

## STAKEHOLDERS

As demonstrated in the previous chapter, special events are dynamic and vary considerably in size, duration, and impact. Accordingly, the planning and management of special events requires the cooperation of many different parties to ensure safe and efficient travel during those times.

This chapter describes stakeholder involvement in special event planning and management, including (1) the role each stakeholder has in the process, (2) the jurisdiction over which the stakeholder is responsible, and (3) the interaction between each of the stakeholders. Other issues described include (1) the consistency with which the various stakeholders interact, (2) provisions for sharing personnel and/or equipment, (3) who takes the lead in coordinating multijurisdictional or interagency activities, and (4) the occurrence of multijurisdictional or interagency meetings to assess current practices.

### STAKEHOLDER INVOLVEMENT

Stakeholders identified as having a primary role in special event planning and management are depicted in Figure 2. For the purposes of this investigation, a stakeholder is said to

have a primary role if more than one survey respondent identified it in the survey questionnaire. Secondary stakeholders, who were identified in only a single instance as having a role in special event planning or management, are listed here.

- Mayor’s office
- Chamber of commerce
- Emergency operations center
- Other state DOTs
- City/county planning boards
- Codes/ordinances offices
- Construction offices
- Consultants
- Barricade companies
- Public transit agencies
- State/national parks offices
- Department of fish and game
- Department of forestry
- Railroads
- General public
- Private groups and volunteers

This secondary involvement likely indicates that stakeholder interaction does not occur uniformly among all

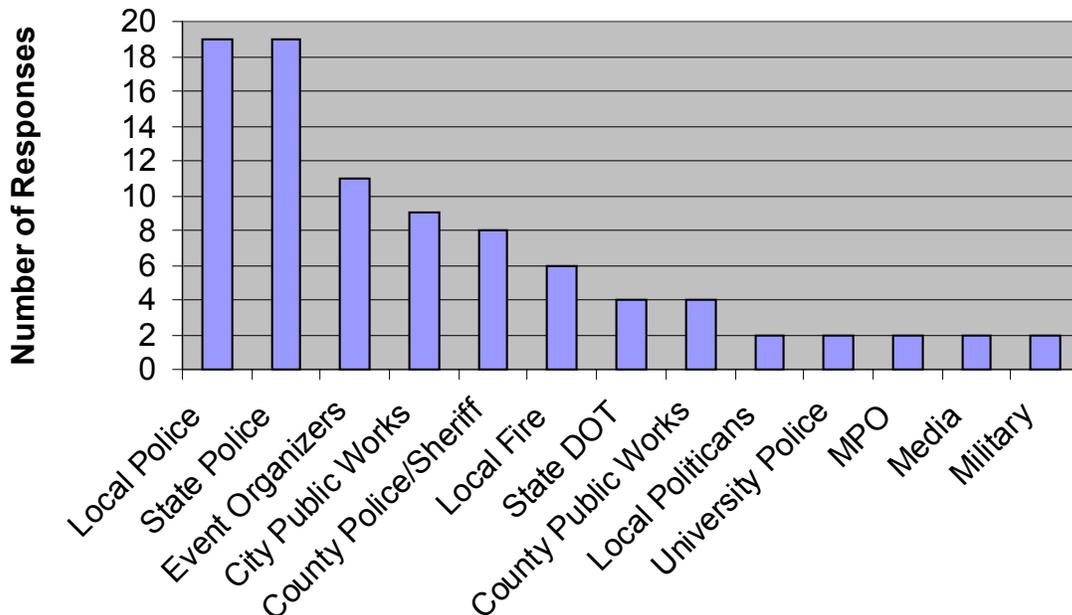


FIGURE 2 Primary stakeholder involvement.

stakeholders. In all, survey respondents, emphasizing the complexity and coordination challenges of special event planning and management, identified 29 different stakeholders. This number increases if peripheral stakeholders, such as towing and recovery agencies or emergency medical services, are included.

The role of each of the primary stakeholders, including law enforcement agencies, fire departments, transportation departments, media, event organizers, planning and political bodies, and the military is described in the following sections. Potential involvement from secondary stakeholders is also described.

### **Law Enforcement**

Law enforcement agencies, comprising state police or highway patrol, county police or sheriff, and local police agencies, are most commonly involved in the planning and management of special events. This diversity within law enforcement emphasizes the need to define jurisdictions and coordinate activities to ensure proper coverage and prevent infringement on another agency's jurisdiction. Despite this diversity, the role of law enforcement agencies in special event planning and management is relatively consistent across the country. Their three primary responsibilities are (1) traffic control, (2) public safety, and (3) crowd control. In limited cases, the local police help provide traveler information to the media and the motoring public.

In larger urban areas, the planning and management for special events is similar to that for routine congestion management activities. Therefore, transportation agencies likely take the lead in planning and managing special events. In smaller urban and rural areas, however, law enforcement may plan and manage special events with little or no input or involvement from transportation agencies. In these instances, the role of law enforcement expands to include actual event and route planning, with law enforcement personnel developing and deploying traffic control plans. Thus, a common role for transportation departments is the provision of traffic control equipment (e.g., traffic cones and barriers, portable variable message signs, and static signs). For university-based events such as sporting events, concerts, festivals, and conferences, university police are involved in the planning and management. As with personnel in other law enforcement jurisdictions, the role of university police is to provide traffic and crowd control and to ensure public safety.

### **Fire Departments**

Fire departments support law enforcement agencies in ensuring public safety. Beyond their ability to deal with fires,

fire department personnel are also typically trained to provide first response medical assistance. An additional role of fire departments may be in the enforcement of occupancy codes to limit the number of people within and around buildings, for the benefit of public safety.

### **Emergency Operations Center**

Cited as a secondary stakeholder in the special event planning and management process, an emergency operations center (EOC) supports resource coordination, and dispatch and information dissemination. It is unlikely that an EOC would be involved in the planning and management of routine special events, because its involvement is likely reserved only for large-scale events. An EOC may also assume the role of creating emergency evacuation plans and maintaining medical readiness in the event of a major catastrophe, such as a terrorist attack.

### **Transportation Departments**

City and county departments of public works and state DOTs are involved in special event planning and management, although the level of involvement varies from jurisdiction to jurisdiction and state to state.

City, county, and state DOTs have similar roles in special event planning and management, distinguished by their jurisdiction or coverage area. The jurisdictional coverage between city, county, and state transportation departments is often neither consistent nor well defined. For example, a city public works department may have jurisdiction over the Interstate highway as it passes through the city limits; however, jurisdiction reverts to the state DOT once the Interstate is outside the city limits. Conversely, a major arterial through an urban area may be under the jurisdiction of the state DOT, whereas the connecting roadway network is under the jurisdiction of the city's public works department.

Public works departments primarily support efforts to provide traffic control, ensure public safety, and disseminate information to the motoring public. However, the responsibilities of public works departments are typically broader than those of a state DOT. Therefore, they may take on additional roles with respect to special events. One survey response reported on the public works department's responsibilities for special event planning and management as follows:

- Roadway maintenance,
- Trash,
- Sanitation,
- Organization,
- Administration,

- Permitting, and
- Parking management.

State DOTs have a more well-defined role in special event planning and management—providing traffic control, ensuring public safety, and disseminating traveler information to the motoring public.

#### *Other State Departments of Transportation*

In instances where traffic from one state affects another state's transportation network, multiple DOTs may become involved in the planning and management of special events. This is not uncommon, particularly for large special events hosted near state borders. For the state of Maryland, the Delaware and Virginia DOTs are involved with the provision of multistate traveler information. Another example is the I-95 Coalition, a regional partnership between major private and public transportation agencies serving the northeastern portion of the United States from Maine to Virginia by providing traveler information ("About the Coalition" 2002).

#### *Construction Offices*

Not directly related to the special event planning and management process but nonetheless important to its success is the coordination of transportation-related construction activities. A simultaneous increase in traffic demand resulting from a special event and restricted roadway capacity because of construction or maintenance activities can lead to significant delay and driver frustration. Coordination between the transportation agency, the construction contractor and the special event coordinator can help alleviate problems related to increased traffic demand and restricted roadway capacity. If the coordination begins early enough, schedules may be modified to meet the needs of all parties.

#### *Public Transit*

Although cited only as a secondary stakeholder in the special event and management process, public transit agency involvement can be beneficial. A special event may affect the services those agencies provide, or transit services can be used to reduce some of the traffic demand generated by the special event. In the city of Los Angeles, California, a large festival requires that many city blocks be closed to all traffic before the event to allow for setup and during the event itself (Ogura 1994). This road closure requires re-routing buses and the temporary relocation of bus stops.

Sports stadiums have worked with local transit agencies to provide extra or extended hours of night service on days

of special events to allow patrons to ride transit both to and from the venue. If one of the goals is providing efficient transportation to and from the special event site through encouraging transit use, then the transit agency should be a key stakeholder in achieving that goal.

#### *Railroads and Rail Transit*

In places where special events affect roadways with rail-highway crossings, it may be necessary to involve the railroad or rail transit company in the planning and management of special events. Their primary role is concerned with traffic control impacts at rail-highway crossings. In certain instances where a significant amount of traffic must cross at-grade railways, either sufficient traffic control must exist to warn motorists and prevent problems, or it may be necessary to attempt to adjust schedules to avoid conflicts.

#### **Media**

Although only two agencies directly identified the media as a stakeholder, 25 of the 36 survey respondents later noted using media partnerships (print and broadcast) to provide information (see chapter four). The media serves a dual purpose in special event planning and management. Before the event, the media may work with special event coordinators to publicize the event as well as any road or traffic control changes. Before and during the event, the media can work with law enforcement and transportation departments to provide traveler information to the motoring public.

#### **Chamber of Commerce**

Cited as a secondary stakeholder, chambers of commerce can also play a dual role in special event planning and management by advertising the upcoming event and by disseminating traveler information to the motoring public.

#### **Event Organizers**

Event organizers initiate the special event planning process through a permit application, a letter of intent, or a telephone call to the affected jurisdiction. The event organizer will generally specify the event date and time, duration, location, and expected size. Sizeable or frequent special events may require improvements or additions to existing venues, which typically requires a traffic impact study to be performed. Event organizers may also assist in the management of special events by bringing in private traffic and crowd control resources.

### *City/County Planning Board*

The city/county planning boards are responsible for the issuing of use permits for county land and roads. The planning board may work with other agencies in evaluating the traffic control plan or other documents submitted with the special event permit application.

### *Codes/Ordinances Office*

Many cities and other jurisdictions have ordinances and other codes that can affect special events. Staff knowledgeable and responsible for these codes and ordinances may become involved in the special event planning and management process to inform other stakeholders about the requirements. Examples may include fire codes and noise ordinances.

### *Consultants*

As noted earlier, event organizers may be required to conduct a traffic impact study before receiving a permit, especially for special event venues, or they may be required to provide their own traffic management plan. In these instances, it is likely they will hire a consultant if they do not have the expertise among their staff. Consultants may also be asked to perform feasibility studies if the use of advanced traffic management technologies is being explored. The role of consultants is typically limited to pre-event planning because of difficulties in delegating real-time activities and decision-making authority from public agencies to consultants.

### *Barricade Companies*

When large, infrequent events occur, public agencies may be unable to justify the purchase of required traffic control devices. On such occasions private companies can be contracted either by the event organizer or the public agency to conduct traffic control before and after an event, for less than the cost of buying equipment and paying personnel.

### *Private Groups and Volunteers*

For smaller special events, private groups and volunteers often comprise special event staff. These people can work at traffic control posts, direct people to available parking, and perform other related functions. Because these groups may consist of untrained personnel, however, responsible agencies may be assuming some risk of liability when using private groups and volunteers as special event staff. Private groups and volunteers need to be brought in early

enough to ensure that they know their role and are properly trained to carry it out.

### **Planning/Political Bodies**

Metropolitan planning organizations (MPOs) provide long-term, regional planning strategies and help to secure funding to support necessary improvements. MPOs can help to coordinate agencies and jurisdictions for regional benefit. As an example, MPOs can work with transit agencies to reduce traffic demand on city arterials at or near a special event site.

Local politicians may also become involved in the special event planning and management process. The primary role of political representatives is to monitor the impacts of the special event on local roads and citizens. One job of politicians is to address problems that affect their constituents and work with the government to address those problems. If a special event is adversely affecting a particular neighborhood, the politician has the responsibility and contacts to help neighborhood residents voice their concerns and find a solution.

### *Mayor's Office*

The mayor's office was identified separately as a secondary stakeholder in special event planning and management. The role of this office is primarily to coordinate events and work with the media.

### *Home and Business Owners*

Though identified as only a secondary stakeholder in the special event planning and management process it is likely that the general public, particularly home and business owners, plays a much more significant role. Often, special events affect local businesses and residents because of additional traffic through residential neighborhoods, the closure of a route that serves a business, or increased congestion on a roadway serving a business that might discourage retail business. The Los Angeles City DOT had to contend with such a challenge during the 2000 Democratic National Convention. A sizeable portion of the business district was closed to all traffic during the convention. Common concerns of many residential neighborhoods near special event venues include event patrons' parking on residential streets or increasing traffic on their streets (Kropidlowski 1992). If discovered early enough in the planning process, traffic control can be planned to discourage such practices by those attending the event. In some instances, special "resident parking only" areas can be

established to reduce problems near venues holding frequent special events.

**Military**

Air shows and other events on military bases across the country are common occurrences, with some military bases annually holding large events. When events are held on military bases, all traffic and security on the base is within military jurisdiction and therefore its responsibility. Involving military personnel in the special event planning and management helps smooth the transition from traffic control onto and off the base.

In regard to increased attention to security, the military’s role is expanding. During the 2002 Winter Olympic Games in Salt Lake City, Utah, more than 5,000 military troops helped provide security. In addition, Air Force F-16 fighter planes and Army Blackhawk helicopters flew air support missions.

*State and National Parks Offices*

There is also the jurisdiction of other government agencies to consider. When events occur on state or national parkland, the agency responsible for that land should be brought in as a stakeholder. Both state and national park offices are responsible for providing public safety and managing parklands.

*Department of Fish and Game*

Departments of fish and game are responsible statewide for all laws and regulations pertaining to streams and rivers, including fishing and safety (e.g., life vests) activities. Departments of fish and game should be involved as stakeholders whenever special event activities affect their jurisdictions.

*Department of Forestry*

Similarly, departments of forestry may become involved when events occur within their jurisdiction. Roles they assume in special event planning and management include public safety, forest preservation, and fire control, particularly for events in or near the forest during dry, fire seasons.

**STAKEHOLDER INTERACTION**

In addition to simply identifying stakeholder involvement in the special event planning and management process, survey respondents were also asked to comment on the nature of their interaction with other stakeholders. The formality of their interaction was categorized as informal, written, or other. Although responses to this question varied, the two most common types of interaction cited were written correspondence and in-person meetings. Though a higher frequency of informal interaction was anticipated among the stakeholders, both written correspondence and in-person meetings allow for the simultaneous involvement of multiple stakeholders. Several respondents indicated that a meeting was held among involved stakeholders before each special event. Respondents were also asked to comment on the consistency of their interaction with other stakeholders, classified by frequent and infrequent events. Surprisingly, the majority indicated a high level of consistency in interaction and little difference was noted in responses between frequent and infrequent event interaction (see Figure 3). These results are not surprising for frequent special events that are anticipatory and that involve common stakeholders. However, a lower level of consistency was expected for infrequent events.

**LEADERSHIP**

Cooperative efforts typically require one person or agency to take the lead in coordinating interaction—a champion. Nearly all survey respondents indicated that there was a



FIGURE 3 Consistency of interaction among stakeholders.

champion among the stakeholders who assumed a leadership role in coordinating interagency interaction; however, the champion's affiliation varied. The three most common lead stakeholders included (1) DOT personnel, particularly traffic and operations engineers; (2) the event organizers; and (3) law enforcement agencies at either the local, county, or state levels, depending on jurisdiction. Many survey respondents indicated that the stakeholder champion might change, depending on the circumstances of the particular special event (e.g., a football game and a parade may have a different champion owing to the different nature of the events).

### **PERSONNEL AND EQUIPMENT SHARING**

Each stakeholder has unique personnel and equipment resources that can be used for special event planning and management. Because special events embody a cooperative effort, it is often beneficial to share personnel or resources across agency or jurisdictional boundaries. Approximately 60% of survey respondents indicated that they have provisions for doing just that. Commonly, agreements exist between DOTs and law enforcement agencies; transportation departments provide the traffic control devices and law enforcement the personnel. In a unique case, the Utah DOT planned to loan six full-time personnel to the 2002 Winter Olympic Games Coordinating Committee for the planning and management phases of this sizeable special event.

### **INTERAGENCY/INTERJURISDICTIONAL MEETINGS**

As noted previously, in-person meetings constitute much of the stakeholder involvement activities. Fifty-nine percent of the survey respondents indicated that, in addition to pre-event meetings, post-event interagency/interjurisdictional meetings were held to assess the success of current practices and to address any problems that may have arisen. These measures allow progress in improved special event planning and management activities.

### **SECURITY**

With the recent threats to and focus on national security, the role of law enforcement and security personnel in special event planning and management, particularly large-scale events, will likely increase. Although it is uncertain what specific changes in special event planning and management will be instituted, public safety will come to the

forefront, likely compromising mobility, efficiency, accessibility, and convenience for event patrons and others in the vicinity. As the elevated focus on and concern over national security wanes, the balance between safety and mobility will also likely shift.

Two recent major special events had to contend with increased security—the 2002 Superbowl and the 2002 Winter Olympic Games. In each case, the events were classified as National Security Special Events, a classification created in 1998 when then President Clinton issued Presidential Decision Directive 62. With this classification, the U.S. Secret Service is designated as the lead security planner for everything, including transportation security.

Concomitant transportation security effects for both events were focused on the transport of hazardous materials and air travel. Hazardous material shippers and transporters were strongly encouraged and sometimes required to take alternate routes around the vicinity of the event. Although this created a safer environment, additional delays and inconvenience were added to the transporters of hazardous materials.

With respect to air travel, the Federal Aviation Administration (FAA) designated a Special Traffic Management Program for Salt Lake City, Utah, during the 2002 Winter Olympic Games. This program called for a 72-km (45-mi) radius around Salt Lake City to be closed to all planes except commercial flights. Additionally, the airspace was entirely closed during the opening and closing ceremonies. To accommodate the additional noncommercial flight traffic rerouted to nearby airports, private planes were required to make slot reservations for all arrivals and departures. Furthermore, additional ramp space was needed for the additional private plane demand at nearby airports.

A third example of recent security concern effects on special event management was the 2002 July 4th Celebration in Washington, D.C. During this celebration, people typically congregate on the Smithsonian Mall. Because of heightened security concerns in 2002, a double fence was installed around the perimeter of the Mall, with a limited number of entrance points to allow for patron screening. Additionally, most of the streets near the Mall were closed to vehicular traffic. Because parking was also limited during the event, people were encouraged to use Metrorail. However, the Metrorail station closest to the Mall, the Smithsonian Station, was closed for security reasons, requiring people to use other, nearby stations. Management of this event provides an excellent example of how mobility can be sacrificed for security.

## TOOLS AND TECHNIQUES

To comprehensively plan and manage special event activities, efforts should focus on (1) disseminating motorist information, (2) managing and controlling traffic, and (3) managing travel demand. This chapter describes techniques planned or currently in use by stakeholders to accomplish those tasks.

A brief description of each of the tools and techniques is provided, supported primarily from findings in the literature. Tables 3 and 4 indicate the level of use of each of these tools and techniques, reported in order of frequency by survey respondents. Related issues regarding communication protocols and event follow-up are discussed in this chapter as well.

Notably, many of the tools and techniques described in this chapter also apply to incident management or construction and maintenance activities. Thus, the investment in these tools and techniques does not have to be justified solely in improvements to special event traffic. For example, variable message signs (VMS) on an Interstate highway may direct traffic to the event venue before an event, but they may also be used to warn drivers of incidents, poor weather, and other situations during times when there are no special events.

### MOTORIST INFORMATION

Providing motorists with information is intended to (1) allow motorists to select the best route, (2) direct motorists

TABLE 3  
TOOLS AND TECHNIQUES CURRENTLY USED—RANKING

Tools and Techniques	Frequency
Motorist Information	
Variable message signs	29
Media partnerships	25
Pre-event informational campaigns	25
Highway advisory radio	10
Other	4
Traffic Management	
Traffic cones	29
Temporary lane closures	29
Portable static signs	28
Traffic management teams	22
Traffic management centers	20
Law enforcement motorcycle patrols	18
Non-law enforcement service patrols	18
Traffic responsive signal systems	18
Law enforcement service patrols	15
Video and closed-circuit television	15
Reversible lanes/moveable barriers/temporary contraflow	15
Electronic loop detection	13
Aircraft patrols	11
Portable traffic signals	6
Major capacity improvements	6
Ramp metering	4
Other	1
Travel Demand Management	
Park-and-ride lots	24
Alternative routes	18
Parking management	16
Economic or preferential incentives for public transportation	9
Automobile-restricted zones	8
Economic or preferential incentives for ridesharing	5
Major transit improvements	4
Economic or preferential incentives for walking/biking	2
Alternate travel hours incentives/congestion pricing	2
Other	1

TABLE 4  
TOOLS AND TECHNIQUES PLANNED FOR USE—RANKING

Tools and Techniques	Frequency
<b>Motorist Information</b>	
Highway advisory radio	7
Variable message signs	3
Media partnerships	3
Pre-event informational campaigns	1
Other	1
<b>Traffic Management</b>	
Video and closed-circuit television	5
Traffic management centers	5
Major capacity improvements	5
Electronic loop detection	4
Traffic responsive signal systems	4
Ramp metering	4
Traffic management teams	3
Non-law enforcement service patrols	2
Portable traffic signals	2
Aircraft patrols	1
Traffic cones	1
Portable static signs	1
Temporary lane closures	1
Reversible lanes/moveable barriers/temporary contraflow	1
Other	1
Law enforcement motorcycle patrols	0
Law enforcement service patrols	0
<b>Travel Demand Management</b>	
Major transit improvements	4
Economic or preferential incentives for walking/biking	3
Economic or preferential incentives for ridesharing	2
Economic or preferential incentives for public transportation	2
Park-and-ride lots	2
Parking management	2
Other	2
Automobile-restricted zones	1
Alternative travel hours incentives/congestion pricing	1
Alternative routes	1

to available parking areas, (3) reduce driver frustration, and (4) inform non-event traffic to encourage the use of alternate routes.

Motorist information tools and techniques commonly used for special event planning and management include the following:

- VMS,
- Highway advisory radio (HAR),
- Media partnerships, and
- Pre-event informational campaigns.

#### Variable Message Signs

VMS have a changeable display, allowing for a variety of pertinent information to be given to motorists. These displays inform about lane closures, warnings, and parking lot closures, or simply provide directional information. It is generally recommended that predetermined message sets be developed to lend consistency to the dis-

plays and speed the messaging process. VMS require active monitoring to ensure that the information is timely and accurate. VMS can be permanently installed on the roadside or be made portable by mounting them on trucks or trailers.

#### Highway Advisory Radio

HAR uses a specific radio frequency to provide information to motorists by means of their in-vehicle radio systems. This information is typically broadcast over the 530 AM or 1610 AM frequencies, with various ranges depending on the location of the transmission antennae. HAR messaging should be updated frequently with timely, accurate information. The benefit to using HAR is the ability to provide detailed messages of moderate length. Both permanent and portable HAR is available. For venues with frequent special events, permanent HAR may be worth the investment. The obvious benefit of portable HAR is the ability to transport it to various special event locations on an as-needed basis.

That HAR is readily available needs to be advertised and it should be used consistently for all events. This will help its credibility with motorists, who may discontinue using HAR if it is selectively used and not advertised.

It should also be noted that HAR use is limited by geographic conditions. The AM frequencies used for HAR are not consistently reliable or effective in all areas of the country (e.g., mountainous regions). Therefore, this technology should be investigated further for use within a specific geographic region before an investment is made.

### Media Partnerships

The media can be used to provide both pre-trip and en-route information to motorists. Radio, television, and print media are used, with radio having the best ability to provide en-route information. Print media such as newspapers are also beneficial because they provide hard-copy, printed maps of detour routes, parking, and transit. Another media source is the Internet, which can be used to publish suggested driving directions and parking. Efforts should be made to both coordinate and educate media personnel if brought in as a partner in motorist information activities. Personnel coordinating traffic for NASCAR races at Phoenix International Raceway witnessed firsthand how limited coordination among various media sources can result in inconsistent and often confusing information to motorists (Wall et al. 2000). To help prevent such problems and to provide accurate information, media information should be obtained from a single source, such as the lead traffic engineer, lead law enforcement officer, or a traffic management center (TMC).

### Pre-Event Informational Campaigns

Pre-event information campaigns inform motorists about traffic and parking conditions prior to a special event. The most common method of information dissemination is through brochures, informational flyers, or pamphlets to event patrons (Baker 1990; Chester and Himes 2000; Gibson and Rifkin 2000; Wall et al. 2000). Patrons are typically provided with suggested parking areas, recommended routes, and even suggestions encouraging early arrival.

For the Tennessee Titans' Adelphia Coliseum in Nashville, Tennessee, patrons with on-site parking are advised to use one Interstate highway to reach the site, whereas patrons with off-site parking are directed to an alternate route to reach central business district parking (Chester and Himes 2000).

In preparation for the Detroit Grand Prix in 1988, officials provided advance publicity by means of television,

radio, local newspapers, and special brochures. The information was directed not only to patrons, but also nonpatrons, in the hope of avoiding the accompanying increased traffic demand and road closures (Aggarwal and Kobran 1989).

## TRAFFIC MANAGEMENT

A wide range of tools and techniques exist to control and manage traffic at or near a special event site. Those commonly used for special event planning and management can be categorized as follows:

- Traffic control devices,
- Patrols,
- Electronic surveillance,
- Signalization,
- Geometric modifications, and
- Other.

### Traffic Control Devices

Traffic control devices represent a standard set of tools used to regulate, warn, and guide traffic. Traffic control devices used for special event planning and management may include traffic cones, portable static signs, or portable traffic signals.

#### *Traffic Cones*

Traffic cones are used to channel vehicles, divide opposing traffic, or divide multiple lanes in the same direction [*Manual on Uniform Traffic Control Devices (MUTCD) 2000*]. The cones should be mostly orange with retroreflective material and of a material such that when struck by a vehicle, the vehicle is not damaged. The standard height for cones in low-speed situations is 450 mm (18 in.) and 700 mm (28 in.) on freeways and other high-speed highways. The standards for traffic cone use are provided in the MUTCD (Chapter 6F.56).

#### *Portable Static Signs*

The most commonly used traffic control device is the static sign. For special event planning and management, temporary static signs are most useful unless the event is a frequent one. Temporary signs can be exposed during the event and covered at its completion, mounted on temporary posts or trailer mounted and staged only for the event. Static signs, both temporary and permanent, should follow the standards for size, placement, and color set forth in the MUTCD.

### *Portable Traffic Signals*

Two types of portable traffic signals may be used for special event planning and management. For long-duration special events such as the Winter Olympic Games, traffic signal poles and lights can be installed in a semipermanent fashion. Alternatively, trailer-mounted portable traffic signal systems can be used (Figure 4). The clear advantages of a portable system are the ease of transport and its use for different events throughout the jurisdiction. Additional information on portable (temporary) traffic signals can be found in the MUTCD (Chapter 4D.20).

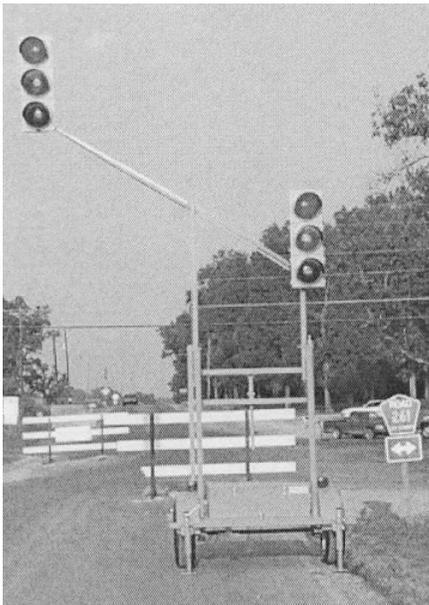


FIGURE 4 Portable traffic signal (Courtesy: K & K Systems, Inc.)

### **Patrols**

Manual patrols to monitor traffic conditions during special event times are common, although the composition of these patrols can vary.

#### *Law Enforcement Motorcycle Patrols*

Law enforcement motorcycle patrols provide an effective means to monitor ingress and egress routes during special events. One advantage is their ability to move more quickly than foot patrols and to maneuver in confined spaces more effectively than a patrol car. A disadvantage is their inability to operate in adverse weather conditions.

#### *Law Enforcement Service Patrols*

Law enforcement service patrols serve much the same function as motorcycle patrols except they are either in vehicles

or on foot. Common responsibilities for these patrols include directing traffic at staffed traffic control points as well as writing citations or summoning a tow truck for such infractions as parking violations. The advantage of using staffed traffic posts over signalized control is the presence of authority and the ability to make dynamic changes to the traffic flow. Public safety is also a primary responsibility of these patrols. Often, their mere presence can prevent problems. In addition, these personnel generally have some form of first aid training for treating minor injuries.

#### *Non-Law Enforcement Service Patrols*

Non-law enforcement service patrols typically consist of transportation, public works, event, or other personnel. These individuals have a different set of skills and a different level of authority than do law enforcement personnel, which may be both beneficial and not so to the management of special events. For example, transportation personnel have a heightened knowledge of traffic control and management, but they may not gain the same respect and responsiveness from the motoring public because of their lack of enforcement authority. However, these patrols may provide services to motorists, such as gas and air, to reduce the impacts of stranded vehicles.

#### *Traffic Management Teams*

As an alternative, multidisciplinary teams can be formed to provide a balance between knowledge and authority. Traffic management teams are groups of individuals who work together in executing a traffic plan and who are all under one central command. For frequent special events these teams become highly familiar with each member's role and responsibilities. One advantage of using such a team under the command of a single person or unit is the ease in relocating personnel to more critical event areas (Ogura 1994).

#### *Aircraft Patrols*

Using either fixed-wing aircraft or helicopters, personnel can monitor traffic and identify problem locations or bottlenecks that are more difficult to detect from the ground. This information can then be relayed to personnel on the ground for appropriate action. Aircraft can also provide a vantage point for media personnel to obtain traffic information, which can then be passed on directly to motorists. Coordination among the various media should occur to avoid the dissemination of conflicting information. However, it should be recalled that aircraft use is subject to air-space restrictions and weather conditions.

## Electronic Surveillance

In addition to the manual surveillance provided by ground or air patrols, electronic surveillance can be used to monitor traffic conditions during special event times. Predominant electronic surveillance tools include the following:

- Electronic loop detection,
- Video and closed-circuit television (CCTV), and
- TMCs.

### *Electronic Loop Detection*

Electronic loop detection can monitor traffic volumes and vehicle speeds on various routes serving the special event venue. This information can then be used to re-route traffic from congested routes to less congested routes. The data collected by the electronic loops can also be stored for later analysis and improvement of related traffic control and signal timing plans.

### *Video and Closed-Circuit Television*

Video and CCTV provide the opportunity to observe survey traffic conditions from many points of view and locations. The cameras, usually mounted on poles or other infrastructure to provide a bird's-eye view, can be placed at strategic locations throughout the roadway network serving the special event. An image of volume as well as speed data describing traffic conditions can be saved for later analysis and planning.

### *Traffic Management Centers*

TMCs are generally the central communication hub for traffic-related information. TMCs collect information from personnel or electronically through electronic loops and video/CCTV. Pertinent information is then disseminated to motorists through an established motorist information system and used to control traffic flow through ramp metering, traffic signal systems, etc. TMCs can also dispatch personnel and other resources as needed based on the information they receive.

For some special event venues a secondary TMC may be used. For example, the Los Angeles City DOT has a satellite TMC near the Staples Center. Although not as well equipped as the central TMC, it has the tools needed to manage traffic during special events at the site.

The development of a TMC is a capital-intensive effort and therefore not economically feasible in areas where the center cannot be used to benefit daily operations and congestion

management. The Minnesota DOT (Mn/DOT) developed a Portable Traffic Management System (PTMS) as an alternative to a costly permanent TMC (Hill and Garrett 1996).

The PTMS comprises VMS, HAR, spread spectrum radio, a portable traffic signal, CCTV, and a link to the permanent TMC. The spread spectrum radio allows data transfer between the CCTV and the TMC without hardwired connections. The VMS are used to disseminate traffic and travel information and are linked to the PTMS by means of a cellular phone. The HAR has internally stored, 1-minute message capabilities activated by means of a cellular phone. The CCTV cameras, capable of tilt, pan, and zoom, are mounted on extendable poles attached to the bed of service vehicles and placed at strategic locations to monitor traffic congestion and send compressed images to the PTMS. The portable traffic signals are used to improve traffic and pedestrian safety on congested routes near the special event site. The reception of the PTMS has been positive, resulting in improved traffic flow during special events.

## Signalization

Permanent traffic signal systems and ramp metering can be used to control and manage traffic during special event times.

### *Standard Signal Systems*

Standard signal systems require timing plans to be adjusted for changing traffic conditions. For frequent events, special timing plans can be developed and stored in the controllers or system to assist in expediting special event traffic flows. For infrequent events, special timing plans can be implemented on the day of the event. Care needs to be taken to restore the original timing plan once the event has finished and traffic returns to normal.

### *Traffic-Responsive Signal Systems*

Traffic-responsive signal systems allow for the dynamic adjustment of cycle characteristics (e.g., splits, phasing, and offsets) in response to real-time traffic condition data. Electronic loop detectors, CCTV, and other resources can provide the real-time traffic data necessary to support this system. In turn, signal cycle lengths and characteristics are adjusted to optimize the performance of the roadway network. For roads that lead to or from a special event venue, an extended green time may allow for greater traffic volumes to move toward or away from the venue. Small-scale events that result in only minor and temporary increases in traffic flow may not warrant investment in such a dynamic system.

### *Ramp Metering*

Ramp metering is used to manage traffic entering controlled access facilities and prevent bottlenecks from forming at the access points. The use of ramp metering to ensure efficient operation of the controlled access facility may lead to problematic queues or congestion on the ramps and secondary facilities.

### **Geometric Modifications**

Both temporary and permanent modifications can be made to the geometrics of a roadway to better accommodate the increased traffic demand resulting from special events.

### *Temporary Lane Closures*

Certain types of special events, such as parades or marathons, require temporary lane or road closures. When this is done and by ensuring that adequate alternate routes are available and that the motoring public is well informed about those alternate routes, overall traffic flow through the region may improve.

### *Reversible Lanes/Temporary Contraflow/Movable Barriers*

Reversible lanes and contraflow traffic, designated with movable barriers or other means, can temporarily add capacity in a single direction during times of increased traffic demand. For example, two-way streets can be temporarily converted to two-lane, one-way streets. Contraflow traffic on multilane facilities can accomplish similar capacity gains. A four-lane facility with two lanes in each direction can be altered to provide three lanes in one direction. When using this technique, proper care must be taken to ensure proper traffic control and signing. Some signs and markings may need to be hidden or removed to eliminate driver confusion (Wolshon 2001).

When enough width is available, roadway shoulders can be used as temporary travel lanes to accommodate increased traffic flow. One common concern with this technique for long-term events is that it will prevent emergency response vehicles from reaching a downstream incident, because emergency response vehicles will commonly use the shoulder as a travel lane when congestion prevents their use of the general travel lanes.

### *Major Capacity Improvements*

Many special event venues around the country simply do not have transportation facilities with the capacity to handle

the increased demand of special event traffic. For this reason, the construction of additional capacity to, from, and near the venue may be required. Examples of major capacity improvements include widening lanes or roadways, building additional roads, adding additional interchanges or intersections, or adding turning lanes.

An excellent example of major capacity improvement is the Arena Drive interchange in Prince George's County, Maryland. The Maryland State Highway Administration engineered a new interchange on I-95/I-495 (Capital Beltway) at Arena Drive in 1996. "The new interchange was necessary to minimize the effect of a new Washington Redskin Football Team stadium and USAir Arena events on operation of traffic along this segment of the Capital Beltway and its interchanges at MD 202 and MD 214." The interchange, a partial diamond with only one exit and one entrance ramp for the southbound lane, was to be open only during special events to reduce the existing and anticipated congestion on the beltway and the two current interchanges. The entrance ramp is closed before the game to discourage people from attempting to use it as an entrance to I-95/I-495 and the exit ramp is closed after the game to discourage motorists from using that exit to access Arena Drive for other purposes (*Approval Request for Access . . . 1996*).

### **Other**

In addition to the array of tools and techniques described thus far for special event planning and management, survey respondents cited two other tools and techniques that were not noted on the survey questionnaire's list of alternatives: (1) contracts with towing companies and (2) increased snow removal activities.

Towing contracts help to speed the removal of unauthorized (i.e., illegally parked either in the right-of-way or in other no parking zones) or disabled vehicles from the roadway. Unauthorized or disabled vehicles can significantly reduce the existing capacity of the roadway; the effects are magnified during times of increased traffic demand.

An increase in regular snow removal activities benefits in two ways. When roadways are kept free and clear of ice and snow, vehicles can travel at higher speeds, increasing the overall vehicle throughput of the facility. Also, snow and ice removal improves the level of safety for the motoring public and prevents the occurrence of incidents that would restrict roadway capacity.

### **TRAVEL DEMAND MANAGEMENT**

In addition to managing existing vicinity traffic, TDM techniques can be employed to actually reduce the vicinity

traffic demand. Formally defined, “travel demand management is the reduction of automobile travel demand, or the spreading of this demand over space or in time, by altering peoples’ behavior” (Orski 2000).

Common TDM tools and techniques can be categorized as follows:

- Economic or preferential incentives and disincentives for alternate mode use and alternate travel times,
- Alternate routes,
- Parking strategies, and
- Major transit improvements.

**Economic or Preferential Incentives and Disincentives**

In the survey questionnaire, economic or preferential incentives and disincentives are distinguished by transportation mode. Incentives for walking, biking, ridesharing, and public transit attempt to encourage the reduction of the number of single-occupancy vehicles (SOVs) in the traffic stream, thereby reducing overall traffic demand at the special event site.

*Economic Incentives/Disincentives for Alternate Mode Use*

Economic incentives for alternate mode use typically come in the form of free or reduced parking rates. The University of Washington charges different rates for SOVs and high-occupancy vehicles (HOVs) (Crandell and Hobson 1989). In 1987, the charge for parking a SOV was \$9, whereas the parking charge for a HOV was \$6.

The transportation planners for the Seattle Mariner’s new baseball park, Safeco Field, also developed a program to promote HOV use to and from games (Rankin 1998). Their strategy involved advertising parking lot services to advance ticket holders in exchange for reduced HOV parking rates. Participating lot locations are also listed on the ballpark website and telephone hotline.

An additional technique includes offering free or reduced transit fares for event ticket holders. This method was used during the 2002 Winter Olympic Games held in Salt Lake City, Utah (“TRAX Facts” 2001).

*Preferential Incentives/Disincentives for Alternate Mode Use*

Added convenience through preferential incentives is another approach to encouraging alternate mode use. At the Seattle Mariner’s Safeco Field, the stadium provides secure, on-site, weather-protected bicycle storage facilities for attendees and employees (Rankin 1998).

For the Staples Center and the Los Angeles Convention Center, larger crosswalks were developed, signal phases were extended, and some streets were closed off for pedestrian use only (Gibson and Rifkin 2000). Specific close-in loading areas and off-street storage for buses helps to encourage transit use. Pedestrian access between the venues and the nearby light-rail station was also improved.

Other preferential incentives to encourage alternate mode use include HOV or bus lanes, which are intended to decrease ingress and egress travel times for the venue.

*Auto-Restricted Zones*

An extreme example of preferential disincentives for alternate mode use is auto-restricted zones. Auto-restricted zones eliminate automobile traffic on specific routes or portions of routes. These zones may be closed to all forms of motorized travel or closed to all automobile traffic but left open for transit vehicles. The result is a more pedestrian-friendly zone.

*Economic Incentives/Disincentives for Alternate Travel Times and Congestion Pricing*

Incentives and disincentives are also used to encourage alternate travel times. Often referred to as “congestion pricing,” there may be a fee charged of individuals choosing to travel during peak traffic demand periods. This fee may be in the form of a toll, higher parking rates, or some other form.

Table 5 shows fan arrival and departure patterns for Qualcomm Stadium in San Diego, California. Note that 32% and 56% of the traffic arrives between 1 and 2 h before game time and less than 1 h before game time, respectively. Incentives for early arrivals would shift a higher percentage of patrons to the category of 1 to 2 h before game time arrival. Unfortunately, departure patterns are more concentrated, with 72% of patrons departing within 1 h of the end of the game.

TABLE 5  
TURNSTILE ARRIVALS—SUNDAY BASEBALL

Patterns	Percentage
Fan Arrival	
1 to 2 h before game starts	32
Less than 1 h before game starts	56
After game starts	12
Fan Departure	
Before game ends	10
Within 1 h after game ends	72
More than 1 h after game ends	18

(Source: Peterson et al. 2000).

As a second example, an air show was held at Gallatin Field in Belgrade, Montana, in August 2001. The gates opened at 10:00 a.m. and except for a minor influx of people at that time, attendees arrived intermittently throughout the day up to the main attraction, the Navy's Blue Angels scheduled for 2:30 p.m. Because of the dispersed arrival pattern, ingress traffic was relatively insignificant. At the conclusion of the Blue Angels' air show, however, the majority of attendees left, resulting in unexpected traffic congestion that did not dissipate for hours. If attendees had been offered incentives to remain longer at the air show, this situation might have been avoided.

### **Alternate Routes**

TDM strategies encourage alternate mode use, alternate travel times, and the use of alternate routes to better disperse traffic demand over the roadway network. Alternate routes are not only beneficial for motorists accessing the special event site but also for those wishing to avoid it. To be most effective, the availability and characteristics (e.g., capacity, construction activity, vertical clearances for overpasses, and weight restrictions) of alternate routes should be carefully investigated and monitored to ensure safe travel for all traffic, including commercial vehicle traffic.

### **Parking Strategies**

Once patrons are at the special event site, the challenge becomes providing adequate parking. On-site, parking management strategies can be used to efficiently direct traffic to vacant parking spaces or lots. Off-site, park-and-ride lots can relieve some of the parking demand if combined with alternate modes of transportation to access the site.

#### *Parking Management Systems*

Parking management systems can monitor the use of spaces and inform motorists of vacancies and even the approximate location of those vacancies. This is particularly helpful for large parking garages where significant time can be spent "trolling" for a vacant space. Furthermore, patrons can avoid queues at parking lot entrances by paying for parking when they buy advance tickets.

#### *Park-and-Ride Lots*

Park-and-ride lots provide a dual benefit for special event planning and management: (1) the need for on-site parking facilities is reduced, and (2) the traffic demand near the event site is reduced. In many areas, especially dense urban areas, the number of on-site parking spaces is severely

limited. To accommodate those wishing to drive, remote lots can be used, and patrons can be bused to the event location. To encourage such behavior, incentives like those described in the previous section for ridesharing and public transportation can be offered. An example is Coors Field in Denver, Colorado. Because of the limited amount of on-site parking, extensive use is made of park-and-ride lots from throughout the Denver area.

A common challenge for park-and-ride lots is accommodating persons with disabilities. During the 2002 Winter Olympic Games, shuttle buses were handicapped accessible, allowing disabled patrons to take full advantage of the system. The Phoenix International Raceway provides handicapped-accessible bus transportation, but also issues special parking tickets to disabled attendees that allow them special access to parking lots immediately adjacent to the raceway.

### **Major Transit Improvements**

Overall, the best way to improve transit use is to improve transit accessibility and service. By locating a subway, rail station, or bus terminal in the proximity of the special event venue, the convenience of using such a mode encourages increased patronage. In some cases, the increased patronage that can be realized even exceeds facility capacity.

In Chicago, Illinois, the Addison Rail Station serves Wrigley Field (Abrams 2000). When it became obvious the station was not able to service the crowds of the baseball games, the facility was redesigned. Adequate space to shelter all riders as they waited for each train was provided. Also, the fare collection system was redesigned to efficiently service all riders. Additional turnstiles were installed and portable fare collection boxes were developed to assist in the processing of passengers.

Even for an infrequent major special event such as the Salt Lake City 2002 Winter Olympic Games, the development of a new transit system was undertaken. The primary purpose of building the TRAX system was to accommodate the extremely high demand anticipated during the Olympics. Existing bus routes operated by the Utah Transit Authority were reoriented to serve TRAX ("TRAX Facts" 2001).

### **CONSISTENCY OF USE**

Consistent use of the tools and techniques as described accomplishes two things: (1) motorists become accustomed to using the tools and techniques to navigate through traffic as they enter or exit special events and (2) responsible stakeholders become proficient at using the tools and techniques, thus improving the overall management of traffic during

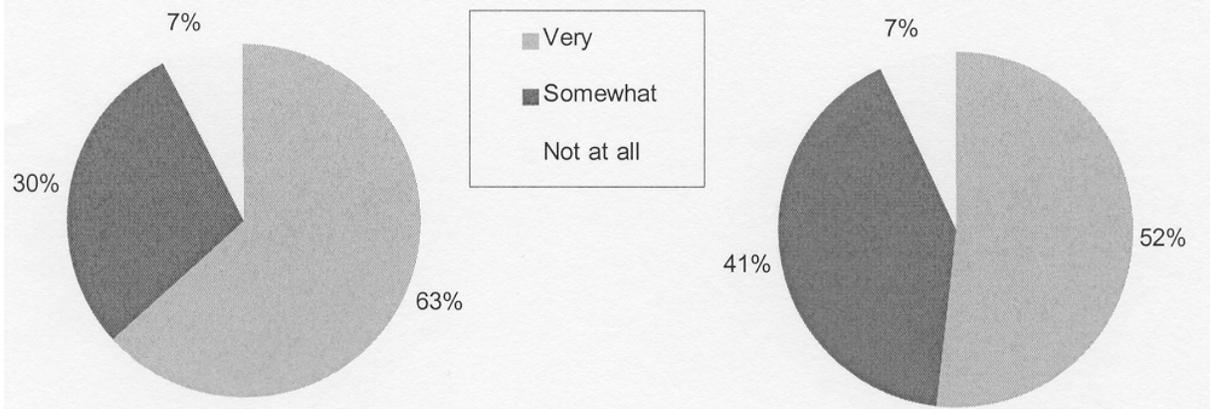


FIGURE 5 Consistency of tools and techniques used for similar events (left, frequent events; right, infrequent events).

special events. Overall, survey respondents rated their consistency of use as very consistent, although consistency in use was slightly lower for infrequent events (see Figure 5). For example, all respondents used VMS for medium-sized, medium-duration, frequent events.

**COORDINATION AND COMMUNICATION**

Although this chapter has described the various tools and techniques individually, the overall success of transportation management during special events requires the combination and coordination of multiple tools and techniques. Without adequate coordination, conflict or duplication may take place, or misinformation and misdirection may be provided to the motoring public.

The development of formal protocols to assist in the coordination of the responsible personnel during special events is essential. One common protocol is the Incident Command System, which allows for the effective management of interagency teams. When such a method is used, all personnel managing a special event should be knowledgeable about that system’s terms and concepts.

In the survey questionnaire, 61% of the respondents reported having formal communication and coordination protocols. When respondents were asked to identify who is formally trained to use the protocol, the responses varied. Many reported a wide variety of personnel from police, fire, and transportation agencies. Others mentioned that all participants involved with traffic management had been formally trained.