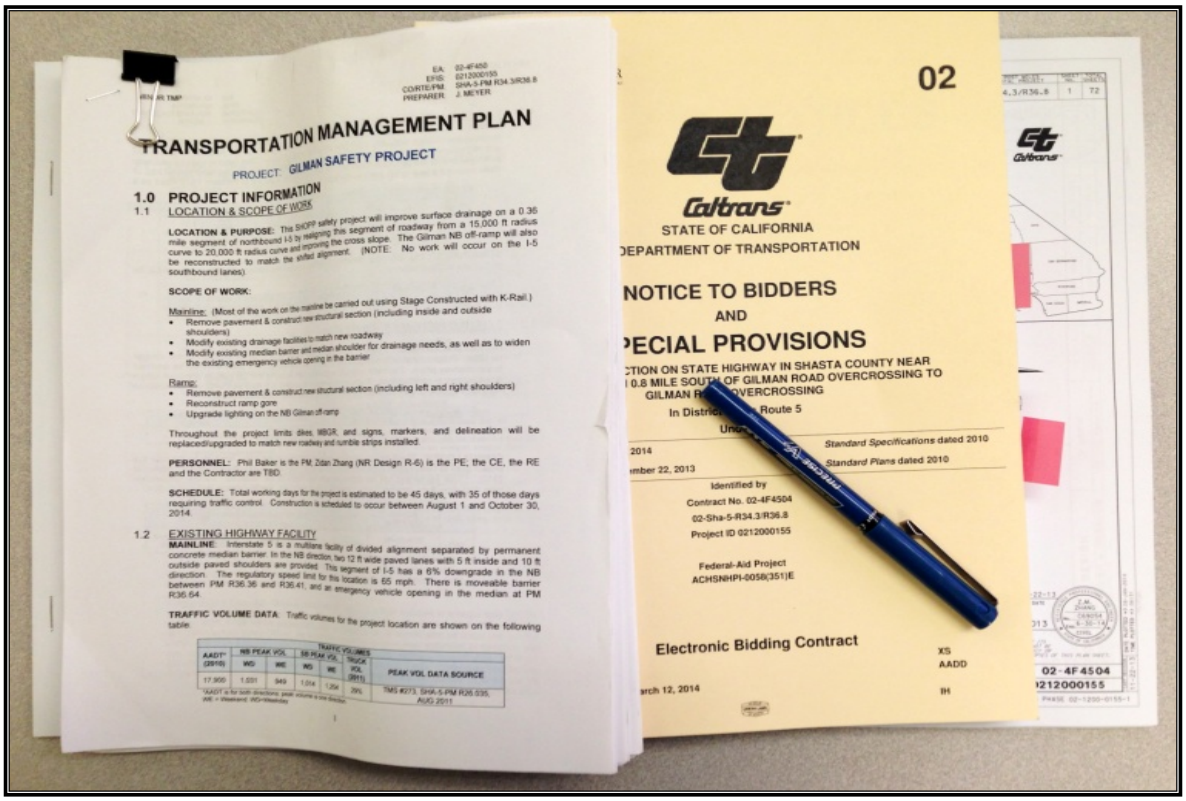
TRANSPORTATION MANAGEMENT PLAN GUIDELINES



Division of Traffic Operations
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CALIFORNIA DEPARTMENT OF TRANSPORTATION

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Introduction

With the construction of California's State Highway System (SHS) virtually complete, the major emphasis of the California Department of Transportation (Caltrans) has shifted from new construction to reconstruction, rehabilitation, operation, and maintenance of existing facilities. As traffic demand steadily increases, work activities on the SHS can result in significant additional congestion, particularly in urban areas. Advance planning and coordination among Caltrans' various divisions is necessary to ensure that planned highway work will not result in extensive traffic delays to the public.

The concept of implementing a Transportation Management Plan (TMP) is not new. Caltrans Districts have used transportation management strategies for decades to move motorists through work zones quickly and safely. Caltrans officially established the TMP program in 2000 through Deputy Directive-60 (DD-60), outlining strategies needed to minimize traffic congestion during road work activities. TMP strategies are required for all planned construction, maintenance, and encroachment permit activities, which may range from a minor guardrail repair to a major bridge construction project.

These guidelines identify the processes, roles, and responsibilities for preparing and implementing TMPs, as well as useful strategies for reducing congestion and managing work zone traffic impacts.

Federal and Caltrans Policies

The following are federal and Caltrans policies pertinent to the development and implementation of TMPs:

- Title 23 Code of Federal Regulations 630, subpart J - *Federal Work Zone Safety and Mobility Regulations* requires Caltrans to adopt a policy for the systematic consideration and management of work zone impacts on all federally funded highway projects.

- DD-60-R2 Transportation Management Plans establishes Caltrans' policy related to the various roles and responsibilities in TMP development and implementation (see Appendix A).

Key Terminology

The following are key terms used throughout this document.

"TMP" is an approach for alleviating or minimizing work-related traffic delays by the effective application of traditional traffic handling practices and an innovative combination of various strategies. These strategies include public awareness campaigns, motorist information, incident management, construction methods, demand management, and alternate route planning. Depending on the complexity of the work or magnitude of anticipated traffic impacts, a TMP may provide lane requirement charts, Standard Special Provisions (SSPs) for maintaining traffic, and for a major project, a separate comprehensive report.

"Work Zone" is an area of a highway where construction, maintenance, or utility work activities are being conducted. The work zone extends from the location of the first temporary traffic control device to the last temporary control device.

"Major Lane Closures" are closures that are expected to result in significant traffic impacts despite the implementation of TMPs. These closures can be implemented for capital projects, maintenance, or encroachment permit activities. A "significant project" as defined by the Federal Highway Administration (FHWA) Final Rule (23 Code of Federal Regulations 630, Subpart J), is one that, alone or in combination with other concurrent projects nearby, is anticipated to cause sustained work zone impacts greater than what are considered tolerable based on State policy or engineering judgment. This term is not used in these TMP Guidelines, because it refers primarily to capital projects and is not all-inclusive; maintenance and encroachment permit activities are not necessarily considered as projects, but the Districts prepare TMPs for those activities.

"Significant Traffic Impact" is defined as being an individual traffic delay of 30 minutes or more above normal recurrent travel time on the existing facility or the delay time set by the District Traffic Manager (DTM), whichever is less. Significant traffic impacts can also occur when motorists experience shorter individual delays that may extend over several months or years. In some cases a full closure of a freeway segment may be justified for a short duration when compared to several months of weekend closures that may severely impact the business community and the public in general. The objective in developing TMP strategies is to balance short-term and long-term impacts to the traveling public with the safe, efficient delivery of highway construction projects and work zone activities.

"District Lane Closure Review Committee" (DLCRC) is composed of the Deputy District Directors (DDDs) of Construction, Design, Maintenance and Traffic Operations, and the District Public Information Officer (PIO). In a regionalized setting, the DLCRC is composed of the representatives of the DDDs of Construction, Design, Maintenance and Traffic Operations, and the District PIO. The DLCRC participates in planned project activities that are expected to result in significant traffic impacts. For example, the DLCRC may decide to implement a full or extended closure to minimize the individual delay (e.g., if the individual traffic delay will exceed 30 minutes) or if the total delay over the duration of the project will greatly inconvenience to the public. Recent examples include the Interstate 80 Labor Day weekend closures on the San Francisco-Oakland Bay Bridge in 2013, taking the original East Span out of service and opening the new East Span to traffic (full closure in both directions). The 80-hour northbound I-405 freeway full closure on the Sepulveda Pass eliminated several consecutive 55-hour closures from the project

schedule and minimized future closure impacts to the community and traveling public. The Interstate 5 “Boat Section” Project full closures (alternately in the northbound and southbound directions) in the summer of 2008 allowed Caltrans to complete the work several months ahead of time with significantly less overall impact to the public.

“Headquarters Lane Closure Review Committee” (HLCRC) is composed of the Division Chiefs of Construction, Design, Maintenance, and Traffic Operations, and the Deputy Director of External Affairs. The California Highway Patrol (CHP) will be asked to participate as appropriate at the Headquarters (HQ) level. For any activities that are of an interregional, statewide, environmental, or otherwise sensitive nature, the DDD of Traffic Operations shall contact the HLCRC to discuss the specific project and its anticipated impacts, and to obtain approval.

Acronyms

ADA	Americans with Disabilities Act of 1990
CCTV	Closed-Circuit Television
CHIN	Caltrans Highway Information Network (511)
CHP	California Highway Patrol
CMS	Changeable Message Signs
COS	Capital Outlay Support
COZEEP	Construction Zone Enhanced Enforcement Program
CTC	California Transportation Commission
CHP	California Highway Patrol
EA	Each
FSP	Freeway Service Patrol
HAR	Highway Advisory Radio
HMA	Hot Mix Asphalt
HQ	Headquarters
ITS	Intelligent Transportation System
LCRC	Lane Closure Review Committee
LCS	Lane Closure System
LS	Lump Sum
PA&ED	Project Approval and Environmental Document
PCMS	Portable Changeable Message Sign
PeMS	Performance Measurement System
PID	Project Initiation Document
PI	Project Identifier
PS&E	Plans, Specifications and Estimates
RE	Resident Engineer
RTL	Ready to List
RTPA	Regional Transportation Planning Agencies
SSP	Standard Special Provisions
TMC	Transportation Management Center
TMP	Transportation Management Plan
TMT	Traffic Management Team
TTC	Temporary Traffic Control
WBS	Work Breakdown Structure

1.0 WHAT IS IN A TRANSPORTATION MANAGEMENT PLAN

1.1 GENERAL

A TMP encompasses activities that are implemented to minimize traffic delays that may result from lane restrictions or closures in a work zone. TMP strategies are designed to improve mobility, as well as safety for the traveling public and highway workers.

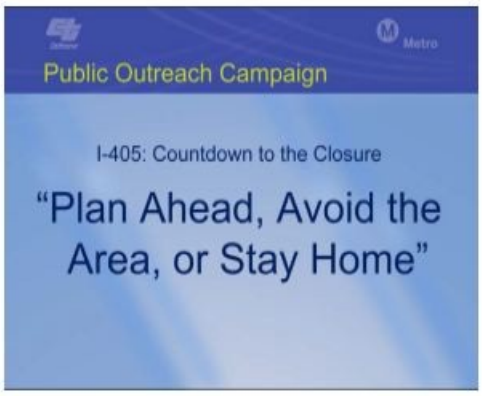
1.2 TRANSPORTATION MANAGEMENT PLAN STRATEGIES

TMP strategies are categorized as follows:

A. Public Information
B. Motorist Information
C. Incident Management
D. Construction Strategies
E. Demand Management
F. Alternate Routes (or Detours)

The TMP strategies selected are dependent on the type of work that is planned, the geographic and demographic area in which the work is located, and the anticipated traffic impacts. This section describes strategies that may be considered where appropriate.

1.2.1 CATEGORY A. PUBLIC INFORMATION



The public is highly interested in advance roadway information so that they can plan their travel accordingly. Due to prevalent use of "smart phones," and other internet-connected devices, public notification of planned and ongoing highway work is one of the most effective tools for reducing congestion in work zones. When the public is equipped with work zone information before they begin traveling, they have the opportunity to adjust their travel plans. Advance roadway delay information can decrease the number of vehicles traveling through the work area and can help to minimize traveler frustration. Public outreach should include information on alternative transportation modes, such as transit services and bicycle routes that can be accessed during project construction to reduce congestion. In addition, public awareness campaigns inform the public of the overall purpose of the project and can help generate and maintain public support. Many of these strategies are used for major construction projects but can also be effectively applied to highway maintenance work or encroachment permit activities that may significantly affect traffic conditions.

A1. Brochures and Mailers. Brochures and mailers are printed material containing project-related information such as advance notice of the project's start date, schedules,

pictures/graphics of the project, a description of the need for the project, alternative routes, alternative modes of transportation, and transit services. These may be disseminated to motorists at key locations, including businesses, rest stops, travel information centers, automobile associations, and through direct mailings to affected businesses and residents in the project area.

A2. Press Releases/Media Alerts. This strategy provides timely project-related information to the news media, affected businesses, and other affected or interested parties using print and/or electronic media. These groups include local and cable television newsrooms, traffic navigation systems groups, schools, major local employers and businesses, emergency services (fire, law enforcement, and ambulance), and social media using services like Twitter to display media alerts. News media strategies (e.g., newspaper, television, and radio press releases) are a no-cost alternative that is very effective in notifying travelers of planned roadway work. Various mechanisms including fax, e-mail, telephone message, and mailings can be used to communicate information relating to start dates, work schedules, significant traffic pattern changes, transit routes, traffic collisions, and other incidents within the work zone.

A3. Advertisements. Paid or public service announcements of a planned major project may be transmitted through newspaper, radio and television ads, internet, and billboards. Paid advertisements may also deliver progress updates or to provide information regarding major changes to the work zone configuration and traffic management strategies. A cost analysis should be conducted to determine the expense of developing a public service announcement against the value of the number of targeted road users the information will reach.

A4. Public Information Center. This is a small-scale facility typically located on or near the project site that contains such materials as scale-model displays, maps, brochures, videos describing the project and potential traffic impacts, and available travel alternatives to minimize those impacts, including available transit routes and transit agency contact information.

A5. Telephone Hotline. This traveler information strategy provides traffic or travel information for the work zone using a toll-free telephone number. It can include prerecorded messages or real-time, interactive request/response information and a link to 511 (travel information telephone direct line).

A6. Lane Closure System. The Lane Closure System (LCS) is a statewide web-based application that allows users to request, review, approve or deny, and monitor planned lane closures on the SHS. The purpose of the LCS is to provide California highway workers and motorists with a single source of information on lane closures on the State's highways. The system operates continuously, providing real-time information on lane closures located in both urban and rural areas. The information is posted on the Planned Lane Closure Web Site and on QuickMap, listing the routes involved the type of work being performed, and the closure end dates and times. The Planned Lane Closures information can be found at: *http://www.lcswebreports.dot.ca.gov/lcswebreports/*.

A7. Project Web Site. A project web site provides information for a specific work zone including long-term static information on project plans and progress, as well as real-time interactive information.

A8. Public Meetings/Hearings. This strategy involves presenting project information to the community and businesses by the project team and the public relations staff and soliciting input such as potential concerns, impacts, and management strategies. Public meetings often use videos, slides, and graphical presentations to supplement public announcements and public information center displays.

A9. Community Task Force. Developing a community task force, including stakeholders (businesses, neighborhood groups, employee transportation coordinators, interested individuals, public officials, or other representatives) that may be impacted by the work zone may facilitate dissemination of information related to a transportation project. A task force may also help generate interest and support for a project.

A10. Communication with Selected Stakeholders. The most directly affected stakeholders can be identified and sent targeted information during construction on a regular basis through periodic meetings, e-mail, fax notices and social media.

A11. Information Kiosk. A kiosk is a small information center that can provide handouts and other information to passersby. The kiosk should be located in an area with high foot traffic in the general vicinity of the work location. Sample locations include shopping malls, rest stops, and gas stations.

A12. Freight Travel Information. This strategy may be appropriate when there is a moderate to high percentage of freight movement through the work zone. It involves coordination with the freight community (trucking companies and truck drivers) to disseminate useful work zone information (e.g., truck restrictions, locations of traffic incidents, planned closures, and detours) and development of a mechanism to provide that information to freight stakeholders at central locations, or to truckers as they approach the work zone.

1.2.2 CATEGORY B. MOTORIST INFORMATION

Motorist information is vital to travelers approaching a work zone and who still have time to make a decision that could divert them away from possible congestion. With available information on travel delays or alternative routes prior to a decision point, motorists can play an active role in completing their trips more smoothly and help reduce the overall congestion. When motorists are stuck in congestion, they become frustrated and impatient. When they have information on the alternative routes and the length and the reasons for the delay, their frustration levels are usually reduced.

B1. Traffic Radio Announcements. Traffic-related information is typically disseminated via regularly scheduled traffic reports on commercial radio stations. These reports are usually scheduled during morning and evening peak hour commute periods.

B2. Highway Advisory Radio (HAR). Fixed or portable HAR systems provide detailed messages beyond the limitations of roadside signage. HAR involves the dissemination of information to motorists over wide-area wireless communications directly to in-vehicle radios. Extinguishable Message Signs (EMS) are typically associated with HAR systems where the sign indicates how to obtain information on roadway conditions by tuning into a specific radio station (e.g., “Tune into 1610 AM”). These signs turn on and off depending on whether the HAR has a message available. EMS, signs with flashing beacons, CMS, and PCMS can be used to inform motorists of the radio frequency for the available information.

B3. Changeable Message Signs (CMS). These permanent overhead message signs are placed along roadways to notify road users of lane and road closures, work activities, traffic incidents, potential work zone hazards, traffic queues (backups), travel times, or delay information, as well as alternate routes in or around the work zone. Per Caltrans policy, permanent CMS that are five miles or less in advance of an active work zone should be considered to advise the traveling public (e.g., WORK ZONE AHEAD/WATCH FOR/HIGHWAY WORKERS). Communication and coordination with the District Transportation Management Center (TMC) for activation and use of the CMS during construction should be included in the TMP.

B4. Portable Changeable Message Signs (PCMS). PCMS can be placed at key locations to notify motorists of lane closures, alternate routes, expected delay, and upcoming road closures. These signs can be used to inform drivers of speed limit reductions and enforcement activities in a work zone, as well as projected delay or road opening times. The appropriate sign placement is included in the project plans. PCMS are typically deployed as a part of project signing. As a TMP measure, additional PCMS may be specified when warranted, based on factors such as roadway geometrics or proximity to interchanges.

B5. Temporary Motorist Information Signs. Temporary conventional signs mounted in the ground or overhead provide "traveler information" to guide motorists through the work zone.

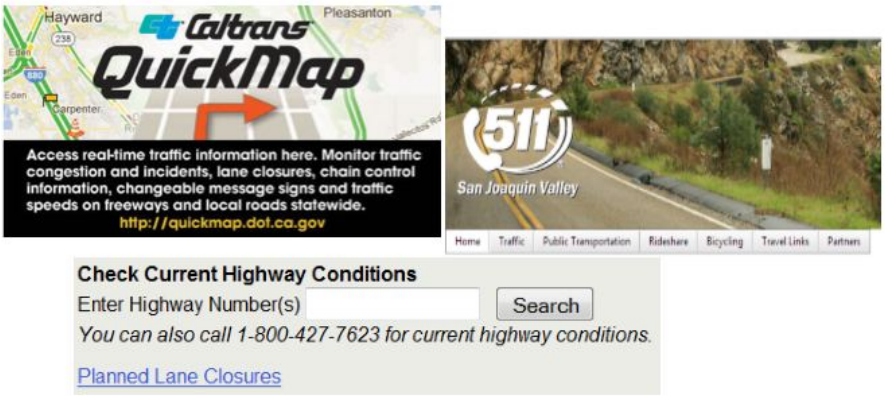
B6. Dynamic Speed Message Signs. Portable systems can be mounted as a fixed sign or located on a portable trailer. Radar measures the speed of approaching vehicles, which is displayed on the sign along with the work zone speed limit. The objective of this system is to enhance safety by encouraging speed limit compliance and limiting the range of speeds among vehicles.

B7. Automated Work Zone Information System (AWIS). In order to mitigate recurring congestion and queuing due to construction work, the AWIS may be considered to inform motorists about upcoming slow traffic. The AWIS is a collection of intelligent transportation system elements that are used to give real time information to travelers in a work zone using a PCMS. The AWIS is also useful if detour routes are rapidly changing due to planned construction activities.

Further details on the AWIS can be found under "TMP Documents" at:

http://traffic.onramp.dot.ca.gov/tmp.

B8. Traveler Information. Traveler information is real-time traffic and travel conditions on the State Highway System (SHS) that affect the traveling public. Accurate and available real-time traveler information regarding congestion, chain controls, incidents, construction, and road closures allows travelers to make informed transportation choices. Caltrans provides/makes traveler information available through the following tools: QuickMap, the Interactive Voice Response System (IVR) or the Caltrans Highway Information Network (CHIN), the California Highway Information web page, and the Commercial Wholesale Web Portal (CWWP). California's regional Metropolitan Planning Organizations (MPOs) own and manage eight operational 511 services.



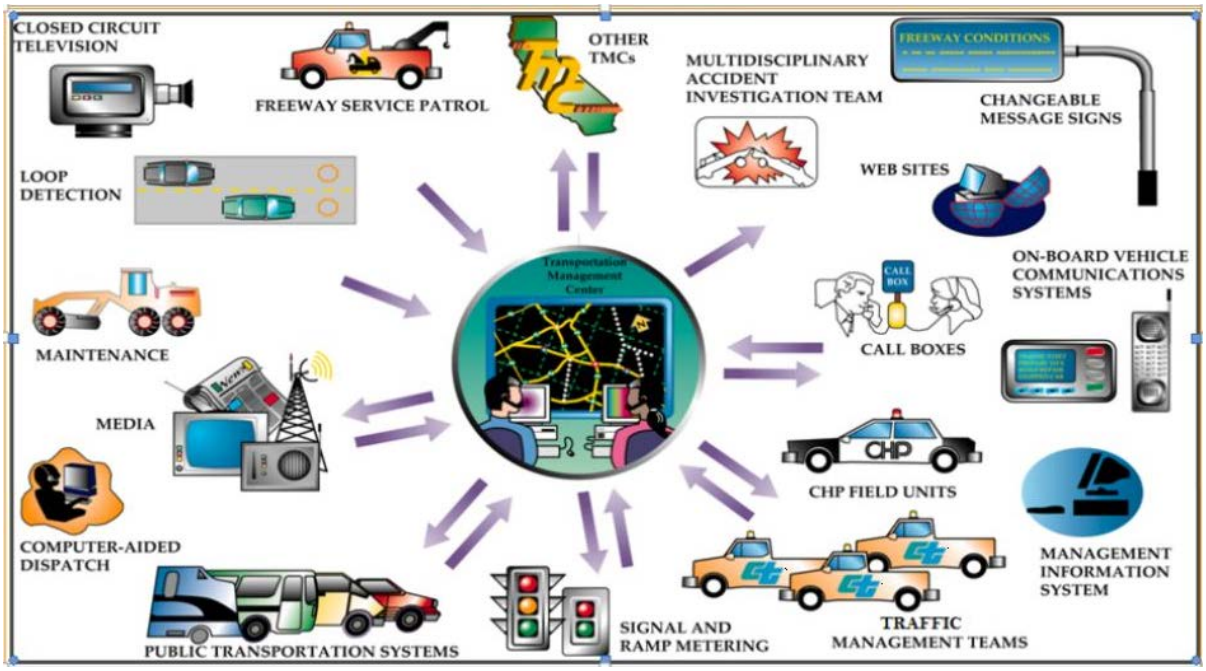
B9. Wizard Citizens Band (CB) Alert System. The Wizard CB Alert System is a device that continuously broadcasts a message over CB radio that warns approaching drivers of the work zone ahead. The messages can be pre-recorded or recorded on site, and can be transmitted every 30, 60, or 90 seconds. The information specifically targeting truck drivers can be broadcast over any selected CB channel, but since most truck drivers listen to channel 19, broadcasting over that channel means they generally do not need to take action to receive the message.

1.2.3 CATEGORY C. INCIDENT MANAGEMENT

When traffic incidents occur on the SHS in or near a work zone, the most effective tool in reducing potential congestion is to remove the elements of the incident from the roadway as quickly as possible. An incident may range in severity from a flat tire to a multiple big rig collision with a hazardous waste spill that closes a section of highway for several hours. A standing protocol is in place for all traffic incidents as a part of the Traffic Operations Division's Incident Management Program. However, the TMP/DTM Manager should determine whether the standard protocol should be supplemented or whether additional strategies may be needed for certain types of projects or in certain areas (i.e. when a work zone includes areas where there are no shoulders or off-ramps readily available, consideration should be given to coordinating with local responder agencies to arrange for priority response to the work zone for incidents).

C1. Transportation Management Center (TMC). This strategy involves the use of a TMC for coordinating and managing traffic and incident information dissemination. The TMC controls all fixed ITS elements and in some cases, portable HAR and PCMS. If the project is large and of long duration, a mobile project-specific TMC vehicle may be used to help manage traffic incidents and maintain efficient traffic flow through and around the work zone. The following diagram depicts the many components used at the TMC.

TMC COMPONENTS



C2. Traffic Management Teams (TMT). The TMTs respond to assist in managing traffic during incidents and planned lane closure activities that are expected to result in significant vehicle queuing. The primary purpose of the TMTs is to minimize secondary, end-of-queue collisions. In some cases these services can be provided by the contractor within the appropriate contract provisions.

C3. Intelligent Transportation Systems (ITS). ITS can be used in work zones to identify areas where traffic flow is impeded so traveler information can be provided and adjustments to the work zone can be made. Work zone ITS deployment uses sensors to detect traffic conditions, and can automatically feed the information to traveler information outlets such as CMS, websites, or the TMC. ITS elements already installed in the field should be used as part of a TMP when practical. ITS elements installed as part of a project should be maintained in operational condition by the contractor throughout the duration of the work. This can be accomplished by reviewing contract plans, identifying and evaluating potential impacts to ITS elements, and including the appropriate SSPs in contract documents.

C4. Surveillance Equipment. Surveillance equipment such as Closed-Circuit Television (CCTV), loop detectors, lasers, probe vehicles, or cameras are used to help identify traffic problems and to detect, verify, and respond to expected traffic impacts and incidents in the work zone.

C5. Helicopter for Aerial Surveillance. Helicopters are especially useful in highly urbanized areas to identify and verify traffic problems and incidents. Helicopters are normally used where several routes may be severely impacted by traffic congestion on any one route. However, helicopter surveillance is not part of the approved Construction Zone Enhanced Enforcement Program (COZEEP) services. When these services are needed, the District must enter into an agreement with the Area CHP office.

C6. Construction Tow Service. An on-site (or near-site) towing service can reduce the time required to remove vehicles involved in a traffic incident (breakdown or crash) from the roadway. Any type of incident near a work zone can significantly impact traffic conditions and may result in secondary collisions. Such services can also be provided at a location where there is no or minimum shoulder width available for a distance of 1/4 mile or more for a short period of time (two weeks).

Construction tow service can be provided through: (1) agreements with the Regional Transportation Planning Agencies (RTPAs) that administer the congestion relief Freeway Service Patrol (FSP) and CHP for supervision of the construction FSP or (2) a requirement of the contractor as part of the construction contract.

C7. Dedicated (paid) Law Enforcement. Caltrans contracts with the CHP to provide enhanced enforcement services through two programs:

- The Construction Zone Enhanced Enforcement Program (COZEEP).
- The Maintenance Zone Enhanced Enforcement Program (MAZEEP).

The visibility of CHP presence alerts motorists that road work is being performed on the roadway and that motorist behavior is under surveillance. The officers are directed by the onsite field supervisor (construction or maintenance supervisor) to patrol the work zone area or to remain stationary. Priority should be given to these services during nighttime operations and where workers are on foot in the work zone. Workers on foot have increased exposure to serious injury or death from errant motorists. Refer to the Construction or Maintenance Manual for implementation criteria to determine when these services are warranted or recommended. A COZEEP/MAZEEP Pocket Guide has been developed for the Resident Engineer's (RE) use in work zones, describing suggested enforcement strategies to be used, and contact names and phone numbers including the TMC contact

information (see Appendix C). The Pocket Guide should be distributed to CHP and to other field staff.

1.2.4 CATEGORY D. CONSTRUCTION STRATEGIES

Construction strategies can be effective in reducing congestion in a work zone. These strategies include: innovative construction staging plans, lane requirement charts requiring crews to work at night instead of during daily peak commute periods, full closures of a roadway segment for a short period instead of nightly closures for several months or years, use of reversible lanes that can be modified to accommodate peak hour traffic in either direction, and use of contractor incentive and disincentive clauses within the contract. Similarly, reduced speed limits in work zones may not reduce congestion, but may make travel through the work zone safer for workers and the traveling public.

D1. Lane Requirement Charts. These charts identify the number of lanes that must be open for traffic each hour of the day to minimize delay when work activities are being conducted. These charts restrict work hours so that traffic is not affected during periods of peak travel demand and congestion (e.g., peak hours, holidays, or special events). Work is typically performed during off-peak periods, such as at night, to minimize work zone impacts to motorists and adjacent businesses. The lane requirement chart templates have been revised to allow splitting the cells into half-hour increments. This allows the TMP to extend the work windows half an hour at each end of the work window.

D2. Construction Staging. The Stage Construction Plan shows the sequence of construction activities. The contract plans may identify portions of the project to be completed in a specific sequence to minimize impacts to the traveling public.

D3. Traffic Handling Plans. Traffic handling plans contain sufficient alignment detail, profiles, and typical cross-sections to guide traffic through the work zone in the sequence shown in the Stage Construction Plan.

D4. Full Facility Closures. This strategy involves complete closure of a roadway, either in one or both directions or a freeway-to-freeway connector. Full facility closures must be considered as one of the design alternatives in the project initiation phase. Full closures can minimize the duration of the project and improve worker safety. Full closures may be brief (intermittent, off-peak), short-term (night, weekend), or long-term (continuous for the duration of the project). Caltrans encourages the use of full closures where feasible as long as adequate advance planning is conducted and appropriate TMP measures are implemented.

Full facility closures should be considered on projects with the following criteria:

- Nighttime or weekend closures lead to significant delay.
- Materials or methods require day time work conditions.
- Longer work windows are required to complete certain activities (e.g., Bridge Removal, Bridge Girder Installation, Paving and Chip Seal Operations, etc.).

- Overall delay over an extended construction period could have significant impacts on the traveling public, as well as on commercial interests in the project area.
- Significant reduction in working days is possible (e.g., 50-75 percentage).
- Viable alternate route must be available that has adequate capacity to accommodate the diverted traffic flow.
- Adequate lead time available to provide information to the public and gain support for the work.
- External partner(s) must support full closure concept.

For further details on Full Closure Guidelines, see Appendix B.

D5. Lane Modifications. It is essential to maintain the existing number of highway lanes to the extent possible. This can be done through lane modifications, which are typically in place for extended periods. Special consideration should be given to accommodate extra-high and extra-wide trucks where possible. Lane width reductions during construction to less than 11 feet require concurrence from the District Safety Review Committee and the District Constructability Review Committee. Lane modifications must also consider bicycle and pedestrian users and emergency parking. Efforts should be made to limit the time a lane or shoulder is closed or reduced in width. Modifications may include the following:

- **Reduced Lane Widths to Maintain Number of Lanes (Constriction).** This involves reducing the width of one or more lanes in order to maintain the existing number of lanes on the facility while permitting work access to part of the facility.
- **Lane Closures to Provide Worker Safety.** This strategy closes one or more existing traffic lanes to accommodate work activities.
- **Reduced Shoulder Width to Maintain Number of Lanes.** This involves reducing the width of the shoulder for use as part of the traffic lane by shifting traffic onto the shoulder, allowing access for the work activities to take place. Adequacy of the shoulder pavement section to handle mainline traffic should be verified before using this strategy.
- **Shoulder Closures to Provide Worker Safety.** This strategy closes the shoulder for use by the public, making it available to accommodate the work activities. Where bicyclists or pedestrians are allowed, shoulder closures must provide for alternate accommodations.
- **Lane Shift to Shoulder or Median to Maintain Number of Lanes.** This strategy involves diverting traffic onto the shoulder/median, or a portion of the shoulder/median, for use as a traffic lane.

D6. One-Way Reversing Operation. On two-lane highways, one-way reversing traffic control involves alternately stopping traffic in one direction, allowing work activities to occur in the lane that is closed. The TMP Manager determines the maximum time that each direction should be stopped so that motorists do not experience undue delays.

D7. Two-Way Traffic on One Side of Divided Facility (contra-flow or crossover). This strategy involves closing one side of a divided facility to permit work to proceed without traffic interference while both directions of traffic are accommodated on the opposing side of the roadway. For example, on a four-lane highway, two lanes in the northbound direction would shift to the southbound side so that work could be done on the northbound side. When completed, all traffic would shift to the northbound side, while work is conducted on the southbound side.

D8. Reversible Lanes. This strategy, also known as variable lanes, involves sharing lane(s) of travel to accommodate peak-period traffic flow. The direction of travel in the shared lane switches by time of day or day of the week.

D9. Split Lanes. This strategy is very useful when planning stage construction for work being performed on the same side of highway. An example of appropriate use of a split lane involves replacing a full structural section of a lane on an 8-lane freeway having 4 lanes in each direction. Traffic is allowed on lane # 1, 2, and 4 while lane # 3 is separated from other lanes by placing temporary railing (Type K) on both sides to perform work in lane # 3.

D10. Bypass Lanes. This strategy involves the shifting of one lane to the opposite side of highway while keeping the remaining lanes in operation on the same side of highway. For example, replacing a concrete barrier of a bridge in the northbound direction on an 6-lane freeway having 3 lanes in each direction. Northbound traffic of lane # 1 is crossed over to southbound lane # 1, and separated from southbound traffic by placing temporary railing (Type K).

D11. Ramp Closure/Relocation. A ramp closure involves closing one or more ramps in or near the work zone for specific periods or construction phases to allow work access. In some cases, a temporary ramp may be constructed to maintain access. SSPs typically do not allow the closure of consecutive ramps.

D12. Connector Closure. A connector closure involves closing one or more connectors in or near the work zone for specific periods or construction phases to restrict the traffic flow onto the mainline where construction activities are in progress.

D13. Night Work. Work is performed at night (end of evening peak period to beginning of morning peak period) to minimize work zone impacts on motorists and adjacent businesses. Consideration should be given to potential impacts to residents due to noise, worker safety, and temperature requirements for paving operations.

D14. Extended Weekend Work. A construction work window may allow work to be performed during weekend periods from the end of the Friday afternoon peak period to the beginning of the Monday morning peak period (55-hour closure). This strategy may be difficult to implement in an area where there is a high volume of weekend tourist traffic. Consideration should be given to avoiding weekends in areas that may have a high volume of special events or tourist traffic.

D15. Pedestrian/Bicycle Access Improvements. This requirement involves providing alternate facilities for bicyclists and pedestrians per DD-64 in places where the work zone may impact their accessibility and movement during highway work activities. Provisions for a shuttle service may be necessary (see Section E9).

D16. Maintain Business Access. When a project has a direct impact on businesses, accessibility issues may warrant signage or specific information to direct motorists to the businesses and relocation of access locations.

D17. Cost + Time Bidding. Cost + Time Bidding is a method of determining the lowest responsible bidder and the number of contract working days for a project by requiring contractors to bid competitively with respect to both construction cost and project duration. Construction cost is the contractor's price bid for the advertised work and time is the product

of the cost of time (sum of liquidated damages, road user costs, and road impact costs) Cost + Time Bidding is recommended on projects estimated at $1 million or more in construction cost and 100 or more working days.

D18. Incentive/Disincentive Clauses. This strategy involves the use of an incentive and disincentive clause in the construction contract to minimize construction duration. Caltrans pays the contractor the incentive for each day the corresponding work part is completed in fewer days than the days shown in the contract documents and deducts the disincentive for each day the corresponding work part is completed in more days than the days shown in the contract documents. The Project Engineer provides calculations after consulting with the TMP/DTM managers to support incentive and disincentive clauses.

D19. Innovative Construction Techniques. The use of special materials such as rapid curing concrete or precast items (e.g., culverts, bridge deck slabs, and pavement slabs) can be used to minimize the duration of construction or maintenance activities where traffic restrictions need to be minimized (e.g., roadways with high volumes), and when work activities need to be completed during night or weekend periods to allow the reopening of traveled lanes for normal weekday travel. Other innovative construction techniques that can expedite construction completion time and minimize impact to the traveling public by reopening travel lanes are Intelligent Compaction (IC) and Slide-In Bridge Construction. IC rollers use vibration and a system to collect, process, and analyze the measurements in real time. IC rollers are able to compact greater amounts of pavement and at the same time analyze the collected data to complete the work in a shorter period of time, thus opening the traffic lanes sooner. Slide-In Bridge Construction is a cost-effective technique for quickly replacing an existing bridge. A new bridge is built on temporary supports parallel to an existing bridge. Once construction is complete, the road is closed and the existing bridge structure is demolished or slid out of the way and the new bridge is slid into place, tied in to the approaches and paved within 48 to 72 hours. These techniques may require short term (55 hour weekend) full closures.

D20. Railroad Crossing Controls. When a rail crossing is located within a work zone or on a detour or diversion route, traffic control enhancements at the crossing may become necessary for safety purposes, especially if work zone delays and congestion have the potential to force vehicles to stop on the tracks or between the crossing gates. Enhancements may include advance warning signs, railroad crossing signs, pavement markings, flashing lights, gate arms, flaggers or law enforcement officers, and possibly closure of railroad crossing to traffic during work periods.

D21. Coordination with Adjacent Construction Projects. This strategy involves combining, coordinating, or staging projects within a specific corridor to minimize the combined impacts on the motoring public and community. The objective is to ensure that adequate capacity remains available to accommodate the anticipated travel demand within the corridor by not implementing work zones on adjacent or parallel highways at the same time. This may entail communicating information about the timing of lane closures and coordinating diversion routes. It may also involve the completion of needed capacity and safety improvements on a highway prior to its use to carry traffic diverted or detoured from another project. Construction staging can be used to remove work at the same location or traffic control conflicts between adjacent projects.

D22. Speed Limit Reduction. A reduced speed limit may improve traffic and worker safety in a work zone. Speed limit reductions may be implemented through an entire work zone

or only in active work areas. Reduced speed limits may also be appropriate on detours where traffic volumes and conflicts are increased. This strategy can be used in combination with a speed radar trailer (dynamic speed message sign) to alert motorists of their speed.

D23. Traffic or "Gawk" Screens. Traffic screens help prevent driver distractions in work zones by blocking the motorist's view of the activities. This strategy helps to keep traffic moving and enhance safety. Screens may be mounted on top of temporary traffic barriers to discourage gawking.

D24. Bus Priority Access. Providing bus-only lanes or other features to ensure buses can travel through a construction zone with minimal delay will entice the public to use transit and decrease the number of vehicles that travel through the corridor.

1.2.5 CATEGORY E. DEMAND MANAGEMENT

Demand management strategies can be used to encourage motorists to travel either in carpools or mass transit vehicles, or to vary work hours to reduce the typical peak hour traffic volumes. Rideshare incentives include free transit tickets or tickets at a reduced price. Park-and-ride lots can be built as a part of the project to encourage commuters to travel together, not only during but also after construction is completed.

TMP teams should contact local transit providers to establish a plan, using the elements below, to use existing transit services and resources to lessen the impact of the construction project on person-throughput throughout the corridor. Public information methods should educate the public on the plan and transit elements that are available. This could lead to a short-term reduction of traffic during construction and might lead to long-term benefits of increased ridership after the project is finished. Transit incentives should be considered for all projects and implemented when deemed effective.

E1. Telecommuting. Telecommuting is working outside of the traditional office or workplace, usually at home. Motorists, particularly in an urbanized area who normally travel through the work zone, can be encouraged to telecommute for the duration of a project to reduce the travel demand.

E2. Truck/Heavy Vehicle Restrictions. This strategy encourages truck drivers to use detours or alternate routes during specific periods, or at all times, increasing passenger vehicle capacity of the roadway on a facility that normally has a high truck volume.

E3. Parking Supply Management. This strategy involves reducing traffic demand in the work zone area by limiting parking supply, typically through price increases.

E4. Variable Work Hours. This strategy involves encouraging motorists who typically travel through the work zone during peak periods to work variable hours (off-peak) to reduce travel demand.

E5. Ramp Metering. Ramp meters are traffic signals located on on-ramps or freeway connectors designed to decrease demand on a highway facility by controlling the entrance of vehicles, matching entering vehicles to gaps in the traffic stream. Various strategies for ramp metering include preset timing, traffic actuated metering changes (based on mainline traffic volumes), or centrally controlled metering. Ramp metering may be used during peak

periods or all day to modify on-ramp traffic directly upstream of the work zone. Portable or temporary ramp meters are options.

E6. Ramp Closures. Temporary closure of one or more on-ramps in or around the work zone may be used to improve traffic flow on the mainline. Consideration must be given to notify emergency services and to provide adequate alternatives for emergency vehicles.

E7. Transit Service Improvements. Where appropriate, transit service improvements may include the modification of transit schedules or routes, increase frequency, or the establishment of transit service in or near the project corridor.

E8. Transit Incentives. Transit incentives include employer or traveler transit subsidies and guaranteed ride home programs.

E9. Shuttle Services. Shuttles and charter buses can reduce traffic volumes through a work zone if a sufficient number of users along the corridor are anticipated to use the service. Shuttle services must be used where pedestrians or bicyclists are allowed and do not have alternate access through a work zone.

E10. Ridesharing/Carpooling Incentives. This strategy involves the use of rideshare/carpool incentives to reduce the number of vehicles traveling through a work zone. Incentives may include preferential parking for carpools, the addition of mainline High-Occupancy Vehicle (HOV) lanes or bypass lanes on ramps, and provisions for vanpool vehicles.

E11. Park-and-Ride Promotion. This involves the development, expansion, and promotion (advertising) of Park-and-Ride lots to encourage ridesharing or transit use, thus reducing the number of vehicles traveling through the work zone.

1.2.6 CATEGORY F. ALTERNATE ROUTES (OR DETOURS)

Alternate route (or detour) strategies can be used to give travelers the opportunity to avoid the work zone completely by diverting to other highways or adjacent surface streets. This strategy includes examining the adequacy of detour or alternate routes and coordinating with the agencies responsible for those routes and the transit services on the routes. Use of a detour may require improving the effectiveness of the detour route by restricting parking or placing traffic control officers at critical intersections to help move traffic along during peak periods. Bicycle and pedestrian accommodations (e.g., access and length) must be considered when using alternate routes during construction.

F1. Off-site Detours/Use of Alternate Routes. This strategy involves rerouting some or all traffic from the roadway under construction or repair to other roadways. Detours need to be evaluated to accommodate extra-high and extra-wide trucks loads; any restrictions must be reported to the Headquarters (HQ) Division of Traffic Operations, Office of Transportation Permits Issuance Branch. Before the work begins, it is advised to record the condition of

the detour route to allow assessment of the roadway condition after the work is completed. During the work, traffic conditions on detours should be monitored to make sure that motorist delays remain within acceptable levels.

F2. Signal Timing/Coordination Improvements. This strategy involves retiming traffic signals to increase vehicle throughput of the roadway(s), improve traffic flow, and optimize intersection capacity in and around the work zone. Signal timing and coordination could include transit vehicle priority.

F3. Temporary Traffic Signals. The installation of temporary traffic signals can be used to improve traffic flow through and near the work zone. At a corridor or network level, the use of temporary traffic signals is more effective than stop signs or flaggers for providing mobility through the work zone area. These temporary traffic signals may also be coordinated with existing signals.

F4. Street/Intersection Improvements. Improvements on streets and intersections for the roadway or alternate routes may be necessary to provide increased capacity to handle the traffic through the work zone or within the adjacent corridor. This may include improvements to the mainline and intersections, including roadway or shoulder widening and construction of new through lanes and turn lanes. Pedestrian, bicycle, emergency vehicles and transit needs should be carefully considered to maximize the positive impact of alternative modes.

F5. Bus Turnouts. This strategy involves the construction of bus stop areas that are recessed from the travel lanes. This strategy may be helpful in work zones or on detour routes with a high frequency of bus traffic.

F6. Turn Restrictions. This involves restricting turning movements for driveways and intersections to increase roadway capacity, reduce potential congestion and delays, and improve safety. Restrictions may be applied during peak periods or all day.

F7. Parking Restrictions. This strategy involves the restriction of parking in all or part of the work zone or alternate routes during work hours or peak traffic periods along alternate routes. Parking restrictions can be used to:

- Increase capacity by converting the parking lane to an additional travel lane.
- Reduce traffic conflicts.
- Provide improved access to the work area.

1.3 PRELIMINARY INFORMATION NEEDED FOR DEVELOPING A TMP

When developing a preliminary TMP, use the most current layout of the roadway (geometrics) information and plans available. This may require a field review of the project site before starting work on developing a TMP. The most current traffic volumes, either at the specific location or as close as possible to the work zone site should be used to determine possible traffic impacts. Traffic information can be accessed through various sources, including: the Caltrans Internet traffic data website (*http://traffic-counts.dot.ca.gov/*), the Performance Measurement System (*http://pems.dot.ca.gov/*) via the loop detection system (devices set into the pavement that collect traffic data), special manual vehicle and occupancy counts, and through tachometer surveys which provide time and speed information. If current traffic counts are not readily available, a request for

a new count should be submitted to the local District Traffic Census branch in the Division of Traffic Operations.

The data is typically used to determine the expected traffic delay at the work site and the work windows that will be made available. Sometimes projects that have been programmed and funded are "shelved" or delayed for a year or more, due to funding, right-of-way or environmental issues. When these projects are put back on the schedule, the traffic volumes and associated work windows need to be reviewed and updated to reflect the latest traffic conditions.

Information to consider when developing a TMP is listed in the following table.

Table 1.0 Items for Consideration in Developing a TMP

• Latest traffic volumes (motorized, non-motorized and truck traffic). • Lane closure policies and procedures. • Political or environmental issues. • Multijurisdictional communication and buy-in. • CHP and local law enforcement involvement. • Percentage of truck volume. • Business and affected activity centers impacts. • Clearance of alternate routes for Surface Transportation Assistance Act and oversized trucks.	• Concurrent corridor (including conflicting) construction projects. • Length of project (miles). • Urban versus rural conditions. • Time constraints (including duration). • Transit and Railroad services. • Viability of alternate routes. • Impacts on bicyclists, pedestrians, senior citizen facilities, or schools. • Current project layout and staging. • Direct project impacts to census, ITS, and other state facilities.

1.4 TMP CLASSIFICATIONS

TMPs can be classified by the anticipated impact of the highway work on the traveling public. The District TMP Manager determines the type of TMP required for the proposed work. The three TMP classifications are described below.

1.4.1 Blanket TMPs

Certain low-impact maintenance and encroachment permit activities do not require the development of detailed work specific TMPs. Those activities performed during off-peak hours on roadways with low volumes may be treated adequately with a blanket TMP. A blanket TMP may range in detail from approval for a lane closure by the DTM to a few selected strategies (e.g., PCMS activation) that would be taken to keep delay below the delay threshold (see example in Appendix D). District Maintenance and Encroachment Permit offices must have a list of activities to which blanket TMPs apply. Depending on the type and duration of the proposed work, a blanket TMP may also include a one-page description of the activities to be performed and contact information for personnel involved in the activities.

1.4.2 Minor TMPs

Certain activities may result in traffic impacts on the SHS that are not significant, as defined in this document, and may require a Minor TMP. A Minor TMP will likely include lane requirement charts specifying when the work can be conducted. Depending on the type

and duration of the proposed work, a Minor TMP may also include a schedule and detailed description of the activities to be performed and the TMP strategies to be used, such as enhanced enforcement services, motorist information (e.g., PCMS), FSP during peak hours, and advance public information provided to the media.

1.4.3 Major TMPs

Major TMPs are prepared for capital, encroachment permit, and maintenance projects that could significantly impact traffic. Major TMPs may involve full closures (e.g., Route 405, the Jamzilla Project closures in District 7 in the northbound direction), weekend closures (Interstate 80 San Francisco Oakland-Bay Bridge Labor Day weekend closures in District 4) and continuous closures (Interstate 15 Devore closures in District 8). Generally, Major TMPs are typically identified as follows:

- Multijurisdictional in scope: often encompassing the interests of CHP, local law enforcement; city, county, and regional governments; bordering state transportation departments; employers, merchants, developers, transit operators, ridesharing agencies; neighborhood and special interest groups; emergency services, and transportation management associations.

- Multifaceted: comprised of traffic operations, facility enhancement, demand-management, and public relations strategies, as well as more traditional work zone actions, construction methods and contract incentives, customized to meet the unique needs of the impacted corridor.

- In place over an extended period of time, sometimes implemented a year or more before the start of actual construction, with specific elements often implemented incrementally to coincide with construction phasing.

Major TMPs may include the full spectrum of strategies, including lane requirement charts, special provisions for unique project characteristics, a large-scale public awareness campaign (with brochures, public meetings, project website, telephone hotline), COZEEP services, FSP, detours to alternate highways or surface streets, and special arrangements with local transit services to accommodate a significant increase in ridership.

1.5 TMP RESOURCES

The development of TMP strategies is a continuous effort to efficiently and effectively manage traffic in work zones on the SHS. Appendix E provides contact information and additional supporting TMP information sources.

2.0 TRANSPORTATION MANAGEMENT PLAN PROCESS

2.1 PROCESS OVERVIEW

TMP development begins at the initiation of the planning process. In the case of capital projects, it begins with the preparation of a TMP datasheet or checklist for each phase of the project as part of the Project Initiation Document (PID) process. The TMP is a "living" document and continues to be modified as work information warrants it. Frequently after construction or maintenance activities begin, if traffic conditions differ from what was anticipated, changes in TMP strategies may be necessary to keep motorist delays below acceptable levels. When modifications are made in the TMP, they should be approved by the TMP Manager.

2.1.1 Corridor, Regional, Multifunctional Area TMPs

When multiple or consecutive projects are within the same general corridor, the cumulative impact can result in excessive traffic delays, detour conflicts, and work conflicts. These may be multiple capital projects, the involvement of more than one district or local jurisdiction, or a combination of capital projects and encroachment permit and maintenance activities. Corridor, regional, and local coordination will mitigate these impacts and thereby minimize inconvenience to the traveling public.

When multiple projects are in the same corridor or on corridors within the same traffic area, it may be possible to develop a single corridor or regional TMP. In other cases, individual TMPs are developed and funded from their own sources and a "bare bones" corridor or regional TMP addresses the cumulative impact. Each project covered by corridor and regional TMP contributes resources in proportion to its traffic impact.

The TMP Manager coordinates the development and implementation of corridor and regional TMPs. The TMP Manager forms a TMP team including, at a minimum, representatives from Caltrans Divisions of Construction, Maintenance, Project Management, and Traffic Operations for each of the affected Districts. The District PIO and CHP participate as needed. The initial meeting is held several months in advance of construction to set milestones, and to allow time to prepare and distribute project information.

During TMP implementation, the TMC serves as an information clearinghouse and coordinates operations. The TMC helps identify conflicts and recommends appropriate action. When provided with accurate and up-to-date lane closure information, the TMC provides real-time traffic information via electronic media, CMS, PCMS, QuickMap, and HAR.

The corridor/regional TMP may call for strategies in addition to those provided by the individual TMP for each project. Those elements may include CMS at key locations outside individual project limits, the establishment of an information hotline, websites for all projects involved, use of the statewide 511, and the use of the TMCs as a central reporting hub.

If the corridor/regional TMP calls for strategies beyond the individual project TMP, it is recommended that:

- The requirement should be included in one of the corridor projects as part of the project plans and SSP.
- The service should be provided through a Construction Change Order on one of the corridor projects.

2.1.2 TMP Team

For Major TMPs, the TMP Manager solicits team members based on the projects proposed TMP elements, and anticipated traffic impacts. The TMP team may include representatives from the following:

- The Divisions of Design, Project Management, Construction, and Traffic Operations.
- PIO or Public Affairs.
- Local law enforcement, transit, and emergency services agencies.
- The FHWA and the CHP.
- District transit representative, District bicycle and pedestrian coordinator, and field staff from the Division of Maintenance.
- Other entities as appropriate.

2.2 TMP IN THE PROJECT INITIATION DOCUMENT PHASE (PID)

The extent of a TMP is determined by the District TMP Manager during the preliminary studies of a capital project. At the request of the project initiating unit (typically Design or Planning), the TMP Manager coordinates the preparation of TMP information that will be included in the PID phase. Projects are generally programmed, budgeted, and scheduled upon project approval at the end of the PID phase. It is extremely important to identify the proper scope and cost of the TMP activities in the PID, as significant post-PID approval changes will be difficult to obtain.

As soon as possible and prior to PID approval, the initiating unit sends conceptual geometrics to the District Office of the TMP/DTM for evaluation. The TMP Manager and the DTM estimate the extent of the TMP required and determine whether potential traffic delays are anticipated that cannot be mitigated by traditional traffic handling practices or well-planned construction staging.

2.2.1 TMP Datasheet Preparation

During the PID process, the TMP Manager coordinates the development of the TMP datasheet. The datasheet identifies the proposed TMP strategies that may be included to minimize the traffic impacts of the planned work (see Appendix F). Contact your District TMP Manager to identify the information that will be needed.

For all TMPs, an itemized estimate of the proposed strategies and their respective costs may be included in the TMP for proper funding consideration. If an itemized estimate is not included, the TMP Manager should review the project cost estimate prepared for the PID.

2.2.2 TMP Cost Estimate

A TMP cost estimate should be developed for each alternative being considered and should not be based only on the project cost. The cost of a TMP could range from a small percentage of project cost to 10 percent or more and often is not dependent on the size of the project. The cost of the TMP strategies should be weighed against the potential delay savings that the motorists might experience, as well as mobility and safety effects on all modes of travel.

2.3 TMP DURING THE PROJECT APPROVAL AND ENVIRONMENTAL DOCUMENT PHASE (PA&ED)

During this phase, studies of the identified alternatives are performed to determine the preferred TMP alternative. During the development of the project concept and staging, the design office has the opportunity to incorporate traffic considerations that could potentially eliminate the need for extensive and expensive TMP strategies. During this phase the highest level deliverables completed are the Project Report and the Environmental Document.

2.3.1 TMP Refinement during the PA&ED Process

The planning or design team should work with traffic engineering/operations personnel and other relevant technical specialists (e.g., right-of-way experts, pavement engineers, and environmental specialists) to obtain the necessary project information and help identify potential issues or concerns. This collaboration can help to develop the best combination of design, construction phasing/staging, and work zone management strategies. With proper planning, potential traffic problems can be eliminated by modifying the design or construction phasing.

If traffic studies are needed to develop TMP strategies, these should be initiated as soon as possible to make sure that the needed data is available. As information becomes available during the PA&ED phase, the preliminary scope and cost of the overall TMP and the individual elements should continue to be refined. The TMP Manager (or TMP team for a major project) will coordinate the TMP strategies with the Project Engineer and appropriate functional units, with each team member handling their area of expertise. For major projects, subcommittees or task forces may be formed to handle the planning, implementation, monitoring, and evaluation details of specific elements.

It is appropriate at this point to develop a schedule for Major TMPs. Many TMP elements may be bid and constructed or initiated separately from the project, or may be included in the project plans and installed or implemented as the first order of work. On major capital projects, public awareness campaigns may need to be initiated well before the actual work begins, often a year or more in advance. For example, if new park-and-ride lots are necessary for the ridesharing element, the planning phase would have to be extended for several months and a design phase added.

An additional activity involves analyzing the existing traffic volume and user mix, such as pedestrians, bicyclists, trucks, and buses in the corridor both on the freeway and surface streets. This will provide the basis for establishing the goal of the TMP and in determining the capability of the surrounding surface streets to handle the additional vehicular demand and the impact on bicycle and pedestrian traffic. Considering transit alternatives and service enhancements may decrease the need for other investments.

2.4 TMP DURING THE PLANS, SPECIFICATIONS AND ESTIMATES (PS&E) PHASE

The Project Engineer should coordinate with the TMP Manager to ensure that all TMP requirements are addressed in the SSPs, Engineer's Estimate, and project plans.

2.4.1 Preparation of TMPs during Design

During project design phase, the TMP strategies may be further developed or modified by the TMP Manager as the details of the work become more specific. Design engineers should consider work zone impacts in the evaluation and selection of the project alternatives. For some projects, it may be possible to choose a design alternative that alleviates many work zone impacts. These broader strategies cross various disciplines and highlight the need for a multidisciplinary approach. As the design progresses, a selected alternative is typically chosen and the TMP is reviewed and updated to reflect the most current project information. During this time the highway historical conditions and current traffic volumes are evaluated to determine the anticipated traffic impacts during construction and to verify that the appropriate TMP strategies are being proposed.

The TMP Manager receives input from the other Divisions that may be involved on the Project Development Team (PDT) or the TMP Team if one is established. The other Divisions on the team would typically include Design, Project Management, Construction, Traffic Operations, Maintenance, and the PIO. The team should also include the CHP and local agencies that might be affected by the project.

Caltrans maintains Standard Plans and Standard Specifications that include typical traffic control plans. Any deviations from those Standard Plans and Standard Specifications such as detours or special work windows require the inclusion of specific SSPs or special details in the project plans for TMP-related work that needs to be implemented by the contractor. All TMP-related special details and SSPs, or changes to those SSPs must be approved by the TMP Manager. Nonstandard special provisions must be approved by the specification owner or designee and the District Construction office.

2.4.2 Acceptable Delay Thresholds

Lane requirement charts are prepared based on historical traffic volumes at the specific location. The best available traffic data should always be used to develop the charts.
If current traffic counts are not readily available, a request for new counts should be submitted to the local District Traffic Census branch in the Division of Traffic Operations.

Lane requirement charts are typically prepared such that no congestion will result from work; that is, "zero delay" will be expected.

Certain activities such as approach slab replacement, falsework, chip seal operations, etc. may require more time than allowed by the "zero delay" charts. The Design Engineer and the TMP/DTM should work together to identify those activities that require a longer work window. At a minimum, the charts should be adjusted to provide a half-hour increment at each end of the work window. The TMP would then need to be modified to mitigate the traffic impacts created by the longer work window.

If the project has been taken off the shelf and is being resurrected, the lane requirement charts should be reviewed and, if necessary, updated using the latest traffic volumes available.

2.4.3 Construction Work Windows

Congestion in work zones with high traffic volumes is typically minimized by only allowing work to be conducted during off-peak commute periods. For example, in urban areas, peak hours might occur between 6 a.m–10 a.m and 3 p.m–7 p.m during weekdays. Peak hour traffic volumes during weekdays do not allow for adequate daytime work windows; certain highway work activities often can only be done at night. Night work that involves noisy equipment and/or lighting operations could create a nuisance for residential housing nearby; pile driving during working hours could also be a nuisance for businesses in the area.

Through TMPs, Caltrans strives to strike a balance between reducing the overall construction duration, minimizing disruption to the traveling public, and maximizing safety in the work zone. DD-60-R2 states that the maximum allowable delay at any location at any time should be limited to less than 30 minutes. Application of this criterion has resulted in a general shift from day work activities to night work, particularly for capital projects.

This strategy has been successfully implemented in general. However, its effectiveness has been questioned in circumstances where materials or methods require day work conditions or where longer work windows are required to complete certain activities. Overall delay over an extended construction period could have significant impacts on the traveling public, as well as on commercial interests in the project area.

Alternative construction strategies and work windows should be considered early in the design phase, for example, during the Project Development Team process. These alternatives might include:

- Extended closure options:
  - o 55-hour weekend closures (typically from 10 p.m on Friday until 5 a.m on Monday).
  - o 72-hour weekday closures.
  - o Continuous closures (10 days including weekends).
- Full closures in one direction or in both directions.
- Closed facility for all vehicles except for buses.

Extended work windows and full closures often provide a shorter project duration, which may result in cost savings and in overall delay savings to the traveling public. The time for setting up and breaking down traffic control and construction equipment mobilization is reduced, resulting in more effective work time. For example, in 2006 the Interstate 15 Devore Pavement Rehabilitation Project team opted for a continuous nine-day closure of the full facility (alternately in each direction) rather than six months of night work. These alternatives also enhance safety.

Use of alternative work windows must include consideration of the need for revised or additional public awareness strategies. The District PIO should be included when determining which strategies are needed and the appropriate timing for implementation.

Use of alternative work windows or extended work windows beyond the lane requirement chart hours must also include consideration of the need for monitoring traffic flow approaching

the work zone to protect motorists approaching the "end of queue." These queues can often result in secondary traffic collisions (usually rear-end collisions) when motorists fail to slow down. This monitoring can be done by the contractor or a District TMT.

If the work methods cannot be modified or avoided, select the least detrimental period and be sure to notify the public why the work is necessary and when it will occur.

2.4.4 Pedestrian and Bicycle Traffic

Work zone activities can disrupt the public's mobility and access. Temporary lane restrictions, use of shoulders as travel lanes, detours, and other transportation management strategies should be designed to accommodate non-motorized travelers wherever they are legally permitted. Safe and convenient access should be maintained for pedestrians and bicyclists, who are susceptible to disruptions because of their slower speeds and sensitivity to noise, airborne dust, road debris, and fumes. Special care should be taken to consider areas where schools or senior citizen centers are located. A travel path that replicates, if possible, the most desirable characteristics of their usual travel route should be provided.

The needs and control of all road users including motorists, bicyclists, pedestrians within the highway, and persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA) through a Temporary Traffic Control (TTC) zone shall be an essential part of highway construction, utility work, maintenance operations, and the management of traffic incidents. The California Manual on Uniform Traffic Control Devices (MUTCD) Part 6 contains figures that can be adapted for traffic handling plans. The "Crosswalk Closures and Pedestrian Detours," figure of the California MUTCD shows typical TTC device usage and techniques for pedestrian movement through work zones. Public participation should be used to ascertain the extent of public impacts of proposed construction activities and to discuss the appropriate temporary accommodations that can be reasonably achieved.

DD-64 - Complete Streets - Integrating the Transportation System requires full consideration of non-motorized travelers including pedestrians, bicyclists, and persons with disabilities in all programming, planning, maintenance, construction, operations, and project development activities and products.

Design Information Bulletin 82 - Pedestrian Accessibility Guidelines for Highway Projects provides highway design guidance to accommodate persons with disabilities within the public rights-of-way. This document satisfies the requirements of the ADA. Further guidance for pedestrian and bicyclist accommodation is provided in the California MUTCD, Part 6 "Temporary Traffic Control."

2.4.5 Transit Services

In preparing a TMP, the team should meet with local transit providers to understand existing transit services, to ensure the transit level of service remains at an acceptable rate, and to find ways to promote use of this transportation mode. An increase transit ridership leads to a decrease in the number of vehicles that must be accommodated during project construction.

2.4.6 TMP Certification

The District Traffic or District TMP Manager must provide a certification that the project contains all the latest TMP strategies, estimate and specifications. Certification occurs before Ready to List (RTL) for all construction projects. If the project has been taken off the shelf, the TMP strategies and specifications need to be reviewed, updated, and recertified before RTL. For encroachment permit projects, the certification occurs prior to encroachment permit issuance.

2.4.7 TMP Modification of Programmed Projects

Generally, the TMP type is determined prior to programming (PID approval); however, it may be necessary to modify a TMP for a project that is already programmed due to project changes, policy changes, emergencies, or unforeseen conditions. These projects must be handled on a case-by-case basis since the course of action depends on where the project is in the development process and the extent of the TMP modifications. For example, a project that was initially designed to be constructed as a nighttime operation over several months may be converted just prior to construction to a full closure or a continuous closure to reduce the overall project duration.

2.5 TMP MODIFICATIONS DURING CONSTRUCTION

Contract-related TMP strategies are implemented by the contractor with Caltrans oversight. Strategies related to public awareness may also be implemented by Caltrans personnel. If project conditions change, traffic volumes increase, or project staging changes, the DTM or the TMP Manager must be notified and consulted to determine if the TMP needs to be revised.

At times, certain activities may require more time than allowed by the lane requirement charts. In those instances, the RE should contact the TMP/DTM Manager to request a longer work window. If that individual determines that minimal delays would be acceptable based on current traffic conditions, the lane requirement charts may be modified to provide a longer work window. When work is allowed outside of the original work window, the District TMT should be contacted to monitor potential traffic backups.

2.5.1 Traffic Monitoring During Construction

The RE should ensure that inspectors monitor traffic conditions while work is being performed to avoid impacts in excess of what was identified in the TMP. When excessive queues occur, the TMC should be notified to initiate mitigation.

When congestion due to highway work zone activities is anticipated, traffic monitoring can be made a part of the construction contract or conducted by District TMT personnel. The traffic monitor typically uses a vehicle with a truck-mounted CMS and stations the vehicle where approaching motorists can clearly read the CMS. This strategy provides periodic assessments of the effectiveness of project safety features and is often done at the beginning of a project to make sure that the TMP strategies are effective. Electronic monitoring and warning systems can also be used for this purpose.

2.5.2 TMP Coordination during Construction

TMP activities are to be monitored and evaluated by the construction office and those elements found ineffective should be appropriately modified after consulting TMP/DTM managers.

During construction, those TMP elements that are part of the main contract or Encroachment Permit are implemented under the general direction of District Construction or Encroachment Permits. Those separate contracts or agreements, such as rideshare, transit activities and public awareness campaigns will be under the direction of their respective contract managers.

Special effort should be given to assure that CMS, HAR, QuickMap, and other media tools provide accurate and timely information to motorists, bicyclists, and pedestrians regarding lane closure times and locations.

2.5.3 Late Lane Closure Opening

The RE or the Encroachment Permit Inspector needs to ensure that lane closures are opened within the lane closure window. Exceptions can occur when the activity needs to be completed for the safety of the public and workers. The RE or the Encroachment Permit Inspector should coordinate with the DTM if the contractor needs to work outside the lane requirement chart hours. The TMC should also be notified and the TMT may need to be called to monitor possible queuing.

In order to avoid significant traffic impacts, it is essential to monitor and respond immediately to delay, open lanes on time, and have solid traffic handling and contractor's construction contingency plans.

Contractor compliance with lane closure opening deadlines can be enforced in two ways. Specifications are often included in the contract allowing the contractor to be assessed for damages based on the value of traffic delay when the contractor exceeds the lane closure window. The minimum damages are generally $1,000 per 10 minutes, but the damages can greatly exceed the minimum, depending on traffic volumes and the highway facility. The TMP/DTM office normally calculates the delay damages during PS&E. The second method to ensure that the lane closures are opened on time is for the RE or the Encroachment Permit Inspector to suspend the contract work.

Contractor or Caltrans forces such as Maintenance can be ordered to open a lane closure early if traffic impacts become significant either due to a project incident or activities outside the project area. During construction, remedial actions may be based on contingency plans submitted by the contractor. When traffic impact becomes significant, early lane opening should be ordered without compromising the safety of the public or workers. Keeping in mind that the contractor will be compensated for liquidated damages. Encroachment Permit provisions require the permittee to open a closure early without compensation.

A Caltrans staff member who can make informed decisions about implementing contingency plans and modifying, terminating, or extending approved lane closures should be available to respond to significant delays and other unexpected events whenever lane closures are in place. The designated employee(s) may be Traffic Operations, Construction, or TMC staff, depending on the District.

2.5.4 "After-Action" Reporting

At the end of a major project, where the actual delay exceeded the threshold set by the DTM, the DLCRC or HLCRC may request that a brief "After-Action" post-TMP report be completed by the TMP Manager after consulting with the construction office (e.g., the San Francisco-Oakland Bay Bridge Labor Day closures in District 4). Post TMP meetings with the CHP and other partners can be held to identify the elements that went well and those that could have been done differently. Samples of past "After-Action" reports can be obtained from the individual District Traffic Operations offices.

2.6 CONTINGENCY PLANS

There are two types of contingency plans. The "Construction Contingency Plan" is developed for the purpose of construction operations equipment and materials backup; the second plan developed by the Division of Traffic Operations is referred to as the "Traffic Handling Contingency Plan."

2.6.1 Construction Contingency Plan

If required by the special provisions, the contractor (permittee) develops a construction contingency plan that identifies the activities, equipment, processes, and materials that may cause a delay in the opening of a closure to traffic.

The contingency plan must include:

1. A list of additional or alternate equipment, materials, or workers necessary to ensure continuing activities and on-time opening of closures if a problem occurs. If the additional or alternate equipment, materials, or workers are not on site, specify their location, the method for mobilizing these items, and the required time to complete mobilization.
2. A general time-scaled logic diagram displaying the major activities and sequence of planned operations. For each activity, identify the critical event when the contingency plan will be activated.

Critical pieces of equipment are those necessary to complete the planned work in the closure, for which no on-site replacements exist, and which, if rendered inoperative, would cause the closure to be kept in place past the lane opening time indicated in the lane requirement charts.

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

The following operations may require a contingency plan:

- Any activity requiring a full roadway closure.
- Blasting.
- Rapid-set concrete activities, including concrete slab replacement.
- Roadway excavations encroaching on the traveled way not protected by temporary railing (Type K).
- Cold planning 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.
- Bridge work.
- Placement of bar reinforcing steel or structural members.
- Falsework erection or removal, including adjustments.
- Bridge demolition.
- Striping.

The contractor verifies or updates the construction contingency plan concurrent with submission of the written schedule of planned closures. If a revision is required, the contractor should not close any lanes until the construction contingency plan has been reviewed and approved by the RE.

2.6.2 Traffic Handling Contingency Plan

The Traffic Handling Contingency Plan is a method of operation consisting of strategies or actions taken to restore or minimize effects on traffic when the congestion or delay resulting from construction, maintenance, or encroachment permit activities exceeds original TMP estimates. This situation may result from unforeseen events such as work zone incidents, higher-than-predicted traffic demand, or late lane closure openings.

These traffic handling contingency strategies may include, but are not limited to the following:

- Notification to the TMC.
- Request for TMT assistance.
- Activation of CMS or PCMS.
- Activation of the HAR system.
- Notification to the CHP.
- Notification to transit agencies.
- Notification to the media.
- Activation of a detour.
- Follow-up with the RE if activation of the contractor's construction contingency plan is appropriate.
- Notification to the HQ Communication Center if the District TMC is not available.
- Communication with the TMCs in other states and across the border when an event may impact traffic across the border.

Depending on the District or the situation, these strategies may be implemented by the DTM, the Construction Traffic Manager, or the TMC.

For lane closures that will be implemented outside of typical lane closure hours and are expected to have significant traffic impacts, the PDT or the TMP/DTM Team should develop a specific traffic handling contingency plan that may include:

- Activation of a TMT when available to monitor congestion and queues.
- Trigger points to identify when certain traffic handling strategies should be taken.
- "Decision tree" with clearly defined lines of communication and authority.

- Specific duties of all participants during lane closure operations, such as coordination with the CHP or local agencies.
- Names and telephone numbers for the DTM or their designee, the RE, Maintenance Superintendent, Encroachment Permit Inspector, the on-site traffic advisor, the CHP Division or Area Commander, and appropriate local agency representatives. One means of disseminating this contact information would be via the COZEEP/MAZEEP Pocket Guide (see Appendix C), which should be prepared for individual projects.
- Coordination strategy and special agreements (if applicable) between the DTM, the RE, the on-site traffic advisor, Maintenance, the CHP, local agencies, and the Office of Public Information

3.0 TRANSPORTATION MANAGEMENT PLAN ROLES & RESPONSIBILITIES

DD-60-R2 clearly defines the roles and responsibilities of Caltrans personnel involved in the TMP process, including:

- District Directors.
- Chief, Division of Traffic Operations.
- DDDs of Construction, Design, Project Management, Maintenance and Traffic Operations.
- District PIOs.
- DLCRC.
- HLCRC.
- District TMP Managers.
- Project Managers.
- DTMs.
- District Design Engineers, Encroachment Permit Engineers, and Maintenance Engineers.
- District Construction Engineers, REs, and Maintenance Supervisors/Superintendents.
- TMC Staff.

DD-60-R2 is included in this document as Appendix A.

4.0 LANE CLOSURE REVIEW COMMITTEE

4.1 SIGNIFICANT TRAFFIC IMPACTS AND MAJOR LANE CLOSURE APPROVAL BY THE DISTRICT LANE CLOSURE REVIEW COMMITTEEE (DLCRC)

This process applies to all major lane closures on the SHS. Major lane closures are those lane closures that are expected to result in significant traffic impacts despite the implementation of TMP strategies. A "significant traffic impact" is defined in DD-60-R2 as an individual traffic delay of 30 minutes or more above normal recurrent travel time on the existing facility, but may also refer to work that may affect traffic conditions over a long period. When a planned lane closure is expected to have a significant traffic impact, the DLCRC review and approval is required. The DLCRC concurrence is required on full facility closures, extended freeway closures, and freeway-to-freeway connector closures. The Project Manager must prepare and submit the major lane closure request memo to the DLCRC for approval as detailed below.

The DLCRC does not have to review and approve emergency closures due to natural events or incidents; however, the TMC and the DTM must be notified, and every effort must be made to minimize traveler delay and reopen traffic lanes as soon as practical.

4.2 HEADQUARTERS LANE CLOSURE REVIEW COMMITTEE (HLCRC) REVIEW

For any activities that are of an interregional, statewide, environmental, or otherwise sensitive nature, the DDD of Traffic Operations shall contact the HLCRC to discuss the specific project, its anticipated impacts, and to obtain approval.

The DLCRC is expected to resolve most issues at the District level with the focus on mitigating delay over 30 minutes or developing full or extended closures that would reduce overall traveler delay for projects that may extend for several months or years.

The Division Chief of Traffic Operations serves as Chair of the HLCRC and may refer the decision back to the District or meet first with the District to discuss major concerns before deciding to call the full committee together. A full HLCRC review is only warranted in rare circumstances (e.g., full closure of the San Francisco-Oakland Bay Bridge in the eastbound direction over Labor Day Weekend 2006).

If the District is confident that the necessary TMP strategies are planned and will be implemented when needed, it is not necessary to request a meeting with the HLCRC. The DLCRC, however, should prepare adequate information (one or two-page fact sheet) so that the District Director can inform the Director of the steps being taken to minimize potential traffic problems for those projects that may be press worthy.

In its evaluation of the proposal, the DLCRC will give consideration to the accuracy, reliability, and completeness of information provided, as well as other reliable sources of information available to the DLCRC.

Proposals will be evaluated on the basis of effectiveness in the following areas:

- Traveler and worker safety improvements.
- TMP strategies.
- Plans for coordination with adjacent construction, maintenance, encroachment permits, and special events activities.
- Plans for coordination with the TMC and field personnel.
- Plans for coordination with public media.
- Plans for use of existing field elements such as traffic surveillance loops, CMS, HAR and CCTV cameras.
- Lines of communication and authority (top to bottom).
- Plans for monitoring delay or corresponding queue length during lane closure operations.
- Alternatives to proposed closures.
- Contingency plan viability.
- Plans for coordination with local agencies, particularly as strategies pertain to detours on local roadways.
- Plans for coordination with the trucking industry on routes with heavy truck traffic.
- Transit agency coordination plan.
- Bicyclists and pedestrians.

4.3 CONTENTS OF MAJOR LANE CLOSURE REQUEST SUBMITTAL

The Project Manager prepares a major lane closure request submittal with support from the PDT. Sufficient information is provided to ensure complete understanding of the proposal. The following minimum information is recommended:

- Location and vicinity maps showing the State highway(s), local street network, and other adjacent lane closures or nearby work that may affect traffic during the same period, including special events.
- Dates, times, and locations of the lane closure(s).
- A brief description of the work being performed during the lane closure(s).
- A brief description of each lane closure and its anticipated effect on traffic conditions and transit services.
- Amount of expected delay and corresponding queue length for each lane closure.
- A summary of TMP strategies that will be used to reduce delay and motorist inconvenience during the lane closure(s). A copy of the approved TMP for the project, if available.
- Detailed detour information, if applicable.
- A construction contingency plan.
- A map of transit routes and pedestrian/bicycle facilities.
- A summary of plans that have been coordinated with emergency services and other impacted groups (i.e., Ambulance, CHP, Fire, Bus Transit).
- A list of alternatives that were considered to reduce impact.

5.0 TRANSPORTATION MANAGEMENT PLAN EVALUATION PROCESS

5.1 TMP STRATEGY EFFECTIVENESS

Monitoring traffic impacts during highway construction helps evaluate how well the TMP strategies are performing or if the TMP strategies have been implemented properly. Field personnel should observe traffic conditions to determine if the actual impacts comply with Caltrans policies and fall within a reasonable range of the impacts that were expected. Monitoring strategies may involve manual traffic volume counts, surveys using "floating cars" to assess travel time through the work zone, or automatic measuring devices. Record keeping on project events and traffic incidents (collisions and traffic queues) may also serve as good sources of information.

The RE, the TMP/DTM Manager should determine whether the implemented strategies are reaching the predetermined goals for reducing congestion within reasonable cost limits. If an element's predetermined goal is not immediately reached during implementation, but there is a general trend toward meeting that goal, the element can remain in effect but may be modified as appropriate. Elements that show no sign of approaching their predetermined goals as determined by the TMP/DTM Manager should be revised or dropped, and other actions may be needed to minimize congestion through the work zone.

The effectiveness of TMP strategies can be evaluated through various methods:

A. Field Counts and Surveys

- Field measurements of actual delay to the road user through electronic or manual data collection.
- Field observation of congestion queues by Caltrans TMT personnel or by the contractor.

B. Public Surveys

- Questionnaires regarding how and when the road user found out about the work.
- Logging of public complaints on Caltrans web pages or through telephone calls.

C. TMP Effectiveness Checklist Reporting Factors, such as:

- The actual delay experienced.
- Additional travel time.
- Queue length.
- Number of incidents in or near the work zone.
- Incident response.
- Impacts on adjacent construction activities.
- The reasons and number of times that planned lane closures were opened late.
- Delay to transit services and ridership impacts.
- Delay to bicyclists and pedestrians.

5.2 POST-CLOSURE EVALUATION STATEMENT

A Post-closure Evaluation statement, if necessary, may be submitted to HQ Division of Traffic Operations, Office of Traffic Management, on projects that cause major delays. Typically, the majority of post-closure evaluation statements are prepared for closures formally approved by the DLCRC under this process; however, any delay over 30 minutes should trigger a post-closure evaluation statement.

The functional unit performing or overseeing the lane closure will prepare the statement within five working days of the date the lane closure exceeded the threshold criteria. No more than one page is suggested. The statement should explain the following:

- The cause and impact of delays.
- Actions taken to avoid or mitigate an occurrence or reoccurrence.
- Why the expected delay was exceeded and why it was necessary to exceed the closure window.

5.3 TMP PROCESS REVIEW

The objective of the process review is to evaluate statewide TMP practices and strategies, and use the results to guide improvements in Caltrans policies and procedures regarding safety and mobility. These reviews may include the evaluation of work zone data at the State level or field observations of selected projects. The information gathered is typically brought to the attention of the TMP/DTM Managers who may analyze and review the information and make recommendations to revise policy or standard specifications, identify training needs, or update guidelines if needed.

A joint Work Zone Safety Committee between Caltrans and the Associated General Contractors meets quarterly to address safety and mobility issues and recommend policy or specification changes. The committee includes Caltrans personnel, contractors and suppliers.

The Division of Construction conducts ongoing reviews of construction practices on randomly selected projects. The Division of Construction publishes a yearly report titled the *Contract Administration Process Evaluation*. Issues that have been addressed in recent years include work zone safety equipment and apparel, construction contingency plans, Cost + Time bidding practices, construction methods, and flexible work windows.

Construction safety meetings are held twice a year to discuss work zone safety issues and make recommendations to improve policy and specifications, to modify the construction manual, and to improve work zone training. Other topics include discussions on collision data and changes that may be needed in work zone practices to improve safety.

6.0 TRANSPORTATION MANAGEMENT PLAN TRAINING

6.1 TRAINING PROGRAM AND MATERIALS

The TMP training materials were initially prepared by Traffic Management staff and have been modified and updated by the Districts to reflect their own issues/needs. The course consists of PowerPoint presentations and videos, as well as technical handouts and interactive class exercises. The subject matter includes the TMP process, strategies, and roles and responsibilities.

Course materials can be found at: *http://traffic.onramp.dot.ca.gov/tmp*.

6.2 TARGET AUDIENCE

TMP training is for all statewide personnel directly involved in the TMP process, generally, the Divisions of Planning, Environmental, Design, Program Management, Traffic Operations, Maintenance, and Construction.

7.0 TRANSPORTATION MANAGEMENT PLAN FUNDING & PROGRAMMING

7.1 TMP CHARGING PRACTICES

When identifying funding for various TMP elements, it is important to distinguish between Capital Outlay Costs and Capital Outlay Support (COS) costs. Work done by district staff for the planning, design, and implementation of TMP activities for capital projects is an integral part of the project development process and should be charged as COS. Please refer to "Proper Charging Guide" at: *http://onramp.dot.ca.gov/hq/projmgmt/index.jsp?pg=5.* The TMP/DTM Manager and each functional manager should work closely with the Project Manager to ensure that TMP activities are included in all project workplans for all phases of the project.

The TMP support activities to consider include ridesharing programs, FSP, public awareness campaigns, route improvements, temporary bicycle and pedestrian facilities, and the Request for Proposal (RFP) process up to award of the contract. Some of these activities may also have a capital component in addition to the support component discussed here.

The workload required to develop and implement TMPs is developed during project development activities. Workload hours for TMP activities must be included in the project workplan at an appropriate Work Breakdown Structure (WBS) in order to ensure they are funded by COS. These activities should then be charged to each unique Project Identifier (PI), using the appropriate WBS code for that phase of the project. TMP-related work should be charged only to the WBS codes reserved for those activities. These codes can be found on Caltrans Division of Project Management's intranet site at: *http://onramp.dot.ca.gov/hq/projmgmt/index.jsp?pg=29* in the document entitled *Workplan Standards Guide (WSG) Release 11.1* or later version.

Work performed by district staff for implementing TMP strategies during construction of capital projects is also a normal part of the project development process. Again, workload (hours) for implementing TMP activities must be included in the project workplans to be resourced by COS. These activities should then be charged to the appropriate WBS code in phase 3 (WBS 270-Construction Engineering and Contract Administration and 270.66-Technical Support).

Various TMP elements, such as route improvements and HAR, could be a phase of the construction contract or separate construction contracts while others such as public awareness campaigns and transit subsidies must be separate contracts or cooperative agreements.

The TMP elements that must be in place prior to the start of construction are identified and funded as first order of work under a single package presented to the CTC. Service contracts such as those for public service or consultant contracts, information campaigns, or establishing telephone hotlines must be arranged separately with consultants and other providers. For most projects, it takes four to six months to obtain a service contract. This means that all consultant contracts have been advertised, the consultant selected, and the contract ready for signature and awarded immediately following the CTC allocation of funds. Other activities such as route improvements are usually included in the main construction contract and as a first order of work under a cooperative agreement.

In some cases, the CTC can be petitioned to fund a portion of the TMP as an initial phase of the main project. This is usually for a high-priority project where PS&E for the main project are not

finalized, but early funds are needed to initiate the TMP activities such as making transit arrangements with local governments. The petition to fund an initial phase comes from the District, explaining why a portion of the project must proceed before funding for the main project is allocated. These early funds are taken from the overall programmed funds for the main project.

7.2 CHARGING FOR ENCROACHMENT PERMIT AND MAINTENANCE TMP ACTIVITIES

TMPs and contingency plans for Encroachment Permit projects are developed by the permittee. Caltrans staff time for review of TMPs and contingency plans for Encroachment Permit projects is charged to the unique PI and reporting codes shown on the Encroachment Permit Application Review (Form TR-0110). Field maintenance normally develops TMPs for its projects which must be approved by the DTM. Field Maintenance and staff from other functional areas that expend time on a Maintenance TMP charge to the designated maintenance unique PI.

However, the TMP for maintenance engineering projects is developed by the traffic management unit and the time spent by the staff is charged to the unique PI.

7.3 CONSTRUCTION TOW SERVICE FUNDING

Construction tow service can be provided through: (1) agreements with the RTPAs that administer the congestion relief FSP program and the CHP for supervision of the construction tow service or (2) a requirement of the contractor as part of the construction contract.

The FSP program is a congestion relief program that funds roving tow trucks primarily during peak morning and evening commute periods to remove stalled or disabled vehicles from the highway in most metropolitan and some rural areas. The FSP program is funded by Caltrans and operated by the RTPAs. Caltrans also reimburses the CHP for training and supervisory services provided for the FSP. The RTPAs enter into contracts with tow companies to provide tire repairs, gasoline, or towing services to assist motorist during peak-hour commute periods, mid-day times, and some weekends as needed.

Construction tow service is similar to the FSP program and can be used for incident management during construction; however, construction tow service should be funded as part of the TMP. A cooperative agreement with the RTPA is required to transfer funds and outline the tow services to be provided by the FSP program beyond the normal hours of FSP. The agreement with the RTPA should be initiated as soon as it is determined that construction tow service will be needed. In addition, an Interagency Agreement (IA) with the CHP is required for field supervision and dispatch operator services. An IA is managed by the Office of Traffic Management at HQ for the CHP supervision of construction tow service statewide. This IA can be used by all districts, with district funding. Please contact HQ Division of Traffic Operations, Office of Traffic Management for more information.

Caltrans HQ Division of Traffic Operations no longer initiates cooperative agreements with the RTPAs for future FSP services. The cooperative agreement is developed at the district level, usually by the Project Manager. An alternative to setting up a cooperative agreement for each project is to establish a Master Agreement with the RTPA for construction tow service. Having a Master Agreement in place will simplify the process for both Caltrans and the RTPAs by eliminating the need for a cooperative agreement for each project; only a task order form will be needed for each project. This is similar to the agreement handled at HQ with the CHP for COZEEP/MAZEEP. A simple task order can be completed by the district for the CHP supervision

funded by the construction project. Please contact HQ Division of Traffic Operations, Office of Traffic Management for more information.

The alternative to using the RTPA and the CHP for supervision of the construction tow service is to include specifications in the contract documents to provide construction tow service. The contract document language should include a requirement that the tow provider must be approved by the CHP as either the FSP certified or tow-rotation provider.

7.4 COZEEP AND MAZEEP FUNDING

Caltrans has contracted with the CHP to provide enhanced enforcement services in work zones through the COZEEP and the MAZEEP. The CHP is the sole provider of these services. On oversight and encroachment permit projects, the local agency typically contracts with the CHP to provide these services. Consult your district COZEEP/MAZEEP coordinator for a current estimate of hourly and mileage COZEEP/MAZEEP cost. For additional information on COZEEP funding, refer to the Construction Manual, section “Estimating COZEEP Funding Requirements”.

7.5 BASIC ENGINEERS ESTIMATE SYSTEM (BEES) ITEM CODES

The TMP elements that are not part of the main contract, but are identified as COS costs tied to the main project, should be itemized as Department Furnished Materials and Supplemental Work Items using the appropriate BEES item codes (see Table 7.1).

TABLE 7.1 TMP BEES ITEM CODES

066004	Miscellaneous State-Furnished Materials
066005	Concurrent Work
066006	Miscellaneous Concurrent Work
066008	Incentive Payment
066010	Work by Others
066060	Additional Traffic Control
066062	COZEEP Contract
066063	Traffic Management Plan Public Information
066064	Specter Radar Unit
066065	Tow Truck Service Patrol
066066	Public Transit Support
066067	Rideshare Promotion
066070	Maintain Traffic
066072	Maintain Detour
066074	Traffic Control
066076	Temporary Traffic Control
066077	Install Traffic Control Devices
066578	Portable Changeable Message Signs
066825	Temporary Striping
066872	Service Contract
120100	Traffic Control System
120105	Automated Work Zone Information System
128651	Portable Changeable Message Sign (EA)
128652	Portable Changeable Message Sign (LS)
129150	Temporary Traffic Screen
860532	Changeable Message Sign System
860808	Detector Loop (EA)
860809	Detector Loop (LS)
860925	Traffic Monitoring Station (Count)
860930	Traffic Monitoring Station
861088	Modify Ramp Metering System

7.6 CHARGE TO OTHER PROJECT PHASE 4 (CONSTRUCTION) FUNDS

Funds from other construction contracts in the District may be used if those projects are in the vicinity of, or will be affected by, the project requiring TMP funds. At the discretion of the Deputy District Director for Construction, a list of chargeable PI may be submitted to HQ Division of Accounting for prorated charging.

7.7 PROJECTS FUNDED BY OTHERS

DD-60-R2 applies to all projects on State facilities, including those not funded by the State. District Directors are responsible for assuring local compliance. Caltrans and local entities must work cooperatively to develop an effective TMP. Caltrans is responsible for approving all Project Study Reports, and it is at this point that agreements should be reached concerning the costs and scope of TMP strategies.

The Caltrans Project Manager must ensure that the TMP Manager is included in discussions regarding projects with traffic-handling issues. The TMP Manager must be contacted early in the project development phase to ensure that adequate TMP strategies and hours for TMP and DTM tasks are included for projects funded by others. The local agencies and consultant preparing the traffic related specifications must be familiar with the TMP process and the specification requirements. The TMP unit will review the TMP, specifications, and traffic analysis submitted by the local agencies and the consultants for completeness, accuracy, and to make sure that submitted documents conform to current Caltrans polices and standards.

APPENDIX – A
Deputy Directive – 60-R2

Number:	DD-60-R2
Refer to Director's Policy:	DP-03-R1 Safety and Health DP-05 Multimodal Alternatives Analysis DP-08 Freeway System Management DD-64-R2 Complete Streets
Effective Date:	01/15/2015
Supersedes:	DD-60-R1 (09-28-07)
Responsible Program:	Maintenance & Operations

TITLE Transportation Management Plans

POLICY

The California Department of Transportation (Caltrans) minimizes disruption to the traveling public on the State Highway System (SHS) by utilizing Transportation Management Plans (TMPs). TMPs are required for all planned construction, maintenance, and encroachment permit activities on the SHS to minimize work-related traffic delays while reducing overall duration of work activities.

BACKGROUND

Caltrans' emphasis towards the SHS has largely shifted from new construction to the reconstruction, rehabilitation, operation, and maintenance of existing facilities. With the ever increasing traffic volumes on California's SHS and more complex highway corridor projects, the need to actively manage traffic on the state's highway facilities is even more critical.

In order to prevent unreasonable traffic delays resulting from planned work, TMPs must be carefully developed and implemented to maintain acceptable levels of service and safety during all work activities on the SHS.

Federal Work Zone Safety and Mobility regulations (23 Code of Federal Regulations 630, Subpart J) require Caltrans to adopt a policy for the systematic consideration and management of work zone impacts on all federally funded highway projects. This policy and TMPs are to be consistent with the regulations.

TMPs are also to be consistent with Deputy Directive-64, "Complete Streets-Integrating the Transportation System."

DEFINITIONS

Transportation Management Plan is an approach for alleviating or minimizing work-related traffic delays by the effective application of traditional traffic handling practices and the innovative combination of various strategies. These strategies encompass public awareness campaigns, motorist information, demand management, incident management, construction methods and staging, and alternate route planning. Caltrans' "Transportation Management Plan Guidelines" provide more information on the recommended level of detail for TMPs.

Major Lane Closures are closures that are expected to result in *significant traffic impacts* despite the implementation of TMPs.

Significant Traffic Impact is defined as being an individual traffic delay of 30 minutes or more above normal recurrent travel time on the existing facility or the delay time set by the District Traffic Manager (DTM), whichever is less. TMP strategies are designed to maintain additional delays to be less than 20 minutes above normal recurrent travel time.

District Lane Closure Review Committee (DLCRC) is composed of the Deputy District Directors of Construction, Design, Maintenance and Traffic Operations, and the District Public Information Officer (PIO). In a regionalized setting, DLCRC is composed of the representatives of the Deputy District Directors of Construction, Design, Maintenance and Traffic Operations, and the District PIO.

Headquarters Lane Closure Review Committee (HLCRC) is composed of the Division Chiefs of Construction, Design, Maintenance, Traffic Operations, and the Deputy Director of External Affairs. The California Highway Patrol may be called upon to participate as appropriate at the district or headquarters level.

RESPONSIBILITIES

District Directors:

- Ensure TMPs and lane closure policies comply with established procedures, guidelines, and policies.
- Ensure TMPs are considered during the project initiation or planning phase to the fullest extent.

Chief, Division of Traffic Operations:

- Develops, implements, and maintains statewide policy regarding TMPs.
- Provides direction, assistance, and training to district staff on all TMP activities.
- Ensures consistency among the districts on the development and implementation of TMPs.

Deputy District Directors of Construction, Design, Project Management, Maintenance, and Traffic Operations:

- Require all staff involved in TMP activities to participate in TMP training.
- Ensure that staff involved in highway work activities consider alternatives that strike a balance between reducing the overall construction duration and minimizing disruption to the traveling public.
- Deputy District Director of Construction must designate a Construction Traffic Manager to serve as a liaison between Construction, the DTM, and the District Transportation Management Plan Manager (DTMPM) to review TMPs and traffic handling contingency plans for constructability issues.

District Public Information Officers:

- Work with the project managers to ensure that the TMP funding for community outreach strategies is planned and expended appropriately, and that personnel time is included in the work breakdown structure for the project.
- Attend preconstruction or planning meetings as needed.
- Lead the implementation of a project's public awareness campaign.

District Lane Closure Review Committee:

- Reviews proposals from the project manager for work activities of the preferred alternative that require major lane closures, and approves or makes recommendations in a timely manner when planned activities are expected to result in significant traffic impacts.
- For any activities that are of an interregional, statewide, environmental, or otherwise sensitive nature, the Deputy District Director of Traffic Operations shall contact the HLCRC to discuss the specific project, its anticipated impacts, and to obtain approval.

APPENDIX – A
Deputy Directive – 60-R2

Headquarters Lane Closure Review Committee:

- Reviews and approves the proposals from the DLCRC for any activities that are of an interregional, statewide, environmental, or otherwise sensitive nature.

District Transportation Management Plan Managers:

- Act as the single focal point for planning and development of the TMPs.
- Participate in the evaluation of design, potential traffic impacts, and mitigation measures for project alternatives.
- Involve the DTM and the Project Development Team (PDT) in the planning and development of the TMP to address all pertinent issues.
- Work with the DTM and the PDT as appropriate to determine the scope and extent of a TMP, and ensure that the TMP is updated during all phases of a project.
- Consider the cumulative impact of multiple projects as well as other activities that may create or generate an increase in traffic demand or delay within the project limits and during the work period. Coordinate with other jurisdictions (such as between corridors, districts, neighboring states, and Mexico) on regional and interregional TMPs.

Project Managers:

- Require TMPs to be considered in the earliest stages of development for all projects and activities performed on the SHS.
- Identify needed project resources for all TMP measures and activities.
- Encourage the use of innovative construction staging and contracting methods to accelerate project completion when appropriate.
- Include the DTMPM, the DTM, and the District PIO as needed on PDTs from project initiation phase through completion of construction.
- Prepare and submit the major lane closure request memo to the DLCRC when approval is being requested for proposed work activities causing significant traffic impacts.
- Coordinate development of TMPs with affected local and regional transportation stakeholders as needed.

District Traffic Managers:

- Consult with the DTMPM during the planning and development of the TMP.
- Coordinate with the district construction engineers, resident engineers, DTMPM, encroachment permit inspectors, maintenance supervisors/superintendents, and District PIO to ensure implementation of the TMP during construction.
- Responsible for the day-to-day decisions pertaining to traffic impacts from planned activities on the SHS.
- Coordinate with the Transportation Management Center (TMC) or District Communication Center staff (coordinate with adjacent districts, if applicable) and PIO to respond with appropriate measures when significant travel delays occur on the SHS.
- Facilitate review, approval, modification, or denial of planned lane closure requests on the SHS.
- Recommend termination or modification of active lane closure operations without compromising the safety of the public or workers when traffic impact becomes significant.
- Review construction and maintenance contingency plans.

District Design Engineers, Encroachment Permit Engineers, and Maintenance Engineers:

- Ensure TMP measures are fully incorporated in the development of a project and for special event permits.
- Coordinate with the DTM and the DTMPM to consider alternative strategies as appropriate to determine the best alternatives for balancing traffic impacts, and construction duration and cost.
- Ensure that impacts of TMP options are fully considered during the development of work schedules and cost estimates.

- Coordinate with the DTM, the DTMPM, and Construction if changes in the TMP strategies are warranted during special events and all phases of the work.

District Construction Engineers, Resident Engineers, and Maintenance Supervisors/Superintendents:

- Ensure full implementation of approved TMPs in close coordination with the DTM and District PIO.
- Include the DTMPM, the DTM, and the District PIO as appropriate in preconstruction or work planning meetings.
- Coordinate with the DTM and the DTMPM as soon as possible to consider traffic and construction impacts if an event is scheduled in an active work zone or construction area.

Traffic Management Center Staff:

- Activate transportation system management elements in support of the TMP.
- Inform the DTM when notified of potential significant impacts due to incidents or ongoing highway activities.

APPLICABILITY

All Caltrans employees involved in TMP activities.

Kome Ajise

KOME AJISE
Chief Deputy Director

1/15/15
Date Signed

APPENDIX – B
Full Closure Guidelines and Checklist

FULL CLOSURE GUIDELINES

Traffic Operations

Caltrans

BACKGROUND

Construction in work zones with high traffic volumes has typically been done at night. Work restricted to night hours may extend over several months or years because of the inability to maximize actual working hours due to continual setup and breakdown of equipment and materials. In the same manner work in some areas has been restricted to weekend hours, heavily impacting commercial and tourist activities during the weekend.

IMPLEMENTATION

Night-time and weekend scheduling has been successfully implemented in general. However, to ensure adequate funding, full-closure traffic control strategies as one of the design alternatives should be included in the project initiation phase on projects with the following criteria.

Criteria:

- **Night-time or weekend closures lead to significant delay.**
- **Where materials or methods require day work conditions.**
- **Where longer work windows are required to complete certain activities.**
- **Overall delay over an extended construction period could have significant impacts on the traveling public, as well as on commercial interests in the project area.**
- **Significant reduction in working days is possible (e.g. 50-75%)**

  Use of a full closure can in some instances help to realize a significant reduction in the total number of working days. If the reduction is on the order of 75%, a full closure would certainly be worth consideration, not only in economic terms, but also in terms of improved quality and worker safety.

- **Must have viable alternate route or capacity**

  There must be an alternate route available that has adequate capacity to accommodate the diverted traffic flow. During construction the alternate route should be monitored in case other measures are required to improve traffic flow to the extent possible (such as restricting parking on a surface street to provide greater capacity). During the design phase identify potential bottlenecks along any proposed alternate route. Include funding within the project to implement traffic management strategies that would enhance capacity along the alternate route.

- **Adequate lead time available to provide info to public and gain support for the work**

  Information on project details and schedules must be provided to the public in advance so that they can make decisions to vary their travel patterns to avoid the planned work. With advance notice the public is usually in favor of getting the work done as quickly as possible rather than stretching it out over several weeks or months.

- **External partners must support concept.**

  External partners can be very helpful in demonstrating the benefits of the project to the public. A local, knowledgeable voice generally carries much more weight than an unknown outside group trying to sell a project, particularly with local consumer groups that may not be initially in favor of the project.

Successful Projects

Boat Section Project
I-5 in Sacramento County

Devore Project
I-15 in San Bernardino County

Bay Bridge Replacement
I-80 in San Francisco

Colfax Narrows
I-80 in Placer County

Extreme Maintenance
SR 12 in San Joaquin County

Carmageddon, I-405 Project
Mulholland Bridge Demolition

APPENDIX – B
Full Closure Guidelines and Checklist

Division of Traffic Operations
Project Initiation Phase
Full-Closure Checklist

May 2014

PROJECT INFORMATION
CO/RTE/PM:
Project #:
Project Location:
Project Description:
Date:
Project Engineer:
NEEDS ASSESSMENT
Consideration of a Full-closure traffic control strategy during the project initiation phase should be made based on whether the following criteria exist on a project and coordination through the project development team (PDT).
CRITERIA CHECKLIST
☐ Do materials or methods require day work conditions?
☐ Are longer work windows required to complete certain activities?
☐ Would night-time or weekend closures lead to significant delay?
☐ Does the extended construction period have significant impacts on commercial interests in the project area?
☐ Are significant reduction in working days possible (e.g. 50-75%)?
☐ Is a viable alternate route with adequate capacity available?
☐ Is there local support for this project?

Complete the "Full-Closure Checklist" during the project initiation phase to determine if full closure strategy should be considered during the design phase for a project.

APPENDIX – C
Work Zone Enforcement Pocket Guide

Daily Briefing - Resident Engineer/ Maintenance Supervisor, CHP Officer, and Contractor Rep

Enforcement Specifics:

- Start & end times
- Type of work being done
- Where work is being done
- Suggested location of CHP vehicle(s)
- Strategy(ies) to be used (roving unless stationary specifically requested)
- Communication protocol – contact R.E./Maintenance Supervisor or Field Inspector for inquiries or to report potential problems
- Questions or suggestions

Enforcement Services:

- Active Speed and DUI Enforcement (Project Rotation)
- Traffic control -
  - Detours
  - Assistance with traffic back-up (queue)
- Emergency assistance

Primary Contact Numbers:

- RE/Maintenance Supervisor:

Name

Phone Number

- Field Inspector:

Name

Phone Number

- CHP Cell Phone:
- Contractor Phone:
- TMC Phone:

First – Drive through the Work Zone to check setup

Help Identify:

- Potentially Hazardous Conditions of any kind
- Signs / Cones out of position
- Inconsistent or Inadequate Advance Warning Signs

If Unexpected Problems arise:

- Notify the Caltrans Resident Engineer/Maintenance Supervisor or Inspector
- Call the TMC if necessary

Caltrans

STAY ALERT!

WATCH OUT FOR EACH OTHER!

- *COZEEP – Construction Zone Enhanced Enforcement Program
- *MAZEEP – Maintenance Zone Enhanced Enforcement Program

California Department of Transportation in partnership with the California Highway Patrol

WORK ZONE ENFORCEMENT

(COZEEP/MAZEEP*)

Pocket Guide

(Project Name)

(Route)

(Post Miles)

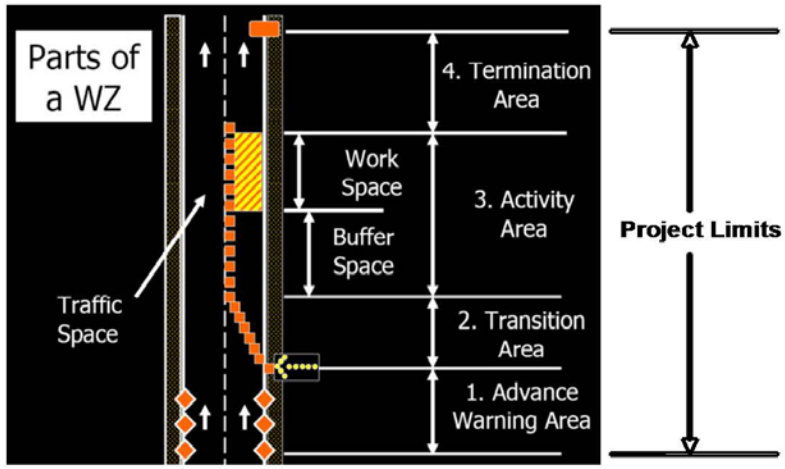
(Type of Project)

SEPTEMBER 2013

APPENDIX – C
Work Zone Enforcement Pocket Guide

Work Zone Diagram

Parts of a Work Zone



Investigations...?

- In order to remain in the Work Zone vicinity, all enforcement action that may result in an in-custody arrest should be relinquished to a Beat Officer. (CHP MM 05-120)

Advance Warning Signs

3-step process:

- 1st sign: Gets motorist's attention
- 2nd sign: Tells what's ahead
- 3rd sign: Tells them what to do

Stationary Strategies (usually COZEEP):

- **Stay on the shoulder**
- **Not in buffer space**
- **Relocate as needed based on traffic conditions**
- **1/4 mile ahead of the end of the traffic back-up (queue)**

Moving Operations (usually MAZEEP):
(Examples: Paving, Striping..)

→ **The Work Zone moves continuously.**
→ **You Should Move with it!**

Observe the "15-minute Rule":

- Arrive 15 minutes before traffic control devices are being placed, moved or taken down.
- Stay 15 minutes after these changes have taken place, to ensure the new traffic control change is working properly.
- Pass on info to the next shift if needed.

APPENDIX – D
MAINTENANCE BLANKET TMPs

List of activities that typically occur off the traveled way:

- Litter removal
- Freeway patrol for debris and litter
- Tree work (trimming/pruning)
- Landscaping area work (irrigation and repair, weed control, trimming, pruning, thinning, replacing)
- Delineator/post mile marker repairs/replacement
- Culvert/drainage facility work (cleaning/inspection)
- Sign repairs/replacement
- Off traveled way median barrier/guard rail/attenuator repairs
- Right-of-Way fence repair work
- Sump pump repairs/cleaning
- Ditch and channel cleaning work
- Rest area/vista points/map view area/weigh station/park-and-ride Lot (public facilities) maintenance work
- Graffiti abatement/cleanup on walls/signs/equipment cabinets
- Non-landscaped area tree/brush/vegetation work
- Non-traveled way electrical work
- Roadside mowing
- Shoulder area grading for lateral support
- Electrical Work (traffic census counters, loops, and cabinets)

Activities that can be suspended (shoulder/lane closure opened) if unacceptable delay occurs:

- Pavement marking operations
- Sign lighting repair
- Traffic signal knockdown repairs
- Sweeping litter/debris operations
- Moving shoulder/lane closure operations
- Asphalt Concrete (AC)
- Portland Cement Concrete (PCC) pavement crack sealing
- Pothole repairs
- Drain inlet cleaning
- Pavement striping operations
- Raised pavement marker replacement
- Sign and highway lighting re-lamping operations
- Roadside vegetation control (spraying/mowing) operations

Work that must be completed prior to reopening to traffic (shoulder/lane closure open):

- Moving shoulder/lane closure operations
- PCCP slab replacement
- Pavement chip seals
- Culvert replacement operations
- Guardrail/gore attenuator repairs
- AC pavement blankets
- Pavement mud jack operations
- Most bridge repair on traveled way
- Pavement grinding (AC Digouts) operations
- Traffic counting elements (loop detectors)

APPENDIX – E
TMP RESOURCES

STATEWIDE TMP RESOURCES

For further guidance or questions on the TMP content and this process, contact the TMP Manager in your District. For questions regarding the TMP policy, contact HQ Office of Traffic Management. Organizational charts and contact information are on the Caltrans intranet at: *http://traffic.onramp.dot.ca.gov/*. External entities may contact their local office at: *http://dot.ca.gov/localoffice.htm*.

SOURCES OF TMP INFORMATION

A publication by the FHWA, *Developing and Implementing Transportation Management Plans for Work Zones*, contains a comprehensive work zone strategies matrix that provides information on triggers for considering various strategies, potential benefits and challenges, and other considerations that can help to determine the best strategies for the project.

Two sources for guidance on selecting the most effective TMP elements, in terms of cost and informational content are *Wilbur Smith Associates' Traffic Management Plan Effectiveness Study* (May 1993)" and *Frank Wilson & Associates' A Traffic Management Plan Study for State Route 91 During Construction of HOV Lanes*. Both of these publications can be obtained from HQ Traffic Operations, Office of Traffic Management.

The Public Information Office in each District is also an experienced source for public awareness campaign strategies, and they can help the TMP Manager estimate the cost and effectiveness of the proposed TMP strategies in reducing traffic demand throughout the project area.

APPENDIX – F
SAMPLE TMP DATASHEET-continued
(Preliminary TMP Elements and Rough Costs)

Co/Rte/PM _____ _____ _____

Project Limit _____

Project Description _____

Expected Construction Schedule _____

1) Public Information

- ☐ a. Brochures and Mailers $ _____
- ☐ b. Press Release
- ☐ c. Paid Advertising $ _____
- ☐ d. Public Information Center/Kiosk $ _____
- ☐ e. Public Meeting/Speakers Bureau
- ☐ f. Telephone Hotline
- ☐ g. Internet/Project web-site/Social media
- ☐ h. Others _____ $ _____

2) Motorists Information Strategies

- ☐ a. Changeable Message Signs $ _____
- ☐ b. Portable Changeable Message Signs $ _____
- ☐ c. Ground Mounted Signs $ _____
- ☐ d. Highway Advisory Radio $ _____
- ☐ e. California Highway Information Network (CHIN)
- ☐ f. Others _____ $ _____

3) Incident Management

- ☐ a. Construction Zone Enhanced Enforcement Program (COZEEP) $ _____
- ☐ b. Tow/Freeway Service Patrol $ _____
- ☐ c. Traffic Management Team
- ☐ d. Helicopter Surveillance $ _____
- ☐ e. Traffic Surveillance Stations (Loop Detector and CCTV) $ _____
- ☐ f. Others _____ $ _____

APPENDIX – F
SAMPLE TMP DATASHEET-continued
(Preliminary TMP Elements and Rough Costs)

4) Construction Strategies

- ☐ a. Lane Requirement Chart
- ☐ b. Reversible Lanes
- ☐ c. Total Facility Closure
- ☐ d. Contra Flow
- ☐ e. Truck Traffic Restrictions
- ☐ f. Reduced Speed Zone
- ☐ g. Connector and Ramp Closures
- ☐ h. Incentive and Disincentive Clause $
- ☐ i. Moveable Barrier $
- ☐ j. Others $

5) Demand Management

- ☐ a. HOV Lanes/Ramps (New or Convert) $
- ☐ b. Park and Ride Lots $
- ☐ c. Rideshare Incentives $
- ☐ d. Variable Work Hours
- ☐ e. Telecommute
- ☐ f. Ramp Metering (Temporary Installation) $
- ☐ g. Ramp Metering (Modify Existing) $
- ☐ h. Others $

6) Alternative Route Strategies

- ☐ a. Add Capacity to Freeway Connector $
- ☐ b. Street Improvement (widening, traffic signal... etc) $
- ☐ c. Traffic Control Officers $
- ☐ d. Parking Restrictions
- ☐ e. Others $

7) Other Strategies

- ☐ a. Application of New Technology $
- ☐ e. Others $

TOTAL ESTIMATED COST OF TMP ELEMENTS = $ _____

APPENDIX – F
SAMPLE TMP DATASHEET-continued
(Preliminary TMP Elements and Rough Costs)

Public Information	
Hiring Consultant to do Public Relations	$100,000 - $250,000
Mailer (printing)	$0.50 - $1.00/1,000 Mailers
Mailer (cost to distribute)	$0.34/Mailer
Flyers (printing)	$0.10 - $1.00/1,000
Flyer (cost to distribute by outside company)	$65/1,000
Billboards	$2,500/month
Press Release, Flyer, Bulletins (Develop, State Force)	$224
Newspaper Ad (Black and White, $\frac{1}{4}$ pg.)	$6,000/day
Newspaper Ad (Black and White, $\frac{1}{2}$ pg.)	$12,000/day
Newspaper Ad (Black and White, full pg.)	$18,000/day
Newspaper Ad (Color, $\frac{1}{4}$ pg.)	$8,000/day
Newspaper Ad (Color, $\frac{1}{2}$ pg.)	$14,000/day
Newspaper Ad (Color, full pg.)	$22,000/day
Press Conference/Public Meeting (Depends on Location/Room Size)	$0 – 1,000/day
Open House	$3,000
Radio Ad (varies greatly)	$800/minute
Telephone Hotline (+$250 Hook-up)	$45/month
TV Commercial (Local Cable)	$4,000+
TV Commercial (Broadcast Channel)	$20,000+
Kiosk Rental (Small)	$1,200/month
Kiosk Rental (Large)	$1,500/month

Motorist Information	
Permanent CMS	$300,000
Portable CMS	$10,000
Portable CMS (Rental)	$350/day, $1,500/week, $3,500/month
Portable Highway Advisory Radio	$60,000/unit
Highway Advisory Radio (Super)	$70,000/unit
Ground Mount Signs	$300 each

APPENDIX – F
SAMPLE TMP DATASHEET-continued
(Preliminary TMP Elements and Rough Costs)

Incident Management	
COZEEP/MAZEEP (One officer at day time and two officers at night time)	$1,000/night time $1,000/day time
Freeway Service Patrol (including admin cost, contingency and CHP dispatch)	$119.07/hr (reg. time) $116.45/hr (over time)
Loop Detector	$300 each
CCTV	$20,000 to $200,000
Traffic Management Team (State Force)	$0
Transportation Management Center (State Force)	$0
Helicopter Surveillance	$600/hour
Mobile Command Center (State Furnished)	$0

Construction Strategies	
K-Rail	$10-15/LF
Movable Concrete Barrier (Rental)	$30/LF
Movable Concrete Barrier – Transportation Machine (Rental)	$100,000/6 months
Gawk Screen (optional)	$3/LF
Temporary Signal	$30,000 each

Demand Management	
Park & Ride	$50/hour
Ramp Metering	$50,000/location

Alternative Routes	
Traffic Control Officers	$50/hour