

PART A – TRAFFIC MANAGEMENT

Section 2: Fundamentals of Traffic Management and Traffic Control

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PART A – TRAFFIC MANAGEMENT

Section 2: Fundamentals of Traffic Management and Traffic Control

2.1 Principles of Traffic Management

2.1.1 Traffic Management Goals and Objectives

The goal of effective traffic management is to **protect workers** and **accommodate road users** while work is underway on roadways. Temporary closures or peak-period capacity reductions are not acceptable on many roadways, and even minor traffic disruptions may have efficiency and safety implications.

Identifying potential impacts and addressing them in the planning process will assist with the establishment of project-specific traffic management objectives and appropriate traffic control, and these in turn will help to ensure successful work.



Figure 2.1: A Work Zone

Effective traffic management ensures that:

- Project and site-specific issues are accommodated.
- Potential traffic impacts are reviewed and mitigated.
- Stakeholders are notified of potential impacts.
- Evaluation and modification occurs as needed.

When planning a project, it is important to use a **clear, consistent, and structured** process for developing the Traffic Management Plan so traffic issues are carefully considered and the Plan is reviewed for suitability. This Manual provides this process for Prime Contractors, Ministry staff, and other Road Authorities.

2.1.2 Traffic Management Principles

Four primary questions should be addressed when considering traffic management for a project:

1. What type of work is occurring?
2. What is the likelihood of traffic delays?
3. What special circumstances must be accommodated?
4. What type of traffic control is required for the work?

2.1.3 Traffic Management Process

The process for planning and evaluating traffic management on every project should consider the following:

1. Identification of the work.
2. Clear definition of roles and responsibilities.
3. Development of clear and consistent Traffic Management Plans appropriate to the complexity of the work and the site.
4. Regular and effective evaluation of Traffic Management Plans.
5. Management and documentation of ongoing changes.

As illustrated in [Figure 2.2: Traffic Management Process Life Cycle](#), traffic management issues should be considered during the project design phase to identify the appropriate project category and develop the contract.

The Ministry's internal process traffic management plan acceptance for major works projects is outlined in [Figure 2.3: Ministry TMP Acceptance Process for Major Works – Category 1 and 2](#) and [Figure 2.4: Ministry TMP Acceptance Process for Major Works – Category 3](#).

A Traffic Management Plan is a dynamic document. Once work is underway, performance should be monitored, and plans modified to reflect changing traffic management issues, construction schedules, and deadlines.

Once the project is completed, the effectiveness of the Traffic Management Plan should be assessed, and the lessons learned incorporated into the planning for future projects.

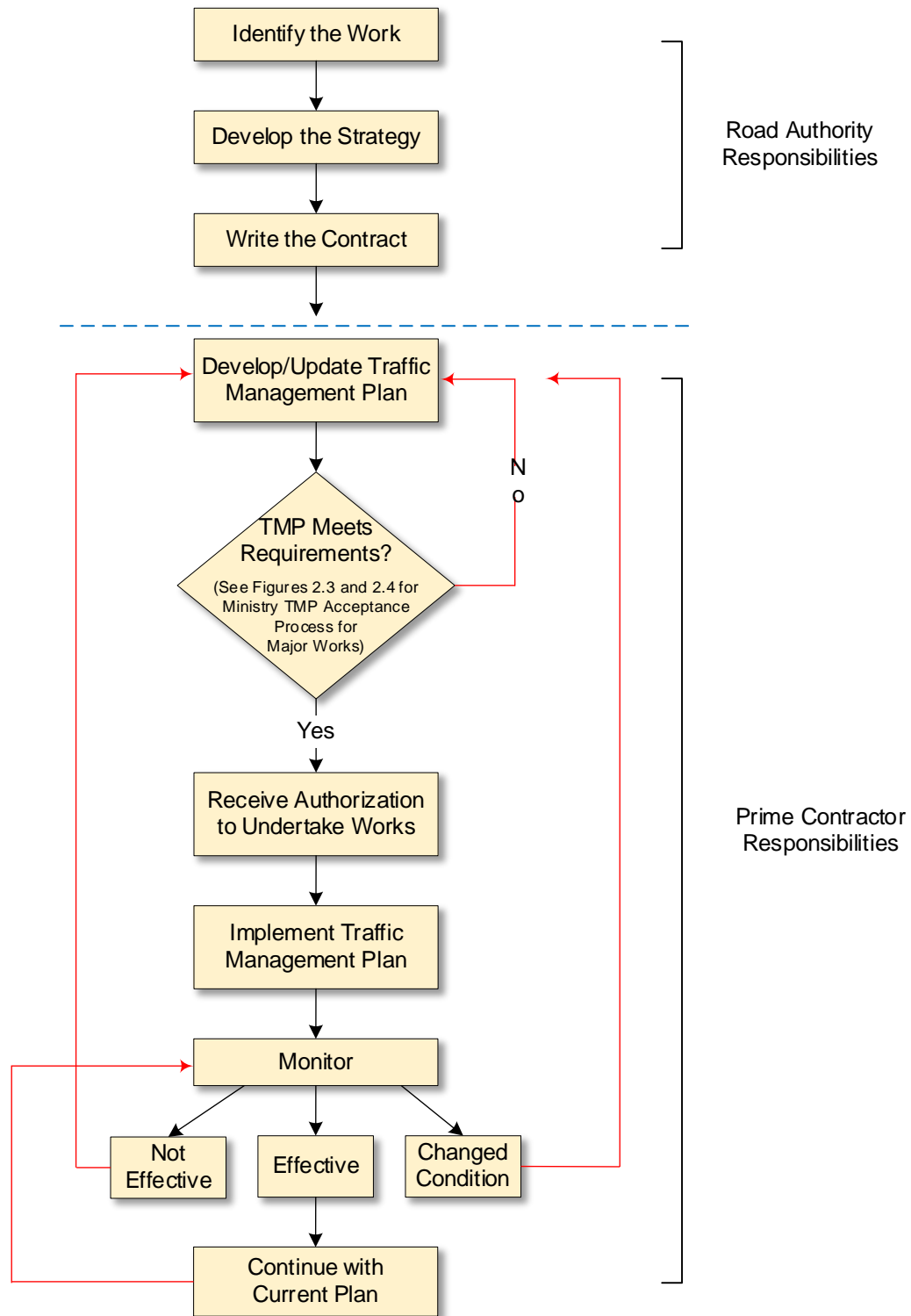
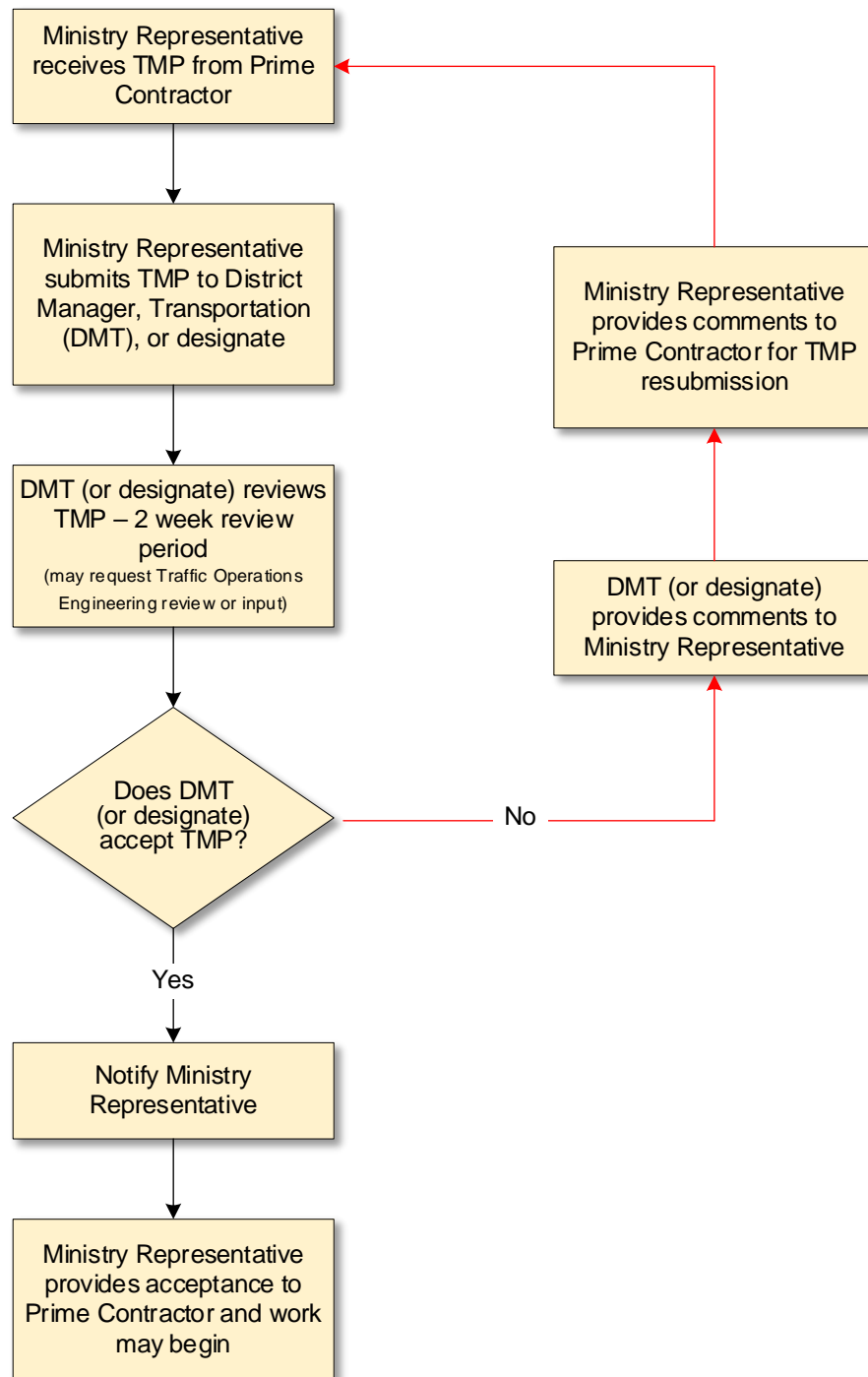


Figure 2.2: Traffic Management Process Life Cycle

**Figure 2.3: Ministry TMP Acceptance Process for Major Works – Category 1 and 2**

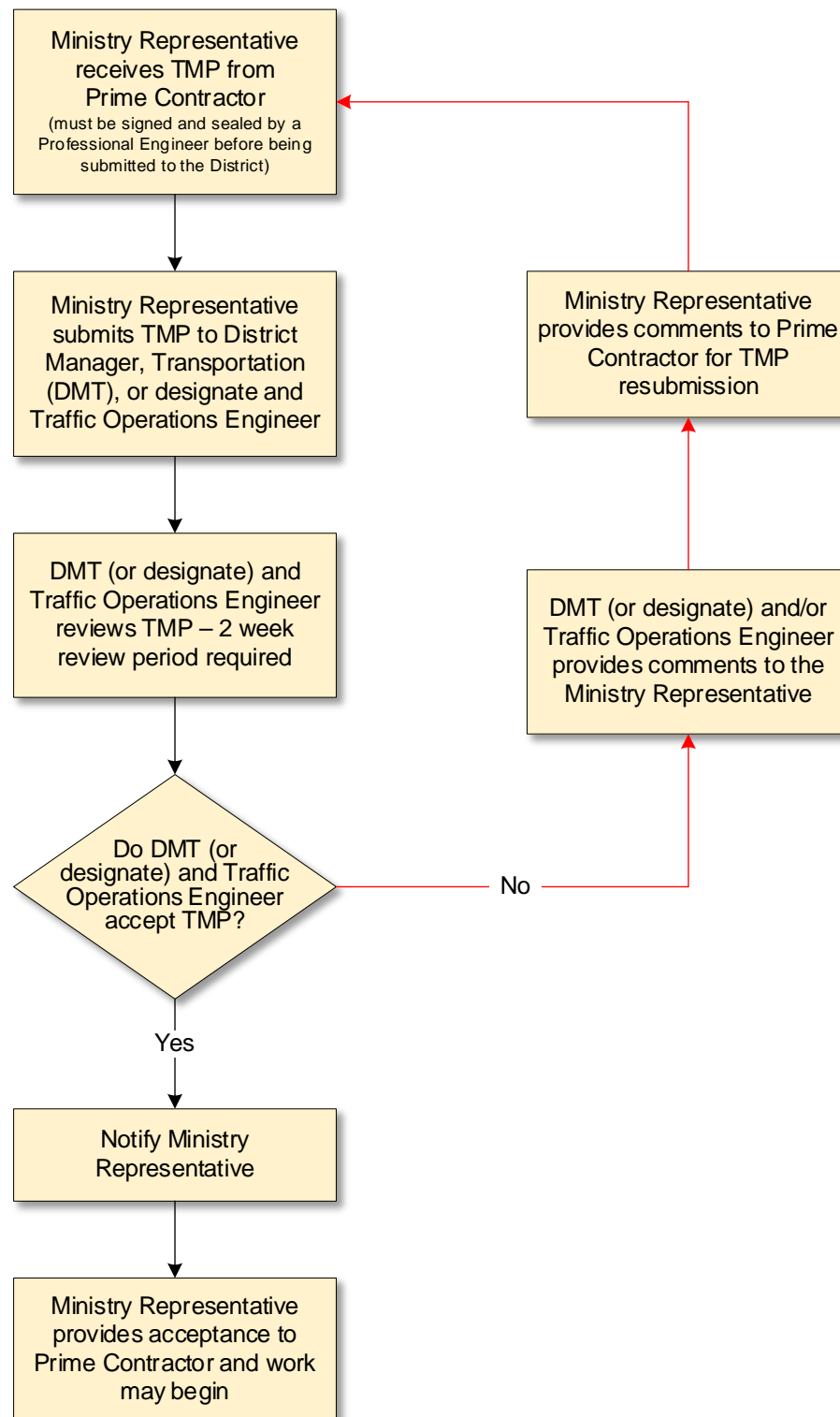


Figure 2.4: Ministry TMP Acceptance Process for Major Works – Category 3

2.2 Principles of Traffic Control

Traffic Control

The implementation of the Traffic Management Plan through the effective use of temporary traffic control devices to protect workers and move road users safely through the work zone.

2.2.1 Hierarchy of Controls

Use the hierarchy of controls below to manage interaction between road users and the work zone. Most work zones will require a combination of these controls.

1. Elimination Controls

Completely eliminate public traffic from the work area and construction traffic through constructed detours, alternate routes, or otherwise isolating the work zone.

2. Engineering Controls

Use prescribed temporary traffic control devices and layouts to effectively control traffic through a work zone, permitting public traffic and construction to interact without the use of Traffic Control Persons.

3. Administrative Controls

Schedule the work at times when traffic volume are low, reducing the exposure of public traffic to construction.

4. Traffic Control Persons

Use Traffic Control Persons where the strategies described above have been considered and deemed unsuitable to effectively manage traffic.

2.2.2 Planning and Implementation by Trained Persons

Traffic control is planned, designed, approved, selected, installed, operated and maintained by trained persons. Complex field layouts require comprehensive plans and the services of an experienced traffic specialist.

Training is usually obtained through course work, programs, and experience in the field of Traffic Control or Traffic Engineering. Traffic Control Persons shall retain evidence of traffic control training that is, at minimum, acceptable to WorkSafeBC.

2.2.3 Minimum Disruption to Road Users

Work on roadways can cause inconvenience and significant disruption for road users. Road user movement and time through a work zone should be inhibited as little as reasonably possible, while addressing all known hazards.

1. Driving conditions through work zones should be as similar as possible to normal driving conditions.
2. Scheduling of work should consider congestion and delay.
3. Keep reduced construction speed limits reasonable to the given hazards and road conditions.
4. Provide notification to all stakeholders of the work.
 - Various media, including newspaper, radio, internet.
 - Businesses and residences for which access will be affected are provided with sufficient advance notice to plan alternative actions or routes.
 - Emergency services are considered and accommodated.
 - Railroad, transit, and commercial vehicle use is accommodated or alternative routing is planned.

2.2.4 Clear, Positive Direction for Road Users

The measures implemented for traffic control should be designed to provide clear, positive direction, as if every road user were approaching the area for the first time.

1. Drivers should be provided with positive guidance in advance of and through work zones by means of temporary traffic control devices that are effective under varying conditions of light and weather.
2. Channelization of traffic should be accomplished by using pavement markings, signing, flexible posts or drums, tubular markers, cones, delineators, barricades, and other light-weight devices.
3. Pavement markings should be modified as needed for long-duration work.
4. When the use of temporary traffic control devices is inadequate for clear direction, Traffic Control Persons should be considered.
5. When traffic control devices are not needed, they shall be removed, covered, or turned.

2.2.5 Accommodation of Other Road Users

All road users should be accommodated through the work zone. Typical traffic control is directed towards drivers of passenger and commercial vehicles.

Motorcycles

Road surface conditions can impact motorcycle operation more so than other vehicles. This is particularly associated with resurfacing projects involving milling and paving.

Transit and School Buses

Discussions with the local Transit Authority or School District should discuss the impacts of the work and address the location of alternative passenger pick-up and drop-off points, if required. It can be expected that groups of bus users can congregate within the work zone. Accommodations may be required for storage and protection of these users.

Emergency Vehicles

Emergency vehicles shall be accommodated through the work zone at any time. This includes volunteer responders (i.e. fire fighters) who may be in personal vehicles.

Police Enforcement

Where there is a need for enhanced police enforcement in a work zone, consideration should be given to providing safe areas where vehicles can park and where enforcement officers can pull vehicles over.

Pedestrians

Provisions should be made to accommodate pedestrians through work zones. Temporary pedestrian facilities should include accessibility features consistent with those present in the existing facility.

Mobility-assisted pedestrians, wheelchairs, walkers, or scooters require smooth and solid transition and running surfaces. Care should be taken to prevent tipping.

Visually-impaired pedestrians may require some additional guidance. Barricades should be used to block off closed areas and a distinguishable “path” of tubular markers should be erected for the pedestrians to follow. Assistance may also be provided by a Traffic Control Persons or designate.

Cyclists

Provisions should be made to accommodate cyclists through work zones. Consideration should be made to the road surface and work zone or detour length.

Under the provisions of the Motor Vehicle Act, cyclists have the same rights and duties as the operators of motor vehicles so the signage and traffic control measures used for drivers also apply to cyclists.

For more information, see [Section 18: Traffic Control Layouts – Bicycle Lanes](#).

2.2.6 Maintenance of Traffic Control Devices

Traffic control devices shall be inspected and maintained during both active and inactive work to ensure that they are not missing, and that they are clean, properly positioned, and effective in all weather and light conditions.

The frequency of inspection will be determined by the operational needs of the project. The operational needs are directly related to factors such as:

- highway functional classification,
- traffic volumes,
- number and choice of traffic control devices deployed, and
- duration of work (active and inactive periods)

The higher the values for these factors, the more frequent the inspections, which should be documented in a Quality Control Plan.

2.2.7 Roadside Safety

Maintaining roadside safety requires constant attention during the project life cycle due to the potential for hazard changes. Traffic control for the project should be modified as required to ensure it is effective in protecting workers and road users. In addition:

- Traffic control devices shall be crash-worthy (American Association of State Highway and Transportation Officials (AASHTO) [Manual for Assessing Safety Hardware](#) (MASH) tested) and not create a greater hazard than the hazard against which they are intended to protect road users.
- A travelled roadway should always be maintained by keeping it clear of construction equipment, materials, and devices as practical. The travelled roadway and any equipment should be clearly marked and delineated as required.
- The shoulder area adjacent to the travelled lanes should be maintained as unencumbered as practical. Due to highway right-of-way constraints, the shoulder area may have to be used for the storage of construction equipment and materials.
- Clear zone requirements are not applicable in work zones.
- The storage of construction equipment and materials should be as far from the travelled lanes as possible unless site constraints require them to be placed on the shoulder. In these cases, they shall be clearly marked and delineated.
- Drop-offs and excavations require special considerations (see [Section 6.5: Treatment of Drop-Offs and Travel Lane Excavations](#)).

Elements of roadside safety are discussed throughout this manual.

2.2.8 Traffic Control during Inactive Work

Traffic control shall be maintained during periods of inactive work, including during seasonal shut downs. When a work zone is left inactive, these steps should be taken:

1. Traffic control should anticipate the most adverse conditions that could reasonably be expected to occur.
2. Store construction equipment and materials clear of the travelled roadway or mark and delineate the area around them.
3. Ensure that all temporary traffic control devices are secured against weather and vandalism.
4. Remove, cover, or turn off any temporary signs or devices that are not applicable. Reinstall any permanent devices which are now applicable.
5. Establish a schedule to monitor and maintain the site during inactive work.
6. Make available to the Road Authority the name and phone number of individuals who can be reached 24/7 to respond promptly to concerns.

2.2.9 Work near Railways

Railways are under the jurisdiction of the railway owner. Any work that may impact railway track or right-of-way requires authorization from the railway owner.

Issues for consideration include:

- the potential queuing of traffic onto railway tracks
- works affecting track operations (e.g., blasting rocks onto tracks)
- disruption of traffic signals with pre-emption operations
- Transport Canada requirements for working around railways

See [Section 7.17: Work Near a Rail System Grade Crossing](#) for additional guidance.

2.2.10 Work near Accesses and Driveways

It is necessary to consider access and egress from private, commercial, and public locations.

Prior to the commencement of work, discussion with business and property owners is highly recommended to facilitate a coordinated and systematic approach to managing traffic flow into and out of the businesses/residential properties. This may include:

- controlling access and egress to the properties
- providing alternative access with supplemental signage
- placing signage within the properties to assist vehicular movement
- assessing sight distance
- establishing “closure” times or planning work in the affected area to minimize disruption to customers/residents
- limiting access

2.3 Driver Information in Work Zones

Processing roadway information in a timely manner is essential to driving safely through a work zone. Inappropriate or unclear messages and/or the incorrect placement of signs, markings, and other devices may mislead and confuse drivers.

There are usually three types of **traffic control messages** in work zones:

1. Warnings about potential hazards
2. Postings of maximum speeds and applicable regulations
3. Delineation of the traveled roadway

Positive guidance for drivers is the process of giving **clear, correct, accurate, relevant, and timely information, and visual cues** through the work zone by means of temporary traffic control devices.

2.3.1 Manage Driver Expectations

There are three types of driver expectations:

1. **Continuity Expectation.** Drivers expect that traffic control devices used in one situation will be used in all situations. For example, a Traffic Control Person Ahead sign is always used in advance of a Traffic Control Person.
2. **Event Expectation.** Drivers expect that if something has not happened, it will not happen. Over time, drivers develop an expectation of various unique events that occur on roadways.
3. **Timing Expectation.** For events that recur in cycles, drivers expect that the longer a state occurs, the more likely it is to change. For example, a stale green signal display can be expected to turn yellow and then red.

Providing consistent driver information will evoke consistent driver behaviour. Displaying the same accurate message repeatedly motivates drivers to take the same action each time they see the sign or device.

2.3.2 Manage Driver Workload

Driver work load relates to the ability for drivers to process information. Driver workload increases through work zones. Providing too much information can result in one of three driver responses:

1. **Doing the wrong thing.** A driver turns in the wrong direction because the more important directional sign is lost among various other signs.
2. **Slowing or stopping.** A driver is distracted by the work activity or overwhelmed with too many signs and slows or stops to try and process the information.
3. **Taking a chance.** A driver is confused but continues and may or may not make the correct decision.

2.3.3 Manage Driver Sight Distances

Driver sight distance is the distance that a driver can see unobstructed along the highway. Driver sight distances are required for the driver to see and respond to conditions through the work zone. The required sight distance increases as the speed of the vehicle increases.

Positioning of devices should always consider the available sightlines of an approaching vehicle so road users can adequately respond.

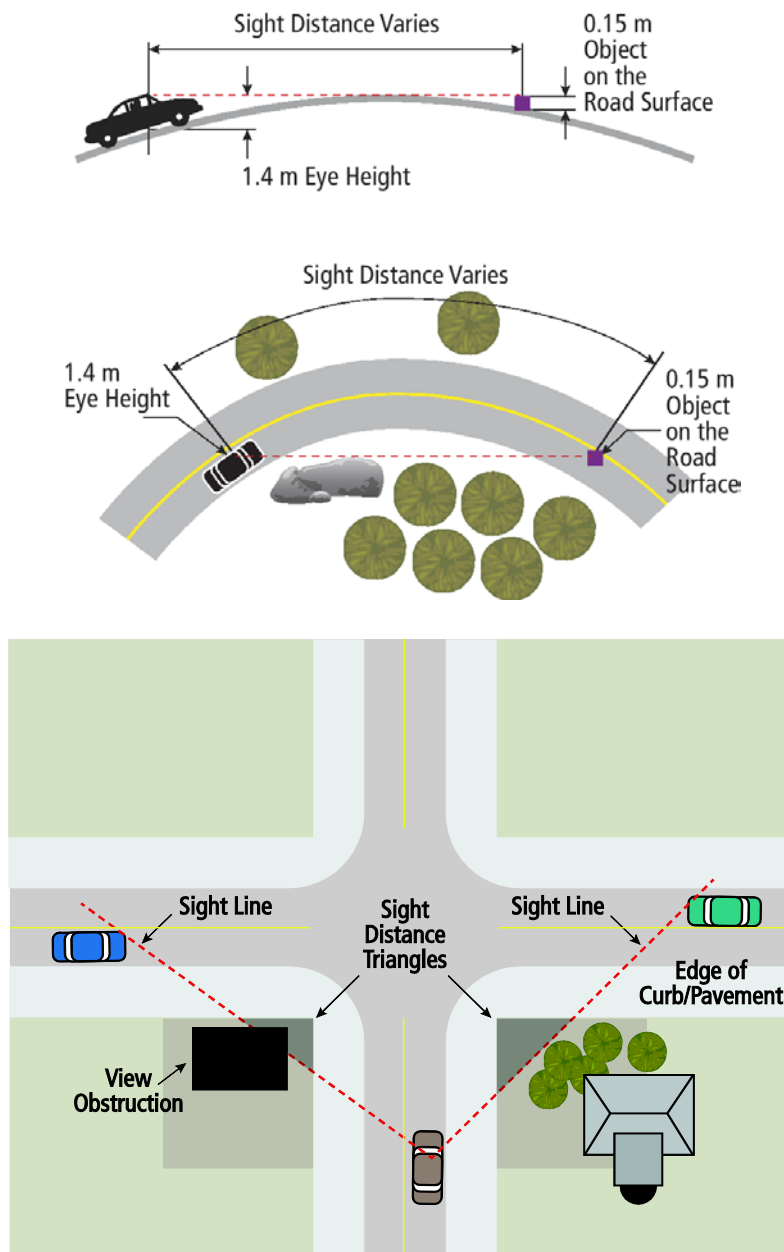


Figure 2.5: Driver Sight Lines

2.4 Management of Speed

Not all road work requires a reduction in the posted speed. Temporary traffic control devices are generally more effective than construction speed limits in drawing attention to the need for caution through work zones. A decision to reduce the existing posted speed limit should be clearly justified.

2.4.1 Basic Guidelines

Speed zones are effective when they appear reasonable to drivers. To make reduced speed zones credible and acceptable:

- Maintain consistency by complying with the standards in this Manual.
- Speed zones remain short and relevant to the nature of the work.
- Ensure that all speed zone signs are covered or removed when not required.

Reduced speed zones should be used:

- In conjunction with other signs or devices required for site-specific conditions
- To complement more effective traffic control
- When temporary road conditions are unsafe at the existing posted speed

To maintain driver cooperation, avoid unnecessarily restrictive requirements such as excessive length, excessive hours for which the zone is in effect, and specified speeds which are too low. The length of the speed zone is typically less than the length of the work zone.

When a further speed reduction is required within a reduced speed zone, signs and devices should be installed based on the higher speed. See [Section 6.6: Positioning of Temporary Traffic Control Devices](#) for details.

2.4.2 Construction Speed Zones

A Construction Speed Zone is established through a Traffic Management Plan to reflect hazards due to the nature and the type of work taking place.

A Construction Speed Zone requires the authorization of the Road Authority and is established by regulatory signs. It may be in place 24 hours a day, so it is important to ensure that it is appropriate and effective during inactive work. The Construction Speed Zone shall be modified or removed as needed.

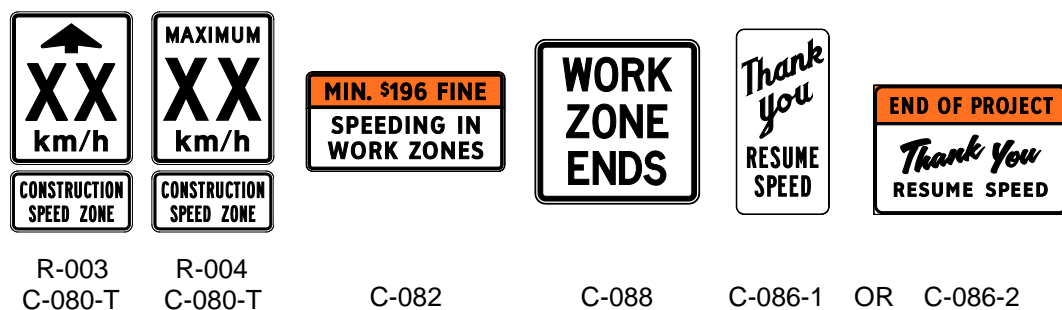


Figure 2.6: Typical Construction Speed Zone Start and End Signage

1. Construction Speed Zones are identified with Maximum Speed R-004 signs and Construction Speed Zone C-080-T.
2. The Min \$196 Fine – Speeding in Work Zones C-082 sign is a speed management tool for use when drivers fail to adhere to the speed limit.
3. The Work Zone Ends C-088 sign marks the end of the work zone.
4. The Thank You Resume Speed C-086-1 or C-086-2 sign may follow C-088 sign to advise drivers that they may resume the regulated posted speed. A Maximum Speed Limit R-004 sign showing the regular posted speed may be installed.

2.4.3 Temporary Speed Zones

A Temporary Speed Zone is a short duration speed reduction typically used for maintenance, surveying, and other work which does not have a significant impact to the roadway yet workers are present on, or adjacent to, the road surface.

Temporary Speed Zones require the approval of an onsite Supervisor, and are signed by a Survey Crew Working C-002-1 or a Crew Working C-002-2 sign, and show the appropriate speed for the work.

The C-002-2 may be used as a supplement to an R-004 Construction Speed Limit to remind drivers of the reduced speed as they approach the work area.

The end of a Temporary Speed Zone is marked with either a Thank You Resume Speed C-086-1 sign or a Maximum Speed R-004 sign. The temporary speed zone shall be removed when no longer required.



Figure 2.7: Typical Temporary Speed Zone Start and End Signage

2.4.4 Determining the Need for a Speed Reduction

Effective work zone speeds depend on the type of work, the change in road characteristics, and the proximity of workers to adjacent traffic. The construction speed limit shall not exceed the regular posted speed limit.

Obtain a clear understanding of these factors to determine appropriate speed zones:

- type of work and traffic control (traffic control persons or signals)
- roadway classification and surface
- type of traffic and volumes
- accesses and land use
- sight distances (fog, smoke, or dust)
- detours

On roadways with a regular posted speed limit of 80 to 120 km/h, consider reducing the speed limit when:

- Workers on foot are less than 6 metres from traffic with no intervening physical barrier, and average daily traffic volumes exceed 12,000 vehicles per day.
- There are changed traffic conditions on the site, such as detours, a reduced number of lanes, and varying surfaces.
- There are work vehicles entering or leaving the roadway.
- TCPs are directing traffic for planned work, the construction speed limit shall be ≤ 70 km/h.

On roadways with a regular posted speed limit of 50 to 70 km/h, consider reducing the speed limit when:

- Workers on foot are less than 3 metres from traffic with no physical barriers.
- There is significant interaction between work vehicles and through traffic.
- There is a reduced standard of alignment due to the road works.
- There is a loose surface such as gravel or a newly sprayed bitumen seal.
- Traffic is adjacent to an excavation.

On roadways with a regular posted speed limit below 50 km/h, consider reducing the speed limit when:

- There is a severe change in alignment.
- The work area is in a high-volume urban area where a variety of activities are competing for drivers' attention.

2.4.5 Transition Speed Zones

There are two options for signing transition speed zones:

Option 1 – Stepped Speed Zone Drop

Transition speed zones, approximately 500 m long are used when the reduction to the speed limit is greater than 30 km/h. For example:

- For a drop of 40 km/h, the transition speed should be 20 km/h above the Construction Speed Zone limit.
- For a drop of 60 km/h, the transition speed should be 30 km/h above the Construction Speed Zone limit.

Option 2 – Singular Speed Zone Drop using Additional Warning

An alternative approach to signing construction speed limits with a speed reduction > 30 km/h and ≤ 50 km/h is to provide additional advance warning through the installation of a Construction Speed Limit Ahead C-128 sign and a Distance C-130 T tab.

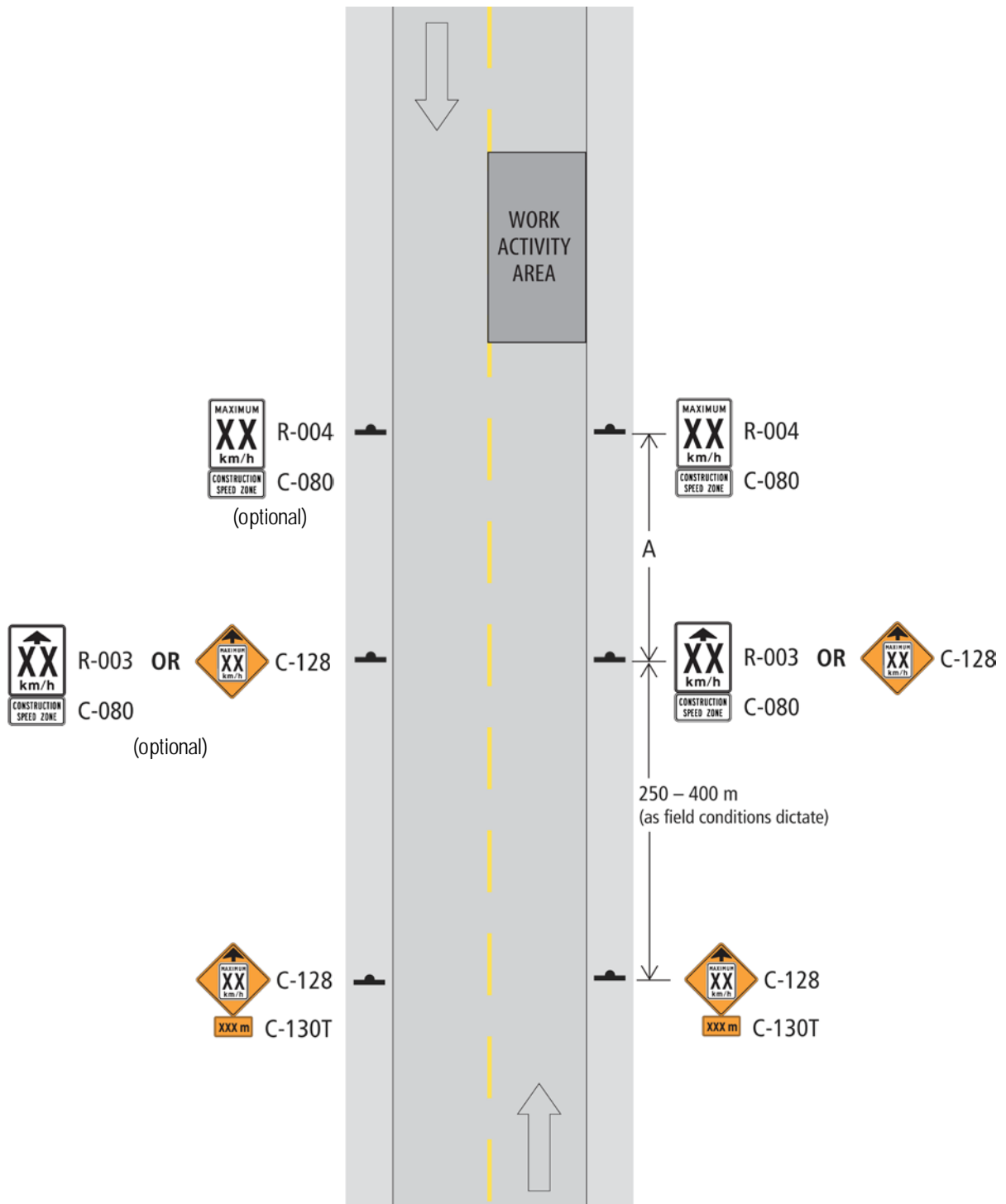
These signs are installed in advance of the Speed Limit Ahead R-003 (or additional C-128 sign) and Speed Limit R-004 signs establishing the construction speed limit. [Figure 2.8: Singular Speed Zone Drop Using Additional Warning](#) shows an example of how these signs should be used.

This process provides consistent messaging of the construction speed limit and replaces the transition speed zone. It suits work zones which have a distinct change in the roadway environment wherein a transition speed zone may not appear reasonable to a driver. See Technical Circular [T-09/14 Speed Zone Transition Signs](#) for more information.



C-128
C-130-T

Figure 2.8: Singular Speed Zone Drop Using Additional Warning



2.4.6 Assessing Speed Zone Effectiveness

If drivers are disregarding the construction speed zone, consider re-evaluating the following items.

- **Site characteristics:** Speed zone signs are clearly visible amongst other temporary traffic control devices. The grade of the roadway may necessitate additional advance warning.
- **Placement of speed zone signs:** The construction speed limit signs should be positioned approximately 10 seconds of travel time in advance of the work activity area.

Table 2.1: Distance Travelled Based on Speed and Time

| Construction Speed (km/h) | 10 Seconds of Travel Time |
|---------------------------|---------------------------|
| 50 | 140 metres |
| 60 | 170 metres |
| 70 | 200 metres |
| 80 | 220 metres |
| 90 | 250 metres |
| 100 | 280 metres |
| 110 | 310 metres |
| 120 | 330 metres |

- **Unnecessarily long speed zones:** The construction speed zone should only encompass the area where the hazards exist from the work. Speed zones should be kept as short as practicably possible.
- **Speed zone speed limit too fast:** Drivers approaching the work zone too quickly and react unsafely. This could be a sign of inadequate perception time, stopping distance, and interpretation of the traffic control.
- **Speed zone speed limit too slow:** Driver disrespect of the construction speed limit leads to heavy queuing, improper passing or tailgating. The construction speed limit should always reflect the actions of a reasonable driver. A reasonable speed limit builds respect for all traffic control, improving overall safety through the work zone.
- **Conspicuousness of speed zone signs:** Keep traffic control simple, positive, and directive, with little need for drivers to make choices, minimizing driver workload. Speed zones signs are regulatory and therefore of high importance when placing traffic control devices.
- **Relevance of speed zone:** Reduced speed zone signs must be removed, turned, or covered when they are not needed.

2.4.7 “Slow Down, Move Over” Regulation and Work Zones

The “Slow Down, Move Over” Regulation in the Motor Vehicle Act requires that drivers reduce their speed when approaching or passing an official vehicle. In addition, the driver must move their vehicle into another lane if safe to do so.

An official vehicle is one which displays a flashing red, blue, white, or amber light.

The Motor Vehicle Act also requires that when work is occurring on a roadway, traffic control devices shall be installed to indicate that persons or equipment are on the roadway. Therefore, for planned and scheduled construction/maintenance activities, the Slow Down, Move Over Regulation does not replace the necessity to establish temporary traffic control, including a construction speed limit, if warranted.

2.4.8 Highway Work Zones – Split Direction of Travel

On divided highways or multilane roadways where the work zone is impacting one direction of travel, the Road Authority may establish a split speed zone where the speed limit differs for each direction of travel.

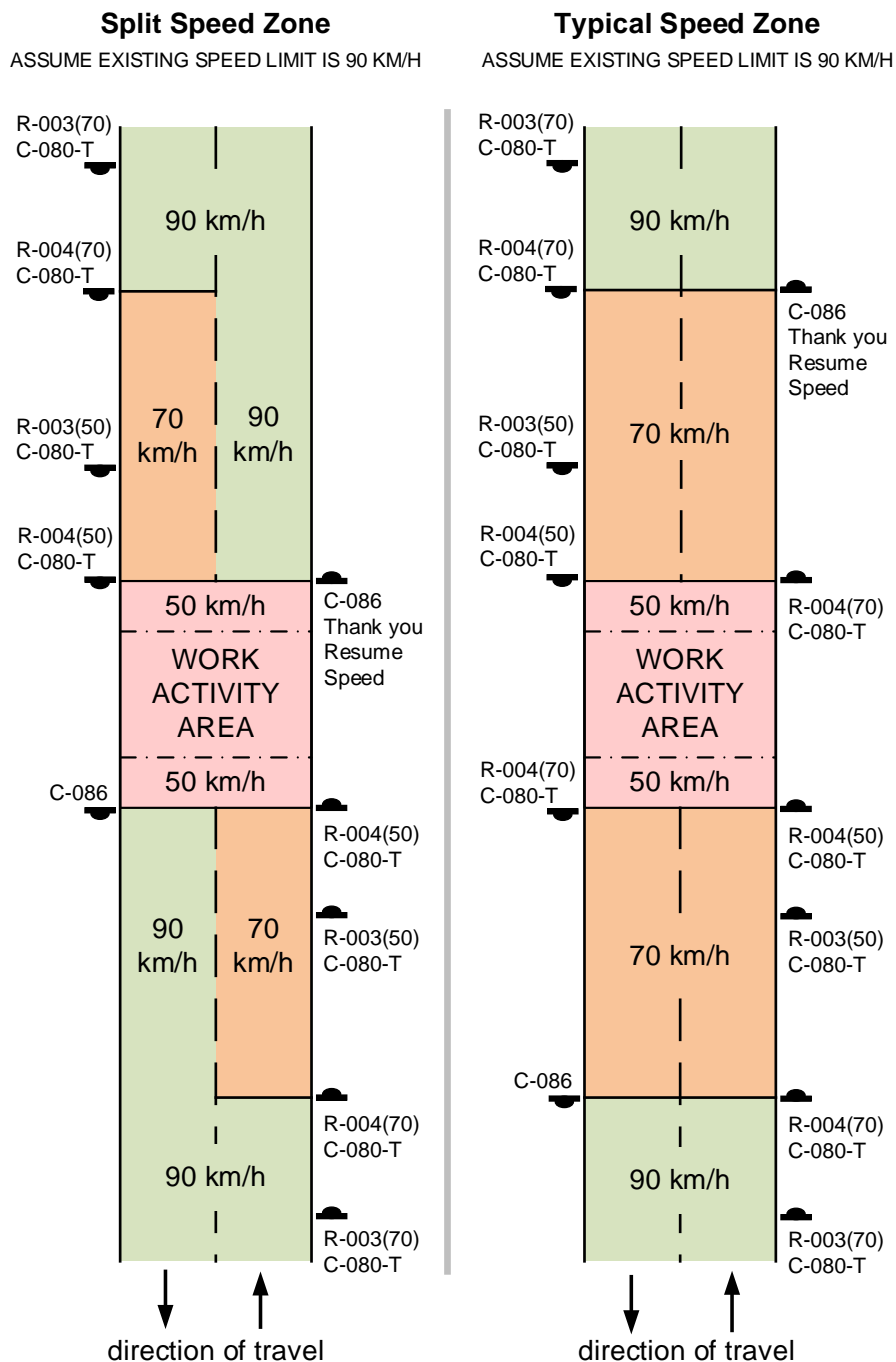


Figure 2.9: Split Speed Zone and Typical Speed Zone

2.5 Establishing Work on Roadways

This section outlines the requirements and processes used by the Road Authority and Prime Contractor in establishing and approving works on roadways.

2.5.1 Road Authority Requirements for Work

The Road Authority sets out the requirements of the Prime Contractor to be accommodated in the Traffic Management Plan.

Each Road Authority has its own policies, specifications, requirements, and systems for Traffic Management Plans. These may include:

- hours of work, acceptable delay, and lane closures
- acceptable temporary traffic control devices
- notification requirements
- municipal approval
- review requirements
- requirements for plan review, updates and modifications
- minimum requirements for Traffic Management Plan documentation

For Ministry projects, these requirements are developed by District Staff (Area Manager, Operations Manager, etc.) and, in more complex situations, in consultation with Traffic Engineering. The District Manager of Transportation, or designate, shall approve the closure of travel lanes for any road works on Provincial Highways.

For non-Ministry initiated projects, it is the responsibility of the agency, group, or other Road Authority engaging the work to define the Strategy and provide it to the Ministry for authorization to close the road and/or commence the work (see [Appendix E: Lane Closure Request Form](#)).

2.5.2 Traffic Management Plan Development

The Prime Contractor shall develop the Traffic Management Plan in accordance with [Section 3: Traffic Management Plans](#), which provides detailed requirements for Category 1, 2, and 3 Traffic Management Plans.

The Traffic Management Plan shall include all requirements set out by the Road Authority.

2.5.3 Road Authority Acceptance

No work may be performed on the roadway unless the Prime Contractor's Traffic Management Plan meets the Road Authority's requirements and has been reviewed and accepted by the Road Authority.

The process of documenting and accepting the Traffic Management Plan generally follows:

- The Prime Contractor designates a qualified Traffic Control Manager or Engineer for the project and that person designs and approves the Traffic Management Plan for the Prime Contractor.
- The Road Authority reviews the Prime Contractor's Traffic Management Plan. If it is acceptable, authorization is granted to proceed with the work. Authorization does not constitute formal approval of the details in the Traffic Management Plan. The Traffic Management Plan is reviewed for completeness but the Prime Contractor is responsible for the content.
- If the Road Authority has concerns about the Traffic Management Plan, it may be returned to the Prime Contractor for amendment and re-submission.

For Ministry projects, all plans requiring Ministry acceptance shall be submitted to the Ministry Representative, who provides them to the District Manager, Transportation or designate. Before submitting a Traffic Management Plan to the Ministry, the Prime Contractor shall receive stakeholder approval, including municipalities and/or regional districts, for the impact of the work.

For non-Ministry projects that require access to a Ministry right-of-way, notification shall be provided directly to the District Manager, Transportation or designate.

2.5.4 Compliance

The Prime Contractor shall perform all works in compliance with the Ministry-accepted Traffic Management Plan for the project.

The Traffic Control Plan component of the Traffic Management Plan shall comply with the requirements of Part 18 of WorkSafeBC's Occupational Health and Safety Regulation.

2.5.5 Traffic Management Plan Documentation

Traffic management documentation is the responsibility of the Prime Contractor. The documentation process includes, but is not limited to:

- amending the Traffic Management Plan as the site requires
- keeping a record of all temporary traffic control devices used on the project
- recording the daily status of temporary traffic control devices and times of device changes
- recording the status of temporary traffic control devices as soon as practicable after any incident (including motor vehicle), taking appropriate measurements and photographs, and marking them with the date and time

2.5.6 Traffic Management Plan Resubmission

The Prime Contractor shall amend and re-submit the Traffic Management Plan to the Ministry for review and acceptance whenever:

- a change to work activities alters traffic management requirements
- a change to the scheduling of work activities is proposed
- a change to the traffic management plan is proposed

If a Traffic Management Plan is signed and sealed by a Traffic Engineer, any changes that significantly impact the planned Traffic Operations should be relayed to the Traffic Engineer

2.6 Quality Management

2.6.1 Quality Control

Quality Control (QC) is the responsibility of the **Prime Contractor**. It is documented in the Prime Contractor's Quality Control Plan.

It is an inspection process that examines the quality and effectiveness of the temporary traffic control.

2.6.2 Quality Assurance

Quality Assurance (QA) is the responsibility of the **Road Authority**.

QA is a process which ensures the Prime Contractor is following their Quality Control Plan.

It includes reviewing the Prime Contractor's Traffic Management Plan prior to the commencement of road works and conducting periodic reviews of traffic control as work progresses.

The Road Authority's QA process includes:

- **verifying** Traffic Management Plans to ensure they meet regulatory, contractual, and project-specific requirements
- **reviewing** Traffic Control Plans for overall effectiveness through the work zone.
- **recording** deficiencies and presenting them to the Prime Contractor for review and correction

2.6.3 Traffic Management Audits

Traffic Management Plan and Traffic Control Plan audits are typically conducted by the Road Authority (or those under contract to do so) when reviewing the documentation and field layout of the Prime Contractor. They may also be used by Road Authorities or Prime Contractors to assist in developing Traffic Management Plans.

[Section 3.7 Auditing Traffic Management Plans](#) details the two audit forms found in [Appendix D](#):

- [Traffic Management Plan Documentation Audit Form](#)
- [Traffic Management Plan Field Audit Form](#)

PART A – TRAFFIC MANAGEMENT

Section 3: Traffic Management Plans

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PART A – TRAFFIC MANAGEMENT

Section 3: Traffic Management Plans

3.1 Introduction

| | |
|--------------------------------|---|
| Traffic Management Plan | The Prime Contractor's project-specific plan that details the strategies for protecting workers and safely and efficiently moving road users through the work zone, including any requirements of the Road Authority. |
|--------------------------------|---|

The Traffic Management Plan is developed by first assigning a Project Category (Category 1, 2, or 3). The Project Category determines the extent of information required in the Traffic Management Plan and sub-plans. The Traffic Management Plan is then written based on these requirements.

The Traffic Management Plan includes up to four sub-plans:

- Traffic Control Plan¹
- Incident Management Plan
- Public Information Plan
- Implementation Plan

The Traffic Management Plan combines these sub-plans into a single document that demonstrates a full understanding of the site-specific issues and project requirements.

It should also contain provisions for updating the Traffic Management Plan and sub-plans throughout the project to address issues as they arise.

Additional documents may be referred to when developing a Traffic Management Plan:

- [Appendix C: Templates for Traffic Management Plans](#)
- [Appendix D: Traffic Management Plan Audit Forms](#)

¹ A Traffic Control Plan is required for all planned work on Provincial roadways.

3.2 Traffic Management Sub-Plans

3.2.1 Traffic Control Plan

The Traffic Control plan outlines the temporary traffic control devices used to protect workers and move road users safely through the work zone. A Traffic Control Plan is required for all planned work on or near Provincial roadways.

Traffic Control Plans range in scope from being very detailed to simply using typical drawings contained in this Manual. The degree of detail in the Traffic Control Plan depends entirely on the complexity of the work and road environment.

For longer-term projects, multiple traffic control plans may be required as the work progresses. These plans shall be approved by the Prime Contractor and presented for acceptance by the Road Authority.

A Traffic Control Plan outlines the specific traffic control devices that will be used on the project, how they will be implemented, and on what schedule. It does this by using a combination of:

- **text descriptions** of the location of the work zone, proposed work activities, proposed traffic control measures, and the specific times and dates when work will be undertaken.
- **customized traffic control layouts** are sketches of the traffic control layouts found in this manual and modified to suit site specific requirements.
- **customized drawings** (scale drawings) show all existing roadway geometry and features as well as all temporary traffic control devices and layouts.

3.2.2 Incident Management Plan

An Incident Management Plan identifies the Prime Contractor's procedures for responding to unplanned events or incidents. An incident includes events which affect Traffic Operations for workers and/or the travelling public, such as a collision which occurs within the construction zone or unexpected adverse weather conditions.

The Incident Management Plan should define a process of regular review and analysis for identifying actions that will reduce the frequency and severity of incidents.

It is important to respond appropriately to an individual incident, identify actions for reducing the occurrence of incidents, and minimize their impact on workers and traffic.

The **Incident Management Plan** includes procedures for:

- identifying and verifying that an incident has occurred
- quickly responding to an incident to ensure worker and public safety
- contacting appropriate emergency response agencies and Road Authority personnel
- ensuring that emergency responders are assisted by project staff
- quickly assessing an incident's impact on traffic operations and identifying the appropriate response measures

- routing traffic away from the incident by means such as using a diversion or detour around the work site
- ensuring that the Road Authority is updated regarding worker and public safety, traffic conditions, and actions taken to normalize traffic flow
- ensuring that travellers within the traffic queue are made aware of the event(s), their options, and estimated time of opening
- ensuring that any health or safety issues from workers or travellers in the traffic queue that may arise can be attended to
- taking action to restore normal traffic operations by modifying work plans and activities where necessary
- reviewing and analyzing incidents if they occur to identify causes and preventative actions, if any
- recording incident details and reporting them to the Road Authority

It shall also address the potential requirement for **emergency vehicles** to pass through the work zone, and processes for ensuring that:

- Emergency services will be contacted and advised of the planned work, potential issues regarding passage through the work zone, and viable alternative routes.
- Work operations will be stopped and the work zone cleared to allow emergency responders to pass queued traffic and move unimpeded through the work zone.
- Emergency responders in personal vehicles will be able to pass through the work zone safely and expediently.

3.2.3 Public Information Plan

A Prime Contractor's Public Information Plan identifies actions and procedures for informing the travelling public, project stakeholders, and the Road Authority of current traffic operations and planned changes. The significance of the work should dictate the degree of public communication and advance notice required.

The Public Information Plan should ensure that:

- communication issues are identified
- stakeholders are aware of the project and its impacts
- groups directly impacted by specific projects (local residents, businesses, etc.) are appropriately informed
- emergency response agencies and the travelling public are informed in a timely manner regarding work

3.2.4 Implementation Plan

An Implementation Plan identifies responsibilities and procedures for ensuring the other Traffic Management sub-plans are developed and implemented in a coordinated manner.

It also identifies the qualifications, responsibilities, and duties of the supervisory and management personnel who will implement the Traffic Management Plan, including the Traffic Control Manager and the Traffic Control Supervisor.

3.3 Project Category Determination

A structured process is used to determine the Project Category.

- | | |
|--|--|
| 1. Initial Category Assessment | Assess the roadway and traffic features. |
| 2. Risk Analysis | Identify the project-specific risks. |
| 3. Final Category Determination | Combine the initial project assessment with the risk analysis to determine the final project category. |

Project Categories are defined as:

- **Category 1** - minimal impact on the travelling public, are typically located on simple terrain, and involve two-lane highways or roads, often with lower speeds and traffic volumes.
- **Category 2** - may be located on higher-speed or higher-volume corridors and involve some complexity. Impacts on the travelling public may be moderate because of the roadway characteristics or the type of work.
- **Category 3** - complex and have a significant impact on the travelling public because of factors such as higher volumes and speeds, project duration, active night work, mountainous terrain, and/or a requirement for lane closures and/or detours.

3.3.1 Initial Project Category Assessment

The initial project category assessment considers road and traffic characteristics, as well as specific work activities.

[Table 3.1: Initial Project Category Assessment](#) on the following pages is used to determine the initial project category.

The total point value calculated at the end of Table 3.1 indicates that the project is initially assessed as a Category 1, 2, or 3.

Table 3.1: Initial Project Category Assessment

| Traffic Consideration | Value | Point Value | Score |
|--|---|-------------|-------|
| Posted or Statutory Speed Regular posted speed limit of the roadway | ≤ 50 km/hr | 1 point | |
| | 60 - 70 km/hr | 3 points | |
| | ≥ 80 km/hr | 4 points | |
| Traffic Volume Traffic volume (both directions) in peak hours | < 1,000 vehicles/hr | 1 point | |
| | 1,000 to 3,000 vehicles/hr | 3 points | |
| | > 3,000 vehicles/hr | 4 points | |
| Lanes Number of lanes in both directions (including auxiliary lanes) | 2 lanes | 0 point | |
| | 3 lanes | 2 points | |
| | 4 lanes or more | 3 points | |
| Encroachment Location of work | Off roadway | 0 point | |
| | Shoulder work/partial lane closure | 3 points | |
| | Full lane closure, ramp closure, or intersection closure | 4 points | |
| Detours | No detour during construction | 0 point | |
| | Detour traffic on temporary roadway during construction next to work zone. | 3 points | |
| | Detour route during construction takes traffic off regular route away from work zone; requires detour signing | 4 points | |
| Duration of Work | Short-duration work (no more than one day-time shift). | 1 point | |
| | Long-duration work (less than 2 weeks) | 2 points | |
| | Long-duration work (2 or more weeks) | 4 points | |
| Allowable Delays Delay time plus time to travel through work zone in minutes | < 20 minutes | 1 point | |
| | ≥ 20 minutes | 3 points | |
| | No allowable delay | 4 points | |

| Traffic Consideration | Value | Point Value | Score |
|--|--|-------------|-------|
| Time of Day Time of day that work will occur | Day-time only work | 1 point | |
| | Active day-time work, with traffic control devices in place at night | 3 points | |
| | Active night-time work | 4 points | |
| Vertical Alignment | Flat terrain | 0 point | |
| | Rolling terrain | 1 point | |
| | Mountainous terrain | 2 points | |
| Horizontal Alignment | Tangent | 0 point | |
| | Horizontal curves, no curve advisory speeds | 1 point | |
| | Horizontal curves, with curve advisory speeds | 2 points | |
| Intersections | No intersections or stop-controlled intersection(s) | 0 point | |
| | Signalized intersection(s) with no left or right turn phases, or single lane roundabout | 2 points | |
| | Signalized intersection(s) with left or right turn phase(s), or multi-lane roundabout | 4 points | |
| | Interchange(s) | 5 points | |
| Runaway Lanes | No runaway lanes | 0 point | |
| | Runaway lanes in or near the work zone; they will not be blocked at any time during course of work | 1 point | |
| | Runaway lanes in or near work zone; they may be blocked by work or queues during course of work | 4 points | |
| Pedestrians and Cyclists | No pedestrians or cyclists | 0 point | |
| | Possible pedestrians and cyclists | 2 points | |
| | Designated cycle route, sidewalk or multi-use pathway | 3 points | |

| Traffic Consideration | Value | Point Value | Score |
|--------------------------|----------------------|-------------|----------|
| HOV or Bus Lane | No HOV or bus lane | 0 point | |
| | HOV or bus lane | 4 points | |
| Counter-Flow Lane | No counter-flow lane | 0 point | |
| | Counter-flow lane | 4 points | |
| Total Score | | | |
| Category 1 | | | < 16 |
| Category 2 | | | 16 to 25 |
| Category 3 | | | > 25 |
| Initial Project Category | | | |

3.3.2 Project Risk Analysis

A project risk analysis is the process of reviewing site-specific characteristics and considering the likelihood and consequence of each item listed. It is able to highlight potential hazards that are not captured in the Initial Project Category Assessment.

Each project has a unique combination of site-specific characteristics, and the risk analysis considers potential hazards associated with the specific project and/or location.

[Table 3.2: Project Risk Analysis](#) on the following pages is used to determine whether each potential hazard creates a low, medium, or high risk for the project and location.

The total point value calculated at the end of Table 3.2 indicates that the project is assessed as a low-risk, medium-risk, or high-risk project.

Combining the results of the initial project category assessment and the risk analysis will determine the final project category (see [Section 3.3.3: Final Project Category Determination](#)).

Table 3.2: Project Risk Analysis

The Project Risk Analysis is a general guideline, applicable to most projects. If significant project-specific hazards are not included in the risk analysis below, the Evaluator may consider increasing the final risk rating. This modification and the justification for it should be documented.

All high-risk, project-specific hazards should be addressed and mitigated in the Traffic Management Plan.

| Item | Risk | Definition | Point Value | Score |
|---|--------|--|-------------|-------|
| Falling object | Low | Potential of falling object through course of work (i.e., overhead works, slung loads, or equipment boom/bucket work) | 1 point | |
| | Medium | Working within a known avalanche or rock fall area; no recent evidence of activity | 2 points | |
| | High | Recent evidence of rock or material entering work site or overhead work that may impact travelling public or worker safety (i.e., overhead structures) Vehicle queues may back into a rock fall or avalanche area | 3 points | |
| Nature of work activity | Low | Work activity is not expected to create a significant hazard | 1 point | |
| | Medium | Work activity will create excessive dirt, dust, or gravel on the road surface, and will thereby create a potential hazard | 2 points | |
| | High | Work activity such as blasting, scaling, or excavation < 2 metres from active travelling lanes will create a potential hazard | 3 points | |
| Removal of safety devices | Low | No removal of safety devices | 1 point | |
| | Medium | Removal of safety devices such as pavement markings, signage, traffic signal, or reflectors | 2 points | |
| | High | Removal of containment devices, such as barrier, guard rail, crash attenuators, fencing, etc. | 3 points | |
| Equipment movement through work zone | Low | Minimal conflict with traffic (e.g., work commencing off travelled roadway) | 1 point | |
| | Medium | Conflict with normal traffic flow; no queuing or traffic stoppages | 2 points | |
| | High | Conflicts with normal traffic; may create queuing and require traffic stoppages. Difficult for equipment to enter and exit site | 3 points | |

| Item | Risk | Definition | Point Value | Score |
|---|--------|--|-------------|-------|
| Roadway surface condition during construction | Low | Roadway surface is maintained | 1 point | |
| | Medium | Roadway surface, such as milling and grinding (consistent surface), creates a hazard for road users | 2 points | |
| | High | Roadway surface is inconsistent, with multiple changes or work tasks (manholes, culvert installation, etc.) | 3 points | |
| Storage of equipment and material | Low | Stored outside the shoulder | 1 point | |
| | Medium | Stored on the shoulder but outside travelled roadway | 2 points | |
| | High | Stored on shoulder but encroaching on travelled roadway | 3 points | |
| Load restrictions as a result of construction | Low | No load restrictions | 1 point | |
| | Medium | Narrow lanes restrict wide loads | 2 points | |
| | High | Overweight/overheight vehicles restricted (may result in structural damage) | 3 points | |
| Lane widths | Low | Maintain existing lane widths | 1 point | |
| | Medium | n/a | n/a | |
| | High | Lane width not maintained throughout work zone, or Single-lane alternating traffic | 3 points | |
| Work zone or queues block access (active or inactive site) | Low | None | 1 point | |
| | Medium | Side street or business access | 2 points | |
| | High | Major public facility and/or major secondary roadway | 3 points | |
| Transit access | Low | No transit or school bus stops | 1 point | |
| | Medium | Community shuttle or school bus stops | 2 points | |
| | High | Express transit or major bus route | 3 points | |
| Impacts of special events | Low | No known event | 1 point | |
| | Medium | Moderate public event with attendance under 5,000 | 2 points | |
| | High | Major public event with attendance over 5,000 or moderate public event (under 5,000) with no alternative access or route | 3 points | |

| Item | Risk | Definition | Point Value | Score |
|--|--------|---|-------------|----------|
| Overlapping work | Low | No overlapping work | 1 point | |
| | Medium | Another work site within 3 km; traffic control for the projects could impact one another | 2 points | |
| | High | Work sites adjacent or overlapping | 3 points | |
| Emergency facility (ie. hospital, police, ambulance, and fire stations) | Low | No emergency facility near work site | 1 point | |
| | Medium | 24-hour manned emergency facility | 2 points | |
| | High | Volunteer-staffed emergency facility; consider responder access through work zone to the facility, and emergency response from facility through the work zone | 3 points | |
| Total Score | | | | |
| Low Risk | | | | < 23 |
| Medium Risk | | | | 23 to 28 |
| High Risk | | | | > 28 |
| Project Risk | | | | |

3.3.3 Final Project Category Determination

The matrix in [Table 3.3: Final Project Category Determination](#) should be used to make the final project category determination.

It combines the initial project category assessment with the results of the risk analysis to identify a final project category based on roadway and traffic characteristics and risks.

It may be appropriate to increase the final category level for high-risk projects to reflect the complexity or hazards associated with the work.

Table 3.3: Final Project Category Determination

| | | Initial Project Category Assessment | | |
|--------------|--------|-------------------------------------|------------|------------|
| | | 1 | 2 | 3 |
| Project Risk | Low | Category 1 | Category 2 | Category 3 |
| | Medium | Category 1 | Category 2 | Category 3 |
| | High | Category 2 | Category 3 | Category 3 |

The final project category determination should be used to identify required and recommended sub-plans and special conditions addressed in the Traffic Management Plan.

This process is a guide and may not capture all components of the project which should be considered when determining the Project Category.

3.4 Traffic Management Plan Requirements by Category

See also Appendix C: Templates for Traffic Management Plans.

3.4.1 Category 1 Traffic Management Plan Requirements

Category 1 Traffic Management Plans are typically appropriate for projects on two-lane highways or roads that have minimal impact on the travelling public.

The Prime Contractor shall provide all updates of the Traffic Management Plan to the Road Authority's project representative for review and acceptance.

Category 1 Traffic Management Plans include:

- Road Authority contact information
- Description of work activity:
 - type and hours of work
 - location and size of work zone
 - lanes affected by the works, and lane configuration in work zone
 - maximum proposed delays or closure times
- Description of site factors, hazards, and the impacts of work:
 - accesses and/or intersections that will be affected by the work zone or by traffic control devices
 - mitigation measures to be implemented for the identified site factors, hazards, and impacts of the work

Note:

1. Additional documentation may be required by the Road Authority.
2. If the Traffic Management Plan uses the Template for Category 1 Traffic Management Plan provided in [Appendix C: Templates for Traffic Management Plans](#), daily updates will be required using the Daily Sign Check Form that is also provided in [Appendix C](#).

Category 1 Traffic Control Plan

A Traffic Control Plan is required for Category 1 projects. It outlines the methods and procedures for managing traffic, including:

- speed limits
- device placement and maintenance
- traffic control layouts for the work zone (for reference, see layouts in Sections 7 to 19)

Category 1 **traffic control layouts** shall:

- reference typical layouts (Sections 7 to 19) selected for the site
- include a North Arrow
- be modified for site specific consideration

Category 1 Incident Management Plan

An Incident Management plan is required when:

- the Road Authority identifies hazards within the work zone that may impact the travelling public
- special work zone accommodation is required for emergency vehicles

An Incident Management Plan is recommended when:

- hazards or risks may impact the work area and require mitigation or consideration in the Traffic Management Plan
- work zones are more than 100 metres long and the travel lanes are restricted in width
- the project requires a total road closure for any duration

Category 1 Incident Management Plans includes:

- a contact list for emergency response agencies and key stakeholders
- procedures for emergency vehicles to pass through the work site
- any additional information required by the Road Authority

Category 1 Public Information Plan

A Public Information Plan is recommended when:

- the highway will be closed for more than 10 minutes
- the project is on a two-lane roadway where traffic volumes in the affected direction exceed 500 vehicles per hour

The Prime Contractor's Public Information Plan should include:

- methods for communicating to the travelling public and the Road Authority
- appropriate, site-specific work information signs, as required
- methods for providing work updates to the Road Authority
- dynamic message sign (DMS) messaging (message and phases), if used
- any additional information required by the Road Authority

Category 1 Implementation Plan

An Implementation Plan is required when an Incident Management Plan is used.

Category 1 Implementation Plans should identify:

- names of persons responsible for overseeing implementation of the Traffic Management Plan:
 - Site Supervisor
 - Traffic Control Supervisor if known (otherwise name to be recorded on Daily Traffic Control Log)
 - Traffic Control Persons if known (otherwise name to be recorded on Daily Traffic Control Log)
- any additional information that may be required by the Road Authority

3.4.2 Category 2 Traffic Management Plan Requirements

Category 2 Traffic Management Plans are typically required for projects that may be located on higher-speed or higher-volume corridors. Impacts on the travelling public may be higher because of the roadway characteristics or the type of work to be done.

For all projects on freeways, expressways, or roads where the regular posted speed limit is 70 km/h or above, there may be a requirement to have the Traffic Management Plan prepared under the direction of a Professional Engineer who is licensed in British Columbia and qualified and experienced in traffic management planning and highway safety.

The Prime Contractor shall provide all updates of the Traffic Management Plan to the Road Authority's project representative for review and acceptance.

Category 2 Traffic Management Plans include:

- Road Authority contact information
- Description of project area:
 - classification of roadway, number of lanes (undivided, expressway, etc.)
 - regular posted speed limit
 - road alignment
- Description of work activity:
 - type and hours of work
 - location and size of work zone
 - lanes affected by the works, and lane configuration in work zone
 - maximum proposed delays or closure times
- Description of site factors, hazards and impacts:
 - location, nature, and impacts of hazardous areas
 - accesses and/or intersections that will be affected by the work zone or by traffic control devices
 - deviations in traffic patterns and/or traffic behaviors
 - geometric roadway conditions (horizontal and vertical roadway geometry)
 - anticipated weather conditions
 - any other relevant risk factors

Category 2 Traffic Control Plan

A Traffic Control Plan is required for Category 2 projects.

It outlines the methods and procedures for managing traffic, and shall include:

- Customized Traffic Control Layouts
- work zone location using landmarks and Landmark Kilometre Inventory (LKI) where applicable
- accesses and/or intersections affected by the work zone or by traffic control devices
- speed limit(s) throughout the work zone
- device placement and maintenance
- mitigation measures for any identified hazards or potential risks
- site-specific, customized traffic control layouts for the work zone (for reference, see layouts in Sections 7 to 19):
 - during active work and as activity changes
 - during periods of inactivity
- detour routes, if available, considering:
 - all local roads to be used as detour routes, and the design speed and design vehicle for each road to be used as a detour route
 - traffic control changes necessitated by the detour route, such as temporary signals or signal timing changes
- provisions to maintain continuous, clear and safe passage for all road users and traffic during all phases of the work

Customized Traffic Control Layouts shall:

- be specific to the site
- include a North Arrow
- show schematically the placement of all traffic control devices in accordance with the standards in this Manual
- use standard symbol conventions for identifying traffic control devices (see layouts throughout the Manual and Legend on first pages of Sections 7 to 19)
- provide work zone/roadway dimensions and explanatory notes on the layouts
- label all signs on the layouts with one of the following:
 - sign number with description
 - sign number with graphical representation
 - sign number and legend
- show all sign spacing, taper lengths, offsets, etc.
- place layouts on project drawings if these are available

Category 2 Incident Management Plan

An Incident Management plan is required when:

- the Road Authority identifies hazards within the work area that may impact the travelling public
- special work zone accommodation is required for emergency vehicles

An Incident Management Plan is recommended when:

- hazards or risks may impact the work area and require mitigation or consideration in the Traffic Management Plan
- work zones are more than 100 metres long and the travel lanes are restricted in width
- the project requires a total road closure for any duration

Category 2 Incident Management Plans shall include:

- contact list for emergency response agencies and key stakeholders
- duties and responsibilities of Traffic Control Supervisor with respect to incident response operations
- types of incidents that could occur in the work zone
- procedures for responding to incidents that occur within the work zone
- procedures for accommodating emergency volunteers on emergency call-out who are travelling through the work zone in personal vehicles
- procedures for emergency vehicles to pass through the work zone
- procedures for informing and updating the Road Authority regarding:
 - incident occurrence
 - response measures taken
 - clearance measures required
 - estimated clearance time
 - resumption of pre-incident operations
- procedures for advising the travelling public of estimated clearance time and any available alternative routes
- procedures for recording incident details and reporting them to the Road Authority within 24 hours
- any additional information required by the Road Authority

Category 2 Public Information Plan

A Public Information Plan is required when:

- the highway will be closed for more than 10 minutes
- the project is on a two-lane roadway where traffic volumes in the affected direction exceed 500 vehicles per hour

A Public Information Plan is recommended when:

- for lane closures on a three- or four-lane roadway: traffic volumes in the affected direction will exceed 1,200 vehicles per hour at any time during the closure periods
- for lane closures on a six-lane roadway: traffic volumes in the affected direction will exceed 2,400 vehicles per hour at any time during the closure periods

The Prime Contractor's Public Information Plan shall include:

- Road Authority contact information
- contact numbers for stakeholders and major user groups
- methods for providing work updates to the Road Authority
- methods and procedures for communicating to the travelling public [e.g., internet, radio, print media, flyer, dynamic message signs (DMS), etc.]
- appropriate, site-specific work information signs, as required
- a process for notifying the travelling public of unscheduled traffic delays
- a process for notifying the travelling public of scheduled traffic delays and project duration at least one week before the work starts or when major changes are made to existing processes
- a process for ensuring that major user groups, emergency response agencies, transportation companies, and the travelling public are aware of the schedule of road closures or alternating lane closures at least two weeks before the work starts or as major changes occur
- a process for notifying road users of traffic pattern changes or road conditions as the work progresses and major changes occur
- methods that will be used to communicate with stakeholders and the public, including a list of DMS messages and phases (if used)
- any additional information required by the Road Authority

Category 2 Implementation Plan

An Implementation Plan is required for Category 2 projects.

Category 2 Implementation Plans should identify the individuals responsible for overseeing the implementation of the Traffic Management Plan in accordance with the duties outlined in [Section 1.2.3: Traffic Control Responsibilities](#) and [Section 5: Traffic Control Persons:](#)

- Site Supervisor – identify name and duties
- Traffic Control Manager – identify name and duties
- Traffic Control Supervisor – identify duties (name to be recorded on Daily Traffic Control Log)
- Traffic Control Persons – identify duties (name to be recorded on Daily Traffic Control Log)
- Traffic Engineer (if required) – identify name and duties
- any additional information required by the Road Authority

3.4.3 Category 3 Traffic Management Plan Requirements

Category 3 Traffic Management Plans are complex because they manage significant impacts to the travelling public as a result of higher volumes and speeds, project duration, active night work, mountainous terrain, and/or a requirement for lane closures and/or detours.

A Category 3 Traffic Management Plan shall be signed and sealed by a Professional Engineer who is licensed in British Columbia and qualified and experienced in traffic management planning and highway safety. The Professional Engineer is responsible for approving, and sealing the Traffic Management Plan and Traffic Control Plans, including all drawings and layouts.

The Prime Contractor shall provide all updates of the Traffic Management Plan to the Road Authority's project representative for review and acceptance.

Category 3 Traffic Management Plans include:

- Road Authority contact information
- Description of project area:
 - classification of roadway, number of lanes (undivided, expressway, etc.)
 - regular posted speed limit
 - road alignment
 - road volumes
- Description of work activity:
 - type and hours of work
 - location and size of work zone
 - lanes affected by the works, and lane configuration in work zone
 - maximum proposed delays or closure times
- Description of site factors, hazards, and impacts:
 - location, nature, and impacts of hazardous areas
 - accesses and/or intersections that will be affected by the work zone or by traffic control devices
 - deviations in traffic patterns and/or traffic behaviors
 - geometric roadway conditions (horizontal and vertical roadway geometry)
 - anticipated weather conditions
 - any other relevant risk factors

Category 3 Traffic Control Plan

A Traffic Control Plan is required for Category 3 projects.

It outlines the methods and procedures for managing traffic, and shall include:

- Customized Drawings
- hours of work
- work zone location and direction, and distance to nearest landmarks
- lanes affected by the works
- lane configuration in work zone
- accesses and/or intersections that will be affected by the work zone or by traffic control devices
- device placement and maintenance
- mitigation measures for identified hazards or potential risks
- traffic volume capacity during project
- proposed delays or closure times
- proposed traffic control including site-specific, customized traffic control layouts for the work zone (for reference, see layouts in Sections 7 to 19):
 - during active work and as activity changes
 - during periods of inactivity
- traffic signal timing changes necessitated by the detour route or project works
- detour routes, if available, considering:
 - all local roads to be used as detour routes, and the design speed and design vehicle for each road to be used as a detour route
 - traffic control changes necessitated by the detour route, such as temporary signals or signal timing changes
- provisions to maintain continuous, clear and safe passage for all road users and traffic during all phases of the work

Customized Drawings shall show:

- a North Arrow
- work zone location using landmarks and Landmark Kilometre Inventory (LKI) where applicable
- accesses and/or intersections affected by work zone or traffic control devices
- travel lanes affected
- resultant lane configuration, including widths
- location of restricted-width lanes
- speed limit(s) throughout the work zone
- location of hazardous areas created by road geometry or local location of vehicle storage areas if delays are anticipated
- any local roads to be used for detour routes, and the design speed and design vehicle for each road to be used as a detour route

- traffic signal location changes necessitated by the detour route or project works
- traffic control layouts showing the placement of all traffic control devices and Traffic Control Persons in accordance with the standards in this Manual
- use standard symbol conventions for identifying traffic control devices (see layouts throughout the Manual and Legend on first pages of Sections 7 to 19)
- dimensions and explanatory notes on the drawings including sign spacing, taper lengths, offsets, etc.
- traffic operations at all phases of the project
- signs labelled on the layouts with one of the following:
 - sign number with description
 - sign number with graphical representation
 - sign number and legend

Category 3 Incident Management Plan

An Incident Management Plan is required for Category 3 projects.

Category 3 Incident Management Plans shall identify:

- contact list for emergency response agencies and key stakeholders (may be a separate page or document)
- name of Traffic Control Supervisor, and duties and responsibilities with respect to incident response operations
- name of Traffic Control Manager, and duties and responsibilities with respect to incident management
- types of incidents that could occur in the work zone
- procedures for detecting and verifying incidents that occur in the work zone
- procedures for responding to incidents that occur within the work zone
- procedures for accommodating emergency volunteers on emergency call-out who are travelling through the work zone in personal vehicles
- procedures for emergency vehicles to pass through the work zone
- procedures for informing and updating the Road Authority regarding:
 - incident occurrence
 - response measures taken
 - clearance measures required
 - estimated clearance time
 - resumption of pre-incident operations
- procedures for advising the travelling public of estimated clearance time and any available alternative routes
- procedures for recording incident details and reporting them to the Road Authority within 24 hours
- procedures for restoring traffic flow around an incident site as quickly as possible
- procedures for clearing the incident and restoring normal project traffic operations as soon as possible
- process for reviewing incidents and proposing modifications to the project that will reduce severity and frequency of incidents
- any additional information required by the Road Authority

Category 3 Public Information Plan

A Public Information Plan is required for Category 3 projects.

The Prime Contractor's Public Information Plan should include:

- Road Authority contact information
- contact numbers for stakeholders and major user groups
- methods for providing work updates to the Road Authority
- methods and procedures for communicating to the travelling public [e.g., internet, radio, print media, flyer, dynamic message signs (DMS), etc.]
- appropriate, site-specific work information signs, as required
- a process for notifying the travelling public of scheduled traffic delays and project duration at least one week before the work starts or when major changes are made to existing processes
- a process for ensuring that major user groups, emergency response agencies, transportation companies, and the travelling public are aware of the schedule of road closures or alternating lane closures at least two weeks before the work starts or as major changes occur
- a process for notifying road users of traffic pattern changes or road conditions as the work progresses and major changes occur
- a process for notifying the travelling public of unanticipated traffic delays
- a list of DMS messages and phases to be used
- any additional information required by the Road Authority

Category 3 Implementation Plan

An Implementation Plan is required for Category 3 projects.

Category 3 Implementation Plans should identify the individuals responsible for overseeing the implementation of the Traffic Management Plan in accordance with the duties outlined in [Section 1.2.3: Traffic Control Responsibilities](#) and [Section 5: Traffic Control Persons](#):

- Traffic Engineer – identify name and duties
- Site Supervisor – identify name and duties
- Traffic Control Manager – identify name and duties
- Traffic Control Supervisor – identify duties (name to be recorded on Daily Traffic Control Log)
- Traffic Control Persons – identify duties (name to be recorded on Daily Traffic Control Log)
- any additional information required by the Road Authority

3.5 Traffic Management Plan Process Summary

Process for Developing Traffic Management Plans for Ministry Projects

- | | |
|---------------|--|
| Step 1 | Gather project information. |
| Step 2 | Complete Initial Category Assessment using Table 3.1 in Section 3.3.1: Initial Project Category Assessment . |
| Step 3 | Complete Risk Analysis using Table 3.2 in Section 3.3.2: Project Risk Analysis . |
| Step 4 | <p>Make Final Category Determination using Table 3.3 in Section 3.3.3: Final Project Category Determination.</p> <p>This involves adjusting the initial category on the basis of the risk analysis outcome to determine the final category for the project.</p> |
| Step 5 | <p>Develop the Traffic Management Plan:</p> <ul style="list-style-type: none"> • Include sub-plans required for the project category. • Ensure that the Plan includes measures for mitigating all risks identified in the Road Authority's traffic management requirements and in Step 3 above. • Consider using the appropriate template in Appendix C: Templates for Traffic Management Plans and the audit forms in Appendix D: Traffic Management Plan Audit Forms as guidance in developing the Plan. |
| Step 6 | Submit the proposed Traffic Management Plan for review. See Figure 2.2: Traffic Management Process Life Cycle for the Ministry's Traffic Management Plan acceptance process. |
| Step 7 | Begin work only after the Traffic Management Plan has been accepted and the Ministry has issued authorization for the work to proceed. |

3.6 Potential for Traffic Incident Litigation

The objective of road authorities, contractors and utilities should be to avoid traffic incidents in work zones. The following will help to accomplish this objective:

- Know and comply with safe and effective principles of traffic control.
- Ensure that the proper devices are in place in the work zone; including times when the zone is unattended at night, weekends, holidays, etc.
- Follow all safety regulations.
- Document all actions taken on or related to traffic control placed in the work zone.
- Inspect the work zone with a view for detecting and correcting observed deficiencies in traffic control.
- Remove all material and equipment not needed at the site as soon as possible, including traffic control devices no longer required.
- Provide adequate warning, guidance and protection for motorists, pedestrians, cyclists and workers for and from all foreseeable conflicts and hazards that could result from the work being done.

In spite of the best efforts outlined above, traffic incidents may still occur and some of these may result in lawsuits against the Road Authority. Defense against such lawsuits relies to a considerable degree on records that have been kept of job related activities and of traffic control maintained in the work zone. Documentation of changes made, as and when seen to be needed, should be viewed as indication of an effort always to provide adequate traffic control.

The primary information captured in documentation of changes made include:

- What is the decision?
- When was it made?
- Why was it made?
- Who made it?
- Other information may be included and may vary based on the scope of the change(s).

3.6.1 Analysis of Work Zone Incidents and Near Misses

Work zones should be monitored and inspected regularly to identify and analyze evidence of traffic incidents and conflicts. The process for analyzing work zone incidents and near misses should be explained in the Incident Management Plan, together with the relevant responsibilities of onsite personnel.

Incidents and near misses should be investigated and relevant information recorded, together with details about any subsequent changes made to the traffic control layout (see also [Section 3.6.2: Traffic Control Records](#)). For example, skid marks or devices that have been moved, knocked over, or damaged may indicate that traffic control changes are required. The Road Authority should be notified of all traffic control changes.

It is important to establish and evaluate the communication processes for reporting incidents to the Road Authority, along with response actions taken, and the steps taken to re-establish normal operations and advise the public of travel delays or traffic pattern changes.

Work zone incident reports should be analyzed and recommendations implemented to assist with improving work zone operations. Once the changes are implemented, they should be monitored for effectiveness.

3.6.2 Traffic Control Records

Although record-keeping in the field can be time-consuming, particularly for a moving operation, it is important to record significant traffic control actions taken by field crews. Good traffic control records prove to be particularly critical in cases in which a traffic incident results in litigation.

The traffic control records should include, but not be limited to:

- photo logging
- photographs accompanied by brief descriptions of time, location, direction, and photographer's name
- maintaining up-to-date Traffic Control Plans by recording notes on construction plans or, preferably, updating the Traffic Control Plan
- daily diary entries of times, locations, and names of individuals involved in the installation, change, and removal of traffic control devices

When the traffic control inspection process reveals a condition that requires changes, the documentation should include:

- description and location of the change required, when the requirement was noted, and by whom
- instructions given to make changes
- what changes or replacements were made, and when
- if changes were deferred, why

Additional traffic control documentation may result from the auditing processes outlined in [Section 3.7: Auditing Traffic Management](#) and [Appendix D: Traffic Management Plan Audit Forms](#).

3.7 Auditing Traffic Management Plans

[Appendix D: Traffic Management Plan Audit Forms](#) contains two forms intended for use by Ministry personnel who are auditing Traffic Management Plans:

- Traffic Management Plan Documentation Audit Form
- Traffic Management Plan Field Audit Form

These forms may also serve as a guide for traffic management planning by other Road Authorities, and for Prime Contractors if they wish to use them or are instructed to do so.

3.7.1 Traffic Management Plan Documentation Audit

The procedures for evaluating a proposed Traffic Management Plan should be appropriate to the complexity of the project:

- **Traffic Management Plans for Category 1 projects** may require only the verification of the information against the requirements in [Section 3.4.1: Category 1 Traffic Management Plan Requirements](#).
- **Traffic Management Plans for Category 2 and 3 projects** require more comprehensive evaluations for completeness and suitability.

Each sub-plan should be evaluated for completeness with respect to the requirements (see [Section 3.4.2: Category 2 Traffic Management Plan Requirements](#) and [Section 3.4.3: Category 3 Traffic Management Plan Requirements](#)), and returned to the Prime Contractor for further attention if it is considered incomplete.

Once all sub-plans are complete, the Traffic Management Plan should be evaluated in its entirety to ensure that it meets the Road Authority's stated requirements.

Any items flagged as incomplete should be addressed in writing in the Comments section at the end of the Traffic Management Plan Documentation Audit Form. The completed form should be provided to, and discussed with, the Prime Contractor.

3.7.2 Traffic Management Plan Documentation Audit Process

Ministry personnel should use the Traffic Management Plan Documentation Audit Form in [Appendix D: Traffic Management Plan Audit Forms](#) in conjunction with the evaluation steps outlined below, using a system of check-marks (✓) and X's on the form to indicate compliance and non-compliance, respectively.

Traffic Management Plan Documentation Audit Process

- | | |
|---------------|---|
| Step 1 | Evaluate completeness of Traffic Management Plan. Ensure that the sub-plans, layouts, and drawings are appropriate for the project category, and that all required information is provided. |
| Step 2 | Evaluate completeness of Traffic Control Plan. Ensure that the proposed traffic control measures are appropriate for the project category, and that the proposed traffic control measures and layouts are suitable for the planned work activities, traffic volumes, route, and time of day. |
| Step 3 | Evaluate completeness of Incident Management Plan. Ensure that all required information is provided. |
| Step 4 | Evaluate completeness of Public Information Plan. Ensure that all required information is provided. |
| Step 5 | Evaluate completeness of Implementation Plan. Ensure that all required information is provided. |
| Step 6 | Accept or reject Traffic Management Plan. If information is missing or any sub-plans are incomplete and do not meet the stated requirements, return the Traffic Management Plan to the Prime Contractor for revision. |
| Step 7 | Document any conditions or limitations before sign-off. Once all of the above requirements have been met, identify any Ministry conditions or limitations before accepting the Traffic Management Plan. |
| Step 8 | Authorize the work. |

3.7.3 Traffic Management Plan Field Audit

The field audit is a process of verifying that the work site practices and traffic control layouts for the project comply with the standards specified in this Manual and the Traffic Management Plan. This process is usually conducted on larger projects by the Ministry or a third-party.

Field audits include the following:

- Verify that the traffic control setups are consistent with those identified in the Traffic Management Plan and Traffic Control Plan.
- Verify that the use, positioning, and condition of signs and other traffic control devices are consistent with those identified in the Traffic Management Plan and Traffic Control Plan, and that they are performing effectively for traffic control purposes. If possible, field audits should be conducted during both daytime and night as visibility can differ significantly based on lighting conditions.
- Verify that the safety practices and apparel of Traffic Control Persons and other workers on the work site comply with the standards specified in this Manual for safety and retroreflectivity.

The Traffic Management Plan Field Audit Form in [Appendix D: Traffic Management Plan Audit Forms](#) should be used when conducting a field audit, using a system of check-marks (✓) and X's to indicate compliance and non-compliance, respectively.

Any items flagged as incomplete should be addressed in writing in the Comments section at the end of the Traffic Management Plan Field Audit Form. The completed form should be provided to, and discussed with, the Prime Contractor.

A follow-up audit may be required to confirm that the Prime Contractor has made and documented the appropriate changes.

Once all problems have been corrected, this should also be recorded, and copies of the completed form should be given to the Prime Contractor and placed on the project file.