

SUMMARY OF WORK ZONE IMPACT MANAGEMENT STRATEGIES

A variety of work zone impact management strategies can be used to minimize traffic delays, improve mobility, maintain or improve motorist and worker safety, complete roadwork in a timely manner, and maintain access for businesses and residents. The following sections provide brief summaries of various strategies that may be used during the development of a Transportation Management Plan. These strategies must be reviewed and adjusted to address each project location and situation. Note that the strategies discussed in these sections are not all inclusive, but offer a large number to consider, as appropriate, in developing TMPs. Other options may be applicable for the project under consideration.

Individual strategies may fall into multiple categories. For example, Variable Message Signs are a traffic control device as defined by the MUTCD; however, they can be used for motorist information and work zone ITS applications as well.

This section is intended to be a reference for selecting work zone management strategies and provide definitions for the strategies.

1. TEMPORARY TRAFFIC CONTROL

Temporary traffic control strategies and devices are used to facilitate traffic flow and safety through and around work zones. Standards, guidance, and other information regarding the proper use of traffic control strategies and devices are provided in Part 6, Temporary Traffic Control, of the MUTCD. Traffic control plans should be developed to construct the corridor improvements using a construction sequencing scheme that completes the project in the shortest possible time frame, focuses early efforts on areas that currently exhibit the highest levels of congestion, and provides safe, quality construction operations.

1.1. Temporary Traffic Control Strategies

Traffic control strategies can be used to accommodate road users within the work zone or the adjoining corridor in an efficient and safe manner. They are also used to provide adequate access to the roadway for the required construction, maintenance, or utility work and to provide safety for the worker.

- Construction Phasing/Staging – Staging refers to how the contractor will position the equipment and materials. Phasing refers to the sequencing of the aspects of a project, completing portions of the project one part at a time. The impacts of a work zone may be minimized by using operationally-sensitive phasing and staging throughout the life of the project.
- Full Closure – Full roadway closures involve the complete closure of the roadway for various time periods to minimize the duration of the project and improve worker safety by reducing traffic conflicts. Full closures may be brief (e.g. intermittent or off-peak), short-term (e.g., night or weekend), or long-term (e.g.

continuous for the duration of the project). Through traffic is rerouted on other designated routes.

- Crossovers – A crossover involves closing one side of a divided facility and routing the traffic across the median to the opposite traffic lanes. Accommodating both directions of traffic on one side of a facility allows work to proceed without traffic interference.
- Lane Shifts or Closures – Lane shifts or closures last for varying durations of time. They may be intermittent, off-peak, night, weekend, for a single project phase, or continuous for the duration of the project. Several approaches may be involved in this strategy, including:
 - *Reduced Lane Widths* – 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 Closure* – Closing one or more lanes of traffic to accommodate work activities and provide worker safety.
 - *Reduced Shoulder Widths* – Reducing the width of the inside and/or outside shoulder to maintain the existing number of lanes while allowing access for the work activities to take place.
 - *Shoulder Closure* – Closing the shoulder for use by the public to accommodate work activities and provide worker safety.
 - *Use of Shoulder or Median* – Diverting traffic onto the shoulder/median or a portion of the shoulder/median for use as a traffic lane.
- Ramp Closure/Relocation – Ramp closure involves closing one or more ramps in or near the work zone for specific time periods or construction phases to allow work access or improve traffic flow on the mainline.
- Detours/Use of Alternate Routes – This strategy involves re-routing some or all of traffic off of the roadway under construction and to other existing roadways. Alternate routes may benefit from improvement such as signal re-timing and coordination as well as operational changes, including parking and turning restrictions.
- One-Lane, Two-Way Operation – This work zone type involves using one lane for both directions of traffic, allowing work operations to occur in the lane that is now closed. Flaggers or temporary signals are typically used to coordinate the two directions of traffic.
- Reversible Lanes – This strategy, also known as contra-flow lanes, involves sharing lane(s) of travel to accommodate peak-period traffic flow. The direction of travel in the shared lane(s) varies by time of day or day of week.

- Night Work – Work (all or individual phases) is performed at night (end of evening peak period to beginning of morning peak period) to minimize work zone impacts on traffic and adjacent businesses.
- Weekend Work – Work (all or individual phases) is restricted to weekend periods from the end of the Friday afternoon peak period to the beginning of the Monday morning peak period.
- Work Hour Restrictions – Work hour restrictions limit work hours such that work that impacts traffic does not occur during periods of peak travel demand and congestion (e.g., peak hours, holidays, and special events).
- Pedestrian/Bicycle Access Improvements – This strategy involves providing facilities for bicyclists and pedestrians in places where the work zone impacts their accessibility.
- Business Access Improvements – Business accessibility improvements may include signage or information to direct motorists to the business and/or relocation of access locations.
- Temporary Structures - An appropriately sized adjacent structure is erected for the duration of the construction project only. All traffic is shifted to this new structure to permit complete closure of the existing structure without detouring traffic to another route. This additional structure is removed once construction on the existing structure is complete.
- Temporary Pavements – This strategy involves the addition of temporary pavement to maintain traffic. Temporary pavement can be used for:
 - *Widening* – The addition of pavement adjacent to the existing roadway in order to maximize the number of lanes available during construction.
 - *Runaround* – A temporary roadway constructed parallel to the work zone within the right-of-way to be used as a detour with the corridor when the mainline is closed.

1.2. Temporary Traffic Control Devices

The MUTCD provides standards, guidelines and other information pertaining to installing, maintaining and operating traffic control devices on streets and highways. Part 6 of the MUTCD, “Temporary Traffic Control”, addresses safety, mobility, and constructability issues in work zones. The following are examples of traffic control and safety devices for work zones:

- Temporary Traffic Signals – This strategy involves the use of fixed or portable temporary traffic signals to improve traffic flow through and near the work zone and/or to address safety concerns.

- Temporary Signs – Temporary signs are used to provide information to road users to enable safe and efficient travel through the work zone or a detour. They are an essential and integral part of temporary traffic control. Signing shall conform to the MUTCD or SHA’s Standard Highway Sign Book.
- Changeable Message Signs – Both fixed and portable changeable message signs are effective for conveying work zone information to drivers. The signs can provide real-time information to drivers concerning specific work operations, traffic patterns, or other conditions in the work zone.
- Arrow Panels – Arrow panels are intended to aid motorists in navigating and merging through and around the work zone.
- Channelizing Devices – Channelizing devices, such as cones, drums, barricades, tubular markers or temporary traffic barrier, are used to define the intended travel path through the work zone and to delineate potential work zone hazards. Refer to the Temporary Traffic Barrier Policy for instruction on when Temporary Traffic Barrier is required.
- Temporary Pavement Markings – Temporary pavement markings define travel lanes and provide guidance through the work zone. Consideration should be given to project phasing to minimize the need for removing and replacing temporary pavement markings for each phase.
- Flaggers and Uniformed Traffic Control Officers – Flaggers, and to a lesser extend police or traffic control officers, are used to direct and control road users and pedestrians in work zone.
- Lighting Devices – Work zone lighting offers enhancement to other work zone strategies by attracting attention to traffic control devices and improving delineation. They can also be used for improved worker safety and for guiding road users through a work zone.

2. PROJECT COORDINATION, CONTRACTING AND ACCELERATED CONSTRUCTION METHODS

Project coordination, contracting, and accelerated construction strategies have the potential to reduce traffic impacts and project duration.

2.1. Project Coordination

Project coordination, done early in the planning and design process, has the potential to reduce safety and mobility impacts, as well as project delays and duration.

- Coordination with Other Projects – Coordinating, sequencing, and scheduling projects at the corridor, District and State levels may reduce motorist delay,

minimize impacts to potentially affected businesses and communities reduce exposure time to road work, and increase efficiency. Projects within a corridor may be combined or scheduled at the same time where practical, pending available funding, to minimize impacts to the motoring public.

- Utilities Coordination – An extensive utility survey should be conducted early on in the project development process to minimize risks. Coordinating and scheduling utility work within the work zone area and near the project is important to minimize potential work disruptions or interruptions due to utility work, and may reduce overall construction time. Also, coordinating work zone design with utilities will help to identify potentially expensive utility impacts and relocations that should be avoided or planned into the project budget.
- Right-of-Way Coordination – Increased consideration of potential right-of-way needs and issues may help reduce project delays and duration. The need for additional right-of-way for staging areas or maintenance of traffic should be identified early.
- Coordination with Other Transportation Infrastructure – Coordination with non-highway transportation facilities such as transit junctions, railroad crossings, and intermodal facilities can help minimize traffic disruptions.

2.2. Contracting Strategies

These strategies typically involve contractual agreements to reduce the project duration or traffic impacts. Contracting strategies include:

- Design-Build – This strategy involves the use of one contract to both design and build the project. Design-build reduces project duration by allowing construction to begin prior to design completion.
- A+B Bidding – A + B bidding encourages contractors to minimize construction impacts by reducing construction time. Part A refers to the contractor's bid amount for the actual items of work. Part B is the proposed number of days bid to complete the project, multiplied by the daily road user cost stipulated in the contract. The combined values of A and B determine the winning bid.
- Incentive/Disincentive Clauses – Consider adding incentive/ disincentive provisions to minimize the time a facility may be affected by construction.
- Lane Rental – Lane rental involves assessing a charge to the contractor when a portion of the roadway is obstructed and unavailable to traffic. The lane rental charge can vary according to time of day, day of week, number of lanes impacted, and duration.

2.3. Accelerated Construction Techniques

These techniques involve the use of special materials or precast items to minimize the duration of construction or maintenance activities where traffic restrictions need to be minimized and when work activities need to be completed during night or weekend periods to allow reopening of travel lanes for normal weekday travel.

- Prefabricated/Precast Elements – Maximize the use of prefabricated/precast elements to reduce construction duration. Consider prefab of entire bridge span off-site then erecting in place. The following are all candidates for prefabrication:
 - Pier caps
 - Pile bent caps
 - Pier columns
 - Girders
 - Full depth decks
 - Deck and girder units (partial or complete superstructure units)
 - Mono-shafts under columns
- Rapid Cure Materials – Quick curing concrete, for example.
- Accelerated Construction Technology Transfer (ACTT) Workshops – Workshops focus on sharing national knowledge and expertise to promote accelerated construction and keep traffic moving. States set up project specific workshops. The ACTT team meets with the project team, tours the project site, and engages in two days of lively exchanges about cutting edge ways to get in, build it (and build it right), and get out as soon as possible, minimizing impacts on the traveling public. More information can be found on FHWA's website at: <http://www.fhwa.dot.gov/construction/accelerated/index.htm>

3. TRANSPORTATION OPERATIONS STRATEGIES

Transportation operations (TO) strategies are used to mitigate work zone impacts through the use of improved transportation operations and management of the transportation system. TO strategies include demand management, corridor/network management, work zone safety management, and enforcement strategies.

3.1. Demand Management Strategies

The objective of demand management strategies is to increase the normal person movement capacity of a freeway corridor. Strategies include:

- Transit Service Improvements - This element may include an increase in existing transit service frequencies, modification of transit schedules and/or routes, or the establishment of transit in the corridor.

- Transit Incentives – Transit pass subsidies through employers and guaranteed ride home for rideshare users can be effective in encouraging transit use, provided that routes, service hours and frequencies serve major origins and destinations in the corridor.
- Shuttle Services – Shuttle services and charter buses can reduce traffic volumes if a sufficient number of users along the corridor are anticipated to use the service.
- Ridesharing/Carpooling Incentives – Rideshare/carpooling incentives may include preferential carpool or vanpool parking and carpool matching. To be effective, rideshare incentives should be implemented with other demand management strategies, such as the addition of HOV lanes on the freeway, provision of vanpool vehicles, and addition of park-and-ride lots.
- Park-and-Ride Lots – This involves the addition, expansion, and/or promotion (advertising) of park-and-ride lots to encourage ridesharing or transit use. Temporary or permanent park-and-ride lots adjacent to the project corridor can use available state owned right-of-way, other public agency properties, existing park-and-ride lots, or leased space from existing shopping centers.
- High Occupancy Vehicle (HOV) Lanes – HOV lanes require two or more persons per vehicle for use and are intended to provide an incentive for carpooling. HOV lanes can be provided as the first phase of construction for an HOV lane construction project, by utilizing existing shoulders or median, or by designating one of the existing lanes for HOV use. Temporary HOV lanes require temporary signing and striping. The designation of an existing lane for HOV use is likely to be controversial.
- Congestion Pricing – Congestion pricing is intended to reduce peak-period vehicle trips through the use of higher tolls during congested conditions.
- Ramp Metering – Ramp meters are traffic signals located on on-ramps or freeway connectors to maintain safe and smooth freeway operations by controlling the entry of vehicles onto the roadway. Ramp metering could cause vehicles to divert to alternate routes.
- Parking Supply Management – This strategy involves reducing traffic demand by managing the parking supply, typically through cost strategies. Overall, parking management strategies tend to have smaller impacts on employee mode choice at firms with an abundant parking supply and where options for controlling spill-over (i.e., employee parking on the streets or in other off-site lots) are limited.
- Variable Work Hours – This strategy involves encouraging motorists to work variable hours in order to reduce travel demand during peak periods.

- Telecommuting – Telecommuting means working at home, or at a telecommuting center near home, either full or part time. Motorists who normally travel through the work zone are encouraged to telecommute to reduce traffic demand.

3.2. Corridor/Network Management Strategies

Corridor/network management strategies optimize traffic flow through the work zone corridor and adjacent roadways by using various traffic operations techniques and technologies, including:

- Signal Timing/Coordination Improvements – Retiming traffic signals can be used to increase corridor throughput, improve traffic flow and optimize intersection capacity in and around the work zone.
- Temporary Traffic Signals – The installation of temporary traffic signals can be used to improve traffic flow through and near the work zone. Temporary traffic signals may be required to accommodate construction phasing.
- Street/Intersection Improvements – Improvements on the project corridor and/or on alternate routes may be necessary to provide increased capacity or adequate geometrics.
- Bus Turnouts – Bus turnouts are bus stop areas that are recessed from the travel lanes. This strategy may be helpful in work zone or on detour routes with a high occurrence of bus stops.
- Temporary Parking Restrictions – This strategy involves the elimination of parking on all or part of the work zone or alternate routes. Restricting on-street parking can be used to add an additional lane or to reduce traffic conflicts. Parking restrictions may be 24 hours/day, during work hours, or during peak periods. Concerns of on-street parking for local businesses must be addressed.
- Truck/Heavy Vehicle Restrictions – Restricting truck travel through the work zone during specific periods or at all times can increase passenger vehicle capacity of a roadway with normally high truck volumes. Consideration must be given to the suitability/availability of alternate routes that restricted truck would be required to take [refer to 23 CFR Part 658.11 (d) (1) and (g)].
- Turn Restrictions – Turn restrictions should be considered where it may be necessary for capacity and/or safety reasons. Restrictions can be at intersections and/or driveways, during peak periods or for 24 hours/day.
- Separate Truck Lanes – This strategy involves the provision of a separate truck lane through the restricted use of an existing lane, use of the shoulder or median, or construction of a new lane.

- Reversible Lanes – This strategy, also known as contra-flow lanes, involves sharing lane(s) of travel to accommodate peak-period traffic flow. The direction of travel in the shared lane(s) varies by time of day or day of week.
- Ramp Metering – Ramp meters are traffic signals located on on-ramps or freeway connectors to maintain safe and smooth freeway operations by controlling the entry of vehicles onto the roadway. Ramp metering could cause vehicles to divert to alternate routes.
- Ramp Closures – Ramp closure involves closing one or more ramps in or near the work zone for specific time periods or construction phases to allow work access or improve traffic flow on the mainline.
- Railroad Crossing Controls – When a railroad crossing is located with a work zone and/or on a detour route, traffic control improvements 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. Improvements may include advanced warning signs, railroad crossing signs, pavement markings, flashing lights, gate arms, flaggers or police officers, and possibly closure of the crossing to traffic during work periods.
- Coordination with Adjacent Construction Site(s) – Projects within a corridor should be coordinated to minimize the combined impacts on the traveling public and community. Work zones on adjacent or parallel highways occurring at the same time as the project may also affect capacity. Project scheduling should be coordinated to ensure that adequate capacity remains available to accommodate the anticipated travel demand. Coordination regarding lane closure hours, the occurrence of incidents, and proposed diversion routes is recommended. Capacity or safety improvements on a roadway expected to carry diverted or detoured traffic should also be coordinated.

3.3. Work Zone Safety Management Strategies

This category includes devices, features, and management procedures used to address traffic safety concerns in work zones.

- SHA's Work Zone Safety Toolbox – The Work Zone Safety Toolbox contains guidance on several work zone safety strategies and technologies, including:
 - Police Traffic Services in Work Zones
 - Portable Changeable Message Signs With Speed Display
 - Speed Display Trailers
 - Temporary Transverse Rumble Strips in Work Zones
 - Alternative Procedure for the Determination of Work Zone Speed Limits
 - Drone Radar
 - CB Wizard Alert System
 - Traffic Lookouts

- Reduced Channelizing Device Spacing
- ITS in Work Zones
- Wider Lane Lines

The strategies and technologies presented in the toolbox are intended to supplement SHA's standards, specifications, and policies. Refer to the Toolbox for details on each strategy/technology. Some are presented in more detail in this document.

- Speed Limit Reduction/Variable Speed Limit – Reduced work zone speed limits may improve traffic safety and help protect workers. Reduced speed limits may also be appropriate on detours where traffic volumes and conflicts are increased.
- Temporary Traffic Signals – In some work zones, temporary traffic signals can be used in place of traffic control officers or flaggers, which may increase safety by removing these personnel from the roadway.
- Temporary Traffic Barrier – Temporary traffic barriers provide positive physical separation between travel lanes and the adjacent work zone, or between travel lanes. Refer to SHA's Temporary Traffic Barrier Policy for further information on when temporary traffic barrier is required.
- Movable Traffic Barrier Systems – A movable traffic barrier system consists of a mechanical transfer machine, which quickly shifts temporary barrier laterally up to the full width of a travel lane while both the transfer operation and traffic in the work zone are protected. This system permits the rapid and safe reconfiguration of the traffic barrier system, allowing daily opening and closing of lanes for reversible lane operations and to provide additional space for the contractor to work during off-peak conditions.
- Crash Cushions – A crash cushion is a fixed or mobile barrier used to protect a temporary hazard or prevent vehicle intrusion into the workspace or other hazardous area.
- Temporary Rumble Strips – Rumble strips are grooves or raised strips placed across or adjacent to a travel lane to alert motorists to a change in roadway conditions, or that they have strayed out of the travel lane.
- Warning Lights – Various types of warning lights (see the MUTCD for further information) are available to alert drivers and pedestrians and to draw attention to critical signs, construction vehicles, and other work zone features.
- Project Task Force/Committee – Creating a project task force or committee to address safety and/or traffic control within the work zone and adjacent corridor can be effective during design and construction.

- Construction Safety Supervisor/Inspectors – Daily inspection and supervision of safety and/or traffic control operations is an integral part of project management, and can be provided by various contractor and/or agency personnel.
- Road Safety Audits – Road safety audits involve analysis of the future or existing roadway by an independent expert(s) on safety issues. It is a proactive way to reduce crashes and identify potential safety hazards.
- TMP Monitor/Inspection Team – This strategy involves the establishment of a team (or person) to monitor and inspect implementation of the work zone transportation management strategies.

3.4. Work Zone Intelligent Transportation Systems (WZ-ITS)

Using intelligent transportation systems in work zones has the potential to make traffic flow through and around the work zone safer and more efficient. WZ-ITS involve the use of electronics, computers, and communications equipment to collect information, process it, and take appropriate actions. ITS technology can be applied in work zones to monitor and manage traffic, provide traveler information, or track and evaluate contract incentives/disincentives (performance-based contracting). WZ-ITS technology may also be applied to enhance the safety of both the road user and worker or increase capacity.

- Late Lane Merge Concept – The Late Lane Merge Concept instruct motorists to use both lanes until the merge point and then take turns merging as they approach a single lane closure situation. The late lane merge concept can be accomplished using static sign or a dynamic system. Refer to the Office of Traffic and Safety’s “Guidelines for the Deployment of the Late Lane Merge Concept” for more information.
- PCMS with Speed Display – Portable Changeable Message Signs (PCMS) with Speed Display is a WZ-ITS system that can be effectively used to reduce the speed of vehicles traveling through work zones and to increase speed limit compliance in work zones. Speed detection devices are connected to the PCMS units and provide vehicle speed information to the PCMS. The vehicle speeds are then displayed to passing motorists.
- Travel Time Estimation System - Travel time estimation is a WZ-ITS system that obtains real-time traffic data and uses computer software to predict the current travel time on a section of roadway. The information can then be displayed to the motorist on a PCMS, displayed on the Internet, or sent to a pager/cell phone/PDA.
- Advanced Speed Information System - An advanced speed information system is a WZ-ITS system that utilizes microwave traffic sensors and PCMSs to alert motorists of upcoming traffic conditions. This information can also be displayed on the Internet or sent to a pager/cell phone/PDA.

- Advanced Congestion Warning System – An advanced congestion warning system is a WZ-ITS system designed to detect congestion (or slowed traffic) in a work zone and alert travelers further upstream via PCMSs that the congestion is occurring. This information can also be displayed on the Internet or sent to a pager/cell phone/PDA.
- Conflict Warning System – A conflict warning system is a WZ-ITS system designed to detect a potential hazardous condition and warn travelers of the condition in time for evasive action. Typical conflict warning systems include runaway truck warning, excessive speed warning, and restricted clearance warning.
- Travel Time Monitor System - Travel time monitor is a WZ-ITS system that obtains real-time traffic data and uses computer software to monitor the current travel time on a section of roadway. This information can be used in combination with a maximum travel-time oriented performance based specification to verify contractor compliance with the spec and/or to determine the incentive/disincentive to be awarded to the contractor.
- Freeway Queue Monitor System – Freeway queue monitor is a WZ-ITS system designed to assess current traffic conditions and report the queue length in real-time over specified intervals. This information can be used in combination with a maximum queue-length oriented performance based specification to verify contractor compliance with the spec and/or to determine the incentive/disincentive to be awarded to the contractor.

3.5. Police Traffic Services

The use of police traffic services in construction and maintenance work zones has proven to be effective in enhancing the safety of road workers and motorists. The primary reasons to utilize police services in work zones include speed control, enforcement, traffic incident/accident management, traffic control, and increased work zone visibility.

- Cooperative Police Enforcement – Cooperative police enforcement is implemented through an Interagency Work Zone Service Agreement between SHA and Maryland Department of State Police (MSP) to provide MSP Troopers in work zones. The purpose of the MSP Troopers is to increase motorist awareness, encourage greater obedience to posted regulations, and enhance safety.
- Drone Radar – Drone radar is an electronic device that emits radio signals that emulate police radar to activate radar detectors used by the general public. Motorists are more likely to adhere to the speed limit if they perceive there is an increased risk of receiving a speeding ticket.

4. PUBLIC INFORMATION AND OUTREACH STRATEGIES

Public information and outreach (PI&O) is an essential and vital component of all TMPs. The goals of the PI&O strategies are to:

1. Improve public awareness/understanding of the project.
2. Modify travel habits to reduce traffic congestion during the project.
3. Promote project support.

The public information campaign may need to start prior to project construction. The purpose of this approach is to make the public aware of the project and potential impacts prior to construction, and to inform the public about the construction status and the available TMP program elements such as alternative travel routes, additional shuttle service, park-and-ride lots, or improved transit services.

Early public involvement, particularly by impacted communities and businesses, in the development of the TMP and keeping them informed throughout construction is essential both to identify potential impacts and to ensure that effective mitigation strategies are developed and implemented.

Refer to the Public Information and Outreach supplement in Appendix G of the TMP Guidelines for information on Public Awareness and Motorist Information strategies.

5. INCIDENT MANAGEMENT STRATEGIES

On highways already constricted by construction, further reduction in capacity caused by accidents or vehicular breakdowns can compound adverse impacts to motorists. Provisions can be made to have standby tow trucks or vehicles equipped with push bumpers on site or close at hand to minimize response time and reduce the effect on traffic flow. The following incident management strategies need to be incorporated into the work zone design or impact management plan. Refer to Appendix X for how other work zone impact management strategies may be used for incident management.

- Standby Towing Services – This strategy involves the use of dedicated or on-site (near site) towing services to reduce the time required to remove vehicles involved in a crash or breakdown.
- Planned Detour Routes – Advance identification and approval/authorization of local detour route is a useful strategy to address major traffic delays due to incidents, particularly for high volume roadways.
- Emergency Pull-outs – Emergency pull-outs designed into the work zone provide a safe location within the work zone for disabled vehicles to pull over without blocking a through traffic lane.

- Crash Investigation/Emergency Access Location – This strategy involves providing a safe location with the work zone for emergency access or for crash investigation.
- ITS for Incident Management – ITS can be used in work zones to identify areas where traffic flow is impeded. This information can be fed to motorist information outlets or to the SOC, where the incident can be verified.