

Section 2 Traffic

2-201 References

2-202 Objective

2-203 Planning

2-204 Responsibilities and Procedures

- 2-204A Resident Engineer
- 2-204B State Representative
- 2-204C District Construction Safety Coordinator
- 2-204D Construction Traffic Manager
- 2-204E Construction Engineer

2-205 Guidelines for Traffic Control Plans

- 2-205A Basic Instructions
- 2-205B General Considerations

2-206 Elements of a Roadway

- 2-206A Geometrics
- 2-206B Crossover Transitions
- 2-206C Existing Ramps
- 2-206D Run-off Areas
- 2-206E Lane Widths
- 2-206F Lateral Shifting
- 2-206G Surfacing Materials—Color and Texture

2-207 Speed Zones

2-208 Night Work

2-209 Delineation

2-210 Ramp Closures

2-211 Informing the Public

2-212 Keeping the Roadway Clear and Clean

2-213 Roadways Over Railroad Tracks

2-214 Transportation Management Plans

- 2-214A Policy
- 2-214B Definitions
- 2-214C Responsibilities
 - 2-214C (1) *District Traffic Manager*
 - 2-214C (2) *TMP Manager*
 - 2-214C (3) *Construction Traffic Manager*
 - 2-214C (4) *Construction Engineers, Resident Engineers, and Construction Inspectors*
- 2-214D Construction Contingency Plan

2-215 Construction Zone Enhanced Enforcement Program

2-215A COZEEP Funding

2-215A (1) *Estimating COZEEP Funding Requirements*

2-215A (2) *Redirection of Project Funds*

2-215A (3) *Obtaining Additional Funds*

2-215B COZEEP Responsibilities

2-215B (1) *Project Engineer*

2-215B (2) *Resident Engineer*

2-215C COZEEP Implementation

2-215C (1) *Freeways and Expressways*

2-215C (2) *Connectors and Ramps*

2-215C (3) *Conventional Highways*

2-215C (4) *Risk Factors*

2-215D COZEEP Administrative Procedures

2-215D (1) *Ordering Work*

2-215D (2) *Completing the Task*

2-215D (3) *Cancellations*

2-215D (4) *Recording Work Performed*

2-215D (5) *Tracking Expenditures*

2-215D (6) *Reconciling the CHP Invoice*

2-215D (7) *Problem Resolution*

2-216 Pedestrian Facilities

2-216A Related Caltrans Standards

2-216B Requirements of the California Manual on Uniform Traffic Control Devices

2-216C Permanent Facilities

Bracketed section numbers refer to the 2006 *Standard Specifications*.

Section 2 Traffic

2-201 References

Section 124 of the Streets and Highways Code authorizes Caltrans to close or restrict the use of any state highway whenever it considers such actions necessary for these reasons:

- To protect the public.
- To protect a highway during construction, improvement, or maintenance operations.
- To protect a highway from damage during storms, major earthquakes, or other natural disasters

Traffic control systems conform to the Standard Plans, unless the contract specifies otherwise.

All signs, lights, and devices must conform to Section 12, “Temporary Traffic Control,” of the *Standard Specifications*. For their application, review the current *California Manual on Uniform Traffic Control Devices (California MUTCD)*.

2-202 Objective

The objective of traffic control is to provide for worker protection and the safe passage of public traffic—including bicycles, motorcycles, and pedestrians—through and around construction with as little inconvenience and delay as possible.

2-203 Planning

Providing for worker safety and the safe movement of traffic through construction zones starts with planning. All contract plans and special provisions must include a traffic control plan. District construction must review it before the district submits the plans, specifications, and estimate to headquarters.

The plan must be adequate for conditions that will occur during construction. The reviewer should determine that the plan can be implemented and that it adequately facilitates the movement of traffic. Discuss comments or suggestions regarding traffic control with district design and traffic units during the project’s planning and design phase.

2-204 Responsibilities and Procedures

Key personnel involved in traffic control have certain responsibilities and procedures as follows:

2-204A Resident Engineer

The resident engineer (RE) has responsibility and authority for administering the traffic control plan and all other aspects of safety on construction projects. Administration of

Section 2 Traffic

2-201 References

2-202 Objective

2-203 Planning

2-204 Responsibilities and Procedures

traffic control may be delegated to another person assigned to the project, preferably the project safety coordinator. For the duties and responsibilities of the project safety coordinator, see Section 2-102E, “Project Safety Coordinator,” of this manual.

Once assigned to the project, perform the following administrative duties:

- Compare the traffic control plan to conditions found at the site. Note any unusual local traffic and emergency vehicle movements. At the preconstruction conference, discuss the traffic control plan. For details related to preconstruction conferences, see Section 5-003, “Preconstruction Conference with the Contractor,” of this manual.
- Modifications of the traffic control plan may be considered at this point. Given the specifics of a contractor’s needs, it may be possible to provide traffic service improved over the service originally contemplated. Changes the contractor requests must provide at least equal traffic service to receive favorable consideration.
- A change order must cover changes made in contract plans and in specifications that address conditions in the contract that are unanticipated or not fully delineated. Change orders must include plans in sufficient detail to define all elements of the proposed changes and roadway design.
- The district will establish a procedure for preparation, review, and approval of changes related to roadway construction and detour plans that include signs and other traffic control devices. Generally, the district traffic unit is responsible for this review activity.
- Urgent, unpredictable situations—minor or of short duration—usually arise during the work and require good judgment for optimum results. These instances do not require formally approved plans. Define or specify what is to be done, and maintain written records of orders given and actions taken.
- To establish the geometry, markings, devices, and signs that existed during the project, maintain in sufficient detail a record of the placement into service, the changes, and the discontinuance of roadways and detours. The record’s form may vary according to the magnitude and complexity of the subject. Dated notations or revisions to plans may be helpful. Dated photographic or video tape records, particularly of points of transition or difficult situations, may be especially valuable.
- If the contractor’s operations interfere with vehicular or pedestrian traffic or cause potential safety problems, immediately contact the contractor and request correction of the deficiency. If necessary, direct the contractor in writing to act at once to remedy the unsatisfactory situation. Call on Caltrans work forces only when necessary—because of a physical inability of the contractor or a refusal by the contractor to act. A contractor’s failure to perform is cause to order cessation of the operations.

2-204B State Representative

When others administer the contract, oversight of traffic through and around a construction zone involves overseeing and working with the local entity or the private sponsor’s resident engineer. The state representative assigned to the project must make sure the resident engineer performs the duties as outlined above.

For changes to the district-approved traffic control plans on contracts administered by others, use the same review and approval process established for Caltrans-administered projects.

As a last resort, the state representative has authority to stop the contractor's operation wholly or in part or take appropriate action when public safety is jeopardized.

2-204C District Construction Safety Coordinator

Section 2-1, "Safety," of this manual covers the duties of the district's construction safety coordinator who must periodically review the traffic handling for each project. Some reviews should take place at night, particularly when a major traffic change has taken place. The coordinator must document the reviews in the project records and discuss apparent deficiencies in the traffic control plan or problems in traffic safety with the construction engineer, traffic engineer, and resident engineer. The construction traffic manager or a district traffic unit specialist may perform the traffic reviews, provided the project records include the required documents and discussions.

2-204D Construction Traffic Manager

The Traffic Management Plan Guidelines describe the roles and responsibilities of the construction traffic manager (CTM) who works in cooperation with the construction safety coordinator. Responsibilities include:

- Serves as a liaison between construction, the district traffic manager (DTM) and the transportation management plans (TMP) manager.
- Reviews the TMP and traffic contingency plan for constructability issues.
- Acts as a resource for the resident engineer, construction engineer, DTM, and TMP manager during TMP implementation and reviews the contractor's construction contingency plan.

2-204E Construction Engineer

The construction engineer is responsible for ensuring that traffic handling through construction projects conforms to specified traffic control plans. If a change order modifies the plans, construction engineers must take steps necessary to ensure that the modified plans are adequate to provide the highest level of traffic safety and service consistent with conditions actually encountered. During routine visits to the project, construction engineers should also review signing, delineation, construction contingency plans, and general traffic handling.

2-205 Guidelines for Traffic Control Plans

Follow these guidelines and general considerations for reviewing and approving traffic control plans:

2-205A Basic Instructions

Basic instructions usually apply more to the planning and design phase of a project, but they also help provide construction personnel with basic concepts for safe and efficient traffic flow through a highway construction project. Use these guidelines when necessary during construction to make changes in traffic control plans.

- Whenever possible, permit traffic to have continued undiminished use of the existing facilities.

2-205

Guidelines for Traffic Control Plans

- When such use is not possible, accommodate traffic by ensuring a continuous roadway throughout the length of the project, achieved by using one or a combination of the following:
 1. The existing unmodified highway.
 2. The newly constructed highway or portions of it.
 3. Interim-constructed facilities.
 4. A detour where traffic, including pedestrians and bicycles, is diverted over a temporary roadway.
 5. Allowing traffic to pass through the work in progress.
- Ensure that the temporary roadway is engineered to the highest standards possible, applying the same design considerations as those in the new construction:
 1. Geometrics of alignment and roadway section.
 2. Surface of the traveled lanes and shoulders or marginal areas.
 3. Pavement markings and other delineations.
 4. Barrier and guardrail.
 5. Signals and lighting.
 6. Signing.
 7. Pedestrian and bicycle facilities.
- Show the design of the temporary roadway, including pedestrian and bicycle facilities, in the traffic control plan.
- Make safety and convenience the primary design considerations. Economy will be a factor only as necessary to obtain balance between benefits and resources. By itself, cost must not be a primary limiting factor.

2-205B General Considerations

No formalized solution and design applies to all situations. The following guidelines are intended only to guide engineering judgment and ingenuity:

- Create a physical facility that will induce motorists to make proper responses to guide their vehicles in the intended path of travel and make it possible for the vehicle to react as intended.
- The traffic lane—the path the car is intended to follow—is the most important single element of the roadway. These elements affect the driver’s ability to follow the intended path:
 1. The lane’s geometry.
 2. Pavement surface condition, texture, and color.
 3. Pavement markers and other delineation.
 4. Signals, lighting, and signing.
- Try to eliminate surprise elements from temporary roadways. Make the environment like the approach highway. If differences must exist, make them clearly apparent.

- Accident concentrations and inconvenience often occur with changes in direction, number of lanes, alignment, and speed. Compensate for a required reduction of one by an improvement of another. For example, compensate for a sharper curve with solutions such as increased lane width or a runoff area.
- Visualize what effect changing conditions of visibility and lighting will create. Glare conditions in rain, at night, or when facing the rising or setting sun may impact driver decisions. Such conditions may alter the apparent pattern of the roadway and cause an eradicated line to appear to be a lane line. Consider how the shape and the light versus the shadow of falsework openings will appear both in daytime and at night. Anticipate needs for special treatments such as lighting.
- Review the project for evidence of driving difficulty. For instance, look for such signs as broken delineators, skid marks, and tire marks on temporary railing, all of which indicate a potential need for improvement. Be aggressive in seeking changes to improve the situation. Continue appraisal throughout the life of the project, since each day a change in condition may impact the facility's effectiveness.
- Reductions in the width or number of lanes affect the capacity and flow of traffic. When severe congestion is forecast because of capacity reductions, include plans for media notification, Construction Zone Enhanced Enforcement Program (COZEEP) services, alternate route development, metering by upstream ramp closures, changeable message signs, highway advisory radios, and monitoring the end of the traffic queue.

2-206 Elements of a Roadway

Following are guidelines for the design of roadways carrying traffic through construction areas:

2-206A Geometrics

For conditions shown on the plans that need adjustment, discuss proposed changes with the district traffic unit. Include these considerations for conditions requiring minor changes in the field:

- Design for the speed that vehicles will travel, not the speed one hopes they will travel. The following determine the safe speed of a vehicle:
 1. Alignment
 2. Profile
 3. Cross section
 4. Pavement surface character
 5. Lateral clearances to obstructions
- On mainline facilities, design the temporary roadway for speeds consistent with the permanent roadway. On highways where the prevailing speed of the approach is limited by alignment, the design speed should be equal to the prevailing speed of the approach roadway. If this equality is not possible, ensure that the design speed differential is no more than 10 mph. Geometrics for a transition at the end of a high-speed approach should be better than those adequate for a situation within the construction area.

2-206 Elements of a Roadway

- Locate the transition so it is visible to the approaching motorist. Avoid placing entering transitions on or just beyond horizontal curves or the crest of a summit vertical. The transition should be completed before reaching such features. The ideal transition is on a horizontal tangent with a slightly rising grade at the end of a level approach. Achieving this transition is worthwhile, even though it may extend the traffic control system farther than the minimum necessary just to clear the construction area.
- In the transition, if physically possible, give the driver at least the same effective traversable roadway width—and preferably more—as on the approach roadway. Adequate maneuver room at critical points is an important factor in preventing accidents.
- Design to require the least change in alignment, speed, or both. When changes are necessary, make one change at a time. For example, if the number of lanes must be reduced and the direction changed, complete the lane drop before starting the alignment change.

2-206B Crossover Transitions

The following guidelines apply to crossover transitions:

- Design crossover transitions to the highest geometric standards within tolerable limits of cost. Use flat diagonal crossing in preference to reversing curves.
- When crossovers require the removal of median barriers or protective devices, review conditions and, where possible, maintain the integrity of the remaining portions of the devices. For example, anchor guardrail ends and install crash cushions.
- When crossovers are not in use, place positive barriers across entry areas. Include appropriate signage.

2-206C Existing Ramps

For temporary modifications of existing ramps, pay close attention to acceleration and deceleration lanes. Reducing standards on existing roadways, such as sharpening curves and shortening auxiliary lanes, can adversely affect operating characteristics. Supplemental construction work may be necessary to retain the existing roadway's effective operating characteristics.

2-206D Run-off Areas

Whenever physically possible, establish and maintain a safely traversable area outside the delineated roadway wide enough for a run-off zone. To enhance night visibility, delineate material, equipment, excavations, or obstructions 15 feet or more from the traveled way (outside normal required protection parameters). Creating safe run-off areas may also require ordering staging of certain elements of the work, cleanup grading, and temporary placement or removal of materials.

2-206E Lane Widths

Lane widths should be consistent with the widths of the approach roadway. A desirable standard consists of full width lanes plus an effective width of constructed shoulder. To provide extra maneuvering room, provide wider lanes or additional surfaced shoulder width in transitions and critical alignment.

2-206F Lateral Shifting

Construction situations frequently require a lateral shifting of traffic in relation to the normal path of travel and may involve dropping a lane. Use the standard formula for taper length shown in the California MUTCD or in the project's traffic control plan details.

Before opening lanes to traffic, remove or obliterate all conflicting lines and markings. Obliterated lines and markings must be unidentifiable as pavement delineation during the day, at night, and under all weather conditions.

2-206G Surfacing Materials—Color and Texture

The following guidelines apply to the color and texture of pavement surfacing materials:

- Surface all roadways and detours, except very temporary or minor facilities, with an appropriate material (in most cases asphalt concrete).
- The area where the surfacing joins the existing roadway can be critical. If new asphalt concrete joins existing asphalt concrete, the difference in texture and color between them creates a taper in the new traffic lane that may convey the wrong sense of direction, especially at night or in rain. An inevitable degree of mismatch between the old and new surfaces creates a slight discontinuity that may cause a car to lurch or swerve. Avoid these difficulties by bringing the temporary surfacing back onto the existing highway in a square joint.
- A square joint is even more necessary when asphalt concrete joins portland cement concrete (PCC), because at night and during rainy weather, the joints often stand out more prominently than traffic lane lines.
- When conditions prevent starting the temporary surfacing at a square joint on the existing pavement, a treatment such as a light sand seal can establish the continuity of the traveled lane. Establishing continuity is especially necessary if previous traffic shifts have created confusing or conflicting diagonal joints and have eradicated pavement markings.

2-207 Speed Zones

The following guidelines apply to speed zones:

- If the safe operating speed of traffic through a construction area is significantly less than the approach speed of highway traffic, a reduced work-zone speed limit may be established.
- Do not use a reduced speed limit as a substitute for other means of creating a safe roadway.
- Establish reduced speed limits in accordance with procedures in the *California MUTCD*. District construction and traffic units must jointly review and agree to the limits, and it is advisable to discuss the limits with the California Highway Patrol (CHP). Caltrans recommends using COZEEP for any project with a proposed reduced speed zone. See subheading 2-215, "Construction Zone Enhanced Enforcement Program," later in this section.
- To avoid having to obtain more than one speed reduction order per project, ensure that the limits requested in the order cover the maximum distance where reduced

2-207

Speed Zones

speed would be required at any time during the life of the contract. Any part of the project within the limits stated in the order becomes a legal speed zone when signs are placed and displayed.

- It is imperative that the speed limit be posted only for the duration of the conditions justifying the reduction and only in areas of the project where it is unsafe at all times to travel in excess of the posted speed limit.
- Speed limit signing may be considered during work operation when workers are present. When work operations are complete for the day, ensure that the contractor removes or covers the signs immediately. Implement temporary speed limit reductions in conjunction with a COZEEP operation.
- Use the posting of advisory speeds on warning signs to advise the public what speed is considered appropriate at specific locations such as points of curvature or traffic diversion. The selected speed should be what a driver exercising due care would drive in normal conditions of light and weather.

2-208 2-208 Night Work

Night Work Frequently, special provisions restrict work on the existing traveled way to a specified period at night. Based on traffic counts, the district traffic unit determines times for closing lanes and for night work.

The effectiveness of handling traffic through night construction depends on the contract plans and the details of the contractor's operations. Require the contractor to submit and obtain approval of the plan or operations before proceeding with night work. Consider these details:

- Avoid traffic splits if possible. Shift traffic to one side or the other, but do not split it into two traffic streams. This requirement may mean closing an extra lane.
- Confine the work area to as short a distance as practical.
- Work areas should be well lighted, but in a way not to blind drivers of approaching vehicles. If properly shielded, most lights can be mounted on construction equipment. Ensure that lighting intensity complies with the Cal/OSHA requirements.
- Ensure that the contractor's plan of operation provides sufficient room for delivery vehicles so they are not forced to stop in the traffic lanes.
- Providing for exit ramp traffic within the coned-off area may be difficult. Sometimes through traffic tends to follow an exiting vehicle. To expedite the work, it is helpful to close the exit temporarily if traffic patterns and volumes permit.
- In addition to requirements for signs and warning devices shown on the plans for traffic control systems, changeable message signs in advance of the work may be used effectively. See Section 4-1203K, "Portable Changeable Message Signs," of this manual. You may also consult the district traffic unit.
- Ensure that the contractor uses road flares to get motorists' attention only under emergency conditions, and takes care to prevent fires in susceptible high-fire-rated areas.

- For the use of amber flashing lights and for driving and parking in a closed lane at night, see the *Caltrans Safety and Health Manual*.
- Ensure all equipment is visible to traffic, through either illumination or suitable marking.
- During daylight hours, mark sign and lane closure locations in advance. Review lane closure layouts for visibility and effectiveness. When possible, mark cone locations in advance so cones can be placed quickly and accurately and the resulting line of cones will be straight and correctly spaced.
- Construction Safety Orders, Article 11, 1599 (e) requires illuminating flagger stations during the hours of darkness. The traffic control system for flaggers should follow Sheet T13 in the Standard Plans. Ensure that all flaggers are clearly visible to traffic and that their positioning is safe and effective.
- Comply with American National Standards Institute (ANSI) 107-2004.
- Nighttime use for all Caltrans staff requires a Class 3 or equivalent garment. The following options meet Class 3 requirements:
 1. A Class 3 “sleeved” vest with the ANSI 107-2004 Class 3 label.
 2. A newer Caltrans rain jacket with an attached ANSI 107-2004 Class 3 label.
 3. A Class 3-equivalent garment—a Class 2 vest with the ANSI 107-2004 label and worn with Class E pants.
- For nighttime operations for contractor staff, the law recommends but does not require Class 3 garments. Caltrans inspectors must make sure that garments worn by the contractor’s staff comply at least with ANSI 107-2004 Class 2.
- To maintain cones, signs, and other safety devices, the contractor must patrol the project’s traffic control systems.
- Personnel representing Caltrans and the contractor who are capable of and empowered to make decisions quickly if the need arises must be on the job at all times.

2-209 Delineation

In accordance with Caltrans policy, no undelineated roadway can be opened to unrestricted or uncontrolled traffic. Before opening a roadway to unrestricted public traffic, the final delineation must be in place on the roadway either by using long-term or short-term temporary delineation or channelizing devices.

For a detailed discussion of acceptable temporary delineation methods, see Section 4-12, “Temporary Traffic Control,” of this manual. For a discussion of final delineation and pavement markings, see Section 4-84, “Traffic Stripes and Pavement Markings.”

2-210 Ramp Closures

Whenever possible, avoid prolonged closure of freeway ramps when it may adversely affect local businesses. Where ramp closures cannot be avoided, minimize adverse effects.

During the planning and design phase of any project, an impact study is made for a proposed prolonged ramp closure. The public distribution of the environmental

2-209 Delineation

2-210 Ramp Closures

document includes local businesses that may be affected and notifies them of any public hearing.

District construction must request an impact study for proposed prolonged ramp closures not formally considered in the planning or design phase. Contact the project manager to arrange for the study. It is not necessary to restudy impact previously studied during planning and design unless significant commercial development has occurred in the area in the interim. Before making a decision to approve a change order that would result in a prolonged ramp closure, weigh the results of the study with factors, such as construction costs, travel costs, delay, and safety.

Request an impact study for ramp closures of short duration where the possibility of adverse results or sufficient public concern exists to identify effects on adjacent businesses.

**2-211
Informing the
Public**

2-211 Informing the Public

Timely publicity can significantly improve traffic behavior on a construction project. A motorist who is forewarned of construction conditions will be more tolerant of delay and inconvenience and probably will be more alert and responsive to construction zone control.

Make information on project road closures, new road openings, traffic rerouting, and changes in traffic conditions available in advance for local publicity. Follow the district's instructions for distributing news releases. For guidelines on public information, see Section 1-206, "Relations With the General Public," of this manual.

**2-212
Keeping the
Roadway Clear
and Clean**

2-212 Keeping the Roadway Clear and Clean

To ensure safety and convenience, Caltrans or the contractor prepares plans to provide unobstructed roadways. Periodic project safety reviews should note deficient areas and recommend corrective action by the contractor. During these reviews, examine the locations of planned roadside obstacles as well as protective safety devices, signs, striping, detours, falsework, temporary railing, attenuators, and run-off zones. Retain documentation of these reviews in Category 6, "Safety," of the project records.

Frequently, the only exception to an otherwise clean roadside is a localized situation such as a partially completed drainage structure or a pile of rubble. Do whatever is necessary to maintain an unobstructed roadside when construction is not in progress.

Keep all traffic control facilities in good repair with a continuing program of inspection, replacement, and cleaning.

**2-213
Roadway Over
Railroad Tracks**

2-213 Roadways Over Railroad Tracks

When construction activities involve railroad right-of-way or grade crossings, contact the district railroad liaison agent to ensure that all processes are complete and that the contractor may begin work. The railroad company should be represented at a preconstruction meeting to discuss the schedule of work over or near railroad facilities.

The district railroad liaison agent must report to the Public Utilities Commission any proposed detours that include a railroad crossing at grade where the volume of state highway traffic will materially increase normal traffic using the crossing. Provide the following information to the district railroad liaison agent who will forward it to the Public Utilities Commission:

- The Public Utilities Commission crossing number shown on the railroad crossing sign.
- Existing protection at the crossing.
- Date the detour will be put into use and the estimated time it will be in use.
- Estimated volume of traffic to be detoured over the crossing.
- Whether additional protection is proposed.

If construction involves structure work, send a copy of the above information to the Office of Structure Design.

Contractors must make their own arrangements with the railroad representative to move materials or equipment across railroad tracks. If that action is required, a contractor must obtain a private crossing agreement.

2-214 Transportation Management Plans

A transportation management plan (TMP) is a program of activities for minimizing or alleviating work-related traffic delays by effectively applying traditional traffic-handling practices and innovatively combining various strategies: public awareness campaigns, motorist information, demand management, incident management, system management, alternate route planning, and construction methods and staging. Depending on the complexity of the work or the magnitude of anticipated traffic impacts, a TMP may provide lane closure charts, standard special provisions for maintaining traffic, traffic control plans, and—for major projects—a separate comprehensive report. Caltrans’ “Transportation Management Plan Guidelines” provide more information on the recommended level of detail for TMPs.

2-214A Policy

The Federal Highway Final Rule 23 Code of Federal Regulations 630, Subpart J, referred to as “Work Zone Safety and Mobility,” requires Caltrans to adopt a policy that implements TMPs on all federally funded highway projects. TMPs must be consistent with the final rule guidelines for developing and implementing the policy.

Caltrans requires TMPs for all planned activities on the state highway system. During the project initiation or planning stage, Caltrans considers TMP measures with associated road user costs and additional construction costs to the fullest extent feasible. TMPs include strategies to minimize work-related traffic delays while reducing the overall duration of work activities where appropriate. Strategies that may result in a net reduction of overall delay for motorists include full facility closures, extended weekend closures, continuous weekday closures, A+B contract specifications, and performance-based, traffic-handling specifications.

2-214B Definitions

Major lane closures—those expected to result in significant traffic impacts despite the implementation of TMPs.

Significant traffic impact—an individual traffic delay of 30 minutes or more above normal travel time during recurring congestion on the existing facility. TMP strategies are designed to maintain additional delays below this maximum threshold, that is, less than 15 or 20 minutes. With approval from the District Lane Closure Review Committee, you may exceed the 30-minute maximum delay.

2-214 Transportation Management Plans

2-214C Responsibilities

The district construction office and the resident engineer must ensure that the contractor's activities are compatible with the TMP that affects the project.

2-214C (1) District Traffic Manager

- Acts as the single focal point for all traffic impact decisions resulting from planned activities on the state highway system.
- Determines the extent of a TMP.
- Facilitates review and approval of TMP measures and planned lane closure requests.
- Directs the termination or modification of active planned lane closure operations when traffic impact becomes significant, without compromising traveler or worker safety.

2-214C (2) TMP Manager

- Acts as the single focal point for development and implementation of TMPs.

2-214C (3) Construction Traffic Manager

- Serves as a liaison between construction, the DTM, and the TMP manager.
- Reviews the TMP and traffic contingency plan for constructability issues.
- Acts as a resource for the resident engineer, the DTM, and the TMP manager during TMP implementation.
- Reviews the contractor's contingency plan.

2-214C (4) Construction Engineers, Resident Engineers, and Construction Inspectors

- Ensure full implementation of approved TMPs in close coordination with the DTM so disruption to the traveling public is minimized.
- Work with the DTM to ensure that project activities conform to the TMP, that contingency plans are implemented when necessary, and that disruption to the traveling public is minimized and does not exceed limits established in the TMP.
- Include the district TMP manager, the DTM, and the public information officer as appropriate in preconstruction or work planning meetings.
- Determine when the contractor must submit a construction contingency plan.
- Ensure that the contractor is prepared to comply with TMPs related to work performance.
- Notify district communication centers or transportation management centers when unforeseen traffic impacts result from planned work.
- Notify district communication centers or transportation management centers to report the status of lane closures in a timely manner (when closures are put in place, picked up, and canceled) to provide accurate information to the public. Provide specific details when reporting, especially when a planned lane closure might be picked up late and significant traffic impacts result.

- Coordinate work activities with the CHP and other local and regional transportation stakeholders as appropriate.

During construction, district construction directs the implementation of TMP elements that are part of the main contract or encroachment permit. Contract managers direct their respective separate contracts or agreements, such as for rideshare activities, transit activities, and public awareness campaigns.

Give special effort to ensure that changeable message signs, highway advisory radio, and other media tools provide accurate and timely information to motorists regarding lane closure times. Caltrans can enforce contractor compliance with lane closure pickup deadlines in two ways:

- A “maintaining traffic” standard special provision allows assessing the contractor a contract payment deduction for the value of a traffic delay when the contractor exceeds the lane closure window. The minimum penalty is \$1000 for each 10 minutes, but it can greatly exceed the minimum depending on traffic volumes and the highway facility. The DTM calculates the delay penalty during PS&E.
- The state representative can suspend the contract work.

Caltrans can order a contractor or Caltrans forces (such as maintenance) to pick up a lane closure early if traffic impacts become significant because of either a project incident or activities outside the project area. Caltrans should order early pickup only when traveler and worker safety will not be compromised. The “maintaining traffic” special provisions for capital projects provide for compensating contractors for early pickup. Encroachment permit provisions require the permittee to pick up a closure early without compensation.

2-214D Construction Contingency Plan

The contractor develops a construction contingency plan to identify operations, equipment, processes, and materials that may fail and delay opening lane closures. The contingency plan identifies alternative or additional equipment, materials, or workers necessary to ensure continuing operations and on-time opening of closures if a problem occurs. If the equipment, materials, or workers are not onsite, the contingency plan specifies the method of mobilizing these items and the time required to complete the mobilization.

Critical pieces of equipment are those necessary to complete the planned work in the closure, for which no close onsite substitutes exist, and which—if rendered inoperative—would cause the closure to be kept in place past the pickup time in the closure charts.

Critical work operations are those performed in a lane, shoulder, or ramp closure that would make the traveled way unsafe or render any portion of the traveled way unsuitable for public traffic use. The operations would, therefore, cause the closure to be kept in place past the pickup time indicated in the closure charts.

The contractor develops a contingency plan and submits it within 1 day of the resident engineer’s request or as specified in the standard special provisions. Discuss the contingency plan at the project partnering or preconstruction meeting.

Samples of operations that may require a contingency plan:

- Any activity requiring a full roadway closure

- Blasting
- Rapid-set PCC operations, including PCC slab replacement
- Roadway excavations that encroach on the traveled way and are not protected by K-rail
- Cold planing hot mix asphalt for depths of 2 inches or greater
- Hot mix asphalt paving
- Asphalt or concrete grinding
- Chip seal
- Asphalt or concrete pavement sealing operations
- Bridge work
- Placement of reinforcing steel or structural members
- Falsework erection or removal, including adjustments
- Bridge demolition
- Striping

A construction contingency plan describes:

- Critical stage for each operation when the alternative or additional equipment, materials, or workers must be activated.
- Communication equipment (for example, cell phones) and procedures to follow when communicating with the resident engineer's field representatives during contingency plan activation.
- Intended amount of work to be done during each lane, shoulder, or ramp closure. Describe the work by length, width, and unit of measure conforming to the appropriate progress pay items.
- Operation work schedule with a timeline set at 20-minute intervals.
- How the contractor will meet the projected rates for material delivery to the jobsite. Materials produced offsite and delivered to a jobsite, such as asphalt concrete and concrete, can encounter numerous delays including plant breakdown, loss of trucking, or trucking delayed by traffic congestion because of accidents or the project itself.
- Beginning and ending times for critical work operations for work conducted in lane, shoulder, or ramp closure.
- A general time-scaled logic diagram displaying the major activities and sequence of planned operations that comply with special provision requirements.
- A set of contingency action plans for each stage of the operations to prevent late opening of the traffic lanes. Clearly identify early-finish and late-finish milestones for every major activity. The contingency action plans must include detailed operations undertaken in case a major activity passes the late-finish milestone.
- Anticipated cooling times needed for asphalt concrete pavements before opening a lane, shoulder, or ramp to public traffic.

- Anticipated times for beginning the closure pickup.
- Anticipated length of time, rounded to the nearest 5 minutes, to pick up the lane, shoulder, or ramp closures.
- Timelines for the contractor and the engineer to meet at the worksite, review progress, and forecast the time when work will be stopped to open the lane, shoulder, ramp, or route to the public.

The contractor verifies or updates the contingency plan at the same time as submitting the written schedule of planned closures. If a revision is required, the contractor should not close any lanes until the resident engineer has reviewed the contingency plan.

2-215 Construction Zone Enhanced Enforcement Program

Caltrans and the CHP have an interagency agreement that is the basis for the Construction Zone Enhanced Enforcement Program (COZEEP). It is an enhancement tool for construction zones and is not intended as a replacement for other temporary traffic control (TTC) measures. Caltrans contracts, procedures, and guidelines form the basis for safe traffic-control measures throughout its construction projects and establish a baseline for operations statewide. COZEEP is not a baseline measure—an important fact when resources are limited and CHP personnel may not be available when requested. Under the agreement, Caltrans pays the CHP for furnishing officers and cars for construction zones.

To implement COZEEP, use the guidelines below, intended to apply COZEEP resources more uniformly throughout the state. Use the guidelines when determining when and how to use COZEEP on a project. Document the reasons for COZEEP use.

2-215A COZEEP Funding

Consult your district COZEEP coordinator for a current estimate of hourly and mileage COZEEP cost.

2-215A (1) Estimating COZEEP Funding Requirements

The project engineer should include the project estimate funds necessary to provide COZEEP as state-furnished materials and services. The pending file for the project maintained by the resident engineer should include the basis of that estimate.

The cost estimate used in the plans, specifications, and estimate is based on the expected number of events needing COZEEP identified during project development. The cost estimate should include an estimated number of COZEEP service hours and travel time converted into an equivalent dollar cost.

When estimating COZEEP hours, take the following CHP operating policies into account:

- CHP policy requires two officers in each unit between 10:00 p.m. and 6:00 a.m. (Caltrans obtained an exception to have one officer per vehicle whenever two or more units are in close proximity of one another on the same project.)
- The CHP memorandum of understanding requires a minimum payment of 4 hours per officer. Caltrans reimburses CHP officers who provide COZEEP services on overtime at time and a half.
- Time and mileage are based on officers' starting and stopping times at their reporting station and include travel to and from the project.

2-215 Construction Zone Enhanced Enforcement Program

The district COZEEP coordinator will provide current hourly and mileage reimbursement costs for the project location.

2-215A (2) Redirection of Project Funds

The detailed estimate will show the initial funding level for COZEEP as supplemental funds for state-furnished materials and services. If additional funds are required during the life of the project, the resident engineer can transfer available contingency funds to “state-furnished materials and services—COZEEP.” Likewise, the resident engineer may transfer unused COZEEP funds to the contingency fund and use them for other purposes.

2-215A (3) Obtaining Additional Funds

Additional funds may be obtained for capital projects and maintenance funded projects as follows:

- Capital projects—if insufficient funds are available in both supplemental work funds and contingency funds, propose a fund request. The request may be processed under the G-12 process or require a California Transportation Commission supplemental vote. Process, justify, and document the request the same way as any other fund request.
- Maintenance funded projects—on maintenance projects, obtain additional funding through a request to the district maintenance unit.

2-215B COZEEP Responsibilities

The resident engineer and project engineer share responsibilities for COZEEP implementation and funding allocation.

2-215B (1) Project Engineer

- On every project that requires the contractor to close traffic lanes, the project engineer must assess the need for COZEEP as part of the project’s safety review, constructability review, or both. The project engineer may recommend which specific construction operations should use COZEEP.
- The project engineer should include adequate COZEEP funds in the project estimate. Look in the resident engineer’s pending file for design assumptions and estimate calculations.

2-215B (2) Resident Engineer

- The resident engineer must administer the COZEEP program on the project. If COZEEP services are not available, exercise judgment about whether to allow the work to proceed. If you do not permit the work to proceed and the controlling operation is adversely affected, you may grant a time extension in accordance with Section 8-1.10 [8-1.07], “Liquidated Damages,” of the 2010 *Standard Specifications*.
- If the contractor requests additional CHP support beyond what the project plan includes, you may, if appropriate, write a change order. The contractor bears costs and expenses for additional support from the CHP, and Caltrans deducts associated costs from monies due the contractor.

- When evaluating cost reduction proposals and change orders requested by the contractor, take into account the costs and savings for COZEEP services.
- Initiate and obtain CHP sign-off of Form CEM-2101, “COZEEP Daily Report.” At the end of each week, report to the district COZEEP coordinator the COZEEP services used during that week.

2-215C COZEEP Implementation

Use the following criteria and risk factors to determine when COZEEP is needed on a project:

2-215C (1) Freeways and Expressways

Provide COZEEP for the following situations:

- Day or nighttime temporary closures of all lanes in the same direction of travel (full freeway closures).
- Nighttime closures of two or more lanes on a freeway with three or more lanes of travel in the same direction.
- Other closures determined on a project-specific basis.

Generally, COZEEP is not necessary when only one lane is closed on freeways with four or more lanes in the same direction of travel.

2-215C (2) Connectors and Ramps

For all lane closures on freeway-to-freeway connectors and for night closures of exit and entrance ramps, evaluate the risk factors. Daytime ramp closures do not usually need COZEEP.

2-215C (3) Conventional Highways

For complete highway closures and nighttime closures of one or more lanes on multilane highways, evaluate project-specific risk factors. In general, lane closures on two-lane highways and daytime closures on multi-lane highways do not require COZEEP.

2-215C (4) Risk Factors

The risk factors below are not an all-inclusive list. Safety reviews conducted during the project’s development may identify other risks. If so, also consider these risks in the decision-making process.

- A median barrier, bridge rail, or retaining wall may block worker escape routes. Lack of escape options increases the likelihood of motorist-involved accidents that will disrupt traffic flow.
- Night construction activities (for example, replacing pavement slab, replacing bridge joint seals, and replacing pavement markers) that do not create an obvious construction zone except while operations are in progress create an unexpected condition for drivers, even those familiar with the highway.
- Construction activities such as night paving are a risk factor when they require a large number of trucks into and out of the work area.
- End-of-queue management is desirable at locations where traffic queues are unavoidable.

- Speed management is desirable at locations such as rural freeways and expressways where traffic has been flowing in a high-speed, free-flow way for a significant period before encountering the work zone.
- Rural locations with a high volume of truck traffic, steep downgrades, or both, also pose a high risk factor.

2-215D COZEEP Administrative Procedures

The following procedures are intended to assist resident engineers in obtaining and tracking COZEEP services and to help Caltrans reconcile the CHP billing system and facilitate payment to the CHP.

2-215D (1) Ordering Work

The statewide master agreement for COZEEP requires that all Caltrans requests for support be received by the supporting CHP area office during normal working hours and at least 72 hours before the time needed.

2-215D (2) Completing the Task Order

- To order work by the CHP, complete and use Form CEM-2102, “COZEEP/MAZEEP Task Order.” Before ordering the work, and while preparing the task order check that:
 1. CHP support is appropriate for the type of work to be performed.
 2. The request has been submitted in a timely manner.
 3. The project has sufficient funds available to pay for the CHP support.
- Ensure that the task order, which has five parts, is completely filled out. Most parts are self-explanatory. In Part 4, identify a Caltrans project supervisor, usually the resident engineer or an assistant resident engineer.
- You may submit a single task order to cover more than 1 day. For example, a project that will occur on Monday through Thursday for the next week would require only one task order. Task orders must specify by date and time when a service is needed.
- Once the task order is completed and signed by the Caltrans person requesting the services, fax or send it to the local CHP area office. The CHP coordinator at the local CHP area office will complete, sign, and return the form to the Caltrans construction office.

2-215D (3) Cancellations

- If it becomes necessary to cancel the work, write or call the local CHP contact person listed in Part 4 of the task order as soon as possible. The statewide agreement requires that cancellations be made during normal working hours and at least 24 hours before the time that the CHP is to arrive on the project. Also confirm it in writing using Form CEM-2103, “COZEEP/MAZEEP Cancellation Form.” Once contact is made, the CHP coordinator will return the completed cancellation form.
- In accordance with the agreement, cancellations received less than 24 hours before work is to begin will be charged a cancellation fee (\$50). If you cannot contact the officer in advance and the officer actually reports for duty, the fee will be equal to

4 hours of overtime pay. The local CHP contact person will note in the cancellation form if Caltrans is being charged a cancellation or 4-hour overtime fee. If the cancellation form indicates a fee is being charged, retain the form in the project records under Category 21, “Construction Zone Enhanced Enforcement Program,” and send a copy to the district COZEEP coordinator.

- For more information on cancellations, refer to the current COZEEP agreement.

2-215D (4) Recording Work Performed

When the officer or officers arrive at the project site, the senior CHP uniformed officer will check in with the Caltrans project supervisor who must initiate form CEM-2101, “COZEEP Daily Report.” The daily report number will also be the project identifier number. In the daily report, enter a description of the services the CHP provided (for example, traffic breaks, stationary patrol upstream of the work area, or circulating patrol), and complete the CHP officer and CHP vehicle information. At the end of the shift, the senior CHP officer onsite must estimate travel time and mileage for each officer from the project site to the CHP office. Calculate the total estimated travel time and mileage, and enter the total on the COZEEP daily report. Both the senior officer and the project supervisor must sign the completed COZEEP daily report.

The CHP has 5 working days to notify Caltrans if the actual travel time, mileage, or both, are greater than the allowances estimated on the daily report. Submit the CHP notification to the person who issued the daily report. If a notice of change is received, attach a copy to your copy of the COZEEP daily report, and submit the original to the district COZEEP coordinator.

2-215D (5) Tracking Expenditures

Once the district COZEEP coordinator receives the COZEEP daily reports, they must be logged into the COZEEP service summary to track COZEEP use. A spreadsheet may be used for the summary.

The CHP will submit the COZEEP service summary electronically for payment with a confirming hard copy to the district COZEEP coordinator.

2-215D (6) Reconciling the CHP Invoice

CHP invoices will include monthly charges for services provided. The invoice backup will include the COZEEP service summary and copies of cancellation notices. Invoices must include the agreement number and be submitted monthly in arrears, in triplicate, within 60 calendar days of date of service.

The CHP sorts and subtotals the COZEEP service summary by project, including cost information. Within 45 calendar days of receipt of the invoice, the district COZEEP coordinator reviews and approves the summary and submits it for payment to the Caltrans Division of Accounting Services, which uses it as the “receiving record” for payment.

During the term of the contract, the CHP may increase or decrease the rates shown in the contract by notifying the Caltrans statewide contract managers, who will notify the district coordinators. For this reason, district coordinators should not return an invoice to the CHP because the billing rates shown on the invoice do not agree with the rates in the contract. Instead, the district coordinator should contact the statewide contract manager to verify the correct billing rates.

2-215D (7) *Problem Resolution*

Remove from the COZEEP service summary inconsistencies between the information Caltrans gives the CHP and the internal information CHP obtains from its payroll system. Return exceptions to the district and area offices involved for resolution. Make every effort to resolve disputes at the lowest level (between the resident engineer and the CHP coordinator at the local CHP area office). If an impasse occurs, the district COZEEP coordinator and the designated CHP division office contact must act as the second level of review. The last level of review will be the COZEEP statewide coordinator.

2-216 Pedestrian Facilities

Work zone activities can disrupt the public's mobility and access. Caltrans maintains safe and convenient access for pedestrians and bicyclists, who are susceptible to disruptions because of their slower speeds and sensitivity to uneven surfaces, noise, airborne dust, road debris, and fumes.

Considering the needs and control of all road users is an essential part of highway construction, utility work, maintenance operations, and the management of traffic incidents through a TTC zone. Users include motorists, bicyclists, and pedestrians within the highway, including persons with disabilities, defined by the Americans with Disabilities Act of 1990 (ADA). The *California MUTCD* Part 6 contains figures that can be adapted for traffic-handling plans. Figures 6H-28 and 6H-29, "Sidewalk Detour or Diversion," and "Crosswalk Closures and Pedestrian Detours" of the *California MUTCD* are examples for accommodating the needs and control of pedestrians.

The design phase of a project considers accommodating pedestrians through a TTC.

2-216A Related Caltrans Standards

These *Standard Specifications* sections apply to pedestrian facilities:

- Section 7-1.02A, "General," requires the contractor to comply with current laws, regulations and decrees.
- Section 7-1.04, "Public Safety," requires that the contractor provide for the safety of the public during construction.
- Section 12, "Temporary Traffic Control," directs the contractor's attention to the *California MUTCD*.
- Section 12-7, "Temporary Pedestrian Walkways," requires the contractor to maintain pedestrian access.

Ensure that the contractor adheres to the following:

- If the contractor's operations require the closure of one accessible pedestrian facility, provide a travel path that replicates, if possible, the most desirable characteristics of the existing walkway. Take special care to consider areas in schools or senior citizen center locations.
- When construction affects the pedestrian facility, the contractor should maintain a continuous unobstructed path connecting existing accessible elements (parking lots, bus stops, and so forth) through the project.
- Provide advanced notification of sidewalk closures.

- Keep pedestrian facilities clear of obstructions. Traffic control devices, equipment, and other construction materials and features must not intrude into the usable width of the sidewalk, temporary pathway, or other pedestrian facility.
- In addition to required openings through falsework, provide accessible pedestrian facilities during pile driving, footing, wall, and other bridge construction operations where an accessible route was available before construction began.
- Provide hand railings on each side of pedestrian walkways as necessary to protect pedestrian traffic from construction operation hazards. Maintain railings and walkways in good condition.
- Provide protective overhead covering as necessary to ensure protection from falling objects and dripping from overhead structures.
- A pedestrian traffic handling plan may be required if the contract plans do not identify the affected facility.
- The contractor is responsible for accommodating pedestrians through the TTC whenever the work disrupts pedestrian facilities.

At the preconstruction conference, discuss the need for temporary pedestrian facilities and ADA requirements. For details related to preconstruction conferences, see Section 5-003, “Preconstruction Conference with the Contractor,” of this manual.

2-216B Requirements of the *California MUTCD*

When planning for pedestrians in TTC zones, ensure that the contractor considers the following items:

- Avoid leading pedestrians into conflicts with worksite vehicles, equipment, and operations and with vehicles moving through or around the worksite.
- Provide pedestrians with a reasonably safe, convenient, and accessible path that replicates as nearly as practical the most desirable characteristics of the existing sidewalks or footpaths.

When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities must be detectable and include accessibility features consistent with those present in the existing pedestrian facility. Refer to Part 6, Chapter 6D of the *California MUTCD*. If the pedestrian facility existing before construction began was accessible to pedestrians with disabilities, the one provided during TTC should also be accessible.

Do not sever or move a pedestrian route for non-construction activities such as parking for vehicles and equipment.

Maintain a width of 60 inches throughout the length of the pedestrian pathway. When it is not possible to maintain a width of 60 inches, provide a 60 x 60-inch passing space at least every 200 feet to allow individuals in wheelchairs to pass. The path must have a clear width of no less than 48 inches. Verify that no fixed objects (cabinets, poles, and so forth) will reduce the path width at any point.

The path must be stable, firm, and slip resistant. Pedestrian facilities must be surfaced with asphalt concrete, portland cement concrete, or timber. Dirt is not an acceptable surface.

The cross slope must be no greater than 1:50 (2 percent) and the running slope no greater than 1:20 (5 percent).

Signs and other devices mounted lower than 7 feet above the temporary pedestrian pathway should not project more than 4 inches into accessible pedestrian facilities. Refer to Part 6, Section 6D.02 of the California MUTCD. Place a barrier across the full width of a closed sidewalk. A person with a visual disability traveling with the aid of a long cane should be able to detect it.

Unless the contractor can provide a reasonably safe route that does not involve crossing the roadway, use appropriate advance signing to direct pedestrians to cross to the opposite side of the roadway. In urban and suburban areas with high vehicular traffic volumes, place the signs at intersections. Midblock worksites should not cause pedestrians to skirt the worksite or make a midblock crossing. Refer to Part 6, Section 6H, and figures 6H-28 and 6H-29 of the California MUTCD.

Consider separating pedestrian movements from both worksite activity and vehicular traffic. When pedestrians are routed adjacent to live traffic, provide barrier protection to prevent vehicles from entering the pedestrian facility.

Do not use tape, rope, or plastic chain strung between devices as controls for pedestrian movements. They are not detectable by persons with visual disabilities.

Whenever feasible, temporary pedestrian facilities should follow the ADA checklist in the *Temporary Pedestrian Facilities Handbook* available at:

http://www.dot.ca.gov/hq/construc/safety/Temporary_Pedestrian_Facilities_Handbook.pdf

Document the reasons why an item does not follow ADA guidelines.

2-216C Permanent Facilities

Ensure that the contractor constructs permanent new facilities and alterations to existing facilities in accordance with the contract plans and specifications.

Additional resources for consideration:

- Caltrans Design Information Bulletin 82-04, "Pedestrian Accessibility Guidelines for Highway Projects," which addresses requirements for new construction and alterations of existing facilities.
- Standard Plans A88A, A88B, A90A, A90B, ES-4C, ES-5C, and ES-7A.

Contact the district design unit to develop plans to add a permanent facility by change order.

During the inspection process, check that all contractor-installed finished elements comply with dimensions and installation requirements.

Do not exceed the maximums shown in the requirements. They are absolute.