WAKA KOTAHI
NZ TRANSPORT AGENCY

STMS CATEGORY A HANDBOOK

WAKA KOTAHI - NZ TRANSPORT AGENCY

VERSION 2.0

Participant name:

New Zealand Government

More information

If you have further queries, call our contact centre on 0800 699 000 or write to us:

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Private Bag 6995
Wellington 6141

Contents

ABOUT THE STMS CATEGORY A TRAINING

Outcomes of the STMS Category A training

People who successfully complete the STMS Category A (Cat A) training will **know**:

- The key requirements for Cat A roading environments
- How to locate information in the CoPTTM relating to Cat A roading environments.

If you are going to be in charge of worksites, you will be mentored and assessed.

At the end of on-job mentoring and assessment you will have the:

- Skills to competently operate within a Cat A roading environment.

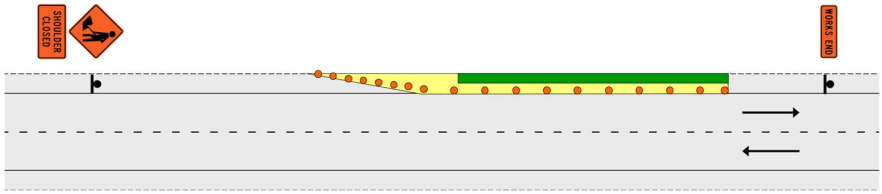
The STMS Cat A warrants and unit standards

ASSESSMENT FOR CAT A PRACTISING

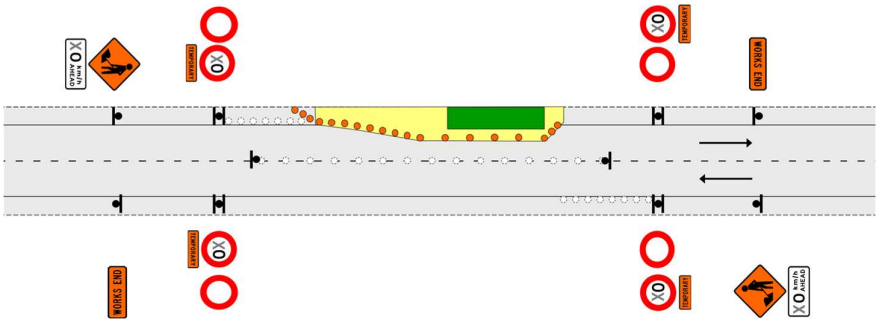
The trainee must complete 3 closures from the list of possible closures.

Any 2 of the following closures:

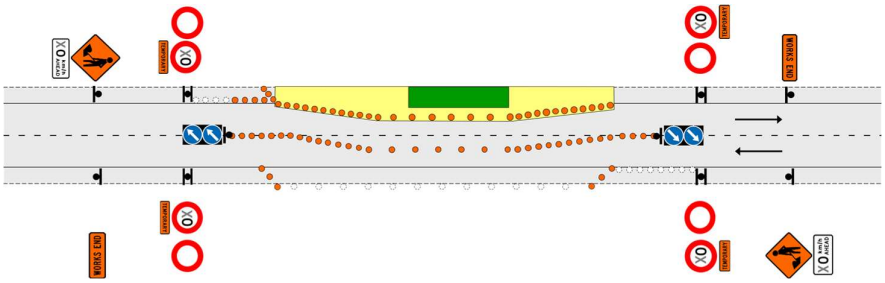
1. **Shoulder closure**



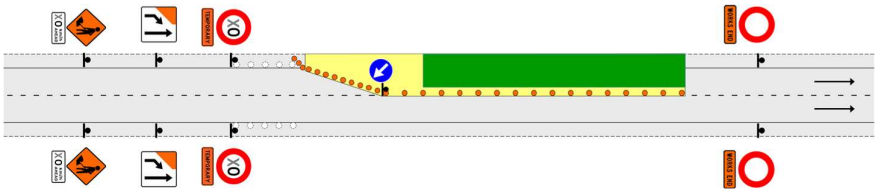
2. **Partial lane shift**



3. **Two-lane diversion**

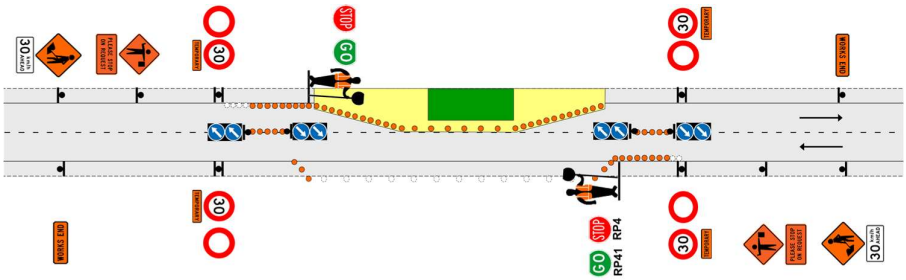
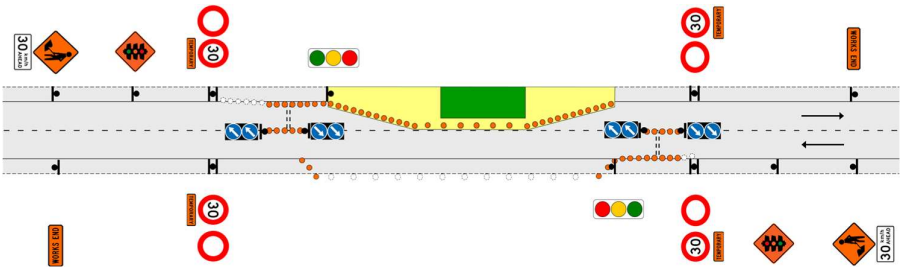


4. **Multi-lane closure**



Note: Only one closure can be a shoulder closure.

One alternating flow closure, which includes:

Stop/go	
Portable traffic signals	

You will be assessed on a worksite requiring alternating flow control.

RISK MANAGEMENT

Suggestions to identify risks at a proposed worksite

Complete a drive-through of proposed worksite.

Identify hazards for example:

- Pedestrians and pedestrian crossings
- Cyclists and cycle lanes
- Shared pedestrian and cyclist paths
- Restricted parking areas in the form of bus stops, loading zones, taxi stands, coupon parking, resident parking etc
- Higher number of intersections and accessways
- Many distractions.

Complete risk assessment before setting up the worksite. For each hazard, identify the risks, determine if it is likely or significant and decide what actions to mitigate the risk.

Communicating hazards, risks and control measures

Hazards, risks and actions (controls) are documented in the risk assessment.

These are included in briefings (working space crew induction and visitor induction).

At some worksites (eg longer-term worksites) these may also be displayed on a site hazard board.

Examples of risk management on Cat A roading environments

Hazard	Risk	Likelihood and severity	Action
Mobile crane outriggers are beside working space cones	Vehicles might hit the outrigger and cause the crane to topple during a lift	Possible and severe – risk rating very high	Ensure the lateral safety zone is maintained
Pedestrians or cyclists can enter the working space	Injured by a hazardous area in the worksite or a vehicle	Likely and severe – risk rating very high	Provide appropriate and compliant isolation (eg safety fences, cone bars)
Traffic is travelling too quickly or too close to workers	Injured by vehicle or roadside debris	Possible and severe – risk rating very high	Introduce a TSL. Provide increased positive traffic management measures
Pedestrians and cyclists are forced to use the same narrow temporary path alongside the workspace	Cyclist striking pedestrian. Walking or riding into the live lane	Possible and moderate – risk rating high	Provide greater shared path width if possible and separate using compliant isolation (eg safety fences, cone bars) Require cyclists to dismount
Bus stop relocation not sign-posted. Pedestrians walking into live	Pedestrians struck by bus or other vehicles	Possible and severe – risk rating very high	Ensure that all TMP requirements including signage and public notifications are carried out before and on the day that the TMP is setup. Relocate temporary ped refuge

Hazard	Risk	Likelihood and severity	Action
lane to stop the bus			
Queues at intersections near a worksite	Road user behavior due to queuing and delays including speeding and overtaking resulting in vehicle strikes vehicle or vehicle strikes worker	Possible and severe – risk rating very high	Create clear cone channels for vehicles. Provide plenty of warning and information on likely delays and alternate routes. Plan the work in smaller chunks to lesson the impact of the works and TTM
Site clutter or many distractions that could overwhelm or confuse the road user	Road user loses concentration and drives into worksite or another vehicle causing injury	Unlikely and severe – risk rating high	Install construction hoarding or blinds to obscure working activity from the road user. Install TSLs to slow the road user and allow more time and space to react

LAYOUT DISTANCES TABLES

LV & L1 combined 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.

2LS layout distances table

Permanent speed limit or RCA-designated operating speed (km/h)		≤40	50	60
Traffic signs				
A	Sign visibility distance (m)	40	50	60
B	Warning distance (m)	40	50	80
C	Sign spacing (m)	20	25	40
Safety zones				
D	Longitudinal (m)	10	10	15
E	Lateral (m)	1	1	1
Tapers				
G	Taper length (m)#	25*	30	50
K	Distance between tapers (m)	30	40	50
Delineation devices				
Cone spacing in taper (m)		2.5	2.5	2.5
Cone spacing: Working space (m)		5	5	5

* *If allowed by the RCA,* a **10m taper** (with cones at 1m centres) may be used on roads ≤40 when there are road environment constraints (eg intersections and commercial accesses).

\# On all roads where 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).

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					
Speed (km/h)		30	40	50	60
F	Lane width (m)	2.75	2.75	3.0	3.0

Except for delineation device spacings, which are maximum values, the distances specified in the above tables are minimum values.

L2 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.

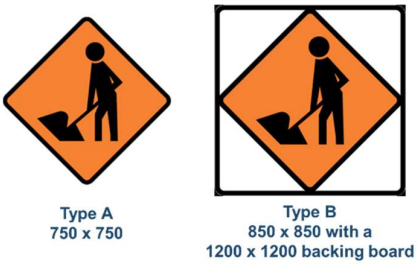
TTM EQUIPMENT

Signs at worksites

3 main reasons signs are set out at worksites:

- Provide advance warning
- Direct and protect road users and road workers
- Notify road users to return to normal driving conditions

Sign size



Some RCAs approve different sign sizes for some situations.

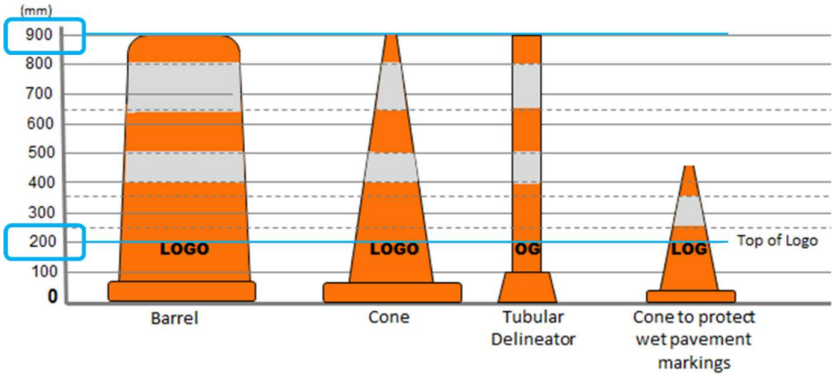
These different sized signs can only be used at worksites where their use has been approved in the TMP.

Sign spacings

Sign spacings allow time for the road user to read, understand and comply with the message on a sign.

Minimum sign spacings can only be used where there are road environment constraints.

Delineators



When installed, delineators:

- Must not be installed in stacks (single cone only)
- Can be ballasted with sandbags
- Can be stabilised with flexible connecting strips
- Must be stable.

Cone bars

Cone bars may be used at worksites to guide pedestrians (subject to conditions).

Must not be used to replace a safety fence.

High visibility garments

High visibility garments must be:

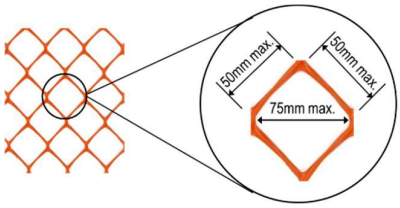
- Done up at all times
- The outer layer (nothing worn over top of the garment)
- Clean.

Safety fences

Vertical uprights

Vertical uprights are to be no more than **100mm apart**

Mesh infill



Gap in mesh no more than **75mm across** (max 50mm x 50mm mesh)

Barricades

Barricades may be used to physically close roads.

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

Barriers

Barriers are needed when:

- There is a need for physical protection to reduce the severity of potential crashes
- A working space must be shielded from adjacent traffic
- The traffic must be shielded from worksite hazards (eg deep excavations)
- There are no other options to safely channel vehicle and pedestrian movements.

POSITIONING OF SIGNS

Cone placed at the base of each sign stand on the traffic side of the sign.

On LV & L1 roads	On 2LS and L2 roads
	
Day-time • **May** have cone ***Night-time*** • **Must** have cone	**Must** have cone at all times

Sign stands on footpaths

If the feet of the stand are on the footpath place a cone to protect pedestrians.

The minimum footpath width must be maintained.

Remove signs and stands that are not in use. Do not turn signs side on.

Also sign bases must not be left in place, without signs attached.

Install signs outside marked cycle lanes.

To avoid parked cars blocking visibility of a sign, place it just past a driveway.

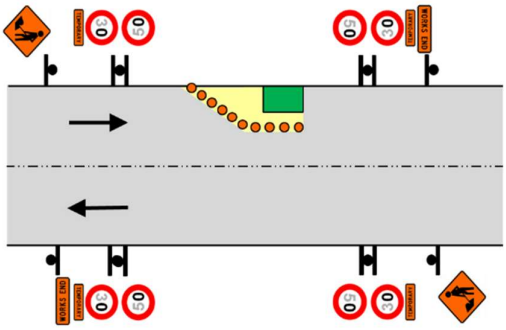
Sign visibility distance

If sign visibility cannot be achieved, **the sign must be advanced up to one sign spacing.** If sign visibility still cannot be achieved **place 2 signs.**

Gated TSL signs (signs on both sides of the road)

Gate speed signs at every change in speed (TSL or return to permanent speed limit).

Gated speed signs are **not required** on roads with an **AADT of less than 500 vehicles.**



Covering permanent signs

All conflicting signs need to be covered.

Cover any supplementary speed advisory plates greater than the TSL.

DO NOT cover advisory speeds that are LOWER than the TSL (trucks need this information).

Location of signs on multi-lane roads

Signs are required on both sides of the road

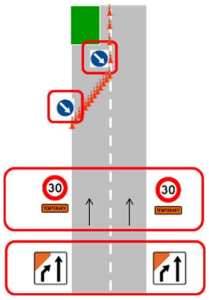
L1 roads

RD6L/R required at widest point of taper

L2LS roads

RD6L/R required at narrowest point of taper

Optional to have RD6L/R at widest point



Cat A intersecting with Cat B roading environment

STMS Cat A can place TTM equipment on a Cat B road environment if:

- The closure is only on the Cat A road environment
- Signs can be placed without interfering with cycle lanes, bus stops, taxi stands, loading zones and restricted parking
- Minimum footpath widths can be maintained.

If these conditions cannot be met then an **STMS Cat B** must install and remove the TTM on the Cat B road environment.

TAPERS

Taper visibility

Approaching traffic must be able to see the full length of taper.

If this is not possible extend taper so that at least 2/3 is visible.

Taper reductions

Calculation of shifting tapers less than 3.5m (LV, L1 and 2LS roads)		
Taper lengths in metres and (cone numbers)		
Width of closure or lane shift	**50km/h 2.5m spacing**	**60km/h 2.5m spacing**
> 3.0	**Apply the full taper length**	
2.0 – 3.0	**25 (11)**	**35 (15)**
1.0 – 2.0	**15 (7)**	**25 (11)**
< 1.0	**5 (3)**	**10 (5)**

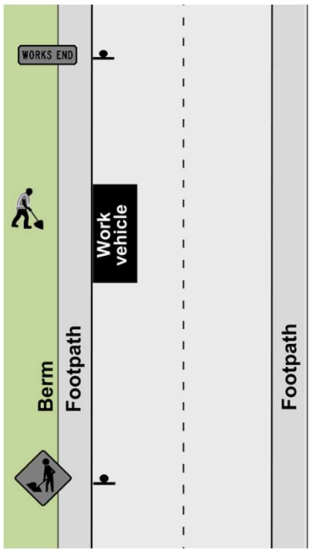
If you shorten a taper due to reduced impact on the road, record it on the On-site record and advise the TTM Planner as soon as possible.

MANAGING TRAFFIC ON THE SHOULDER AND LANE

Roadside activities

The STMS can install, maintain and remove a static roadside worksite on category A road environments *(*level LV, level 1 and 2 roads with speed limits of 60km/h or less*)* provided:

- The work activity is carried out on the roadside or footpath
- The associated work vehicle is **legally parked**
- The vehicle is only accessed from the non-traffic side
- Large plant and machinery must not be used in this situation; a more substantial closure is required
- Advance warning and works end are optional
- Pedestrians do not have to cross over a kerb or edgeline
- This layout must only be used during daylight hours.



Shoulder closures

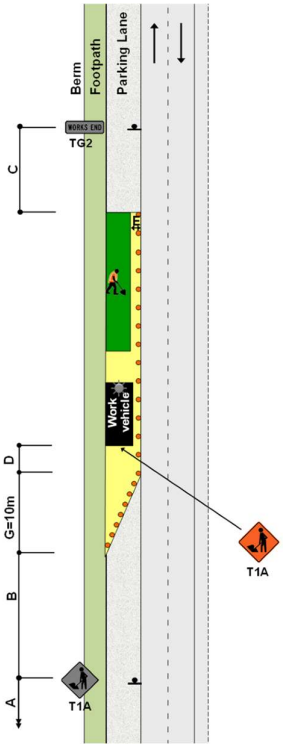
Shoulder closures on level LV and level 1 roads (not level 2 roads) with speed limits of 60km/h or less

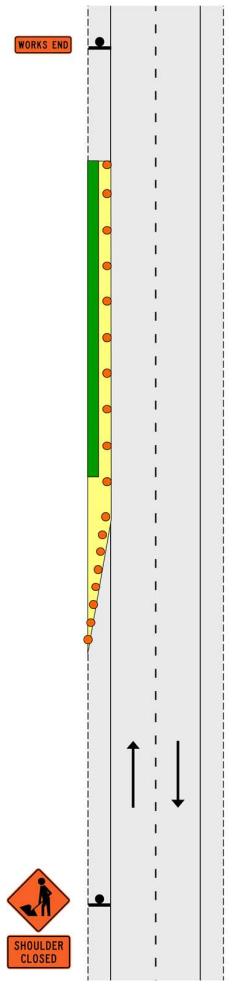
Where activity is carried out in the legal parking lane, the following minimum standard of TTM must be provided:

- 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

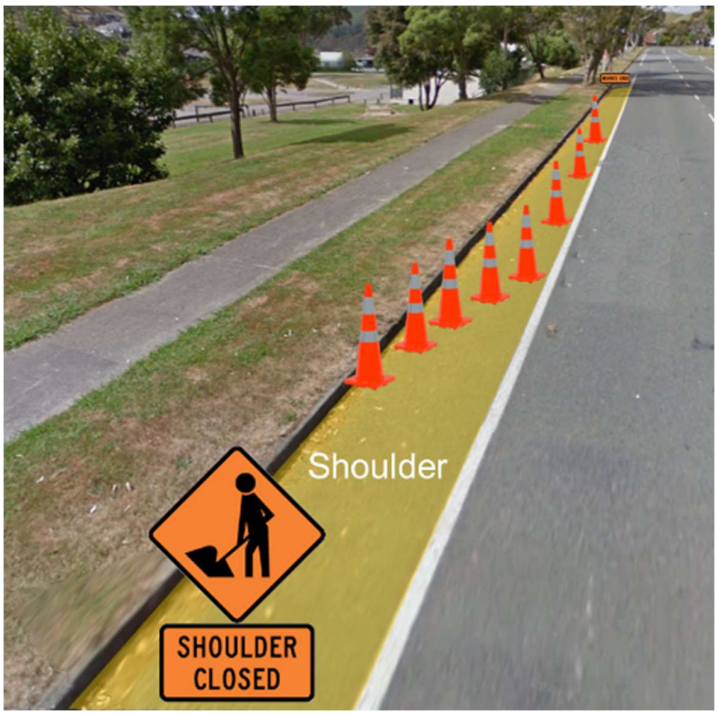
This layout must only be used during daylight hours.





When SHOULDER CLOSED supplementary plate is used

Shoulder closed supplementary plate is installed if there is a marked edgeline and all TTM equipment is outside of the edgeline.



STMS can infer the edgeline

If there is no marked edgeline the STMS can infer the edgeline (which basically means work out where it should be).

The key is that the lane width cannot be reduced below the minimum lane width for the road (which is in the layout distances tables).

Note: The TMO (or existing TC) cannot infer the edgeline (even if they have been delegated responsibility to setup, maintain and remove a shoulder closure).

Positive traffic management

TSL signs alone will not slow traffic down. Positive traffic management controls may also be required. These include:

- T144 sign (speed advisory sign)
- Narrowing lanes (side friction)
- Cone offset delineation
- Gradually reducing the space between delineation devices
- Placing cones from the TSL to the taper (often called lead-in cones)
- Using temporary speed humps
- Using flashing beacons, flares, or illuminated signs
- Using a speed information sign

Setting up detour a route

Before you leave the yard, **make sure you have enough TTM equipment** for the detour – signs, stands, ballast and cones.

Check the detour route in both directions to check that it is stable and safe for the types of vehicles that will be using it (eg no overhanging trees that will be hit by passing trucks).

Notify the RCA and/or the engineer when the detour is to be activated.

Open the road when detour is no longer needed.

Remove detour route signs when no longer required.

Incidents

If there is a minor incident (eg a rear end crash):

- Stop all activity and traffic movement.
- Secure the site to prevent injury or further damage.
- Notify the RCA representative and / or the engineer.
- Safely remove TTM and 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.

DO NOT
remove or disturb any TTM equipment or crash wreckage unless directed to do so by the Police or FENZ

If there is a major incident:

- Do the same as for a minor incident and in addition…
- Contact the appropriate emergency authorities
- Render first aid if competent and able to do so
- 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
- Comply with any obligation to notify WorkSafe.

Delegation of worksites to TMO or TC

STMS can delegate the following static worksites to a TMO/TC:

- Install, maintain and remove roadside activity
- Install, maintain and remove shoulder closure where all TTM is clear of the edgeline (TMO/TC cannot install shoulder closure in the lane if there is no edgeline)
- Minding of static worksite on the lane (STMS must return to site if changes are required).

The TC can be responsible for worksites on TC on LV and L1 (60km/h or less).

The TMO can be responsible for worksites on Cat A road environments (which include LV, L1, 2LS and L2).

PEDESTRIANS AND CYCLISTS

Pedestrians

Temporary footpaths - Minimum widths

Location	Minimum width (m)
Residential / Rural / Suburban Centre	**1.2m**
CBD and commercial zones	**2.0m**

These measurements may have to be increased depending on the environment and person needing to use the temporary footpath.

Temporary footpath options – Category A road environments

Only allowed on level LV and level 1 roads with permanent speeds 60km/h or less

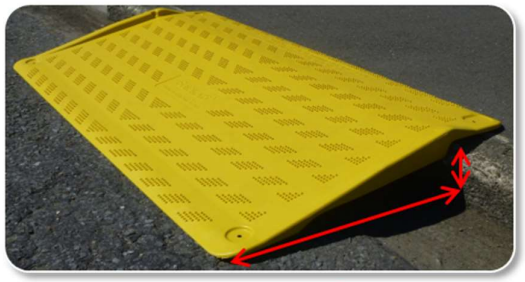
Protecting pedestrians from the working space

Option	Image	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 risks have been identified, 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).

Protecting pedestrians - Footpath diverted into carriageway

Option	Image	When used	Lateral safety zone with delineation
Barriers		Long-term worksites	According to barrier designer specification
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)	1m

Ramps



Overall requirements

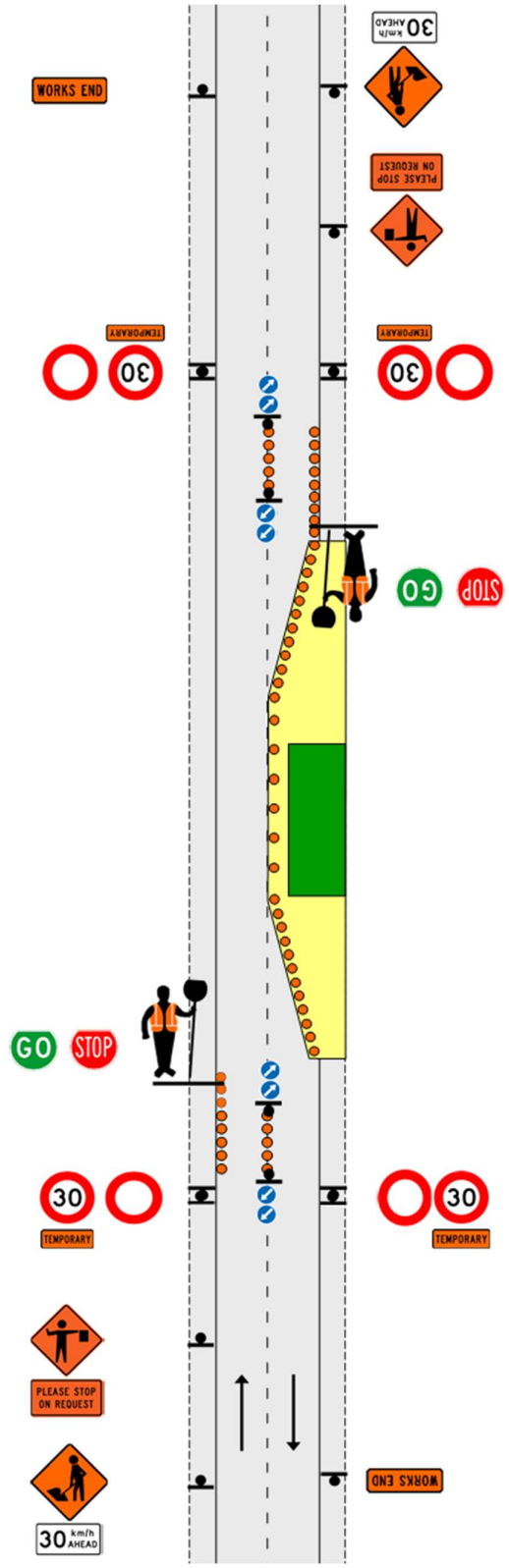
Keep temporary paths smooth and even (no trip hazards).

Allow turning room at bottom of ramps.

Use footpath controllers to provide assistance as required.

ALTERNATING FLOW

Summary of MTC essentials



- Extend advance warning signs beyond the anticipated queue length.
- 30km/h ahead sign is recommended but optional.
- MTC ahead sign must be removed when MTC stop operating.
- TSLs gated across the road (if more than 500 vehicles per day).
- Min 5 cones each side of the cone threshold.
- Centerline cones must have RD6L signs.
- Offset centreline cones by 10m to allow heavy vehicles to manoeuvre.
- 30m taper - 13 cones at 2.5m spacing.
- Must have 30m end taper as well.
- Speed reinstatement must be gated if more than 500vpd.
- Works end sign to tell road users to return to normal driving conditions.

Briefing the MTCs

- Ensure they know the **basics of the task** (ask them questions – get them to demonstrate actions).
- Explain any specific requirements for this worksite. For example:
  - Max time paddle can be held on STOP
  - Trigger points for long queue length
  - Where they are to stand
  - Escape routes
  - Radio protocols
  - Break times.
- Explain how you want them to act (smile, wave).

Communicating with on-site personnel (MTCs)

Face to face when completing safety briefings

By 2-way radio when giving instructions at a distance

INSTALLATION AND REMOVAL PROCEDURES

Traffic count

The STMS must complete a traffic count before installing TTM.

If there are no traffic count details in the TMP, the STMS completes a visual check to ensure that the traffic volumes are not unusually high.

Calculating key layout dimensions for a worksite

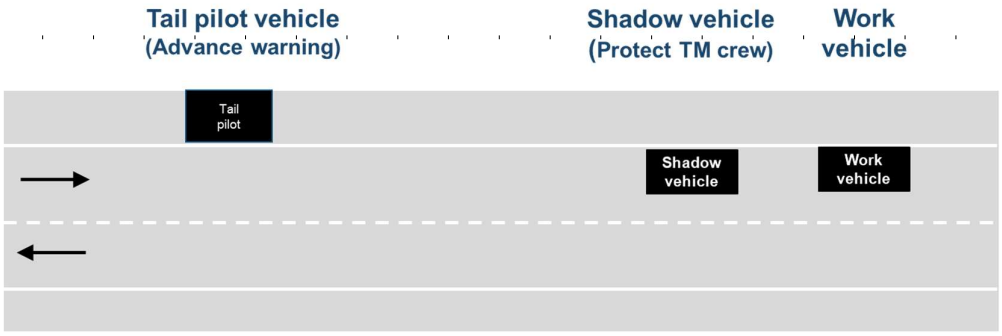
TIPS

- To work out where signs and cones are placed, start at the edge of the working space and work back down the road allowing space for each dimension.
- Allow extra space in front of the working space as a contingency.
- **10m** from start of white line to start of the next white line.

Installing and removing TTM at the worksite

Follow the TTM installation/removal procedures in the TMP (and also your company's procedures for installing and removing TTM at a worksite).

Vehicles used in a mobile operation to install, maintain or remove TTM



A shadow vehicle is required for all mobile closures on level 2 roads.

A **shadow vehicle** is required for **all mobile closures** (either moving or stationary) when operating **in the live lane** on level LV, level 1 or level 2LS roads **if** the **TM crew are working on the rear deck of (or behind) the work vehicle.**

When a shadow vehicle is NOT REQUIRED on Cat A road environments

Level LV, Level 1 and level 2LS

A shadow vehicle is not required if:

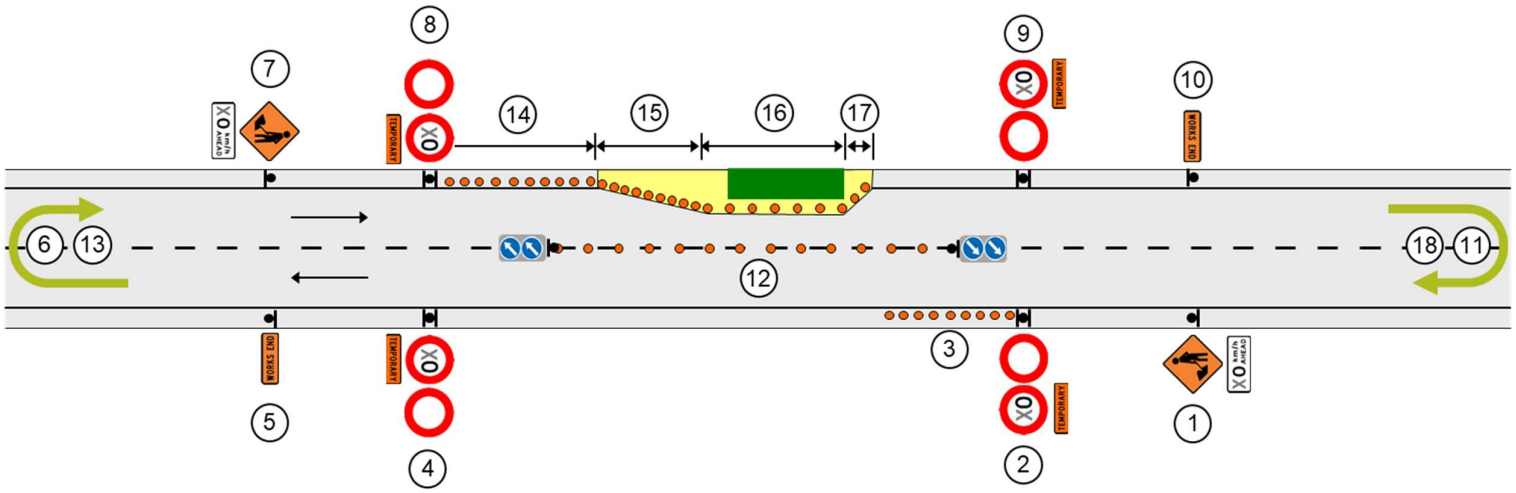
- The work vehicle is stopped out of the live lane and the TM crew is not working in the live lane (must be on the roadside or in the shoulder)
  Note: The TM crew can be on the rear deck of the work vehicle when it is stationary and off the live lane
- The work vehicle is **stopped in the live lane** and workers are unloading TTM equipment from the ***non-trafficked*** side of the work vehicle ***only*** (workers are not on the rear deck of or behind the work vehicle).

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.

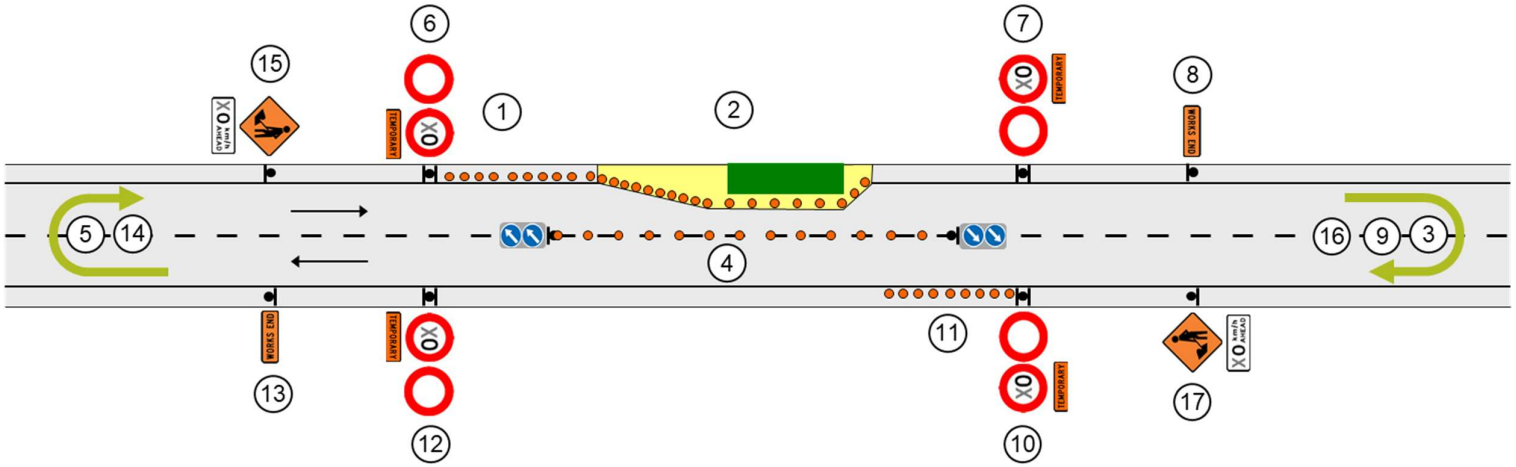
Set out on the following pages are some **OPTIONS** for installing and removing TTM at worksites.

F2.11 - TWO-WAY TWO-LANE ROAD – Traffic NOT crossing road centre - INSTALLATION procedures



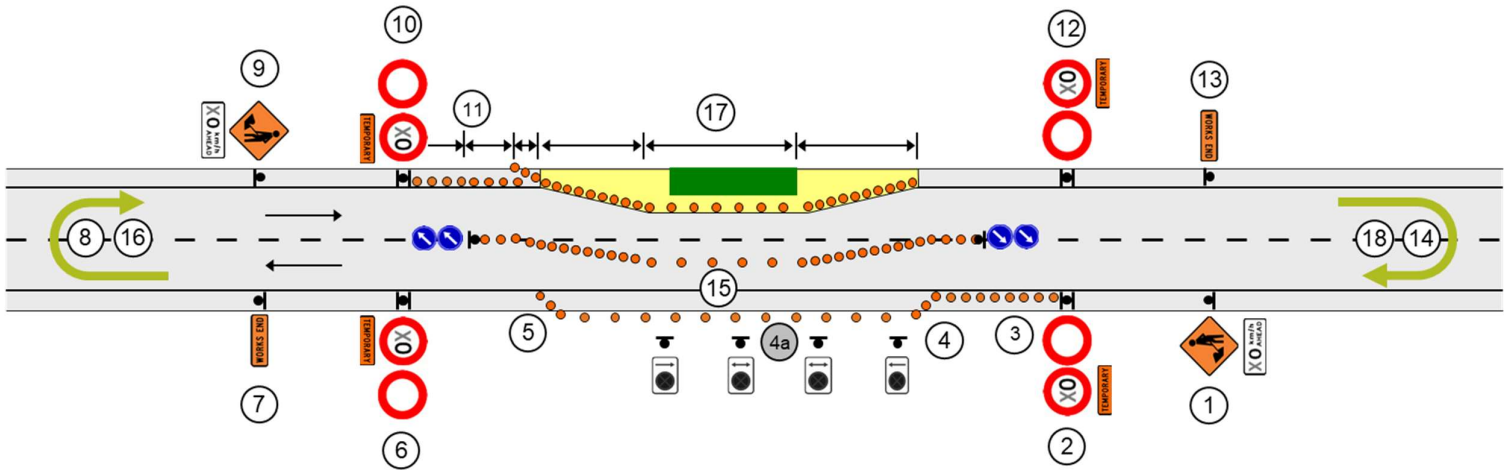
STMS completes drive through check of the worksite once TTM is installed

F2.11 - TWO-WAY TWO-LANE ROAD – Traffic NOT crossing road centre - REMOVAL procedures



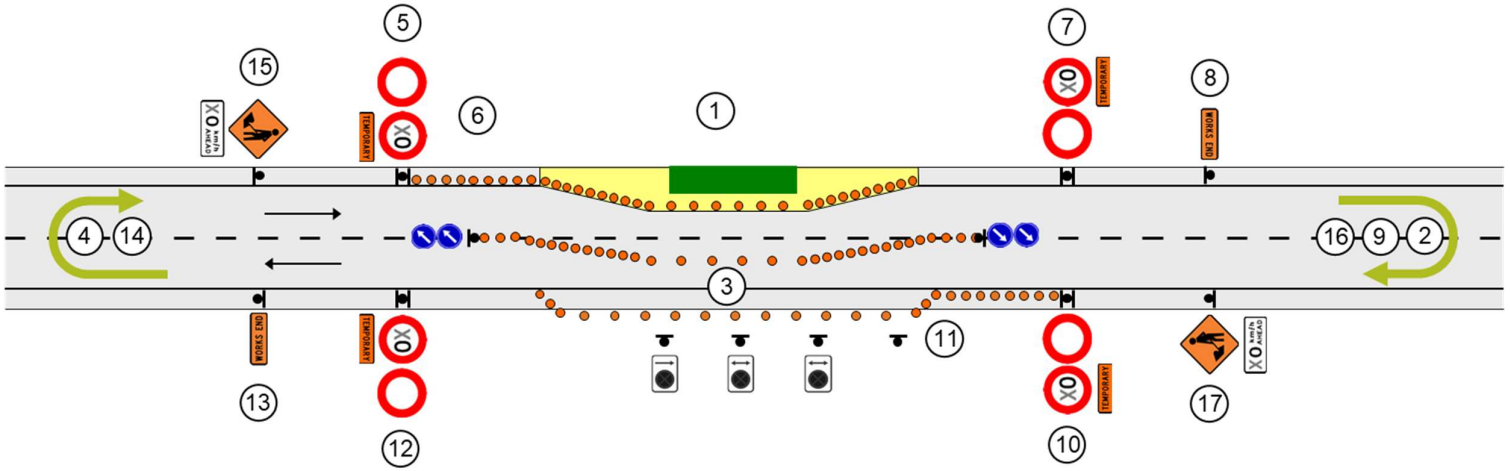
STMS completes final check of the worksite as final 2 signs are removed

F2.13 - TWO-WAY TWO-LANE ROAD – Traffic CROSSING road centre - INSTALLATION procedures



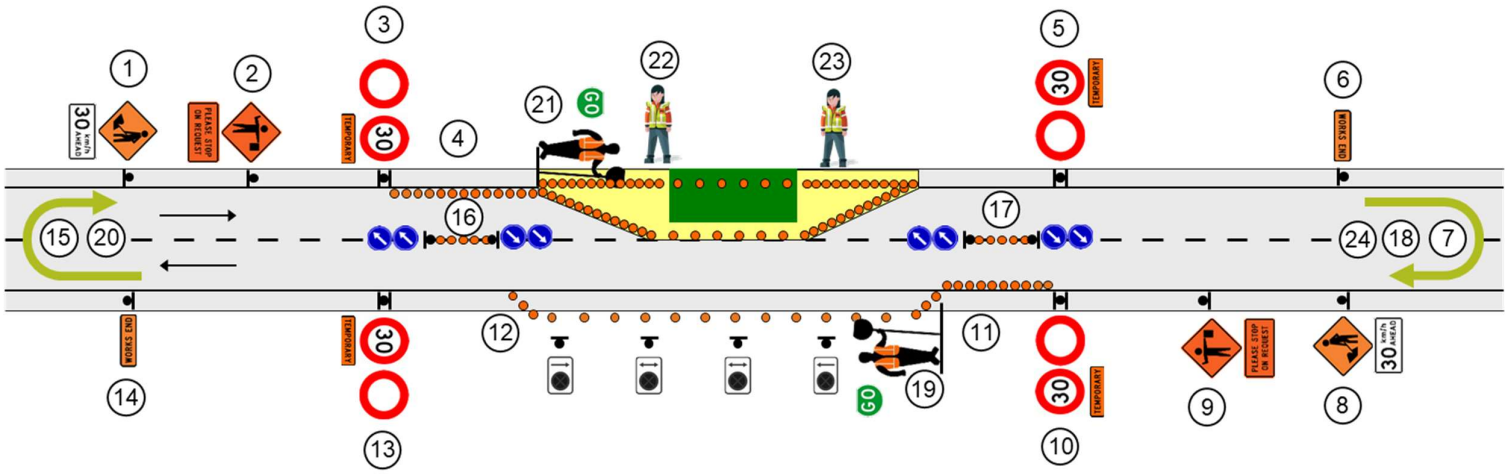
STMS completes drive through check of the worksite once TTM is installed

F2.13 - TWO-WAY TWO-LANE ROAD – Traffic CROSSING road centre - REMOVAL procedures



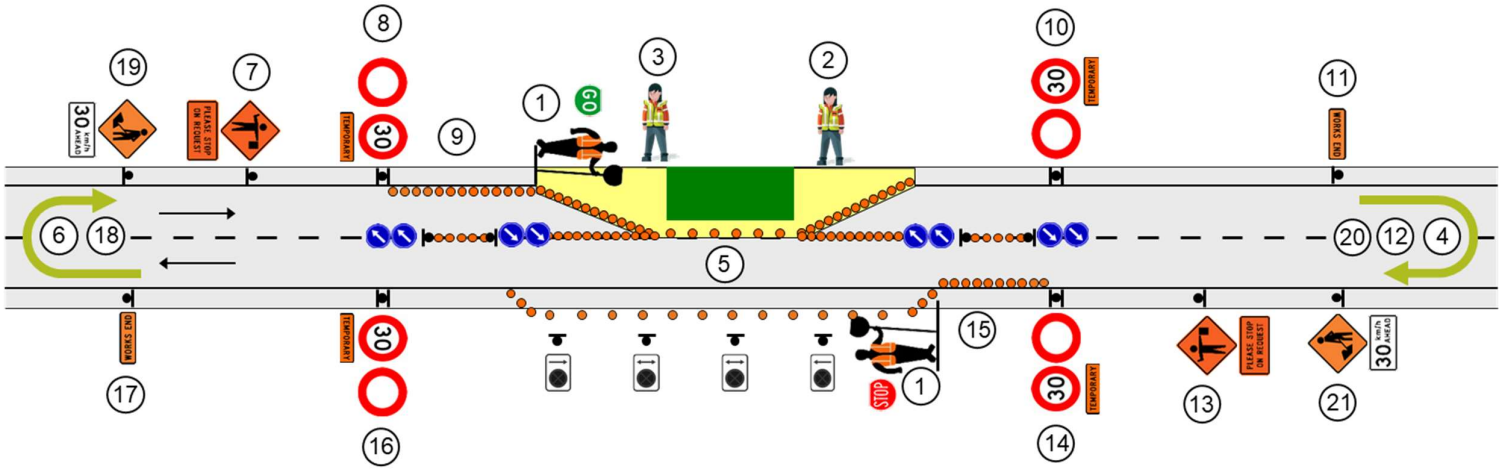
STMS completes final check of the worksite as final 2 signs are removed

F2.14 - TWO-WAY TWO-LANE ROAD – Single-lane alternating flow (STOP/GO or STOP/SLOW) - INSTALLATION procedures



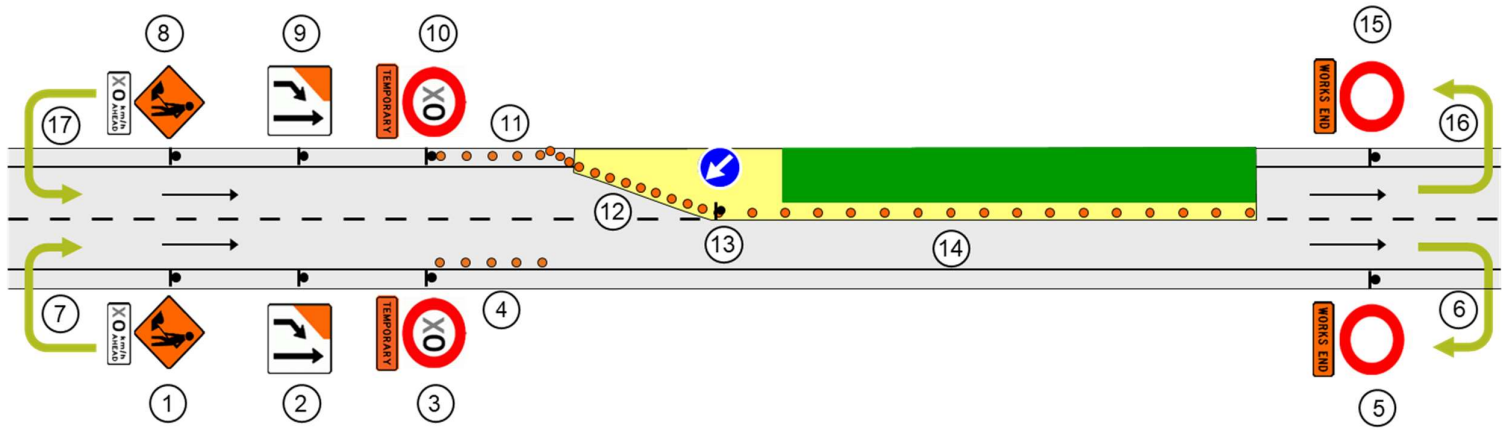
STMS completes drive through check of the worksite once TTM is installed

F2.14 - TWO-WAY TWO-LANE ROAD – Single-lane alternating flow (STOP/GO or STOP/SLOW) - REMOVAL procedures



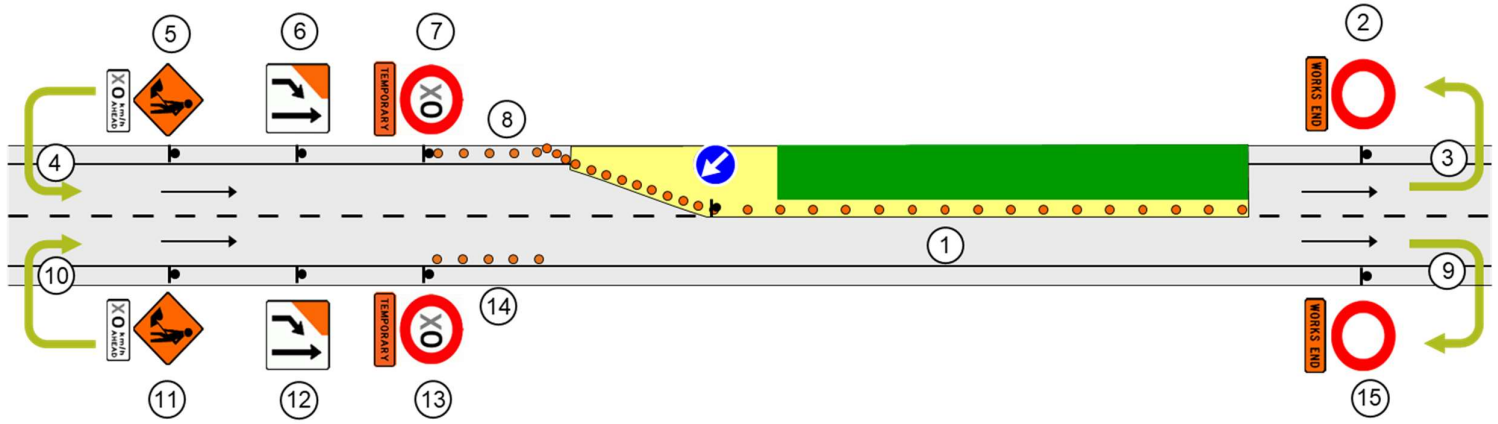
STMS completes final check of the worksite as final 2 signs are removed

F2.30 - ONE-WAY TWO-LANE ROAD – Left-lane closure - INSTALLATION procedures



STMS completes drive through check of the worksite once TTM is installed

F2.30 - ONE-WAY TWO-LANE ROAD – Left-lane closure - REMOVAL procedures



STMS completes final check of the worksite as final 2 signs are removed

MOBILE OPERATIONS

Mobile operations a practising STMS Category A can be in charge of

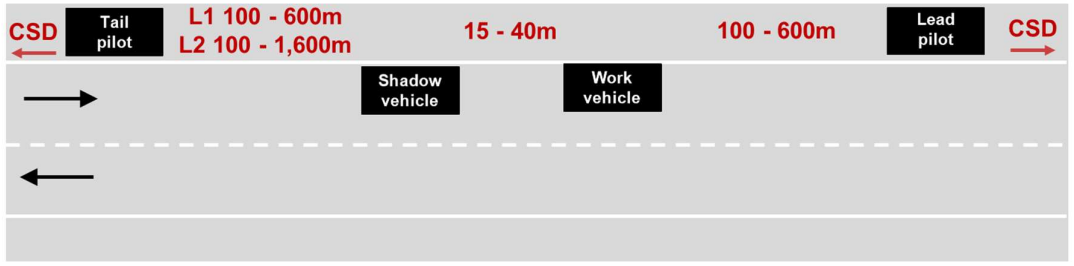
- Mobile operations to install, maintain and remove TTM on Category A road environments.
- Install, maintain and remove semi-static operations.
- TTM for any activity that moves along the road (eg mowing, road marking).

Clear sight distance (CSD)

Approaching road users must have CSD to the activity. CSD varies depending on the permanent speed.

Calculating CSD	Permanent speed	CSD
100 to 60km/h CSD = 3 x the permanent speed in metres (100km/h x 3 = 300m)	**60km/h**	180m
50km/h or less CSD (state highways) = 150m CSD (non-state highways) = 75m	**50km/h or less** **(state highways)**	150m
	50km/h or less **(non-state highways)**	75m

Distances between vehicles



Options for displays on work vehicles

Basic vehicle

LV, L1, 2LS, L2

Horizontal arrowboard

LV, L1, 2LS, L2

Light TMA

LV, L1 & 2LS

LAS

LV, L1, 2LS, L2

Protection of workers

Workers on the back of a work vehicle in the lane must be protected by a shadow vehicle.

Workers on foot behind a work vehicle require a shadow vehicle to be in place.

On level 2 roads a shadow vehicle with a Light Arrow System (LAS) and TMA must be used for mobile operations to install, maintain and remove TTM.

The RCA may also require these to be used on some L1 and 2LS roads.

Options for signs and displays on shadow vehicles

Basic vehicle

LV, L1 & 2LS

Horizontal arrowboard

LV, L1 & 2LS

Light TMA

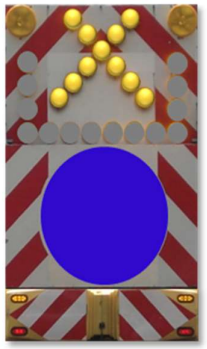
LV, L1 & 2LS

LAS

LV, L1, 2LS & L2

Shoulder closed Pass right when safe

Lane change right required



Lane closed or Rolling block Do not pass

Lane change left required

Shoulder or median closed Pass left when safe

Options for signs and displays on tail pilot vehicles

Basic tail pilot

LV, L1 & 2LS

Light TMA

LV, L1 & 2LS

AWVMS

LV, L1, 2LS **& L2**

Static signs or tail pilot vehicles

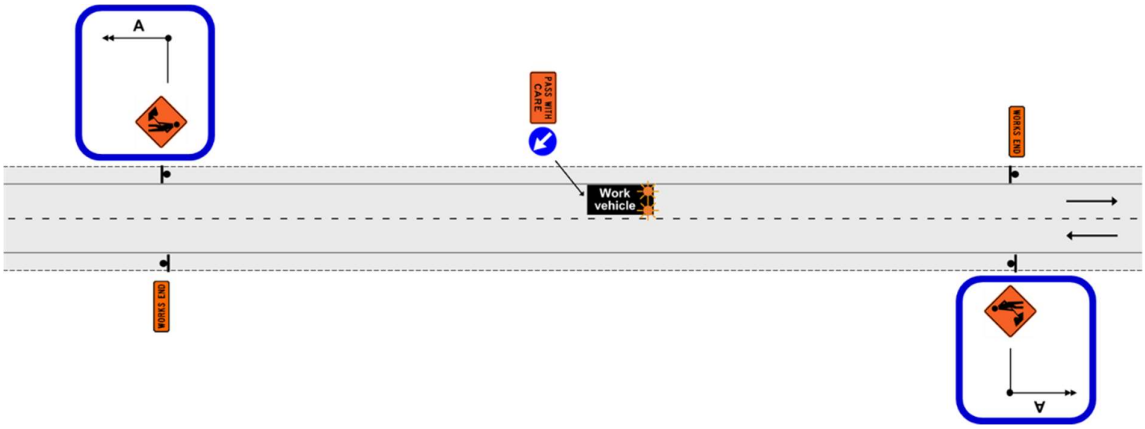
Mobile operations can utilise either:

- A tail pilot vehicle
- Static advance warning and works end signs.

If the work vehicle is in the lane (or partially in the lane) and static signs are installed, every side road impacted must have advance warning and works end signs installed.

If a tail pilot vehicle is used signs on the side roads are not required.

If static signs are used, use the dimension **A Sign visibility** distance instead of CSD.



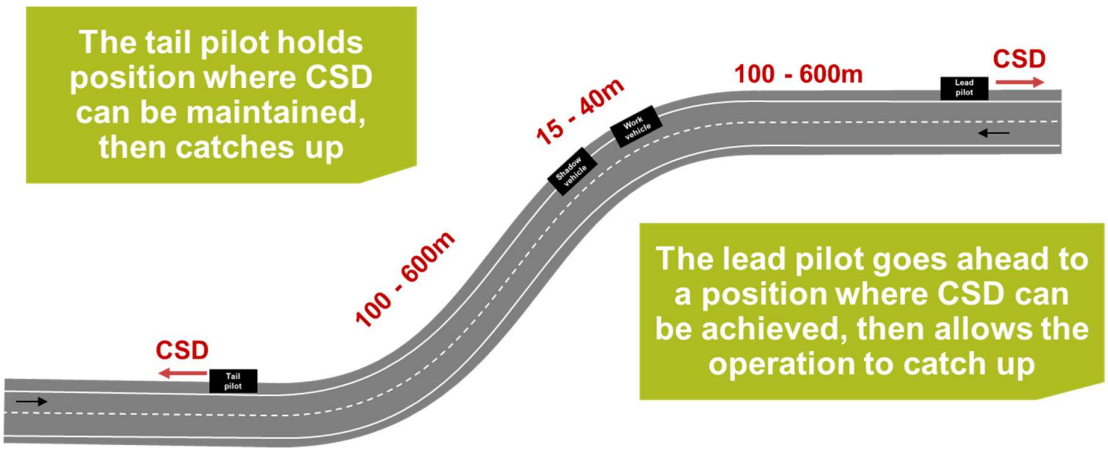
Options for signs and displays on lead pilot vehicles

Must have appropriate signage facing approaching traffic.

The advance warning sign may be mounted on the front of the vehicle or the roof of the vehicle.

Must have pass with care and RD6 mounted on the rear of the vehicle.

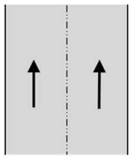
Maintaining CSD for the activity around curves or over hills



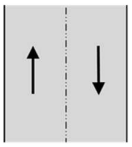
SEMI-STATIC

A semi static operation allows work for up to 1 hour. Less TTM is required (fewer signs, no TSLs).

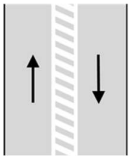
LAS or horizontal arrowboard used to compensate for less TTM.



Can be used on multi-lane roads



Not permitted on two-way two-lane roads…

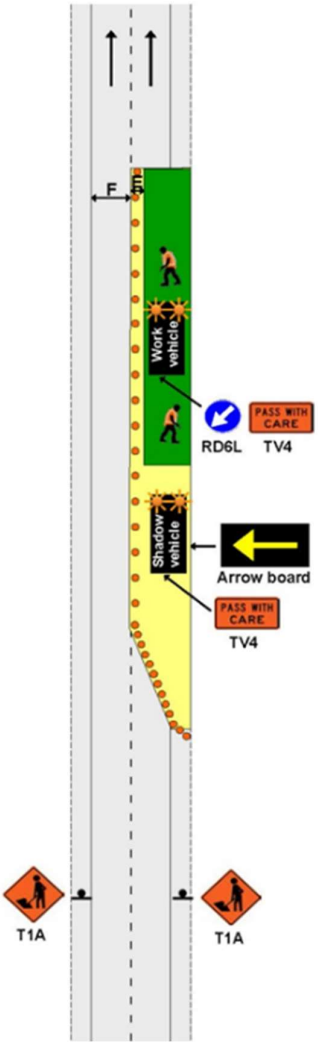


…unless the closure is on the painted flush median and traffic is directed to the left

Semi-static closures on L1 roads

Follow the instructions in the TMP. The requirements normally include:

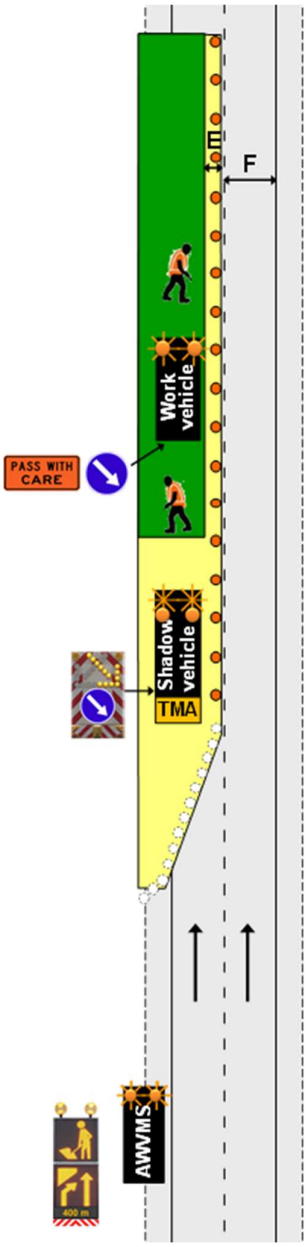
- Must have a shadow vehicle fitted with an arrowboard, PASS WITH CARE but no RD6L/R.
- Cones must be installed between shadow and work vehicle(s).
- Cone taper must be installed in advance of shadow vehicle or work area.
- One of the T1 signs can be replaced by a tail pilot vehicle, but the sign opposite must remain.
- If an AWVMS is used as the tail pilot, static sign is not required opposite.



Semi-static closures L2 roads and 2LS roads

Follow the instructions in the TMP. The requirements normally include:

- Must have a shadow vehicle fitted with an LAS and RD6L/R.
- Cones must be installed between shadow and work vehicle(s).
- If static advance warning signs are used, then a taper must be installed.
- If using an AWVMS for advance warning you are not required to install the taper.
- If an AWVMS is used as the tail pilot, static sign is not required opposite.



When a semi-static operation is stopped with a side road **between** the tail pilot and the shadow/work vehicle additional signs must be placed on the side road to warn approaching drivers.

CRITICAL POINTS FOR ME

Add critical points here:

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