h AHEAD sign is optional



TWO-WAY TWO-LANE ROAD
Work in centre of road

F2.18
Level 1

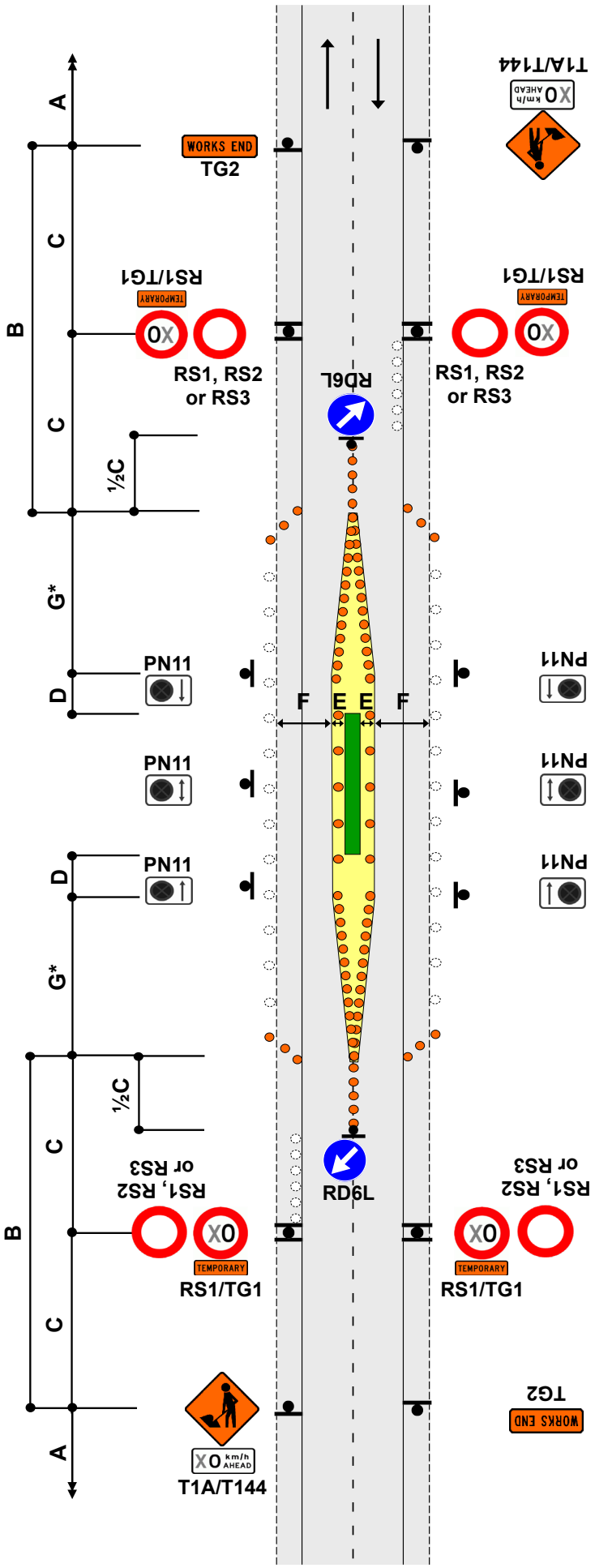
Notes

1. Cones are required on edge of the temporary lane opposite closure if road is not well defined
2. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times G}{3.5}$$

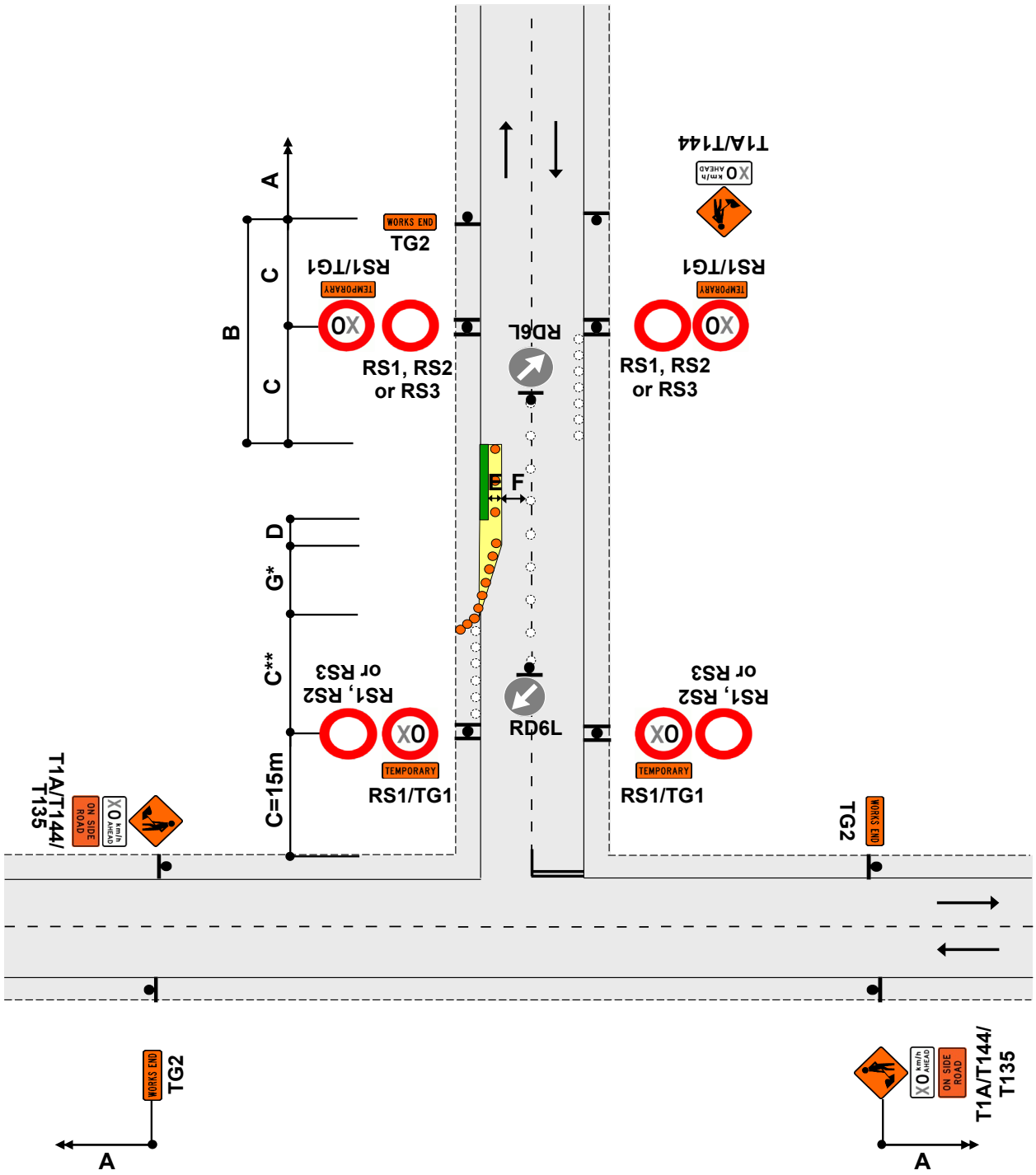
   W = Width of lateral shift

   G = Taper length in metres from the level 1 layout distance table
3. Use PN11 no stopping signs, if necessary
4. Use TSLs if required by TSL decision matrix
5. The T144 X0km/h AHEAD sign is optional



TWO-WAY TWO-LANE ROAD - Intersection or roundabout
Road works on side road after intersection - TSL on side road
Traffic not crossing road centre

F2.19
Level 1



Notes

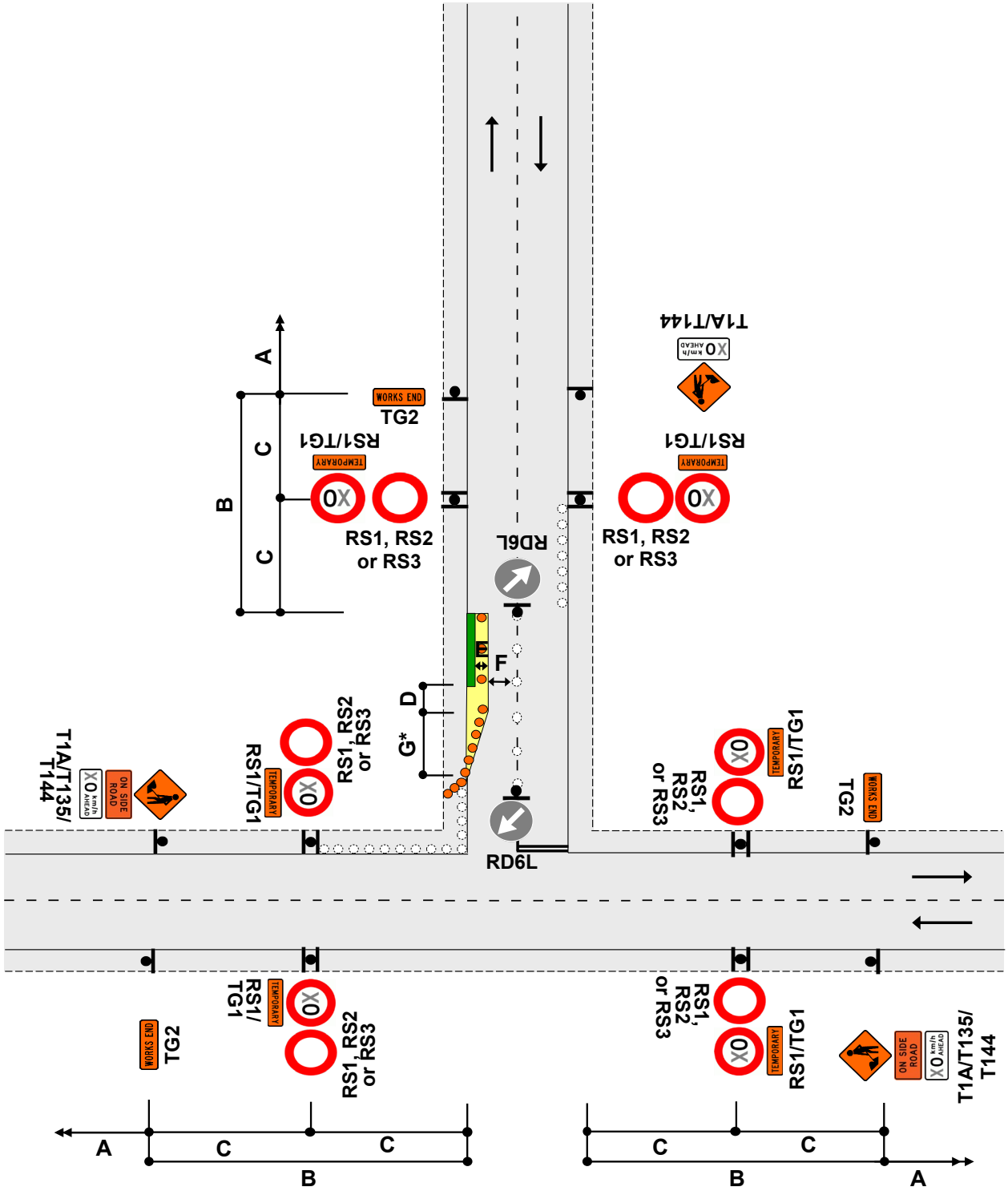
1. Sign spacing of TSL at the intersection can be reduced as per the table shown below
2. Where minimum dimensions cannot be achieved TMD F2.20 is to be used
3. Advance warning signs on main road must be at least the warning distance away from first cone in taper
4. *Calculation of taper length for lateral shift of less than 3.5m is:

   $\frac{W \times G}{3.5}$ W = Width of lateral shift
   G = Taper length in metres from the level 1 layout distance table
5. If traffic likely to cross the centreline, place cones on the centreline with RD6L signs at each end
6. Use TSLs as required by TSL decision matrix
7. The T144 30km/h AHEAD sign is optional

Speed (PSL)	Intersection to TSL	C** TSL to taper	Total
<50km/h	15m	15m	30m
60km/h	15m	25m	40m
>70km/h	15m	40m	55m

TWO-WAY TWO-LANE ROAD - Intersection or roundabout
Road works on side road after intersection - TSL on main road
Traffic not crossing road centre

F2.20
Level 1



Notes

1.*Calculation of taper length for lateral shift of less than 3.5m is:

$$\frac{W \times G}{3.5}$$

W = Width of lateral shift

G = Taper length in metres from the level 1 layout distance table

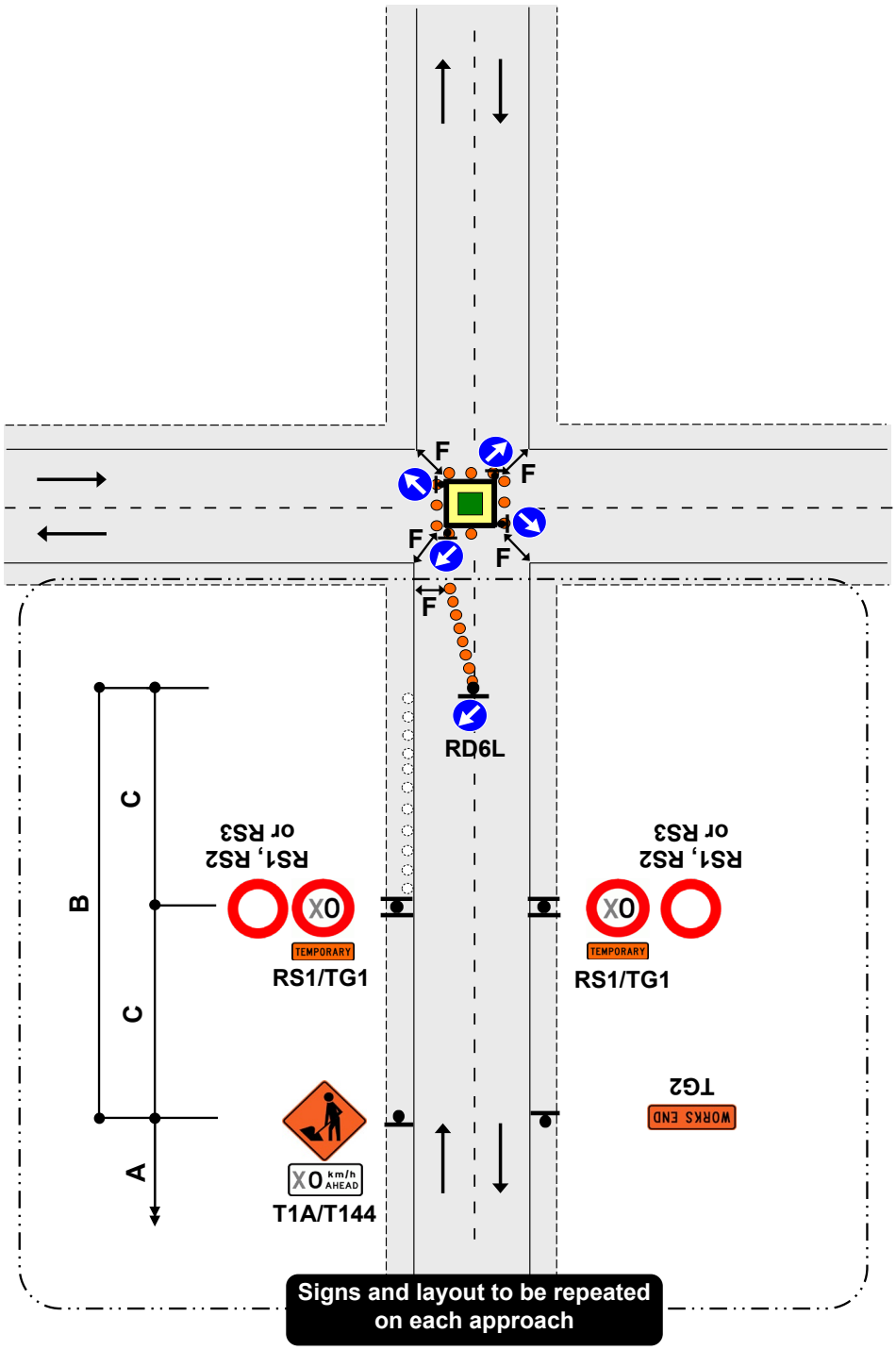
2.If traffic likely to cross the centreline, place cones on the centreline with RD6L signs at each end

3.Use TSLs as required by TSL decision matrix

4.The T144 X0km/h AHEAD sign is optional

TWO-WAY TWO-LANE ROAD - Intersection or roundabout
Work in middle of intersection

F2.21
Level 1



Notes

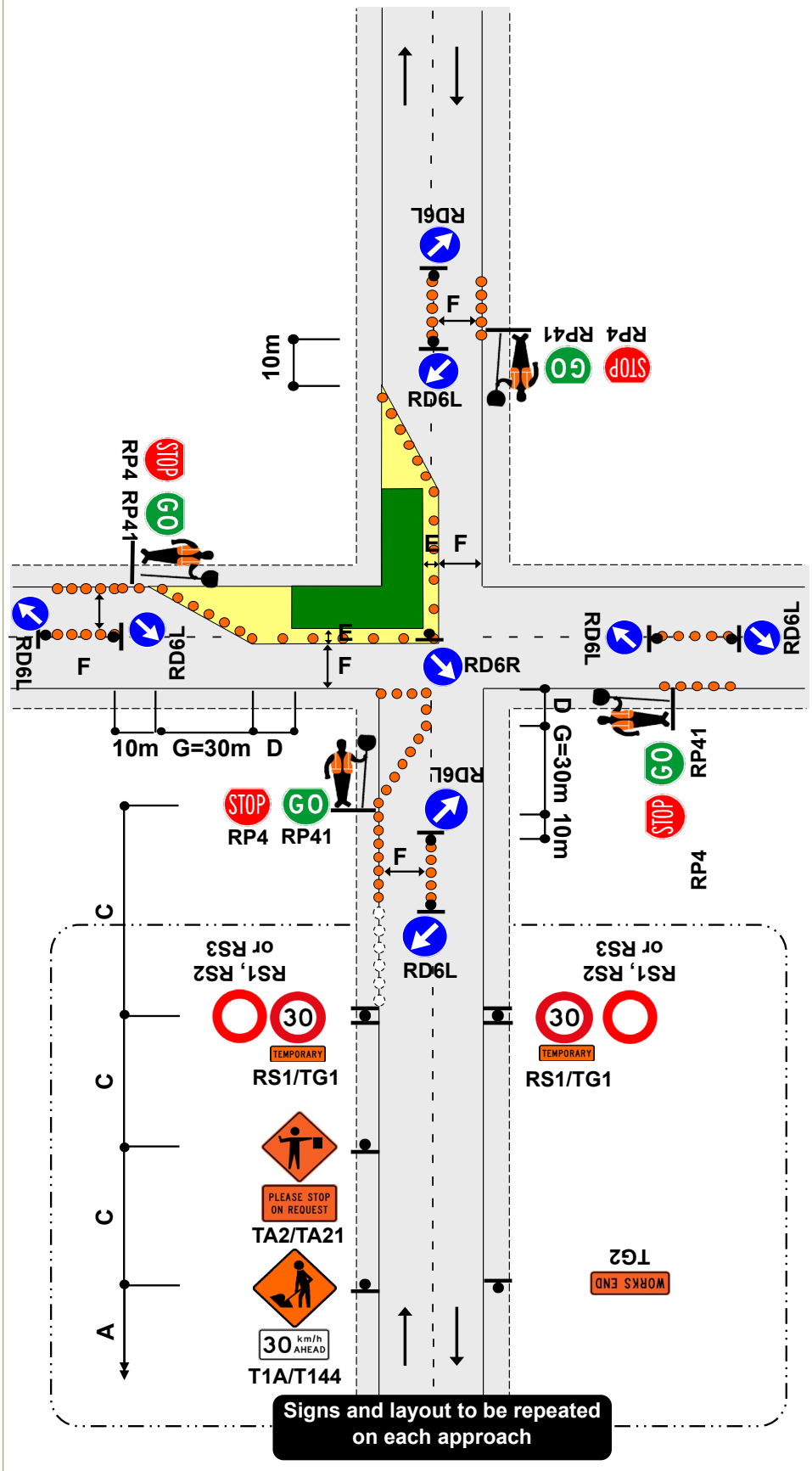
1. This diagram may be used at a T intersection by removing any one of the roads
2. Signs and layout shown in the box at the bottom of the diagram is to be repeated on each approach
3. RD6L signs are not required at an existing roundabout
4. Cone tapers are optional at existing roundabouts
5. Lane widths, F, may need to be increased to allow for turning movements of larger vehicles
6. Use TSLs if required by TSL decision matrix
7. The T144 X0km/h AHEAD sign is optional

TWO-WAY TWO-LANE ROAD - Intersection or roundabout
Closure at corner of an intersection
Manual traffic control (Stop/Go or Stop/Slow)

F2.22
Level 1

Notes

1. This diagram may be used at a T intersection by removing any one of the roads
2. Signs and layout shown in the box at the bottom of the diagram is to be repeated on each approach
3. A 30m return taper at the end of the closure is mandatory
4. Use PN11 no stopping signs, if necessary
5. MTC with RP4/RP41 STOP/GO or RP4/RP42 STOP/SLOW paddle on road shoulder located between 1st and 2nd cone in the cone threshold closest to the working space
6. Minimum 5 cones in cone threshold at:
   - 2.5m centres - less than 65km/h
   - 5m centres - more than 65km/h
7. Refer to C10.2.3 MTC essentials for further information
8. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
9. The T144 30km/h AHEAD sign is optional

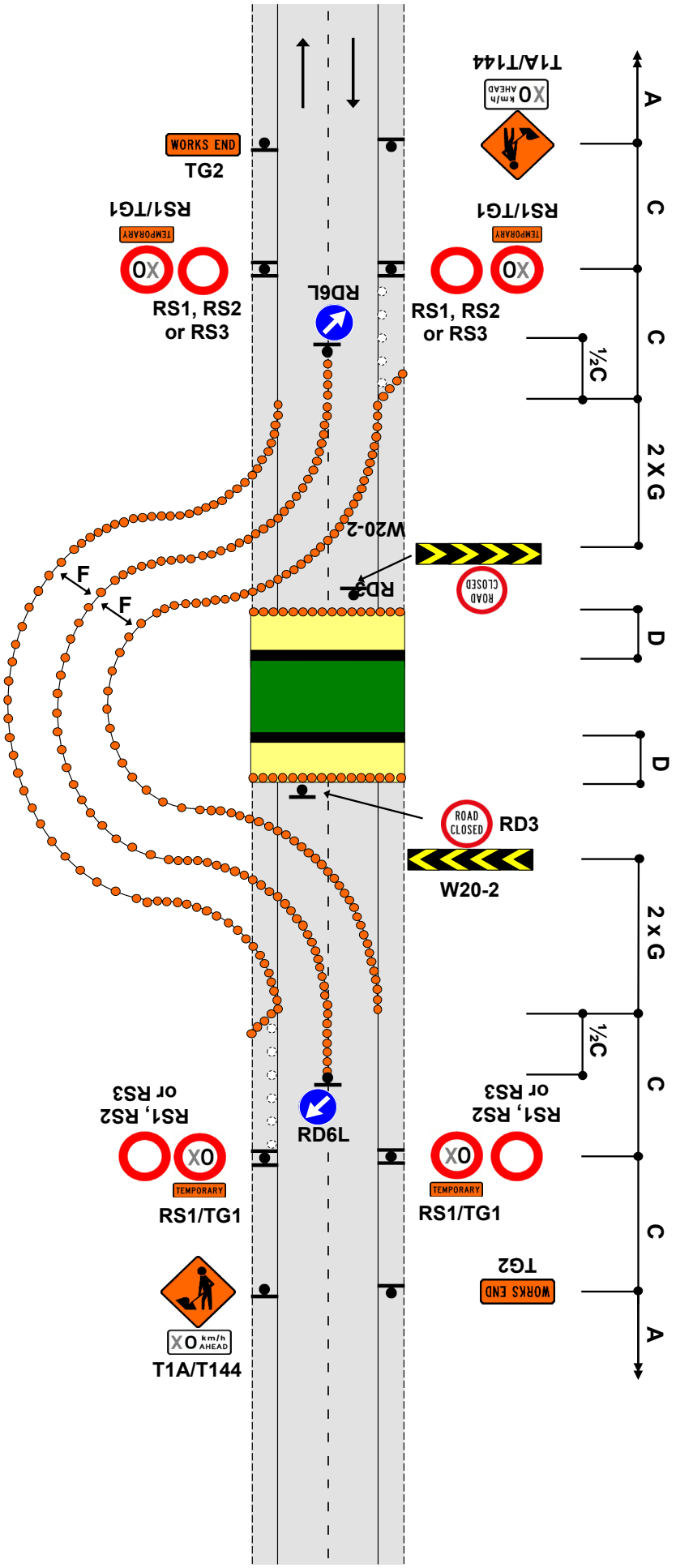


TWO-WAY TWO-LANE ROAD - Road closures and detours
Road closure
Temporary route around a hazard or workspace

F2.23
Level 1

Notes

1. Use TSLs if required by TSL decision matrix
2. To allow heavy vehicles to manoeuvre, cones in the channel must be offset by at least 10m where the direction changes. Refer C8.2.12
3. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
4. The T144 X0km/h AHEAD sign is optional

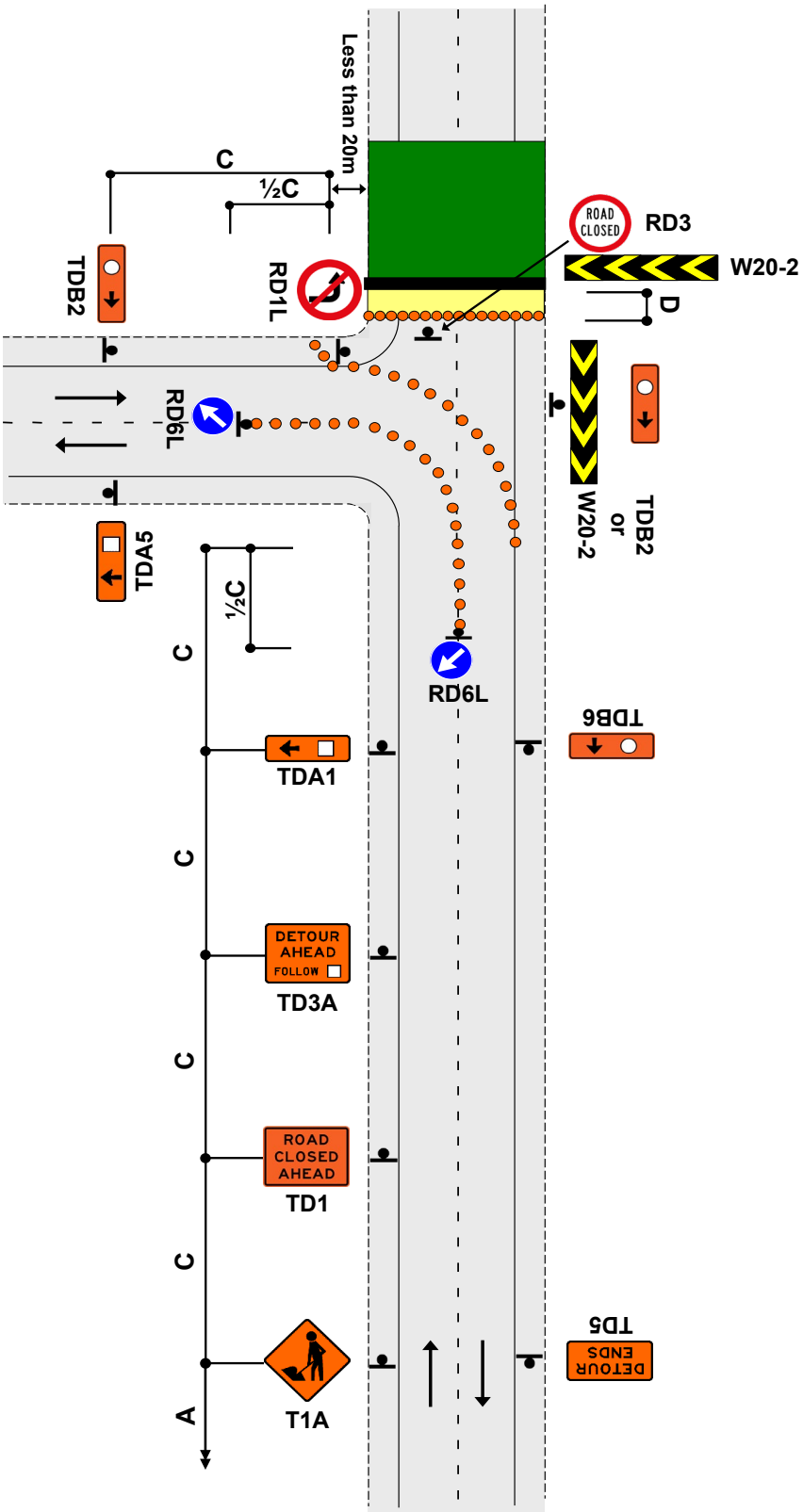


TWO-WAY TWO-LANE ROAD - Road closures and detours
Road closure - detour route
Example

F2.24
Level 1

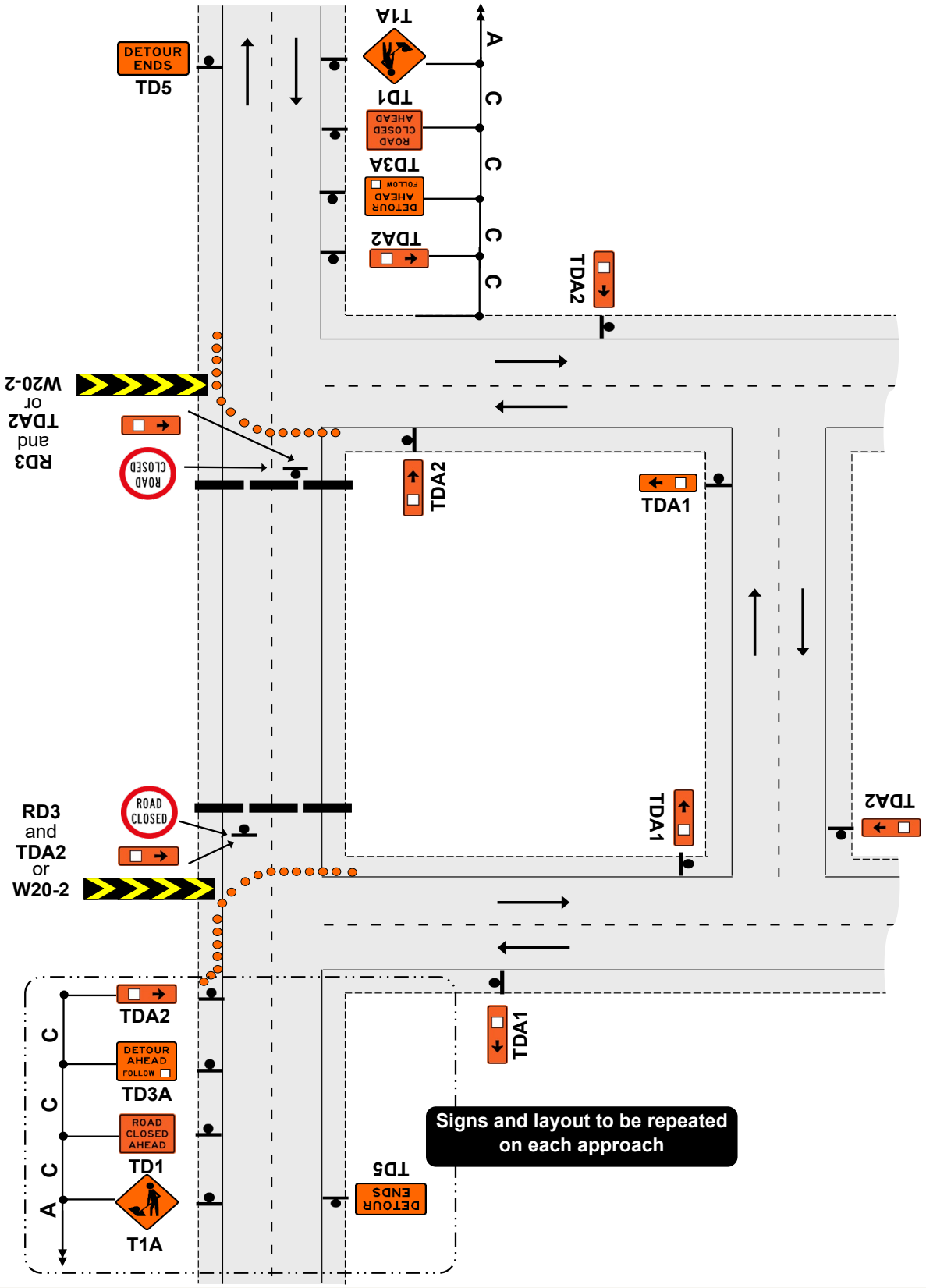
Notes

1. Block access to road with barricade
2. If a longer term site, use chevron sight board to direct traffic



TWO-WAY TWO-LANE ROAD - Road closures and detours
Typical detour route signing
Example

F2.25
Level 1



Notes

1. Signpost all intersections to return diverted traffic back to normal/intended route:
   - Use appropriate sign to indicate detour ahead (eg TD3A)
   - Use appropriate route signs before each intersection and on long straights (eg TDA1)
   - Use TD5 signs to advise end of detour
2. If detour to operate for more than 48 hours:
   - Use chevron sight board to direct traffic
   - Add destination signage as appropriate

TWO-WAY TWO-LANE ROAD
Other hazard
Flooding, washout, slip, slippery surface

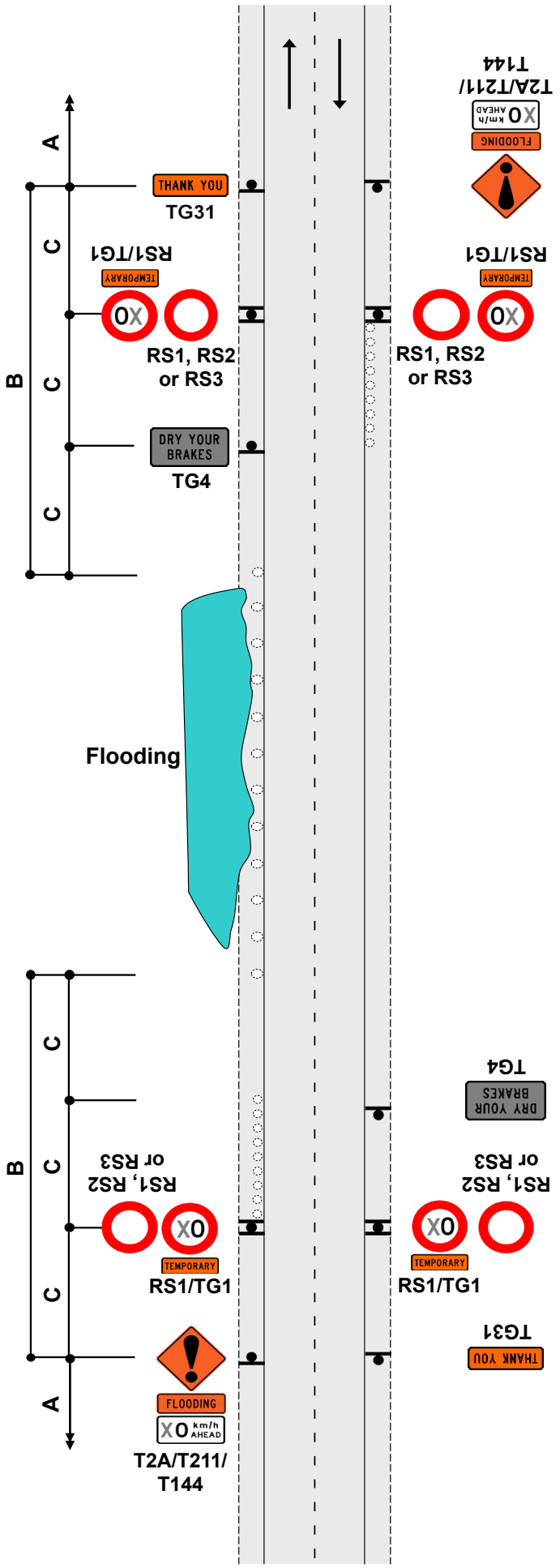
F2.26
Level 1

Notes

1. This diagram is for initial response only. Appropriate long term TTM must be installed as soon as practical
2. Use one of the following signs and/or supplementary plates:

T211 FLOODING Flooding
T212 WASHOUT Washout
TR1L/R Slips
TR2 Slippery Surface
TR4 Uneven Surface

3. If necessary, erect TG4 DRY YOUR BRAKES sign
4. Delineate hazard if hazard extends onto lane
5. Use TSLs if required by TSL decision matrix
6. The T144 X0km/h AHEAD sign is optional

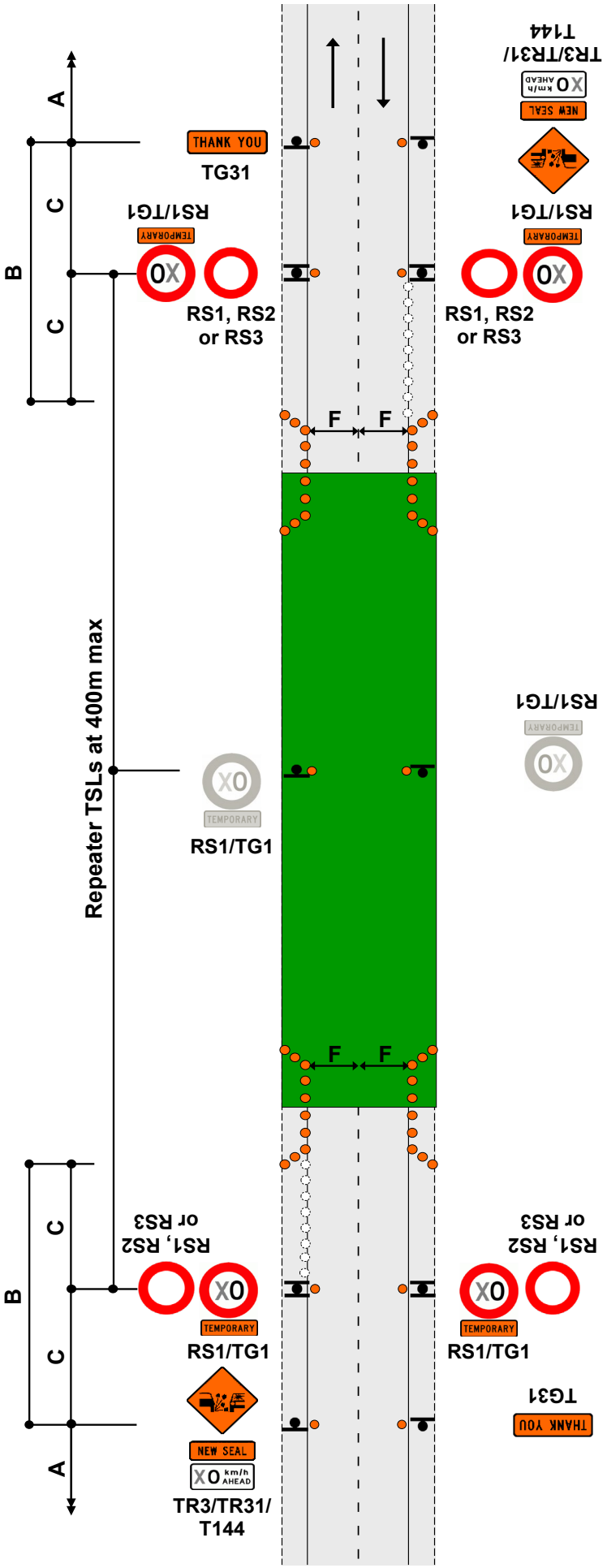


TWO-WAY TWO-LANE ROAD
Unattended worksites
New seal - unattended and/or unswept worksite

F2.27
Level 1

Notes

1. Use TSLs if required by TSL decision matrix
2. Worksites need positive traffic management to ensure all road users travel at the TSL
3. Use cones to form a threshold treatment at the start of the new seal. Minimum of 10 cones at 5m centres
4. Cones on the trafficked side of signs for sites to be left unattended overnight
5. TSLs to be repeated at not more than 400m intervals
6. The T144 X0km/h AHEAD sign is optional



TWO-WAY TWO-LANE ROAD
Unattended worksites
Surface hazard

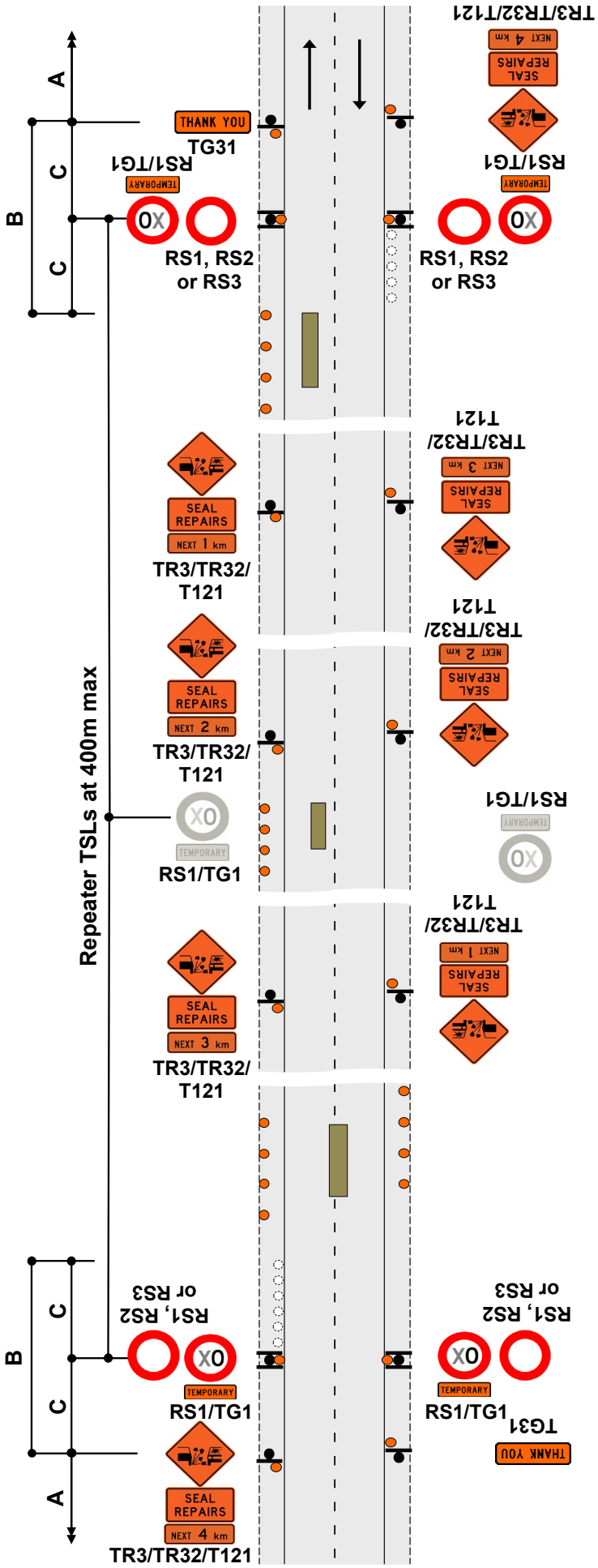
F2.28
Level 1

Notes

1. This layout must not be used on an alignment with horizontal curves (corners) or when repairs are carried out on or near horizontal curves. See TMD F2.29
2. On long worksites, use 'Next X km' plates, repeat temporary speed limit signs at not more than 400m intervals
3. Signs for some alternative situations:

TR4		Uneven Surface
TR2		Slippery Surface
TR3		Gravel/ Unsealed Surface
TR31	NEW SEAL	New Seal
TR32	SEAL REPAIRS	Seal Repairs

4. Cones to be placed on left of carriageway for full length of hazard at 10m centres or at least 3 cones, whichever is the greater
5. Cones on the trafficked side of signs for sites to be left unattended overnight
6. Worksites need positive traffic management to ensure all road users travel at the TSL
7. Use TSLs if required by TSL decision matrix
8. The T144 X0km/h AHEAD sign is optional

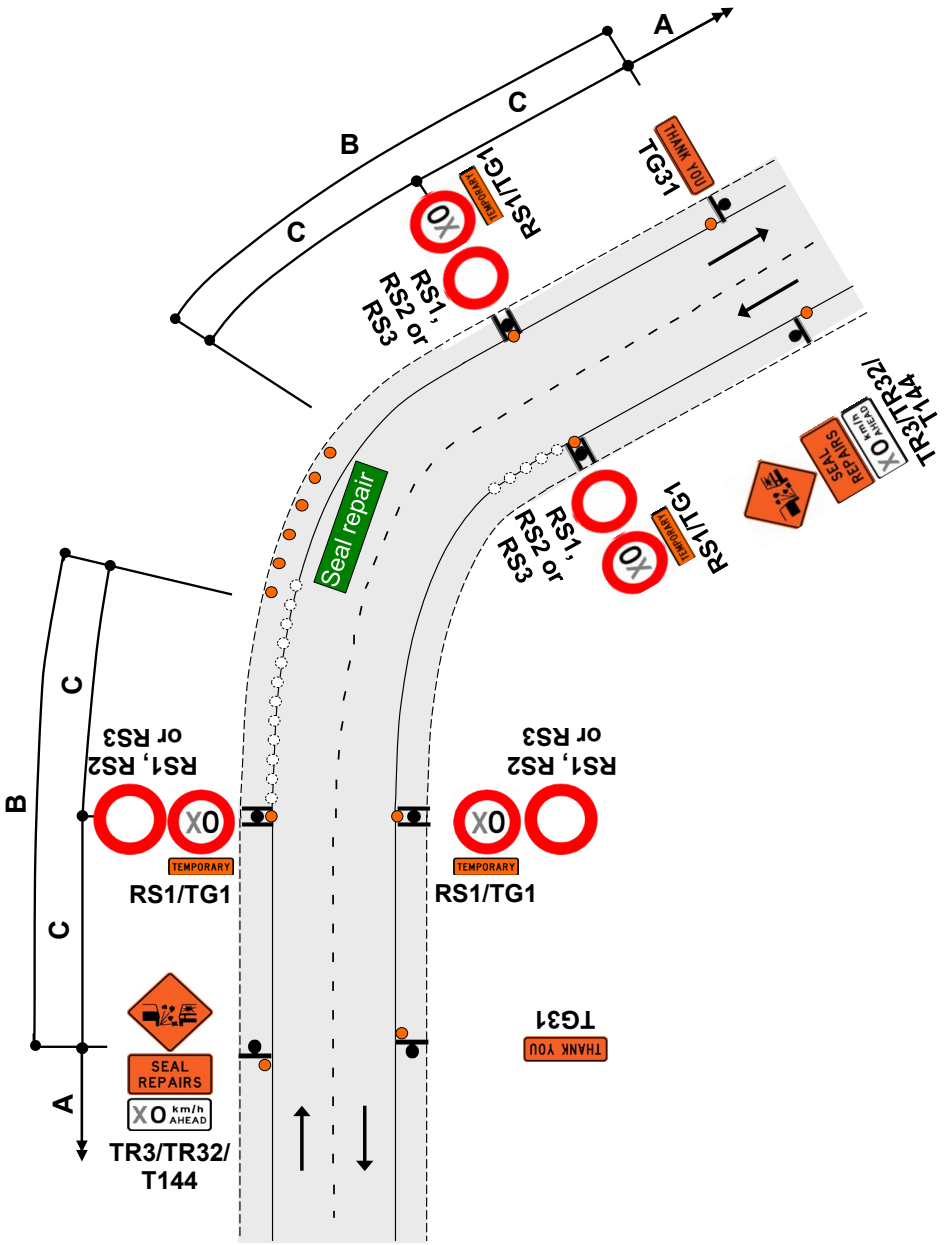


TWO-WAY TWO-LANE ROAD
Unattended worksites
Seal repairs on a curve

F2.29
Level 1

Notes

1. Cones on edge of seal - minimum 3 cones, maximum spacing 10m, next to each repair area
2. Cover any curve advisory speed sign that has a higher speed than the TSL
3. Use TSLs if required by TSL decision matrix
4. The T144 X0km/h AHEAD sign is optional

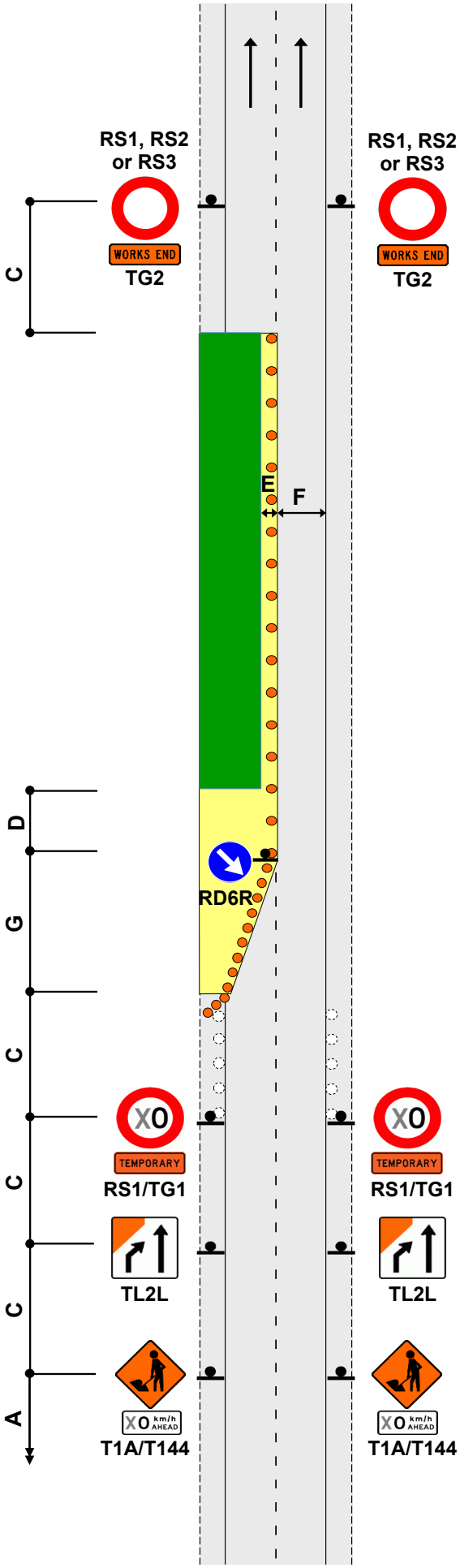


ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Left-lane closure

F2.30
Level 1

Notes

1. Use TSLs if required by TSL decision matrix
2. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
3. The T144 X0km/h AHEAD sign is optional

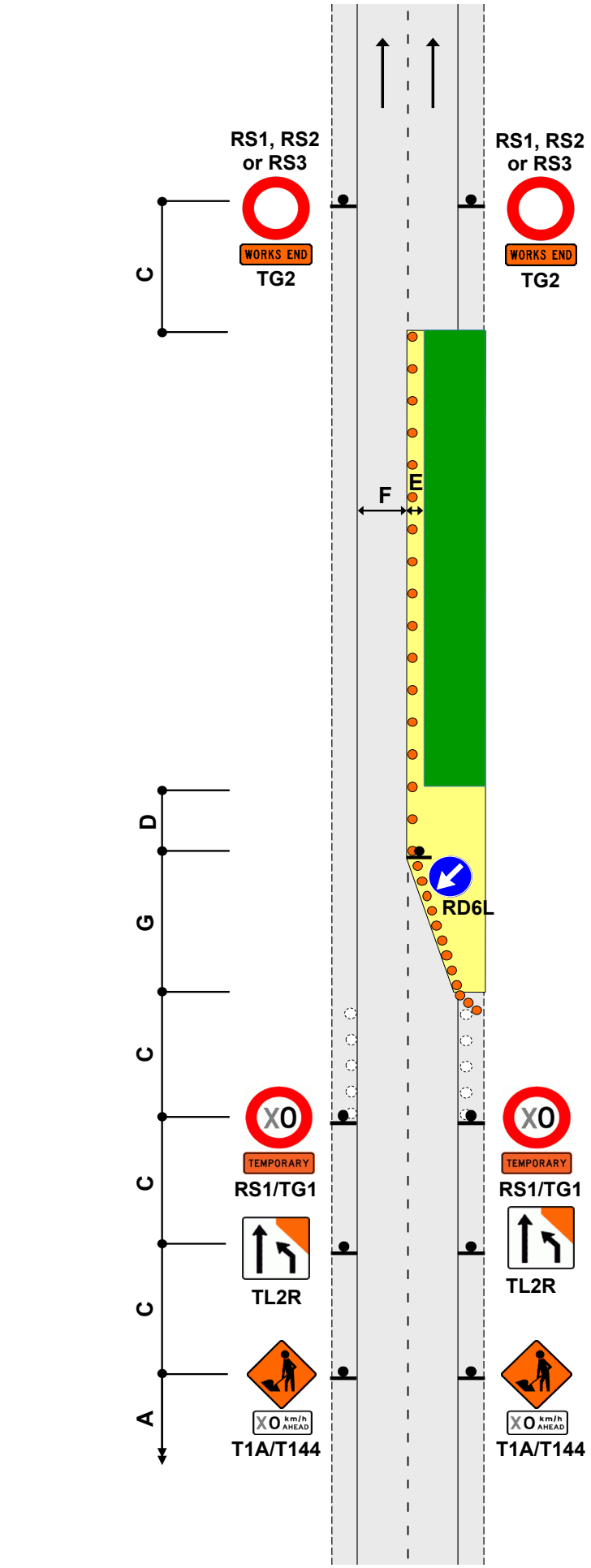


ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Right-lane closure

F2.31
Level 1

Notes

1. Use TSLs if required by TSL decision matrix
2. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
3. The T144 X0km/h AHEAD sign is optional



ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
One-lane closure
Temporary two-lane diversion

F2.32
Level 1

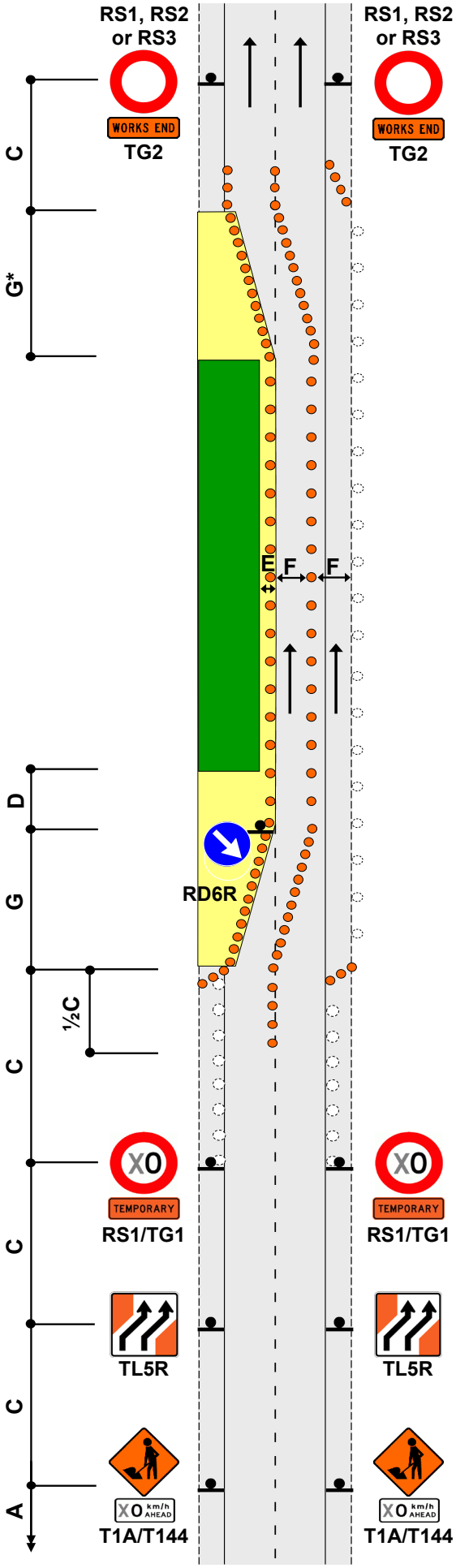
Notes

1. Cones required opposite closure if edge of carriageway not clearly defined
2. *Calculation of taper length for lateral shift of less than 3.5m is:

   $\frac{W \times G}{3.5}$

   W = Width of lateral shift

   G = Taper length in metres from the level 1 layout distance table
3. To allow heavy vehicles to manoeuvre, cones in the channel must be offset by at least 10m where the direction changes. Refer C8.2.12
4. Use TSLs if required by TSL decision matrix
5. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
6. The T144 X0km/h AHEAD sign is optional



ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Lane diversions in both directions

F2.33
Level 1

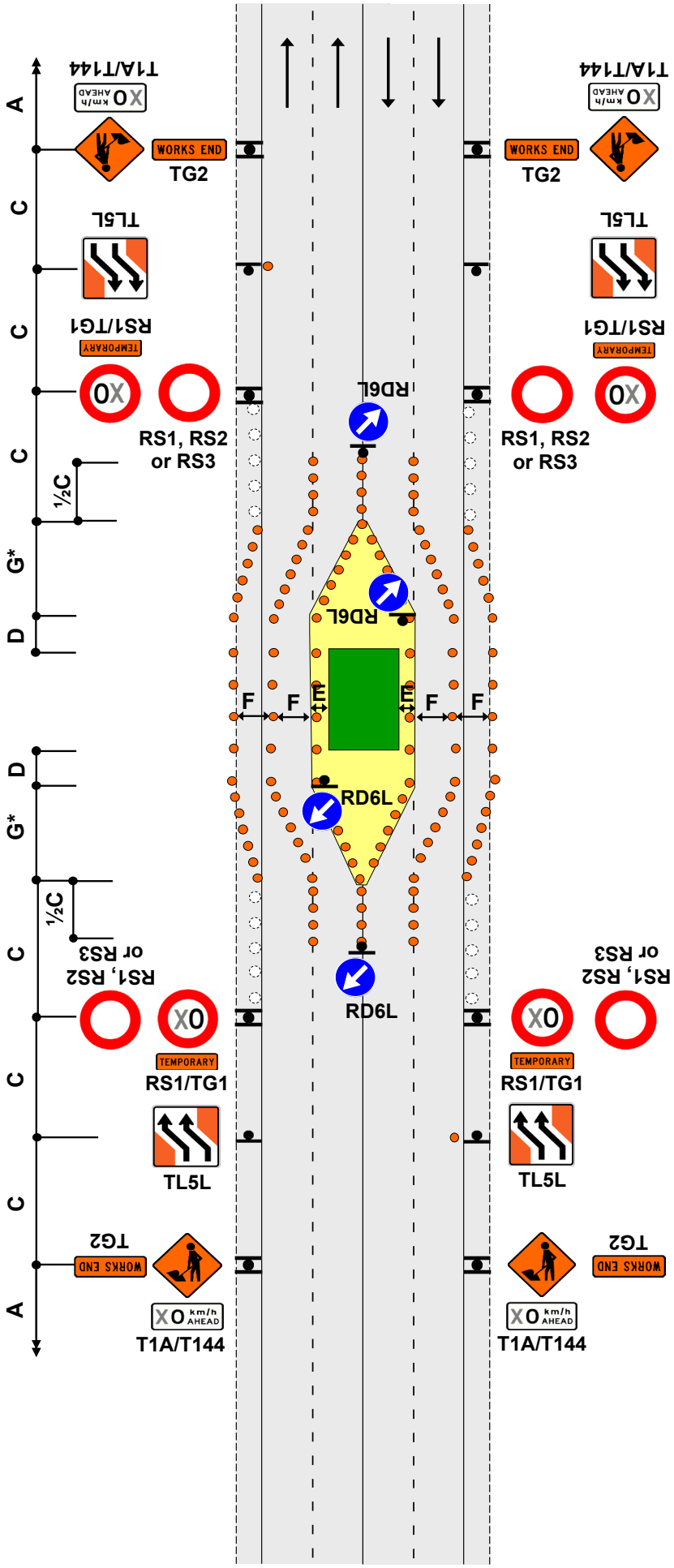
Notes

1. Where a physical centre median exists which is more than 2m wide, signs and cones may be positioned on the median
2. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times G}{3.5}$$

   W = Width of lateral shift

   G = Taper length in metres from the level 1 layout distance table
3. Cones must be placed behind any away-facing signs for rear-side visibility
4. To allow heavy vehicles to manoeuvre, cones in the channel must be offset by at least 10m where the direction changes. Refer C8.2.12
5. Use PN11 No Stopping signs, if necessary
6. Use TSLs if required by TSL decision matrix
7. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
8. The T144 X0km/h AHEAD sign is optional



ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Work in middle of road

F2.34
Level 1

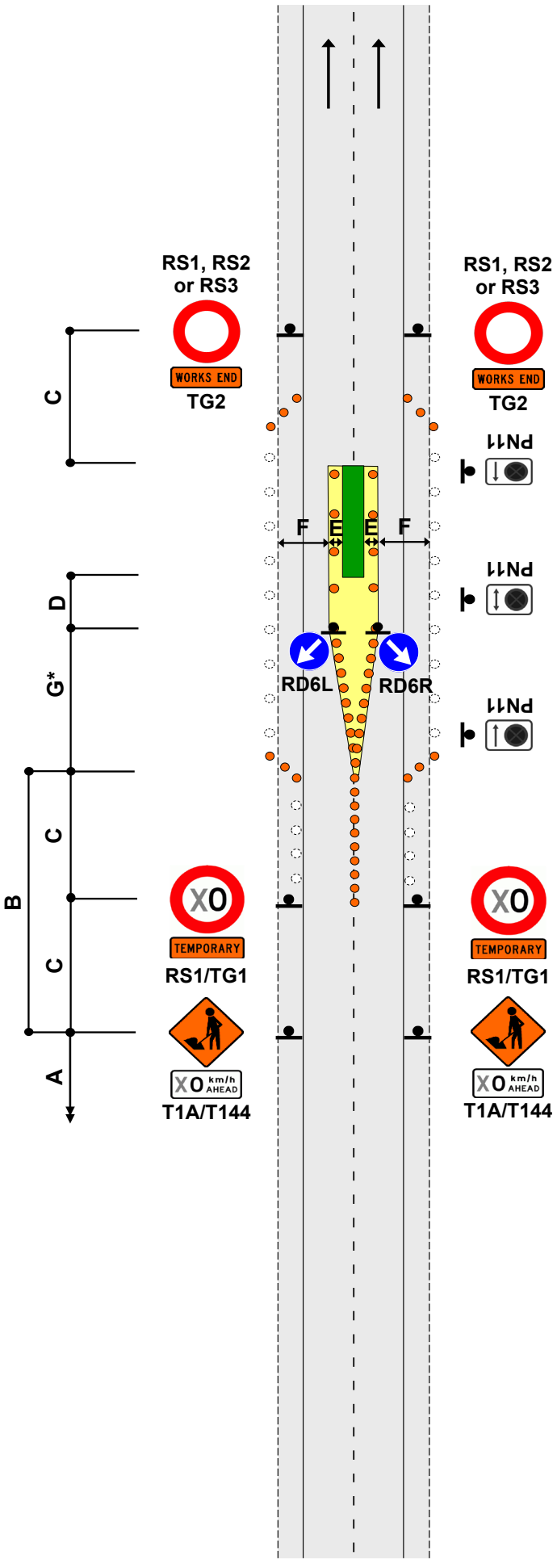
Notes

1. Use either TMD F2.32 or TMD F2.33 in preference to this TMD, unless their use would likely cause traffic delays
2. Cones are required on edge of the temporary lane opposite closure if road is not well defined
3. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times G}{3.5}$$

   W = Width of lateral shift

   G = Taper length in metres from the level 1 layout distance table
4. To allow heavy vehicles to manoeuvre, cones in the channel must be offset by at least 10m where the direction changes. Refer C8.2.12
5. Use PN11 No Stopping signs, if necessary
6. Use TSLs if required by TSL decision matrix
7. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
8. The T144 X0km/h AHEAD sign is optional

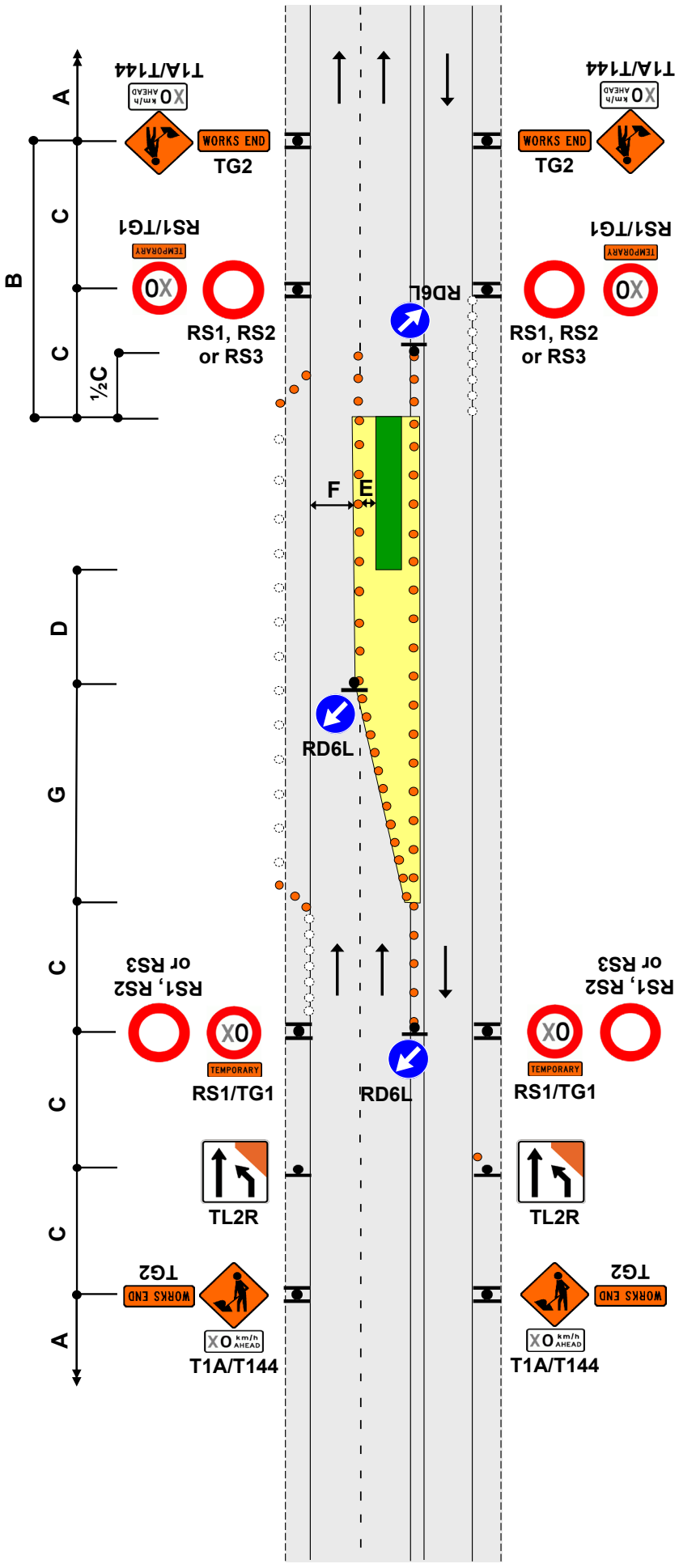


TWO-WAY THREE-LANE ROAD
2 x 1 centre-lane closure

F2.35
Level 1

Notes

1. If the closure is on a passing lane, the start of the taper must be greater than 600m from the start of the passing lane (if this cannot be achieved then close the passing lane completely and cover all permanent passing lane signs)
2. If the end of the closure is within 600m of the end of a passing lane, continue to close the centre lane
3. Cones are required on edge of the temporary lane opposite closure if road is not well defined
4. Cones must be placed behind any away-facing signs for rear-side visibility
5. To allow heavy vehicles to manoeuvre, cones in the channel must be offset by at least 10m where the direction changes. Refer C8.2.12
6. Use TSLs as required by TSL decision matrix
7. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
8. The T144 X0km/h AHEAD sign is optional

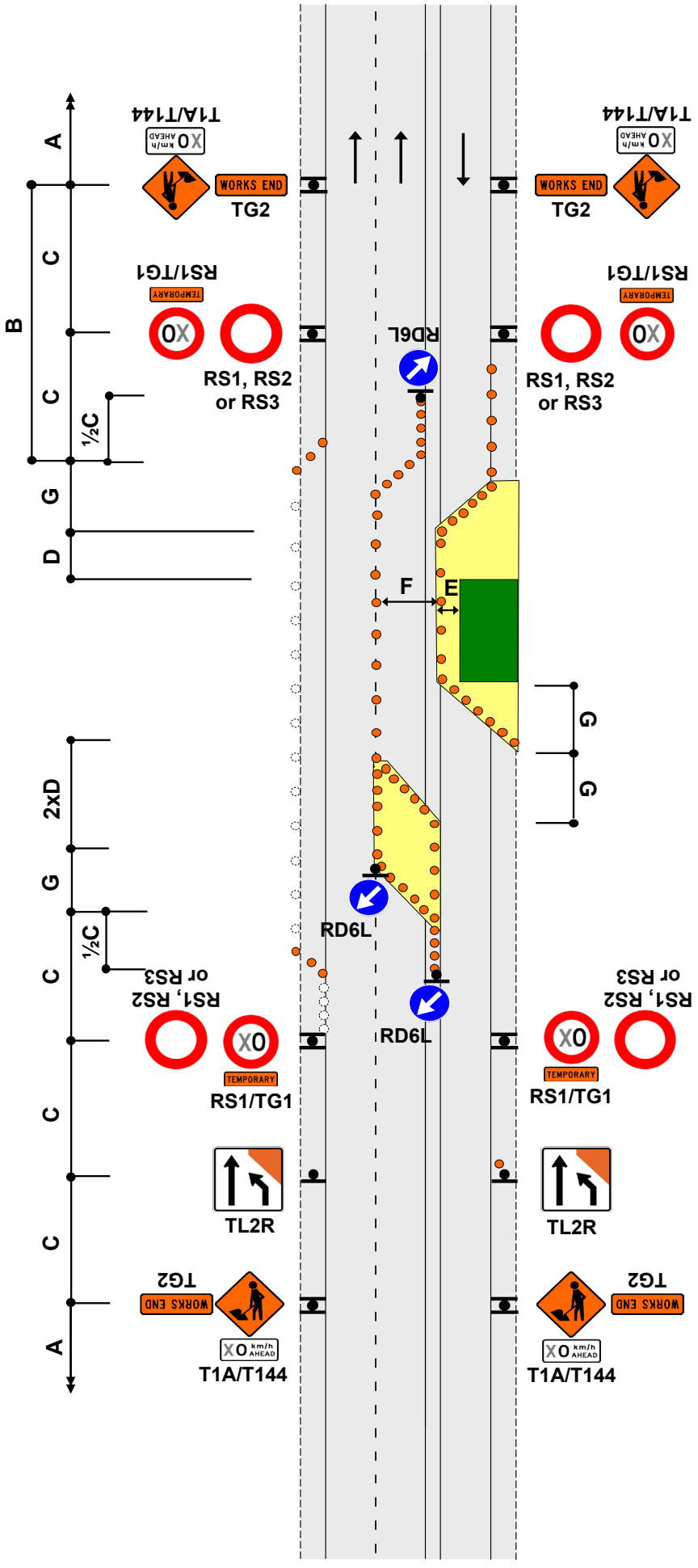


TWO-WAY THREE-LANE ROAD
Contraflow lane closure

F2.36
Level 1

Notes

1. **Refer to C8.2.17 if the closure is within a passing lane**
2. Cones must be placed behind any away-facing signs for rear-side visibility
3. To allow heavy vehicles to manoeuvre, cones in the channel must be offset by at least 10m where the direction changes. Refer C8.2.12
4. Use TSLs as required by TSL decision matrix
5. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
6. The T144 X0km/h AHEAD sign is optional

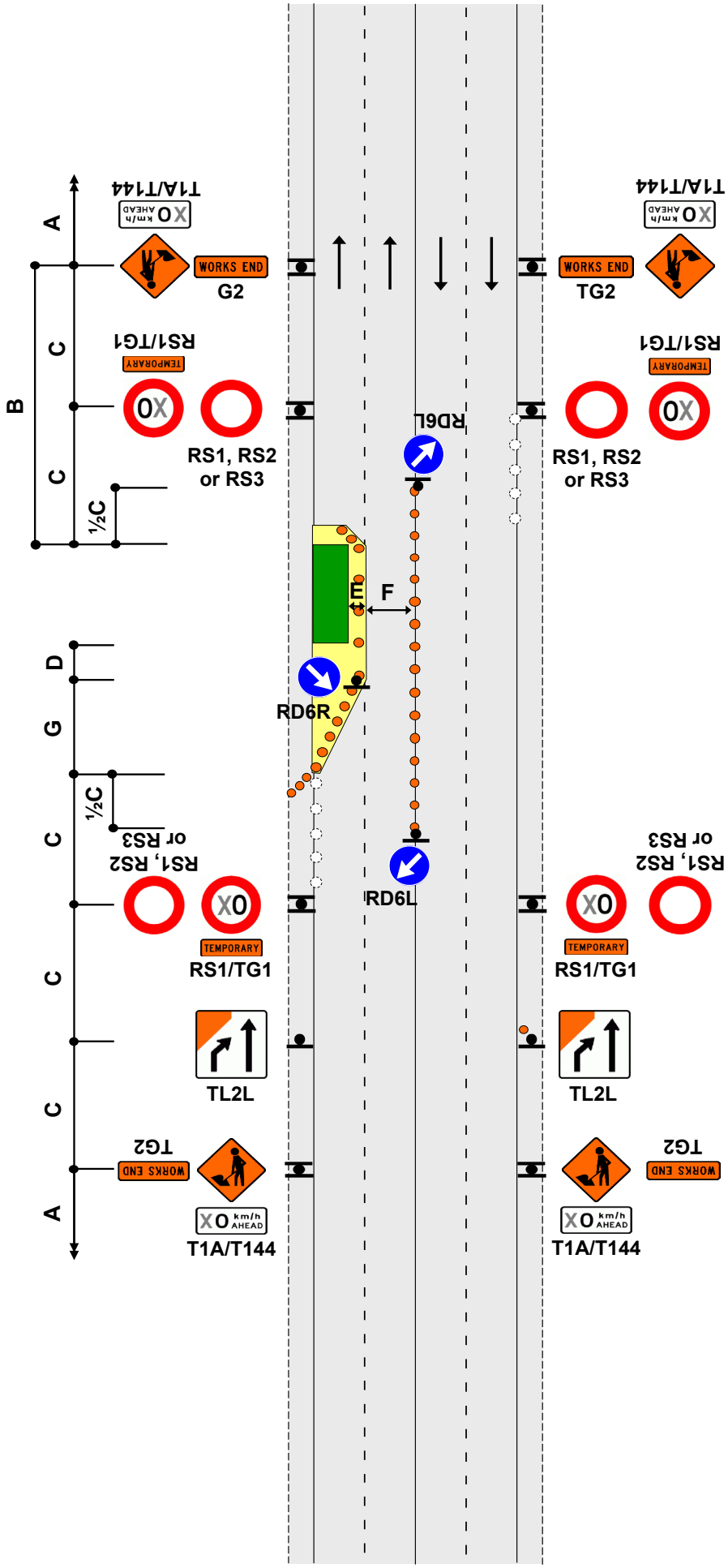


TWO-WAY FOUR-LANE ROAD
Left-lane closure

F2.37
Level 1

Notes

1. Where a physical centre median exists which is more than 2m wide, signs and cones may be positioned on the median
2. Cones must be placed behind any away-facing signs for rear-side
3. Use TSLs if required by TSL decision matrix
4. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
5. The T144 X0km/h AHEAD sign is optional



TWO-WAY FOUR-LANE ROAD
Two-lane closure
One-lane contraflow

F2.38
Level 1

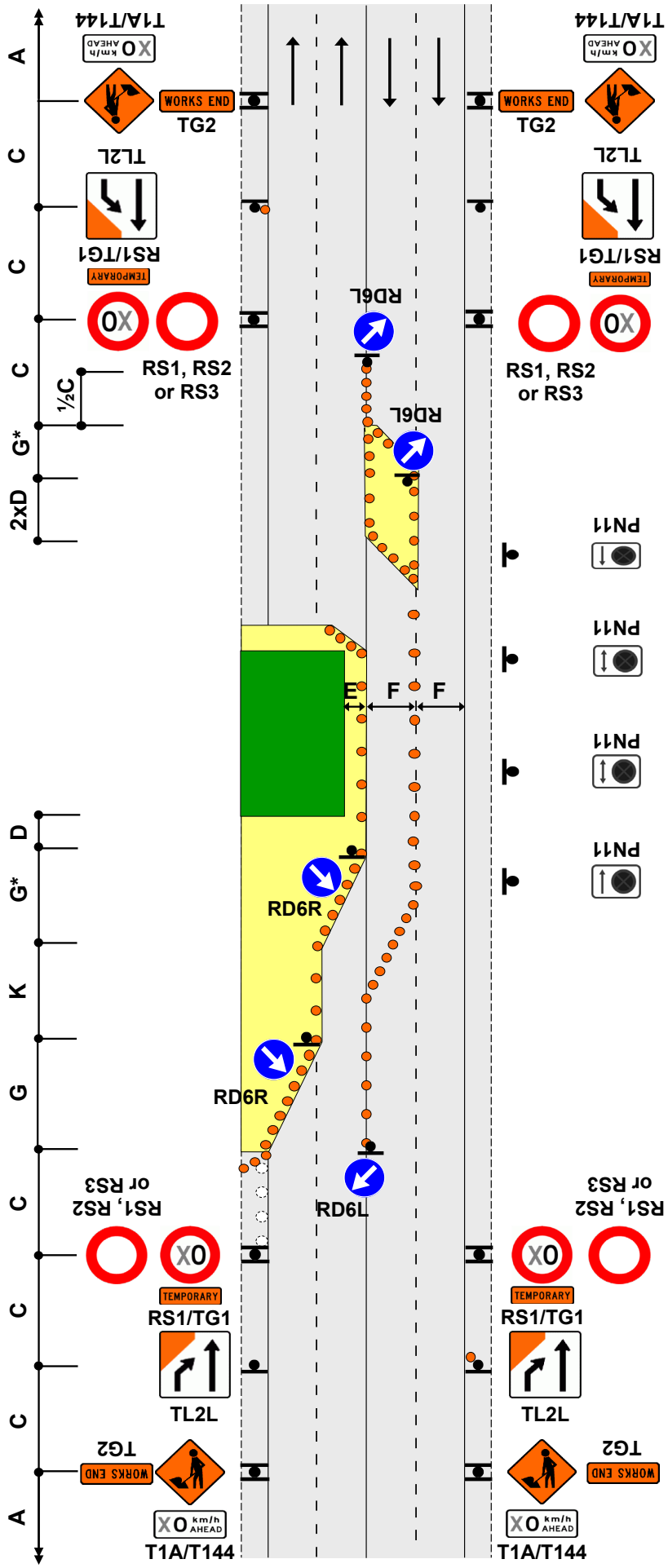
Notes

1. Use PN11 No Stopping signs, if necessary
2. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times G}{3.5}$$

   W = Width of lateral shift

   G = Taper length in metres from the level 1 layout distance table
3. Cones must be placed behind any away-facing signs for rear-side visibility
4. To allow heavy vehicles to manoeuvre, cones in the channel must be offset by at least 10m where the direction changes. Refer C8.2.12
5. Use TSLs if required by TSL decision matrix
6. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
7. The T144 X0km/h AHEAD sign is optional

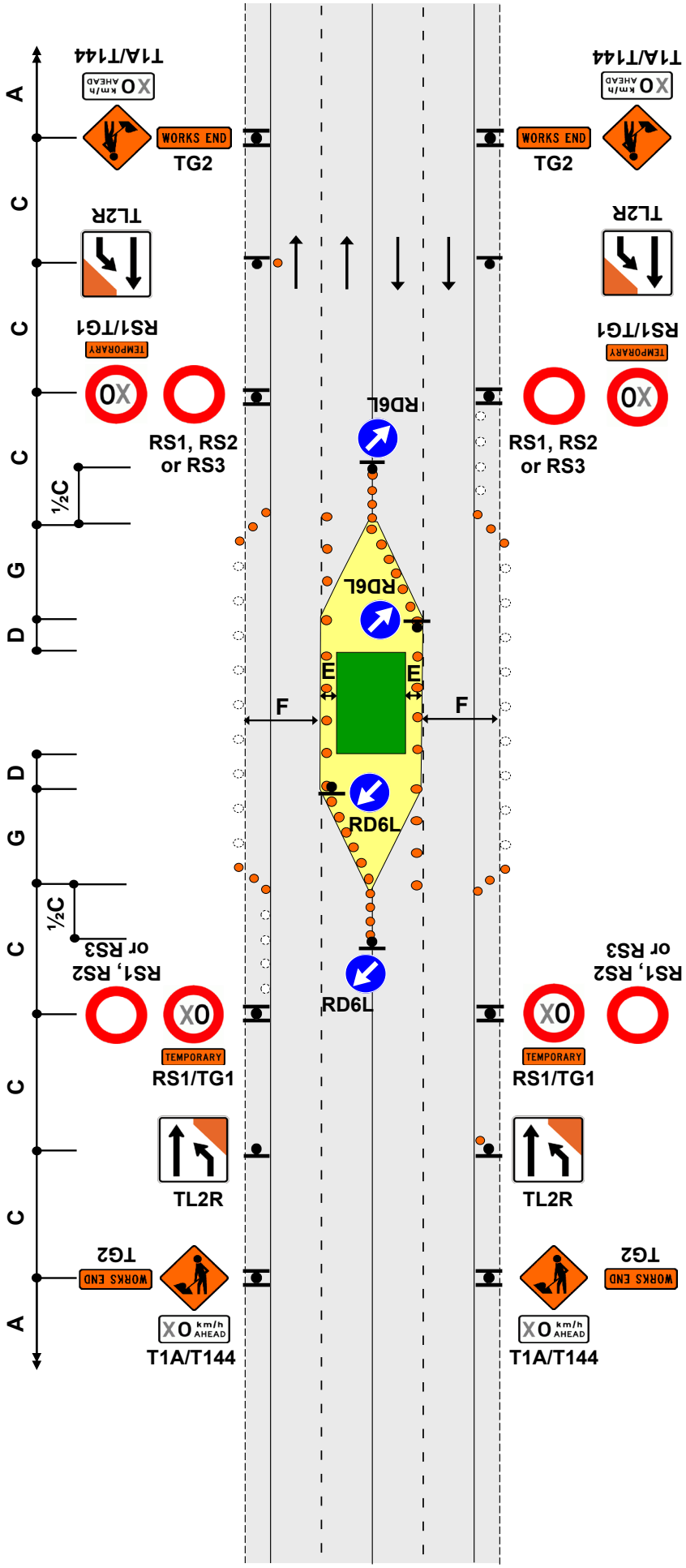


TWO-WAY FOUR-LANE ROAD
2 x 2 centre-lane closures

F2.39
Level 1

Notes

1. Cones must be placed behind any away-facing signs for rear-side visibility
2. Cones are required on edge of the temporary lane opposite closure if road is not well defined
3. To allow heavy vehicles to manoeuvre, cones in the channel must be offset by at least 10m where the direction changes. Refer C8.2.12
4. Use TSLs if required by TSL decision matrix
5. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
6. The T144 X0km/h AHEAD sign is optional

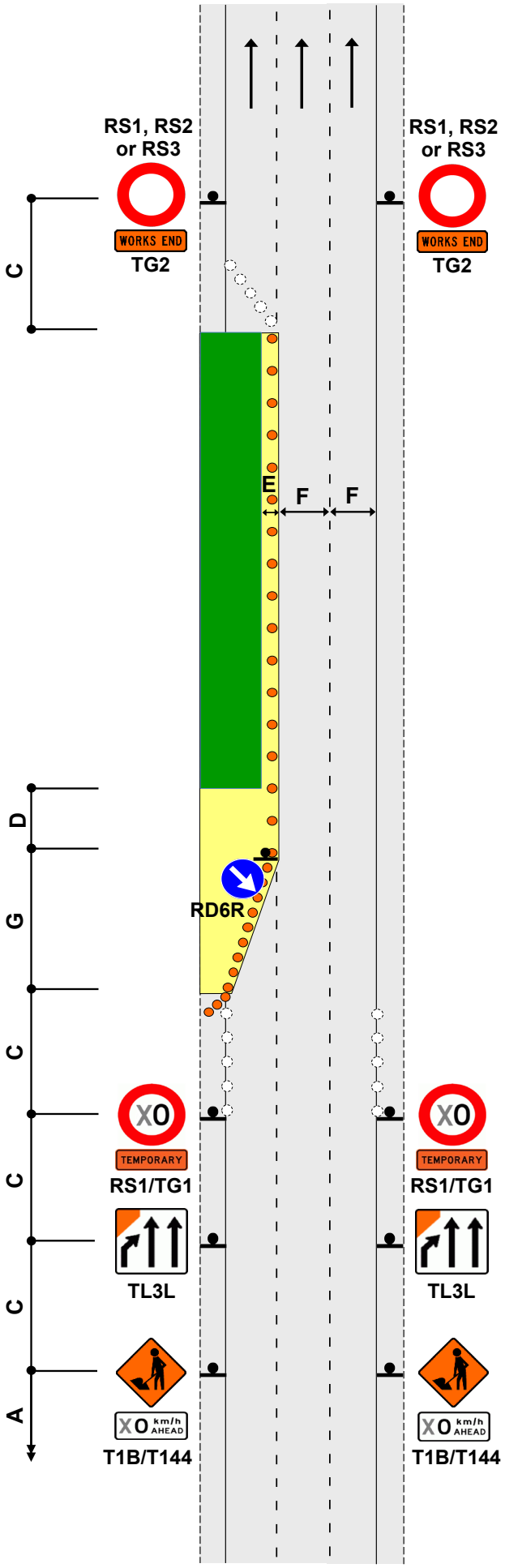


ONE-WAY THREE-LANE DIVIDED OR THREE-LANE ROAD
One-lane closure
Left lane

F2.40
Level 1

Notes

1. Full end taper may be added if required
2. Use TSLs if required by TSL decision matrix
3. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
4. The T144 X0km/h AHEAD sign is optional

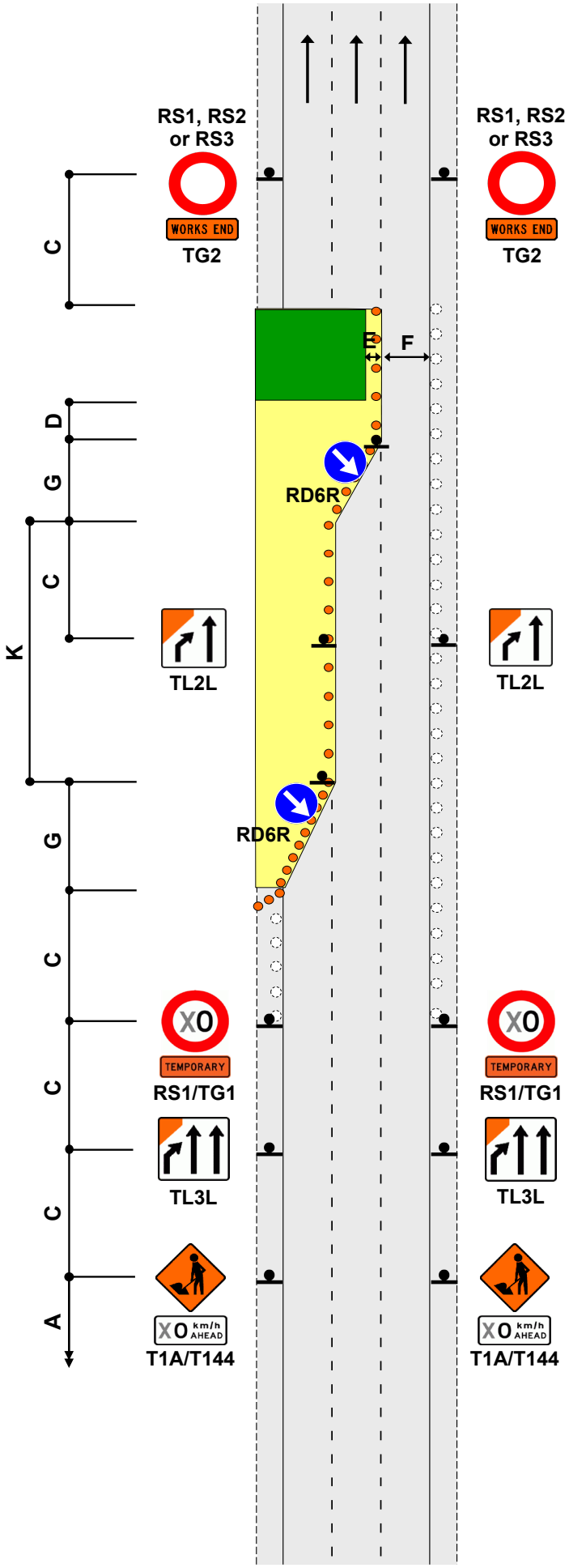


ONE-WAY THREE-LANE DIVIDED OR THREE-LANE ROAD
Two-lane closure
Left and centre lanes

F2.41
Level 1

Notes

1. Cones are required on edge of the temporary lane opposite closure if road is not well defined
2. Use TSLs if required by TSL decision matrix
3. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
4. The T144 X0km/h AHEAD sign is optional



ONE-WAY THREE-LANE DIVIDED OR THREE-LANE ROAD
Two-lane closure
Two lane temporary diversion

F2.42
Level 1

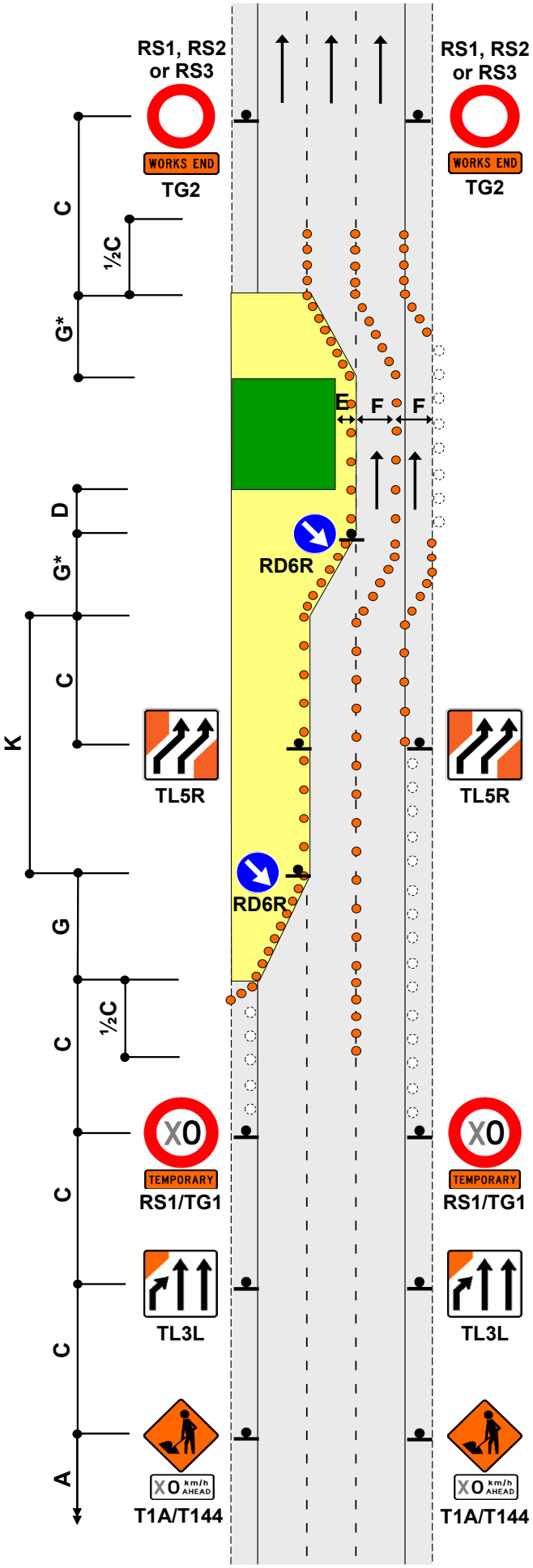
Notes

1. Cones are required on edge of the temporary lane opposite closure if road is not well defined
2. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times G}{3.5}$$

   W = Width of lateral shift

   G = Taper length in metres from the level 1 layout distance table
3. To allow heavy vehicles to manoeuvre, cones in the channel must be offset by at least 10m where the direction changes. Refer C8.2.12
4. Use TSLs if required by TSL decision matrix
5. On roads with a permanent speed limit of 100km/h, cones are required from the TSL to the taper if the speed is reduced by more than 30km/h
6. The T144 X0km/h AHEAD sign is optional

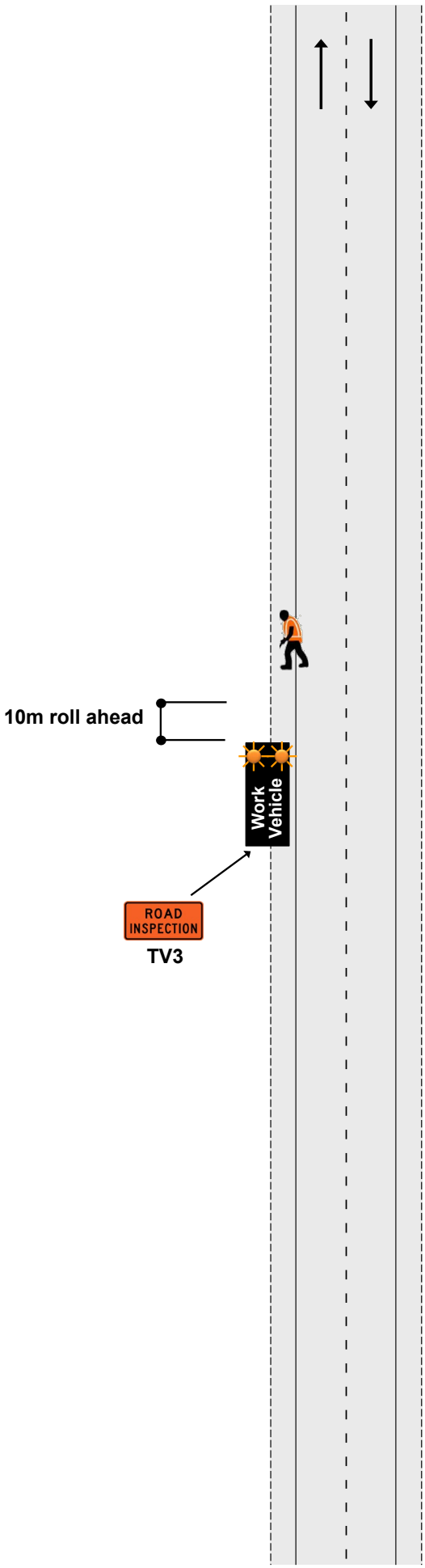


TWO-WAY TWO-LANE ROAD
Road inspection activities

F3.1
Level LV

Notes

1. Work vehicle must be parked clear of the live lane and must have one, preferably two, flashing beacons operating
2. The work vehicle must have a rear mounted sign indicating the type of activity taking place
3. Rear mounted sign recommended but not mandatory on level LV
4. Activities taking place in front of the work vehicle must allow for a 10m roll ahead zone
5. Inspector can proceed onto the live lane if CSD exists and activity takes no longer than 5 minutes
6. The inspector must have CSD if on the live lane. A spotter can be used to attain CSD

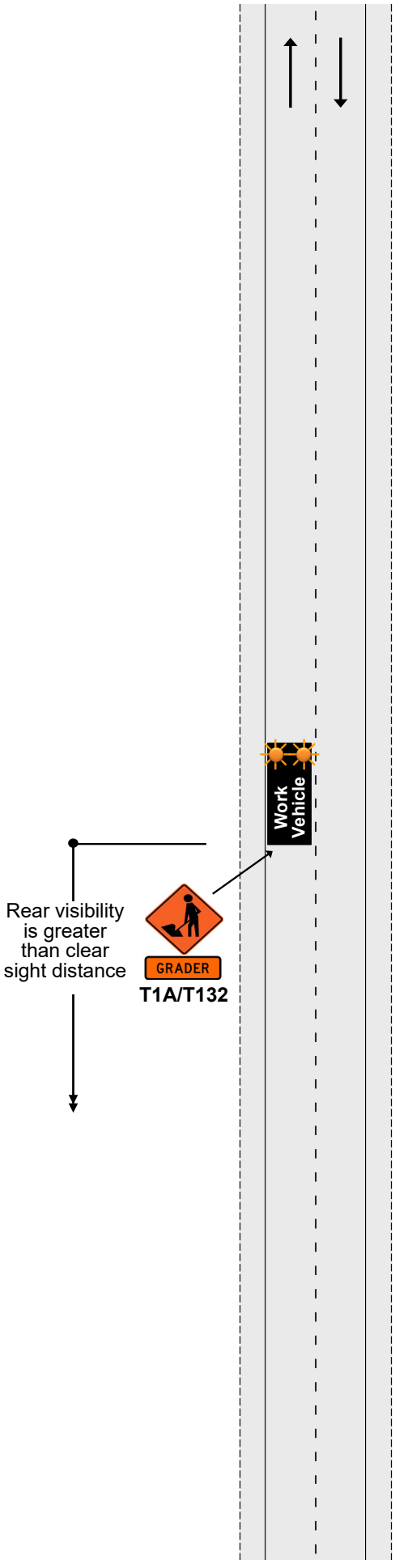


TWO-WAY TWO-LANE ROAD
Work vehicle is in a lane
With CSD - on LV Low-risk roads (any speed) and LV roads under 65km/h

F3.2
Level LV

Notes

1. This TMD can be used if the work vehicle is on shoulder, berm or live lane
2. The only signage required is a T1A sign with appropriate supplementary plate mounted on the rear of the work vehicle

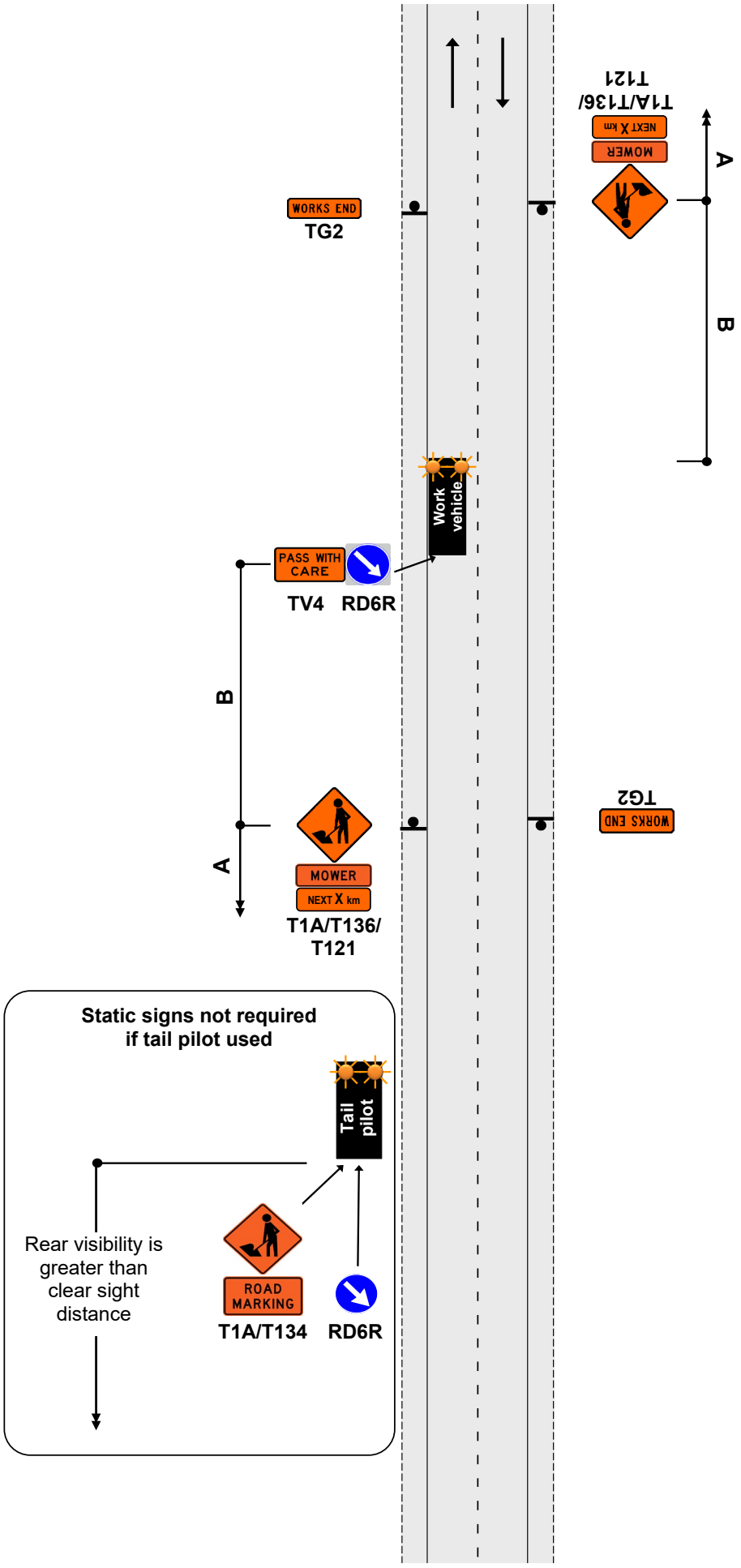


TWO-WAY TWO-LANE ROAD
Work vehicle is on berm, shoulder or lane
No CSD

F3.3
Level LV

Notes

1. This TMD can be used if the work vehicle is berm, shoulder or live lane
2. For long worksites, the T1A advance warning sign must be repeated throughout the worksite at intervals not greater than 4km
3. If using static advance warning signs and the operation is on the lane, then static advance warning signs must also be placed on any intersecting roads
4. A tail pilot vehicle equipped with T1A advance warning sign and a supplementary plate (T132, T133, T136, T137) can be used to **replace all static signs**

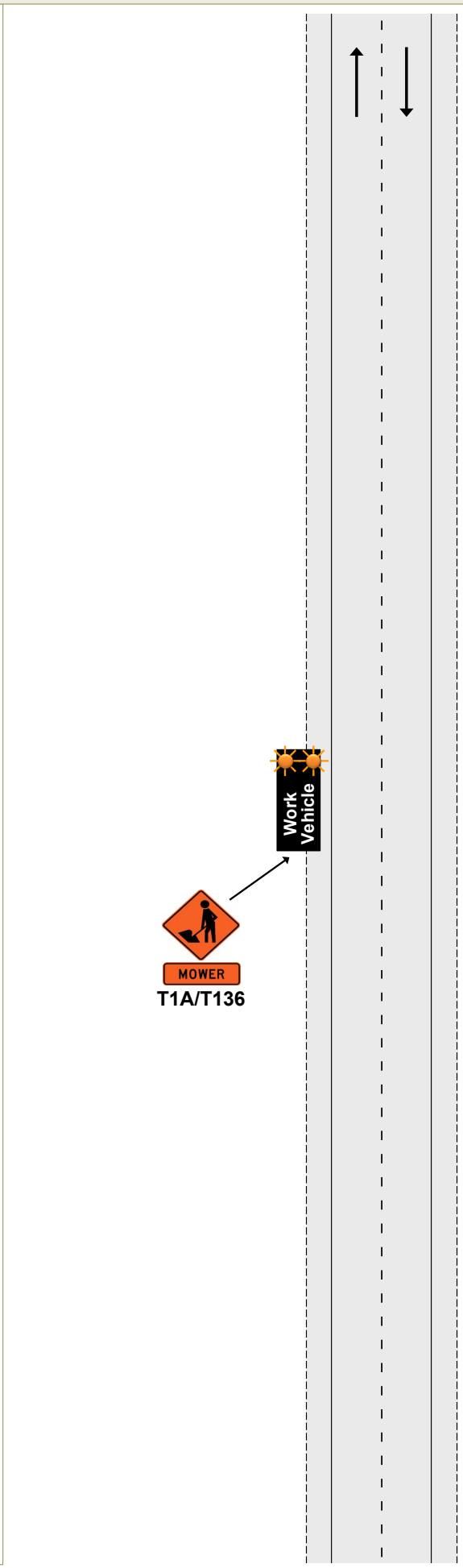


TWO-WAY TWO-LANE ROAD
Work vehicle on shoulder or berm - clear of live lane
CSD not required

F3.4
Level LV

Notes

1. The only signage required is a T1A sign with appropriate supplementary plate mounted on the rear of the work vehicle



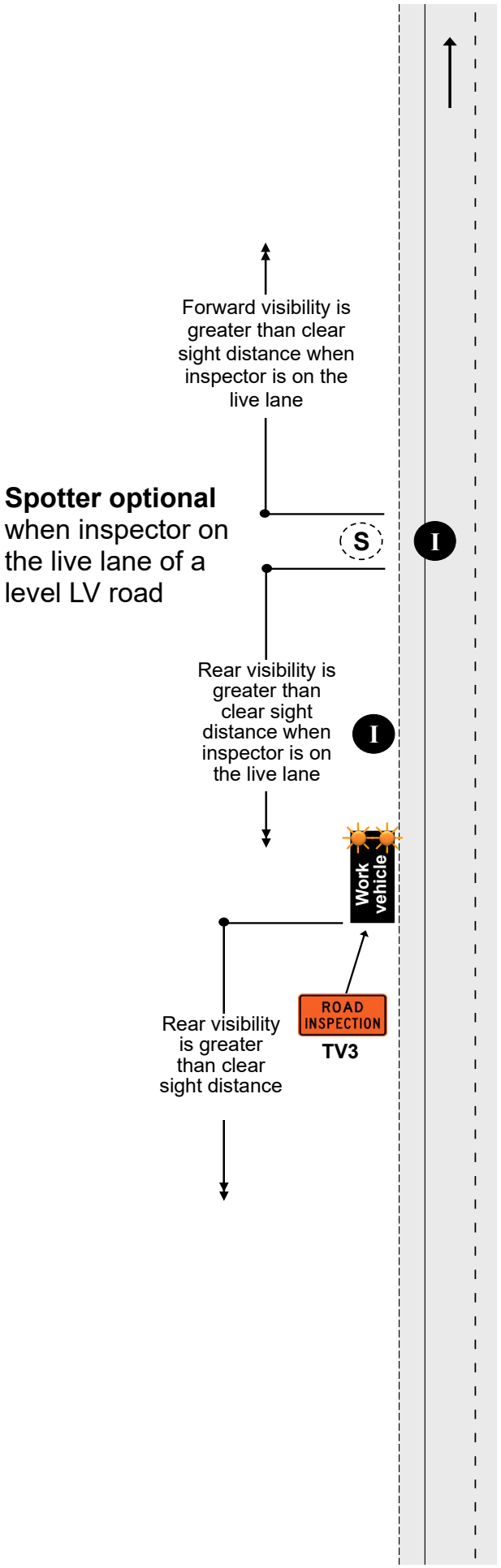
T1A/T136

INSPECTION ACTIVITIES AND NON-INVASIVE WORKS
On shoulder and on the live lane

F3.5
Level LV

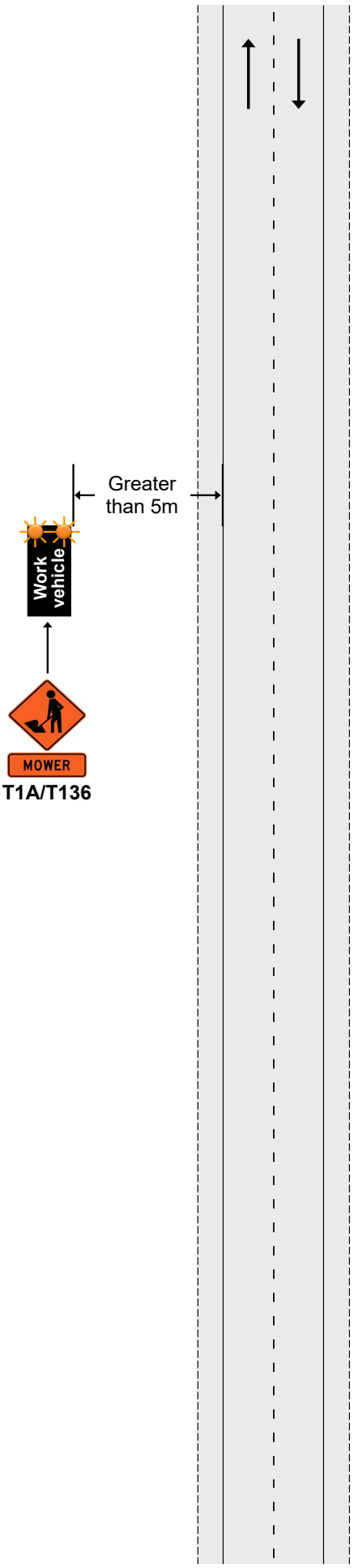
Notes

1. Inspectors must move from live lanes to avoid traffic. They must not expect traffic to drive slowly or drive around them
2. A person completing an inspection or non-invasive works cannot be on a live lane for more than 5 minutes
3. A spotter is not required for inspections and non-invasive works on level LV roads
4. 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
5. There must be CSD to the inspector when on the live lane.If this cannot be achieved, a spotter must be placed in a position where CSD can be attained and give verbal instructions to the inspector. If this is not possible, a static or mobile operation is required.
6. For inspection activities that are carried out by a TC on level LV roads the STMS must be immediately contactable but does not have to be within 30 minutes travel time of the worksite
7. An unaccompanied inspector may walk across a level LV road
8. A vehicle is not required on a level LV road with a permanent speed of less than 65km/h if the inspector remains on a footpath
9. 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)



TWO-WAY TWO-LANE ROAD
Work vehicle is more than five (5) metres from the edgeline
Any speed

F4.1
Level 1



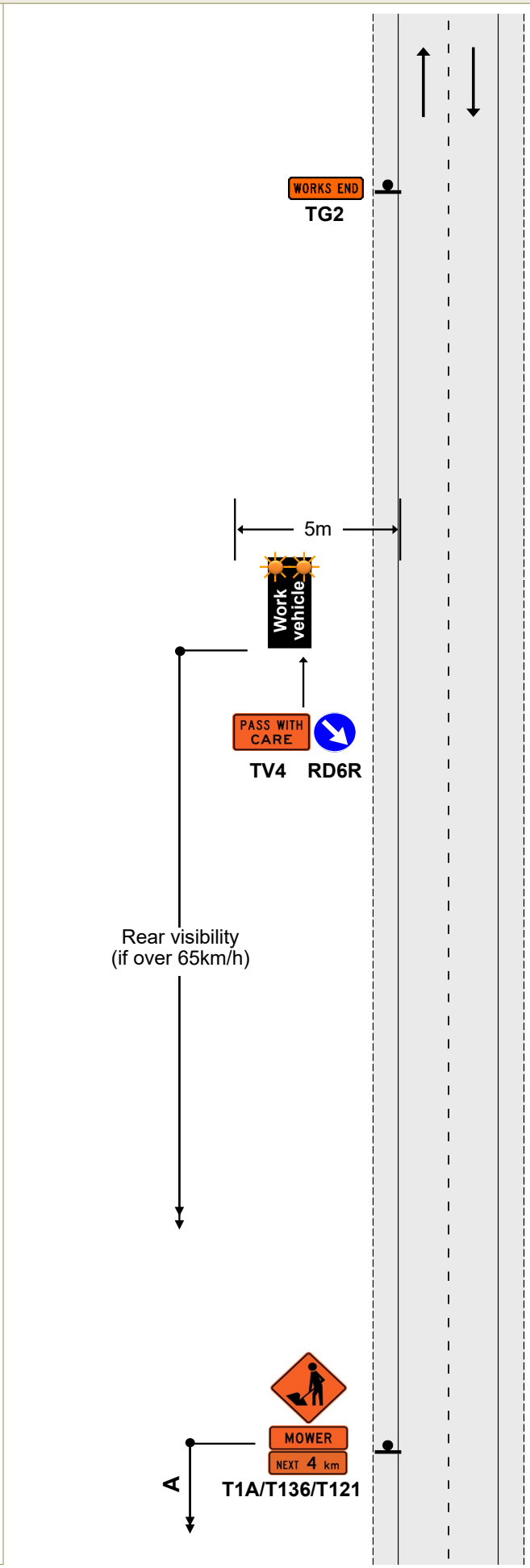
T1A/T136

TWO-WAY TWO-LANE ROAD
Work vehicle is within five (5) metres of the edgeline
CSD to work vehicle - not required under 65km/h, required over 65km/h

F4.2
Level 1

Notes

1. If permanent speed is **under** 65km/h, rear visibility to the work vehicle is **not** required
2. If permanent speed is **over** 65km/h, rear visibility to the work vehicle is required
3. A tail pilot vehicle equipped with T1A advance warning sign, appropriate supplementary plate and RD6R may replace the static signs if the permanent speed is under 65km/h (see TMD F4.3)

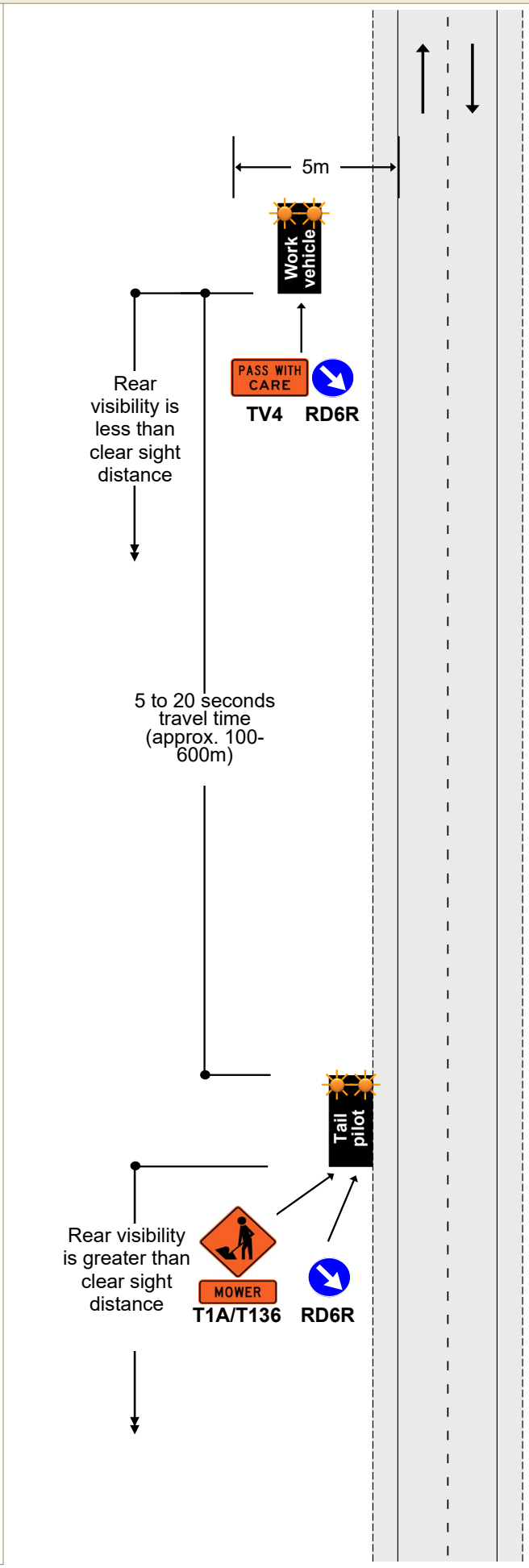


TWO-WAY TWO-LANE ROAD
Work vehicle is within five (5) metres of the edgeline
Speed limit over 65km/h - the rear visibility is less than CSD

F4.3
Level 1

Notes

1. This TMD can replace TMD F4.2 when permanent speed is under 65km/h. In these situations, static signs are not required

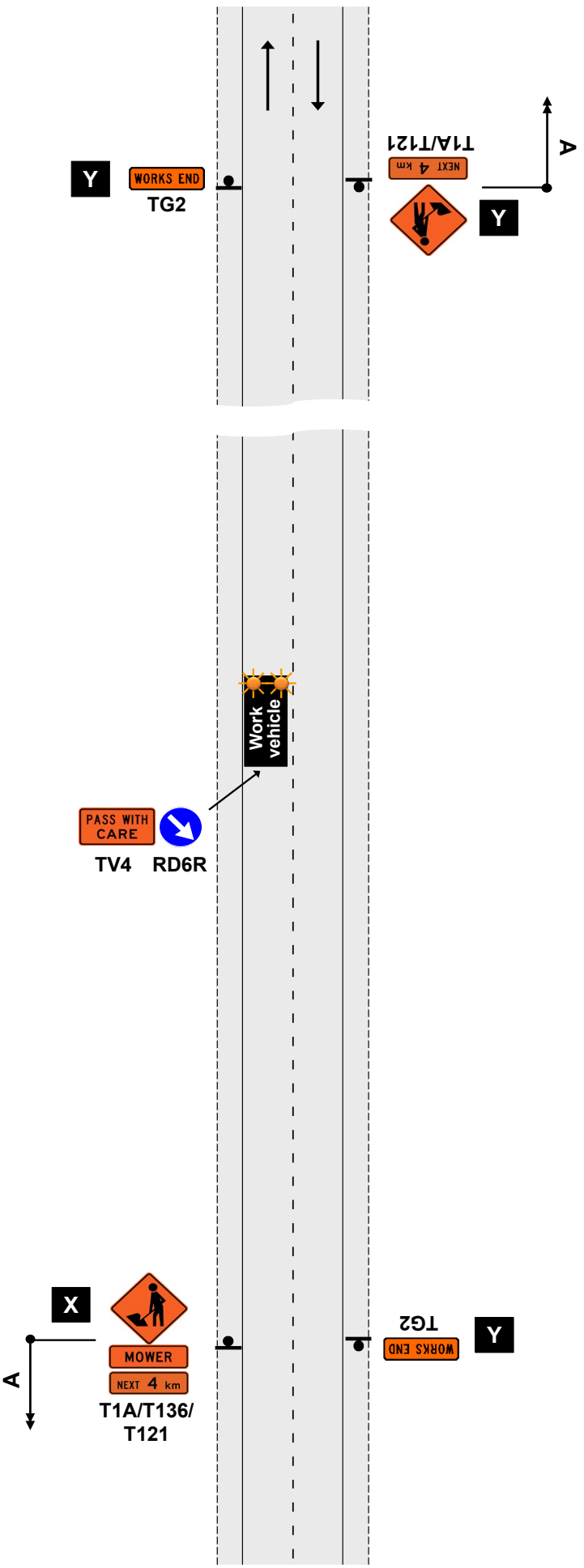


TWO-WAY TWO-LANE ROAD
Work vehicle is in a lane
Permanent speed under 65km/h

F4.4
Level 1

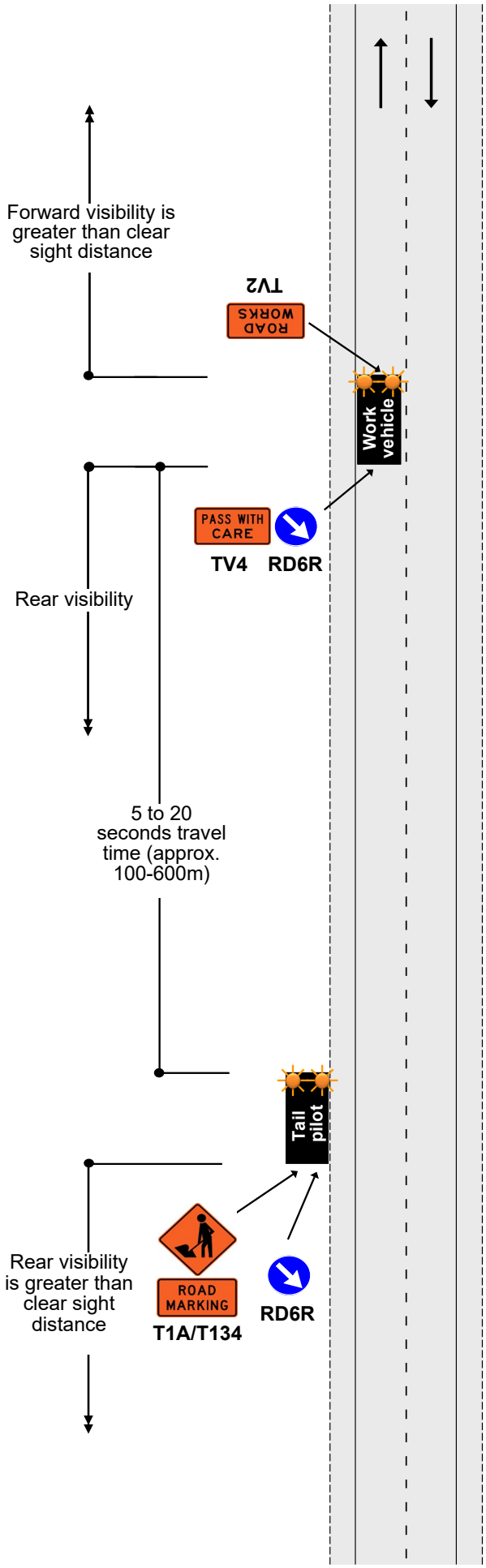
Notes

1. Advance warning sign **X** may be replaced by tail pilot equipped with T1A advance warning sign and appropriate supplementary plate
2. In this case, signs marked with **Y** do not need to be erected
3. If using static advance warning signs and the operation is on the lane, then static advance warning signs must also be placed on any intersecting roads



TWO-WAY TWO-LANE ROAD
Work vehicle is in a lane
Permanent speed over 65km/h - CSD forward visibility to work vehicle

F4.5
Level 1

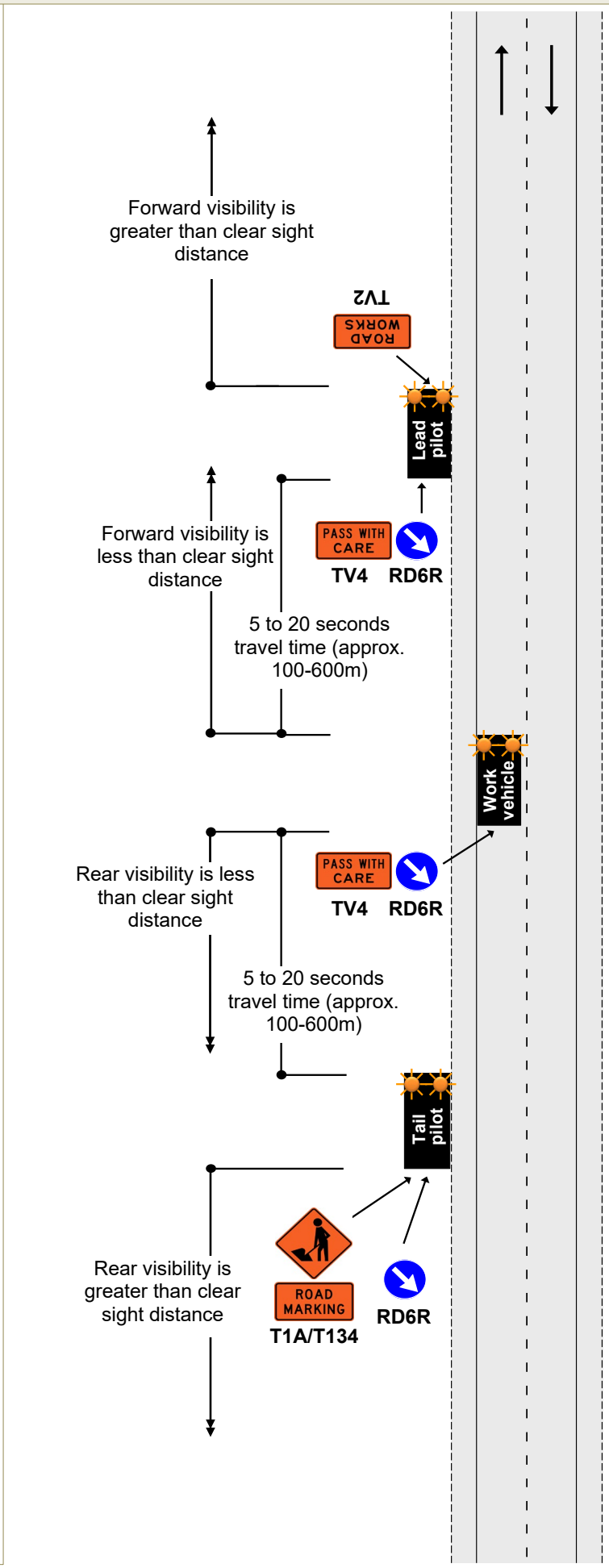


TWO-WAY TWO-LANE ROAD
Work vehicle is in a lane
Permanent speed over 65km/h - no CSD to work vehicle

F4.6
Level 1

Notes

1. Both forward and rear visibility is less than the clear sight distance continuously for 1km to the work vehicle

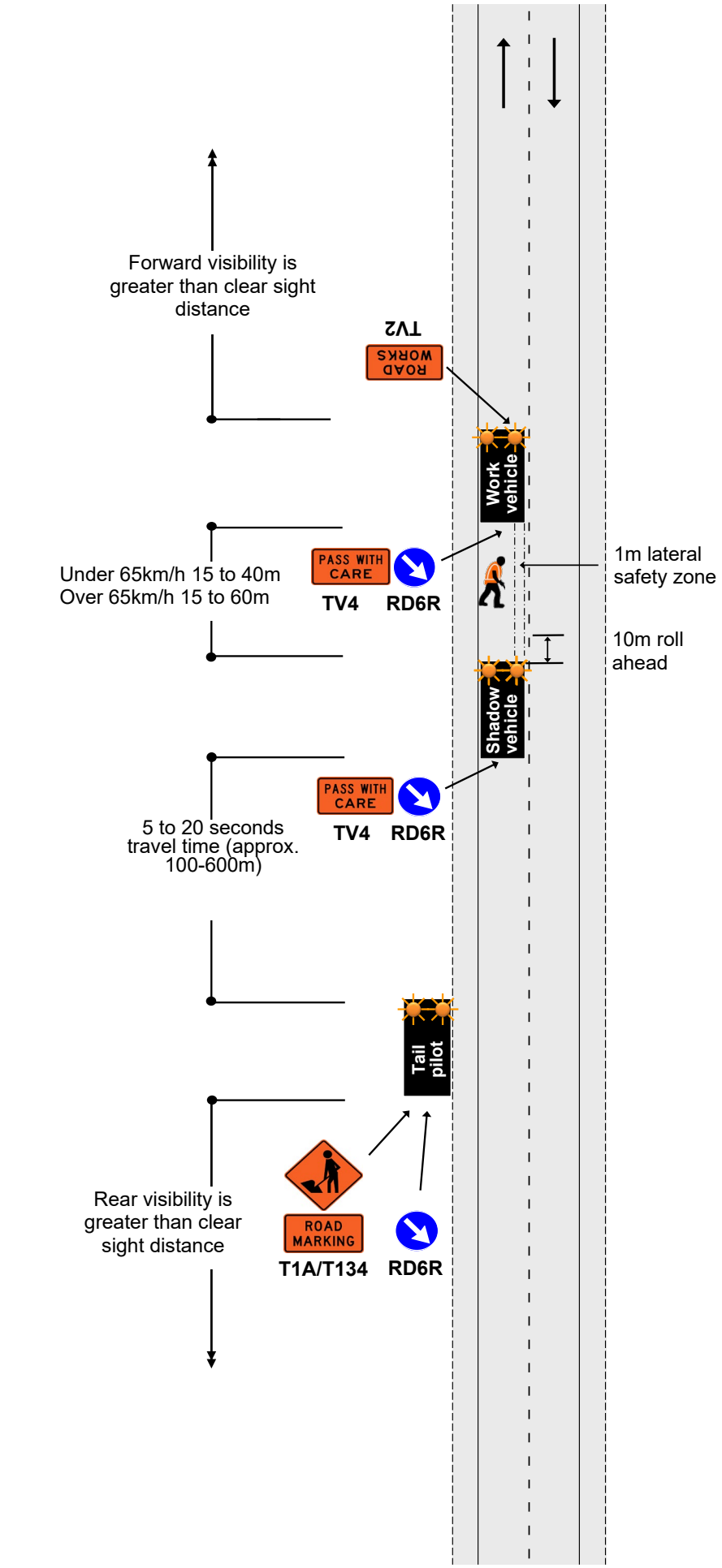


TWO-WAY TWO-LANE ROAD
Personnel on the road
Any speed

F4.7
Level 1

Notes

1. If the permanent speed is under 65km/h, the tail pilot vehicle may be replaced with static signs (T1A with appropriate supplementary plate and TG2)

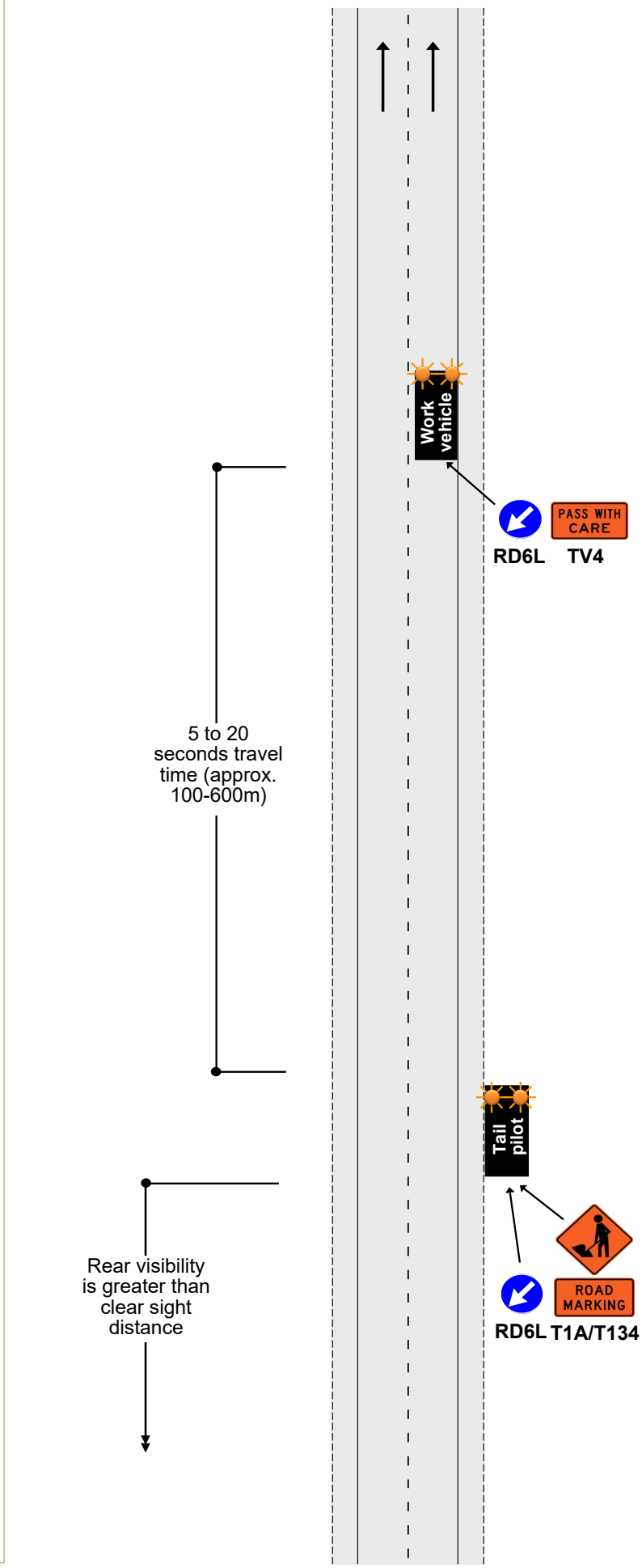


ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Work vehicle in the right lane
Permanent speed over 65km/h

F4.8
Level 1

Notes

1. If the permanent speed is under 65km/h, the tail pilot vehicle may be replaced with static signs (T1A with appropriate supplementary plate and TG2) on both sides of the carriageway

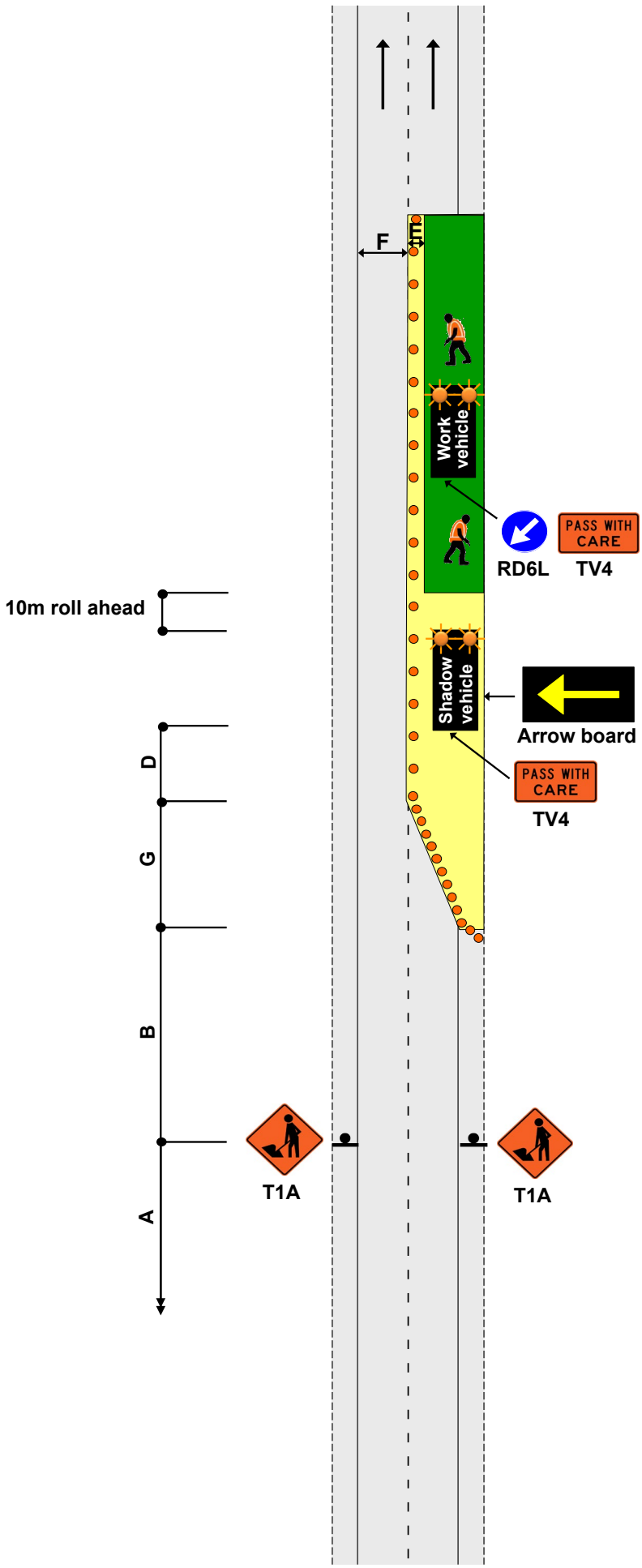


ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Part or all of a lane occupied
Semi-static closure - work for up to 1 hour

F4.9
Level 1

Notes

1. Only use this TMD when activity can be completed within 1 hour (excluding set up and removal of worksite)
2. The T1A advance warning signs may be replaced by a tail pilot vehicle with a T1A sign, appropriate supplementary plate and a RD6R/L
3. If shadow vehicle is fitted with a TMA, the longitudinal safety zone (D) is not required
4. If using static advance warning signs and the operation is on the lane, then static advance warning signs must also be placed on any intersecting roads

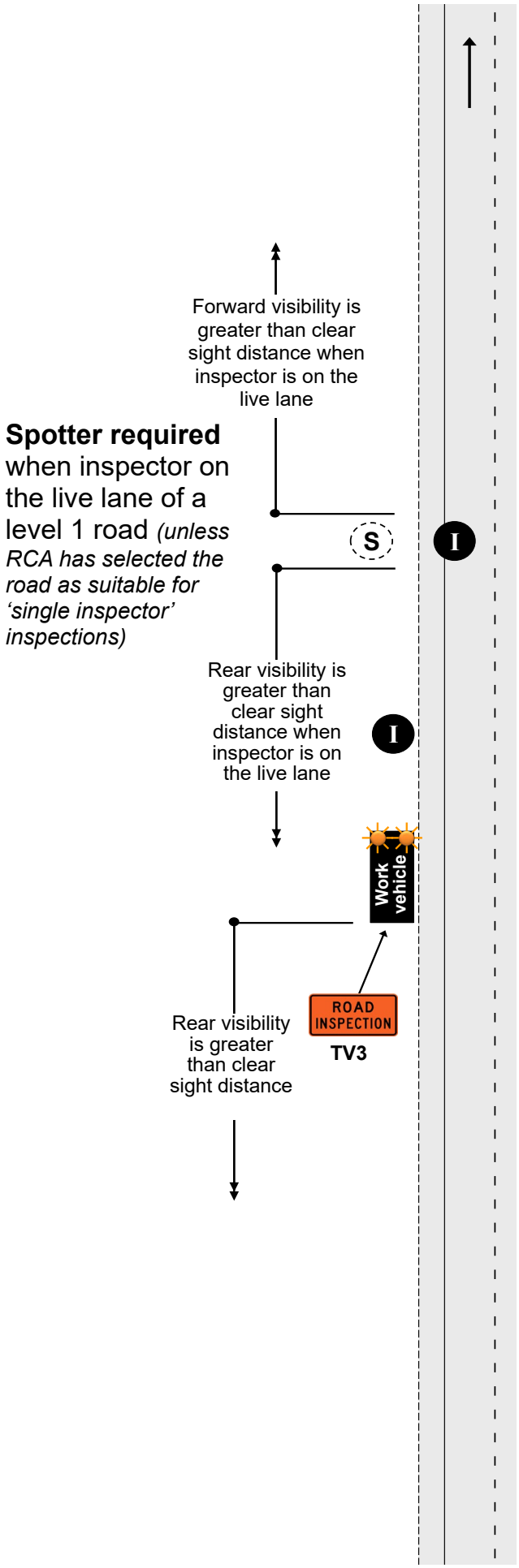


INSPECTION ACTIVITIES AND NON-INVASIVE WORKS
On shoulder and on the live lane
This TMD may also be applied on level LV roads

F4.10
Level 1

Notes

1. Inspectors must move from live lanes to avoid traffic. They must not expect traffic to drive slowly or drive around them
2. 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 5 minutes
3. 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
4. There must be CSD to the inspector when on the live lane.If this cannot be achieved, a spotter must be placed in a position where CSD can be attained and verbal instructions be given to the inspector. If this is not possible, a static or mobile operation is required.
5. A spotter is not required for inspections and non-invasive works on level LV roads or working off the live lane of a level 1 road
6. Where an unaccompanied inspector is not able to maintain adequate attention (eg due to work tasks or poor visibility), a spotter will be required or another type of traffic management operation used
7. For inspection activities that are carried out by a TC on level LV and level 1 roads the STMS must be immediately contactable but does not have to be within 30 minutes travel time of the worksite
8. An unaccompanied inspector may walk across a level LV or level 1 road
9. 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
10. 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)



Note:
This page is to be used as the layout distances table for the level 1 static and semi-static diagrams.
Print this page on A3 paper and fold it to fit an A4 page.
Unfold this page when you want to view the layout distances table and a diagram at the same time.

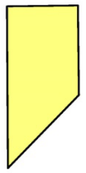
LEGEND FOR DIAGRAMS

Working space

Mandatory:

- **Cones**
- **Signs**

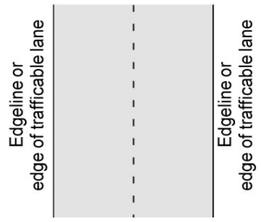
Safety zones



Optional:

- **Cones**
- **Signs**

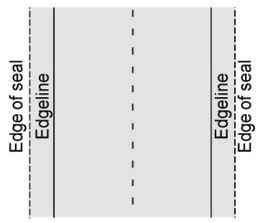
Edgeline or edge of trafficable lane (indicated by solid black line)



Hazard area

Manhole

Edge of Seal (indicated by dotted line next to solid black line)



Barrier, safety fence or cone bars

Ramp

COMBINED LEVEL LV & LEVEL 1 LAYOUT DISTANCES TABLE

Permanent speed limit or RCA-designated operating speed (km/h)		≤50	60	70	80	90	100
Traffic signs							
A	Sign visibility distance (m)	50	60	70	80	90	100
B	Warning distance (m)	50 or 30*	80	105	120	135	150
C	Sign spacing (m)	25 or 15*	40	50	60	70	75
Safety zones							
D	Longitudinal (m)+	10 or 5*	15	30	45	55	60
E	Lateral (m)+	1	1	1	1	1	1
	Lateral behind barrier installation	As specified by the Installation Designer					
Tapers							
G	Taper length (m)#	30	50	70	80	90	100
G	LV roads taper length (m)#	25	30	35	40	45	50
K	Distance between tapers (m)	40	50	70	80	90	100
Delineation devices							
Cone spacing in taper (m)		2.5	2.5	5	5	5	5
Cone spacing: Working space (m)##		5	5	10	10	10	10

* Larger minimum distances apply on all state highways and also on all multi-lane roads. The smaller minimum distances may be applied on other roads to accommodate road environment constraints.

+ On LV roads the longitudinal and lateral safety zones may be reduced, or eliminated, in order to retain a single lane width. Positive traffic management and an appropriate TSL must be used.

\# 1. On non-state highways with speeds 50km/h or less, a **10m taper** (with cones at 1m centres) may be used when there are road environment constraints (eg intersections and commercial accesses).
2. On all roads where the shoulder width is less than 2.5m and the activity does not affect the live lane, a **10m shoulder taper** is permitted (with at least 5 cones at no greater than 2.5m centres).
3. A **taper of 30m** (with cones at 2.5m centres) **must** be used where manual traffic control (stop/go), portable traffic signals or priority give way are employed.

\## LV roads: double the cone spacing alongside working space (eg 5 = 10, 10 = 20).

Lane widths (based on permanent speed or TSL if applied)								
Speed (km/h)		30	40	50	60	70	80	90	100
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above tables are minimum values.

LV/low-risk roads (less than 250vpd - less than 20 vehicles per hour)

When on the shoulder:

- *If CSD **not** available*: Advance warning sign and base to be installed with sign visibility distance and warning distance in place
- *If CSD available:* Advance warning sign may be attached to the rear of a work vehicle which has an amber flashing beacon(s) and is visible to approaching road users from the rear.

When the activity encroaches onto a live lane consider alternating flow controls.

If the above requirements cannot be achieved, the operation must be modified to comply with the appropriate level LV or level 1 requirements.

Traffic Control Devices Manual
Part 8

Code of practice for temporary traffic management (CoPTTM)

manual number: SP/M/010

Section G

www.nzta.govt.nz

Fourth edition, Amendment 4 of
Code of practice for temporary traffic management

Date of issue: November 2018

Effective date: 1 February 2019

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)

STATIC OPERATIONS

No.	LEVEL 2 ROADS	
FOOTPATH		
G1.1	Footpath diverted onto berm behind working space	First preference
G1.2	Footpath diverted onto berm between working space and carriageway	Second preference
G1.3	Footpath diverted onto carriageway	Third preference
SHOULDER AND ROADSIDE ACTIVITIES		
G1.4	Work on berm and or footpath	Permanent speed less than 65km/h
G1.5	Shoulder closure	
CYCLE LANE		
G1.6	Traffic crossing road centre	Diverted cycle lane - coned lane control
TWO-WAY TWO-LANE ROAD		
G1.7	Traffic crossing road centre	Two-lane diversion
G1.8	Single-lane alternating flow	Manual traffic control (Stop/Go or Stop/Slow)
G1.9	All traffic stopped temporarily	Manual traffic control (Stop/Go or Stop/Slow)
G1.10	Single-lane alternating flow	Portable traffic signals
G1.11	Work in centre of road	
G1.12	New-chip seal or road construction	Attended worksite
	Road closures and detours	
G1.13	Road closure - detour route	Example
	Other hazard	
G1.14	Shallow flooding, washout, slip, slippery surface	
	Unattended worksites	
G1.15	New seal	Unattended and/or unswept worksite
SITE ACCESS		
G1.16	Forms part of a larger worksite	
ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD		
G1.17	Left-lane closure	
G1.18	Right-lane closure	
G1.19	Right-lane closure	One-lane temporary diversion
G1.20	One-lane closure	Two-lane temporary diversion
TWO-WAY FOUR-LANE ROAD		
G1.21	Left-lane closure	With chicane
G1.22	Two-lane closure	One-lane contraflow
G1.23	Centre-lane closures	
ONE-WAY THREE-LANE DIVIDED OR THREE-LANE ROAD		
G1.24	One-lane closure	Left lane
G1.25	One-lane closure	Right lane
G1.26	Two-lane closure	Left and centre lanes
G1.27	Two-lane closure	Right and centre lanes
G1.28	Two-lane closure	Two-lane temporary diversion

LEVEL 2 DIAGRAMS LIST

MOBILE OPERATIONS

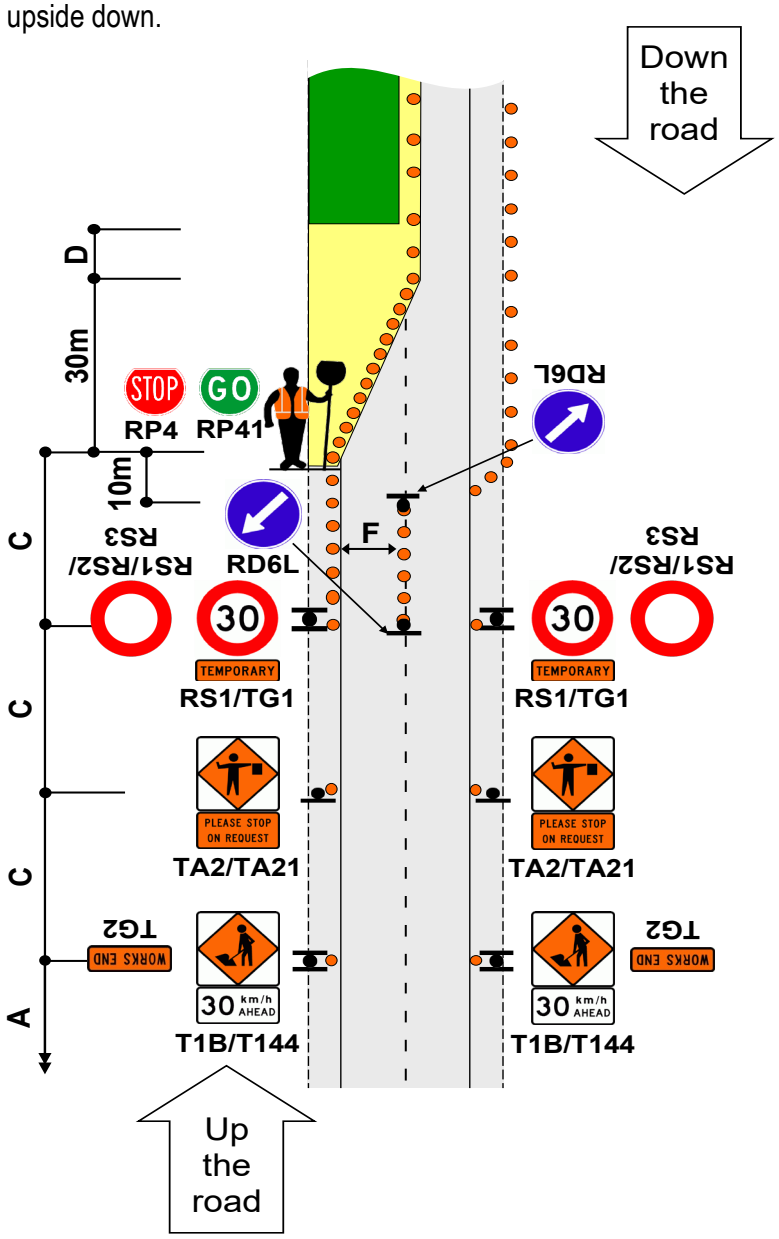
No.	LEVEL 2 ROADS	
TWO-WAY TWO-LANE ROAD		
G2.1	Work vehicle is more than five (5) metres from the edgeline	Any speed
G2.2	Work vehicle is between two (2) and five (5) metres of the edgeline	
G2.3	Work vehicle is between two (2) and five (5) metres of the edgeline	Permanent speed greater than 65km/h
G2.4	Work vehicle is between zero (0) and two (2) metres of the edgeline	Permanent speed under 65km/h
G2.5	Work vehicle is between zero (0) and two (2) metres of the edgeline	Permanent speed greater than 65km/h
G2.6	Work vehicle on live lane	Permanent speed less than 65km/h
G2.7	Work vehicle on live lane	Permanent speed greater than 65km/h
G2.8	Personnel on the live lane	
ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD		
G2.9	Work vehicle is between zero (0) and two (2) metres from the edgeline	Permanent speed less than 65km/h
G2.10	Work vehicle is between zero (0) and two (2) metres from the edgeline	Permanent speed greater than 65km/h
G2.11	Work vehicle is on the live lane	Permanent speed less than 65km/h
G2.12	Work vehicle is on the live lane	Permanent speed greater than 65km/h
G2.13	Part or all of lane occupied – Semi-static closure (work for up to 1 hour)	Permanent speed less than 65km/h
G2.14	Part or all of lane occupied – Semi-static closure (work for up to 1 hour)	Permanent speed greater than 65km/h
G2.15	Inspection activities and non-invasive works	On shoulder and on the live lane

READING A TRAFFIC MANAGEMENT DIAGRAM (TMD)

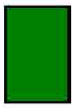
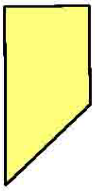
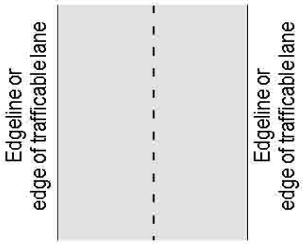
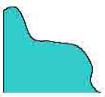
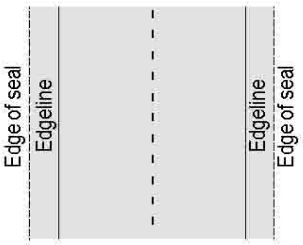
Usually contractors place the signs on left-hand side of the road first with the TMD the right way up. When signs are placed for the right-hand side of the road the contractor tips the TMD upside down and reads which signs have to be placed for that side of the road.

To make this process easier:

- Signs going up the page are shown closest to the road
- Signs going down the page are shown further away from the road
- Sign icons and sign numbers for layout down the road (from top to bottom of the TMD) are turned upside down.



LEGEND FOR DIAGRAMS

Working space 	Mandatory: • Cones • Signs 
Safety zones 	Optional: • Cones • Signs 
Edgeline or edge of trafficable lane (indicated by solid black line) 	Hazard area  Manhole 
Edge of Seal (indicated by dotted line next to solid black line) 	Barrier, safety fence or cone bars  Ramp 

LEVEL 2 LAYOUT DISTANCES TABLE

Permanent/TSL (km/h)		≤50	60	70	80	90	100 /110
Traffic signs							
A	Sign visibility distance (m)	60/50+	70/60+	80	100	120	120
B	Warning distance (m)	100/75+	120/90+	140	160	200	200
C	Sign spacing (m)	50/35+	60/45+	70	80	100	100
Safety zones							
D	Longitudinal (m)*	15	20	30	45	60	60
E	Lateral (m)						
	1. Behind cones	1	1	1	1	1	1
	2. Behind barrier installations	As specified by the Installation Designer					
Tapers							
H	Initial taper length per lane (m)**	90/50+	100/60+	120	150	180	180
I	Subsequent taper length per lane (m)	50	60	70	80	100	100
K	Minimum distance between tapers (m)	50	60	70	80	100	100
Delineation device							
Spacing (centres)	All tapers (m)	2.5	2.5	2.5	2.5	2.5	2.5
	Cones parallel to the lane - eg between tapers and alongside working space (m)	5	5	10	10	10	10
	At merge and diverge points for ramps and slip lanes, intersecting road entry and exit points, and worksite access points	2.5m for 10m either side of a change in alignment		2.5m for 20m either side of a change in alignment			

* A longitudinal safety zone is not required when a barrier completely protects the approach end of the worksite.

** Taper length is based on a single lane shift of 3.5m.

\+ The longer distance is the desirable distance, the shorter distance is the minimum distance required. The longer distances must be used wherever possible. The shorter distances may only be used where there are road environment constraints.

Lane widths (based on permanent speed or TSL if applied)

Speed (km/h)		30	40	50	60	70	80	90	100/110
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above tables are minimum values.

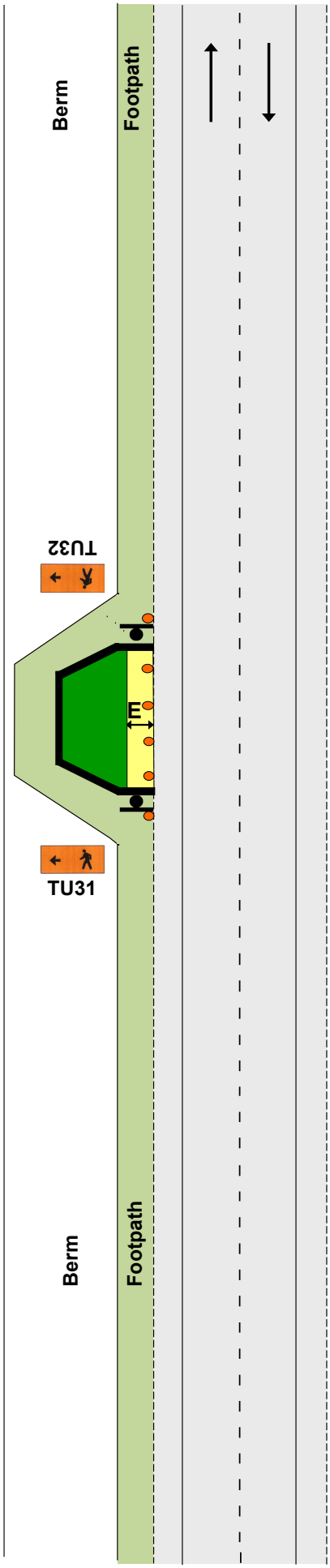
Approach sign distances and spacings, the initial taper(s) and any longitudinal safety zone associated with that taper must be based on the permanent speed limit. The layout distances of the remainder of the worksite, including any subsequent tapers, may be based on the TSL, provided the TSL is applied prior to the first taper.

FOOTPATH
Footpath diverted onto berm behind working space
First preference

G1.1
Level 2

Notes

1. Minimum pedestrian footpath widths:
   - Residential/Rural/ Suburban Centre -1.2m
   - CBD - 2m
2. Where the length of the temporary footpath exceeds 20m, these widths may have to be increased to allow footpath users to pass
3. Refer to C13.2.3 for temporary footpath surface requirements
4. Use a safety fence to enclose the working space, or at attended worksites, cones connected with cone bars can be used to enclose the working space but only for a short period of time. Refer C13.2.5 and C13.2.6
5. This TMD must be used in conjunction with appropriate TTM for any work carried out on the shoulder or in the live lane



EXAMPLE ONLY

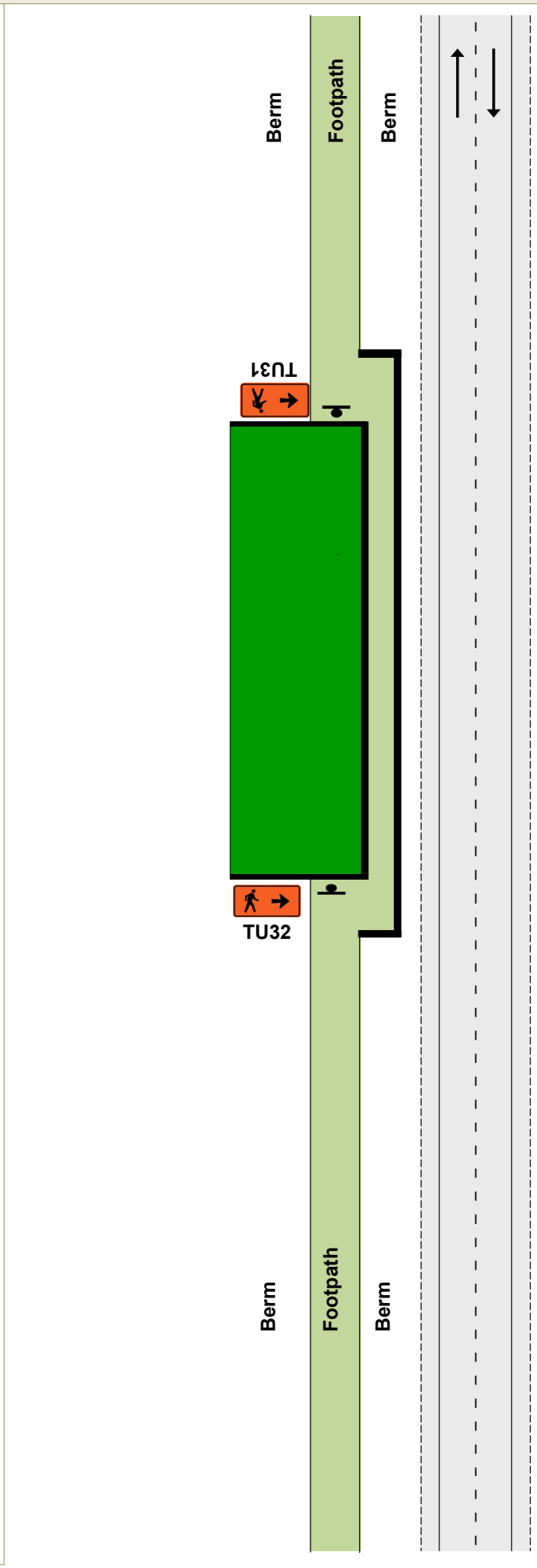
This drawing must not be used as a TMP diagram

FOOTPATH
Footpath diverted onto berm between working space and carriageway
Second preference

G1.2
Level 2

Notes

1. Minimum pedestrian footpath widths:
   - Residential/Rural/ Suburban Centre - 1.2m
   - CBD - 2m
2. Where the length of the temporary footpath exceeds 20m, these widths may have to be increased to allow footpath users to pass
3. Refer to C13.2.3 for temporary footpath surface requirements
4. Use a safety fence to enclose the working space. At **attended** worksites, cones connected with cone bars can be used to enclose the working space. Refer C13.2.5
5. Use barrier or safety fence to delineate the traffic side of the temporary footpath. For temporary barrier requirements. Refer to C18
6. This TMD must be used in conjunction with appropriate TTM for any work carried out on the shoulder or in the live lane



EXAMPLE ONLY

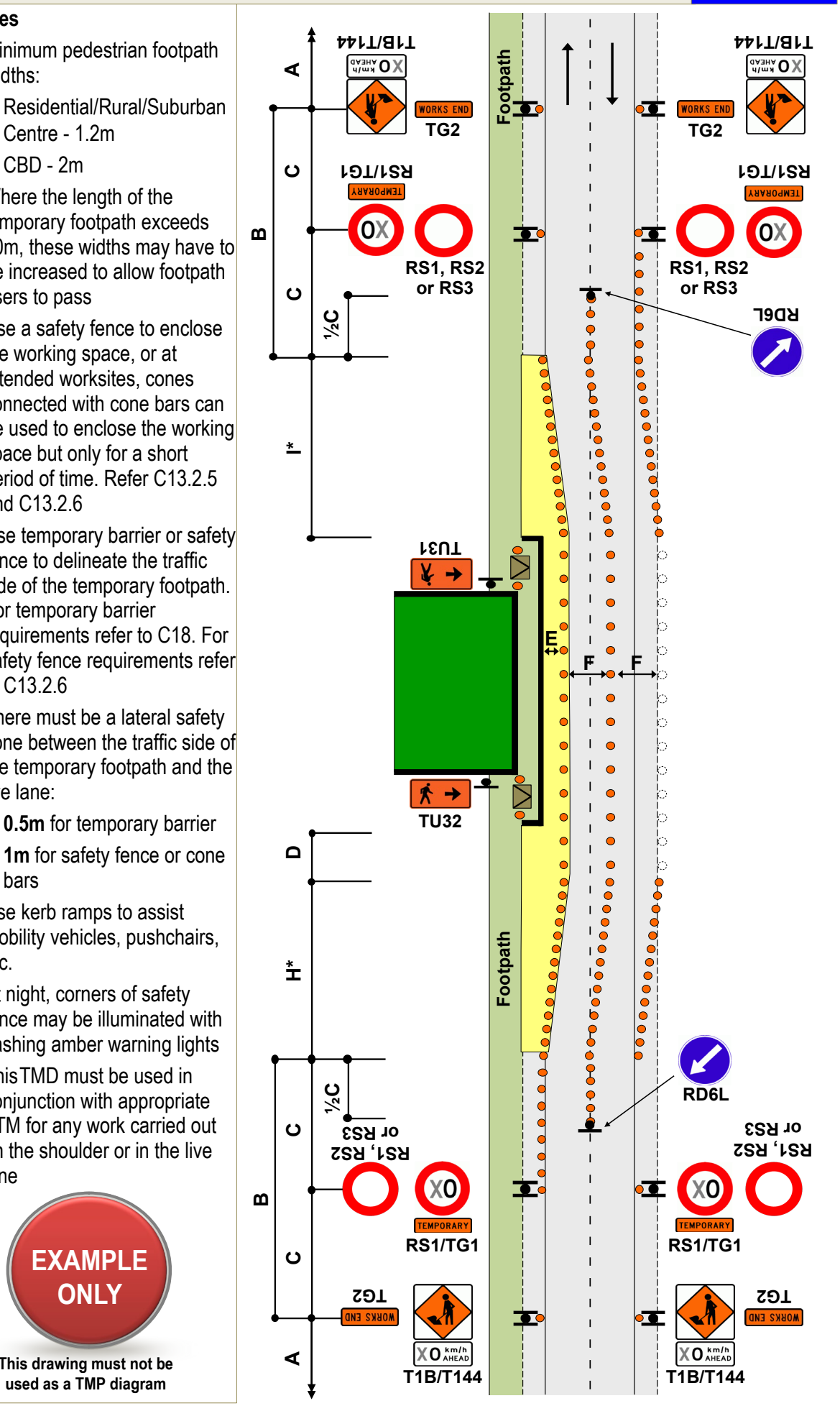
This drawing must not be used as a TMP diagram

FOOTPATH
Footpath diverted onto carriageway
Third preference

G1.3
Level 2

Notes

1. Minimum pedestrian footpath widths:
   - Residential/Rural/Suburban Centre - 1.2m
   - CBD - 2m
2. Where the length of the temporary footpath exceeds 20m, these widths may have to be increased to allow footpath users to pass
3. Use a safety fence to enclose the working space, or at attended worksites, cones connected with cone bars can be used to enclose the working space but only for a short period of time. Refer C13.2.5 and C13.2.6
4. Use temporary barrier or safety fence to delineate the traffic side of the temporary footpath. For temporary barrier requirements refer to C18. For safety fence requirements refer to C13.2.6
5. There must be a lateral safety zone between the traffic side of the temporary footpath and the live lane:
   - **0.5m** for temporary barrier
   - **1m** for safety fence or cone bars
6. Use kerb ramps to assist mobility vehicles, pushchairs, etc.
7. At night, corners of safety fence may be illuminated with flashing amber warning lights
8. This TMD must be used in conjunction with appropriate TTM for any work carried out on the shoulder or in the live lane



EXAMPLE ONLY

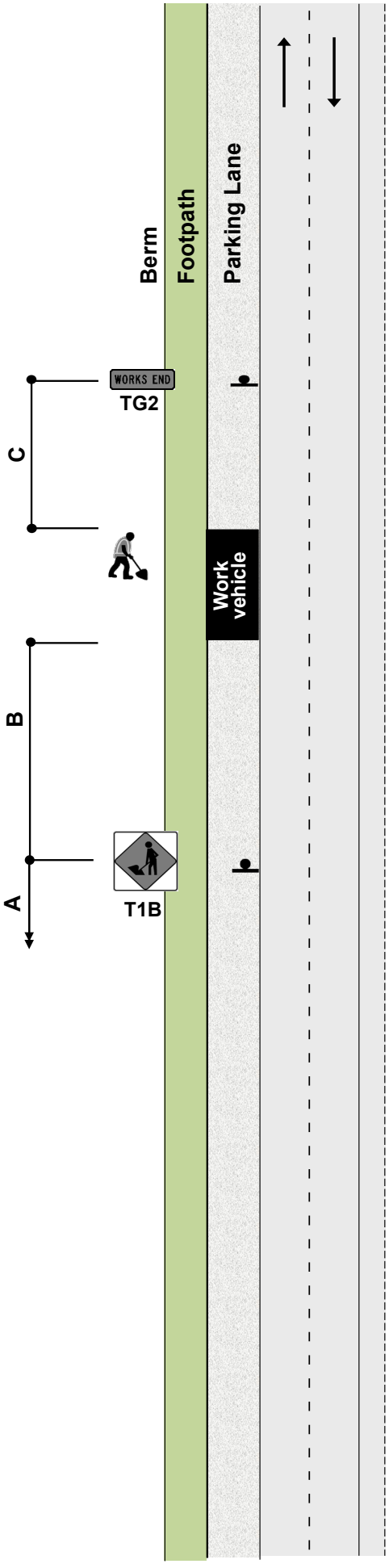
This drawing must not be used as a TMP diagram

SHOULDER AND ROADSIDE ACTIVITIES
Work on berm and/or footpath
Permanent speed less than 65km/h

G1.4
Level 2

Notes

1. Where work is carried out on the berm or footpath and a work vehicle is parked in a legal parallel car park, provided the vehicle is only accessed from the off traffic side, advance warning T1B and WORKS END TG2 are optional
2. The work vehicle can have a registration classification of either Class MA, MB, MC or NA
3. Traffic management must be provided where footpath users or cyclists are affected
4. This layout may only be used during daylight hours
5. Refer to section C13 and C8 for further information



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

SHOULDER AND ROADSIDE ACTIVITIES
Shoulder closure

G1.5
Level 2

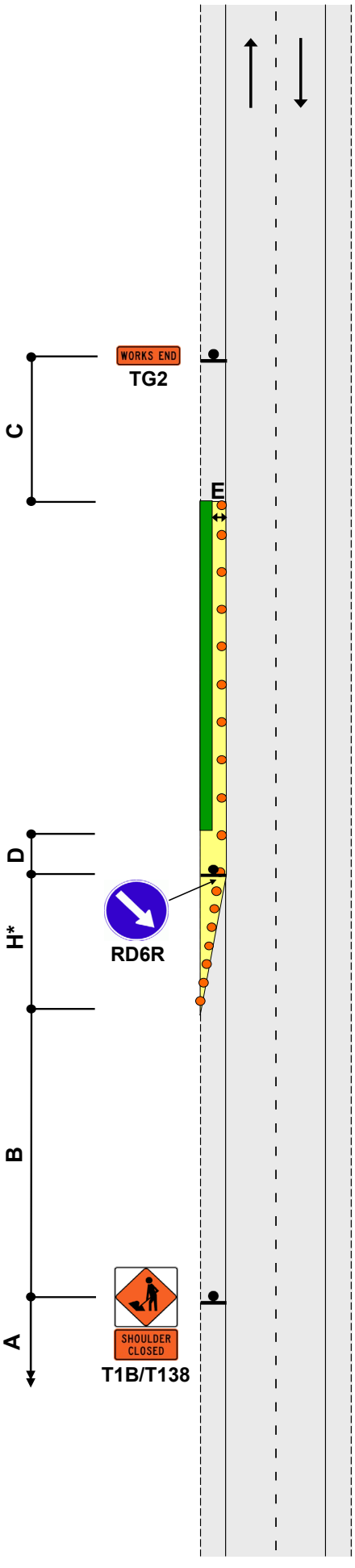
Notes

1. A 10m taper is allowed where shoulder width is less than 2.5m
2. The taper is a minimum of 5 cones at 2.5m centres
3. *For shoulders exceeding 2.5m width, apply the calculation of taper length for lateral shift of less than 3.5m:

$$\frac{W \times H}{3.5}$$

W = Width of lateral shift

H = Taper length in metres from the level 2 layout distance table



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

CYCLE LANE
Traffic crossing road centre
Diverted cycle lane - coned lane control

G1.6
Level 2

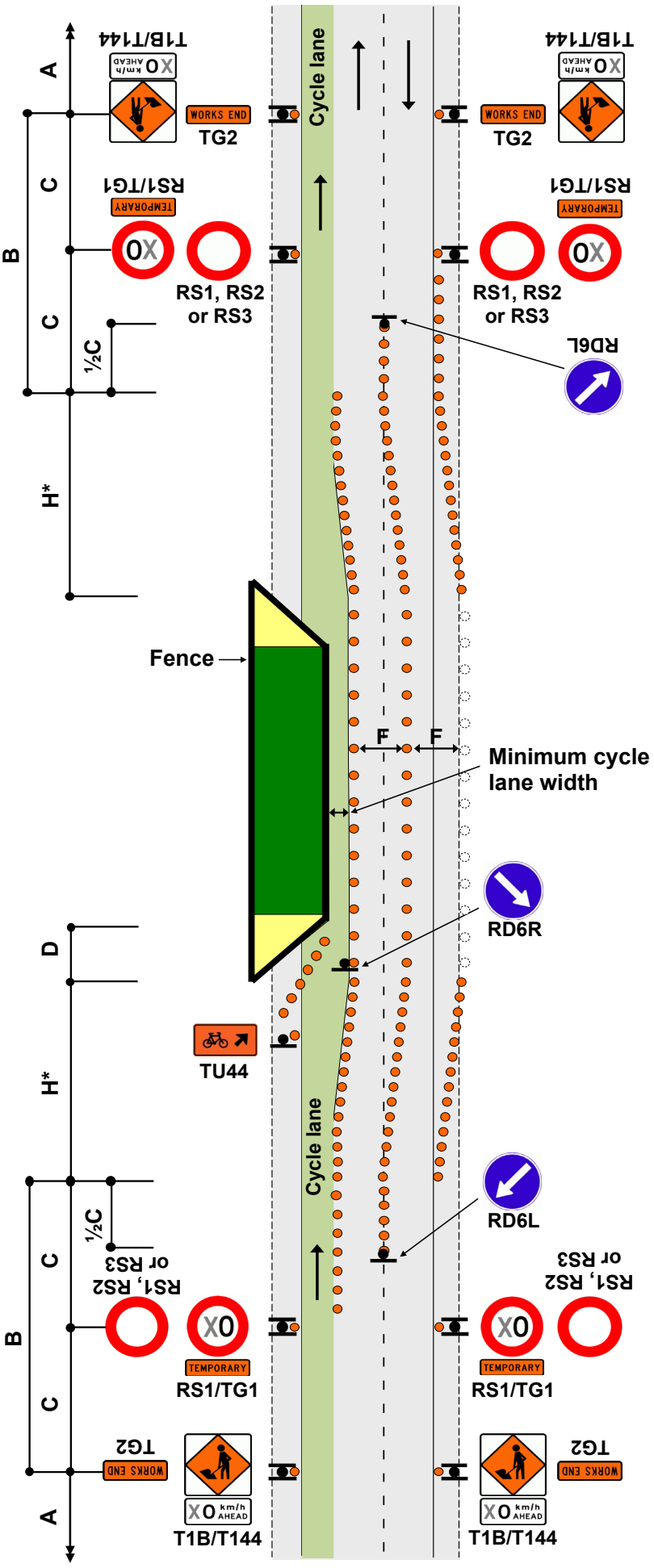
Notes

1. Minimum cycle lane width must be:
   - 1m - 50km/h or less
   - 1.5m - 60km/h or more
2. A minimum cycle lane width of 1.5m is required if the temporary cycle lane is uphill
3. Cones are required on edge of temporary lane opposite closure if road is not well defined
4. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times H}{3.5}$$

   W = Width of lateral shift

   H = Taper length in metres from the level 2 layout distance table
5. Use TSLs if required by TSL decision matrix



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

CYCLE LANE
Traffic not crossing road centre
Cycle lane closed

G1.6a
Level 2

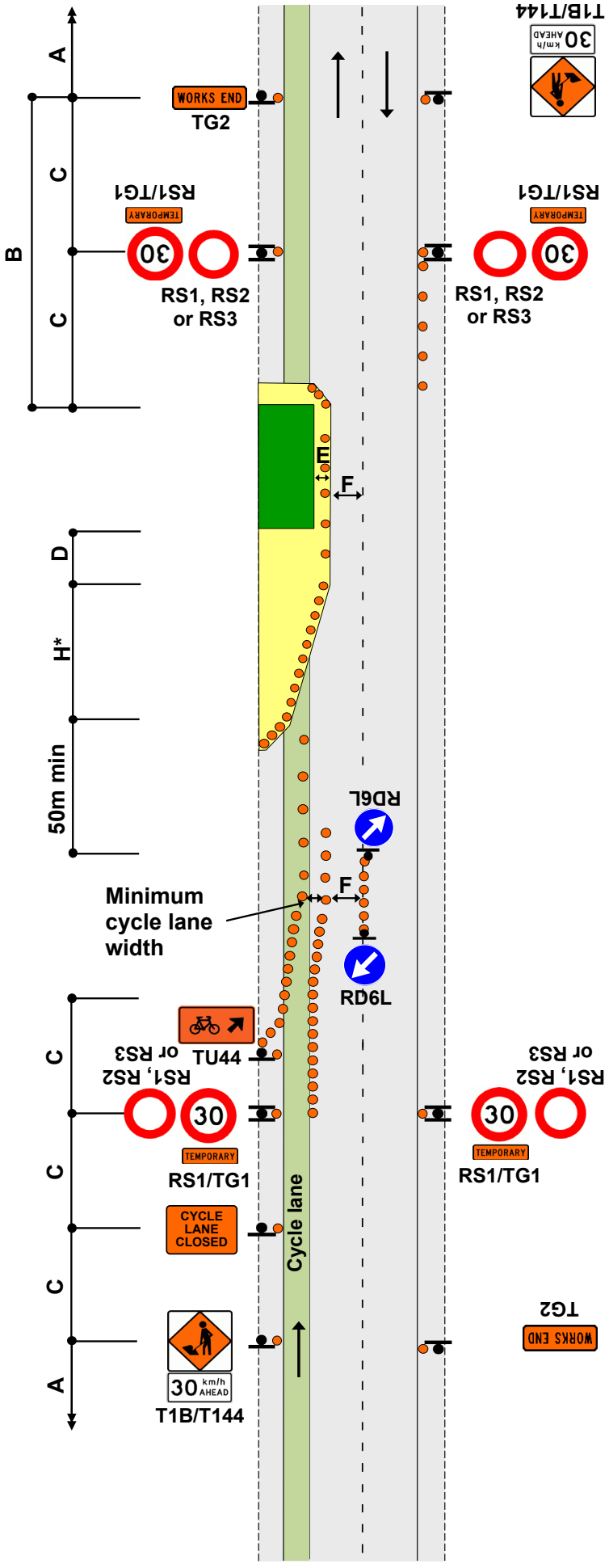
Notes

1. Only use this TMD if there is insufficient width to fit a replacement cycle lane
2. Minimum cycle lane width must be:
   - 1m - 50km/h or less
   - 1.5m - 60km/h or more
3. A minimum cycle lane width of 1.5m is required if the temporary cycle lane is uphill
4. Merge of cycle lane with live lane must be delineated
5. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times H}{3.5}$$

   W = Width of lateral shift

   H = Taper length in metres from the level 2 layout distance table



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
Traffic crossing road centre
Two-lane diversion

G1.7
Level 2

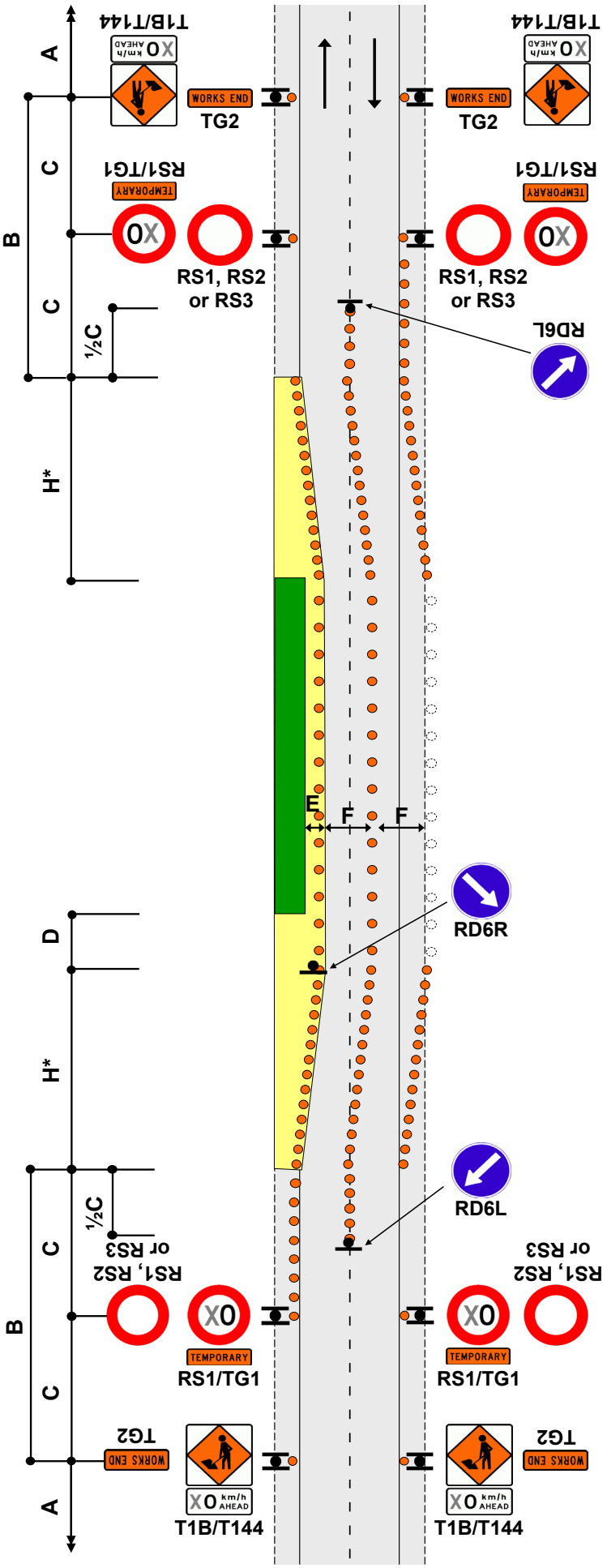
Notes

1. Cones are required on edge of temporary lane opposite closure if road edge is not well defined
2. *Return taper at end of closure may be reduced using the calculation of taper length for lateral shift of less than 3.5m:

   $$\frac{W \times H}{3.5}$$

   W = Width of lateral shift

   H = Taper length in metres from the level 2 layout distance table
3. Use PN11 No Stopping signs, if necessary
4. Use TSLs if required by TSL decision matrix



EXAMPLE ONLY

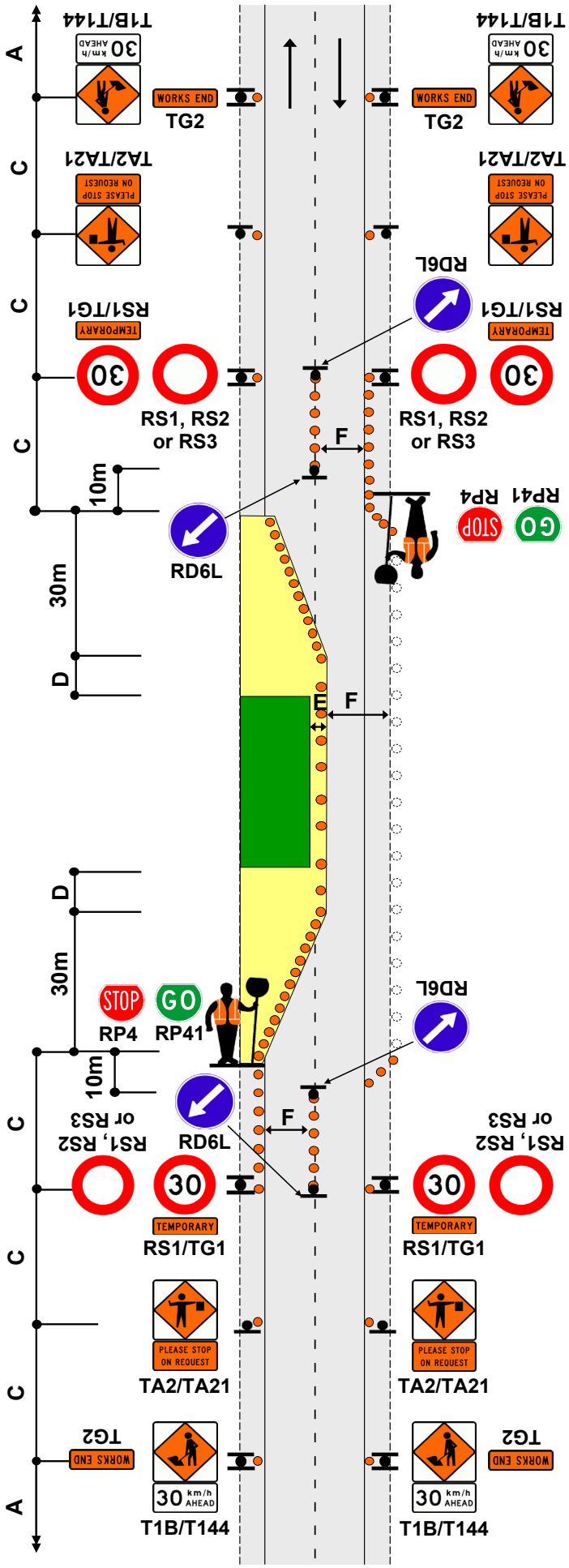
This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
Single-lane alternating flow
Manual traffic control (STOP/GO or STOP/SLOW)

G1.8
Level 2

Notes

1. Extend or place extra advance warning signs towards on-coming traffic beyond the end of any expected traffic queues
2. A 30m return taper at the end of the closure is mandatory
3. Cones are required on edge of temporary lane opposite closure if road edge is not well defined
4. Use PN11 no stopping signs, if necessary
5. MTC with RP4/RP41 STOP/GO or RP4/RP42 STOP/SLOW paddle on road shoulder located between 1st and 2nd cone in the cone threshold closest to the working space
6. Minimum 5 cones in cone threshold at:
   - 2.5m centres - less than 65km/h
   - 5m centres - more than 65km/h
7. Refer to C10.2.3 for further information



EXAMPLE ONLY

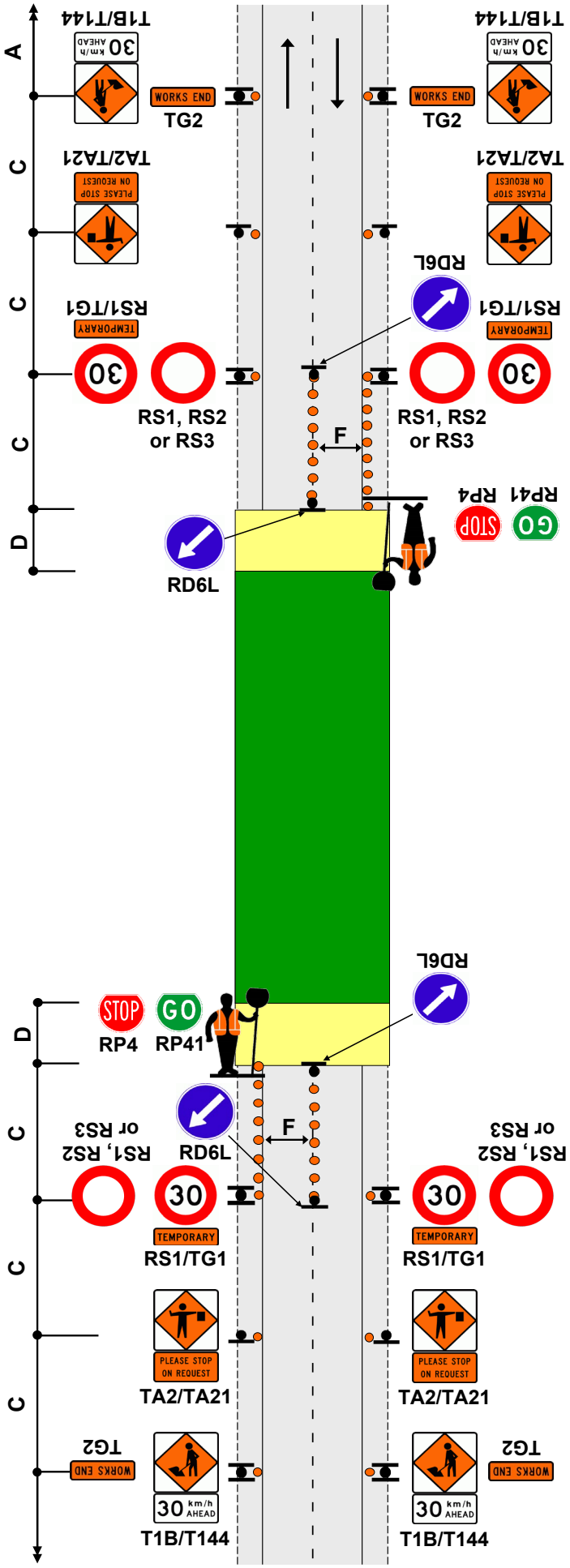
This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
All traffic stopped temporarily
Manual traffic control (STOP/GO or STOP/SLOW)

G1.9
Level 2

Notes

1. Closure period not to exceed the limit set or approved by the RCA
2. Extend or place extra advance warning signs towards on-coming traffic beyond any expected traffic queues
3. MTC with RP4/RP41 STOP/GO or RP4/RP42 STOP/SLOW paddle on road shoulder located between 1st and 2nd cone in the cone threshold closest to the working space
4. Minimum 5 cones in cone threshold at:
   - 2.5m centres - less than 65km/h
   - 5m centres - more than 65km/h
5. MTCs must show same message to oncoming traffic (eg STOP/STOP or GO/GO)
6. Refer to C10.2.3 for further information
7. Work vehicle movement must cease whenever road users are moving through the site unless there is full delineation separating the closure and the traffic



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

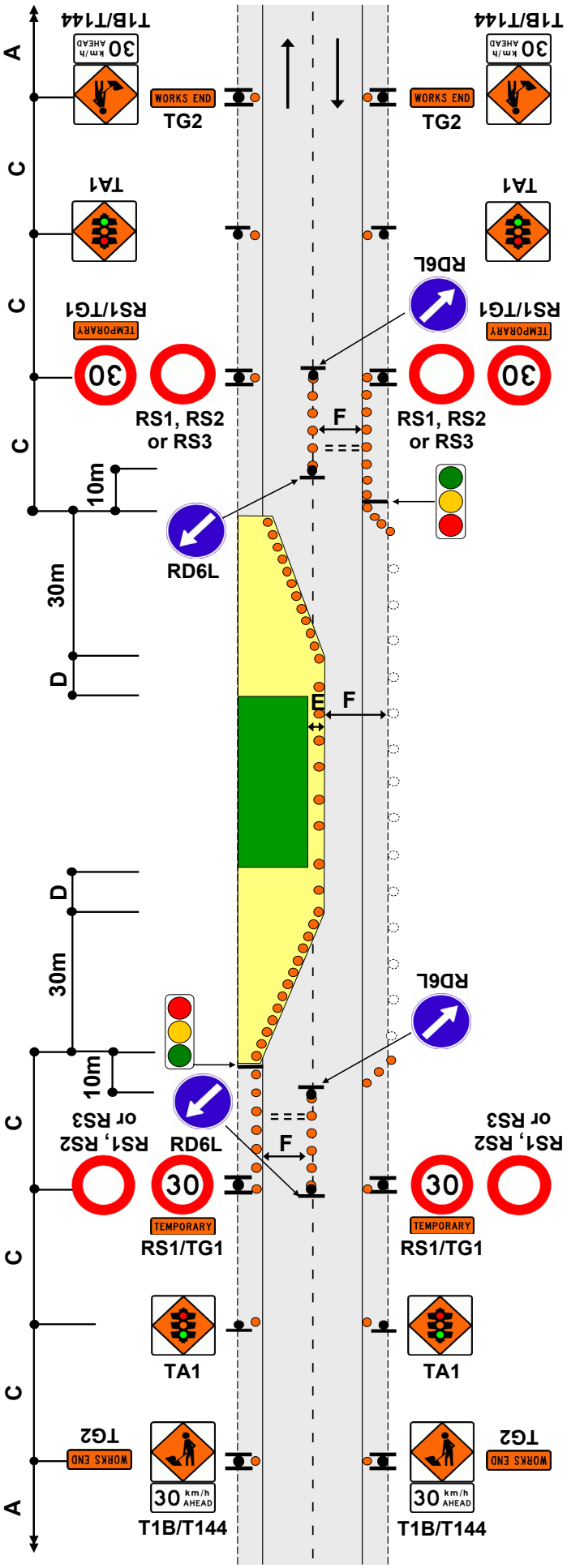
TWO-WAY TWO-LANE ROAD
Single-lane alternating flow
Portable traffic signals

G1.10
Level 2

Notes

1. Provide details of make and model of portable traffic signals in the TMP
2. Install temporary limit lines (must be able to be removed upon completion) or use RP61/RP62 signs

3. Approved temporary speed humps may also be used
4. A 30m return taper at the end of the closure is mandatory
5. Cones are required on edge of temporary lane opposite closure if road is not well defined
6. The STMS should monitor queues during the worksite operation and extend or place extra advance warning signs towards on-coming traffic beyond the end of any expected traffic queues
7. Use PN11 No Stopping signs, if necessary
8. Minimum 5 cones in cone threshold at:
   - 2.5m centres - less than 65km/h
   - 5m centres - more than 65km/h



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
Work in centre of road

G1.11
Level 2

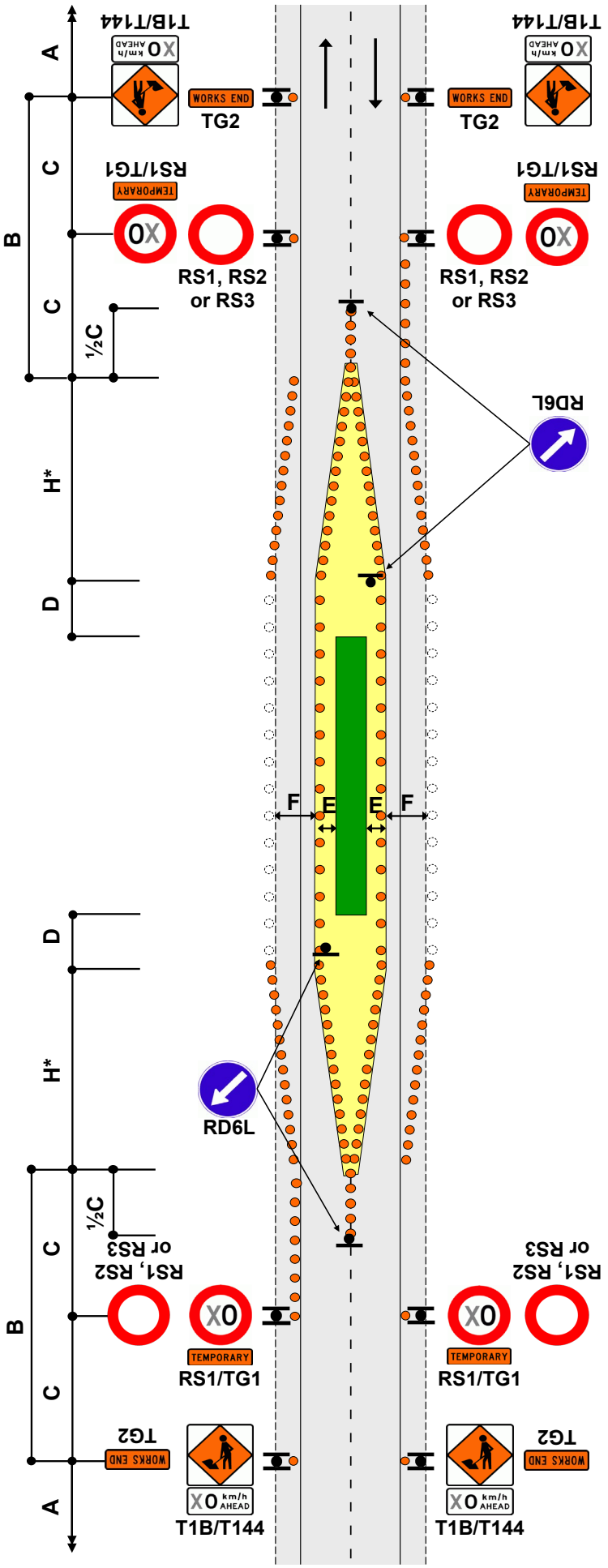
Notes

1. Cones are required on edge of temporary lane opposite closure if road is not well defined
2. *Calculation of taper length for lateral shift of less than 3.5m is:

   $$\frac{W \times H}{3.5}$$

   W = Width of lateral shift

   H = Taper length in metres from the level 2 layout distance table
3. Use PN11 No Stopping signs, if necessary
4. Use TSLs if required by TSL decision matrix



EXAMPLE ONLY

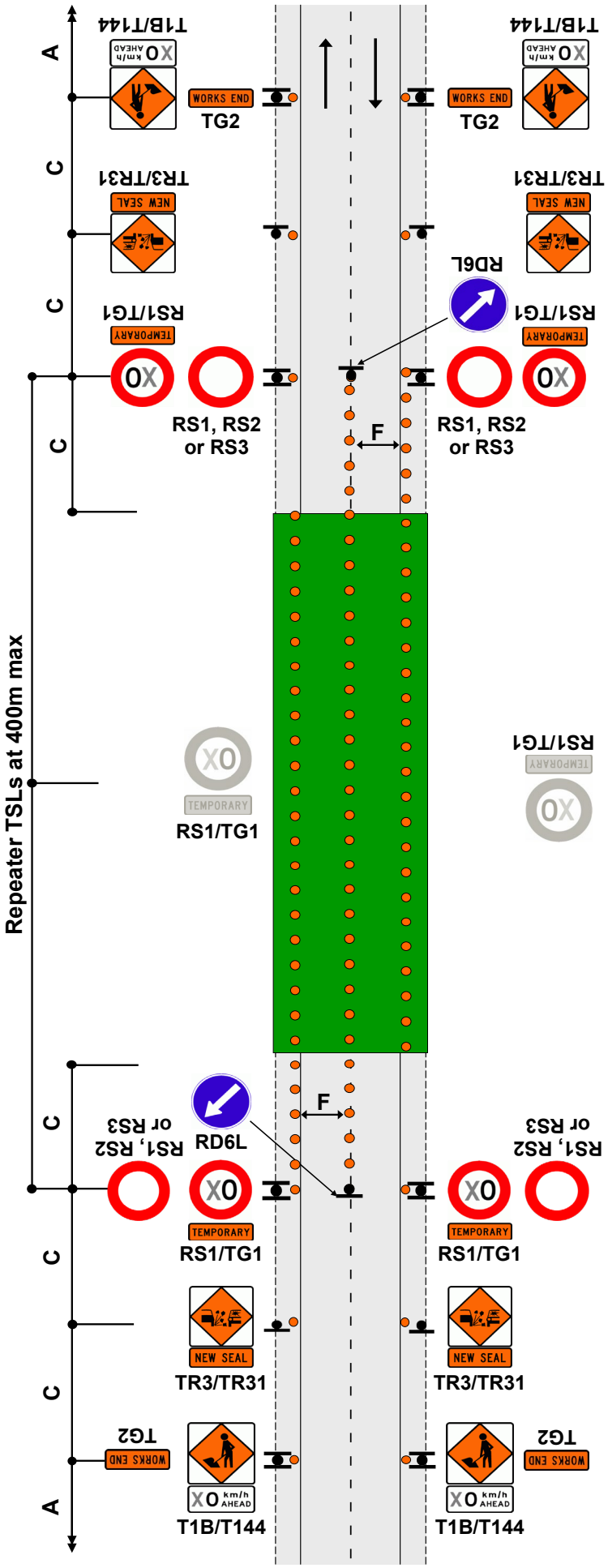
This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
New-chip seal or road construction
Attended worksite

G1.12
Level 2

Notes

1. This diagram is used to enhance the finished product by moving the cone lines at regular intervals across the road to ensure it is evenly trafficked
2. Refer to diagram G1.15 for unattended worksites
3. This diagram is a form of positive traffic management
4. Use TSLs if required by TSL decision matrix
5. TSLs to be repeated at 400m maximum centres



EXAMPLE ONLY

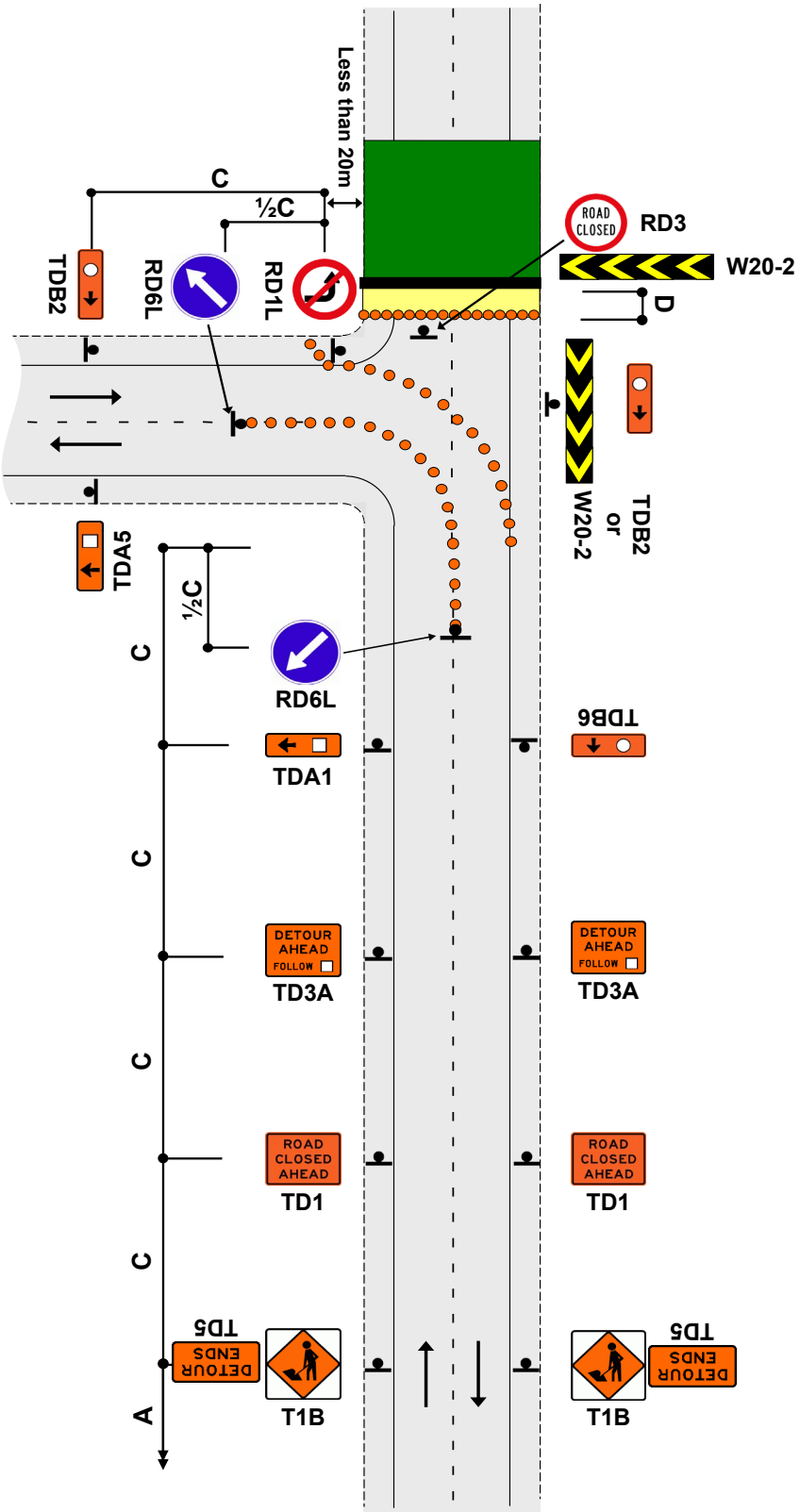
This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
Road closure - detour route
Example

G1.13
Level 2

Notes

1. Block access to road with barricade
2. If a long term site, use chevron sight board to direct traffic
3. On multilane roads the detour directional arrows (eg TDA1) signs will need to be gated
4. Cover any conflicting control signage at intersections
5. Use TSLs if required by TSL decision matrix



EXAMPLE ONLY

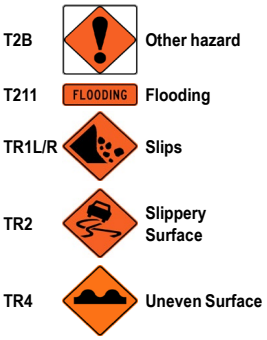
This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
Other hazard
Shallow flooding, slip, slippery surface

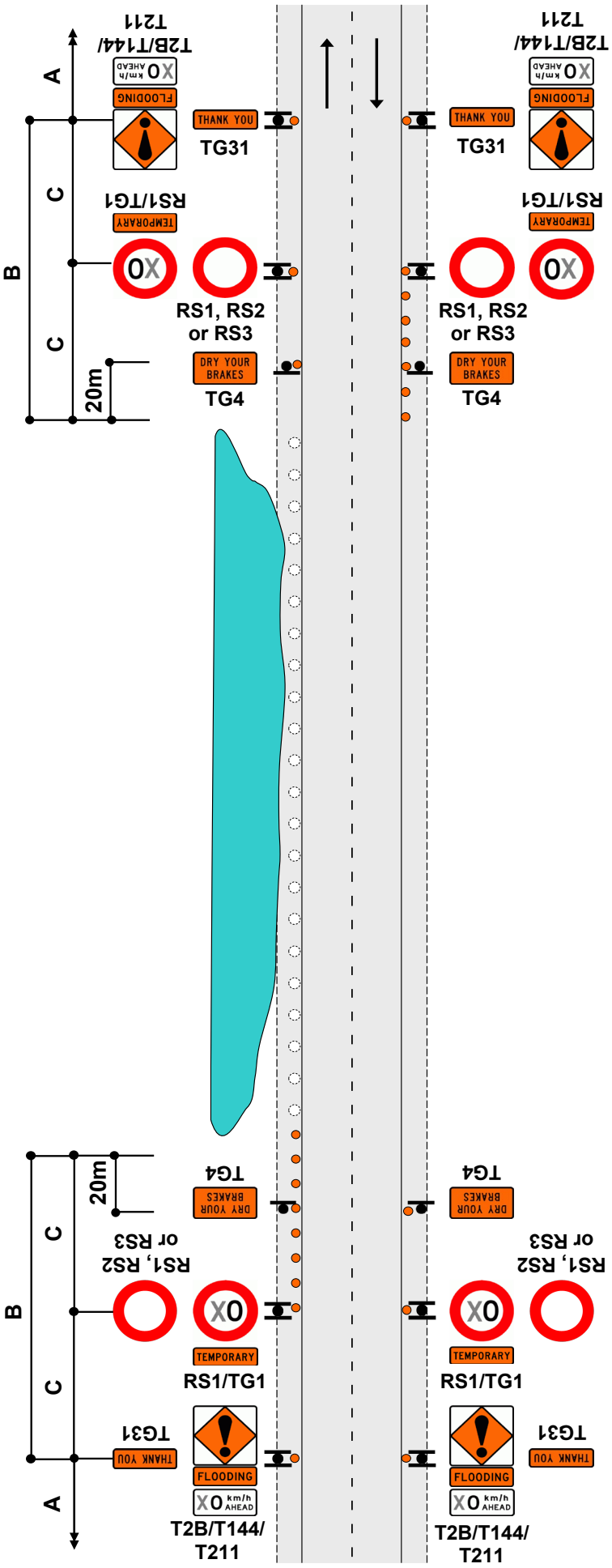
G1.14
Level 2

Notes

1. Shallow flooding that can be safely traversed by vehicles
2. This diagram is for initial response only. Appropriate long term TTM must be installed as soon as practical
3. The advance warning sign may be any one of the following:



4. If necessary, erect TG4 DRY YOUR BRAKES sign
5. Delineate hazard if hazard extends onto lane
6. Use TSLs if required by TSL decision matrix



EXAMPLE ONLY

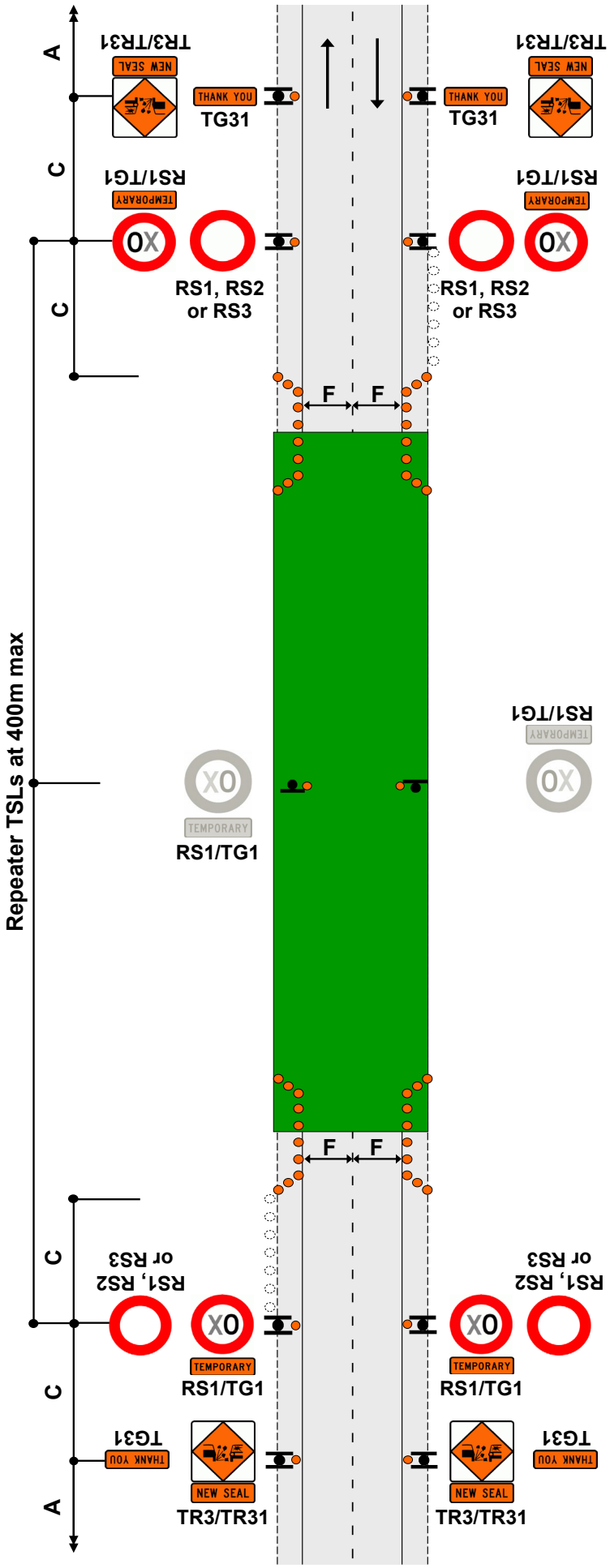
This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
New seal - unattended and/or unswept worksite

G1.15
Level 2

Notes

1. Use cones to form a threshold treatment at the start of the new seal. Minimum of 10 cones at 5m centres
2. Worksites may need additional positive traffic management to ensure all road users travel at the TSL
3. Use TSLs if required by TSL decision matrix
4. TSLs to be repeated at 400m maximum centres



EXAMPLE ONLY

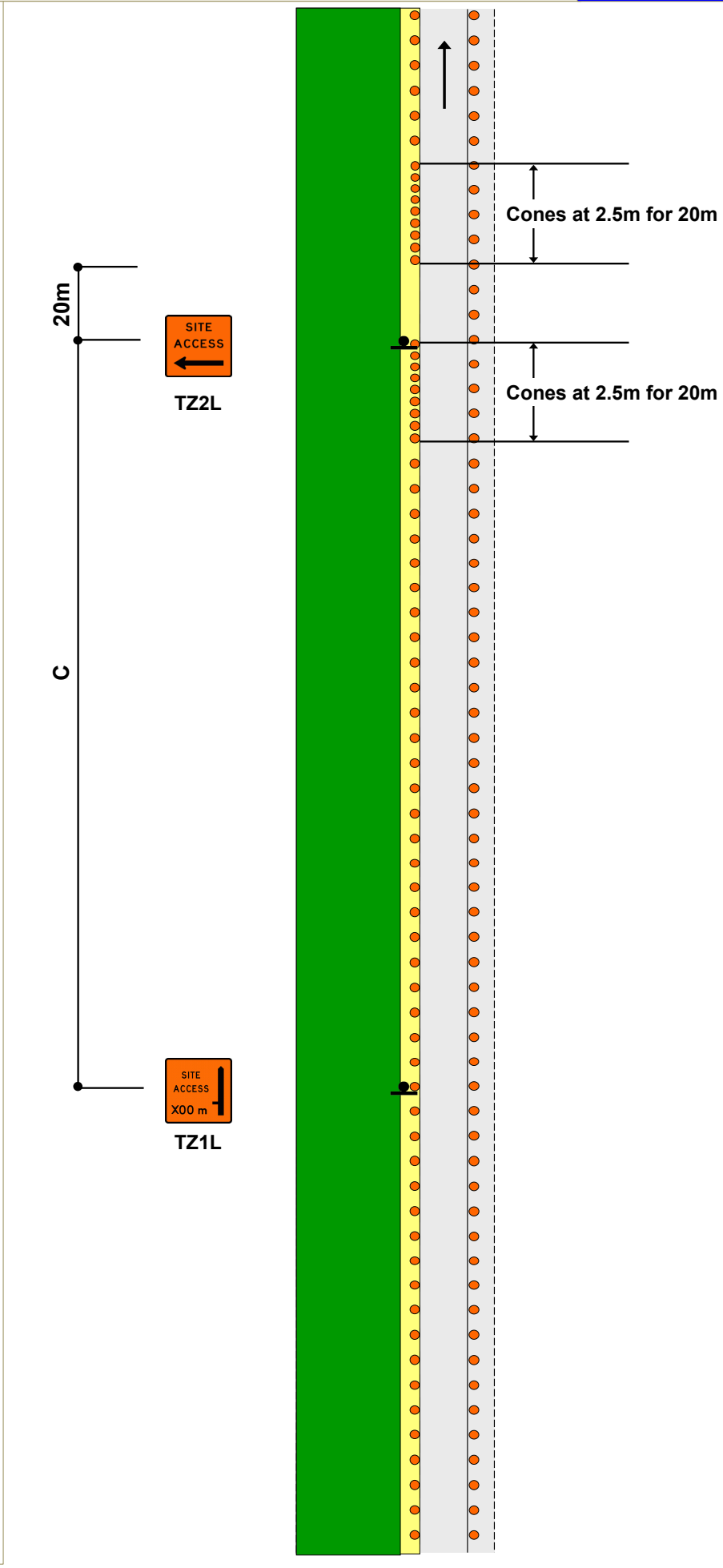
This drawing must not be used as a TMP diagram

SITE ACCESS
Forms part of a larger worksite

G1.16
Level 2

Notes

1. It is intended that this diagram forms part of a larger worksite
2. Cones immediately before and after the site access to be spaced at 2.5m centres for 20m at over 65km/h and 10m under 65km/h



EXAMPLE ONLY

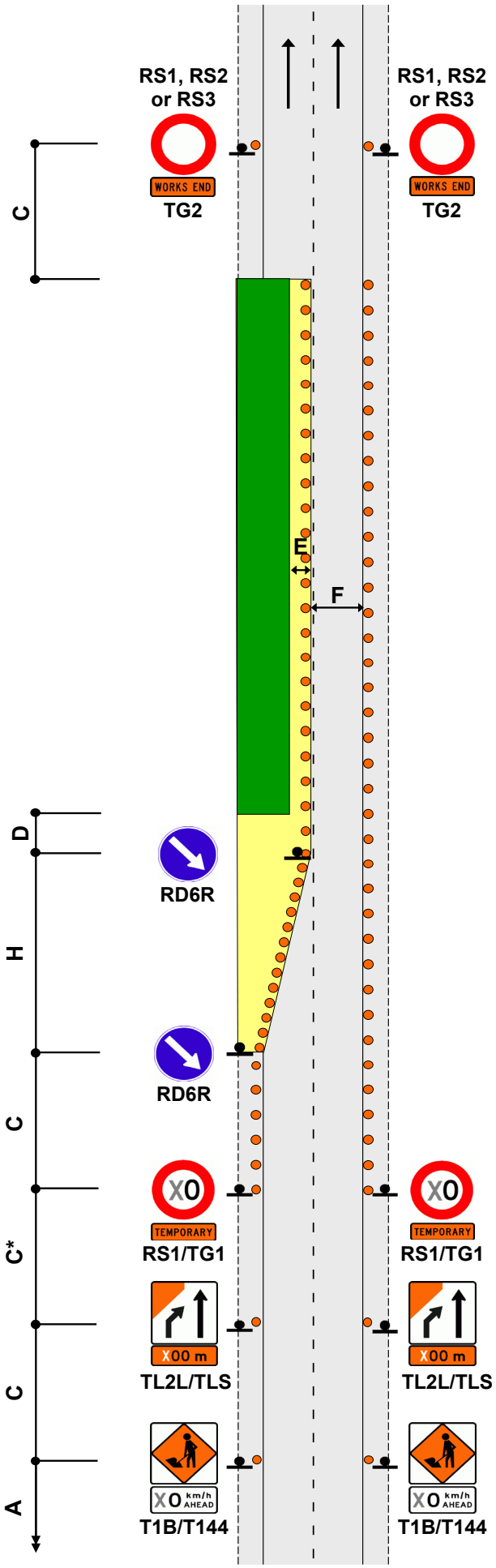
This drawing must not be used as a TMP diagram

ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Left-lane closure

G1.17
Level 2

Notes

1. C* - the TL2L/TLS signs are to be either 100m or 200m in advance of the start of the taper
2. Cones are required from TSL to taper (or hazard area where no taper is installed) unless the edgeline is well defined
3. Use TSLs if required by TSL decision matrix



EXAMPLE ONLY

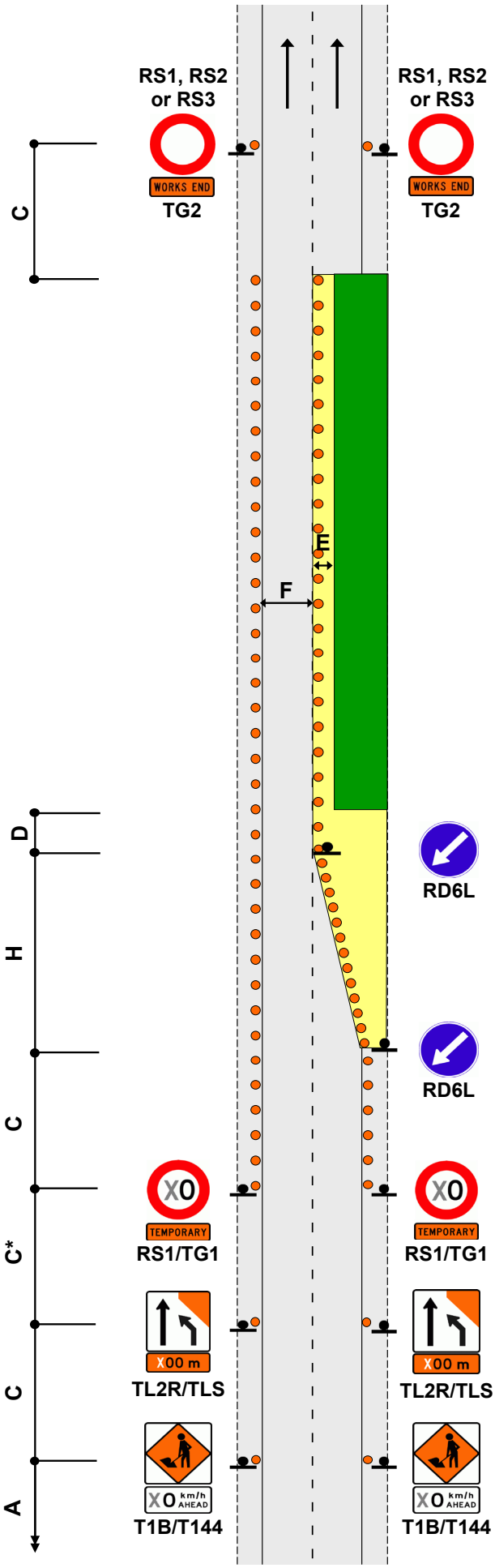
This drawing must not be used as a TMP diagram

ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Right-lane closure

G1.18
Level 2

Notes

1. C* - the TL2R/TLS signs are to be either 100m or 200m in advance of the start of the taper
2. Cones are required from TSL to taper (or hazard area where no taper is installed) unless the edgeline is well defined
3. Use TSLs if required by TSL decision matrix



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Right-lane closure
One-lane temporary diversion

G1.19
Level 2

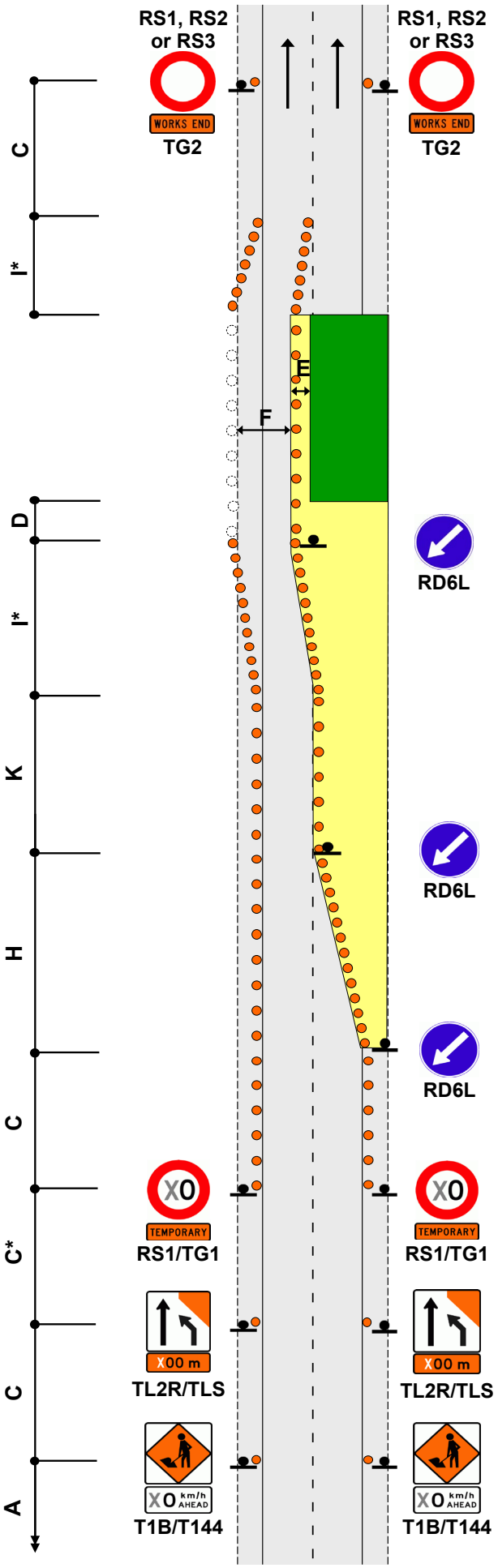
Notes

1. The longitudinal safety zone is based on the temporary speed limit
2. C* - the TL2R/TLS signs are to be either 100m or 200m in advance of the start of the taper
3. Cones are required from TSL to taper (or hazard area where no taper is installed) unless the edgeline is well defined
4. *Calculation of taper length for lateral shift of less than 3.5m is:

   $\frac{W \times l}{3.5}$

   W = Width of lateral shift

   l = Taper length in metres from the level 2 layout distance table
5. Cones are required on edge of temporary lane opposite closure if road edge is not well defined
6. Use TSLs if required by TSL decision matrix



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
One-lane closure
Two-lane temporary diversion

G1.20
Level 2

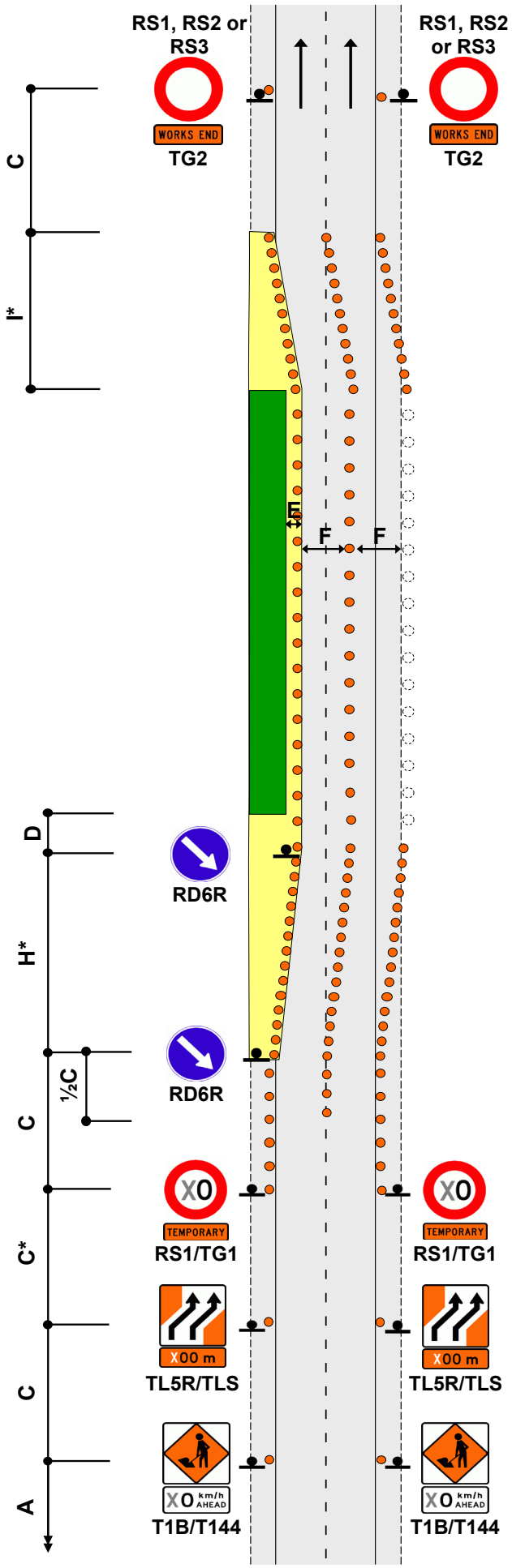
Notes

1. C* - the TL5R/TLS signs are to be either 100m or 200m in advance of the start of the taper
2. Cones are required from TSL to taper (or hazard area where no taper is installed) unless the edgeline is well defined
3. *Calculation of taper length for lateral shift of less than 3.5m is:

   $\frac{W \times (H \text{ or } I)}{3.5}$

   W = Width of lateral shift

   H or I = Taper length in metres from the level 2 layout distance table
4. Cones are required on edge of temporary lane opposite closure if road edge is not well defined
5. Use TSLs if required by TSL decision matrix



EXAMPLE ONLY

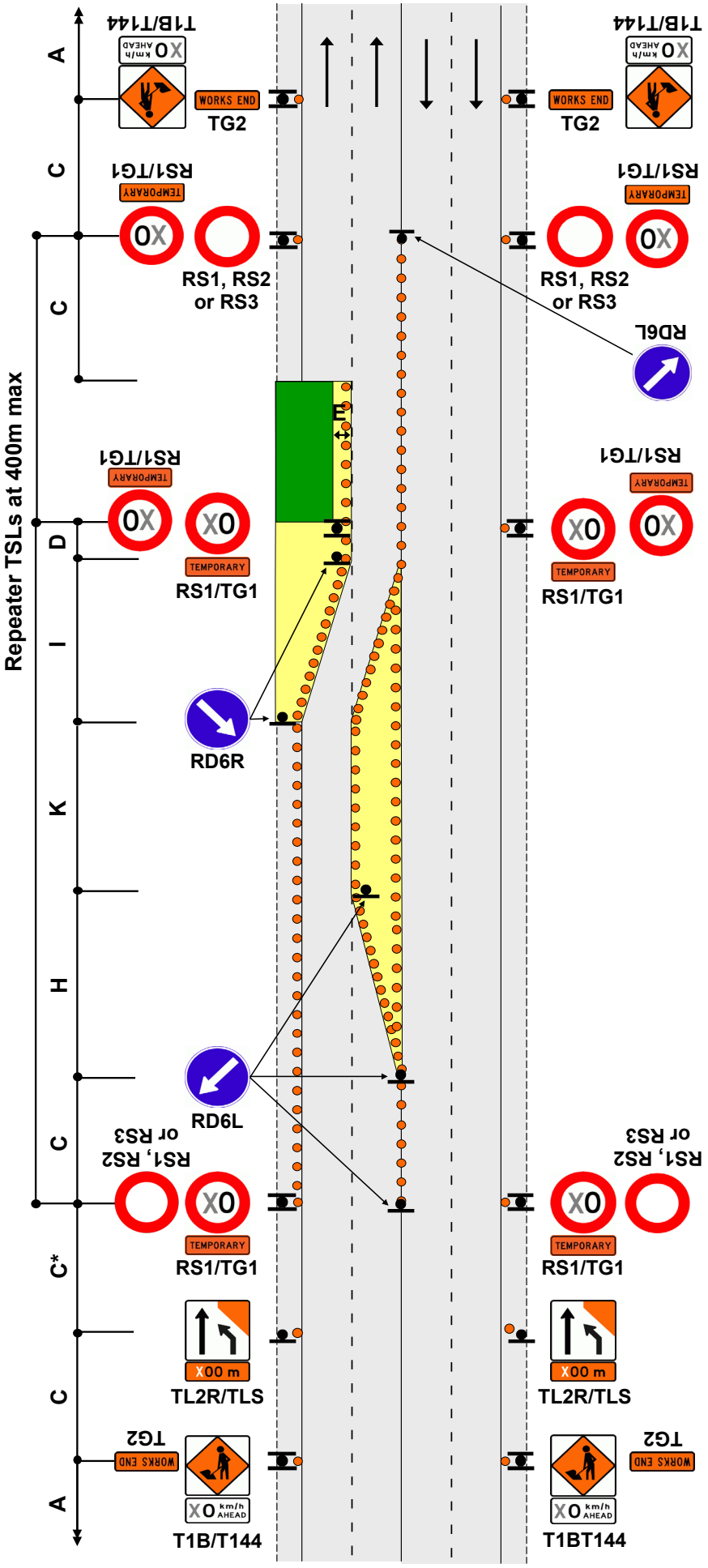
This drawing must not be used as a TMP diagram

TWO-WAY FOUR-LANE ROAD
Left-lane closure
With chicane

G1.21
Level 2

Notes

1. C* - the TL2R/TLS signs are to be either 100m or 200m in advance of the start of the taper
2. Cones are required from TSL to taper (or hazard area where no taper is installed) unless the edgeline is well defined
3. Use TSLs if required by TSL decision matrix
4. TSLs to be repeated at 400m maximum centres



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

TWO-WAY FOUR-LANE ROAD
Two-lane closure
One-lane contraflow

G1.22
Level 2

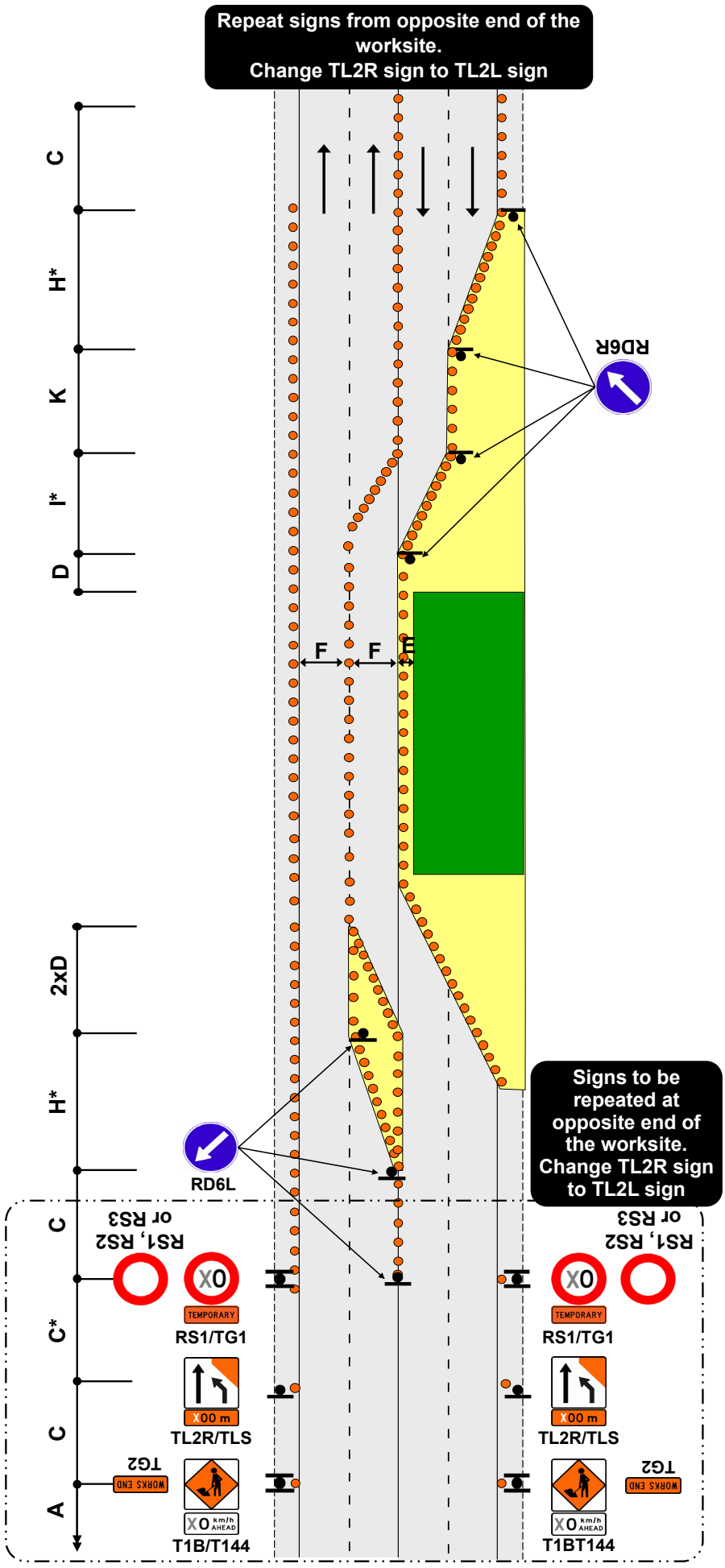
Notes

1. **Refer to C8.2.17 if the closure is within a passing lane**
2. C* - the TL2R/TLS signs are to be either 100m or 200m in advance of the start of the taper
3. Cones are required from TSL to taper (or hazard area where no taper is installed) unless the edgeline is well defined
4. *Calculation of taper length for lateral shift of less than 3.5m is:

   $\frac{W \times (H \text{ or } I)}{3.5}$

   W = Width of lateral shift

   H or I = Taper length in metres from the level 2 layout distance table
5. Use TSLs if required by TSL decision matrix
6. TSLs to be repeated at 400m maximum centres



EXAMPLE ONLY

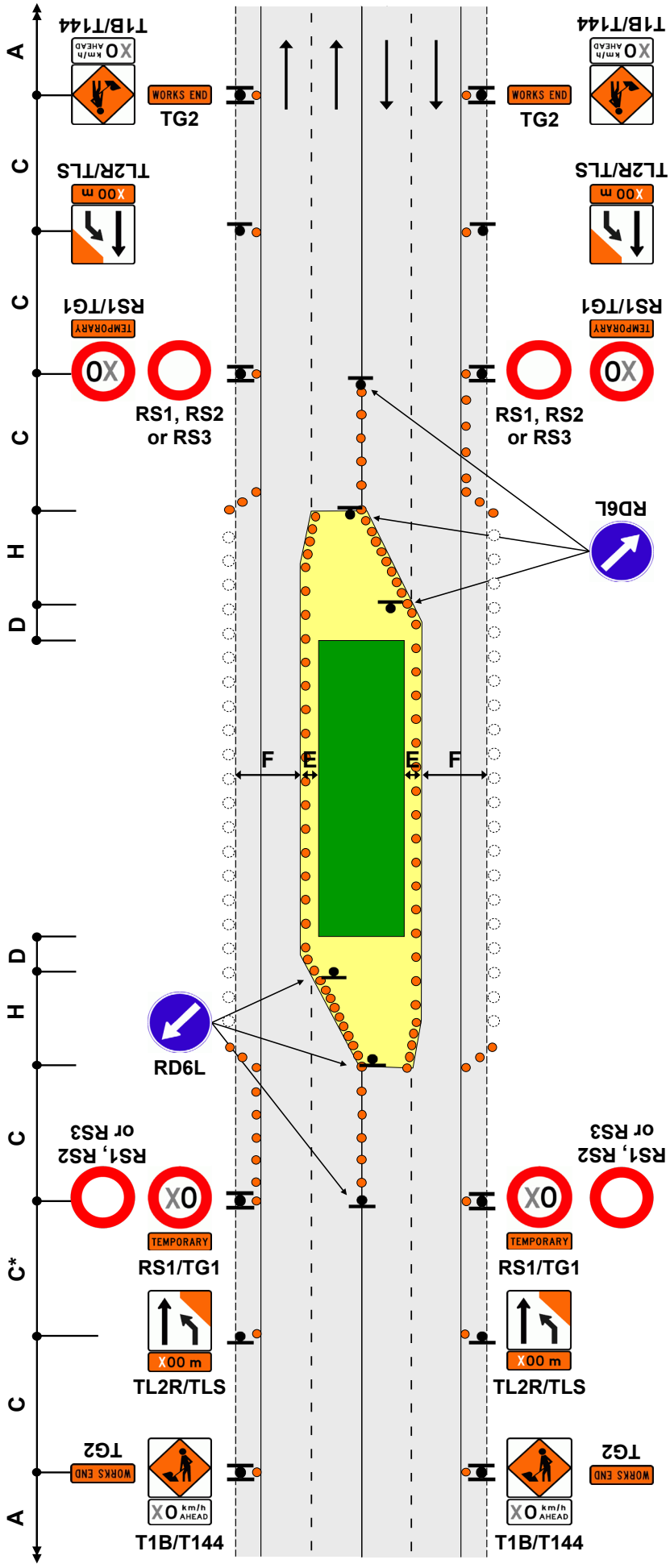
This drawing must not be used as a TMP diagram

TWO-WAY FOUR-LANE ROAD
Centre-lane closures

G1.23
Level 2

Notes

1. C* - the TL3L/TLS signs are to be either 100m or 200m in advance of the start of the taper
2. Cones are required from TSL to taper (or hazard area where no taper is installed) unless the edgeline is well defined
3. Cones are required on edge of temporary lane opposite closure if road is not well defined
4. Use PN11 no stopping signs, if necessary
5. Use TSLs if required by TSL decision matrix



EXAMPLE ONLY

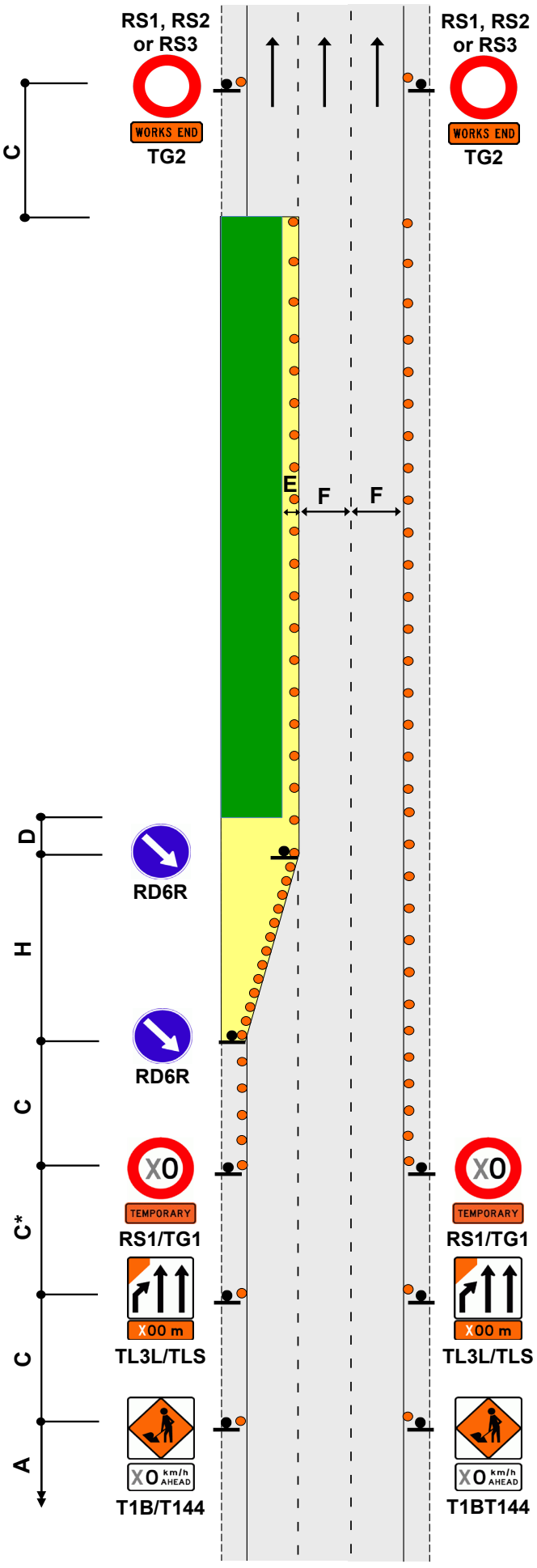
This drawing must not be used as a TMP diagram

ONE-WAY THREE-LANE DIVIDED OR THREE-LANE ROAD
One-lane closure
Left lane

G1.24
Level 2

Notes

1. C* - the TL3L/TLS signs are to be either 100m or 200m in advance of the start of the taper
2. Cones are required from TSL to taper (or hazard area where no taper is installed) unless the edgeline is well defined
3. Full end taper may be added if required
4. Use TSLs if required by TSL decision matrix



EXAMPLE ONLY

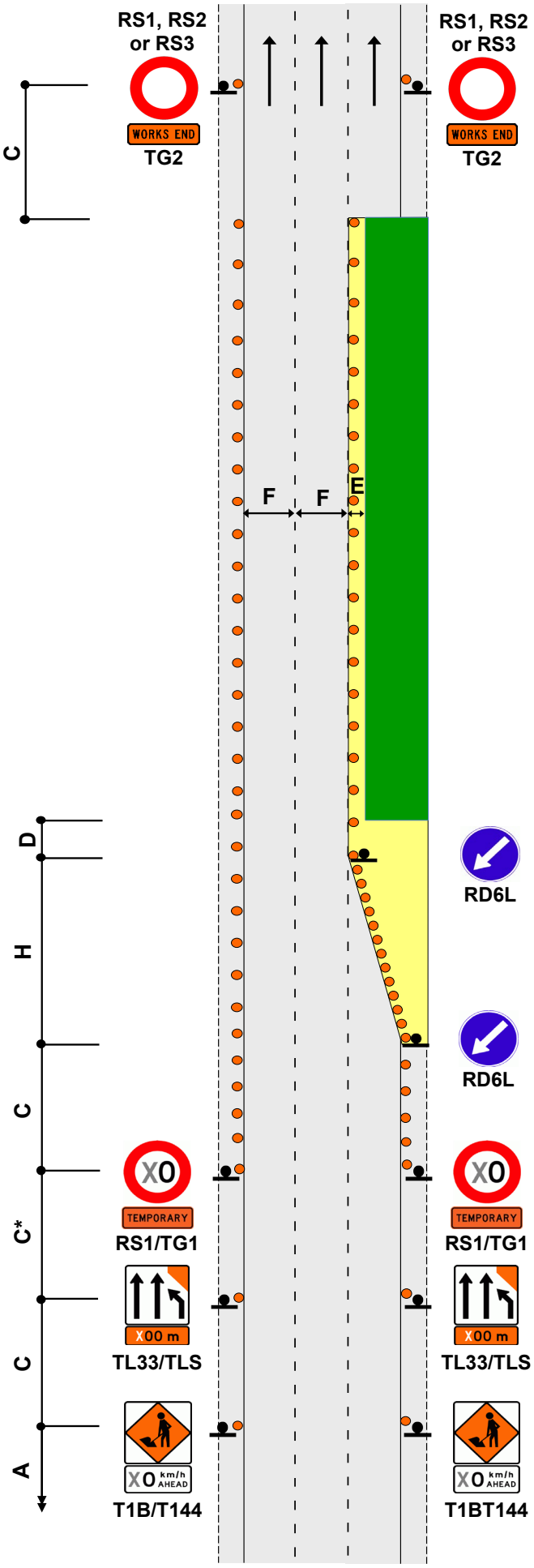
This drawing must not be used as a TMP diagram

ONE-WAY THREE-LANE DIVIDED OR THREE-LANE ROAD
One-lane closure
Right lane

G1.25
Level 2

Notes

1. C* - the TL33/TLS signs are to be either 100m or 200m in advance of the start of the taper
2. Cones are required from TSL to taper (or hazard area where no taper is installed) unless the edgeline is well defined
3. Full end taper may be added if required
4. Use TSLs if required by TSL decision matrix



EXAMPLE ONLY

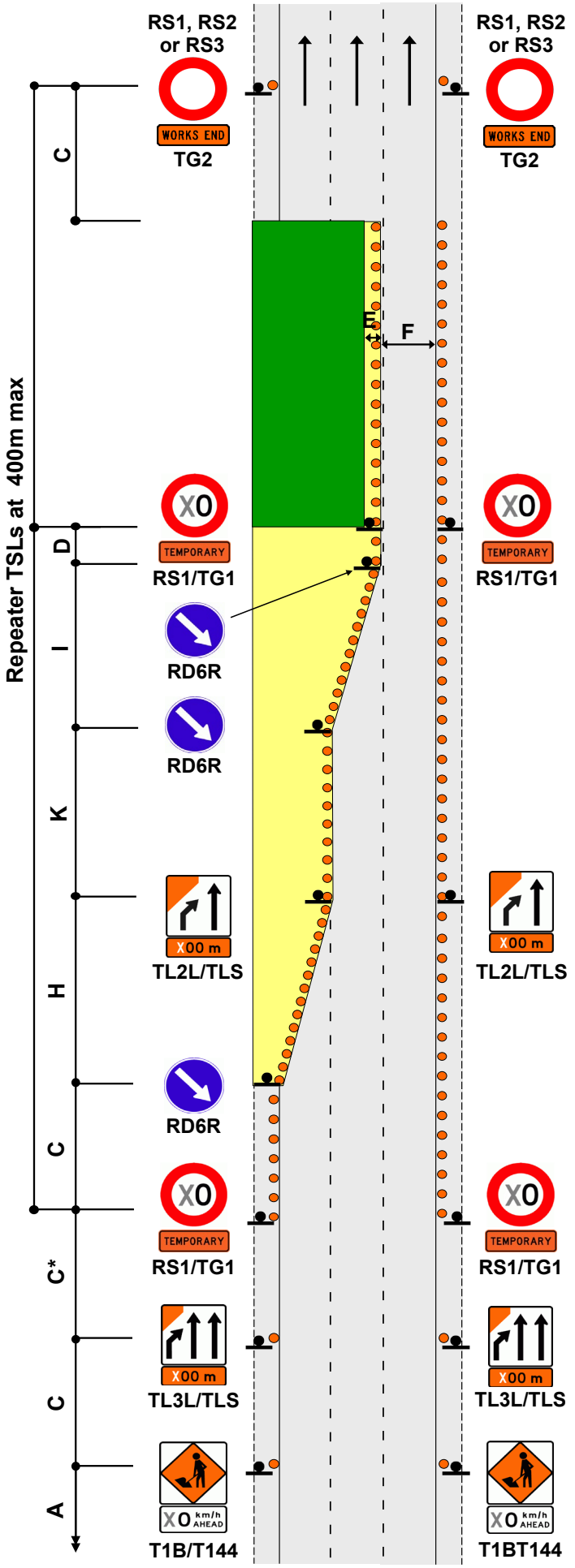
This drawing must not be used as a TMP diagram

ONE-WAY THREE-LANE DIVIDED OR THREE-LANE ROAD
Two-lane closure
Left and centre lanes

G1.26
Level 2

Notes

1. C* - the TL3L/TLS signs are to be either 100m or 200m in advance of the start of the taper
2. Distance K must be extended to match the distance shown on any supplementary plate used with the TL2L sign
3. Cones are required from TSL to taper (or hazard area where no taper is installed) unless the edgeline is well defined
4. Full end taper may be added if required
5. Use TSLs if required by TSL decision matrix
6. TSLs to be repeated at 400m maximum centres



EXAMPLE ONLY

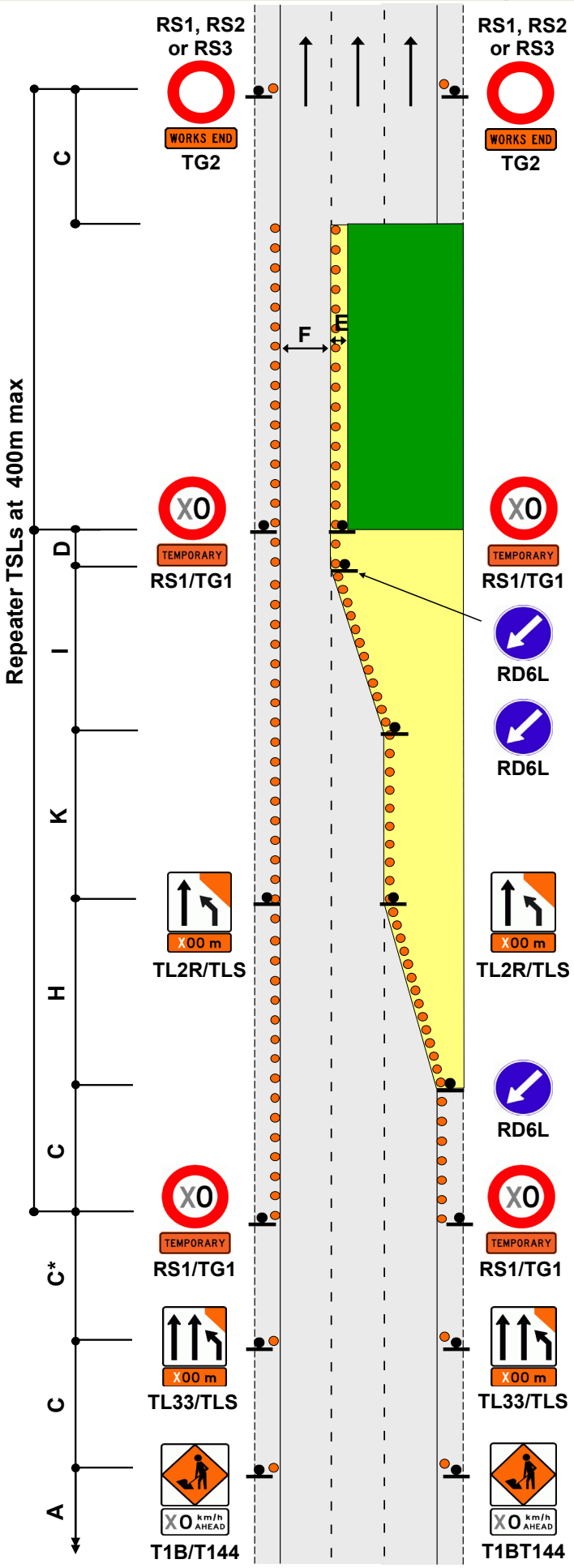
This drawing must not be used as a TMP diagram

ONE-WAY THREE-LANE DIVIDED OR THREE-LANE ROAD
Two-lane closure
Right and centre lanes

G1.27
Level 2

Notes

1. C* - the TL33/TLS signs are to be either 100m or 200m in advance of the start of the taper
2. Distance K must be extended to match the distance shown on any supplementary plate used with the TL2L sign
3. Cones are required from TSL to taper (or hazard area where no taper is installed) unless the edgeline is well defined
4. Full end taper may be added if required
5. Use TSLs if required by TSL decision matrix
6. TSLs to be repeated at 400m maximum centres



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY THREE-LANE DIVIDED OR THREE-LANE ROAD
Two-lane closure
Two-lane temporary diversion

G1.28
Level 2

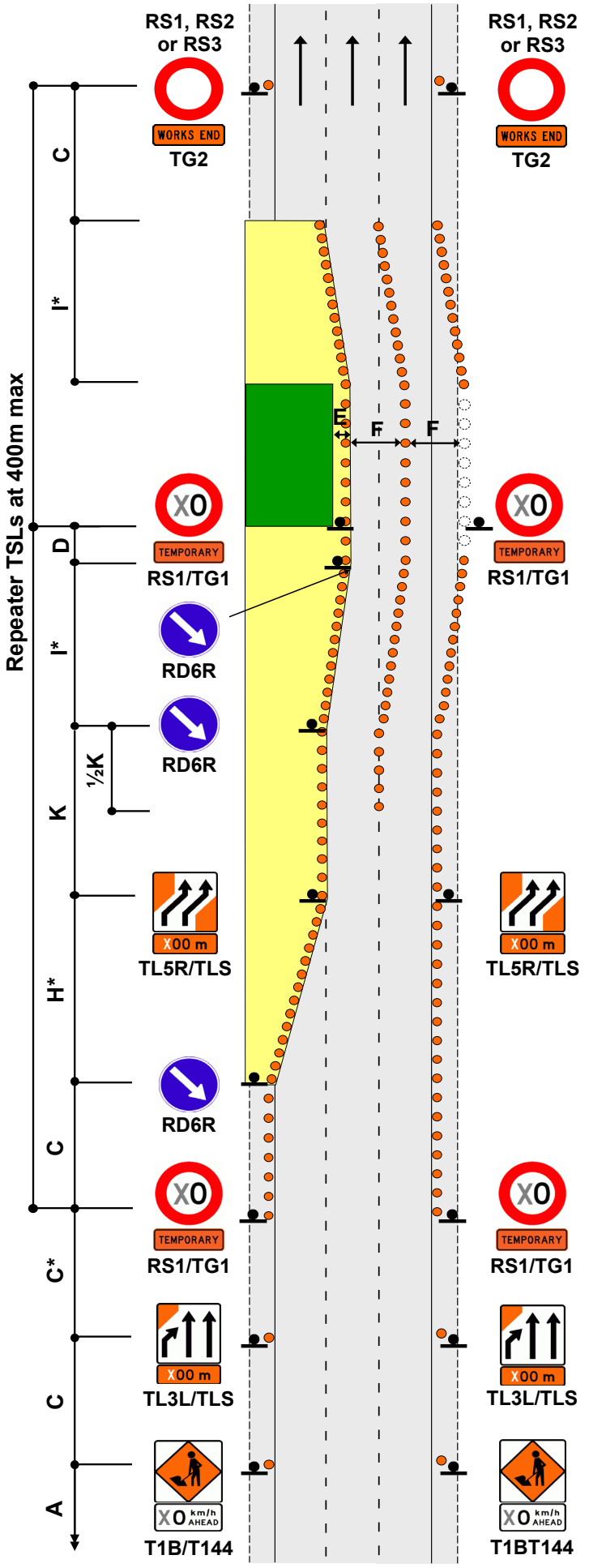
Notes

1. C* - the TL3L/TLS signs are to be either 100m or 200m in advance of the start of the taper
2. Distance K must be extended to match the distance shown on any supplementary plate used with the TL2L sign
3. Cones are required from TSL to taper (or hazard area where no taper is installed) unless the edgeline is well defined
4. *Calculation of taper length for lateral shift of less than 3.5m is:

   $\frac{W \times (H \text{ or } I)}{3.5}$

   W = Width of lateral shift

   H or I = Taper length in metres from the level 2 layout distance table
5. Cones are required on edge of temporary lane opposite closure if road edge is not well defined
6. Use TSLs if required by TSL decision matrix
7. TSLs to be repeated at 400m maximum centres



EXAMPLE ONLY

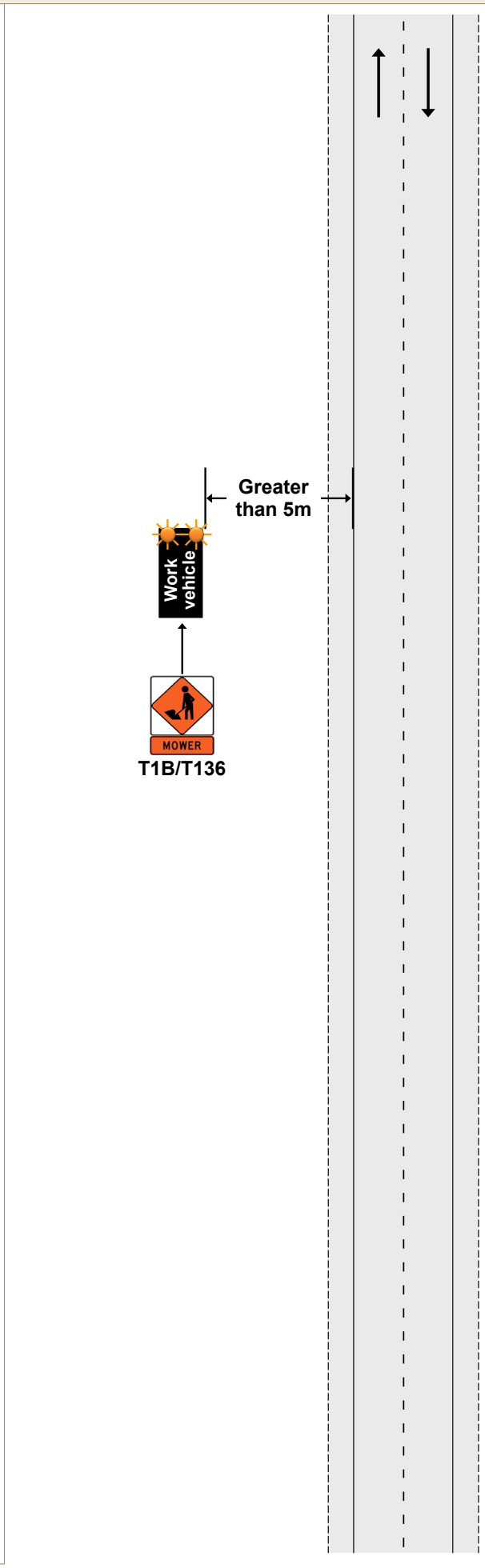
This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
Work vehicle is more than five (5) metres from the edgeline
Any speed

G2.1
Level 2

Notes

1. This layout will also apply to a multiple laned two-way road without a permanent median barrier



TWO-WAY TWO-LANE ROAD
Work vehicle is between two (2) and five (5) metres of the edgeline

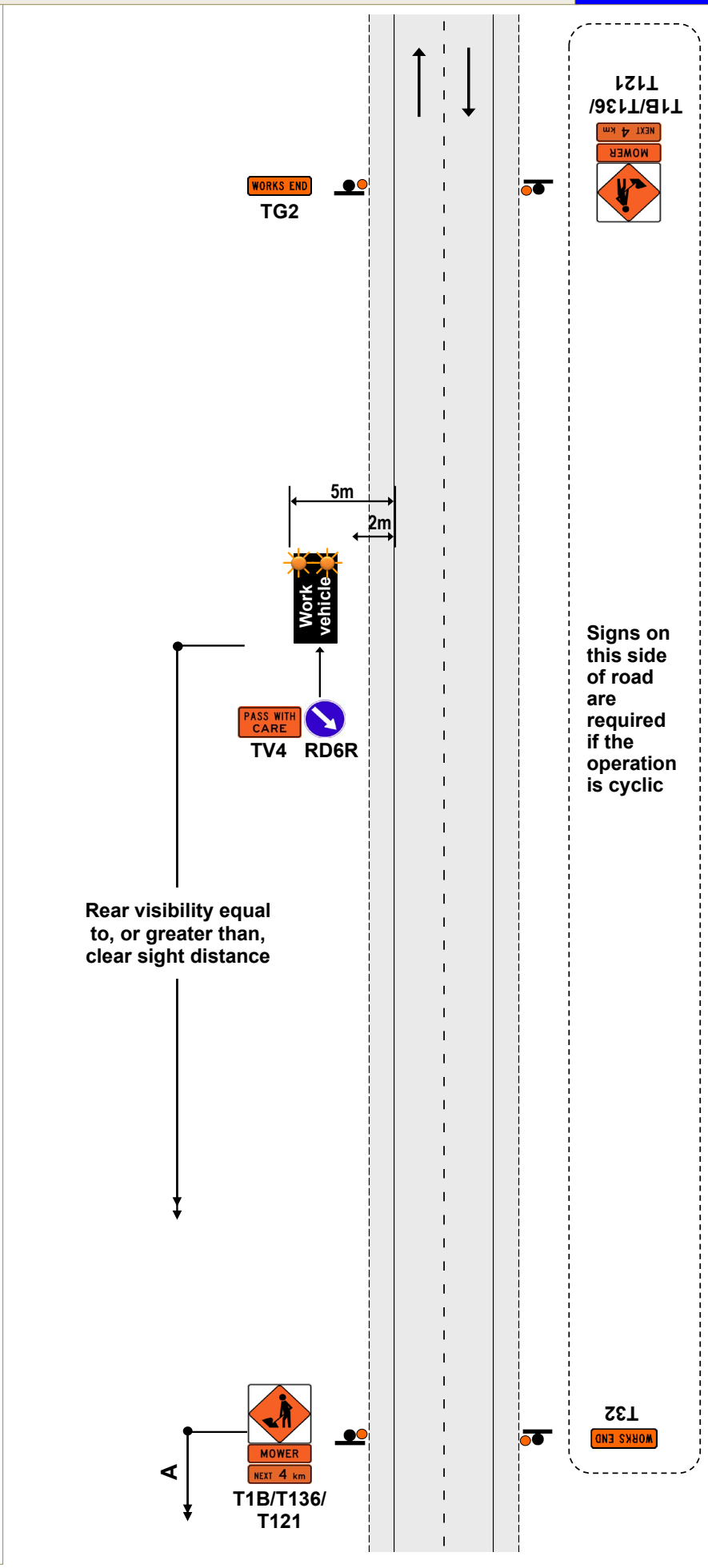
G2.2
Level 2

Notes

1. This layout may also be used on multiple laned roads
2. Rear visibility is more than clear sight distance or rear visibility is less than clear sight distance with the permanent speed of less than 65km/h
3. The T1B sign and supplementary plates must be repeated throughout the length of the worksite at intervals no greater than 4km
4. The static signs may be replaced by an AWVMS if used as a tail pilot

For non-state highways

5. The static signs may be replaced by a tail pilot vehicle with T1B and RD6R/L signs



EXAMPLE ONLY

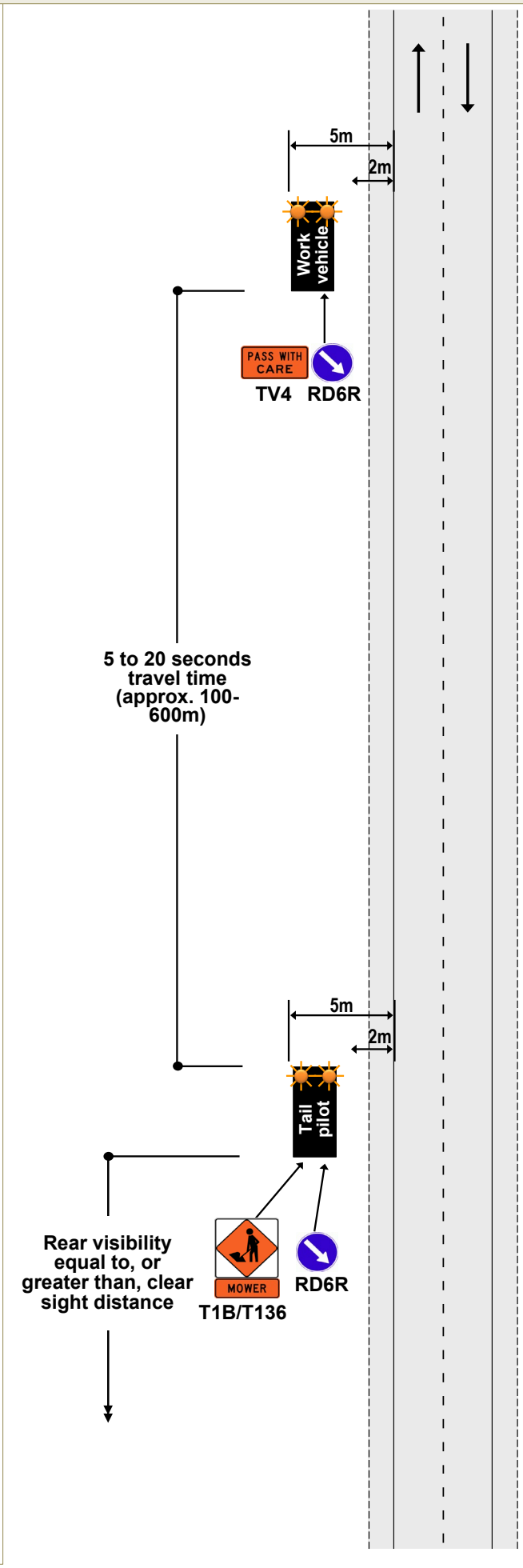
This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
Work vehicle is between two (2) and five (5) metres of the edgeline
Permanent speed greater than 65km/h

G2.3
Level 2

Notes

1. This layout will also apply to a multiple laned two-way road without a permanent median barrier



EXAMPLE ONLY

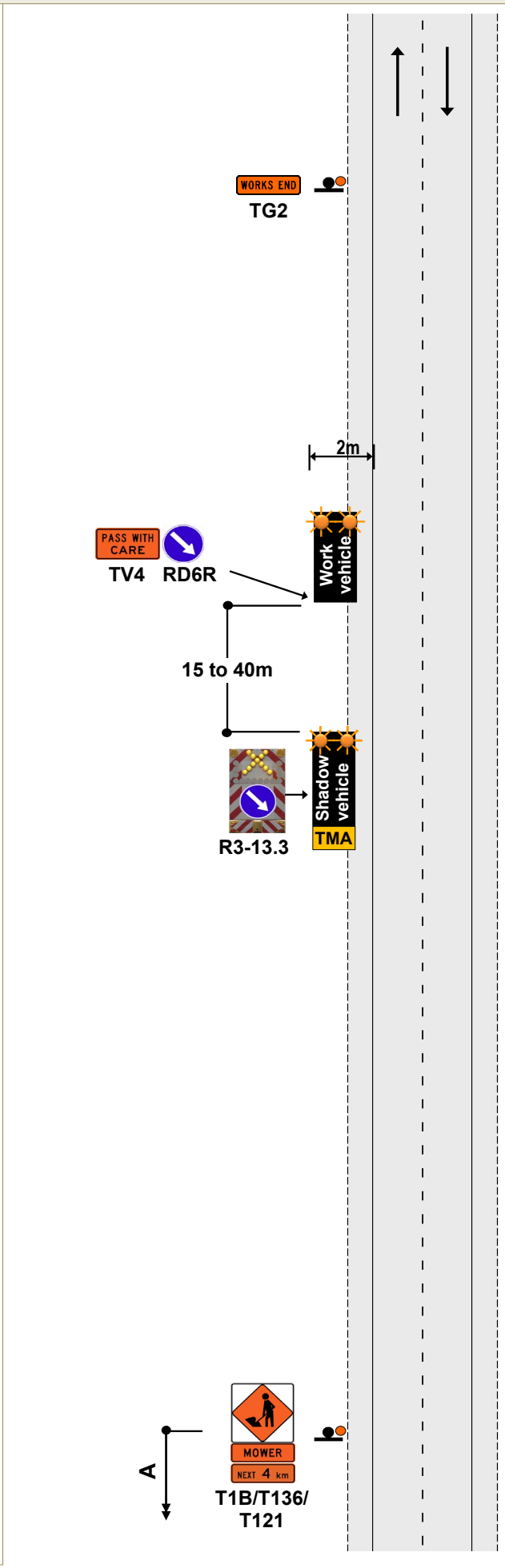
This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
Work vehicle is between zero (0) and two (2) metres of the edgeline
Permanent speed less than 65km/h

G2.4
Level 2

Notes

1. This layout may also be used on multiple laned roads
2. The T1B sign and supplementary plates must be repeated throughout the length of the worksite at intervals no greater than 4km
3. The shadow vehicle must be 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
4. The static signs may be replaced by an AWVMS if used as a tail pilot
5. If using static advance warning signs and the operation is on the lane, then static advance warning signs must also be placed on any intersecting roads/ramps
   For non-state highways
6. With the relevant RCA's permission, the TMA shadow vehicle may have a horizontal arrowboard and a TV4 PASS WITH CARE sign instead of the LAS
7. The static signs may be replaced by a tail pilot vehicle with a TMA, horizontal arrow board, T1B and RD6R/L signs



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
Work vehicle is between zero (0) and two (2) metres from the edgeline
Permanent speed greater than 65km/h

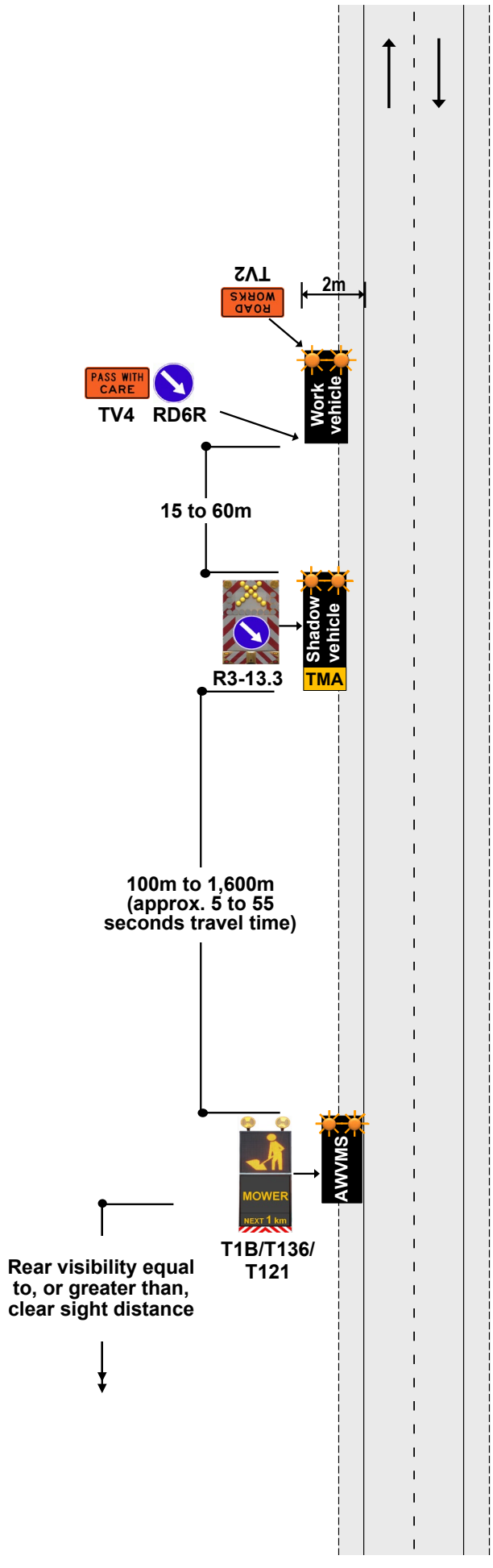
G2.5
Level 2

Notes

1. This layout may also be used on multiple laned roads
2. The shadow vehicle must be 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
3. Where the work is on a two-lane two-way road the leading work vehicle must be fitted with a front-mounted TV2 ROAD WORKS sign unless a lead pilot is required

For non-state highways

4. With the relevant RCA's permission, the TMA shadow vehicle may have a horizontal arrowboard and a TV4 PASS WITH CARE sign instead of the LAS
5. The AWVMS may be replaced by a tail pilot vehicle with a TMA, horizontal arrow board, T1B and RD6R/L signs



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
Work vehicle on live lane
Permanent speed less than 65km/h

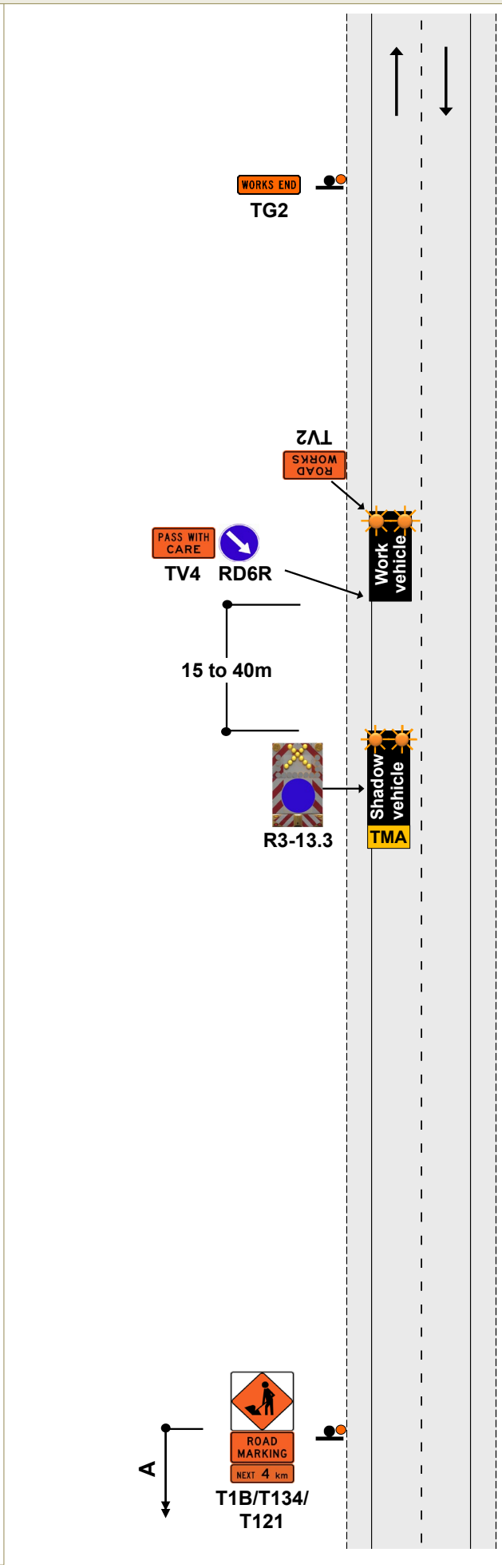
G2.6
Level 2

Notes

1. This layout may also be used on multiple laned roads
2. The T1B sign and supplementary plates must be repeated throughout the length of the worksite at intervals no greater than 4km
3. The shadow vehicle must be 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
4. The static sign may be replaced by an AWVMS if used as a tail pilot
5. If using static advance warning signs and the operation is on the lane, then static advance warning signs must also be placed on any intersecting roads/ramps

For non-state highways

6. With the relevant RCA's permission, the TMA shadow vehicle may have a horizontal arrowboard and a TV4 PASS WITH CARE sign instead of the LAS
7. The static sign may be replaced by a tail pilot vehicle with a TMA, horizontal arrow board, T1B and RD6R/L signs



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
Work vehicle on live lane
Permanent speed greater than 65km/h

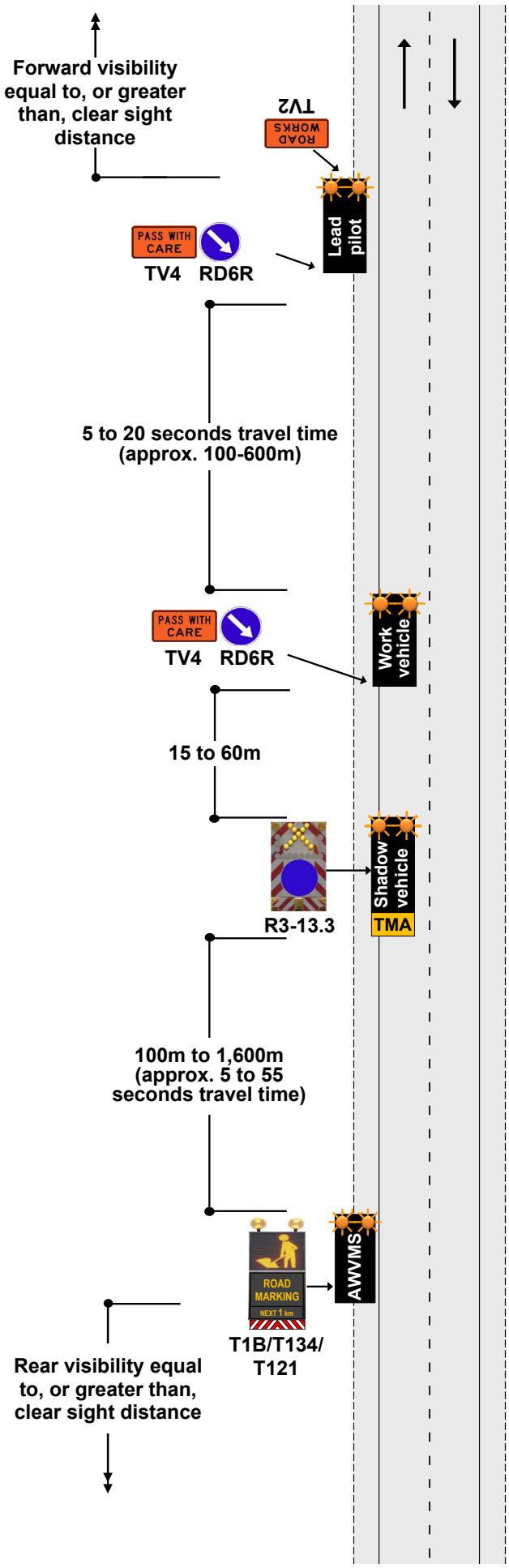
G2.7
Level 2

Notes

1. A lead pilot vehicle must be used on undivided two-way roads with permanent speed limits greater than 65km/h when:
   - visibility to the work vehicle is less than CSD continuously for more than 1km, or
   - the operation crosses the centre line
2. The shadow vehicle must be 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

For non-state highways

3. With the relevant RCA's permission, the TMA shadow vehicle may have a horizontal arrowboard and a TV4 PASS WITH CARE sign instead of the LAS
4. The AWVMS may be replaced by a tail pilot vehicle with a TMA, horizontal arrow board, T1B and RD6R/L signs



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

TWO-WAY TWO-LANE ROAD
Personnel on the live lane

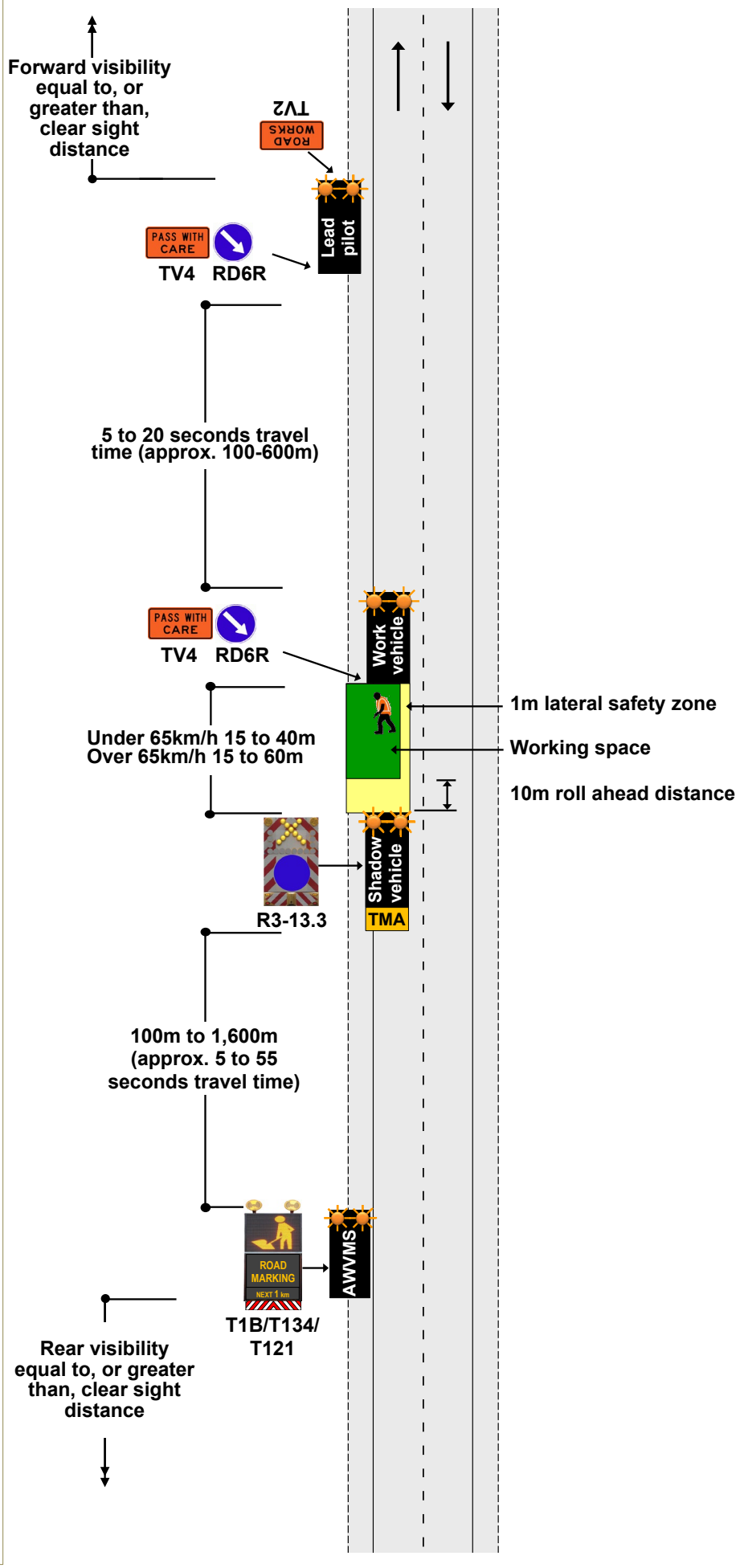
G2.8
Level 2

Notes

1. A lead pilot vehicle must be used on undivided two-way roads with permanent speed limits greater than 65km/h when:
   - visibility to the work vehicle is less than CSD continuously for more than 1km, or
   - the operation crosses the centre line
2. The shadow vehicle must be 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

For non-state highways

3. With the relevant RCA's permission, the TMA shadow vehicle may have a horizontal arrowboard and a TV4 PASS WITH CARE sign instead of the LAS
4. The AWVMS may be replaced by a tail pilot vehicle with a TMA, horizontal arrow board, T1B and RD6R/L signs



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Work vehicle is between zero (0) and two (2) metres from the edgeline
Permanent speed less than 65km/h

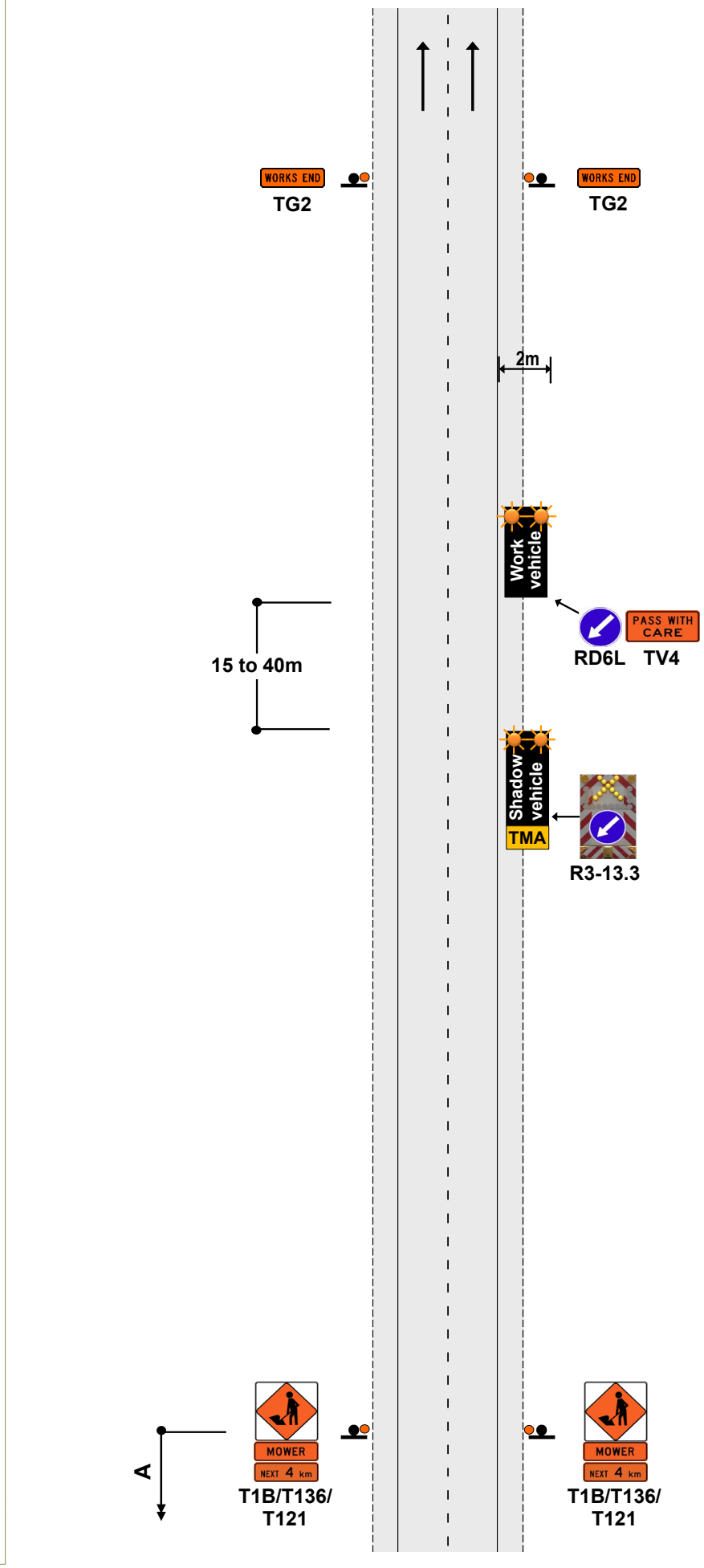
G2.9
Level 2

Notes

1. The T1B sign and supplementary plates must be repeated throughout the length of the worksite at intervals no greater than 4km
2. The shadow vehicle must be 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
3. The static sign may be replaced by an AWVMS if used as a tail pilot
4. If using static advance warning signs and the operation is on the lane, then static advance warning signs must also be placed on any intersecting roads/ramps

For non-state highways

5. With the relevant RCA's permission, the TMA shadow vehicle may have a horizontal arrowboard and a TV4 PASS WITH CARE sign instead of the LAS
6. The static signs may be replaced by a tail pilot vehicle with a TMA, horizontal arrow board, T1B and RD6R/L signs



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Work vehicle is between zero (0) and two (2) metres from the edgeline
Permanent speed greater than 65km/h

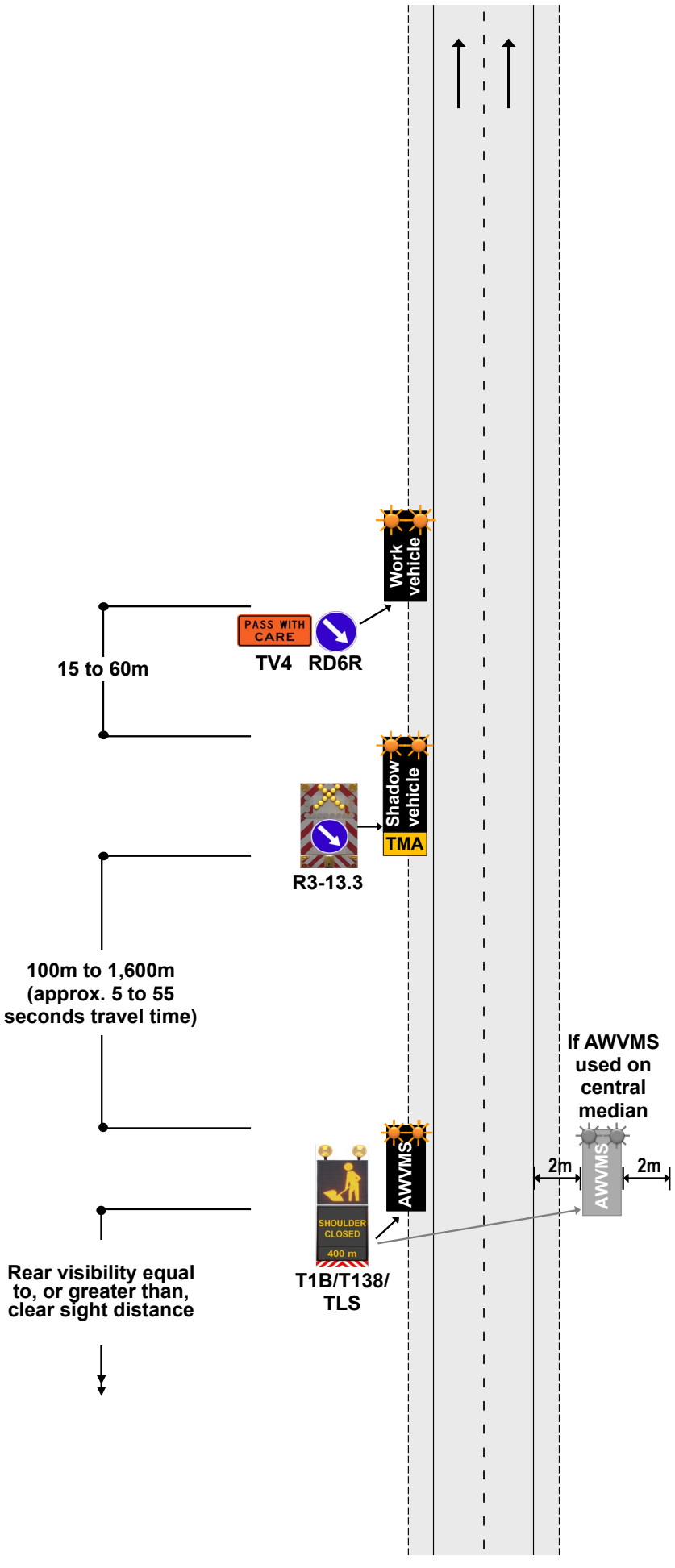
G2.10
Level 2

Notes

1. The shadow vehicle must be 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
2. If used on a central median, the AWVMS is to be positioned at least 2m clear of the edgeline of both carriageways
3. With a right hand closure where there is no available shoulder on the right hand median, the AWVMS can be positioned on the left hand side clear of the edgeline showing a right hand lane drop

For non-state highways

4. With the relevant RCA's permission, the TMA shadow vehicle may have a horizontal arrowboard and a TV4 PASS WITH CARE sign instead of the LAS
5. The AWVMS may be replaced by a tail pilot vehicle with a TMA, horizontal arrow board, T1B and RD6R/L signs



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Work vehicle is on the live lane
Permanent speed less than 65km/h

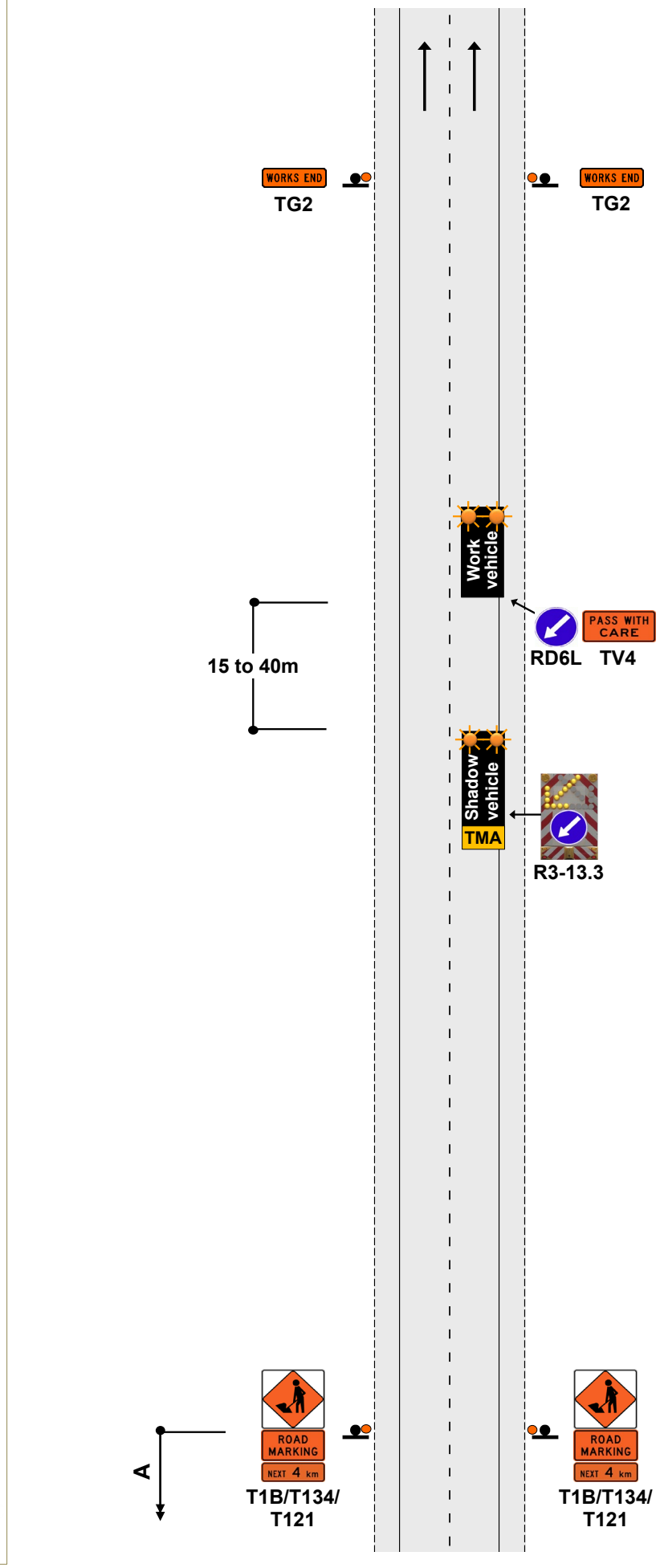
G2.11
Level 2

Notes

1. The T1B sign and supplementary plates must be repeated throughout the length of the worksite at intervals no greater than 4km
2. The shadow vehicle must be 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
3. The static signs may be replaced by an AWVMS if used as a tail pilot
4. If using static advance warning signs and the operation is on the lane, then static advance warning signs must also be placed on any intersecting roads/ramps

For non-state highways

5. With the relevant RCA's permission, the TMA shadow vehicle may have a horizontal arrowboard and a TV4 PASS WITH CARE sign instead of the LAS
6. The static signs may be replaced by a tail pilot vehicle with a TMA, horizontal arrow board, T1B and RD6R/L signs



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Work vehicle is on the live lane
Permanent speed greater than 65km/h

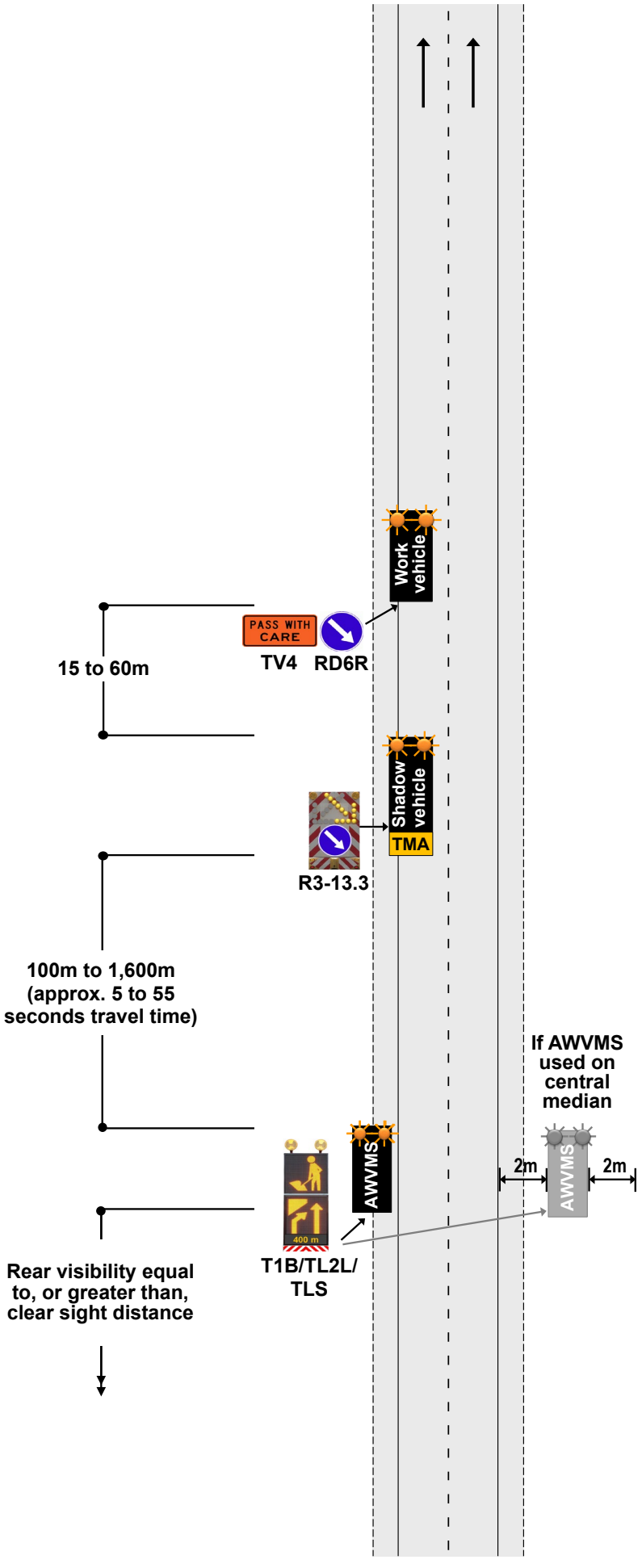
G2.12
Level 2

Notes

1. The shadow vehicle must be 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
2. If used on a central median, the AWVMS is to be positioned at least 2m clear of the edgeline of both carriageways
3. With a right hand closure where there is no available shoulder on the right hand median, the AWVMS can be positioned on the left hand side clear of the edgeline showing a right hand lane drop

For non-state highways

4. With the relevant RCA's permission, the TMA shadow vehicle may have a horizontal arrowboard and a TV4 PASS WITH CARE sign instead of the LAS
5. The AWVMS may be replaced by a tail pilot vehicle with a TMA, horizontal arrow board, T1B and RD6R/L signs



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Part or all of lane occupied – Semi-static closure (work for up to 1 hour)
Permanent speed less than 65km/h

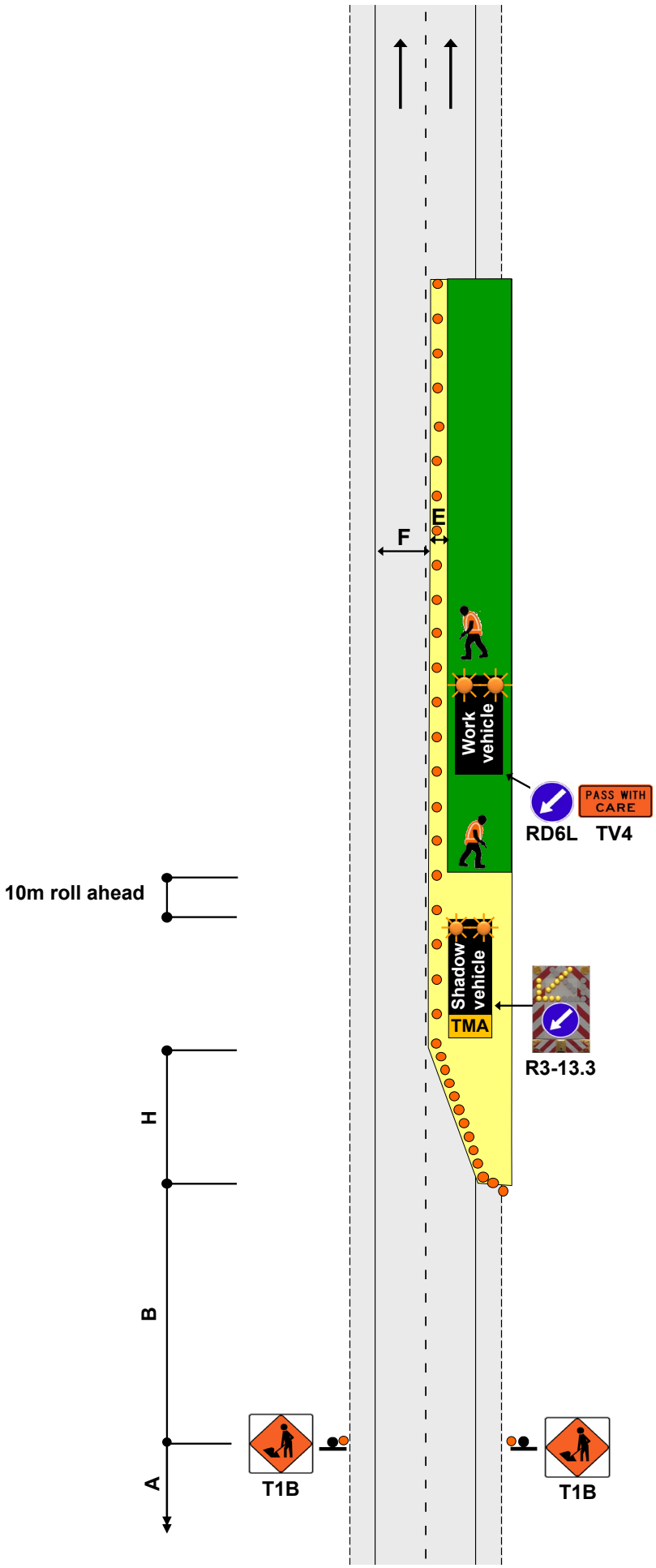
G2.13
Level 2

Notes

1. This layout applies when the work activity can be completed within one hour (excluding TTM set up and TTM removal from the worksite)
2. The shadow vehicle must be 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
3. The static signs may be replaced by an AWVMS. Use TMD G2.14 in this case
4. If using static advance warning signs and the operation is on the lane, then static advance warning signs must also be placed on any intersecting roads/ramps

For non-state highways

5. With the relevant RCA's permission, the TMA shadow vehicle may have a horizontal arrowboard and a TV4 PASS WITH CARE sign instead of the LAS
6. The static sign on the right-hand side of the road may be replaced by a tail pilot vehicle with a TMA, horizontal arrow board, T1B and RD6L sign



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY TWO-LANE DIVIDED OR TWO-LANE ROAD
Part or all of lane occupied – Semi-static closure (work for up to 1 hour)
Permanent speed greater than 65km/h

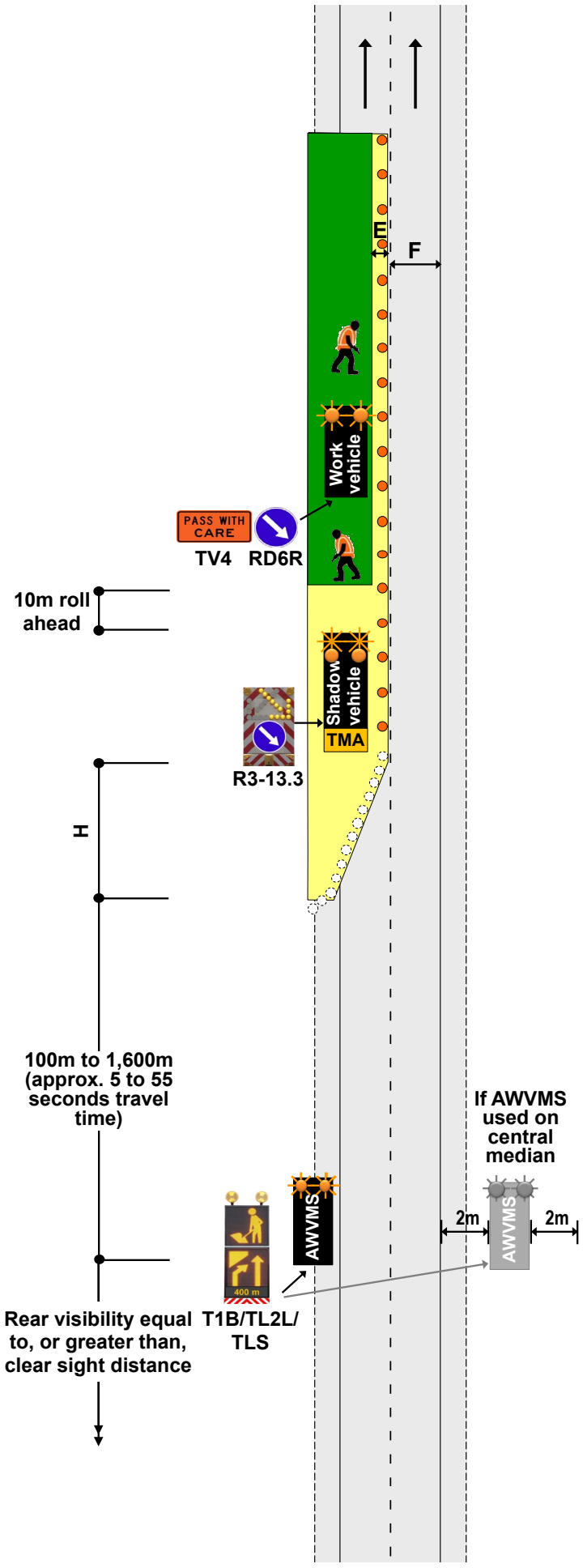
G2.14
Level 2

Notes

1. This layout applies when the work activity can be completed within one hour (excluding TTM set up and TTM removal from the worksite)
2. The shadow vehicle must be 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
3. The AWVMS can be located either side of the road depending on availability of space to park the AWVMS
4. If used on a central median, the AWVMS is to be positioned at least 2m clear of the edgeline of both carriageways
5. With a right hand closure where there is no available shoulder on the right hand median, the AWVMS can be positioned on the left hand side clear of the edgeline showing a right hand lane drop
6. Where an AWVMS is used, a cone taper (H) is optional

For non-state highways

7. With the relevant RCA's permission, the TMA shadow vehicle may have a horizontal arrowboard and a TV4 PASS WITH CARE sign instead of the LAS
8. The AWVMS may be replaced by a tail pilot vehicle with a TMA, horizontal arrow board, T1B and RD6L sign



EXAMPLE ONLY

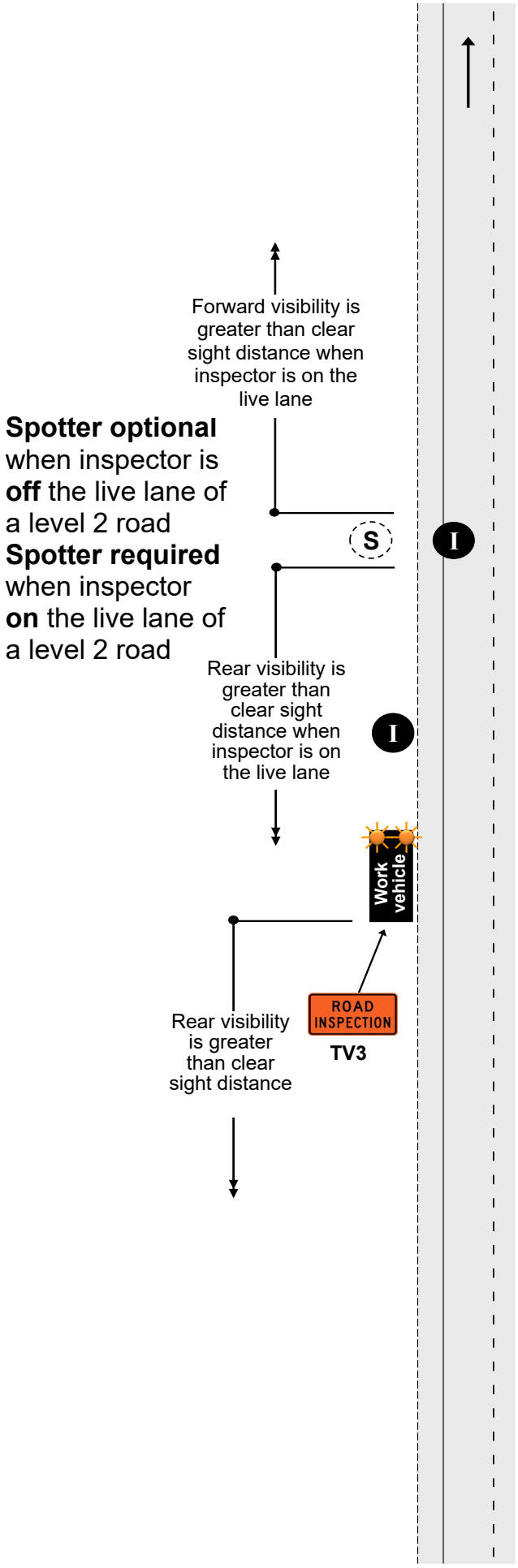
This drawing must not be used as a TMP diagram

INSPECTION ACTIVITIES AND NON-INVASIVE WORKS
On shoulder and on the live lane

G2.15
Level 2

Notes

1. Inspectors must move from live lanes to avoid traffic. They must not expect traffic to drive slowly or drive around them
2. The inspector cannot be on a live lane for more than 5 minutes
3. There must be CSD to the inspector when on the live lane. If this cannot be achieved, a spotter must be placed in a position where CSD can be attained and verbal instructions be given to the inspector. If this is not possible, a static or mobile operation is required.
4. A spotter is not required for inspection activities out of the live lane
5. If the Inspector is on the live lane of a road with a permanent speed greater than 65km/h the onsite control must be by a L2/3 STMS or an STMS-NP
6. If the Inspector is on the live lane of a road with a permanent speed less than 65km/h the onsite control must be by a L2/3 STMS, or an STMS-NP or a TC Inspector
7. For inspection activities that are carried out by a TC Inspector or an STMS-NP the L2/3 STMS must be immediately contactable but does not have to be within 30 minutes travel time of the worksite
8. An unaccompanied inspector may walk across a level 2 road
9. A vehicle is not required on a level 2 road with a permanent speed of less than 65km/h if the inspector remains on a footpath
10. 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)



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

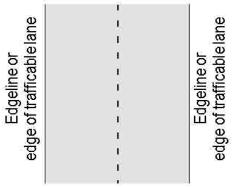
Note:
This page is to be used as the layout distances table for the level 2 static and mobile diagrams.
Print this page on A3 paper and fold it to fit an A4 page.
Unfold this page when you want to view the layout distances table and a diagram at the same time.

LEGEND FOR DIAGRAMS

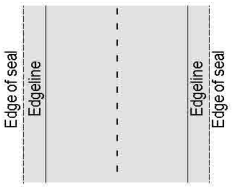
Working space

Safety zones

Edgeline or edge of trafficable lane (indicated by solid black line)



Edge of Seal (indicated by dotted line next to solid black line)



Mandatory:
- Cones
- Signs

Optional:
- Cones
- Signs

Hazard area

Manhole

Barrier, safety fence or cone bars

Ramp

LEVEL 2 LAYOUT DISTANCES TABLE

Permanent/TSL (km/h)		≤50	60	70	80	90	100 /110
Traffic signs							
A	Sign visibility distance (m)	60/50+	70/60+	80	100	120	120
B	Warning distance (m)	100/75+	120/90+	140	160	200	200
C	Sign spacing (m)	50/35+	60/45+	70	80	100	100
Safety zones							
D	Longitudinal (m)*	15	20	30	45	60	60
E	Lateral (m)						
	1. Behind cones	1	1	1	1	1	1
	2. Behind barrier installations	As specified by the Installation Designer					
Tapers							
H	Initial taper length per lane (m)**	90/50+	100/60+	120	150	180	180
I	Subsequent taper length per lane (m)	50	60	70	80	100	100
K	Minimum distance between tapers (m)	50	60	70	80	100	100
Delineation device							
Spacing (centres)	All tapers (m)	2.5	2.5	2.5	2.5	2.5	2.5
	Cones parallel to the lane - eg between tapers and alongside working space (m)	5	5	10	10	10	10
	At merge and diverge points for ramps and slip lanes, intersecting road entry and exit points, and worksite access points	2.5m for 10m either side of a change in alignment		2.5m for 20m either side of a change in alignment			

* A longitudinal safety zone is not required when a barrier completely protects the approach end of the worksite.

** Taper length is based on a single lane shift of 3.5m.

\+ The longer distance is the desirable distance, the shorter distance is the minimum distance required. The longer distances must be used wherever possible. The shorter distances may only be used where there are road environment constraints.

Lane widths (based on permanent speed or TSL if applied)

Speed (km/h)		30	40	50	60	70	80	90	100/110
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above tables are minimum values.

Approach sign distances and spacings, the initial taper(s) and any longitudinal safety zone associated with that taper must be based on the permanent speed limit. The layout distances of the remainder of the worksite, including any subsequent tapers, may be based on the TSL, provided the TSL is applied prior to the first taper.

Traffic Control Devices Manual
Part 8

Code of practice for temporary traffic management (CoPTTM)

manual number: SP/M/010

Section H

www.nzta.govt.nz

Fourth edition, Amendment 4 of
Code of practice for temporary traffic management

Date of issue: November 2018

Effective date: 1 February 2019

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

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

More information

Published 2013

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

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

LEVEL 3 DIAGRAMS LIST

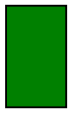
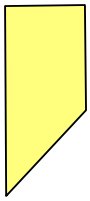
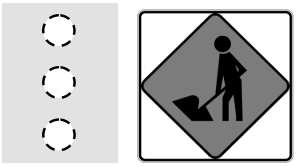
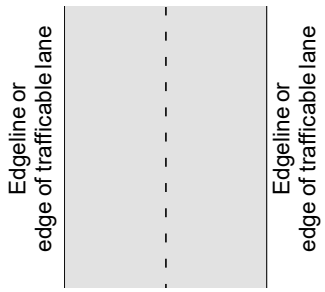
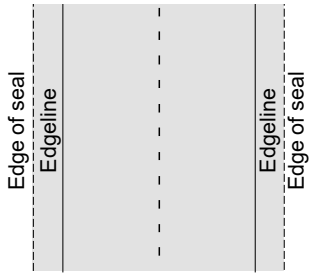
STATIC OPERATIONS

No.	LEVEL 3 ROADS	
ONE-WAY MULTI-LANE ROAD		
H1.1	Shoulder closure	No temporary speed limit
H1.2	Other hazard	Flooding, slips, slippery surface
H1.3	Right-lane closure	
H1.4	Two-lane closure	One-lane temporary diversion
H1.5	Left-lane closure	Chicane layout
H1.6	Site access	
H1.7	Right-lane closure	
H1.8	Left-lane closure	Chicane layout
H1.9	Right and centre lane closure	
H1.10	Left and centre lane closure	Chicane layout
H1.11	Right and centre lane closure	Two lane temporary diversion
H1.12	Left-lane closure	On-ramp within worksite
H1.13	Left-lane closure	Off-ramp within worksite
H1.14	Off-ramp closure	
H1.15	Road closure	Detour via off ramp
H1.16a	Closure example	On-ramp within worksite
H1.16b	Closure example	Low accessed site
H1.16c	Closure example	High accessed site
H1.16d	Closure example	Off-ramp within worksite
H1.17	Long-term closure	Left-lane closure - barrier
H1.18	Long-term closure	Right-lane closure - barrier

MOBILE OPERATIONS

ONE-WAY MULTI-LANE ROAD		
H2.1	Work vehicle is more than five (5) metres from the edgeline - Zone A	
H2.2	Work vehicle is between two (2) and five (5) metres from the edgeline - Zone B	Rear visibility is GREATER than the clear sight distance
H2.3	Work vehicle is between two (2) and five (5) metres from the edgeline - Zone B	Rear visibility is LESS than the clear sight distance
H2.4	Work vehicle is between zero (0) and two (2) metres from the edgeline - Zone C	
H2.5	Work vehicle on live lane - Zone C	
H2.6	Work vehicle on live lane or within 2m from live lane - Zone C	No available shoulder width for AWVMS within 1,600m of work vehicle
H2.7	Work vehicle on live lane or within 2m from live lane - Zone C	Personnel on the live lane
H2.8	Inspection activities and non-invasive works	On shoulder or berm only
H3.1	Semi-static closure	Left-lane closure
H3.2	Semi-static closure	Right and centre lane closure

LEGEND FOR DIAGRAMS

Working space 	**Mandatory:** ▪ Cones ▪ Signs 
Safety zones 	**Optional:** ▪ Cones ▪ Signs 
Edgeline or edge of trafficable lane (indicated by solid black line) 	**Hazard area** 
Edge of Seal (indicated by dotted line next to solid black line) 	**Barrier** 
	Chevron 

LEVEL 3 LAYOUT DISTANCES TABLE

Permanent/TSL (km/h)		≤50	60	70	80	90	100/110
Traffic signs							
A	Sign visibility distance (m)	60/50+	70/60+	80	100	120	120
C +	Sign spacing (m) - **Desirable**	50	60	70	160	200	200
	Sign spacing (m) - **Minimum**	35	45	70	80	100	100
Safety zones							
D	Longitudinal (m)*	15	20	30	45	60	60
E	Lateral (m)						
	1. Behind cones etc	1	1	1	1	1	1
	2. Behind barrier installations	As specified by the Installation Designer					
Tapers							
H	Initial taper length per lane (m)**	90/50+	100/60+	120	150	180	180
I	Subsequent taper length per lane (m)	50	60	70	80	100	100
K	Minimum distance between tapers (m) ***	50	60	70	80	100	100
Delineation devices (all speeds)							
Spacing (centres)	All tapers (m)	2.5	2.5	2.5	2.5	2.5	2.5
	Cones parallel to the lane (eg between tapers and alongside the working space) (m)	5	5	10	10	10	10
	At merge and diverge points for ramps and slip lanes, intersecting road entry and exit points, and worksite access points	2.5m for 10m either side of a change in alignment		2.5m for 20m either side of a change in alignment			

\+ The longer distance is the desirable distance, the shorter distance is the minimum distance allowed. The desirable distances must be used wherever possible. The minimum distances may only be used where there are road environment constraints.

Where only one sign is erected in advance of a taper the distance from the sign to the taper is 2xC.

* A longitudinal safety zone is not required when a barrier completely protects the approach end of the worksite. Refer subsections H1.17 and H1.18.

** Taper length is based on a single lane shift of 3.5m.

*** Must be altered if required to meet the distance shown on the TLS supplementary plate.

Lane widths (based on permanent speed or TSL if applied)

Speed (km/h)		30	40	50	60	70	80	90	100/110
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above table are minimum values. Approach sign distances and spacings, the initial taper(s) and any longitudinal safety zone associated with that taper must be based on the permanent speed limit. The layout distances of the remainder of the worksite, including any subsequent tapers, may be based on the TSL, provided the TSL is applied prior to the first taper.

ONE-WAY MULTI-LANE ROAD
Shoulder closure
No temporary speed limit

H1.1
Level 3

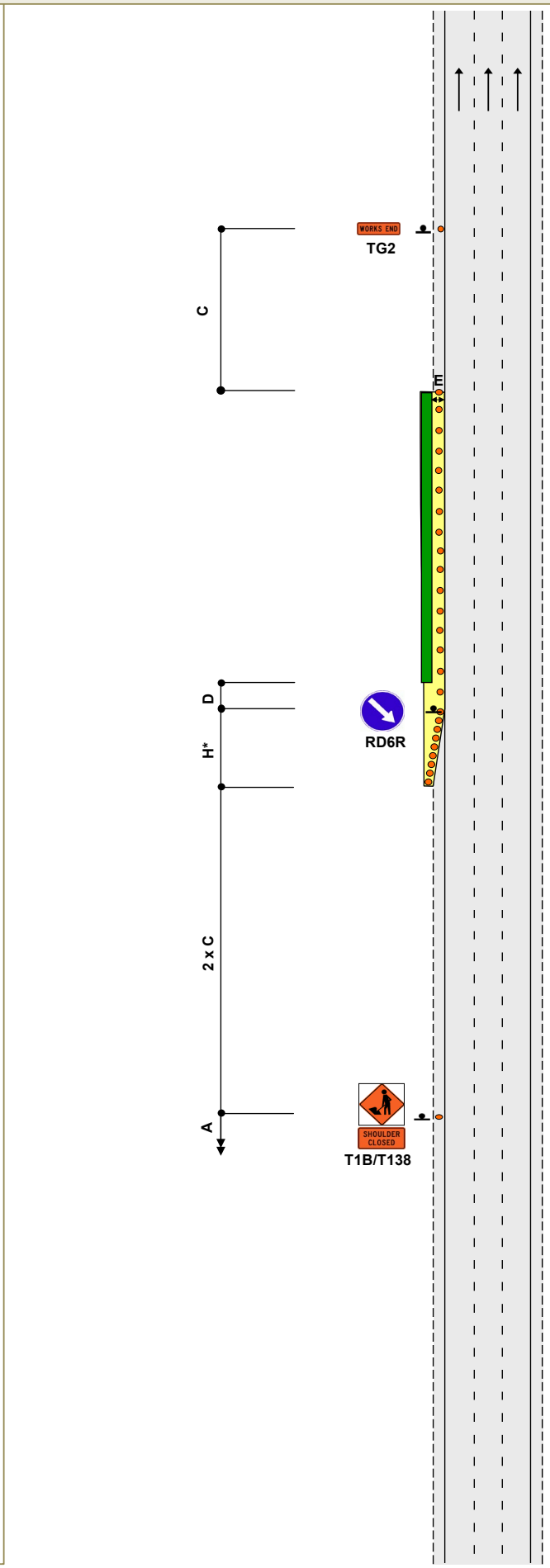
Notes

1. A 10m taper, with a minimum of 5 cones, is allowed where shoulder width is 2.5m or less
2. If a 10m taper is used, an RD6R is only required at the head of the taper
3. *For shoulders exceeding 2.5m width, apply the calculation of taper length for lateral shift of less than 3.5m:

   $\frac{W \times H}{3.5}$

   W = Width of lateral shift

   H = Taper length in metres from the level 3 layout distance table



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Other hazard
Flooding, slips, slippery surface

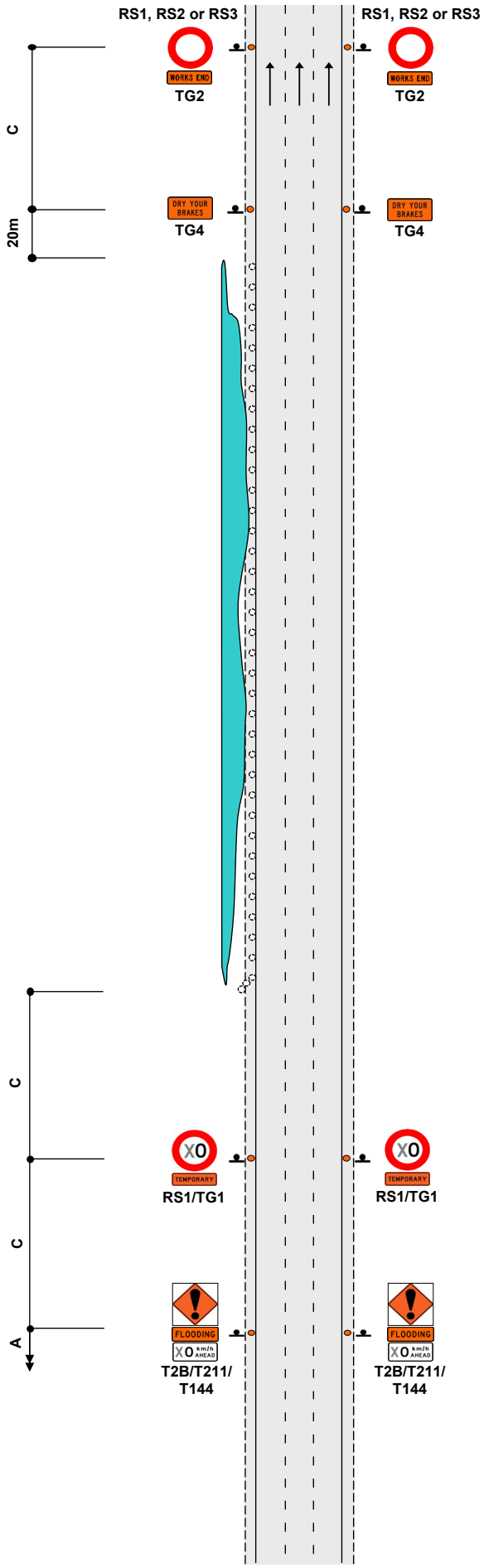
H1.2
Level 3

Notes

1. This diagram is for initial response only. Appropriate long term TTM must be installed as soon as practical
2. This layout should only be used for shallow flooding that vehicles can traverse while remaining in their correct lane(s)
3. A 10m taper, with a minimum of 5 cones, is allowed where shoulder width is 2.5m or less
4. The advance warning sign may be any one of the following:

T2B		Other hazard
T211		Flooding
TR1L/R		Slips
TR2		Slippery Surface

5. If necessary, erect TG4 DRY YOUR BRAKES sign
6. If TSLs are not required, the warning distance must be at least 2 x C



EXAMPLE ONLY

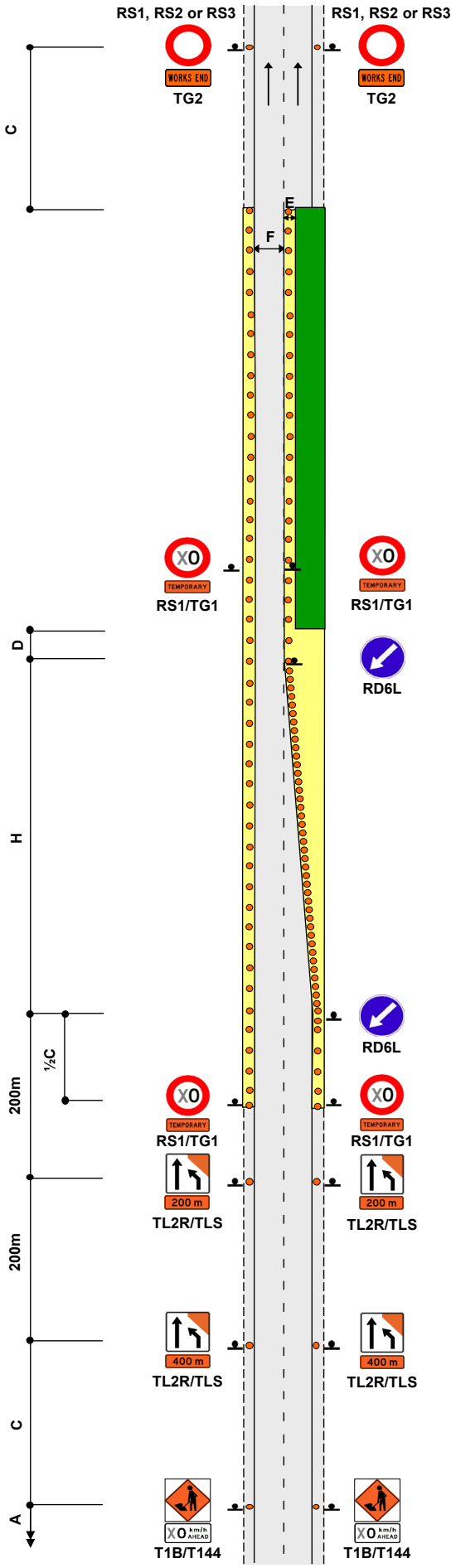
This drawing must not be used as a TMP diagram

ONE-WAY TWO-LANE ROAD
Right-lane closure

H1.3
Level 3

Notes

1. TSLs to be repeated at 400m maximum centres
2. C.4.3.1 - On level 3 roads cones are required from the TSL sign to the start of the taper or hazard area where no taper is installed. Where the edgeline is well defined (ie by a clean kerb and channel) the line of cones is not required



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY TWO-LANE ROAD
Two-lane closure
One-lane temporary diversion using shoulder

H1.4
Level 3

Notes

1. *Calculation of taper length for lateral shift of less than 3.5m is:

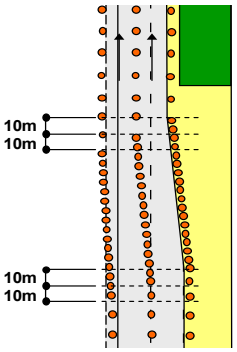
   $\frac{W \times l}{3.5}$

   W = Width of lateral shift

   l = Taper length in metres from the level 3 layout distance table

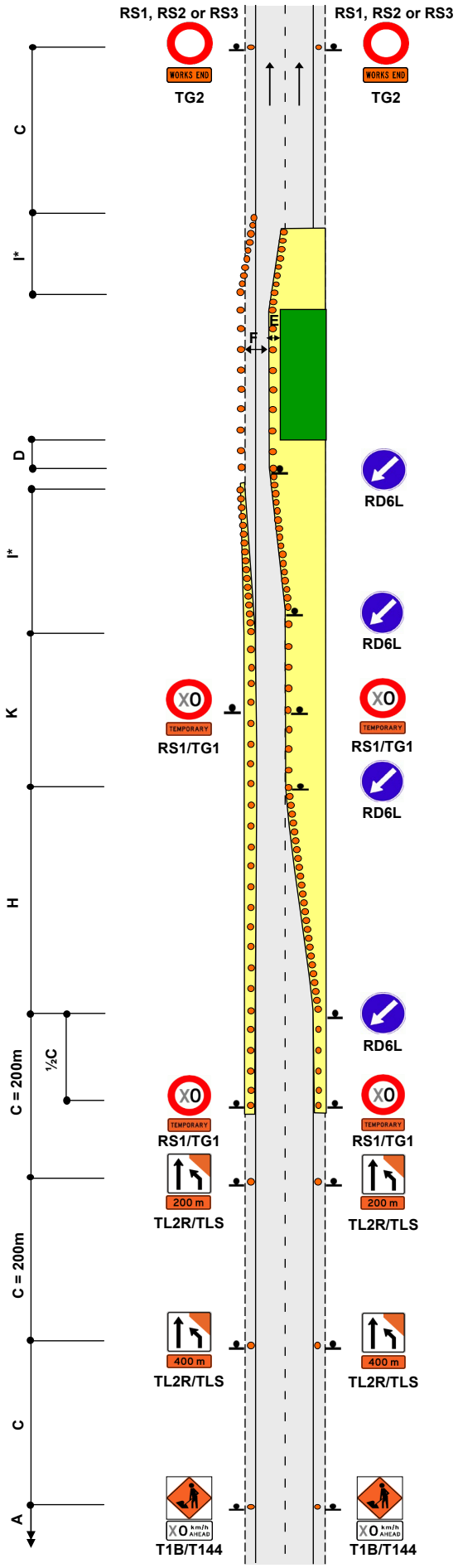
2. TSLs to be repeated at 400m maximum centres
3. If delays are likely, add a T143 DELAYS POSSIBLE sign either 1km or 2km in advance of the worksite

4. Where there is a lane shift, a 10m minimum offset should be used to enable heavy vehicles to make the shift



5. C.4.3.1 - On level 3 roads cones are required from the TSL sign to the start of the taper or hazard area where no taper is installed. Where the edgeline is well defined (ie by a clean kerb and channel) the line of cones is not required

This drawing must not be used as a TMP diagram



ONE-WAY TWO-LANE ROAD
Left-lane closure
Chicane layout

H1.5
Level 3

Notes

1. *Calculation of taper length for lateral shift of less than 3.5m is:

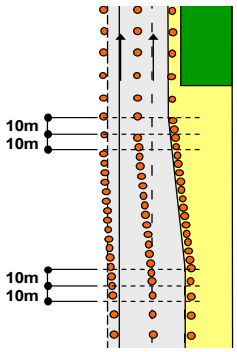
   $\frac{W \times l}{3.5}$

   W = Width of lateral shift

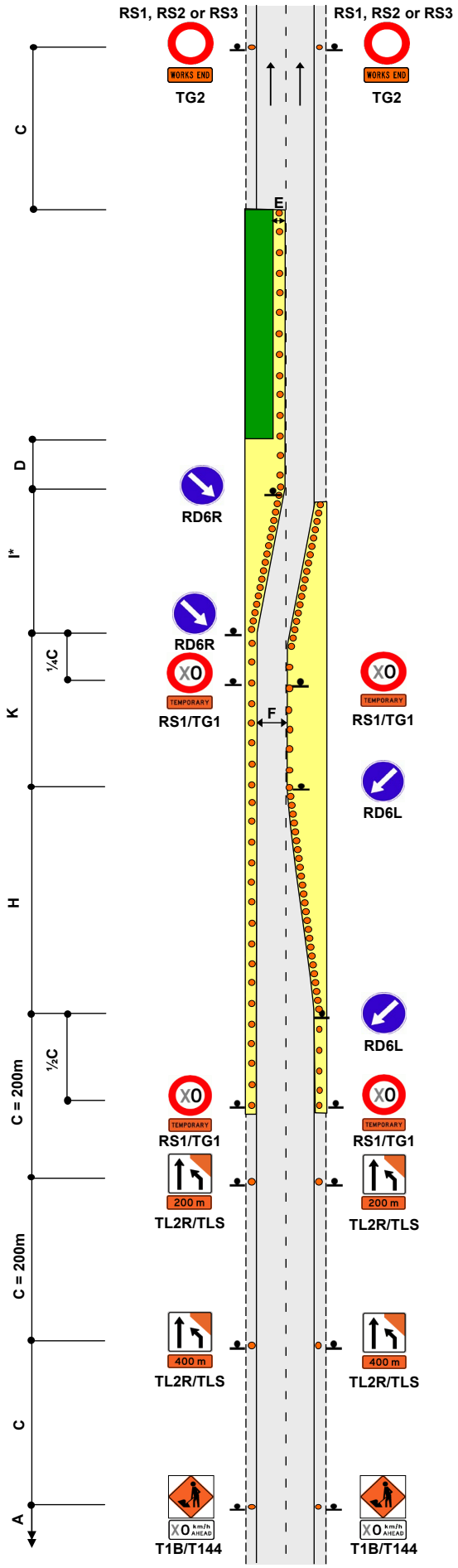
   l = Taper length in metres from the level 3 layout distance table

2. TSLs to be repeated at 400m maximum centres
3. If delays are likely, add a T143 DELAYS POSSIBLE sign either 1km or 2km in advance of the worksite

4. Where there is a lane shift, a 10m minimum offset should be used to enable heavy vehicles to make the shift



This drawing must not be used as a TMP diagram

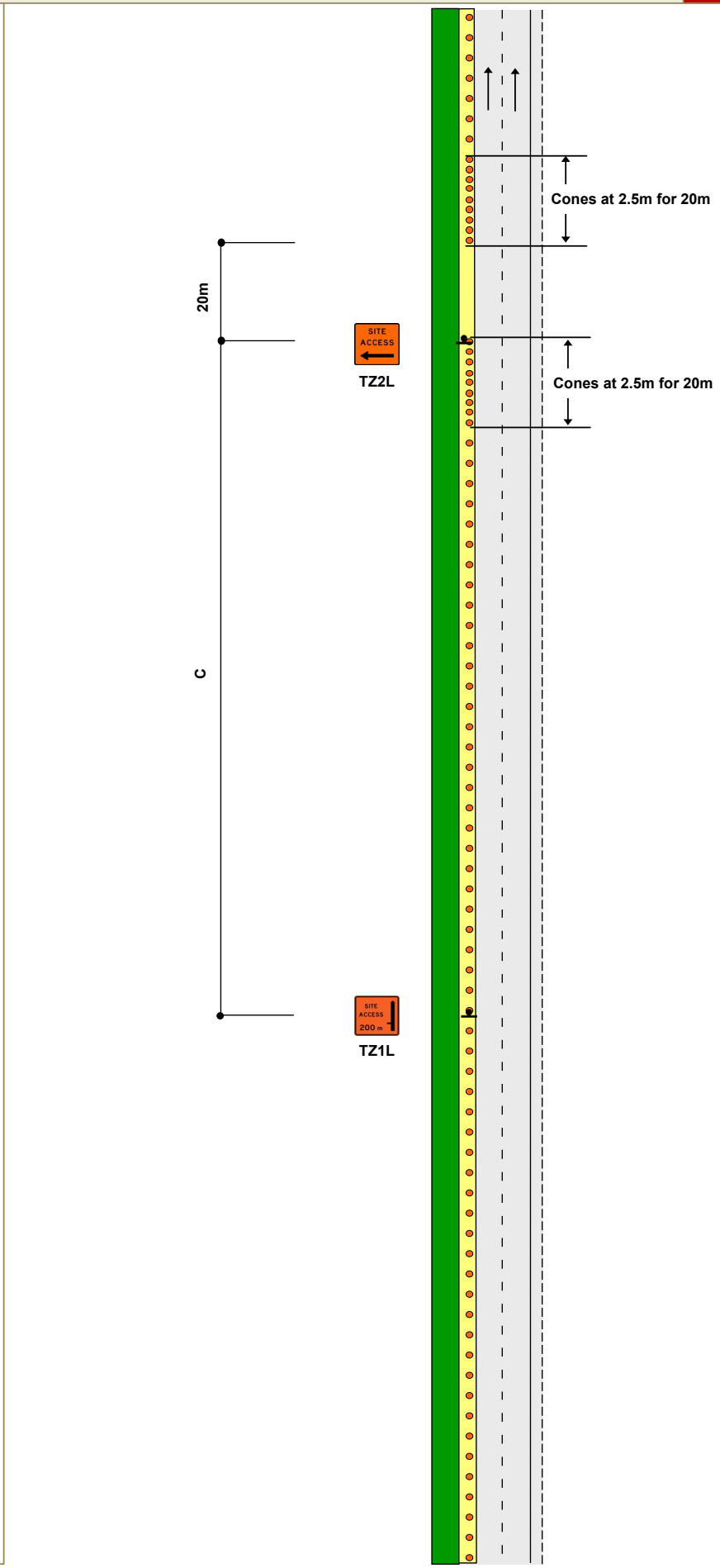


ONE-WAY MULTI-LANE ROAD
Site access

H1.6
Level 3

Notes

1. This diagram is designed to show only the site access to a closure



EXAMPLE ONLY

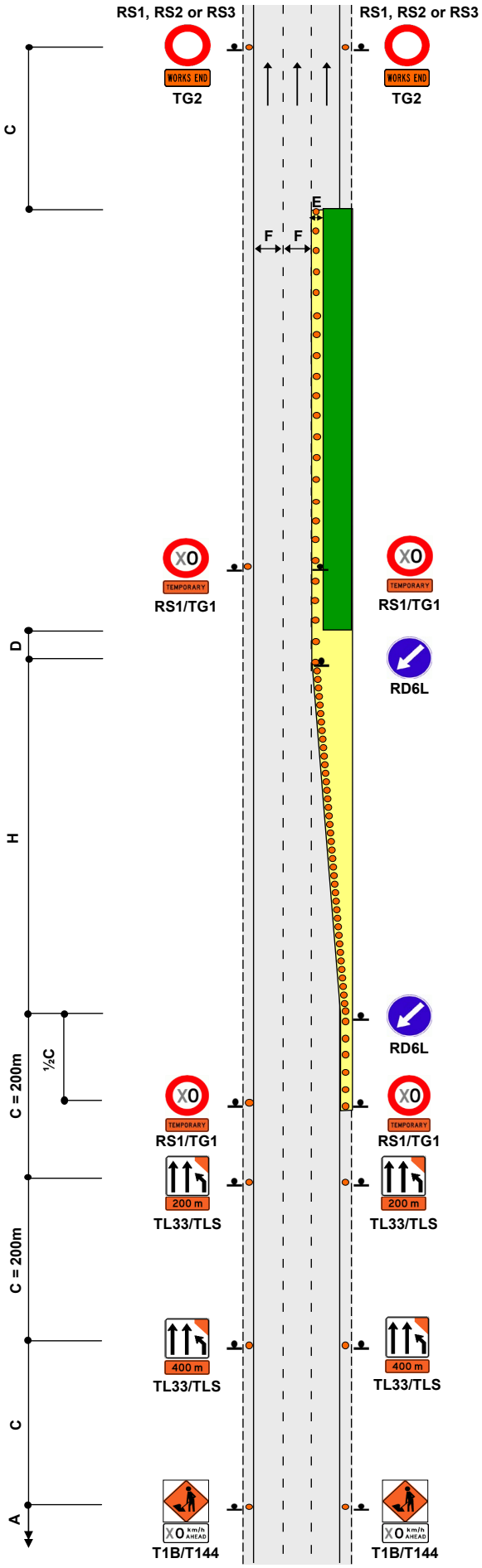
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Right-lane closure

H1.7
Level 3

Notes

1. TSLs to be repeated at 400m maximum centres
2. If delays are likely, add a T143 DELAYS POSSIBLE sign either 1km or 2km in advance of the worksite



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Left-lane closure
Chicane layout

H1.8
Level 3

Notes

1. *Calculation of taper length for lateral shift of less than 3.5m is:

   $\frac{W \times I}{3.5}$

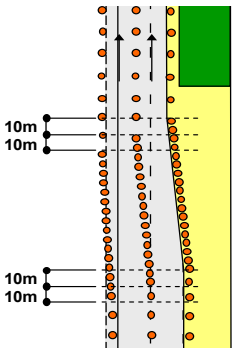
   W = Width of lateral shift

   I = Taper length in metres from the level 3 layout distance table

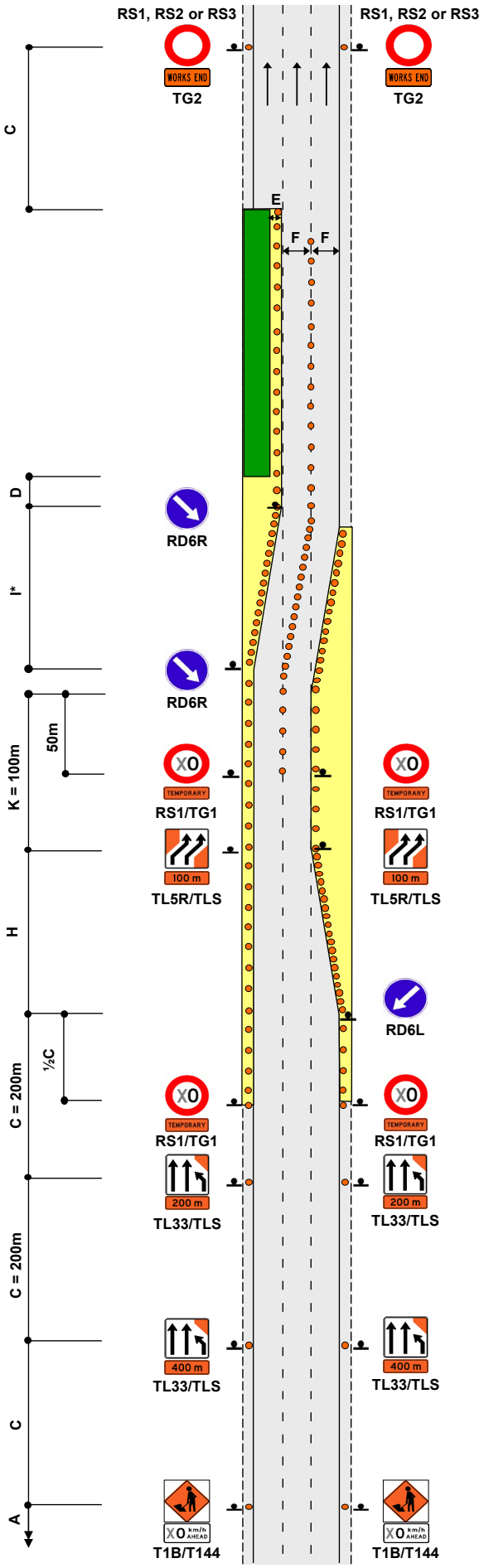
2. TSLs to be repeated at 400m maximum centres

3. If delays are likely, add a T143 DELAYS POSSIBLE sign either 1km or 2km in advance of the worksite

4. Where there is a lane shift, a 10m minimum offset should be used to enable heavy vehicles to make the shift



5. For the centre median, tubular delineators temporarily fixed to the surface may be used, or for a long term situation a new centreline may be applied



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Right and centre lane closure

H1.9
Level 3

Notes

1. *Calculation of taper length for lateral shift of less than 3.5m is:

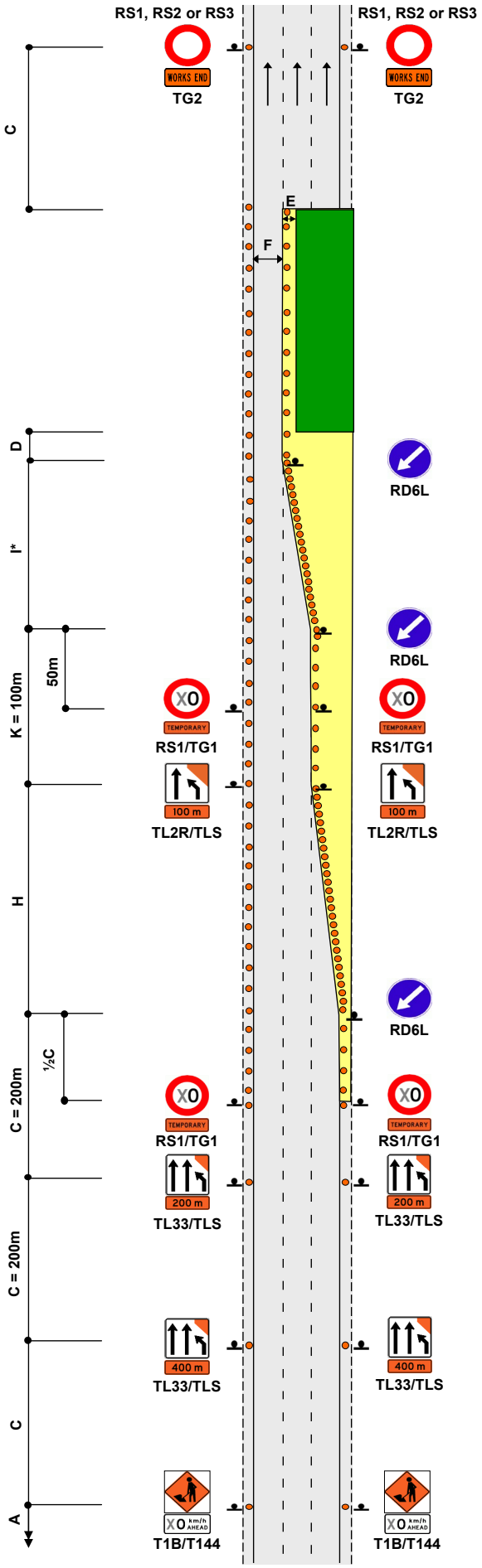
   $\frac{W \times l}{3.5}$

   W = Width of lateral shift

   l = Taper length in metres from the level 3 layout distance table

2. TSLs to be repeated at 400m maximum centres
3. If delays are likely, add a T143 DELAYS POSSIBLE sign either 1km or 2km in advance of the worksite

4. Refer C.4.3.1 - On level 3 roads cones are required from the TSL sign to the start of the taper or hazard area where no taper is installed



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Left and centre lane closure
Chicane layout

H1.10
Level 3

Notes

1. *Calculation of taper length for lateral shift of less than 3.5m is:

   $\frac{W \times I}{3.5}$

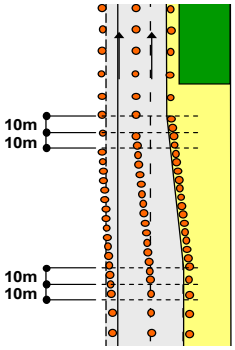
   W = Width of lateral shift

   I = Taper length in metres from the level 3 layout distance table

2. TSLs to be repeated at 400m maximum centres

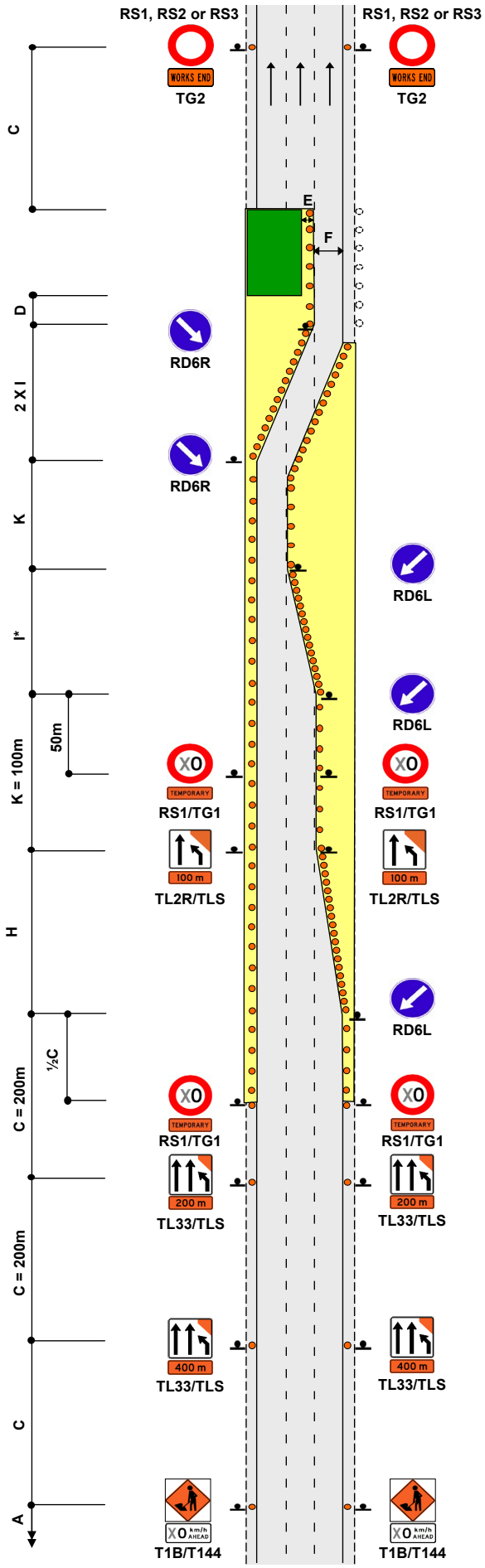
3. If delays are likely, add a T143 DELAYS POSSIBLE sign either 1km or 2km in advance of the worksite

4. Where there is a lane shift, a 10m minimum offset should be used to enable heavy vehicles to make the shift



5. Refer C.4.3.1 - On level 3 roads cones are required from the TSL sign to the start of the taper or hazard area where no taper is installed

This drawing must not be used as a TMP diagram



ONE-WAY MULTI-LANE ROAD
Right and centre lane closure
Two lane temporary diversion

H1.11
Level 3

Notes

1. *Calculation of taper length for lateral shift of less than 3.5m is:

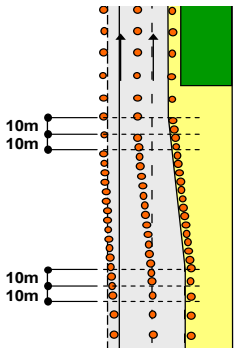
   $\frac{W \times I}{3.5}$

   W = Width of lateral shift

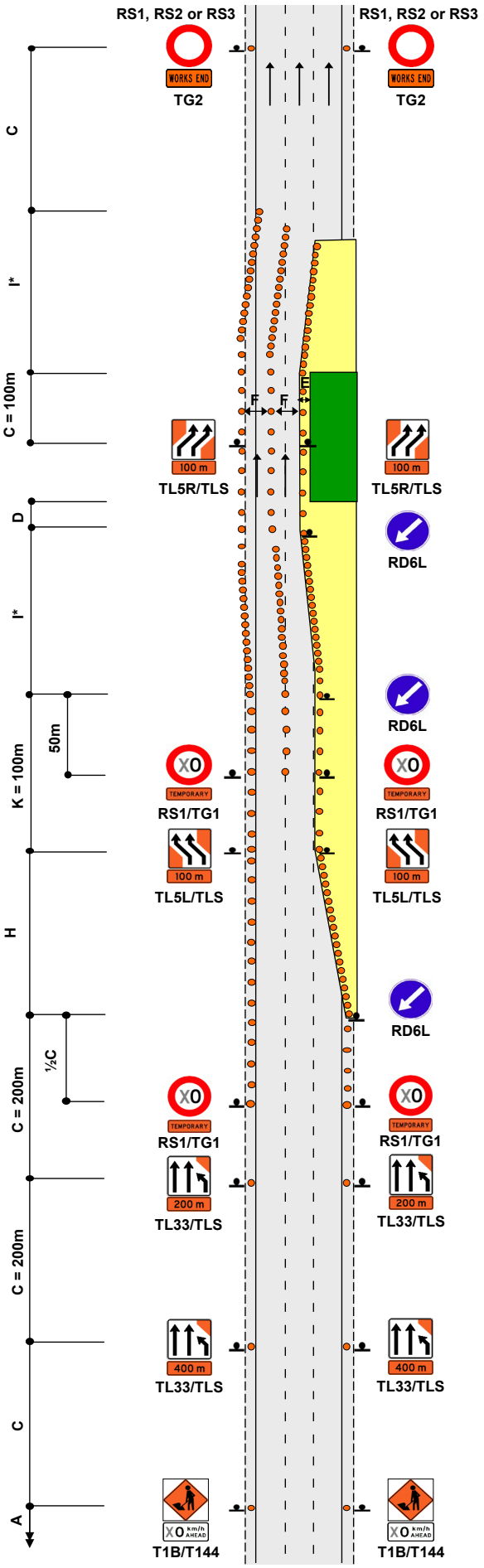
   I = Taper length in metres from the level 3 layout distance table

2. TSLs to be repeated at 400m maximum centres
3. If delays are likely, add a T143 DELAYS POSSIBLE sign either 1km or 2km in advance of the worksite

4. Where there is a lane shift, a 10m minimum offset should be used to enable heavy vehicles to make the shift



5. For the centre median, tubular delineators temporarily fixed to the surface may be used, or for a long term situation a new centreline may be applied

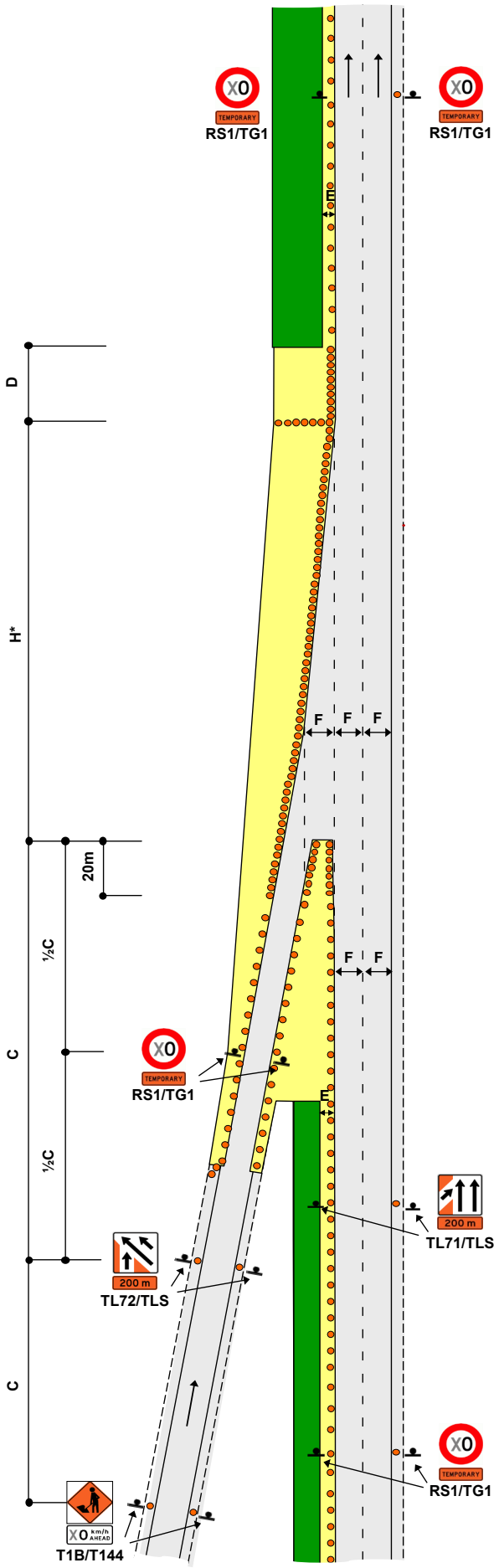


ONE-WAY MULTI-LANE ROAD
Left-lane closure
On-ramp within worksite

H1.12
Level 3

Notes

1. This diagram is designed to show only the on-ramp within the worksite
2. Secondary row of cones in front of the longitudinal safety zone are to be placed at 1m centres
3. A TSL sign may be used to cover the permanent speed sign on the approaches to the main carriageway



EXAMPLE ONLY

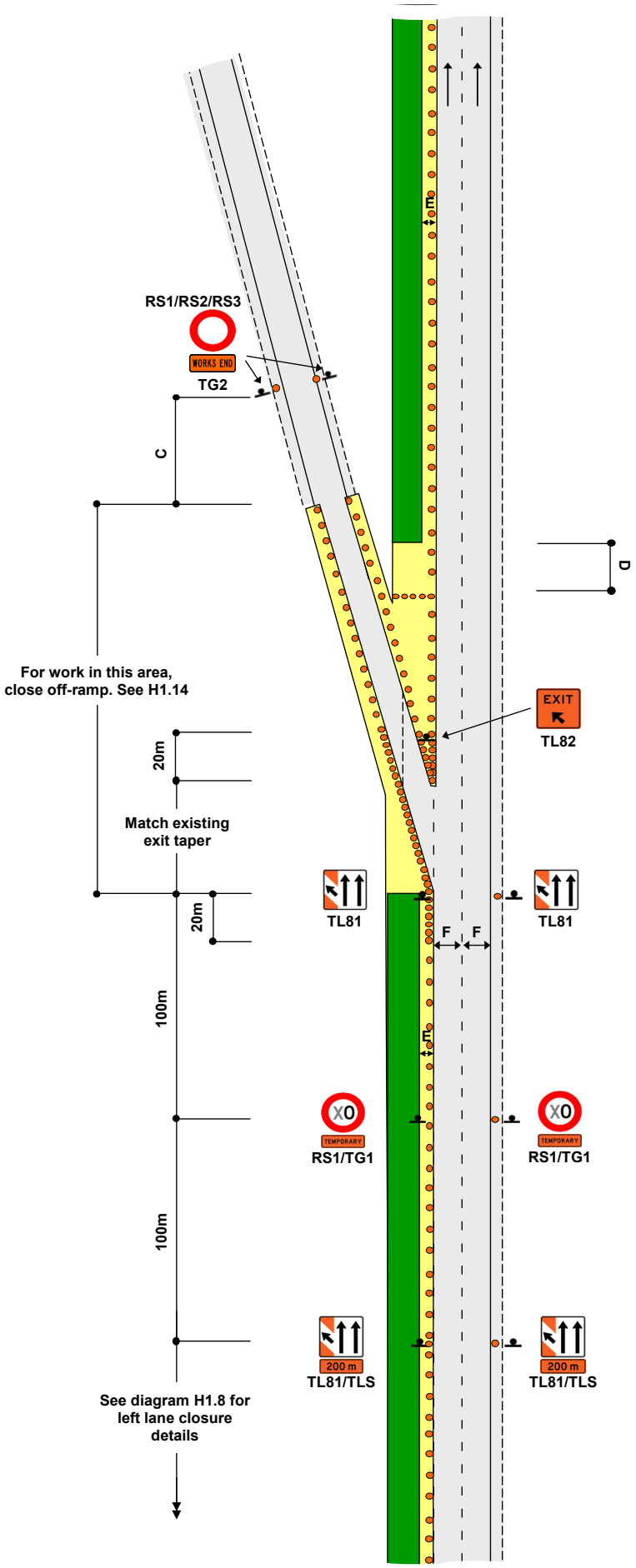
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Left-lane closure
Off-ramp within worksite

H1.13
Level 3

Notes

1. This diagram is designed to show only the off-ramp within the closure
2. Secondary row of cones in front of the longitudinal safety zone are to be placed at 1m centres
3. A TSL sign may be used to cover the permanent speed sign on the off - ramp



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Off-ramp closure

H1.14
Level 3

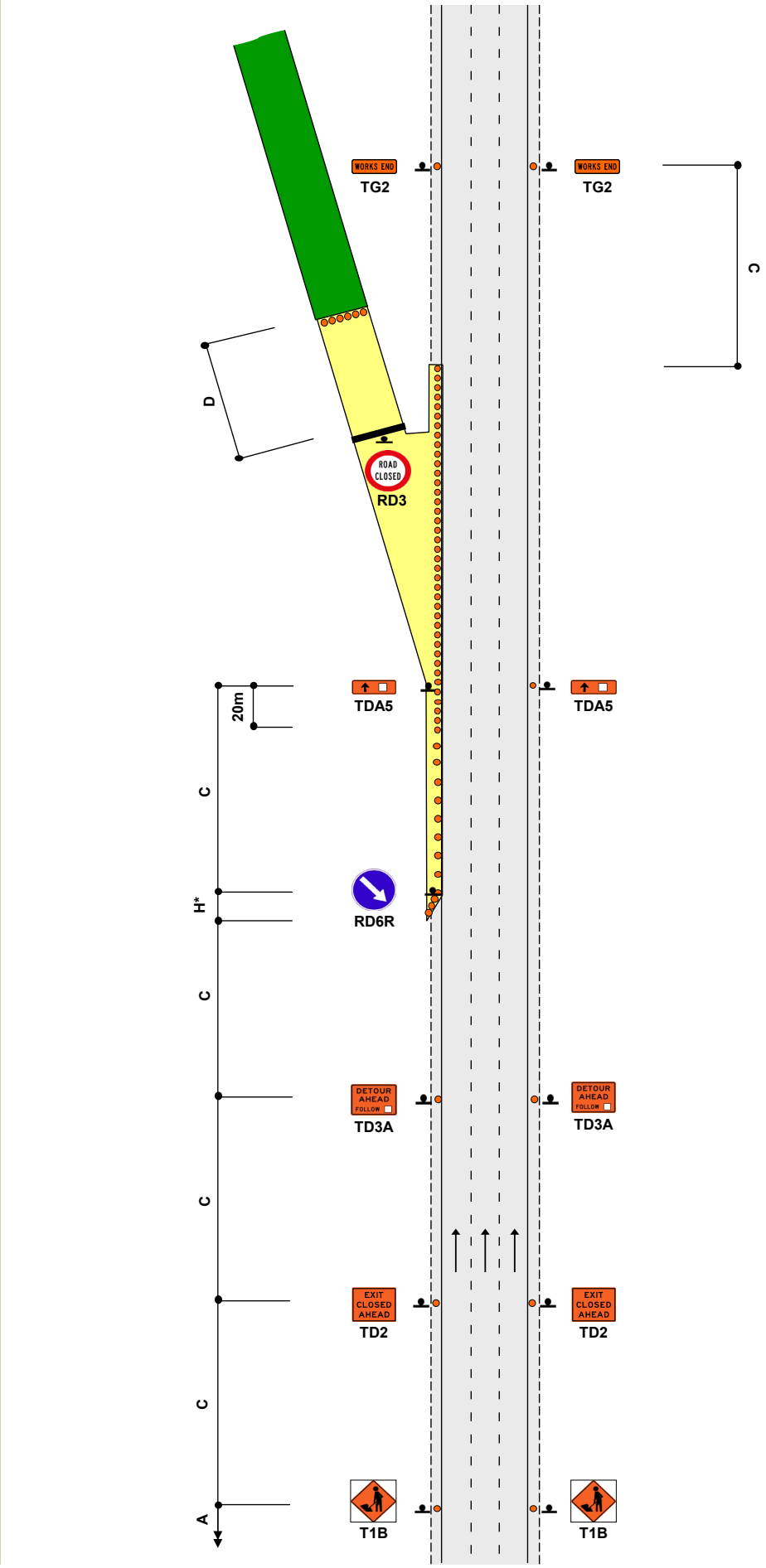
Notes

1. A 10m taper, with a minimum of 5 cones, is allowed where shoulder width is 2.5m or less
2. If a 10m taper is used, an RD6R is only required at the head of the taper
3. *For shoulders exceeding 2.5m width, apply the calculation of taper length for lateral shift of less than 3.5m:

   $$\frac{W \times H}{3.5}$$

   W = Width of lateral shift

   H = Taper length in metres from the level 3 layout distance table
4. Cones used to close off-ramp to be placed at 1m centres
5. Secondary line of cones at end of longitudinal safety zone to be placed at 1m centres
6. Block access to road with barricade/barrier



EXAMPLE ONLY

This drawing must not be used as a TMP diagram

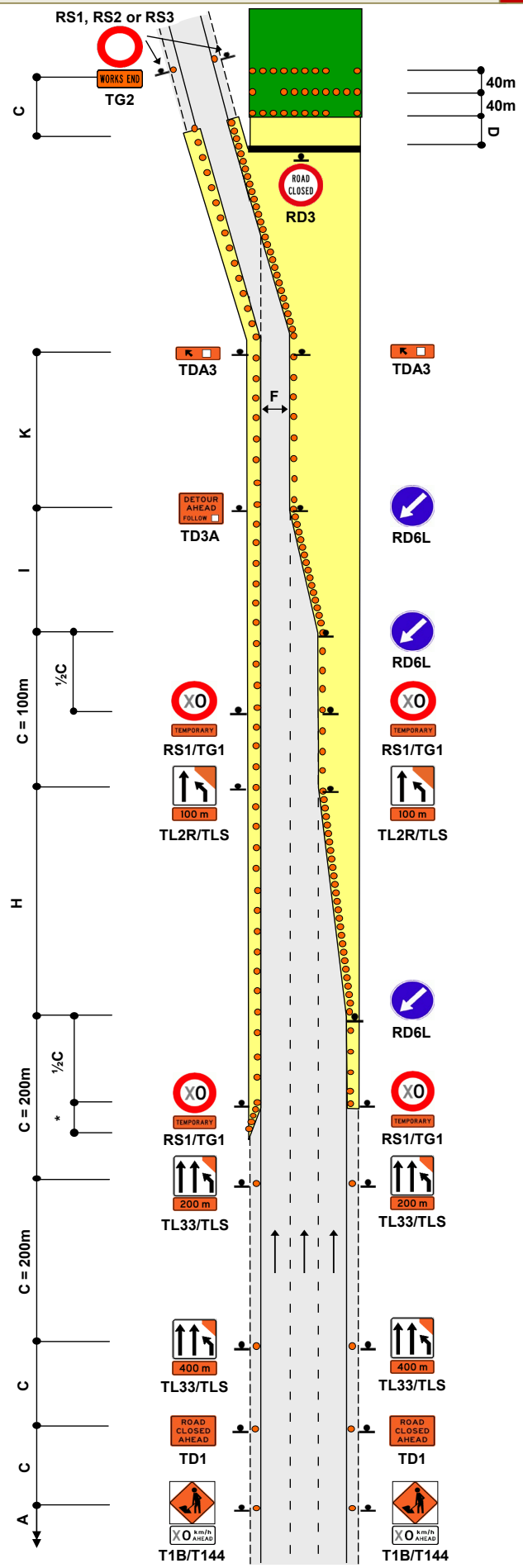
ONE-WAY MULTI-LANE ROAD
Road closure
Detour via off-ramp

H1.15
Level 3

Notes

1. *A 10m taper, with a minimum of 5 cones, is allowed where shoulder width is 2.5m or less
2. If a 10m taper is used, an RD6R is only required at the head of the taper
3. Block access to road with fence
4. At the beginning of the working space place three lines of cones 40m apart across lanes and shoulder. Cones to be placed at 1m centres. Leave a 2.5m gap in opposite ends of each line of cones to allow site access
5. TSLs to be repeated at 400m maximum centres
6. If delays are likely, add a T143 DELAYS POSSIBLE sign either 1km or 2km in advance of the worksite

7. C.4.3.1 - On level 3 roads cones are required from the TSL sign to the start of the taper or hazard area where no taper is installed. Where the edgeline is well defined (ie by a clean kerb and channel) the line of cones is not required



EXAMPLE ONLY

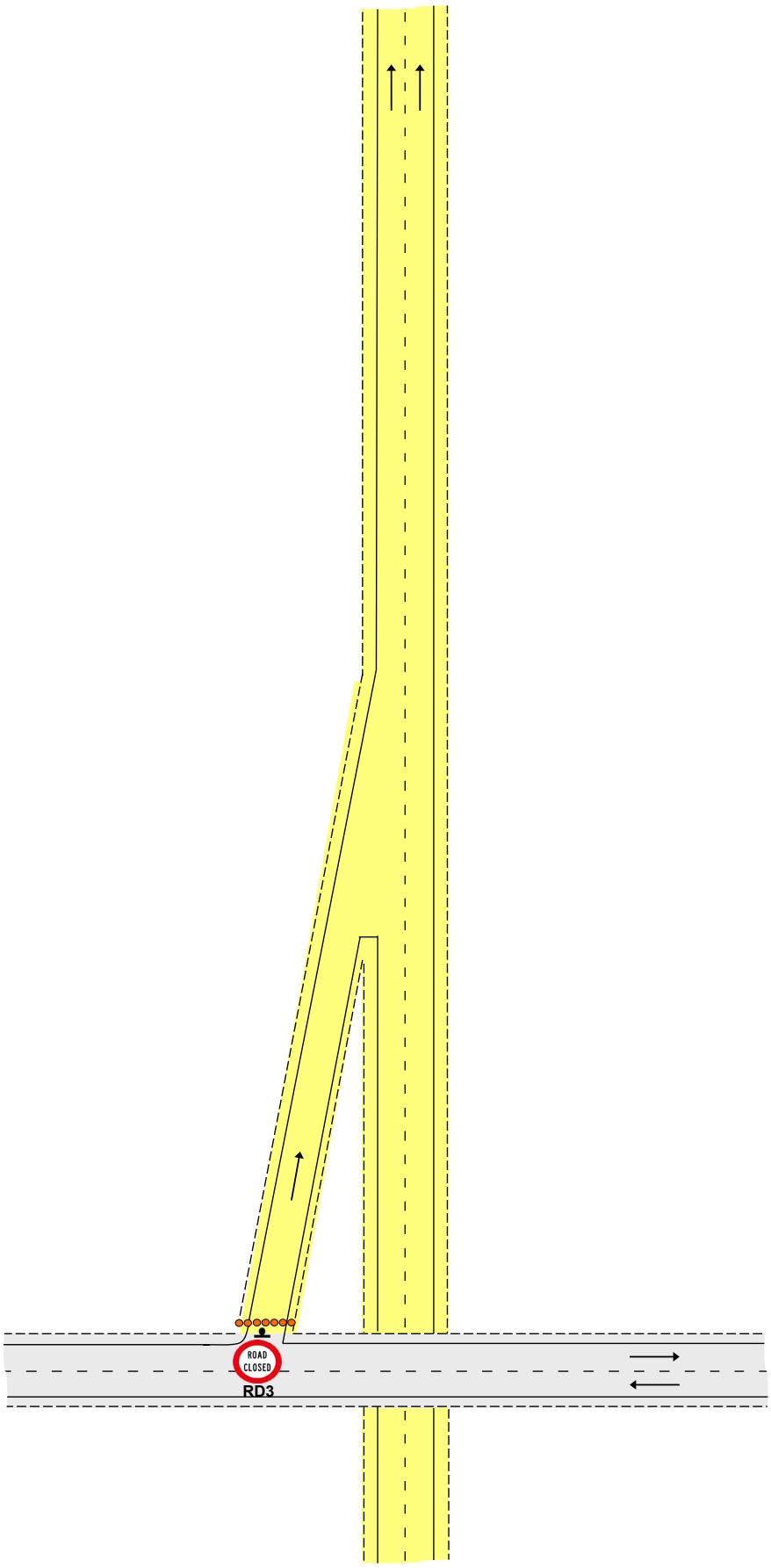
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Closure example
On-ramp within worksite

H1.16a
Level 3

Notes

1. This diagram is part of a series of diagrams providing example diagrams for a motorway closure:
   - H1.16a - Closure of on-ramp within worksite
   - H1.16b - Closure example low accessed site
   - H1.16b - Closure example high accessed site
   - H1.16d - Closure of off-ramp within worksite
2. Where a motorway is completely closed to traffic in one or both directions, any on or off ramps impacted must also be closed
3. Cones across the on-ramp to be placed at 1m centres



EXAMPLE ONLY

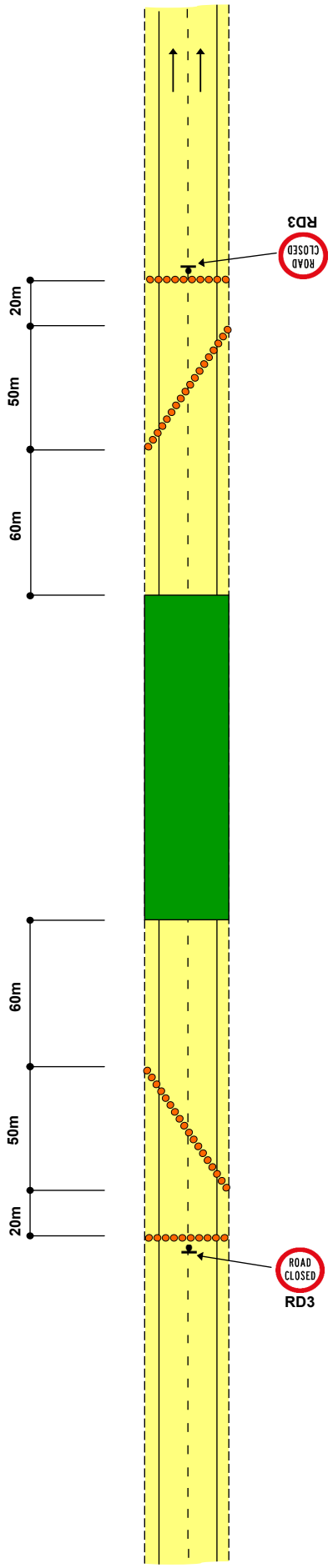
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Closure example
Low accessed site within worksite

H1.16b
Level 3

Notes

1. This diagram is part of a series of diagrams providing example diagrams for a motorway closure:
   - H1.16a - Closure of on-ramp within worksite
   - H1.16b - Closure example low accessed site
   - H1.16b - Closure example high accessed site
   - H1.16d - Closure of off-ramp within worksite
2. Where the motorway is completely closed to traffic in one direction or both directions, the normal application of road closure signs, cones, barriers, fences or barricades at on and off ramps must be reinforced by a double line of cones at a normal warning distance from the working space
3. The double lines of cones must be either continuous or chicaned
4. TMA vehicles parked outside this inner cordon must be parked with their attenuators down and facing the expected direction of traffic. Vehicles inside the cordoned worksite are not subject to this requirement
5. Cones in tapers and across road to be placed at 1m centres



EXAMPLE ONLY

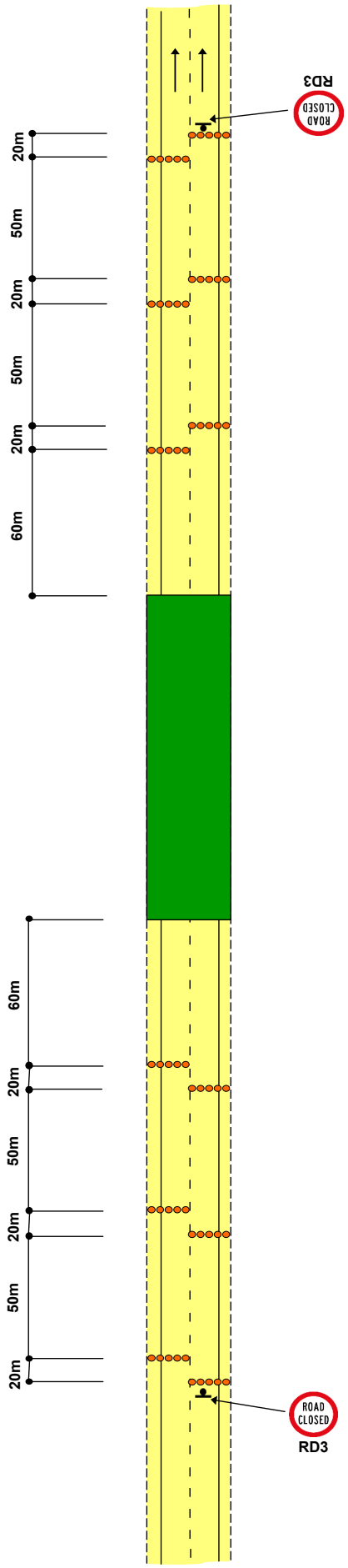
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Closure example
High accessed site within worksite

H1.16c
Level 3

Notes

1. This diagram is part of a series of diagrams providing example diagrams for a motorway closure:
   - H1.16a - Closure of on-ramp within worksite
   - H1.16b - Closure example low accessed site
   - H1.16b - Closure example high accessed site
   - H1.16d - Closure of off-ramp within worksite
2. Where the motorway is completely closed to traffic in one direction or both directions, the normal application of road closure signs, cones, barriers, fences or barricades at on and off ramps must be reinforced by a double line of cones at a normal warning distance from the working space
3. The double lines of cones must be either continuous or chicaned
4. TMA vehicles parked outside this inner cordon must be parked with their attenuators down and facing the expected direction of traffic. Vehicles inside the cordoned worksite are not subject to this requirement
5. Where there are oversized vehicles being used, the 20m gap in the chicanes may be increased
6. This is a secondary safety element for the worksite
7. Cones in chicanes to be placed at 1m centres



EXAMPLE ONLY

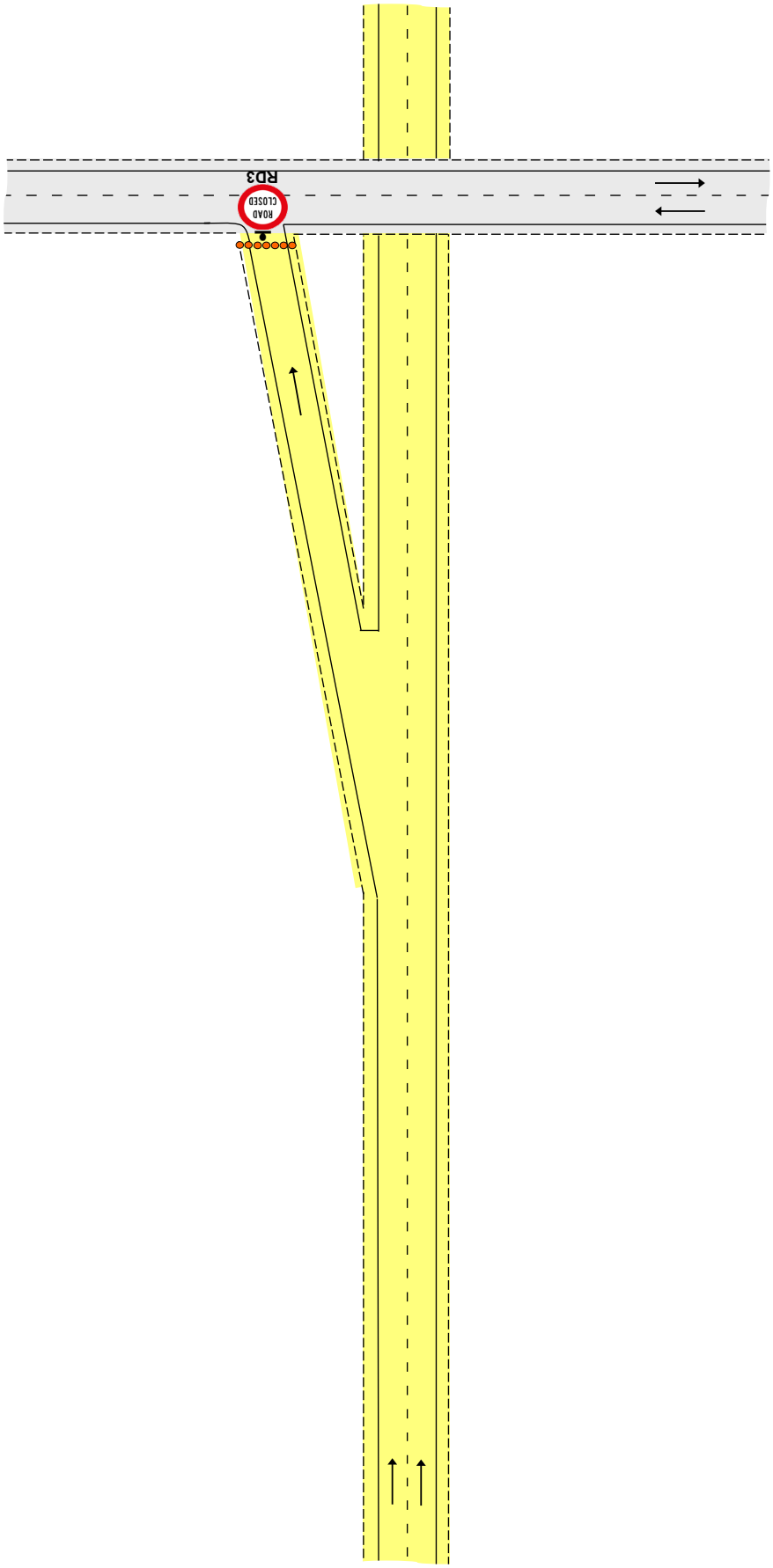
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Closure example
Off-ramp within worksite

H1.16d
Level 3

Notes

1. This diagram is part of a series of diagrams providing example diagrams for a motorway closure:
   - H1.16a - Closure of on-ramp within worksite
   - H1.16b - Closure example low accessed site
   - H1.16b - Closure example high accessed site
   - H1.16d - Closure of off-ramp within worksite
2. Where a motorway is completely closed to traffic in one direction or both directions, any on or off ramps impacted must also be closed
3. Cones across the on-ramp to be placed at 1m centres



EXAMPLE ONLY

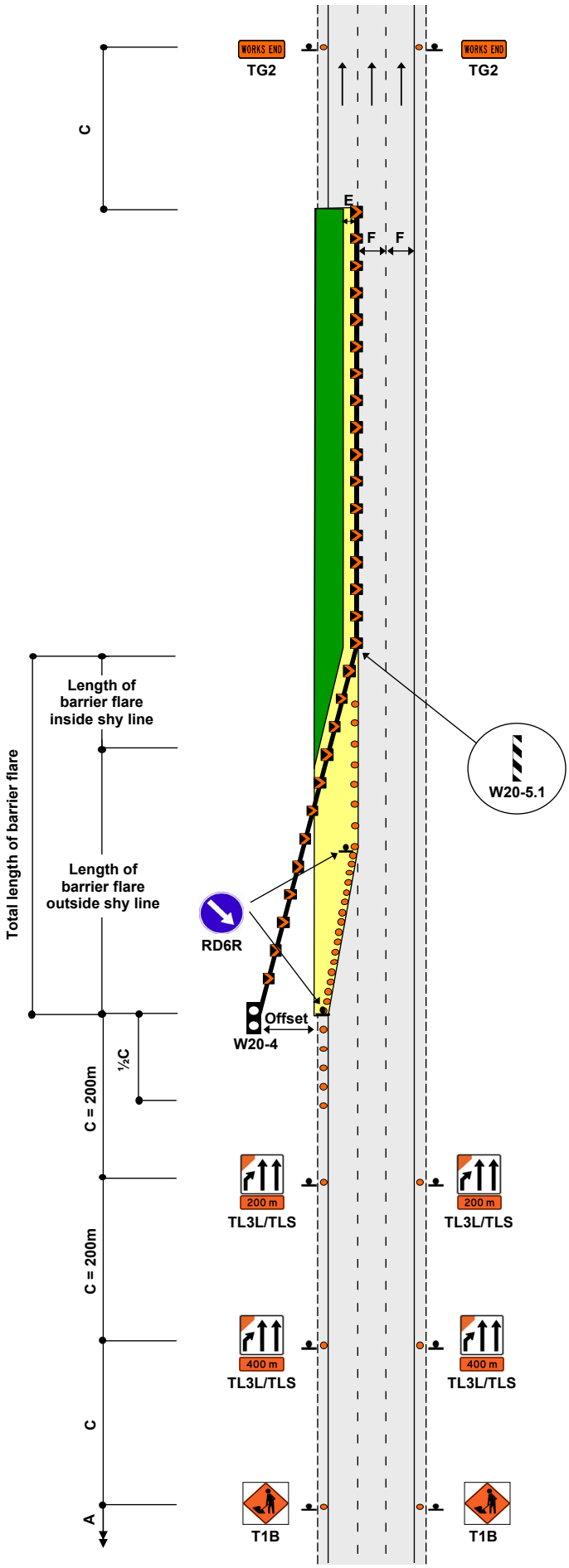
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Long-term closure
Left-lane closure - barrier

H1.17
Level 3

Notes

1. Barrier end treatment depends on its distance from the edgeline. Refer C18.4 for details
2. A black/white right-hand bridge end marker post must be used to delineate the approach end of the barrier at its narrowest point
3. Offset depends on speed ie 100km/h = 9m
4. Total length of barrier flare depends on:
   - the offset from the live lane line
   - the width of lane and shoulder closed
   - barrier flare rates, and
   - the offset of the barrier end from the edgeline
5. Hazard marker must be used to delineate the barrier terminal



EXAMPLE ONLY

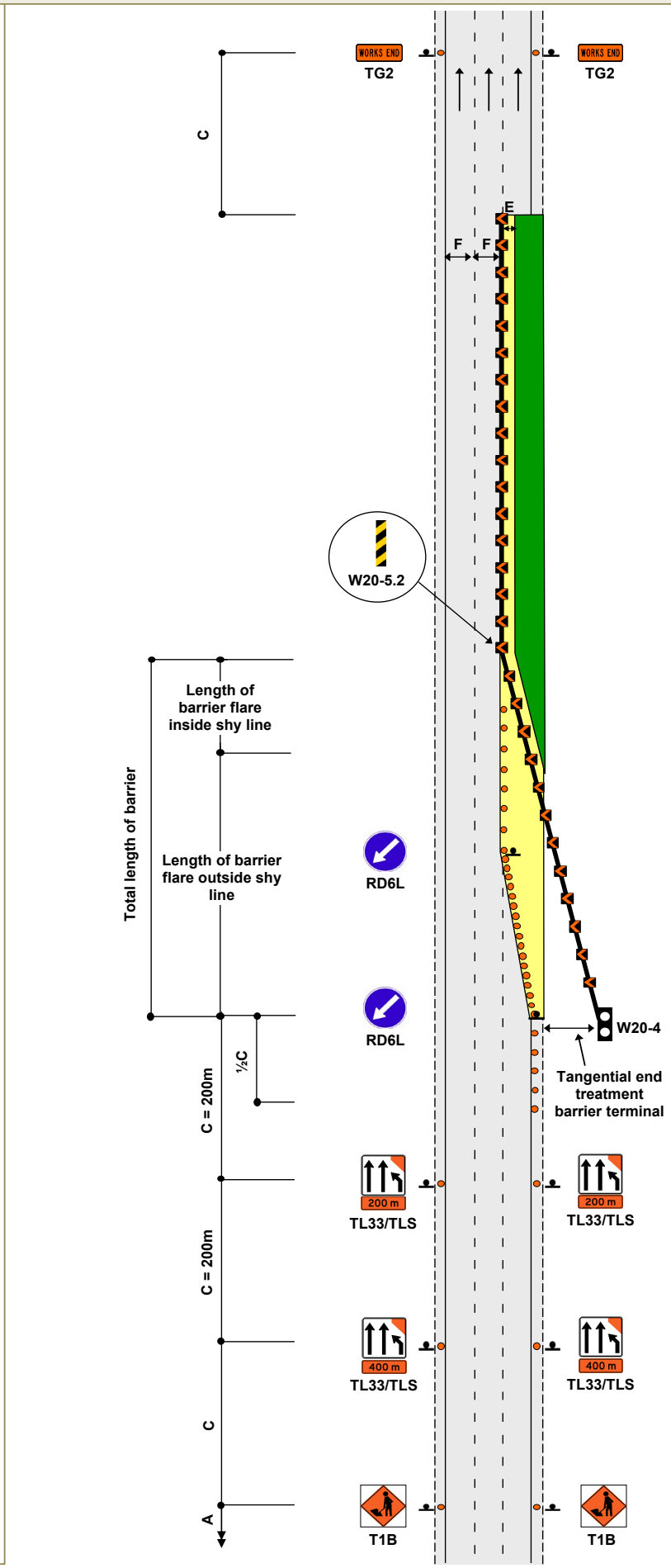
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Long-term closure
Right-lane closure - barrier

H1.18
Level 3

Notes

1. Barrier end treatment depends on its distance from the edgeline. Refer C18.4 for details
2. A black/yellow right-hand bridge end marker post must be used to delineate the approach end of the barrier at its narrowest point
3. Total length of barrier flare depends on:
   - the offset from the live lane line
   - the width of lane and shoulder closed
   - barrier flare rates, and
   - the offset of the barrier end from the edgeline
4. Hazard marker must be used to delineate the barrier terminal



EXAMPLE ONLY

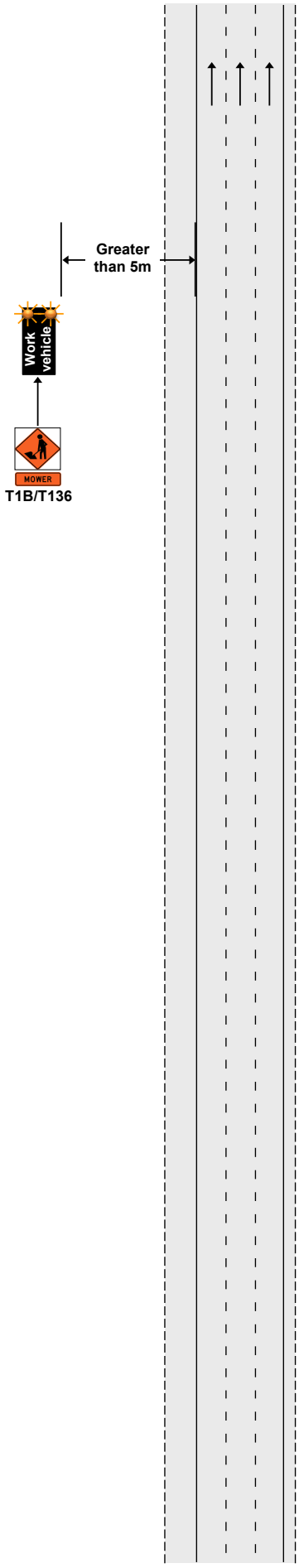
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Work vehicle is more than five (5) metres from the edgeline - Zone A

H2.1
Level 3

Notes

1. Worksite can be managed by a level 2/3 STMS-NP



EXAMPLE ONLY

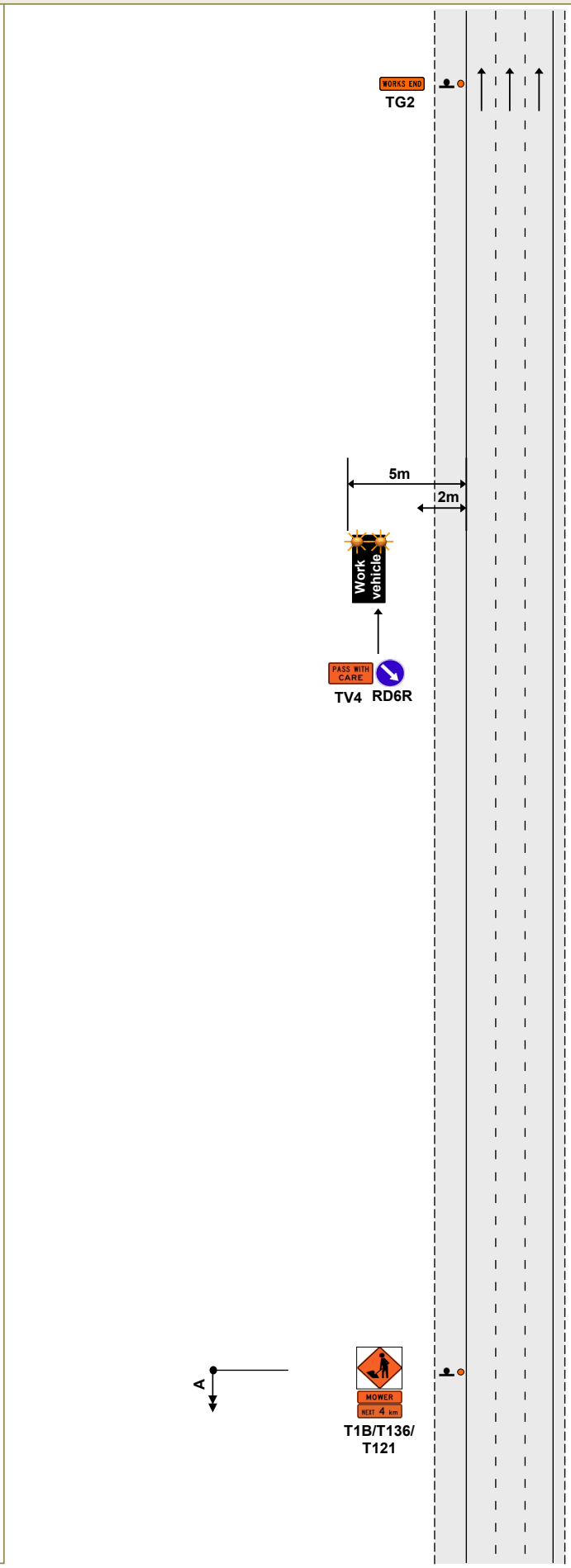
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Work vehicle is between two (2) and five (5) metres from the edgeline - Zone B
Rear visibility is GREATER than the clear sight distance

H2.2
Level 3

Notes

1. The T1B sign and supplementary plates must be repeated throughout the length of the worksite at intervals no greater than 4km
2. The static signs may be replaced by an AWVMS. In this case CSD will be required (see H2.3)



EXAMPLE ONLY

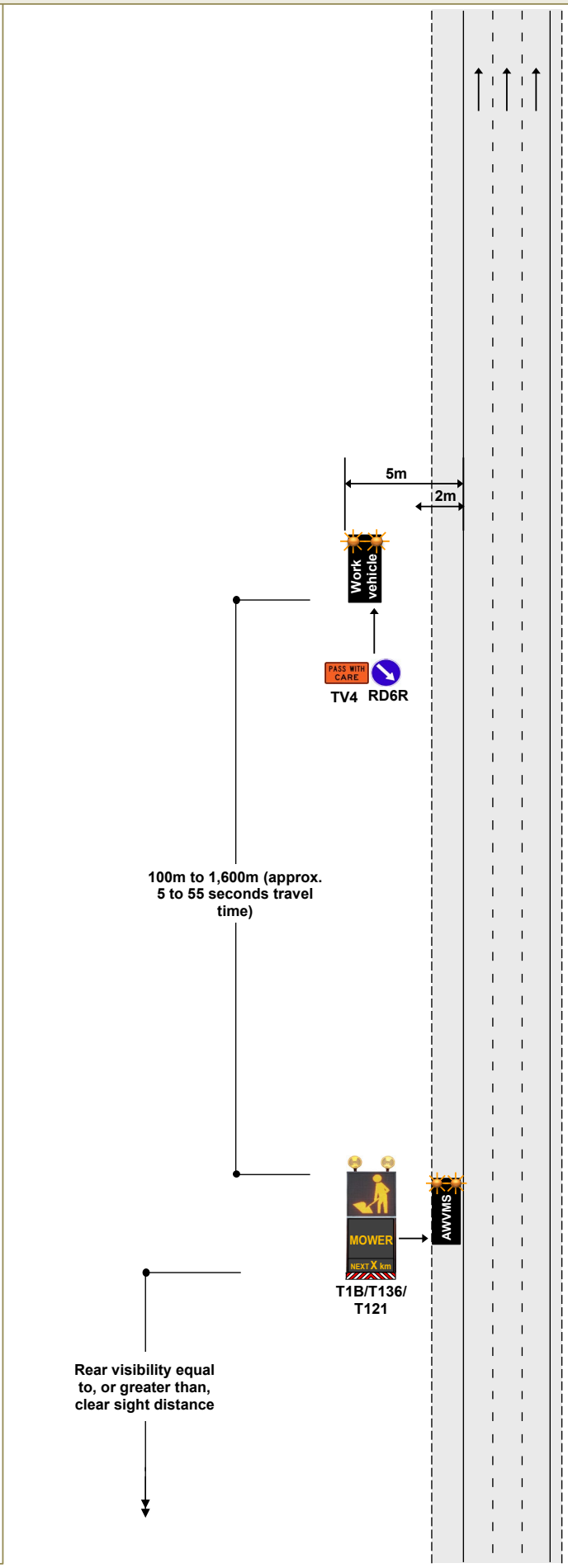
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Work vehicle is between two (2) and five (5) metres from the edgeline - Zone B
Rear visibility is LESS than the clear sight distance

H2.3
Level 3

Notes

1. Always try to use the shortest distance where a range is displayed (eg 100m to 1,600m, try for 100m)



EXAMPLE ONLY

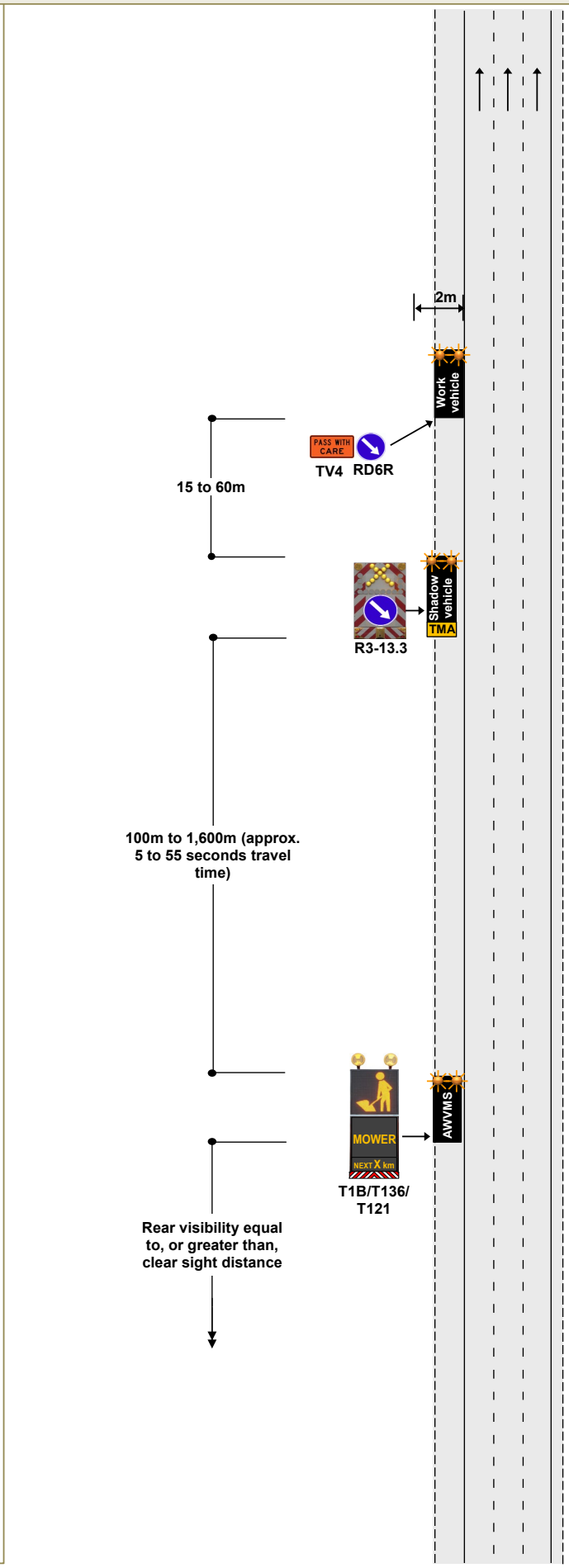
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Work vehicle is between zero (0) and two (2) metres from the edgeline - Zone C

H2.4
Level 3

Notes

1. The shadow vehicle must be 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
2. Always try to use the shortest distance where a range is displayed (eg 100m to 1,600m, try for 100m)



EXAMPLE ONLY

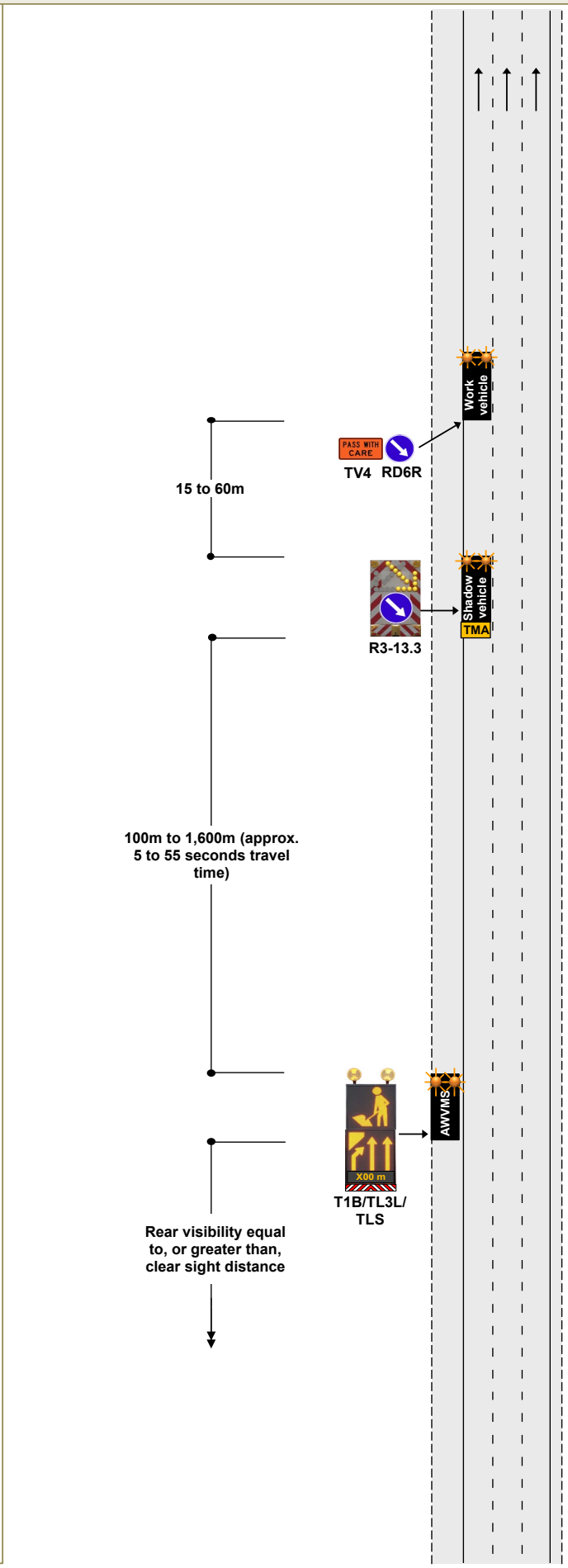
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Work vehicle on live lane - Zone C

H2.5
Level 3

Notes

1. The shadow vehicle must be 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
2. Always try to use the shortest distance where a range is displayed (eg 100m to 1,600m, try for 100m)



EXAMPLE ONLY

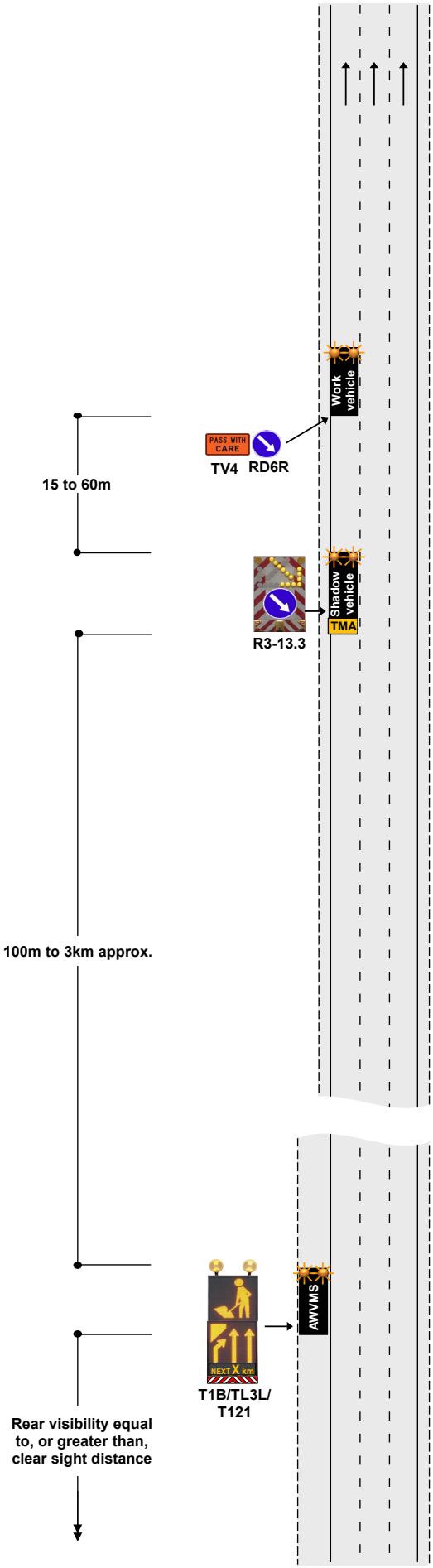
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Work vehicle on live lane or within 2m from live lane - Zone C
No available shoulder width for AWVMS within 1,600m of work vehicle

H2.6
Level 3

Notes

1. To provide advance warning, the AWVMS may be located more than 1,600m from the work vehicle
2. The shadow vehicle must be 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
3. Always try to use the shortest distance where a range is displayed (eg 100m to 1600m, try for 100m)
4. AWVMS may be up to 3km behind shadow vehicle where there is insufficient shoulder width within 1,600m



EXAMPLE ONLY

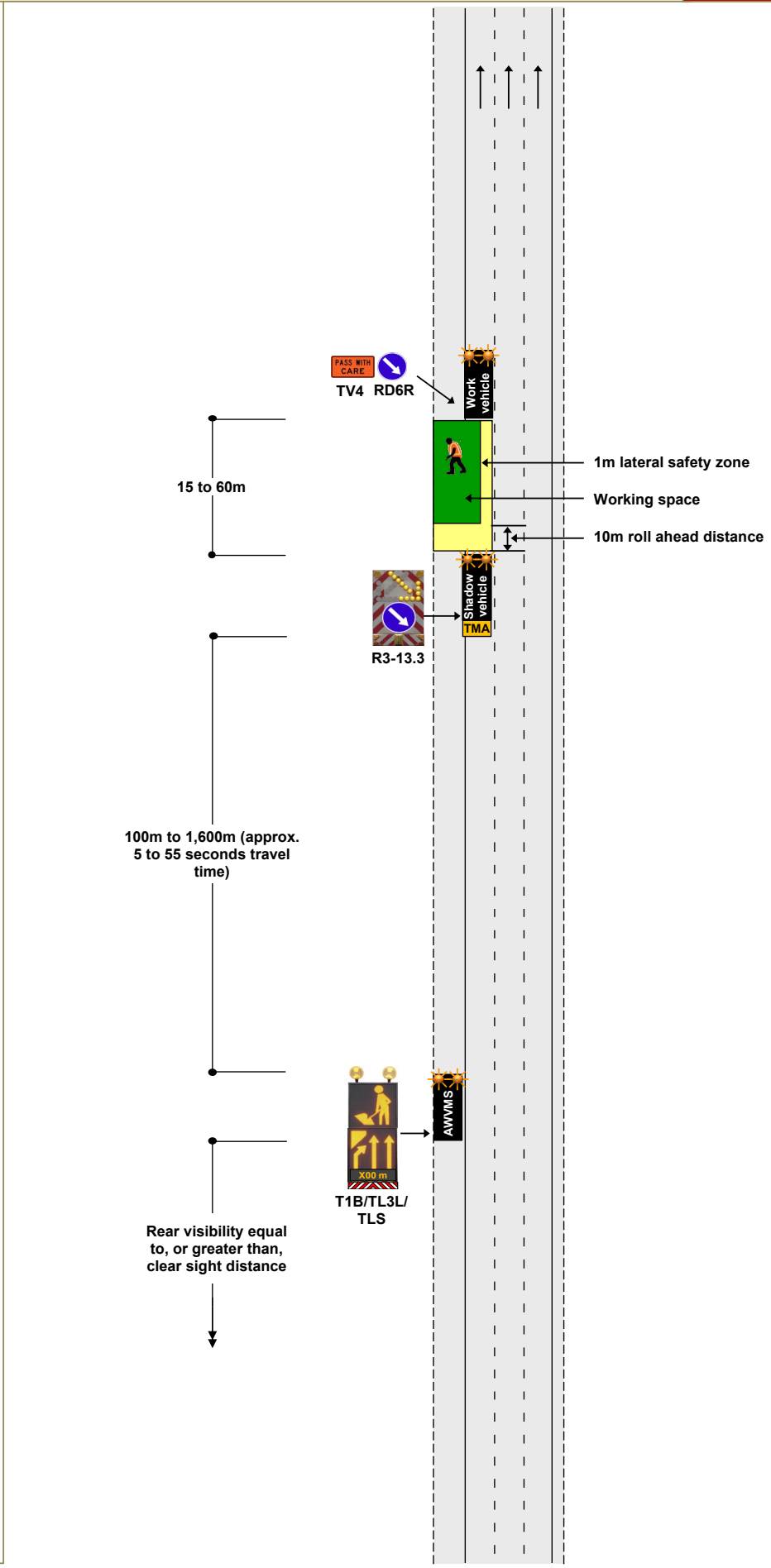
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Work vehicle on live lane or within 2m from live lane - Zone C
Personnel on the live lane

H2.7
Level 3

Notes

1. The shadow vehicle must be 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
2. Always try to use the shortest distance where a range is displayed (eg 100m to 1,600m, try for 100m)



EXAMPLE ONLY

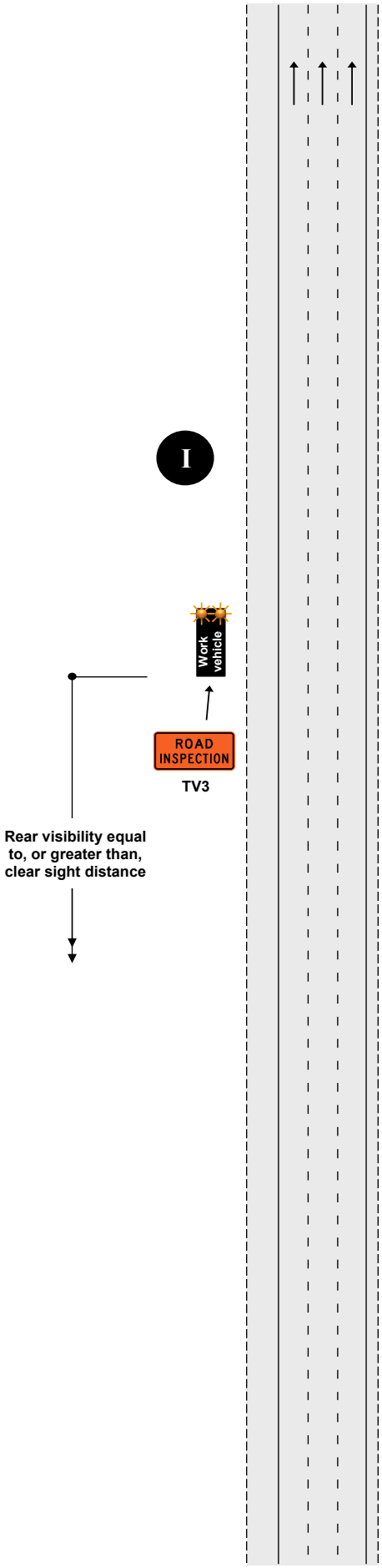
This drawing must not be used as a TMP diagram

INSPECTION ACTIVITES AND NON-INVASIVE WORKS
On shoulder or berm only

H2.8
Level 3

Notes

1. Inspections must only be on the shoulder or berm of a level 3 road
2. A spotter is not required
3. Onsite control must be by a L2/3 STMS, or an STMS-NP or a TC Inspector
4. For inspection activities that are carried out by a TC Inspector or an STMS-NP the L2/3 STMS must be immediately contactable but does not have to be within 30 minutes travel time of the worksite



EXAMPLE ONLY

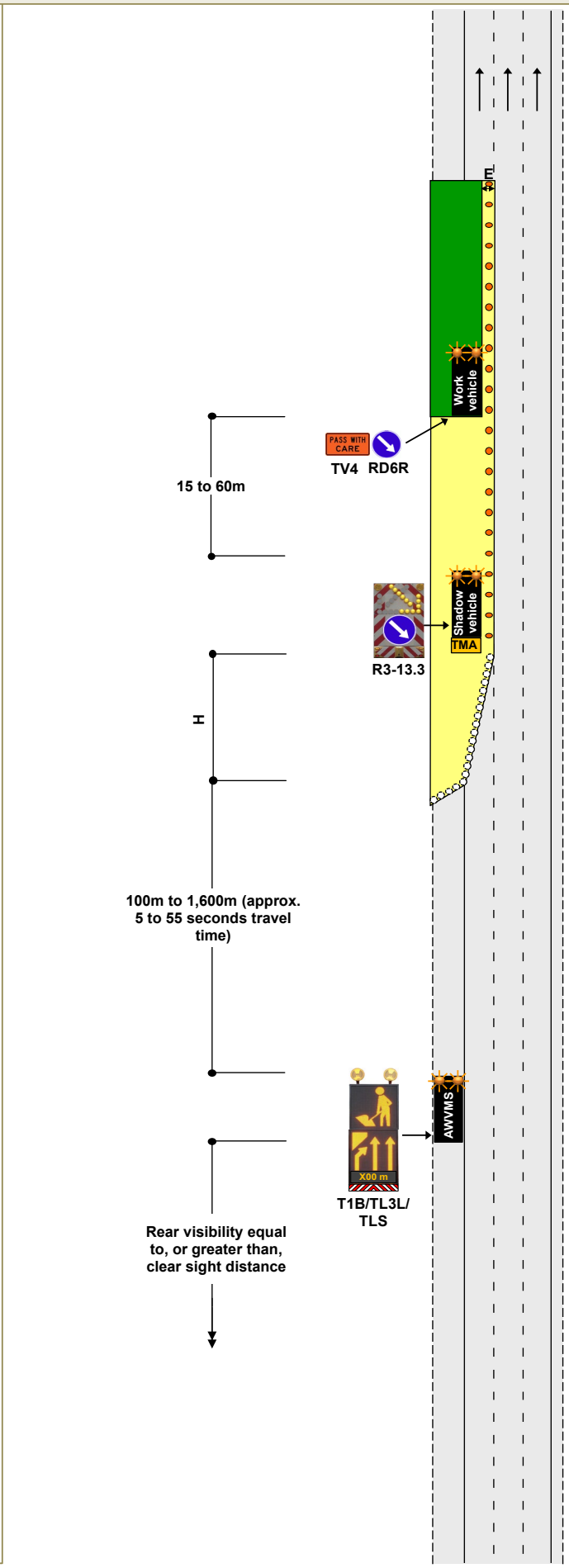
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Semi-static closure
Left-lane closure

H3.1
Level 3

Notes

1. The shadow vehicle must be 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
2. The AWVMS may be replaced by T1B signs installed on both sides of the road
3. Where an AWVMS is used, cone taper (H) is optional
4. Always try to use the shortest distance where a range is displayed (eg 100m to 1,600m, try for 100m)



EXAMPLE ONLY

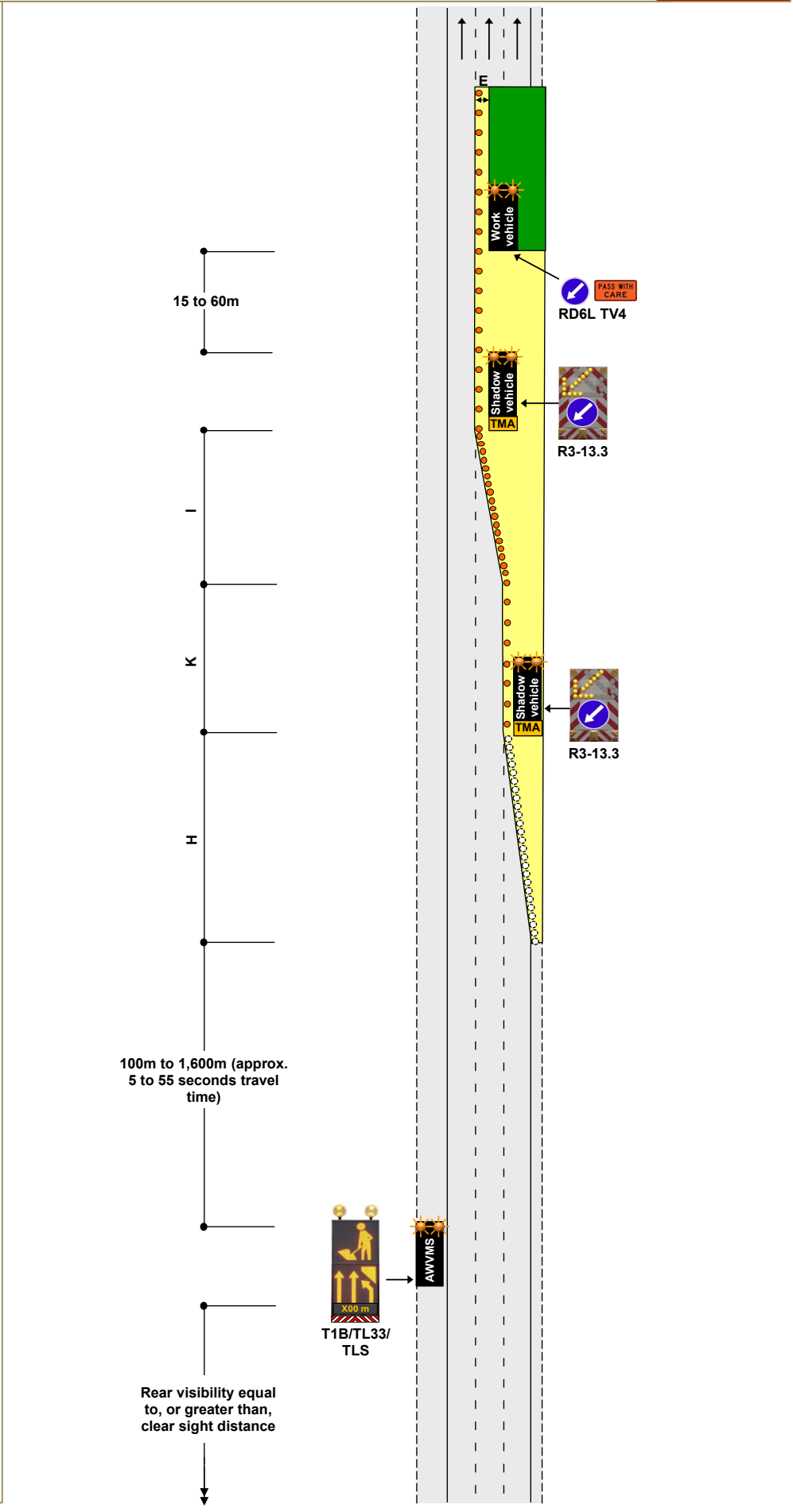
This drawing must not be used as a TMP diagram

ONE-WAY MULTI-LANE ROAD
Semi-static closure
Right and centre lane closure

H3.2
Level 3

Notes

1. The shadow vehicle must be 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
2. The AWVMS may be replaced by T1B signs installed on both sides of the road
3. Where an AWVMS is used, cone taper (H) is optional
4. Always try to use the shortest distance where a range is displayed (eg 100m to 1,600m, try for 100m)



EXAMPLE ONLY

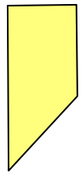
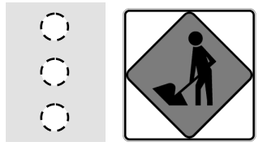
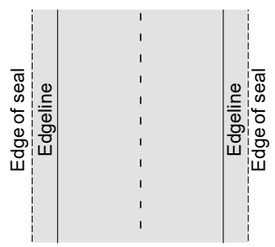
This drawing must not be used as a TMP diagram

Note:
This page is to be used as the layout distances table for the level 2 static and mobile diagrams.

Print this page on A3 paper and fold it to fit an A4 page.

Unfold this page when you want to view the layout distances table and a diagram at the same time.

LEVEL 3 LAYOUT DISTANCES TABLE

Working space 	**Mandatory:** ▪ **Cones** ▪ **Signs** 
Safety zones 	**Optional:** ▪ **Cones** ▪ **Signs** 
Edgeline or edge of trafficable lane (indicated by solid black line)	**Hazard area** 
Edge of Seal (indicated by dotted line next to solid black line) 	**Barrier**  **Chevron** 

LEVEL 3 LAYOUT DISTANCES TABLE

Permanent/TSL (km/h)		≤50	60	70	80	90	100/110
Traffic signs							
A	Sign visibility distance (m)	60/50+	70/60+	80	100	120	120
C +	Sign spacing (m) - **Desirable**	50	60	70	160	200	200
	Sign spacing (m) - **Minimum**	35	45	70	80	100	100
Safety zones							
D	Longitudinal (m)*	15	20	30	45	60	60
E	Lateral (m)						
	1. Behind cones etc	1	1	1	1	1	1
	2. Behind barrier installations	As specified by the Installation Designer					
Tapers							
H	Initial taper length per lane (m)**	90/50+	100/60+	120	150	180	180
I	Subsequent taper length per lane (m)	50	60	70	80	100	100
K	Minimum distance between tapers (m) ***	50	60	70	80	100	100
Delineation devices (all speeds)							
Spacing (centres)	All tapers (m)	2.5	2.5	2.5	2.5	2.5	2.5
	Cones parallel to the lane (eg between tapers and alongside the working space) (m)	5	5	10	10	10	10
	At merge and diverge points for ramps and slip lanes, intersecting road entry and exit points, and worksite access points	2.5m for 10m either side of a change in alignment		2.5m for 20m either side of a change in alignment			

\+ The longer distance is the desirable distance, the shorter distance is the minimum distance allowed. The desirable distances must be used wherever possible. The minimum distances may only be used where there are road environment constraints.
Where only one sign is erected in advance of a taper the distance from the sign to the taper is 2xC.

* A longitudinal safety zone is not required when a barrier completely protects the approach end of the worksite. Refer subsections H1.17 and H1.18.

** Taper length is based on a single lane shift of 3.5m.

*** Must be altered if required to meet the distance shown on the TLS supplementary plate.

Lane widths (based on permanent speed or TSL if applied)

Speed (km/h)		30	40	50	60	70	80	90	100/110
F	Lane width (m)	2.75	2.75	3.0	3.0	3.25	3.25	3.5	3.5

Except for delineation device spacings, which are maximum values, the distances specified in the above table are minimum values. Approach sign distances and spacings, the initial taper(s) and any longitudinal safety zone associated with that taper must be based on the permanent speed limit. The layout distances of the remainder of the worksite, including any subsequent tapers, may be based on the TSL, provided the TSL is applied prior to the first taper.