New Zealand guide to temporary traffic management

The temporary traffic management system

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Draft for feedback

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Contents

1. The TTM System – how we do it

1.1. Risk management for TTM

This section introduces the risk-based approach to TTM and outlines risk concepts and principles.

If, when assessing risk, you become unsure how to proceed, this simple explanation may help you figure out how to move forward.

This section is not comprehensive risk management training. If you are unclear on risk management processes, you should seek advice and training.

1.1.1. Duty of care

Any person conducting a business or undertaking (PCBU) has a **duty of care** to ensure the health and safety of workers and others, so far as is reasonably practicable.

In TTM, a PCBU includes all types of working arrangements such as crown agencies, local authorities, companies, contractors, sub-contractors, trusts, and incorporated societies. You can find out more about PCBUs in the *Road and Roadside Workers Health and Safety Good Practice Guide* produced by WorkSafe.

There is a fundamental shift in roles and responsibilities with the move to a risk-based approach:

- Everyone is responsible
- If you create the risk, you manage the risk

WorkSafe's good practice guide *PCBUs working together – advice when contracting* highlights the following key points:

- You must consult, cooperate, and coordinate with other PCBUs when working in a shared workplace, or as part of a contracting chain.
- You can't contract out of health and safety duties and responsibilities.
- You should always build health and safety into contract management.

The *Road and Roadside Workers Health and Safety Good Practice Guide* also covers providing for health and safety throughout the contracting chain.

1.1.2. TTM PCBU responsibilities model

- Lead Contractor
  - **Prepares** site risk assessments
  - **Prepares** TMPs including input from other PCBU
  - **Approves** TMPs.
- Sub-contractor
  - **Contributes** to the design of the TMP to make sure their needs and risks are covered.
- Road Controlling Authority (RCA)
  - **Peer reviews** risk assessments to make sure the needs of the parties they represent are recognised and addressed.
  - Has **veto rights** and can stop a TMP from being approved if they consider it too risky for road users.
- Contracting PCBU (client)
  - Must ensure **safety in design** is considered. A contracting PCBU must ensure a project can be delivered, maintained, and operated safely.

- Where other people are required to be onsite, the contracting PCBU must ensure their safety, either directly or through **consultation**, **cooperation**, and **coordination** with other PCBUs.

In this model the duties and responsibilities of each group overlap. For example, the RCA PCBU is mainly responsible for the safety of the public, while the lead contractor PCBU is mainly responsible for the safety of the public and workers onsite. Both parties must work together to make sure the site is safe, but they can't tell each other how to manage their HSWA 2015 responsibilities.

This model changes the relationship between representatives from the RCA PCBU (TMCs), lead contractor PCBU and contracting PCBU from previous requirements. Under HSWA 2015 everyone has a duty to make sure everyone's safety needs are met - all workers and road users go home safe every day.

1.1.3. Non-road construction activities

For road construction works, the RCA PCBU and contracting PCBU are the same. However, for other activities, the contracting PCBU (client) is usually not the RCA. This means there are now three parties responsible for the safety being:

- Event Organiser
- Lead Contractor
- Road Controlling authority.

Non-road construction activities include:

- Events – sporting, motorsport, concerts, parades, markets, local community etc
- Security –
  - cordons to keep the public out (fire, flooding, earthquakes), likely Civil Defence would be the client
  - security cordons to protect people from harmful criminal drivers, likely Police or Ministry of Justice would be the client
- Primary industry – forestry, agriculture, etc
- Vertical construction – building construction, etc
- Utilities and services – telecommunications, power, gas, breakdown, waste collection etc

Non-road construction activities have some unique features to consider:

- Often the client isn't familiar with their obligations, nor have the skills, systems, or processes to deliver best practice safety within a road environment.
- Participants at a concert, parade, or sporting event often aren't trained at occupying road space. They might not follow traditional road rules such as stopping or giving way at an intersection or one lane bridge.
- Specific needs, such as security cordon to protect the public from harmful criminal drivers. This may include tools to deliberately damage and disable a vehicle, known as hostile vehicle mitigation devices.
- Often the footprint of the activity is big or has a big impact on the transport system, for example a marathon route covering 20+ km of network or concert requiring closure of major intersections to allow for pedestrian volumes.

The NZGTTM content applies to these activities, as the risk-based approach allows for identification of unique or unusual risks and controls that apply to the activity. Also, the equipment and plant used are the same and are to be selected from the Toolbox in section 5.

Key Point

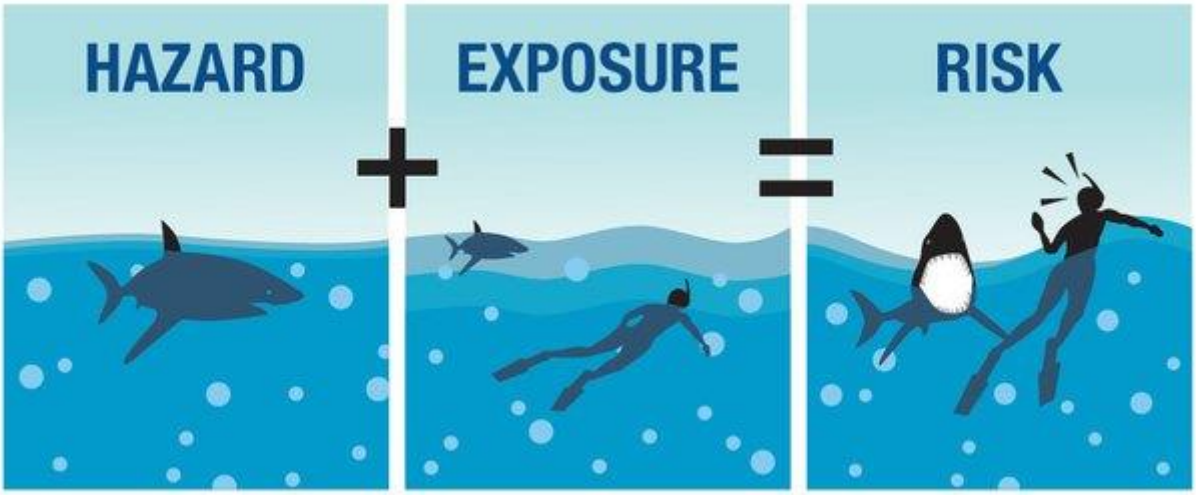
The lead contractor PCBU must make sure the client is given professional, robust, and complete advice on the risks, controls, and implementation requirements. When less experienced clients are involved, everyone else has more responsibility make sure everyone is safe. The more influence and control a PCBU has over a workplace or health and safety matter, the more responsibility they are likely to have.

A contracting PCBU (client) may want to use volunteer labour from their club or another volunteer group. This is acceptable for straight forward low risk activities such as guiding runners and cyclists. However, where there is an interaction with public using the road, such as staff at a closure point or manual traffic control, these staff must have appropriate capability and training. You can find out more about capability and training in section 4.

1.1.4. What is risk

Before getting into the planning process, you need to understand risk and how to identify it. Risk is the combination of a hazard and a person interacting with that hazard.

- Hazards are something that can cause harm.
- To cause harm, somebody must interact with the hazard.
- Risk is the chance or probability that the hazard will cause harm and the severity of the harm.



To apply this to TTM:

- A washout on the shoulder of a road is a hazard.
- If people travel down the road, they will interact with the washout.
- There is a risk of possible harm to some people.

Describing risk

You'll need to identify, describe, and assess risk carefully, otherwise you could choose the wrong risk control and end up increasing the risk.

Start by describing the:

- hazard which is the source of the risk
- event that could result from the identified hazard
- consequences or impacts of that event.

Risk Assessment

A traditional way to determine the overall risk rating is to use a risk matrix that takes account of both probability and consequence of a hazard causing harm. A risk matrix is only one of many methods. It's up to the company or organisation doing the risks assessment to decide the best method for assessing the risks.

For more guidance on various risk assessment options see: Paté-Cornell, M.Elisabeth, 1996 'Uncertainties in risk analysis: Six levels of treatment', *Reliability Engineering & System Safety*, vol. 54, no. 2–3, pp 95-111.

The six levels of risk assessment have been briefly outlined below, along with commentary regarding how useful each are.

Level 0: Hazard detection and failure modes' identification

- Noting a potential hazard or different ways a system can fail, without attempting to assess the risk in any measurable way.
- Some risks are very small, and it becomes a judgement call whether the hazard exists.
- This is the simplest, but also the least robust method.

Level 1: Worst-case approach

- Identifying the worst-case scenario without any assessment of probability.
- What is the worst thing that can happen, is it tolerable?
- This method is flawed because it is possible to identify a worse case, but the scenario is less likely.

Levels 2 to 5:

These are all variations on an approach that looks at both consequence and probability in the risk assessment.

Each level increases in complexity around the probability of an event. There are a few ways to work out the probability, from averages to risk curves to multiple risk curves. The main thing to remember is that everyone doing the risk assessment uses the same method.

Other things to consider when doing a risk assessment:

- **Experience** – a person with one day of experience will make different decisions from a person with 5 years and a person with 25 years of experience will make different decisions again. More experience may increase knowledge and ability, but they may have also learned habits that no longer apply.
- **Cognitive bias** – a person's point of view and experiences affects their initial response to new information. This can influence their decision-making process.
- **Group decisions** – a single person will have a different perspective from a team of people. We do not all perceive hazards and probability the same.

With these things in mind, risk assessments should be done by a diverse group of people – experienced, new to the industry, risk tolerant, risk adverse.

For many situations the group may consist of people from the works crew, TTM staff, community, and client. For complex situations, the group members represent the stakeholder groups such as – works crew, TTM staff, event participants and road users (light and heavy vehicle, pedestrians, cyclist, public transport, blind and low vision, mobility impaired etc).

How this applies to TTM

When assessing risks in TTM, work through the following method:

1. Identify the hazard.
2. Identify the probability of the hazard causing harm.
3. Identify the consequence of the harm.
4. Determine the level of risk

1.1.5. Types of Risk

There are many types of risk, including:

- Safety – potential for impacts on a person's safety
- Security – potential for malicious intentional acts to impact on a person's safety directly or indirectly
- Health – potential for impacts on a person's health
- Environmental – potential for environmental harm
- Legal – potential for prosecution
- Quality – potential for quality to be reduced/of poor standard
- Property – potential for property, public or private, to be damaged
- Reputation – potential for bad publicity for an organisation
- Financial – potential for cost increase

Key point

Workers and others need to be given the highest level of protection from workplace health and safety risks as is reasonably practicable.

In temporary traffic management your focus is on health and safety risk. You must do everything reasonably practicable to eliminate or minimise the health and safety risks. Other risks may exist, but health and safety risks must be addressed first.

Key Point

In designing our road system, we must acknowledge the limits of our capabilities and plan for human error, so that the impact of a collision does not cause fatal or serious injuries.

Not all safety risks are the same. You must never tolerate risks of fatal or serious injury, but you may have to tolerate a risk of property damage or minor injury to deal with the risk of a fatal or serious injury.

For example, using a truck mounted attenuator (TMA) at a worksite will reduce the risk of a fatal crash, however there is still a risk of injury if a car crashes into the TMA. Another example is installing a safety barrier to prevent a fatal crash, but it may damage cars and cause injury if drivers crash.

1.1.6. Who's at risk?

Risks are created any time an activity changes the way the road normally operates. Because risks are created when somebody is exposed to a hazard, lots of different people are affected.

Therefore, when identifying risk, you must identify everyone affected by the activity. Everybody has same right to be safe, including:

- Work crews
- TTM crews
- Vehicle drivers
    - Private car drivers
    - Heavy vehicle drivers
    - Motorcyclists
    - Bus drivers
- Vehicle passengers

    - Public transport users
    - Passengers in private vehicles
- Cyclists
    - Commuters
    - Racing/training cyclists
    - Mountain bikers
- Pedestrians
    - Those less able – take extra care when a site is near schools, hospitals, rest homes etc
    - Runners
- Special vehicle operators
    - Mobility scooters
    - Over dimension vehicles
    - Over-weight vehicles
    - Agricultural vehicles
    - Forestry vehicles

You also need to recognise that all these people have different reasons for being on the transport system. These include:

- travelling to or from work
- transporting goods
- repairing or building the road
- working on roadside
- participating in an event
- travelling to or from recreational activities
- travelling to or from school
- travelling to or from shops
- travelling to or from friends and family.

Key point

Creating TTM solutions for urban areas are often more complicated than for rural areas as there are generally more users, all doing different things.

1.1.7. Risk Controls

Once you have identified the risks, you need to decide what you are going to do about them. Choosing the risk controls, also called risk mitigation measures, is just as important as identifying risks.

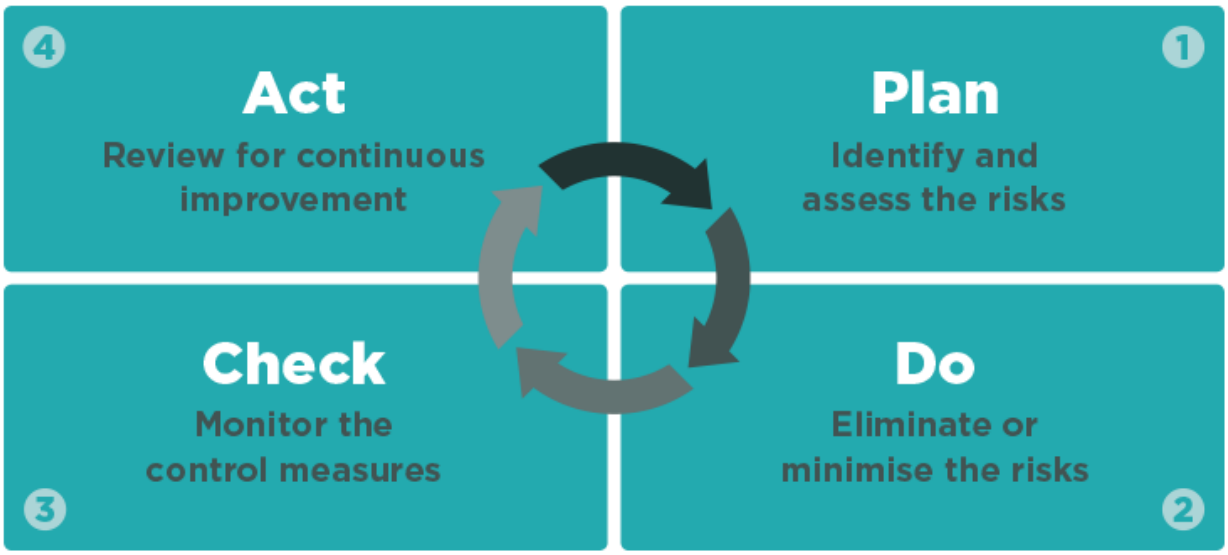
The Hierarchy of Controls

Most effective control	Preferred	Eliminate the risk	to eliminate risks to health and safety, so far as is reasonably practicable;
	Second choice	Substituting Isolating Engineering	minimise risks to health and safety, so far as is reasonably practicable, by taking one or more of these actions that are the most appropriate and effective, taking into account the nature of the risk
	Least preferred	Administrative	If a risk then remains, you must minimise the remaining risk as far as reasonably practical
Least effective control		Personal protective equipment.	If a risk then remains, you must minimise the remaining risk using PPE

Not all risk controls are as effective as each other. Health and Safety at Work Regulations 2016 Section 6 - Hierarchy of control measures, describes the priority order for controls to be considered. You must work to do everything reasonably practicable to eliminate or minimise health and safety risk

1.1.8. Risk Management Process

The basis for risk management process in New Zealand is the Risk Management Standard AS/NZS ISO 31000:2018. From this, WorkSafe have developed, the Plan, Do, Check, Act cycle.



Go to worksafe.govt.nz/managing-health-and-safety/managing-risks/how-to-manage-work-risks/ for more information.

Key Point

The key aspect of this process is that it is cyclic – plan, do, check, act, then back to the start. It is through thinking, acting, learning, and rethinking that you improve your ability to eliminate or minimise the risks.

It is very rare to have a perfect set of controls for every scenario, so you must apply a risk-based approach to each scenario.

1.1.9. Lowest Total Risk

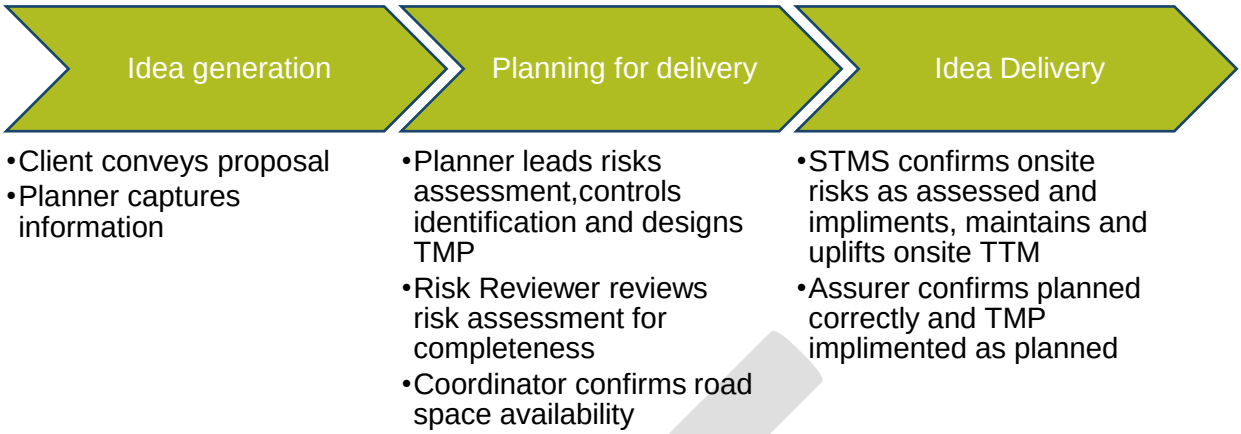
Always deal with critical risks first. However, sometimes a control for one risk may increase or transfer risk to another group of people or it may introduce another risk. This is where the concept of **lowest total risk** comes in.

Assessing the total risk is a big challenge in transport because many people can be affected by the same risk. You'll need to make sure you consider the total risk and work to achieve lowest total risk. Examples to help explain this can be found in supporting material 6.1 Examples.

1.2. TTM planning process

1.2.1. Peer review system

The peer review system includes multiple people and stages. There are people who propose ideas, who review the ideas, who deliver the ideas and who check that everything is done correctly. This makes sure ideas are appropriate, robust, and well executed.



Within this TTM peer review system the following checks and balances exist:

- The planner leads the preparation of a risk assessment and identifies TTM risk controls. They prepare the documentation, work through the lead contractor PCBU quality assurance process and then submits to the network access coordinator and risk reviewer.
- The client confirms risks are appropriately managed for any people they bring or allow onto site. For example, event participants or crowds going to a concert.
- The network access coordinator confirms the worksite required is available at the time requested and there are no clashes with other activities. This also includes ensuring that if the proposed site is combined with other sites in place at the same time, it will not unduly disrupt the transport system.
- The risk reviewer checks the risk management processes and TMP are well prepared. They focus on elimination or minimisation of risks to the public from one or combinations of sites. They do not have a role regarding the risks to workers or event participants. The risk reviewer leads risk management practice on behalf of organisations such as Kiwirail, public transport operators, and RCAs, who are controllers of various parts of the land transport system. They ensure the risk assessment is robust and the public's safety needs are met.
- The STMS reviews the TMP, ensures the risks onsite are the same as identified in the risk assessment, then delivers, maintains, and uplifts the site. The STMS leads the implementation and any changes identified during planning.
- The assurer checks the site to confirm the planner's risk assessment was fit for purpose and the STMS is delivering a quality site. The assurer escalates any poorly controlled risks to the STMS as well as the accountable party, such as the client, planner, or risk reviewer.

1.2.2. Client request – project confirmation

The TTM industry allows clients to go about their activities on the transport system safely.

Understanding the client's intentions and goals is critical to ensuring safety of workers or event participants and those using the transport system. This information is central to your risk assessment and TMP design. Categories and sources of information, along with examples can be found in supporting material 6.2.

1.2.3. TTM risk process

All workers and road users go home safe every day

Traffic management is one of the highest risk activities on a road work site and some sites are more complex than others. The level of effort in the planning phase needs to be consistent with the risk – more risk means more planning effort.

After confirming the project details, work through the following steps:

1. Identify risks

2. Analyse the risks.
3. Identify control options
4. Assess residual risks and lowest total risk
5. Design the TMP.

1.2.4. Identifying risks

The range of risks to be considered vary from site to site.

Start by describing the:

- threat or opportunity which is the source of the risk
- event that could result from the identified threat or opportunity
- consequences or impacts of that event.

All relevant risk types should be included but remember that safety is your main focus. You can find examples of common risks as well as identification of risks in supporting material 6.3 Identification of risks.

An emerging risk type is security for events with crowds of people. This is the potential of intentional malicious acts to impact on a person's safety directly or indirectly. In the context of TTM, a security risk is the same as safety risk. Use the NZ Police self-assessment tool to determine level of security risk for events.

1.2.5. Analyse the risks

Once you've identified the risks, each one must be assessed. This is so you can compare the rating for each risk and identify the risks with highest ratings.

It's up to you and your organisation to decide the best way to assess the risks and make sure your risk assessment team is made up of a diverse group of people.

Key points

- Not all risks are equal.
- The goal is to identify the risks with the highest risk rating, so you know what to focus on first.
- The effectiveness of risk controls will also need to be assessed and the residual risks (risks after controls implemented) identified and assessed.
- Focus on both the absolute risk rating as well as the relative differences between risks.

1.2.6. Identify and assess the control options

The next step is to order all risks from highest to lowest risk rating - very high to negligible. This is to make sure the highest rated risks are focused on first.

Each worksite or activity will have its own risk profile and the boundary between intolerable and tolerable risks will be subject to the reasonably practicable test in section 3.2.1.

Key point

Everyone is responsible

If controls cannot be identified for very high or high rated risks, you must discuss them with the client and their support team. This is because the client cannot contract out of risk management and has an obligation to review the project and assist in resolving the issues.

Knowing very high and high risks must be dealt with, you need to apply the hierarchy of controls on page 16.

Control Section Guidance

For some risks, some control types may not be available, practicable or feasible. For other risks combinations of controls types may achieve the best result. Different control types may be selected for different parts of a project or at different times within a project.

For each risk there are some things to consider when selecting a control type:

- Severity of the risk – does the control match the risk level?
- Effectiveness of the control – does it sustainably eliminate or minimise the risk? Is the residual risk after the control is implemented noticeably less? Is the control easy or complicated to implement correctly? Will it be effective if not implemented correctly?
- Introduced risks - What are the new risks created by the control? Solving one risk but introducing another risk must be very carefully considered. If the new risk is substantially lower than the original, it may be appropriate.
- Most appropriate control – there is more than one way to manage traffic at a worksite.
- The most suitable option may not be clear until the risk assessment and option selection process is done.
- It is unethical and inconsistent with HSWA 2015 to transfer risk from one group to another, for example from workers to the public. Refer to lowest total risk in section 4.1.9.
- Planners selecting the risk controls need to be clear in their reasoning for the TTM control approach to their company (PCBU), client and the TMP approver. If the reasoning cannot clearly be explained and proved through a risk management process, then the planning process has failed, which could end in injury or death and prosecution.
- All options for all stages need to be evaluated. This will inform the selection of TTM staging, which may be consistent across multiple stages or may vary within a stage.
- Evaluate the options for each of the different groups impacted, for example, workers, athletes, public transport, pedestrians, motorists, cyclists, and local business owners.

Once the set of controls is selected, review both the reductions for each individual risk and the lowest total risk. If the initial risks are not eliminated or minimised enough, or the residual risk is still too high, go through the risk control selection process again.

1.2.7. Fundamental TTM controls

Applying the Hierarchy of Controls, the following fundamental TTM controls cover most situations where an activity needs to be carried out:

Remove need to do work

- No longer in road reserve

Go around the site – this is the preferred TTM control to minimise risk to the workers as you remove the traffic from the site. However, care must be taken not to increase risk to road users such as detouring them onto a less safe route without putting in place appropriate improvements.

There are two main options in this category: –

- **Detour** – sends traffic onto other roads in the road network, ensuring there is no traffic in the worksite. Be sure to consider the impacts on pedestrians and cyclists. A detour may include a contraflow, diverting traffic to the other side of the road.
- **Temporary Road** – a specially built section of road to divert traffic, eliminating the risk to workers.

Go through the site – this is the second level of TTM control. By temporarily closing a road, people can operate in a safe environment without exposure to traffic. The activity is then periodically paused, the site made safe, and people moved to safety. The traffic is then released to travel through the site safely. There are two primary options in this category:

- Manual traffic control for stop/stop periods.
- Portable traffic control device for stop/go periods. Note using a replaceable device is better than manual traffic control.

Risks to road users as they travel through the site must also be addressed.

Go past the site – this is the third level of TTM control and historically the most common. It is important that the planning process justifies using this TTM control because the risks people are exposed to are higher. There are three main options, which can be combined, in this category:

- Separation of traffic and workers by a physical barrier or exclusion zone space.
- Isolating workers in space by using a truck mounted attenuator
- Isolating workers in time using manual traffic control or portable devices for stop/go periods.

In the Gaps – this is the lowest form of TTM control and is historically the second most common. This form involves workers entering lanes in the gaps between approaching vehicles. This form of control leans heavily on the concept of lowest total risk. If deploying any other form of TTM control increases the risk to people more than the original risk, this approach can be taken. Typically, this approach is used for very short term or very low risk activities. There are two main options, which can be combined, in this category:

- Safe work method statements.
- Detailed training and instruction with close supervision.

Other key points to note when selecting a TTM controls:

- **Minimise the length of road and paths where traffic management is placed** - long sites where it isn't obvious why drivers are being delayed, often leads to non-compliance with speed controls. If the site is long, reduce speeds only for the parts of the site where it's necessary.
- **Consider the right times -** when working on the road, choose times with less traffic to reduce risk to people and road users. Chose a time based on actual hourly traffic counts. If something happens, such as a crash, and traffic is still heavy later than normal, delay setting up the site until traffic has cleared.
- **Minimise the time the road and path is blocked (exposure reduction)** – to minimise the risk to road users, set up the TTM right before the activity starts and pack up as soon as it's complete. Consider whether the TTM needs to be setup for the entire length of the job. For example, at a vertical build site outside the road, set up the lane drop for deliveries only when needed, don't block the lane and create unnecessary risk.
- **Minimise blocked lanes and paths** – consider whether you need to block a traffic lane to work on the footpath or verge. Can vehicles be on the shoulder or verge rather than blocking a lane?
- **Have realistic options for all modes of transport** - a pedestrian diversion taking them a long way around a site is unlikely to be considered reasonable.
- **Coordination** - consider coordinating with other works being done nearby.
- **Not all risks are the same –** you must never tolerate risks of fatal or serious injury, but you may have to tolerate a risk of property damage or minor injury to control the risk of a fatal or serious injury.

The options selected must be the highest practicable level of protection and safety to achieve the lowest total risk. Before selecting a treatment option, consult with those who will be applying the measures, supervising the works and groups representing road users.

1.2.8. Traffic management diagrams

Once you've done the risk assessment and worked out the fundamental TTM, you'll need to do a detailed site design. Using traffic management diagrams (TMDs), you'll show the location of TTM equipment for the site with vertical and horizontal geometric design.

Geometric design makes sure the shape of a road is appropriate for the way in which it's being used. Measurements used are typically time (seconds) and distance (meters) and human factors such as detection, decision making and reaction times as well as physics such as breaking forces (energy and friction), cornering forces (radial acceleration and friction) are included.

> TTM is simply permanent design delivered temporarily, so a TTM should align with permanent design guides. This includes things like taper lengths, curve radii, safe stopping distances and speed limits.

You'll also need to do traffic engineering assessments for the design and to reconfirm risk assessments. For example, calculating queue lengths to work out the right spacing of advanced warning signs. If sign spacing is based only on safe stopping distances and the queue is long, then there's no advanced warning of the stopped queue, which is a hazard.

All equipment to be used onsite must be:

- legal signs and markings as defined in the Traffic Control Devices rule
- compliant with current standards – static, mobile, variable, and personal equipment
- approved equipment where there is no current standard.

- where necessary, specifically designed to minimise a unique risk at the site and only for exceptional circumstances.

For more detail on geometric design, traffic engineering, and equipment, go to section 5 TTM Toolbox.

1.2.9. TMP documentation

The risk assessment, fundamental TTM controls, and the detailed site design must be documented. This creates a record of decisions and allows communication with the contracting PCBU, network access coordinator, peer reviewers, STMS, and assurer. The most important person to communicate risk and the site design too is the STMS because they set up the site and manage the risks to workers and road users.

As the TMP has several audiences, it needs to include:

1. Traffic management plan reference
2. Organisations and people involved
3. Project overview – activity and location
4. Transport system aspects affected
5. Risk register – including controls and residual risks
6. Consultation
7. Communication
8. Proposed TTM details – time, location, plant, and equipment
9. Contingency plans
10. Monitoring and assurance
11. Contact information – planner, delivery team
12. Peer reviews
13. Diagrams

Traffic management plan reference

This is the TMP unique identifier for the client, TTM supplier and the reviewers.

Organisations and people involved

Include the organisations (PCBU) and their representatives for the project:

- Contracting PCBU (client) and the project manager
- Lead contractor PCBU and the project manager
- TTM sub-contractor PCBU and department manager
- Road Controlling Authority PCBU and TTM manager

Contact information – Planner, Delivery Team,

Details of the contact information for the operational representatives or operational duty numbers for each of the organisations involved, for example:

- Contracting PCBU (client) operational representative and duty contact details
- Lead contractor PCBU operational representative and duty contact details
- TTM sub-contractor PCBU operational representative and duty contact details
- Road Controlling Authority PCBU operational representative and duty contact details

Project overview – activity and location

A brief overview of the project, its location and surrounding environment.

- Project description:
    - The work or event, for example chip sealing, line marking, pavement reconstruction, intersection upgrade, power cable maintenance, running race, waste collection, logging, cycle race, parade, security cordon.
    - Outline of the major stages of work.
- Location – road name and location identifiers such as side roads, RS/RP, GPS coordinates, map references etc.

- Surrounding environment – farmland, residential, school, rest home, commercial business, industrial, forestry,

Transport system elements affected

Details of the transport system elements affected and their use:

- Shoulder – grass, sealed, aggregate
- Lane – which lane, for example lane number 1 of 3 where lane 1 is closest to the median (the fast lane). Include the AADT of the road by direction and where necessary the hourly traffic volume (by lane or carriageway). Include the posted speed limits.
- Special vehicle lanes – bus lanes, cycle lanes, transit lanes, etc. Include the AADT of the lane and where necessary the hourly traffic volume. Include the posted speed limits.
- Pathways – footpath, shared path, cycle path etc. Include the AADT of the path and where necessary the hourly traffic volume. Include the posted speed limits.
- Accessways – the property affected, the accessways affected and the lane they provide access too.

Risk register – including controls and residual risks

Details showing:

- a description of each risk
- an assessment of each risk, including total risk
- controls identified
- each residual risk, including total residual risk.

Consultation

An overview of the consulted parties and their responses. These may include:

- landowners
- parking officers
- traffic signal operators
- overweight and over dimension transport operators
- rail operator
- public transport operator
- emergency services
- any other relevant party.

Communication

Any planned communication with the public. This could be through:

- social media
- printed media
- radio and television campaign
- onsite messaging – VMS, billboards etc

Temporary road closures are legally required to be publicly notified:

- Any works or events on local roads – Local Government Act 1974, section 342 and Schedule 10, paragraph 11-16
- For any work on a state highway – Government Roading Powers Act 1989 section 61. Sub-clauses (4)(h) and (4)(i) describe the types of work that the Act covers.
- For holding vehicle races or trials, processions, carnivals, celebrations, sporting events, or other special events on any road – Transport (Vehicular Traffic Road Closure) Regulations 1965 section 3 and 4.

Onsite TTM details – time, location, plant, and equipment

Includes details of all parts of the TTM to be installed onsite. This can include:

- Plant – vehicles and their specifications
- Equipment –
    - Signs
    - Vertical delineators (cones or bollards)
    - Barriers
    - Fencing
    - Electronic systems such as –
        - portable traffic controls (portable traffic lights, portable booms, etc)
        - speed feedback systems
        - variable message signs.
- Requests for special equipment as necessary

TTM contractors may wish to also provide detailed schedules of equipment to assist the STMS responsible for setting up, maintaining, and removing the site.

Contingency plans

Shows what will be done if something unexpected happens. For example, will the site be adjusted, uplifted, or extended. It should also include how decisions will be made and peer reviewed for any required changes.

Monitoring and Assurance

Shows what monitoring is in place to make sure the site is set up as per the peer reviewed TMP.

Include what assurance will done to give to the PCBU's confidence the risks are correctly identified, manged appropriately and the controls are appropriate.

Peer Reviews

Shows the names and details of the peer reviewers of the TMP. The peer reviews are done by representatives of each of the involved organisations, for example:

- Contracting PCBU (Client) peer reviewer
- Lead contractor PCBU peer reviewer
- TTM sub-contractor PCBU peer reviewer
- Road Controlling Authority PCBU peer reviewer

Include space for signatures/stamp of the peer reviewers.

Diagrams

These are the detailed layout diagrams, commonly known as traffic management diagrams (TMDs).

The diagrams should clearly show the TTM staging for the project and the works each stage covers. Staging diagrams show all major elements of a traffic management stage of the works, including installation and uplift. You'll need a diagram for each stage that impacts traffic in a different way. However, you may be able to include multiple stages of work within one TTM stage.

Other obligations

The TMP is a communication tool and record keeping tool, but it may not cover all the other obligations that the PCBUs have for a project. Other documents that may be required include:

- crew briefing plans and pre-start records
- TMP variation register
- incident reports
- site inspection records
- temporary speed limit record
- consultation log

- complaints register

Example forms have been included in supporting material 6.4 Example Forms for these records as aids, however they are not mandatory. A PCBU may choose to develop their own forms.

Clarification

There are several topics in the Code of Practice for Temporary Traffic Management not included in this process. This is because in moving to a risk-based approach, they are no longer necessary:

- Mobile, semi static or static sites
  - These definitions are about how the TTM equipment such as signs, cones, and plant are used. Each of these sites use the same types of equipment with the only thing changing is the length of time on onsite.
  - The risk management approach requires that the PCBUs decide on the right controls for each site based on its unique situation.
  - The contracting PCBU might specify the controls when preparing contract conditions. The lead contractor and TTM sub-contractor PCBUs should negotiate these controls with the them if they don't feel the risks have been properly addressed.
  - If the contracting PCBU doesn't specify the controls, then the lead contractor and TTM sub-contractor PCBU must work out the risks and controls.
  - For regular or repetitive tasks where the risks are consistent a practice note could be created – see supporting material 6.6.
- Generic plans
  - This definition has been removed.
  - A pre-approved reusable plan (PARP) is a layout or set of layouts that have been pre-drawn and pre-approved.
  - In a risk management approach, the lead contractor and TTM PCBU's (contractors) decide if they are suitable. **Never** assume they are applicable for any individual situation.
- Road Levels
  - Road levels are a stand-in for risk. High-speed, high-volume roads are generally more dangerous than low speed low volume roads.
  - There is no need for road levels in a risk management approach because the risk for each site is based on the speed and volume of that site.
  - Road levels have still been included in TTM Toolbox so there is consistency in the equipment used on high-speed roads.

1.3. TMP Peer reviews

1.3.1. Introduction

There are three different functions required to complete a robust peer review:

- Network access coordination
- Risk review
- Regulatory functions – approval of closures, diversions or traffic control on any road or part of a road, including temporary speed limits.

These three functions were done by the Road Controlling Authority who took on the role of TMP approver, basically not allowing works to proceed until the issues are resolved. However, this makes it difficult for those who created the risk to manage it. Now all PCBUs need to make sure they understand and deliver their duties in a way that doesn't overstep their function.

For major projects, there may be a nominated wider project member or consultant who takes on the role of peer reviewer.

Note - Asset management, that is making sure Road Controlling Authorities assets are left in suitable condition at the end of the activity is not covered here as it is covered by the *National Code of Practice for Utility Operators' Access to Transport Corridors*, enabled by the Utilities Access Act 2010.

1.3.2. Network Access Coordination

There are two parts to the network access coordination functions:

Space and time coordination

This function makes sure the section of road where the activity is proposed doesn't clash with another activity, unless both activities can happen safely at the same time.

Transport Impacts review

This function is complicated and may require some traffic or transport engineering skill:

- Ensuring detours don't travel through another site such as a road closure
- Reviewing the transport impacts such as travel time, vehicle operating costs, accessibility to property etc, for individual and multiple sites in the vicinity. The impacts are subject to the type of transport system, for example a grid network (Christchurch), rooms and corridors (Wellington), or a combination of both (Auckland). This cannot be done by any one TMP applicant as they will not have information for all sites. Often assessment of the impact can be done using first principles, however in complex situations, traffic modelling may be needed.

Safety comes first, delay is secondary to safety.

1.3.3. Peer Review

There are three formal peer reviews:

Risk review – done in the planning stages

Risk assurance – review during the activity

STMS – contractor reviews during the activity

The most important part of these reviews is making sure the risks are correctly identified, assessed, and the right fundamental controls put in place.

Risk Review

The risk review is a process review that makes sure the risk management process is robust and has not overlooked any risks. This includes risks from combining multiple sites. The risk reviewer does not approve the risk assessment, rather provides recommendations to the lead contractor. This is an important shift from the historic approver function as it doesn't approve the design decisions and detail of the TMP.

The risk review also makes sure all equipment meets the requirements of legalisation, rules, and specifications. It doesn't need to check the equipment is positioned correctly as this is the job of the lead contractor and their TTM planner.

Some TMPs may require multiple risk reviews as the activity impacts the normal operation of roads and railways administered by different organisations. The reviewers may be from several different organisations, for example RCAs, Kiwi Rail, and public transport operators.

If the risk reviewer does not believe the risk assessment is fit for purpose, they have the right to stop the lead contractor from proceeding.

Risk assurance

Once the site is established, risk assurance checks that the risks identified in the risk assessment are consistent with the actual onsite risks and that the fundamental control is appropriate.

1. First confirm the fundamental TTM controls are appropriate
2. If the fundamental control is right, check the site has been established as per the TMP, and if not, there is a documented risk management process leading to documented TMP changes.
3. Then check that the equipment meets the requirements of legislation, rules, and specifications.

Go to section 4.5 Monitoring and review, for more detail on the assurance process.

STMS

The STMS peer review makes sure the activity and the TMP are compatible. If they are not compatible, the STMS must make sure any new risks are identified and assessed, and then the appropriate controls are identified and implemented. The STMS must get help from the TTM planner before making any major changes to the assessed TMP. A major change in the fundamental controls must never be done by a STMS alone. The STMS may make minor changes, such as adjusting a cone location or sign placement, to enhance the safety of the site for both workers and the public.

Go to section 4.4 TMP implementation, maintenance and uplift for more information.

1.3.4. Regulatory Functions

The powers of a Council or Waka Kotahi to close, divert or otherwise control traffic, including temporary speed limits, on any road or part of a road come from various pieces of legislation:

Approver of closures

Waka Kotahi NZ Transport Agency is granted powers by the:

- Government Roading Powers Act 1989, section 61, clause 4(h) –
  to stop, divert, or otherwise control the traffic upon any State highway temporarily while any work or investigation is being undertaken or for the structural protection of any part of the State highway:
- Government Roading Powers Act 1989, section 61, clause 4(i) –
  to close to traffic any State highway, or any part of it, for such period as the Agency considers necessary to execute repairs or to remove any obstruction:
- Transport (Vehicular Traffic Road Closure) Regulations 1965, section 3 –
  For the purpose of holding on any road any vehicle races or trials, or any processions, carnivals, celebrations, sporting events, or other special events, the controlling authority may, subject to the provisions of these regulations, close the road to ordinary vehicular traffic for a period or series of periods of not more than 12 hours each in any consecutive 24 hours.

Councils are granted powers by the:

- Local Government Act 1974 section 342, clause 1 –
  The council may, in the manner provided in Schedule 10,—
  (b) close any road to traffic or any specified type of traffic (including pedestrian traffic) on a temporary basis in accordance with that schedule and impose or permit the imposition of charges as provided for in that schedule.
- Local Government Act 1974 Schedule 10, Temporary prohibition of traffic, clause 11 –
  The council may, subject to such conditions as it thinks fit (including the imposition of a reasonable bond), and after consultation with the Police and the New Zealand Transport Agency, close any road or part of a road to all traffic or any specified type of traffic (including pedestrian traffic)—
  (a) while the road, or any drain, water race, pipe, or apparatus under, upon, or over the road is being constructed or repaired; or
  (b) where, in order to resolve problems associated with traffic operations on a road network, experimental diversions of traffic are required; or
  (c) during a period when public disorder exists or is anticipated; or
  (d) when for any reason it is considered desirable that traffic should be temporarily diverted to other roads; or
  (e) for a period or periods not exceeding in the aggregate 31 days in any year for any exhibition, fair, show, market, concert, film-making, race or other sporting event, or public function:
  provided that no road may be closed for any purpose specified in paragraph (e) if that closure would, in the opinion of the council, be likely to impede traffic unreasonably.

In terms of TTM, this means that Waka Kotahi and Councils hold the legal function to approve a road closure.

Legal function is not the same as the decision-making process.

The decision to approve a closure or not should be guided by HSWA 2015 and this guide, that is does the closure achieve lowest total risk.

Approver of temporary speed limits

A Land Transport Rule: Setting of Speed Limits 2017, has been made in accordance with the Land Transport Act (1998). A temporary speed limit is set by getting approval from the Road Controlling Authority and installing the signs. Waka Kotahi and Councils must approve temporary speed limits in writing. For more information see section 6 of the Setting of Speed Limits Rule 2017.

1.4. TMP implementation, maintenance, and uplift

1.4.1. TTM Implementation fundamentals

At all sites where TTM is in place it needs to:

- ensure safety and minimise risk
- have a traffic management plan (TMP) and traffic management diagrams (TMDs) for all activities and they must be suitable for the nature and duration of the work.
- give clear and positive guidance for road users, including
    - protection for pedestrians, cyclists and other vulnerable road users.
    - providing an alternative route when signs or devices obstruct a road or path
    - appropriate warning of changes in surface condition
    - appropriate warning of the presence of people or plant working on the road
- protect people onsite, such as workers or event participants
- be set up and used correctly.

During the installation phase, the TMP needs to:

- clearly set out the peer reviewed site layout design to the STMS
- be used to record any changes made onsite.

If anybody is hurt, the TMP with amendments will be used in a court of law to show how the site was set out.

At every site you'll need to:

- monitor the TTM performance for effectiveness, for example, when managing traffic queues, delays, make sure drivers know what is expected and that there is compliance with speed limits. This is the check and act part of the Plan, Do, Check, Act cycle included in section 4.1.8
- make sure signs and devices are installed by a competent person with the necessary training, skills, and experience
- make sure signs and devices are consistent with the TMP
- place signs and devices just before a site becomes active and removed as soon as they are no longer needed
- keep appropriate signs, including any aftercare signs, in place until all work has been completed
- regularly check signs and devices to make sure they are still relevant, in good condition, clean, not faded and have good low light visibility and reflectivity
- regularly check signs and devices to make sure they are displayed in the right order and are clearly visible to road users. They must not be blocked by vegetation, vehicles, plant or other signs and devices
- keep records of all signage and delineation
- if the TMP requires it, move existing regulatory traffic control items at a site promptly to positions where they are visible and can perform their regulatory function. If not identified on the TMP, the STMS should get authorisation before regulatory signs are covered or moved

1.4.2. Implementation roles and responsibilities

Lead contractor's TTM responsibilities

- Hold briefings to make sure everyone onsite understands the risks, controls, and residual risks.
- Make sure everyone is supported when it comes to safety, for example, production and financial pressures must not compromise safety.
- Make sure everyone working in traffic management operations is qualified and competent.
- Deal with non-compliant traffic management workers as appropriate.
- Follow traffic regulations and the requirements of the TMP.
- Make sure peer reviewed TMPs are in line with the site layout and worksite conditions.
- Report on incidents and crashes at worksites.
- Make sure you have authorisation to carry out work or activities within the road reserve or affecting the road reserve. This may include approvals such as:
    - a Work Access Permit - refer to the Utilities Code.
    - an event permit
    - approval to install hoardings, containers, fencing or other semi-permanent structure in road reserve.
    - approval to occupy paid parking spaces.

TTM planner

The TTM planner may be a part of the lead contractor PCBU's organisation or a subcontractor. They are responsible for areas in the development and peer review of the risk assessment and TMP. The planner makes sure all risks are identified and controls put in place to eliminate or minimise these risks.

Site traffic management specialist (STMS)

The STMS has three primary functions:

- Establish the site so it is consistent with the TMP.
- Monitor the site
- Uplift the site

Make sure to check and act if there are issues with the site at any time. This is the check and act part of the Plan, Do, Check, Act cycle included in section 4.1.8 Risk Management Process

The STMS needs to:

- make sure the TMP is right for the worksite, and if it isn't, contact the TTM planner to update the TMP
- set up the peer reviewed TMP, including driving, walking, and cycling checks to make sure the TMP has been implemented correctly
- if a new risk is identified, change the site as necessary. Changes should be reviewed by a qualified person, preferably a TTM planner. If the STMS believes the TMP needs to be changed, they should contact the TTM planner or suitability qualified person to check the proposed changes. If they are unable to do this, they can use their knowledge of the NZGTTM to make the best decision they can and document any changes. The STMS is responsible for the TTM on site and must do everything they can to ensure the safety of workers and the public.
- make sure a copy of the approved TMP is always available on-site
- make sure people entering the worksite attend a Toolbox Talk on the TTM risks and the safety controls to be followed.
- lead the TTM team and make sure TTM workers
    - have been briefed
    - are wearing compliant PPE
    - know what their tasks are and monitor that they are completed
    - make sure everyone complies with all traffic controls and best practice for worksites.
    - other matters as appropriate.
- provide leadership during an incident
- manage fatigue and staffing breaks as required.

- always be contactable by mobile phone or two-way radio
- complete worksite inspections to make sure
    - there are no contradictory signs or markings
    - there are no surplus, obstructing or distracting signs or markings
    - the TMP fits with other traffic control devices in the area, such as permanent signs or other TTM, including those put in place by another STMS.
    - devices are in place at the right times and removed or covered when not needed.
    - damaged or defective signs are replaced or repaired as soon as possible.
    - low light guidance signs are inspected under these conditions.
- safely and quickly put in place any TTM changes instructed by an authorised person, for example Police, a WorkSafe representative, or other qualified person. These changes must be recorded and signed on the TMP and the TMD by the requesting person. The TTM planner must also be told straight away.

Interactions between the lead contractor, subcontractors and the STMS

- STMS should contribute to toolbox talks with information on the peer reviewed TTM, for example daily, and at each change of a TMD.
- STMS shall record and alert the lead contractor of
    - all incidents at the worksite – supply a crash report where needed.
    - any assurance assessments completed by 3rd parties.
    - any complaints about the TTM.

Other TTM workers

To reduce the risk of misunderstanding and to support the STMS, all other TTM workers should be qualified with the recognised qualification Traffic Management Operative. If the lead contractor decides to use un-qualified, un-trained or volunteer workers, they need to manage any risks associated with this, for example additional trained STMS to provide leadership.

The STMS has the right to ask workers to leave the site if they're acting unsafely.

1.4.3. TTM implementation risk management

Even with the controls identified by the TTM planner, there will be residual risks. These are the risks that may happen even with the controls in place. This means the risks are known but acceptable because of the risk reduction from the controls.

The TTM planner must give the risk register to the STMS so they are aware of the residual risks and can brief everyone onsite about the risks. It also tells the STMS why the controls were selected, which will help them make an informed decision on changing any controls.

1.4.4. Pre-start

Before starting works, the STMS is responsible for a peer review of the site's risk register to make sure nothing has been overlooked during planning. Using the site risk register complete the following:

- Risk identification review
    - Have all risks been identified? Are any risks missing from the TMP documents?
    - Add any additional risks into the risk register.
    - If you find additional risks, seek input from a TTM planner. If you don't get input from another person, you'll undermine the peer review process and possibly create more risk. All decisions and actions must be recorded.
- Measure the volume of traffic, a 5-minute count of traffic should give you a good estimate
- The speed of the traffic – observation using known distances (such as painted centre line dashes or edge marker posts) and a stopwatch. Speeds can be estimated from the following):
    - 100kph = 100m in 3.6s
    - 80kph = 80m in 3.6s
    - 50kph = 70m in 3.6s
    - 30kph = 30m in 3.6s

- The duration of work – confirm with the lead contractor
- The location of work
- The weather conditions

1.4.5. Toolbox talks

Everyone onsite needs to be inducted and regularly briefed by the STMS. Keep a log of these with the site records. The toolbox talk should cover:

- identified risks for the site
- the controls for the site including the fundamental controls, detailed controls, and residual risks
- The key aspects of the TMP, such as
    - around, through, past or administration/PPE
    - TTM equipment
    - exclusion zones
    - the worksite hazards
    - site driving and parking requirements
    - entering and leaving the worksite
    - clearances to live traffic.

1.4.6. Site installation

The TTM measures for the site can be installed in a planned and safe manner once you have completed the pre-start activities. The process should be in the TMP and be risk assessed in the same way as the TTM for the active site.

It's important the site is installed and maintained according to the risk management concepts in the TMP. If a different approach is taken the controls may not be as effective as planned, such as a TMA not positioned to protect workers or a barrier missing it's end treatment.

Positioning devices

Refer to section 5 Toolbox for guidance on how devices should be positioned.

Any changes must be marked on the TMP, so it remains an accurate record of the site.

Seek support from the TTM planner if there are any concerns or issues during site set up.

1.4.7. Site maintenance and operation

Once the TTM worksite is set up, the STMS needs to monitor its effectiveness. Drive, walk, and cycle through the site regularly to ensure it is working. Check the risk controls are operating as expected and there aren't any unexpected risks that become apparent. You also need to make sure the work is in line with what the lead contractor requested during the planning stage.

The STMS's primary duty of care is to ensure the safety of the workers and public. Anything that increases risk and compromises safety beyond that in the TMP is a failure of the STMS. If the activity changes, you'll need an updated risk assessment and TMP.

Active site hours

At the start and regularly during each shift check:

- all signs continue to be securely mounted
- all signs remain observable from appropriate sight distance by the road user
- positioning of signs and cones continues to be correct
- dynamic operations such as manually operated controls and ITS devices continue to be consistent with other signage
- barriers continue to meet manufacturers specifications
- TMA and arrow boards continue to function as intended, such as visual cues and crash energy reduction.

Seek support from the TTM planner if there are any concerns or issues during maintenance of the site.

Inactive site hours

Controls for inactive site hours should be included in the TMP. There may need to be changes made to prepare for inactive site hours, such as removing signs, uncovering of permanent signs, or installing different signs.

All installed devices and operations must continue to operate as designed during inactive hours. The controls must continue to reduce risk as planned. Because there are no workers onsite, the risk profile is different, so the controls will be different from the active hour's controls.

The process for checking and remedying any issues should be identified by the TTM planner and STMS during the planning phase. High pedestrian areas or conditions such as high wind or winter snows may need checks more often. Control failure will increase risk, so it's important the controls always function.

Record keeping

Keep detailed records and update them every day. The level of detail should allow the STMS to easily recreate the site in the future, which could be a couple of years later. They may also be used in legal proceedings.

It's up to the TTM PCBU to decide how these records will be kept, such as paper, secure digital, or video. The records need to show:

- STMS details
- Date
- Location
- Identification of job, including any reference numbers
- Time of inspection
- Detail of any adjustments and modifications
- Name of person who made the changes
- Name of person authorising the changes
- Comments
- Reference number of traffic management plan or traffic guidance scheme
- Hand over procedures at shift change or moving from active to inactive
- Weather conditions
- Check of all devices onsite, for example:
    - signs are upright, clean, visible, and correctly spaced
    - taper lengths are correct
    - dynamic operations (either manual or ITS) are working correctly
    - pedestrians and cyclists are provided for
    - lane widths are adequate
    - vehicle queue lengths are acceptable
    - road surface condition is adequate
    - installation and removal times are recorded.

Incidents

Incidents, such as crashes or collisions, either witnessed or reported, involving the public or from which legal proceedings might arise, should be documented for reporting. Record and photograph the actual TTM arrangements in use at the time of the incident. This includes spacings, widths, positioning, dynamic operations – all the TTM and permanent controls in place.

Details of weather, surfacing condition, activity details, traffic conditions, the type of crash, vehicles involved, and their drivers, should also be recorded.

This information may be important if legal proceedings result from an incident. If this happens, the TTM and lead contractors are asked to provide details of the site. Tampering with evidence by shifting signs and devices is a criminal activity

If a fatal or serious injury happens, evidence of all aspects of the site and the incident must be preserved until police are able to complete a forensic examination. Changes to the site must only be done to save

lives. The site must not be cleaned or tampered with, including all traffic management devices, and leave crash debris in place until police and/or workplace health and safety arrive. Preserving evidence overrides traffic access, so additional lane closures or complete road closure may be needed to achieve this. Guidance on partially or fully closing a site to traffic should be sought from the TMP contingency plan specific for the site.

For detailed information on notifiable incidents as required by HSWA go to What must a PCBU do if a notifiable event occurs? worksafe.govt.nz/notifications/notifiable-event/what-is-a-notifiable-event/

Excessive controls

For controls to remain effective, the public must trust that the controls are in place for a reason. Using controls excessively, such as deploying them early or leaving them installed when the site is completed, will undermine the public's trust. Making sure there are no excessive controls is the responsibility of the lead contractor and TTM contractor.

If the public aren't paying attention to the TTM equipment, it becomes ineffective at managing risk and the safety of current and future workers and the public is weakened.

1.4.8. Site Removal

Removing a site can often be high risk for TTM crews because of fatigue and being focused on getting home. There can also be fewer risk controls, such as advanced warning. Make sure to put in place any controls to manage these risks. Pre-plan the site removal process, for example schedule a shift change with a new crew coming in and manage the length of shifts onsite.

A risk assessment for the site should be completed before starting the removal process. What has been happening on site should be also looked at, as it will show the type of road user behaviours seen in that location.

The assessment includes:

- duration of the site. Removal of a long-term site may confuse drivers and result in safety risks.
- length of the site.
- complexity of the site
- permanent speed of the road
- speeds observed during road work
- time of day
- type of conditions such as weather or sun glare.

Make sure the removal process is described in the TMP and risk assessed in the same way as the TTM for the active site.

1.5. Monitoring and review

This is the check and act part of the Do, Check, Act cycle – section 4.1.8 Risk Management Process. For your risk management process to be robust, you need to monitor and review to make sure the risk controls put in place are the best for the risks identified.

TTM is permanent road design delivered temporarily. The processes used for TTM should be consistent with those used for permanent road design and construction. Road safety audit principles have not been used in the TTM industry so far, however the NZGTTM leads this change.

In Aotearoa New Zealand's road and traffic industry, inspections for safety issues in designs and recently completed roads are done regularly. These are called road safety audits and they use a risk-based approach. They are independent peer reviews with recommendations to improve safety.

The concept of audits to reduce safety risk can be applied to the TTM industry also.

Application of reviews to TTM

For TTM, there are three types of reviews as outlined below:

- suitability reviews
- compliance safety inspections
- roadworks road safety audits.

While having some overlap, each of these are quite different and none should take the place of another.

1.5.1. Suitability Review

This is the first step in reviewing a site, focusing on risk management. A suitability review makes sure the risk identification, assessment, and choice of controls, leads to lowest total risk and is robust. In other words – is the fundamental TTM control right for the site?

We recommend a suitability review be done at these stages:

- When the planning phase is complete – by a person within the TTM contractor and lead contractor organisation.
- During the risk review – this is the primary function of the risk reviewer.
- During pre-start
- On a regular basis once installed. The size, duration, and complexity of the site will affect how often the review should be done.

The reviewer works through the risk register and gives feedback on:

- risk descriptions
- risk ratings
- fundamental TTM controls selected
- lowest total risk.

The reviewer's name, date, time, and location should also be recorded. Do not give solutions or re-design the TMP in the review.

Feedback is given to the TTM planner or lead contractor as recommendations. The goal is to boost safety for workers and the public. Note once the TMP has been peer reviewed and implemented, the STMS cannot change the fundamental TTM control.

It is important to note that the lead contractor PCBU has the most responsibility for health and safety risk and makes the final decisions on any changes. However, the lead contractor should carefully consider any recommendations given to them.

1.5.2. Compliance safety inspections

Compliance safety inspections are the simplest of the reviews. It makes sure the site is consistent with the TMP, including any modifications made to the TMP. A compliance safety inspection should include a suitability review whenever possible. The size, duration, and complexity of the site will affect how often the review should be done.

The inspections can be completed by representatives of the lead contractor, TTM contractor, contracting PCBU, transport system PCBU or Police. The STMS must always have the TMP onsite for the inspection.

The inspection is usually done using a check list where the reviewer records a yes/no/not applicable or acceptable/not acceptable/not applicable rating. Details such as the reviewers name, date, time location are also recorded.

Any issues are reported to the STMS straight away so they can be fixed. As the site is live, any major issues must be made safe, such as improve the site or close the site, before any administrative steps are taken. Only once the site has been made safe, can conversations about negligence of a STMS, planner or company happen.

It is important to note that the lead contractor PCBU has accountability for the health and safety risks to staff and public on a live site. The Road Controlling Authority has veto rights.

1.5.3. Road safety audits

A road safety audit is an independent review of a future road project to identify anything that may affect the road's safety.

The Waka Kotahi *Road safety audit procedures for projects guidelines* identifies TTM as a project that would benefit from a road safety audit.

Audits are applicable for the TMP design and pre-opening stages of long-term projects. For short-term projects, it may be difficult to do an implementation stage audit. We recommend doing a strong planning stage audit. For maintenance, routine works, and emergency response contracts, we recommend the risk assessment and TMP are audited as they'll be used many times during the life of the contract.

Working out when and at what stage a road safety audit can and should be done for any site will take a bit of planning. Table 3.1 gives you a comparison of need and key areas of compliance safety inspections and road safety audits.

Road safety auditors are usually trained and experienced professional engineering consultants. They'll produce a report that is more comprehensive than a suitability review or compliance safety inspection. The skill and experience of the audit team is important to covering any safety issues in the TTM. The report will likely be photos of safety issues, associated risk assessments and often have recommendations for the lead contractor PCBU to consider. There may be a need to change the TMP and site installation so the safety risk can be properly managed.

1.5.4. Monitoring and review general guidance

Table 3.1: Comparison of compliance and road safety audits

	Suitability reviews or Compliance safety inspections Typically contracting or RCA representatives	**Road safety audits** Trained auditors
How often		
Site duration Less than 1 day	May be done • Inspections will be done, on a selection of sites for common activities, to assess general system and company compliance	Not usually done
Site duration 1 day – 3 months of a single TTM stage.	Should be done • See **When to inspect/audit** notes**.**	May be done • Depends on the impact on road operations. Recommended for sites with higher speeds or complex temporary geometry such as curves, crossfall, warp rates.
Site duration More than 3 months of a single TTM stage.	Should be done • At all sites	Should be done • Depends on the impact on road operations, Recommended for sites with higher speeds or complex temporary geometry such as curves, crossfall, warp rates.
When to inspect/audit		

	• At the start of works • At each major change to the TMP that may happen in staged works • During day and night operation • Following an incident • Must be completed following a death or serious injury incident • When there are unexpected major disruptions to traffic • At the request of site safety or WorkSafe representative	• Following preparation of the TMP, before works start –detailed design audit • At each major change to the TMP such as may occur in staged works – pre- and post-opening audit • During day and night operation • At the end of the operation of the TMP – can be incorporated into a pre-opening audit • At the request of site safety or WorkSafe representative
Things to consider…		
	• Safety of workers and the public at work site • Signs, road marking, temporary safety barriers, lighting and facilities for pedestrians and cyclists are in place as per the TMP. • Traffic compliance with the implemented TMP • Access to neighbouring properties • Effect of the works on surrounding land use • Differences in weather conditions • Traffic flow and road congestion to determine how the traffic is flowing	• Safety of workers, road users and the public at work site • Appropriateness of speed restrictions, signs, road markings, temporary safety barriers, lighting, and facilities for pedestrians/cyclists • Traffic compliance with the implemented TMP • Traffic volumes and composition • Parts of the traffic management plan arrangements that may confuse road users travelling through the work site • The operation and safety in adverse weather conditions • Conflicts between permanent and temporary features • Speed and geometry of the road • Roadside hazards due to works – plant, excavations, removal of existing barriers or re-alignment of traffic to suit works • Accident history of the work site – may identify specific issues due to road works and temporary operations • Risk of end-of-queue collisions
Report format		
	• Checklist with standard questions seeking Yes/No/Not applicable response • Free-form comments can be made outlining any non-compliance matters • Action required to address any non-compliance with the approved TMP	• Checklist available as a guide to auditors to ensure relevant aspects are reviewed • Written report, usually with supporting photos of safety issues • Recommendations/suggestions to address safety issues for the lead contractor to consider • Adoption of any recommendations and suggestions is not mandatory
Post audit actions		

	• Make safe ASAP • Follow up with administrative actions. These may include improvement notices or sanctions	• Make safe ASAP • Follow up with administrative actions. These may include improvement notices or sanctions

1.6. Emergency response

For workers attending emergency sites it's understood there won't have been a full risk assessment leading to a TMP and it won't be possible to set up TTM that is fully consistent with a TMP or practice note. However, in an emergency, PCBUs are still legally obliged to ensure the safety of workers and the public as much as possible. This means reducing the overall risk as much as reasonably practicable, which is consistent with HSWA 2015. This may mean using a different approach than for a planned site. So for emergency response situations our vision is changed to:

Do the best you can with what you have, to ensure all workers and road users go home safe every day

There should be no more harm, either from inaction or action of the responders. More death or serious injury from inaction is no different to more death or serious injury from action.

If legal proceedings result from an accident, information about the site will be important and the TTM planner and lead contractors are likely to be asked for details of the site. It's important that good records are kept.

Situations which typically require an unplanned time critical reactive response include:

- vehicle crashes
- fires
- floods
- live power cables or gas leaks
- emergency repairs to roads and essential services
- large objects on a road.

This approach doesn't apply to non-time critical responses or activities that can be planned, such as

- general maintenance activities which can be reasonably foreseen and therefore a TMP prepared
- activities that are generally known, such as streetlight replacement.

After every unplanned time critical reactive response, do everything you can to move into a planned emergency response.

Emergency response can be broken into four phases of operation as described below:

- **Short term response** – the first hour where the response is reactive with limited resources.
- **Medium term response** – after the first hour until around three hours after the incident where the response is reactive, but more resources become available.
- **Long term response** – approximately three hours after the incident until it's stabilised. There is more leadership and oversight, and the response may be changed in a planned way.
- **Recovery period** – the incident is stabilised until return to normal. Operate as normal, with pre-planning and peer review of all activities.

Transition from one phase to the next is never obvious. It's important that everybody involved understands these transitions will happen and supports the changing response. For some events, such as a vehicle crash with only minor injuries, the move from short term response to return to normal may be less than an hour. For other events such as a major fire or flooding the long-term response may be in

place for days, with many updates to the long-term response plans. A major earthquake may take weeks for the long-term response phase and years for the recovery phase. It is important that everybody proactively and positively supports the lifecycle of the emergency.

1.6.1. Short term response

While Police may take initial and short-term measures, the primary traffic management of the site and the follow-up TTM control measures should be provided by the TTM industry, as it's better trained and equipped to ensure the safety of those onsite and the public. This allows Police to focus on the resolution of the incident rather than directing traffic.

In the case of emergency response, the safety of road users and workers is central and actions to achieve maximum safety, such as road closures, are acceptable.

Organisations on standby for emergency response should develop efficient methods and procedures for attending emergencies. Emergencies are often outside working hours with limited access to support. The teams assigned to short term response should be trained in the use of the specific emergency response procedures, including:

- Duties of workers attending the site
- Modified duties where there aren't enough workers for ideal control of the site, for example, the need for a single manual traffic controller to control traffic from two directions
- Procedures for contacting police, emergency services, back-up assistance and any other help needed, including when usual communication, such as a mobile phone, isn't available or working.
- Equipment is always ready on callout vehicles.

Moving from the short-term response to the medium-term response should be done as quickly as possible. This means the initial responders calling out additional on-site resources and alerting managers and professional support so they can start planning for the long-term response.

1.6.2. Medium term response

Additional resources will become available, but their use continues to be unplanned. Staff onsite continue to lead operations independently or with limited communication with emergency services, operational managers, planners etc. The focus is on further reducing risk and enhancing safety using equipment as it becomes available. Safety continues to be the central focus and actions to achieve maximum safety, such as road closures, are acceptable.

Planners and managers will start collecting information so that coordinated response plans can be developed, and resources prepared for implementation.

They need to understand the risks and ensure appropriate controls are identified and communicated. This includes identifying the most appropriate fundamental TTM control that is reasonably practicable. This will continue to evolve as more resources and information becomes available.

Where possible, welfare should be considered, such as shelter and toilets, for staff and those who are directly affected by road closures.

1.6.3. Long term response

All actions are now from event specific risk management planning. It will feel like normal planning, but the response is still focused on ensuring safety and stabilising the emergency. Follow the NZGTTM, including risk assessment for identifying fundamental TTM controls, TMP development, peer review and risk-based installation and removal.

1.6.4. Recovery period

During this phase all actions are planned, however the focus is on repair of the damage. Follow the NZGTTM, including risk assessment for identifying fundamental TTM controls, TMP development, peer review and risk-based installation and removal.

1.7. Innovation

Innovation to reduce risk and improve safety outcomes is actively encouraged. Consider and apply the following as appropriate:

- Innovation could be through
  - using existing materials and plant
  - introducing new materials or plant.
- Innovation must lead to an increase in total safety. Safety improvements for one group, such as workers, that introduces risk for another group, such as the public, are unacceptable.
- Products must be approved by review of applicable standards or through a trial. Aotearoa New Zealand has laws and rules governing equipment that must be followed. Introducing new products without a review or trial is unacceptable. The Waka Kotahi TTM team will support you through this process.

The Waka Kotahi Traffic Note 10 has more information on the trial process.
https://www.nzta.govt.nz/assets/resources/traffic-notes/docs/traffic-note-10-rev3.pdf

PCBUs should keep a record of the benefits and details of any innovation and any outcomes from trials shared, both good and bad, with other organisations within the sector. It's unethical to withhold information that may lead to an improvement in safety and save a life.

1.8. Capability and training

1.8.1. Background

All workers must have the appropriate training and certifications and be competent to do their work safely. Training requirements will depend on:

- the level of risk their job involves
- industry or occupation specific training requirements and certifications, including licences, are required
- their knowledge, experience, and previous training.

PCBUs are responsible for making sure all workers, including subcontractors, have the appropriate training and certifications for the work they'll be doing. Where reasonably practicable, specify and check these requirements at the planning stages of a project.

PCBUs must make sure workers meet requirements before they start work. For example:

- have the relevant TTM/STMS qualifications
- have the appropriate licences and training to operate specific types of plant
- have any industry required health and safety and site access training.

1.8.2. Temporary traffic management training

Training in the future will be more industry driven. The role of Waka Kotahi is to assist in the development of critical skills in the industry, but not necessarily provide warrants. TTM specific training and TTM career development is important, so Waka Kotahi will support industry to develop the critical skills needed.

The TTM industry must have capability in the following functions:

- Planning
- Network access coordination
- Peer review
- Regulatory functions
- Assurance
- STMS