Planned Special Events – Economic Role and Congestion Effects

August 2008

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7. Authors Jonathan Skolnik (JFA), Rami Chami (JFA), and Matthew Walker (DEA)		**8. Performing Organization Report No.**
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16. Abstract The purpose of this study is to estimate the influence that large planned special events (PSEs) have on both the economy and congestion on a national level. Transportation planners define PSEs as public activities with a scheduled time and location that affect normal transportation system operations as a result of increased travel demand and/or reduced capacity attributed to event staging. The types of PSEs that are of interest to this study are those special events with more than 10,000 participants and spectators. Increased awareness of the frequency and economic magnitude of these large events is essential to better understanding the important role transportation planning should play in managing the transportation aspects of these events.		
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EXECUTIVE SUMMARY

Purpose - The purpose of this study is to estimate the influence that large planned special events (PSEs) have on both the economy and congestion on a national level. Transportation planners define PSEs as public activities with a scheduled time and location that affect normal transportation system operations as a result of increased travel demand and/or reduced capacity attributed to event staging. The types of PSEs that are of interest to this study are those special events with more than 10,000 participants and spectators. Increased awareness of the frequency and economic magnitude of these large events is essential to better understanding the important role transportation planning should play in managing the transportation aspects of these events.

Data Collection - Currently, information on PSEs is largely fragmented and dispersed. This is the first known systematic attempt to collect and estimate the size, frequency, and economic magnitude of large PSEs nationally. In order to overcome challenges in data dispersion and availability, an effort was made to collect information from secondary sources, event organizers, event venue managers, and government officials. This study is essentially a first glance at the subject. It provides order-of-magnitude estimates of the extent of these events and lays the groundwork for refinement in future research.

Annual Estimates of PSEs with More Than 10,000 Attendees

- 24,000 PSEs
- 600 million attendees
- $40 billion of "in-event" revenue
- $160 billion in total economic impact
- $4 billion in government revenue
- $1.7 billion to $3.5 billion in congestion costs
- 93 million to 187 million hours in travel delay
- 64 million to 128 million gallons excess fuel consumption

Attendee revenue and spending estimates were often based on reported numbers for direct attendee spending on tickets, concessions, and merchandise during the events. At other times, these estimates were made using association or industry revenue and attendance data. In addition to direct spending at events, event attendees spend money outside the event on travel, restaurants, hotels and other goods and services. These two spending categories together are referred to as total attendee spending. Attendee spending at and outside events stimulates further spending in the economy. The sum of all this economic activity is known as economic impact. This report classifies PSE frequency, attendance, and economic data by event activity types, such as professional sports events, concerts, and fairs.

Economic Activity Types

- Professional team sports
  - Football, basketball, baseball, ice hockey
- College sports
  - Football, basketball
- Other professional sports
  - Auto racing, horse racing, golf
- Street and park events
  - Marathons/walkathons, parades, fairs, festivals, political events
- Shows and concerts
  - Exhibitions, shows, concerts

Case Studies - To develop a better understanding of PSEs, four city-level case studies were conducted: Detroit, Michigan; Portland, Oregon; El Paso, Texas; and Columbia, South Carolina. The case studies describe the special events venues in each city and include information on the venues' locations, maximum capacities, event type characteristics, and frequency of hosting large PSEs. A summary table of the four case studies is provided in Exhibit ES-1. It can be seen that there are relatively few permanent venues capable of hosting large crowds in the case-study cities.

Exhibit ES-1: Case Study Results

Region	Major Venues	Number of Events	Event Days Per Million Capita	Most Frequent Events
Detroit, MI	7	526	134	Professional team sports & concerts
Portland, OR	7	187	108	Professional basketball, concerts, & festivals
El Paso, TX	4	93	142	College events: sports & graduations
Columbia, SC	5	94	214	High school & college events

Source: Study estimates

Events and Attendance - Most of the PSE frequency and attendance estimates were developed by aggregating data from several of the event type categories used in this report. A summary table of number of events and attendance by event type category is provided in Exhibit ES-2.

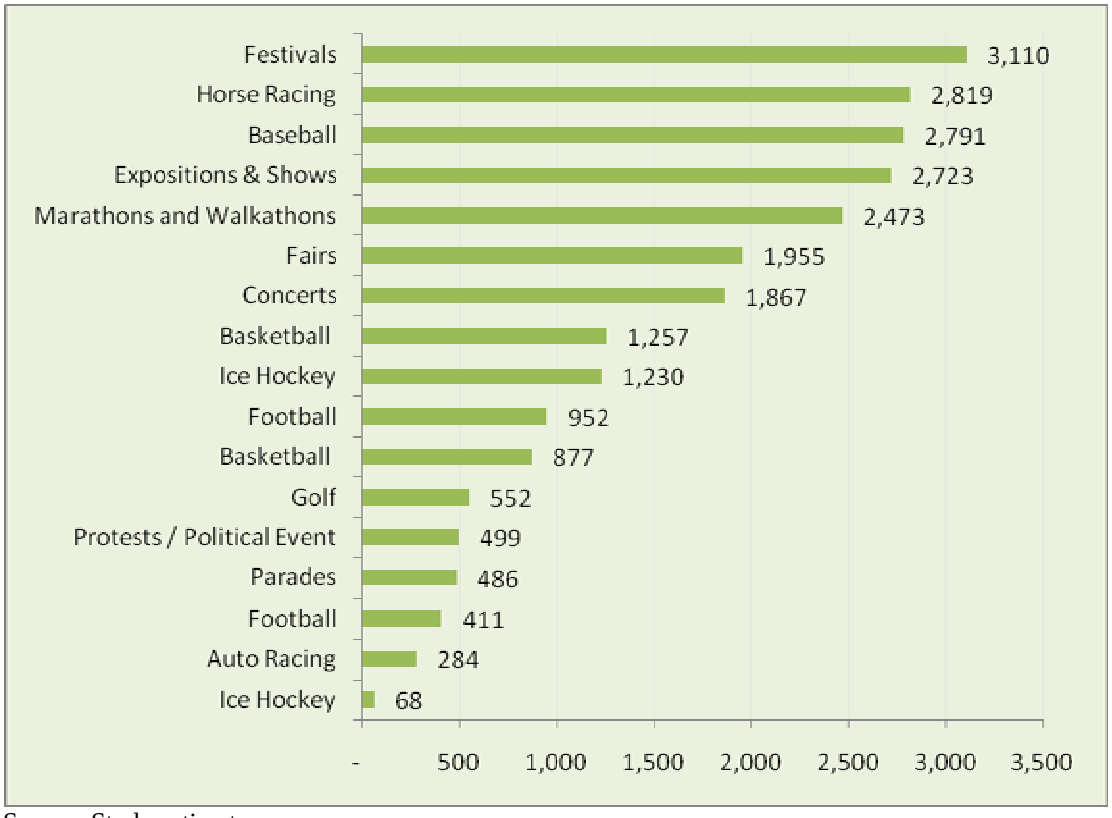
Exhibit ES-2: Number of Events

Event Category	Number of Events	Attendance (Millions)
Professional Team Sports	5,689	147
College Sports	1,897	50
Other Professional Sports	3,655	78
Street and Park Events	8,523	249
Shows & Concerts	4,590	78
TOTAL	24,353	602

Source: Study estimates

A disaggregated summary of the number of events by event type is provided in Exhibit ES-3. As the graph shows, street and park events are the largest category, followed by professional team sports. However, it should be noted that professional team sports data is more readily available and accurate than street and park data.

Exhibit ES-3: Number of Events



Source: Study estimates

Economic and Fiscal Impact – Direct in-event revenues for PSEs are about $40 billion annually in the U.S. Direct outside-of-event spending and secondary economic effects raise the total economic impact of large PSEs to $164 billion. Government revenue from these events is

estimated to be approximately $4 billion. The event category with the largest economic impact is professional team sports, at about $60 billion, while the category with the smallest economic impact is college sports, with about $6.7 billion. Exhibit ES-4 summarizes economic measurements by event type.

Exhibit ES-4: National Economic Magnitude

Event Category	Attendance (Millions)	Total Attendee Spending ($ Millions)	Economic Impact ($ Millions)	Fiscal Impact ($ Millions)
Professional Team Sports	147	18,390	59,698	1,413
College Sports	50	2,053	6,666	158
Other Professional Sports	78	7,742	25,131	595
Street and Park Events	249	8,427	58,037	1,692
Shows & Concerts	78	3,234	14,480	298
TOTAL	602	39,847	164,012	4,155

Source: Study estimates

Congestion Estimates - PSE congestion accounts for between four to eight percent of total p.m. peak congestion. An important aspect of PSE-caused congestion is that the resulting delays affect both attendees and non-attendees of the events. Travel delay due to PSE-caused congestion is estimated at approximately 93 to 187 million hours annually and results in between $1.7 and $3.4 billion dollars in congestion costs. The results of the congestion analysis are summarized in Exhibit ES-5.

Exhibit ES-5: Nationwide Congestion Estimates

Congestion Category	Units per Year	Low End Costs	High End Costs
Average Delay per Traveler	Hours	0.8	1.7
Wasted Fuel per Traveler	Gallons	0.6	1.2
Travel Delay	Hours (Millions)	93.4	186.8
Excessive Fuel Consumed	Gallons (Millions)	63.9	127.9
Congestion Cost	US$ (Billions)	1.743	3.485

Source: Study estimates

Mitigation Techniques - A number of traffic mitigation measures can be applied to the various modes of transportation and infrastructures. Many of these measures are classified as Intelligent Transportation Systems (ITS), which apply information and communications technologies to transportation infrastructure and vehicles in an effort to manage vehicles, loads, and routes to improve safety and reduce vehicle wear, transportation times, and fuel consumption. Research on PSE congestion mitigation measures indicates that some measures have the potential to reduce congestion substantially. One study estimates that travel time

reductions associated with the introduction of ITS range from 14 to 34 percent for attendees and from 10 to 13 percent for non-attendees.[1]

Mitigation Techniques

- Automate and/or man freeway and surface street traffic control to decrease traffic congestion and increase roadway capacity.
- Automate and/or man intersection traffic control to avoid intersection-related traffic buildups.
- Implement traffic incident management to quickly and safely remove disabled vehicles from roadways.
- Increase driver access to traffic information through the use of media reports, online reports, road signage, and in-vehicle technology.
- Increase use of public transit to PSE venues by event attendees and by non-attendees when traveling near or past large PSEs.
- Initiate high-occupancy vehicle incentives to increase the number of persons traveling in each vehicle.
- Accommodate bicycle travel to and from event venues and provide safe bicycle parking at event venues.
- Coordinate activities of venue operators, event organizers, and transportation officials to manage event schedules and traffic concerns.

Research Needs - This study identified a number of areas where additional research is needed. Further research on these topics will enhance understanding of the extent of PSEs, their contribution to congestion, and the costs, benefits, and equity impacts they impose on society.

Research Needs

- Further research on number of PSE event days, attendance, and revenues
- Development of a GIS database of PSEs
- Controlled PSE venue congestion studies comparing congestion during PSEs with non-event times
- PSE cost management and recovery studies
- Benefits and costs of PSE studies
- Equity impacts of PSE studies

Recommendations – Hosting of large PSEs involves important issues including traffic congestion and the costs of planning for and providing transportation management and control. The first step for a city or MPO attempting to manage congestion from these events will be to develop an understanding of the frequency, types, and locations of PSEs in their area. Once this data has been collected, officials can move on to assess the congestion impacts of the events and explore opportunities to apply various mitigation techniques.

[1] R. Jayakrishnan , M. McNally, and M. Cohen, "Simulation of Advanced Traveler Information Systems (ATIS) Strategies to Reduce Non-Recurring Congestion from Special Events," University of California Transportation Center, UCTC No. 173 (August 1993).

INTRODUCTION

As the United States becomes an ever-more leisure-oriented society, special events and travel to them become a more important aspect of our lives – whether urban, suburban, or rural. These events are counted among the benefits of living in or near an urban area and are important to the prestige of individual cities. However, the increased traffic caused by these events not only intersects with and extends the rush hour, but often results in congestion and street closures on weekends and evenings. Planned special events are often more difficult for drivers, freight movers and transportation planners to work around than usual weekday traffic patterns. As the number of these events increases and multiple events occur simultaneously, the impacts escalate ever more rapidly.

Planned special events generate substantial revenues and incur large costs to private industry and government entities. However, little is known about the number of these events, their economic significance, or the impact they have on traffic congestion.

The diversity of planned special events is tremendous. Professional team sports such as baseball, basketball, hockey, and football are among the best known. Additionally, PSEs also include college versions of these sports, as well as a broad range of other professional sporting events such as auto racing, horse racing, golf, tennis, skating and niche events like tractor pulls, rodeos, dog races, and extreme sports. A variety of mainly non-professional individual sporting events, such as marathons, half-marathons, walks, wheelchair races, bike races, and boat races, are also included in this list. Additionally, a variety of shows, expositions, festivals, parades, circuses, protests, and religious events are a part of this mix.

Definition of a Planned Special Event

In 1988, the National Highway Institute defined a "special event" as an occurrence that "abnormally increases traffic demand," unlike an accident, or construction and maintenance activities, which typically restrict the roadway capacity.[2] According to the FHWA, PSEs include sporting events, concerts, festivals, and conventions at permanent multi-use venues (e.g., arenas, stadiums, racetracks, fairgrounds, amphitheaters and convention centers). They also include less frequent public events, such as parades, fireworks displays, bicycle races, sporting games, motorcycle rallies, seasonal festivals, and milestone celebrations at temporary venues.[3]

The term *planned* special event is used to describe these activities because their locations and times of occurrence are known and their associated operational needs can be anticipated and managed in advance. Emergencies, such as a severe weather event or other major catastrophe, represent special events that can induce extreme traffic demand under evacuation conditions.

[2] Carson, Jodi and Ryan Bylsma, "2003 NCHRP Synthesis 309: Transportation Planning and Management for Special Events," http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_syn_309a.pdf.

[3] Federal Highway Administration, "Managing Travel for Planned Special Events Handbook," Final Report, September 2003, http://ops.fhwa.dot.gov/program%5Fareas/sp%2Devents%2Dmgmt/handbook/.

However, these events occur at random and with little or no advance warning, in contrast to the characteristics of planned special events.

A planned special event creates an increase in travel demand and may require road closures to stage the event. Planned special events generate trips, thus affecting overall transportation system operations. This includes freeway operations, arterial and other street operations, transit operations, and pedestrian flow. Unlike roadway construction activities or traffic incidents that constrain travel within a single corridor, planned special events affect travel in all corridors serving the event venue.

Previous Studies

Previous planned special event work in which FHWA participated focused specifically on the transportation aspects of these events. The two main reports that focus on traffic management in relation to PSEs are 2003 NCHRP Synthesis 309: Transportation Planning and Management for Special Events[4] and the FHWA's 2003 Managing Travel for Planned Special Events Handbook.[5]

Both reports focused on in-depth examinations of the various challenges posed by traffic associated with PSEs and possible solutions. The Managing Travel for Planned Special Events Handbook addresses the unique and diverse set of challenges to stakeholders charged with maintaining transportation system safety, mobility, and reliability. Some of the main challenges identified in PSE event planning include the need to:

- Manage intense travel demand
- Mitigate potential capacity constraints
- Influence the personal economic utility associated with various travel choices
- Accommodate heavy pedestrian flow

The NCHRP synthesis identified "Regional Planning and Coordination" and "Event-Specific Travel Management" issues regarding PSEs. "Event-Specific Travel Management" issues require the following types of responses:

- *Program planning* that encompasses both advance planning activities completed months prior to a single target event and activities related to a series of future planned special events.
- *Event operations planning* that involve advance planning and resource coordination activities conducted for a specific planned special event.
- *Implementation activities* that concern strategizing traffic management plan deployment in addition to conducting necessary equipment testing and personnel training activities.
- *Day-of-event activities* that refer to the daily implementation of the traffic management plan, in addition to traffic monitoring.

[4] Carson, Jodi and Ryan Bylsma, "2003 NCHRP Synthesis 309: Transportation Planning and Management for Special Events," http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_syn_309a.pdf .

[5] Federal Highway Administration, "Managing Travel for Planned Special Events," Final Report, September 2003, http://ops.fhwa.dot.gov/program%5Fareas/sp%2Devents%2Dmgmt/handbook/.

- *Post-event activities* that cover the evaluation of local and regional transportation operations based on stakeholder debriefings and an analysis of traffic data collected during the day-of-event.

The only comprehensive data covering the special events sector was collected as part of the 2002 Economic Census published by the U.S. Census Bureau.[6] This data was collected according to industries as defined in the North American Industry Classification System (NAICS). Much of the PSE economic activity is contained in NAICS 711, *Performing Arts, Spectator Sports, & Related Industries*. Some PSEs of interest to this study also may be classified in two other NAICS categories: NAICS 713 (*Amusement, Gambling, and Recreational Industries)* and NAICS 6113 (*Colleges, Universities, and Professional Schools*).

The Census Bureau lists 110,313 establishments in the NAICS 711 and 713 classifications, which generate $141.9 billion in annual revenue and employ 1.8 million workers. Unfortunately, the Census data are not very useful for determining the number and size of special events. Many of the establishments in arts and entertainment do not host large events, and many types of large events, such as college sporting events and protests, are outside the data in the Census reports. However, the 2002 Census estimates of $141.9 billion in product line revenue for all of arts, entertainment, and recreation and $58.3 billion for performing arts, spectator sports, and related industries provide a starting point for estimating the economic significance of PSEs.

Purpose of the Study

The purpose of this study is to investigate the economic and congestion effects of large planned special events (PSEs) on a national level. A clearer understanding of the scale of PSEs and their economic influence is essential to better understand and advocate for the important role that transportation planning can and should play in managing the traffic logistics of these events. Currently, no comprehensive, integrated, and publicly available information exists on PSEs.

Given the transportation aspects of planned special events identified in previous studies, the purpose of this report is to delineate where planned special events fit within the national economy and to establish the magnitude of this sector. Particular attention is warranted to both the dollar value and number of events held annually. Once the total economic value of planned special events to the national economy is understood, the important role that transportation must play in managing the transportation aspects of these events can be better appreciated.

Thus, this study attempts for the first time to apply a systematic approach to collecting and estimating data on the size and frequency of large PSEs. As previously stated, due to lack of data and/or data dispersion, this study made extensive efforts to collect information from secondary sources, event organizers, event venue managers, and government officials.

[6] U.S. Census Bureau, "2002 Economic Census: Miscellaneous Subjects," http://www.census.gov/prod/ec02/ec0271sxsb.pdf.

Organization of the Report

This report aims to answer four questions: What are PSEs? Why study them? What information on PSEs is currently available, and what more is still needed?

- To begin, the Study Methodology section defines and categorizes PSEs and then discusses the methods employed in this report to collect data, choose case studies, analyze the case study data and estimate the traffic impact of PSEs.

- Next, the Detroit, MI; Portland, OR; El Paso, TX; and Columbia, SC case studies are presented. These case studies allow the reader to develop a deeper understanding of the role of special events in each of these cities: their types, frequency, location, and average attendance.

- The National Estimates section details the development of the first-known national estimate of the extent and magnitude of PSEs. The section details the method by which national macro data was collected and then combined with micro case study data, resulting in comprehensive estimates of the economic and traffic effects of PSEs.

- The Conclusions and Recommendations section summarizes the findings of the report and provides recommendations to public officials, transportation planners, and event organizers. This section also identifies areas of research that are still needed to advance the field of PSE management policy and planning.

- Lastly, the Appendix contains a discussion of traffic and congestion mitigation options for city planners and other officials working to plan for and manage PSEs. It also provides users with the means to estimate the extent and magnitude of PSEs in an area of interest.

STUDY METHODOLOGY

In order to estimate the number, economic significance, and traffic impact of PSEs nationally, several methodological issues had to be addressed. These included:

- Technical definition of PSEs
- Categorization of event types
- Selection of data collection methodologies
- Selection of case studies
- Case study methodology
- Macro national methodology
- Traffic effect estimation methodology

The following parts of this section explain each of these methodological issues, which were then applied to develop the estimates provided in subsequent sections.

Technical Definition of PSEs

As defined earlier, a PSE is a planned occurrence that "abnormally increases traffic demand."[7] This occurs because PSEs usually attract a large number of attendees from a wide geographic area to a specific location for a specific period of time. Numerous factors influence the degree to which a PSE affects traffic demand, including:

- Attendance
- Arrival and departure patterns (i.e., do attendees arrive and leave at the same time, or is attendance staggered?)
- Available modes of transportation to and from the event
- Location
- Time

When considered individually, the number of attendees is more useful in predicting the likelihood of an event affecting traffic demand than the other factors listed above. Accordingly, estimating the total number of PSEs nationally without regard to attendance size is unlikely to be very useful to transportation planners. This is because there are likely tens of thousands of small events that increase traffic demand slightly, but not significantly.

The wide range and vast number of events that "abnormally" impact traffic are almost too numerous to count. For that reason, this report is concerned with estimating the traffic and economic effects of events that cause significant impacts. In order to exclude low-attendance PSEs that have small effects on traffic demand, project staff, in coordination with FHWA,

[7] Carson, Jodi and Ryan Bylsma, "2003 NCHRP Synthesis 309: Transportation Planning and Management for Special Events," http://onlinepubs.trb.org/Onlinepubs/nchrp/nchrp_syn_309a.pdf

selected an event attendance size cut-off of 10,000. In order to examine the sensitivity of these results, data on the number of events with attendance of more than 5,000 was collected for two smaller city case studies, where data collection was relatively less complex.

Categorization of Event Types

In order to collect and present data on the magnitude of PSEs, a first step was to develop an economic classification scheme that would help to identify the major types.

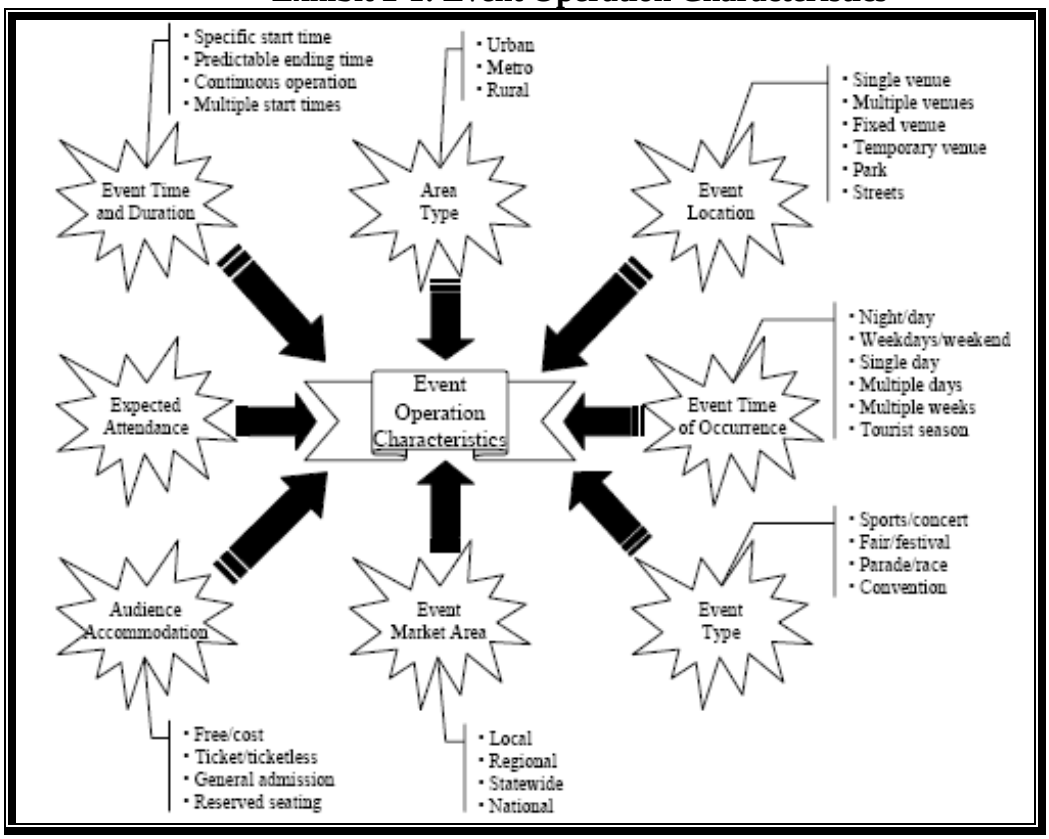
The FHWA Handbook identifies five planned special events types:

- Discrete/recurring event at a permanent venue
- Continuous event
- Street use event
- Regional/multi-venue event
- Rural event

The Handbook also defines PSEs by a variety of other *Event Operations Characteristics,* as shown in Exhibit 2-1. Of these *Event Operations Characteristics,* the category *Event Type* is the most applicable to the collection of economic data. Event types included in Exhibit 2-1 include:

- Sports
- Concerts
- Fairs
- Festivals
- Parades
- Races
- Conventions

Exhibit 2-1: Event Operation Characteristics



Source: FHWA Handbook, "*Managing Travel for Planned Special Events*."

The 2002 Economic Census published by the U.S. Census Bureau and the NCHRP Synthesis 309 report also identify several event types, which are listed in Exhibit 2-2. The Census data is collected according to industries as defined in the North American Industry Classification System (NAICS). Much of the PSE economic activity is contained in NAICS 711 (*Performing Arts, Spectator Sports, & Related Industries)* report. In addition, some PSEs of interest to this study may also be classified in NAICS 713 (*Amusement, Gambling, and Recreational Industries)* and NAICS 6113 (*Colleges, Universities, and Professional Schools).*

Exhibit 2-2: Identified Types of PSEs in Previous Studies

Source	NAICS Code	Description	Frequent/ Infrequent	Traffic Impact	Establishments (Number)	Receipts/Revenues ($1,000)	Employees*
Product Lines Identified In NAICS Section 71 (Arts, Entertainment, and Recreation), 2002 Economic Census, Establishment & Firm Size							
Census	7111101	Opera companies	Frequent	unlikely	178	$722,639	10,615
Census	7111102	Theater companies	Frequent	unlikely	3,222	$4,226,895	52,703
Census	7111103	Dinner theaters	Frequent	unlikely	183	$467,873	9,169
Census	711120	Dance companies	Frequent	unlikely	557	$499,510	9,017
Census	7111301	Symphony orchestras and chamber music organizations	Frequent	maybe	841	$1,452,917	27,085
Census	7111309	Other music groups and artists	Frequent	maybe	3,753	$2,617,710	21,965
Census	7111901	Circuses	Infrequent	maybe	58	$386,772	2,252
Census	7111909	Other performing arts companies (except circuses)	Frequent	maybe	511	$489,315	5,415
Census	7112111	Football clubs	Frequent	likely	67	$4,573,049	6,722
Census	7112112	Baseball clubs	Frequent	likely	242	$3,751,351	15,976
Census	7112119	Other professional sports teams and clubs	Frequent	likely	365	$4,700,650	18,048
Census	7112121	Dog racetrack operation	Frequent	maybe	47	$904,528	10,629
Census	7112122	Auto racetrack operation	Frequent	likely	478	$1,992,894	8,249
Census	7112123	Horse racetrack operation	Frequent	maybe	121	$3,805,034	28,243
Census	7112191	Professional athletes	N/A	N/A	551	$400,923	2,160
Census	7112192	Racing (except racetrack operation)	Frequent	maybe	2,201	$2,184,987	17,700
Census	711310	Promoters of performing arts, sports, etc. with facilities	N/A	N/A	1,699	$5,315,254	71,314
Census	711320	Promoters of performing arts, sports, etc. without facilities	N/A	N/A	3,537	$6,853,297	31,152
Census	711410	Agents & managers for artists, athletes, entertainers, etc.	N/A	N/A	3,262	$3,602,288	17,291
Census	711510	Independent artists, writers, and performers	N/A	unlikely	15,862	$9,337,795	56,828
Census	712110	Museums	Infrequent	unlikely	4,533	$5,907,767	82,061
Census	712120	Historical sites	Infrequent	unlikely	999	$550,650	10,277
Census	712130	Zoos and botanical gardens	Infrequent	unlikely	558	$1,789,048	25,323
Census	712190	Nature parks and other similar institutions	Infrequent	unlikely	573	$360,494	5,437
Census	7131101	Waterparks	Infrequent	unlikely	148	$480,358	4,372
Census	7131102	Amusement parks (except waterparks)	Infrequent	unlikely	296	$7,693,690	88,171
Census	713120	Amusement arcades	Infrequent	unlikely	2,571	$1,269,152	29,586
Census	713210	Casinos (except casino hotels)	Frequent	maybe	356	$12,386,830	105,792
Census	7132901	Slot machine operators	Infrequent	unlikely	331	$1,758,687	10,475
Census	7132902	Lottery, bingo, bookie, and other betting operation	Frequent	unlikely	1,385	$4,747,361	41,309
Census	713910	Golf courses and country clubs	Infrequent	unlikely	12,261	$17,533,703	312,812
Census	713920	Skiing facilities	Infrequent	unlikely	387	$1,801,235	70,083
Census	713930	Marinas	Infrequent	unlikely	4,272	$3,351,721	27,728
Census	7139404	Ice skating rinks	Infrequent	unlikely	443	$419,950	11,641
Census	7139405	Roller skating rinks	Infrequent	unlikely	1,540	$396,485	17,526
Census	7139409	Other fitness and recreational sports centers	Infrequent	unlikely	23,307	$14,171,212	416,341
Census	713950	Bowling centers	Infrequent	unlikely	4,924	$3,074,777	82,010
Census	7139901	Dance halls	Infrequent	unlikely	214	$82,344	2,325
Census	7139902	Concession operators of amusement devices and rides	Infrequent	unlikely	958	$430,957	6,249
Census	7139904	Miniature golf courses	Infrequent	unlikely	1,392	$396,744	7,161
Census	7139905	Coin-operated amusement devices (except slot machine op.)	Infrequent	unlikely	2,291	$1,577,643	14,581
Census	7139908	All other miscellaneous amusement and recreation services	Frequent	unlikely	8,839	$3,437,620	54,881
Events Identified in NCHRP Synthesis 309 Report - Tables 1 & 2							
NCHRP		Football games	Frequent	likely			
NCHRP		Baseball games	Frequent	likely			
NCHRP		Basketball/hockey games	Frequent	likely			
NCHRP		Auto Racing	Frequent	likely			
NCHRP		Golf	Frequent	likely			
NCHRP		Concert Series	Frequent	likely			
NCHRP		Conferences/Conventions	Frequent	likely			
NCHRP		Parades	Frequent	likely			
NCHRP		Seasonal Markets	Frequent	likely			
NCHRP		July 4th Celebrations	Infrequent	likely			
NCHRP		Other Fairs/Festivals	Infrequent	likely			
NCHRP		Olympics/Games	Infrequent	likely			
NCHRP		Political/Religious Visits	Infrequent	likely			
NCHRP		Protests	Infrequent	likely			
NCHRP		Convention Events/Expositions	Infrequent	likely			
NCHRP		Vehicle or Equipment Shows	Infrequent	likely			
NCHRP		Marathon Races	Infrequent	likely			
NCHRP		Bike Races	Infrequent	likely			
NCHRP		Horse races	Infrequent	likely			
NCHRP		Sailing	Infrequent	likely			
NCHRP		Fishing Derby	Infrequent	maybe			
Events Identified by Jack Faucett Associates							
JFA		College football	Frequent	likely			
JFA		College basketball	Frequent	likely			
JFA		"Megachurch" services	Frequent	likely			
JFA		Sunday Street Closures within Parks (e.g. GG Park-SF)	Frequent	maybe			
JFA		On-Location Movie Shootings	Infrequent	maybe			
JFA		Political ceremonies (inauguration, presidential funeral)	Infrequent	likely			
JFA		Emergency preparedness drills	Infrequent	maybe			
JFA		"Spare the Air"/"Bike to Work" Days	Infrequent	maybe			
JFA		Air Shows/Fleet Week/naval ship display/QE II Ship Visit	Infrequent	maybe			
JFA		Transit Strike/Transit System Malfunction	Infrequent	likely			
JFA		Town Christmas Tree/Menorah Lightings	Infrequent	maybe			

Sources: 2003 NCHRP Synthesis 309: Transportation Planning and Management for Special Events and 2002 Economic Census: Miscellaneous Subjects, U.S. Census Bureau

Exhibit 2-3 provides a state-by-state breakdown of spectator sports revenues/receipts compiled from the 2002 Economic Census. The data reveal notable regional differences (e.g., whereas team sports are big business in more populous states, racetracks command most of the spectator sports market in less populous states such as Alabama and Iowa).

Exhibit 2-3: Spectator Sports Receipts/Revenues in 2002 ($1,000)

State	Sports Teams & Clubs	Racetracks	Other Spectator Sports	Total	State Total As % of Nat'l Total
ALABAMA	5,992	121,948	3,493	131,433	0.6%
ALASKA	D	D	2,941	6,989	0.0%
ARIZONA	377,971	85,865	11,861	475,697	2.1%
ARKANSAS	D	D	D	63,877	0.3%
CALIFORNIA	1,733,997	663,395	360,094	2,757,486	12.4%
COLORADO	434,867	39,745	29,850	504,462	2.3%
CONNECTICUT	23,661	24,938	4,929	53,528	0.2%
DELAWARE	D	323,704	D	332,323	1.5%
DISTRICT OF COLUMBIA	D	D	D	D	D
FLORIDA	965,294	597,194	195,551	1,758,039	7.9%
GEORGIA	339,331	D	D	463,282	2.1%
HAWAII	1,961	D	1,331	3,292	0.0%
IDAHO	2,349	5,159	1,709	9,217	0.0%
ILLINOIS	578,623	285,742	81,670	946,035	4.2%
INDIANA	D	D	D	1,053,549	4.7%
IOWA	15,096	300,583	7,194	322,873	1.4%
KANSAS	3,886	67,735	10,963	82,584	0.4%
KENTUCKY	D	241,126	D	339,666	1.5%
LOUISIANA	D	302,669	D	465,701	2.1%
MAINE	5,727	14,146	733,016	20,606	0.1%
MARYLAND	331,044	D	D	464,832	2.1%
MASSACHUSETTS	485,311	99,874	7,136	592,321	2.7%
MICHIGAN	429,208	154,566	15,791	599,565	2.7%
MINNESOTA	363,985	D	D	421,626	1.9%
MISSISSIPPI	3,155	2,451	583,004	6,189	0.0%
MISSOURI	523,649	7,850	7,529	539,028	2.4%
MONTANA	1,256	1,170	1,093	3,519	0.0%
NEBRASKA	12,556	20,864	8,301	41,721	0.2%
NEVADA	D	D	D	107,983	0.5%
NEW HAMPSHIRE	D	101,171	D	110,430	0.5%
NEW JERSEY	367,878	52,409	45,354	465,641	2.1%
NEW MEXICO	D	101,673	D	106,744	0.5%
NEW YORK	1,288,760	398,516	105,006	1,792,282	8.0%
NORTH CAROLINA	290,294	102,694	748,147	1,141,135	5.1%
NORTH DAKOTA	D	D	D	D	D
OHIO	753,221	167,980	77,712	998,913	4.5%
OKLAHOMA	8,280	29,909	15,711	53,900	0.2%
OREGON	D	D	5,198	121,210	0.5%
PENNSYLVANIA	736,019	221,563	90,778	1,048,360	4.7%
RHODE ISLAND	D	D	D	D	D
SOUTH CAROLINA	19,025	D	D	65,866	0.3%
SOUTH DAKOTA	D	D	D	9,523	0.0%
TENNESSEE	277,815	D	D	380,041	1.7%
TEXAS	966,054	224,114	68,817	1,258,985	5.6%
UTAH	D	D	D	D	D
VERMONT	D	2,195	D	3,834	0.0%
VIRGINIA	226,520	100,216	50,825	377,561	1.7%
WASHINGTON	399,861	D	D	474,260	2.1%
WEST VIRGINIA	D	647,912	D	665,619	3.0%
WISCONSIN	312,621	42,865	17,131	372,617	1.7%
WYOMING	D	D	D	4,653	0.0%
UNITED STATES	13,025,050	6,702,456	2,585,910	22,313,416	100.0%

Note: "D" = nondisclosure by Census Bureau to maintain confidentiality of a business or person
Source: 2002 Economic Census: Miscellaneous Subjects, U.S. Census Bureau

One of the shortcomings of the Census data provided in Exhibit 2-2 is that they are only collected from establishments whose primary purpose is arts, entertainment, or recreation. For example, college sports are not included, as the primary purpose of colleges and universities is education. County or state fairs are not included, as the primary purpose of county and state governments is not recreation. In addition, other large attendance events, such as protest marches and parades, are not classified as performing arts, spectator sports, or related industries and thus are not counted in the Census data. Therefore, to add to the Census "product lines," the second part of Exhibit 2-2 provides event types identified in the NCHRP Synthesis 309 Report.

For each type of industry or event in Exhibit 2-2, the final two columns include a judgment as to whether the events were likely to be regularly occurring (frequent, infrequent) and were likely to have a traffic impact (likely, maybe, unlikely). These judgments were provided in the NCHRP report and were added to the Census data for this study.

From this list, a reasonable number of event types was selected, including only those event types that were likely to have significant effects. The selection process was completed in coordination with the FHWA. It was determined that the list should be long enough to include the majority of events and impacts, but not so long as to make data collection efforts unreasonably complicated. The final event types selected for inclusion in this study are:

1. Professional Football
2. Professional Baseball
3. Professional Basketball
4. Professional Hockey
5. College Football
6. College Basketball
7. College Hockey
8. Auto Racing
9. Horse Racing
10. Golf Tournaments
11. Marathons
12. Concerts
13. Parades
14. Fairs
15. Festivals
16. Protests/Political Events
17. Expositions and Shows

Selection of Data Collection Methodologies

Several approaches were employed to collect event size and frequency data. These included both a venue and permitting authority-based approach and an association-based approach. The venue and permitting authority-based approach was designed to collect data from a sample of special events venues and permitting authorities, such as stadiums and police departments at a micro or city-level. The association-based approach was designed to collect data from trade associations

representing the relevant entities within various special events categories at the national or macro level.

For the micro or city level approach, the first step was to select representative cities to serve as case studies. Once the case study cities were selected, venues, permitting authorities, and other officials were identified and contacted to develop estimates of the number of PSEs and the attendance at those PSEs. For the macro or national approach, the first step in the process was to collect the available data at the national level from the Census and from associations and other organizations. This process was an effective means for many types of events, particularly for sporting events, which have national groups that collect such data such as the NFL, NBA and NCAA. However, for other types of events, especially street-use events, data is often not available at the national level. Therefore, for these types of events, the local case studies were used to capture data and develop national estimates using scaling factors.

The primary data items that needed to be collected and estimated for the 17 identified event types were the following:

- Number of event days annually
- Average attendance
- Total attendance
- Revenue or spending per attendee
- Economic effects
- Fiscal effects

Selection of Case Studies

As noted earlier, comprehensive information on PSEs at the national level is not available for many types of events. To the extent information is available, it is typically fragmented. In order to overcome these challenges, sample data was collected from four U.S. cities to gain a better understanding of the types of PSEs, the level of attendance, and the characteristics that would affect traffic congestion. The sample city data was also used to aid in the development of national estimates. The four sample cities that were selected are:

- Detroit, Michigan
- Portland, Oregon
- El Paso, Texas
- Columbia, South Carolina

The sample cities were identified based on data from the Texas Transportation Institute's *2007 Urban Mobility Report* (UMR). The UMR provides congestion data for a sample of urban areas in the U.S. This data can be used to create national congestion estimates by scaling up the data to the national level.

The UMR examines congestion data for 85 selected urban areas in the U.S. which it groups into four categories according to population size: Very Large, Large, Medium, and Small. The population ranges represented by each category and the number of urban areas within each one

are summarized in Exhibit 2-4. The fifth column in Exhibit 2-4, "Number of Urban Areas in the U.S.," lists the number of Urban Areas in the country that the FHWA estimates fit into the population range categories used by the UMR.

Exhibit 2-4: Urban Area Categories in the TTI Urban Mobility Report

Category	Population Range		Number of Urban Areas in UMR Sample*	Number of Urban Areas in the U.S.**
	Minimum	Maximum		
Very Large	3 million	Uncapped	14	13
Large	1 million	2.9 million	25	26
Medium	0.5 million	0.9 million	30	36
Small	0.05 million	0.4 million	16	385

* TTI, *Urban Mobility Report*, 2007, http://mobility.tamu.edu/ums/congestion_data/national_congestion_tables.stm
** Information based on FWHA, Highway Statistics, 2005 http://www.fhwa.dot.gov/policy/ohim/hs05/pdf/hm72.pdf

Each urban area listed in the National Congestion Tables in the UMR contains data in the following three fields:

- Annual Delay per Traveler in Hours
- Travel Time Index
- Wasted Fuel per Traveler

For the purpose of this study, an additional field – Population – was added to the three fields in the National Congestion Tables. The population estimates that are used in this report are urban population estimates.

One sample city was selected from each of the four categories. When selecting the sample cities, the intent was to select cities with statistics near the average for each field within each category. For example, Portland was selected for the *Large* urban area category in part because the city's data is relatively close to all the category averages in the four fields in the *Large* urban area category. Exhibit 2-5 compares *Large* urban area average statistics with Portland's statistics.

Exhibit 2-5: National Congestion Table Averages for Large Urban Areas and Portland, OR

Urban Area	Annual Delay per Traveler	Travel Time Index	Wasted Fuel per Traveler	Population (thousands)
	Hours	Value	Gallons	
Large Average (Average)	37	1.24	25	1,631
Portland, OR-WA	38	1.29	27	1,729

Source: TTI, *Urban Mobility Report*, 2007, http://mobility.tamu.edu/ums/congestion_data/national_congestion_tables.stm
FWHA, Highway Statistics, 2005 http://www.fhwa.dot.gov/policy/ohim/hs05/pdf/hm72.pdf

The next criterion used when selecting the sample cities was to represent different major regional areas of the U.S. As is shown in Exhibit 2-6, the selected cities represent four different regions of the U.S.

Exhibit 2-6: Regional Classification of Selected Urban Areas

Urban Area	Region of U.S.
Detroit, MI	North
Portland, OR	West
El Paso, TX	South
Columbia, SC	East

Thus, the selections of the sample urban areas for analysis in this study were made on the bases of congestion, population, and regional representation. National aggregate estimates were obtained by scaling up by the number of urban areas in the U.S.

Very Large Urban Areas

The National Congestion Table for *Very Large* urban areas is shown in Exhibit 2-7. Detroit was selected to represent this category. The reasons for its selection included its statistical proximity to the category averages for annual delay per traveler in hours, travel time index, and wasted fuel per traveler. Detroit's population is not very close to the category population average, largely because the extremely large populations of New York City and Los Angeles skew the average. However, the median population for the category, 4.1 million, is relatively close to Detroit's population of 3.9 million. Detroit's average annual delay per traveler is 54 hours, exactly the category average. The city's travel time index is 1.29, which is slightly below the category average of 1.38. Travelers in Detroit waste an average of 35 gallons of fuel due to congestion annually. This is slightly less than the category average of 38. (For most of the metrics, the cities, especially Portland, are almost exactly equal to the category average.)

Exhibit 2-7: National Congestion Table for Very Large Urban Areas

Urban Area	Annual Delay per Traveler		Travel Time Index		Wasted Fuel per Traveler		Population (thousands)
	Hours	Rank	Value	Rank	Gallons	Rank	
Very Large (Average)	54		1.38		38		5,736
Los Angeles-Long Beach-Santa Ana, CA	72	1	1.5	1	57	1	12,149
San Francisco-Oakland, CA	60	2	1.41	3	47	2	3,110
Washington, DC-VA-MD	60	2	1.37	7	43	5	4,251
Atlanta, GA	60	2	1.34	11	44	3	4,172
Dallas-Fort Worth-Arlington, TX	58	5	1.35	9	40	7	3,746
Houston, TX	56	7	1.36	8	42	6	2,487
Detroit, MI	54	8	1.29	21	35	10	3,931
Miami, FL	50	11	1.38	6	35	10	5,331
Phoenix, AZ	48	15	1.31	15	34	13	3,270
Chicago, IL-IN	46	16	1.47	2	32	17	7,702
New York-Newark, NY-NJ-CT	46	16	1.39	5	29	23	17,773
Boston, MA-NH-RI	46	16	1.27	25	31	19	4,077
Seattle, WA	45	19	1.3	17	34	13	3,002
Philadelphia, PA-NJ-DE-MD	38	33	1.28	23	24	34	5,296

Source: TTI, *Urban Mobility Report*, 2007, http://mobility.tamu.edu/ums/congestion_data/national_congestion_tables.stm
FWHA, Highway Statistics, 2005 http://www.fhwa.dot.gov/policy/ohim/hs05/pdf/hm72.pdf

Large Urban Areas

Portland was chosen to represent the *Large* urban area category. One reason it was selected is its proximity to the category averages for annual delay per traveler in hours, travel time index, wasted fuel per traveler, and population. The National Congestion Table for Large Urban Areas is shown in Exhibit 2-8. Portland's average annual delay per traveler is 38 hours, which is only one hour more than the category average of 37. The city's travel time index is 1.29, which is

slightly above the category average of 1.24. Travelers in Portland waste an average of 27 gallons of fuel due to congestion annually, slightly more than the category average of 25. Additionally, Portland's population of 1.7 million is only slightly higher than the category average of 1.6 million.

Exhibit 2-8: National Congestion Table for Large Urban Areas

Urban Area	Annual Delay per Traveler		Travel Time Index		Wasted Fuel per Traveler		Population (thousands)
	Hours	Rank	Value	Rank	Gallons	Rank	
Large Average (Average)	37		1.24		25		1,631
San Diego, CA	57	6	1.4	4	44	3	2,903
San Jose, CA	54	8	1.34	11	38	9	1,649
Orlando, FL	54	8	1.3	17	35	10	1,335
Denver-Aurora, CO	50	11	1.33	13	33	15	2,092
Riverside-San Bernardino, CA	49	13	1.35	9	40	7	1,828
Tampa-St. Petersburg, FL	45	20	1.28	23	28	25	2,251
Baltimore, MD	44	22	1.3	17	32	17	2,149
Minneapolis-St. Paul, MN	43	23	1.26	26	30	21	2,519
Indianapolis, IN	43	23	1.22	32	28	25	915
Sacramento, CA	41	27	1.32	14	30	21	1,787
Las Vegas, NV	39	29	1.3	18	27	27	1,256
San Antonio, TX	39	29	1.23	28	27	27	1,143
Portland, OR-WA	38	33	1.29	21	27	27	1,729
Columbus, OH	33	36	1.19	36	24	34	1,197
St. Louis, MO-IL	33	36	1.16	46	20	40	2,106
Virginia Beach, VA	30	42	1.18	39	20	40	1,521
Memphis, TN-MS-AR	30	42	1.13	53	16	46	1,017
Providence, RI-MA	29	44	1.16	46	17	45	1,242
Cincinnati, OH-KY-IN	27	45	1.18	39	19	42	1,619
Milwaukee, WI	19	59	1.13	53	14	52	1,399
New Orleans, LA	18	63	1.15	49	11	62	1,009
Kansas City, MO-KS	17	64	1.08	73	10	66	1,454
Pittsburgh, PA	16	67	1.09	64	9	69	1,769
Cleveland, OH	13	75	1.09	64	9	69	1,767
Buffalo, NY	11	77	1.08	73	7	76	1,123

Source: TTI, *Urban Mobility Report*, 2007, http://mobility.tamu.edu/ums/congestion_data/national_congestion_tables.stm
FWHA, Highway Statistics, 2005 http://www.fhwa.dot.gov/policy/ohim/hs05/pdf/hm72.pdf

Medium Urban Areas

El Paso, Texas was chosen to represent the *Medium* urban area category. The reasons for its selection were El Paso's proximity to the category averages for annual delay per traveler in hours, travel time index, wasted fuel per traveler, and population. El Paso's average annual delay per traveler is 24 hours, four hours less than the category average. The city has a travel time index of 1.17, which is very close to the category average of 1.16. Travelers in El Paso waste an average of 16 gallons of fuel due to congestion annually, only two gallons less than the category average of 18. Additionally, El Paso's population of 656,000 is fairly close to the category average of 685,000. The National Congestion Table for Medium Urban Areas is provided in Exhibit 2-9.

Exhibit 2-9: National Congestion Table for Medium Urban Areas

Urban Area	Annual Delay per Traveler		Travel Time Index		Wasted Fuel per Traveler		Population (thousands)
	Hours	Rank	Value	Rank	Gallons	Rank	
Medium (Average)	28		1.16		18		685
Austin, TX	49	13	1.31	15	33	15	641
Charlotte, NC-SC	45	20	1.23	28	31	19	855
Louisville, KY-IN	42	25	1.23	28	29	23	904
Tucson, AZ	42	25	1.23	28	26	31	749
Nashville-Davidson, TN	40	28	1.17	42	25	33	984
Oxnard-Ventura, CA	39	29	1.24	27	27	27	367
Jacksonville, FL	39	29	1.21	35	26	31	992
Raleigh-Durham, NC	35	35	1.18	39	23	37	673
Albuquerque, NM	33	36	1.17	42	21	39	573
Birmingham, AL	33	36	1.15	49	22	38	680
Bridgeport-Stamford, CT-NY	31	40	1.22	32	24	34	868
Salt Lake City, UT	27	45	1.19	36	18	44	970
Sarasota-Bradenton, FL	25	48	1.19	36	15	50	636
Omaha, NE-IA	25	48	1.16	46	15	50	571
Honolulu, HI	24	51	1.22	32	16	46	648
El Paso, TX-NM	24	51	1.17	42	16	46	656
Grand Rapids, MI	24	51	1.1	60	14	52	595
Allentown-Bethlehem, PA-NJ	22	55	1.14	51	14	52	607
Oklahoma City, OK	21	56	1.09	64	13	59	856
Fresno, CA	20	57	1.12	55	12	61	616
Richmond, VA	20	57	1.09	64	13	59	910
Hartford, CT	19	59	1.11	57	14	52	889
New Haven, CT	19	59	1.11	57	14	52	558
Tulsa, OK	19	59	1.09	64	11	62	575
Dayton, OH	17	64	1.1	60	11	62	287
Albany-Schenectady, NY	16	67	1.08	73	10	66	524
Toledo, OH-MI	15	71	1.09	64	9	69	518
Springfield, MA-CT	11	77	1.06	81	7	76	587
Akron, OH	10	80	1.07	76	7	76	615
Rochester, NY	10	80	1.07	76	7	76	658

Source: TTI, *Urban Mobility Report*, 2007, http://mobility.tamu.edu/ums/congestion_data/national_congestion_tables.stm
FWHA, Highway Statistics, 2005 http://www.fhwa.dot.gov/policy/ohim/hs05/pdf/hm72.pdf

Small Urban Areas

The *Small* urban area category consists of a total of 16 urban areas in the UMR out of a total of 385 cities of this size. Columbia, South Carolina was selected to represent this category. Factors involved in Columbia's selection included its proximity to the category averages for annual delay per traveler in hours, travel time index, and wasted fuel per traveler. It should be noted that Columbia's population of 440,000 is not very close to the category population average of about 313,000, largely because the very small populations of Boulder, CO and Brownsville, TX skew the average. Columbia was ranked 7 out of 16 in terms of annual delay per traveler. Its average annual delay per traveler is 16 hours; the category average is 17 hours. The city's travel time index is 1.07, which is slightly below the category average of 1.09. Travelers in Columbia waste an average of 10 gallons of fuel due to congestion annually, which is equal to the category average. The National Congestion Table for Small Urban Areas is provided in Exhibit 2-10.

Exhibit 2-10: National Congestion Table for Small Urban Areas

Urban Area	Annual Delay per Traveler		Travel Time Index		Wasted Fuel per Traveler		Population (thousands)
	Hours	Rank	Value	Rank	Gallons	Rank	
Small (Average)	17		1.09		10		313
Charleston-N. Charleston, SC	31	40	1.17	42	19	42	443
Colorado Springs, CO	27	45	1.14	51	16	46	489
Pensacola, FL-AL	25	48	1.11	57	14	52	344
Cape Coral, FL	24	51	1.12	55	14	52	411
Little Rock, AR	17	64	1.07	76	11	62	376
Boulder, CO	16	67	1.1	60	9	69	98
Columbia, SC	16	67	1.07	76	10	66	440
Eugene, OR	14	72	1.1	60	8	73	237
Bakersfield, CA	14	72	1.09	64	8	73	469
Salem, OR	14	72	1.09	64	8	73	223
Laredo, TX	12	76	1.09	64	6	81	183
Beaumont, TX	11	77	1.05	84	7	76	224
Anchorage, AK	10	80	1.07	76	5	83	278
Corpus Christi, TX	10	80	1.06	81	6	81	297
Brownsville, TX	8	84	1.06	81	4	85	148
Spokane, WA	8	84	1.04	85	5	83	354

Source: TTI, *Urban Mobility Report*, 2007, http://mobility.tamu.edu/ums/congestion_data/national_congestion_tables.stm
FWHA, Highway Statistics, 2005 http://www.fhwa.dot.gov/policy/ohim/hs05/pdf/hm72.pdf

Case Study Methodology

In conducting the case studies, an exhaustive search of national and local data was conducted both to identify venues where large events might occur and to compile data by event type, such as professional and college football, basketball, and other sports, in order to identify event generators. For each venue, when officials were contacted to identify the number of events at their venue and the characteristics of their venue that might affect congestion, they were also asked to identify additional venues that might host special events. For example, if an auto race track was contacted, they were asked whether there were additional tracks in the case study area that might generate additional large attendance events. The next four sections of this study document the results of the case studies for Detroit, Portland, El Paso, and Columbia.

PSEs usually occur in either specially designed event-hosting facilities or in open areas. Specially designed facilities can include stadiums and exposition halls, while the open area venues are usually either streets or parks. Collecting information on PSEs involved contacting facility staff for the specially-designed facilities as well as municipal officials and event organizers for the open area venues.

Survey respondents and interviewees were asked the following questions regarding the event(s) or venue(s) with which they were involved.

- What are the names of the main events?
- How often do the events occur?
- What is the average number of event-days during which participants and attendees exceed 10,000? (El Paso and Columbia officials also identified events with more than 5,000 attendees.)
- Is the event accessible by public transportation?

- If the event is accessible by public transportation, which type of public transportation is available (e.g., bus, light rail)?
- Does the event take place in the downtown area, an urban area, a suburban area, or a rural area?
- Is the event close to an interstate highway?
- What is the number of dedicated parking spaces for the event?
- Is arrival at and departure from the event staggered, or do most people arrive at the same time and leave at the same time?

The questionnaire stated: "Some of these types of events are periodic – many will be annual (e.g., marathons and festivals). Some others are not periodic (e.g., protests and some concerts). The interest of the report is in annual averages when the information is available. If annual averages are not available, it is possible to use information for a single sample year as a substitute. You may respond to the questions by creating an Excel matrix, using bullet points, or prose."

A sample response to the questionnaire is provided in Exhibit 2-11. The response was provided by the Special Events Coordinator at the Portland Revenue Bureau.

Exhibit 2-11: Sample of Survey Response from the Portland Bureau of Licenses

Event Type	Name	Frequency	Event Days	Public Trans?	Type	Location	Highway	Parking Spaces	Arrival Depart	Participants
Marathon	Shamrock Run	1x annual	1	Yes	Bus/rail	Downtown	Yes	None	Staggered	11,000
Protest/March	May 18 Coalition	1x annual	1	Yes	Bus/rail	Downtown	Yes	None	Same	19,000
Marathon/Walk	America's Walk for Diabetes	1x annual	1	Yes	Bus/rail	Downtown	Yes	None	Same	12,000
Marathon/Bike	Bridge Pedal	1x annual	1	Yes	Bus/rail	Downtown	Yes	None	Staggered	19,000
Parade	Starlight Parade	1x annual	1	Yes	Bus/rail	Downtown	Yes	None	Same	250,000
Marathon/Walk	Race for the Cure	1x annual	1	Yes	Bus/rail	Downtown	Yes	None	Staggered	47,000

Another sample response to the questionnaire is shown in Exhibit 2-12. The response was provided by the Special Events Coordinator at the Portland Department of Parks and Recreation.

Exhibit 2-12: Sample of Survey Response from the Portland Department of Parks and Recreation

Event Type	Name	Frequency	Event Days	Public Trans?	Type	Location	Highway	Parking Spaces	Arrival Depart	Participants
Run	Shamrock Run	1x annual	1	Yes	Bus/rail	Waterfront	Yes	None	Staggered	11K
Protest/March	Portland Peace Coalition	1x annual	1	Yes	Bus/rail	South Park Blocks	Yes	None	Staggered	19K
Festival	Cinco de Mayo	1x annual	4	Yes	Bus/rail	Waterfront	Yes	None	Staggered	12K-20K per day
Festival	Doggie Dash	1x annual	1	Yes	Bus/rail	Waterfront	Yes	None	Staggered	10K
Festival	Rose Festival Waterfront Village	1x annual	11	Yes	Bus/rail	Waterfront	Yes	None	Staggered	20K-40K per day
Parade	Rose Festival Junior Parade	1x annual	1	Yes	Bus/rail	Normandale, Grant	No	None	Staggered	10K
Festival/Parade	Portland Pride Festival	1x annual	2	Yes	Bus/rail	Waterfront	Yes	None	Staggered	12K-14K per day
Festival	Blues Festival	1x annual	4	Yes	Bus/rail	Waterfront	Yes	None	Staggered	15K per day
Festival/Bike Race	Seattle-to-Portland Classic	1x annual	2	Yes	Bus/rail	Holladay	Yes	None	Staggered	10K per day
Festival	Cathedral Park Jazz Festival	1x annual	3	Yes	Bus	Cathedral		None	Staggered	10K per day
Festival	Brewers Festival	1x annual	4	Yes	Bus/rail	Waterfront	Yes	None	Staggered	15K - 20K per day
Festival	The Bite	1x annual	3	Yes	Bus/rail	Waterfront	Yes	None	Staggered	15K - 20K per day
Festival/Bike Race	Twilight Criterium	1x annual	1	Yes	Bus/rail	North Park Blocks	Yes	None	Staggered	10K
Festival	Salsa en la Calle	1x annual	1	Yes	Bus	Eastbank Esplanade	Yes	None	Staggered	10K
Concert	Oregon Symphony	1x annual	1	Yes	Bus/rail	Waterfront	Yes	None	Staggered	10K
Festival	Art in the Pearl	1x annual	3	Yes	Bus/rail	North Park Blocks	Yes	None	Staggered	10K per day
Festival	Portland Pirate Festival	1x annual	2	Yes	Bus	Cathedral	No	None	Staggered	10K per day
Run/Walk/Festival	Race for the Cure	1x annual	1	Yes	Bus/rail	Waterfront	Yes	None	Staggered	47K

Note that the Shamrock Run and Race for the Cure were listed by both the Portland Bureau of Licenses and Department of Parks and Recreation. The events were not double counted in the report analysis.

Macro National Methodology

A second methodological approach used to collect data on the economic magnitude of PSEs focused on a macro or national-level methodology. This association-based approach involved data collection from the variety of organizations that compile data on specific types of events. It was particularly effective for certain event types, most notably sporting events, where national groups or leagues collect data on their operations. For example, the National Football League (NFL), the National Basketball League (NBA), and the National Collegiate Athletic Association (NCAA) all collect attendance and revenue information on their events.

The basic approach for this national methodology was to search for sources of information that covered an individual event type. A search for data on the Internet was typically the first step. Where such searches did not provide the necessary information, individuals at various trade groups or industry publications were contacted.

In several cases, most notably street and park event types (parades, fair, festivals, and protests), data were not available at the national level, as these event types are not represented by a trade group. In these cases, data from the case studies was often utilized, adjusted by scaling factors to develop a national estimate of the number of events and attendance per event.

In addition, for many of the event types only some portions of the necessary data were available, while other portions were not. For example, no data were found on a national level for average spending or revenue from auto races, parades, or marathons. Also, while some data was available on the direct spending or revenue from events, there was a desire to measure the larger economic

impacts caused by events and the tax revenue generated that could offset the costs of traffic management.

These data gaps were filled in with the aid of a report on PSEs in San Jose, California.[8] This report covered six different actual events that occurred in San Jose and was based on data collection from 3,000 surveys of 10,000 actual event attendees. Released by SportsEconomics, LLC, in 2007. The San Jose report contains information on spending both inside and outside the events and data on total economic impacts, as well as on the city's tax receipts. Data on economic impacts were rigorously defined to include outside-the-event spending only for attendees who visited San Jose solely to attend the event. The six events in the study and associated data are shown in Exhibit 2-13. The exhibit also indicates which of the PSE event categories used in this study are assigned to each of the six San Jose events.

Economic and Fiscal Effects

The economic effects that spectator spending and event revenue have on the local economy can be estimated using a multiplier. In economics, the multiplier effect refers to the idea that an initial spending rise can lead to an even greater increase in local spending and income. In other words, an initial change in aggregate demand can cause a further change in aggregate output for the economy. Based on the San Jose study, the economic and fiscal impact multipliers assigned to each event type are listed in the shaded rows in Exhibit 2-13.

[8] "Analysis of the Economic and Fiscal Impact of Cultural and Sporting Events in San Jose: Explanation of Recommended Methodology and Impact Assessment for Six Representative Events," Sports Economics, 2007.

Exhibit 2-13: Economic Impact Multiplier Assigned to Study Event Types

	Grand Prix	Rock n' Roll Marathon	Zero One Festival	Jazz Festival	Tapestry Arts Festival	Mariachi Festival	All Fairs and Festivals
Total Attendance	**117,600**	**63,000**	**84,600**	**76,000**	**130,000**	**34,500**	**325,100**
Number of Unique Attendees (individual people attending event)	49,000	39,300	27,800	46,300	118,000	30,500	222,600
Number of "Relevant" Visitors: Count Towards Economic Impact	21,700	23,700	15,900	27,000	36,700	7,600	87,200
Ratio of Unique to Total Attendees	0.44	0.60	0.57	0.58	0.31	0.25	0.39
Average Expenditure for Entire Trip Per "Relevant" Visitor Inside Event	164	70	39	26	82	60	55
Average Expenditure for Entire Trip Per "Relevant" Visitor Outside Event	282	368	243	206	141	69	173
Total Inside Event Spending - Relevant	$3,558,800	$1,659,000	$620,100	$702,000	$3,009,400	$456,000	4,787,500
Total Outside Event Spending - Relevant	$6,119,400	$8,721,600	$3,863,700	$5,562,000	$5,174,700	$524,400	15,124,800
Total Inside Event Spending - Others	$3,718,900	$253,100	$952,400	$267,600	$88,400	$9,500	1,317,900
Total Inside Event Spending - All	$7,277,700	$1,912,100	$1,572,500	$969,600	$3,097,800	$465,500	6,105,400
Average Inside Event Spending - All	$149	$49	$57	$21	$26	$15	$27
Total Direct Spending	$13,397,100	$10,633,700	$5,436,200	$6,531,600	$8,272,500	$989,900	21,230,200
Total Economic Impact	$23,624,800	$16,479,800	$9,276,600	$10,884,700	$12,361,600	$1,518,500	34,041,400
Ratio of Direct Spending to Inside Spending	1.84	5.56	3.46	6.74	2.67	2.13	3.48
Ratio of Economic Impact to Direct Spending	1.76	1.55	1.71	1.67	1.49	1.53	1.60
Total Ratio of Economic Impact to Inside Spending	3.25	8.62	5.90	11.23	3.99	3.26	5.58
Total Fiscal Impact	$559,000	$554,900	$225,500	$312,400	$251,400	$22,600	811,900
Ratio of Fiscal Impact to Economic Impact	0.024	0.034	0.024	0.029	0.020	0.015	0.024
Applicable Special Event Types	Team Sports	Marathons	Expositions			Concerts	Festivals
	Racing						Fairs
	Golf						Protests
							Parades

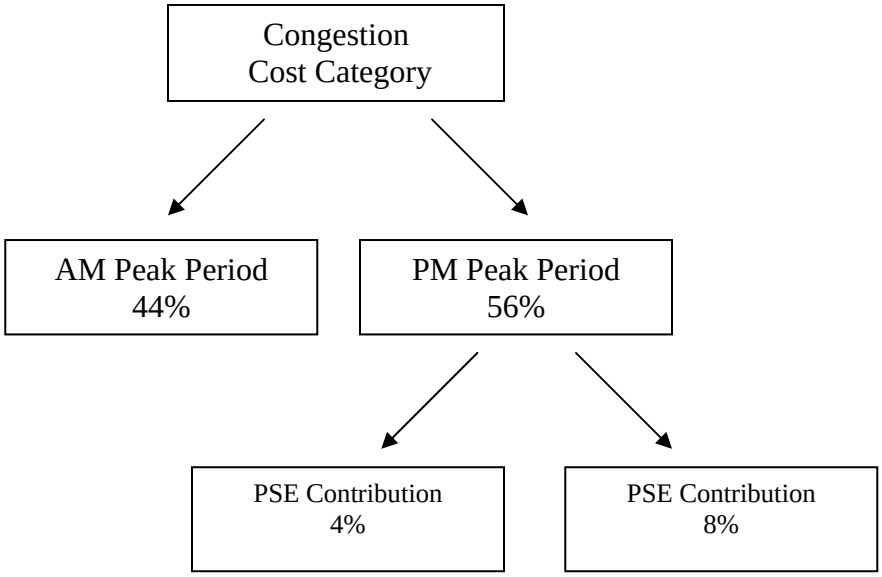
Source: Sports Economics, 2007, "Analysis of the Economic and Fiscal Impact of Cultural and Sporting Events in San Jose: Explanation of Recommended Methodology and Impact Assessment for Six Representative Events."

Traffic Impact Estimation Methodology

The next few paragraphs describe the methodology used to develop traffic impact estimates associated with PSEs. Cost categories associated with congestion were broken down in order to determine the portion of congestion attributable to planned special events. The steps, as outlined in Exhibit 2-14, were as follows:

- Determine the Congestion Cost Category
- Split into AM and PM peak periods
- Determine a range of values for planned special events

Exhibit 2-14: Traffic Impact Flow Diagram



Congestion Cost Categories

The first step in the process of determining the congestion caused by planned special events was to research Texas Transportation Institute's *The 2007 Urban Mobility Report* (UMR).[9] As previously noted, this document provides congestion information on the 85 most populous urban areas in the United States. The UMR provides data on the average delay per traveler, which is defined as the extra travel time for peak period travel during the year for trips beginning during the AM peak period (6 AM to 9 AM) and the PM peak period (4 PM to 7 PM). In addition, the UMR provides data on wasted fuel per traveler.

The first two analyzed categories in the UMR estimate congestion on a per traveler basis. The following categories use population data along with congestion information to determine the raw numbers of delay and cost. These categories are: 1) travel delay, which represents the total travel time above that needed when compared to a trip at free-flow speed; 2) excess fuel consumed, which is calculated as the extra fuel consumed for trips when compared to free flow conditions; and finally 3) congestion cost, which shows the actual dollar amounts attributable to congestion.

AM Peak Period vs. PM Peak Period

The first category (average delay per traveler) is defined as the extra travel time for peak period travel during the year for trips beginning during the AM peak period (6 AM to 9 AM) and the PM peak period (4 PM to 7 PM). Planned special events rarely affect the AM peak period, since most events begin during the evening hours or on weekends. Thus, it was decided not to analyze the AM peak period and to focus on the PM peak period.

[9] D. Schrank, and T. Lomax, "The 2007 Urban Mobility Report," Texas Transportation Institute, September 2007.

Nevertheless, when a planned special event does occur during the AM peak period, it can be especially detrimental to travelers throughout the region. One example would be a golf tournament, which typically runs all day from Thursday until Sunday. However, for this type of event the finals normally occur on the weekend and this is the main draw. Similar travel patterns occur for tennis championships and even all day concert events: while there is some additional travel during the weekday phase, the main draw of the planned special event is normally on the weekend. (It is difficult to determine congestion on weekends since it is highly site-specific. For instance, resort areas receive much more congestion on weekends, especially during their peak seasons, when compared to AM and PM peak periods. When planned special events take place on weekends, the congestion can be similar to that of a weekday commuting period with the major exception that the background, non-event traffic is much less when compared to the AM or PM peak periods.)

Some exceptions to this pattern are a dignitary's arrival or a funeral procession for a high-ranking official. These types of planned special events may occur within the AM peak period and could greatly increase congestion during that time period. Furthermore, there is often little preparation time available for this type of planned special event. In the case of a funeral procession for a high-ranking official, the route may be predetermined, but the actual implementation may have to be done within days once the schedule of activities is known. It is difficult to quantify these types of events, and the key aspect in regard to congestion is reducing background traffic during the AM peak period.

The report *Peak Spreading Models Promises and Limitations*, which analyzes data from the San Francisco Bay Area, indicates that 66 percent of the vehicle trips in the AM peak period (6:30 AM to 8:30 AM) and 40 percent of the vehicle trips starting in the PM peak period (4:00 PM to 6:00 PM) were home-based work trips.[10] The results of this study begin to show the disparity in commuting periods as well as the types of drivers during each of the periods. The conclusion from this study is that in the San Francisco Bay Area, the PM peak period has about 26 percent more vehicle trip starts than the AM peak period.

This data was then used to extrapolate information from the Congestion Tables in the UMR and segregate the delays into the AM peak period and the PM peak period. Using the data from the UMR, the PM peak period was assigned 26 percent more of the delay component than the AM peak period.

Planned Special Event Contribution

At this point in the analysis, data has been obtained for several key categories of congestion effects for the PM peak periods. The next step in the process is to determine the percentage of the PM peak period congestion attributable to planned special events.

The congestion analyses performed in this study consider each step in the process as being equal. However, a closer look at the characteristics of each venue and each planned special event

[10] C. Purvis, "Peak Spreading Models Promises and Limitations," 7th Transportation Research Board Conference on Application of Transportation Planning Methods, March 1999.

reveals that there are many factors in some locations that help to reduce congestion. Specifically, availability of public transportation helps to reduce congestion on the roadways, as does a nearby interstate highway. These factors provide access to the venue and help to reduce the impacts on the local network of arterial streets.

In attempting to put congestion numbers in perspective and to estimate the order of magnitude of congestion caused by planned special events, this study assumes that all traffic conditions are equal with the exception of the presence of planned special events. The only way to obtain specific data for congestion costs for each event would be to undertake a massive data collection effort that would include travel time, speed and delay under normal operating conditions, with no incidents or accidents, and compare that to normal operating conditions with a planned special event added.

According to the report *An Initial Assessment of Freight Bottlenecks on Highways*, an estimated 40 percent of congestion is caused by recurring congestion at highway sections that exceed capacity on a regular basis.[11] The remaining 60 percent is caused by non-recurring congestion. The report breaks down the sources of congestion as follows:

- Recurring Congestion – 40 percent
- Traffic Incidents – 25 percent
- Bad Weather – 15 percent
- Work Zones – 10 percent
- Poor Signal Timing – 5 percent
- Special Events – 5 percent

According to this reference, planned special events account for approximately 5 percent of all congestion. In addition to the above referenced study, an additional study, *The Components of Congestion: Delay from Incidents, Special Events, Lane Closures, Weather, Potential Ramp Metering Gain, and Excess Demand*, reached similar results.[12] Specifically, a 45-mile section of Interstate 880 in the San Francisco Bay Area was studied in depth. This study determined that planned special events accounted for 4.5 percent of the total daily delay, which included the AM peak period, the PM peak period, and the off-peak periods.

The study further broke down the delay caused by special events according to direction (northbound and southbound) in the AM peak period and the PM peak period. The results showed that the percentage of delay caused by planned special events during the PM peak period was 9.3 percent in the northbound direction and 6.6 percent southbound. The percentage of delay caused by planned special events in the AM peak period was negligible and, therefore, was assumed to be zero.

[11] Federal Highway Administration, "An Initial Assessment of Freight Bottlenecks on Highways" (FHWA White Paper, October 2005).

[12] J. Kwon, M. Mauch, and P. Varaiya, "The Components of Congestion: Delay from Incidents, Special Events, Lane Closures, Weather, Potential Ramp Metering Gain, and Excess Demand" (presented at 85th Annual Meeting, Transportation Research Board, January 2006).

Given the results of the previous studies, it was concluded that planned special events account for between 4 percent and 8 percent of all PM peak period delays, with the remaining delays caused by other factors.

Congestion Factors Due to Planned Special Events

A further breakdown of the congestion statistics in the UMR report can now be used to determine the role of planned special events. This analysis enables a determination of the key congestion factors caused by planned special events. The first congestion category in the UMR report is annual delay per traveler. Given the results of the previous studies, the annual delay per traveler in the PM peak period was determined by allocating 44 percent to the AM peak period and 56 percent to the PM peak period. The results of the other studies indicated that planned special events account for between 4 percent and 8 percent of all PM peak period delay. Utilizing this range, 4 to 8 percent of the previously determined PM peak period congestion was allocated to PSEs.

The next category analyzed in the UMR is wasted fuel per traveler. A similar approach was taken to determine the percentage of wasted fuel per vehicle attributable to planned special events. The third step in the analysis was to utilize the population figures for each city to obtain total values for the effects of congestion. This analysis is vital in order to assess congestion effects in cities of varying sizes and populations.

The next category analyzed in the UMR is travel delay. Similar to the previous breakdowns, the PM peak period was determined to account for 56 percent of this factor, and planned special events accounted for between 4 percent and 8 percent of the PM peak period congestion numbers. The final two categories analyzed in the UMR report were excess fuel consumed and congestion cost. Congestion cost includes the value of personal time, posited to be $14.60 per hour for travelers and $77.10 per hour for commercial truck time. Additional fuel consumption was based on the state's average fuel costs.

Specific Venue Contributions to Congestion

In order to determine PSE congestion effects caused by specific events and venues in the case studies, attendance figures were used to determine the event or venue with the largest percentage of attendance in each city. Next, this venue was further analyzed to determine its impact on the region based on this percentage. The travel delay for each city is developed in case study sections of this report. These estimates were then disaggregated based on the percentage figure for the most highly attended event in the area. This analysis provided the travel delay due to the most highly attended event in the region on a yearly basis. The number of events at the venue was then used to determine the per-event statistics. This allowed a determination of the travel delay caused by each event at the most popular venue in the region. In addition to the travel delay per venue and events at the venues, the excess fuel consumed and the congestion cost were also calculated.

DETROIT CASE STUDY

This section presents the results of a case study of PSEs in the Detroit metropolitan area. Detroit was selected as the case study representative of the *Very Large* city category and is in the northern region of the U.S.

In conducting the case study, an exhaustive search of national and local data was conducted to identify venues where large events might occur and also to search data by event type, such as professional and college football, basketball, and other sports to identify event generators in the case study area. This dual approach of compiling data by both venue and event type was designed to maximize the coverage of events.

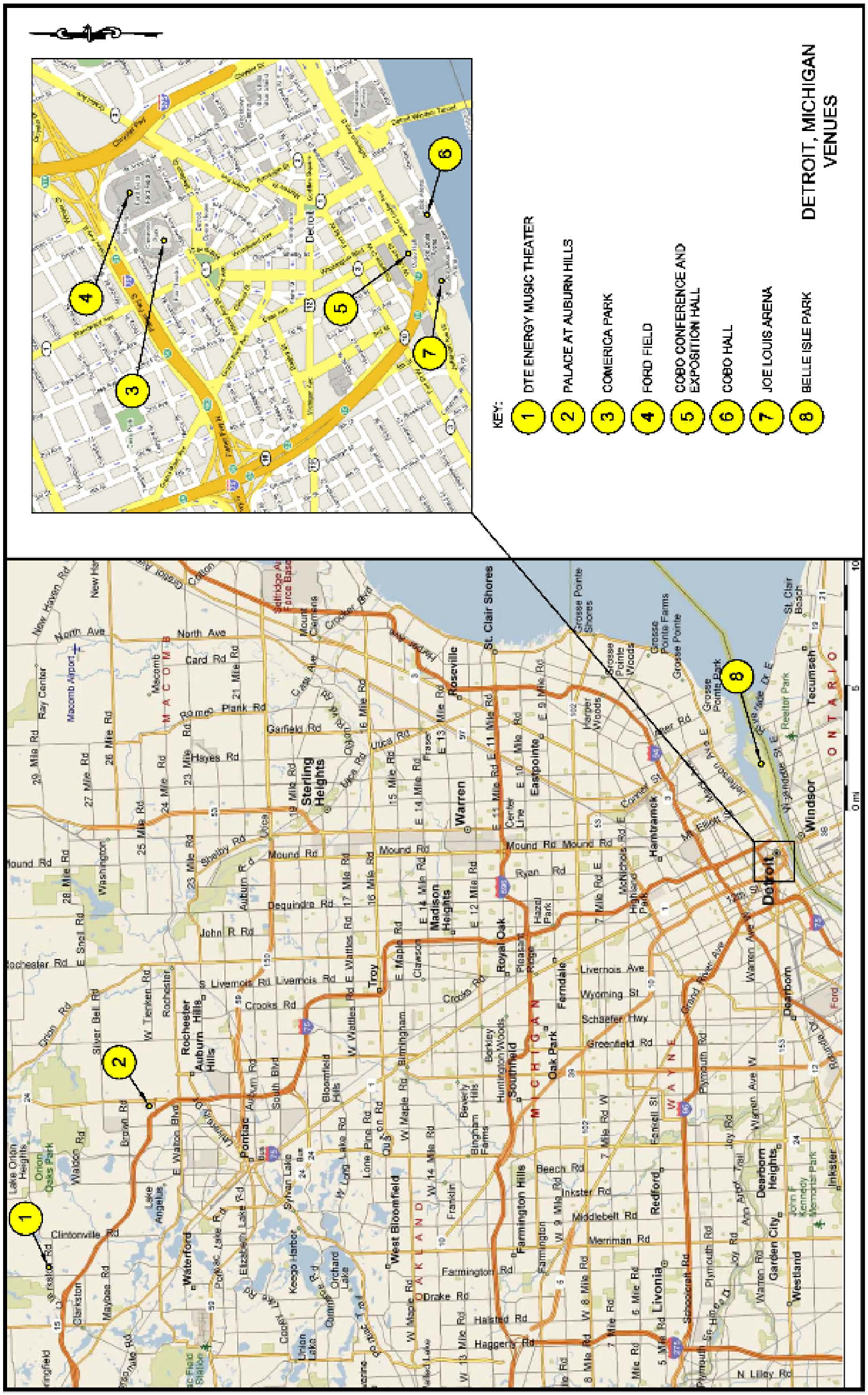
Venues and Event Types

The following specially designed facilities with event days drawing crowds of more than 10,000 people in the Detroit area were identified and contacted:

- Ford Field – maximum capacity 65,000
- The Palace of Auburn Hills – maximum capacity 22,076
- Joe Louis Arena – maximum capacity 19,988
- Comerica Park – maximum capacity 41,070
- Cobo Arena – maximum capacity 12,191
- Cobo Conference and Exposition Hall – maximum capacity not available
- Belle Isle Park – maximum capacity not available
- DTE Energy Music Theater – maximum capacity 15,274

A map of these venues provided in Exhibit 3-1 shows that each is located within five miles of a major highway. All but two of the venues are located within five miles of the center of the city.

Exhibit 3-1: Map of Venues in Detroit that Host PSEs with More Than 10,000 Attendees



Other event hosting facilities that were examined, but found not to host events with more than 10,000 people, are listed in Exhibit 3-2. While these facilities are not expected to host events that meet this study's 10,000 attendance criterion, they are important to consider, especially in the context of simultaneous events and localized traffic management.

Exhibit 3-2: Detroit Venues That Do Not Host Events with More Than 10,000 Attendees

Venue	Capacity
Bohemian National Home	650
Bonstelle Theatre	2,500
Detroit Opera House	3,200
Detroit Repertory Theatre	5,700
Detroit Science Center	1,500
Detroit Symphony Orchestra Hall	2,000
Fillmore Detroit	2,220
Fisher Theatre	2,000
Ford Community & Performing Arts Center	1,200
Fox Theatre	5,000
Gem Theatre	450
Greektown Casino	1,500
Harpos Concert Theatre	2,000
Hillberry Theatre	4,050
Magic Stick	210
The Majestic	1,000
Marquis Theatre	500
Masonic Temple	4,400
MGM Grand Casino	1,200
Moto City Casino	1,200
Music Hall Center for the Performing Arts	1,700
Compuware Sport Arena	4,500

A major events calendar published by the GM Renaissance Center was used to estimate the number of street and park events.[13] The major annual events listed in the event calendar are provided in Exhibit 3-3.

[13] GM Renaissance Center, "Major Detroit Events and Festivals" (GM Renaissance Center), http://www.gmrencen.com/Detroit/MajorEvents/tabid/99/Default.aspx (accessed 4/24/2008).

Exhibit 3-3: Calendar of Events in the Detroit Area

Month	Event
January	North American International Auto Show - Jan. 17-25, 2009
February	Detroit's Winter Blast
	Detroit Boat Show
April	March of Dimes WalkAmerica 2008 - April 27, 2008
May	WYCD Downtown Hoedown - May 9-11, 2008
	Eastern Market Flower Day - May 18, 2008
	MOVEMENT: Detroit's Electronic Music Festival - May 24-26, 2008
	Komen Detroit Race for the Cure - May 31, 2008
	Red Bull Air Race 2008 -- May 31-June 1
June	Detroit Festival of Arts - June 6-8, 2008
	GM River Days - June 20-23, 2008
	Target Fireworks - June 23, 2008
	Rockin' on the Riverfront - Concert Series TBA
July	Comerica Cityfest - July 2-6, 2008
	Detroit APBA Gold Cup - July 11-13, 2008
	Rockin' on the Riverfront - Concert Series TBA
August	Rockin' on the Riverfront - Concert Series TBA
September	Detroit Belle Isle Grand Prix – Aug. 29 - Aug. 31, 2008
	Detroit International Jazz Festival
October	Detroit Free Press/Flagstar Bank International Marathon – Oct. 19, 2008
November	America's Thanksgiving Parade – Thanksgiving Day - Nov. 26, 2008

Source: GM Renaissance Center ,"Major Detroit Events and Festivals" http://www.gmrencen.com/Detroit/MajorEvents/tabid/99/Default.aspx.

Data Collection by Venue

The next few paragraphs provide a description of each of the PSE hosting venues in the city that draw crowds of more than 10,000 people. Information is provided on the size of the venues, the number and type of events that are hosted and the venue locations.

Ford Field

Ford Field is an indoor football stadium located in Detroit that is the home of the Detroit Lions of the NFL. It is across the street from Comerica Park. Its regular capacity is 65,000 seats, although it expands to 78,000 seats for basketball games. In addition to other events, Ford Field hosts 10 professional football games with an average attendance of 55,000.

The Palace of Auburn Hills

The Palace of Auburn Hills, often referred to simply as "The Palace," is a sports and entertainment venue in Auburn Hills, Michigan. Since opening in 1988, it has been the home of the Detroit Pistons of the NBA. Since 1998 it has also hosted the Detroit Shock of the WNBA. It

also hosts an average of 40 concerts per year with more than 10,000 attendees, and 10 days of exhibitions and shows with more than 10,000 attendees.

Joe Louis Arena

Joe Louis Arena, nicknamed “The Joe” and “JLA,” is a hockey arena. It is the home of a National Hockey League franchise, the Detroit Red Wings. It also hosts 90 concerts a year with more than 10,000 attendees per concert.

Comerica Park

Comerica Park, the baseball stadium located in downtown Detroit, replaced historic Tiger Stadium in 2000 and serves as the home of the Detroit Tigers of Major League Baseball's American League. Comerica Park is located across the street from Ford Field. The stadium hosts 81 regular season baseball games annually, each with an attendance of more than 10,000 people. Baseball games are the only major events hosted at the venue.

Cobo Arena

Cobo Arena is a 12,191-seat indoor arena adjacent to Cobo Conference and Exposition Hall. It is the home of the University of Detroit Mercy men's basketball team.

Cobo Conference and Exposition Hall

Cobo Conference and Exposition Hall, usually called Cobo Hall, is the convention center adjacent to Cobo Arena. Both Cobo Hall and Cobo Arena opened in 1960. Cobo Hall underwent a significant expansion in 1989 and presently holds 700,000 square feet (65,030 m^2) of exhibition space. Each January, it hosts the North American International Auto Show or NAIAS, which draws about 56,000 people per day for 17 days.

Oakland Hills Country Club

Oakland Hills Country Club will host the 2008 PGA Championship. It is expected that the PGA Championship will draw about 40,000 people per day for four days during the tournament.

Belle Isle Park

Belle Isle is a 982 acre (2.42 square miles) island park in the Detroit River managed by the Detroit Recreation Department. It is connected to the rest of the city by the MacArthur Bridge and is the largest island park in the United States. In 1992, a temporary street race circuit was constructed on the isle for CART races. Belle Isle hosted ten events from 1992-2001, and racing resumed in 2007 as part of the IndyCar Series and American Le Mans Series.

DTE Energy Music Theatre

The DTE Energy Music Theatre is a 15,274-seat amphitheater located in Clarkston, Michigan. The amphitheater hosts approximately 45 concerts per year.

Data Collection by Activity

The next few paragraphs describe information relevant to Detroit for each of the PSE event types.

Professional Sports

Detroit is one of 13 American metropolitan areas that are home to professional teams representing all of the four major sports in North America. All of Detroit's teams play within the city of Detroit itself except for the NBA's Detroit Pistons and the WNBA's Detroit Shock. Both of these basketball teams play in Auburn Hills, a suburb of Detroit. The three active major sports venues within the city are: Comerica Park (home of the MLB's Detroit Tigers), Ford Field (home of the NFL's Detroit Lions), and Joe Louis Arena (home of the NHL's Detroit Red Wings).

College Sports

In college sports, Detroit's central location within the Mid-American Conference has made it a frequent site for the league's championship events. While the MAC Basketball Tournament moved permanently to Cleveland starting in 2000, the MAC Football Championship Game has been played at Ford Field in Detroit since 2004, and annually attracts 25,000 to 30,000 fans. The University of Detroit Mercy has a NCAA Division I program, and Wayne State University has both NCAA Division I and II programs. The NCAA football's Motor City Bowl is held at Ford Field each December.

Auto Racing

Detroit's only auto racing venue is the Belle Isle Park, where the IndyCar Series and American Le Mans Series have various race events.

Golf Tournaments

The PGA Championship at Oakland Hill County Club is the one major golf tournament in Detroit scheduled for 2008. The Oakland Hills Country Club expects to host four event days with more than 10,000 attendees during the PGA Championship. Information on golf tournaments was determined by contacting all of the 19 golf courses in the Detroit area.

Street and Park Events

Street and park events in the Detroit area include fairs, festivals, and marathons. Information on street events was collected by contacting every event organizer listed in an annual event calendar published by the GM Renaissance Center.

Expositions and Shows

Most large exhibitions in Detroit are held at the Cobo Conference and Exposition Hall. As discussed earlier, the annual auto show is the largest of these events.

PSE Event Days Summary Matrix

A matrix that details the number of event days for PSEs with more than 10,000 attendees in the Detroit area is provided in Exhibit 3-4. The matrix categorizes the event days by event type and venue location. Detroit is host to approximately 526 large PSEs annually. Accordingly, there is an average of about 1.4 large PSEs every day in the city.

Exhibit 3-4: Matrix of PSE Event Days in Excess of 10,000 People in the Detroit Area

	Affiliated team / event	Average Attendance	Ford Field	The Palace of Auburn Hills	Joe Louis Stadium	Comerica Park	Cobo Arena	Cobo Conference and Exposition Hall	Street	Parks	Belle Isle Parkway	DTE Energy Music Theatre	Oakland Hills Country Club	TOTAL
Professional Football	Loins	55,000	10											10
Professional Baseball	Tigers	32,000				81								81
Professional Basketball	Pistons	20,000		70										70
Professional Ice Hockey	Red Wings	18,000			46									46
College Football		15,000	5											5
College Basketball		15,000		10										10
Auto Racing		30,000									3			3
Horse Racing														0
Golf Tournaments													4	4
Marathons		15,000							2					2
Concerts		15,000		40	90					2		45		177
Parades		100,000							1					1
Fairs														0
Festivals		40,000							3					3
Protests / Political Events														0
Expositions and Shows		10,000	1	40			3							44
Other - Concerts		47,000	2											2
Other - High School Football		25,000	3											3
Other - Auto Show		58,600						17						17
Other - NAACP Event		125,000						3						3
Other - Festival (Target Fireworks)		500,000								1				1
Other - Festival (Thanksgiving; Arts Fest.)		105,000							1	3				4
Other - Festival (Rockin' Riverfront)		10,000								8				8
Other - Fevtival (Winter Blast)		125,000								4				4
Other - Festival (Eastern Mkt. Flower Day)		125,000							1					1
Other - Festival (GM River Days)		117,000								3				3
Other - Fevtival (Comerica Cityfest)		87,000								1				1
Other - Festival (Detroit Int'l Jazz Fest.)		250,000								4				4
Other - Festival (Winter Blast)		125,000								4				4
Other - Boat Race		33,000								3				3
Other - College Hockey		12,000			12									12
TOTAL			21	160	148	81	3	20	8	33	3	45	4	526
Maximum Facility Capacity			65,000	22,076	19,988	41,070	12,191	NA	NA	NA	NA	15,274	NA	
Public Transportation (Y/N)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Near Interstate (Y/N)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Type of Public Transit*			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Number of Parking Spaces			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Venue Location**			U	U	U	U	U	U	U	U	U	U	U	

* Response options are: B (Bus), L (Light Rail), and H (Heavy Rail)
** Response options are: D (Downtown), U (Urban), S (Suburban), R (Rural)

Exhibit 3-5 summarizes venue-specific PSE event days with attendance over 10,000 as a percent of the total number of PSEs with attendance over 10,000. An average of approximately 526 PSE event days with attendance of more than 10,000 people occurs annually. This translates into an average of 1.4 events with crowds of more than 10,000 people per day, or about 10 per week. The venue that hosts the most events with more than 10,000 attendees is the Palace of Auburn Hills. This venue hosts 31 percent of all such events. The second most frequent host is Joe Louis Arena, which hosts 28 percent of all PSEs with attendance of more than 10,000. The third most frequent host is Comerica Park, which hosts 16 percent of all events with more than 10,000 attendees. Combined, these three venues host 75 percent of all PSE events with more than 10,000 attendees.

Exhibit 3-5: PSE Event Days with Attendance Above 10,000 by Venue

Venue	Venue Type	Number of PSE Event Days Annually	Percent of Total (%)
Ford Field	Stadium	21	4.0
The Palace of Auburn Hills	Arena	160	30.4
Joe Louis Arena	Arena	148	28.1
Comerica Park	Stadium	81	15.4
Cobo Arena	Arena	3	0.6
Cobo Conference and Exposition Hall	Convention Center	20	3.8
Street	Street	8	1.5
Park	Park	33	6.3
Oakland Hills Country Club	Golf Course	4	0.8
Belle Isle Park	Raceway	3	0.6
DTE Energy Music Hall	Music Hall	45	8.6
TOTAL		526	100.0

Exhibit 3-6 lists PSE event days by activity categories. The three largest categories are professional sports, concerts, and expositions and shows. Professional sports account for 40 percent of PSEs, with more than 10,000 attendees, while concerts account for 34 percent, and expositions and shows account for another 12 percent. Together these three categories account for 86 percent of events with more than 10,000 attendees.

Exhibit 3-6: PSE Event Days with Attendance Above 10,000 by Activity

Activity category	Activity	Number of PSE Event Days Annually	Percent of Total (%)
Professional Sports	Professional Football	10	1.9
	Professional Baseball	81	15.4
	Professional Basketball	70	13.3
	Professional Ice Hockey	46	8.7
College & High School Sports	College Football	8	1.5
	College Basketball	10	1.9
	Other – College Hockey	12	2.3
Racing	Auto Racing	3	0.6
	Horse Racing	0	0.0
	Other – Boat Racing	3	0.6
Golf	Golf Tournaments	4	0.8
Concerts	Concerts	179	34.0
Marathons	Marathons	2	0.4
Parades	Parades	1	0.2
Fairs	Fairs	0	0.0
Festivals	Festivals	33	6.3
Protests & Political Events	Protests & Political Events	3	0.6
Expositions & Shows	Expositions & Shows	61	11.6
TOTAL		526	100.0

Traffic Impacts

According to the UMR, the annual delay per traveler in Detroit is 54 hours. Given the results of the previous studies, the annual delay per traveler in the PM peak period would be 30.1 hours per year. Utilizing a range of 4 percent to 8 percent as the portion caused by PSEs results in an estimated 1.2 to 2.4 hours of delay per year for every traveler in the Detroit area as a result of planned special events. The results of the congestion analysis for the Detroit area are summarized in Exhibit 3-7.

Exhibit 3-7: Congestion Costs per Year due to Planned Special Events in Detroit

Congestion Category	Units	AM Peak (44%)	PM Peak (56%)	PSE Caused (4%)	PSE Caused (8%)	Totals
Average Delay per traveler	Hours	23.9	30.1	1.2	2.4	54
Wasted Fuel per Traveler	Gallons	15.5	19.5	0.8	1.6	35
Travel Delay	Hours	51,126,991	64,420,009	2,576,800	5,153,601	115,547,000
Excessive Fuel Consumed	Gallons	33,655,752	42,406,248	1,696,250	3,392,500	76,062,000
Congestion Cost	$ Million	$962	$1,212	$48	$97	$2,174

This delay affects both attendees and non-attendees of the planned special events. The attendees experience delay while they are trying to enter the various venues throughout the Detroit area. This includes entering parking lots and the delay caused by increased volumes. However, non-attendees also experience delay, since traffic volumes increase during planned special events along with possible roadway closures and detours. This reduces the consistency of the non-attendee traffic, since additional volumes and possible closures are introduced. The UMR notes that 40 percent of all congestion is recurring congestion. Travelers come to expect the recurring congestion on the roadway network and look at it as just part of the drive. The "unexpected" congestion is a larger issue, and this is what can result from planned special events. The next category analyzed in the UMR is wasted fuel per traveler; an estimated 0.8 and 1.6 gallons is wasted annually per traveler in the Detroit area as a result of planned special event congestion.

The population figures for the Detroit region were then further analyzed to obtain the total values of the effects of congestion. Planned special events account for between 2,577,000 and 5,154,000 hours of travel delay per year in the Detroit area. Excess fuel consumed is between 1,696,000 and 3,393,000 gallons per year, and the congestion cost is between $48 million and $97 million dollars per year. This figure would be higher if current gasoline prices were used in the calculators. A total cost of $97 million for the Detroit region is substantial and must be considered when planning and operations are undertaken for planned special events. This figure is indicative of the significant influence planned special events have on the traveling public in regions throughout the country.

This study used the previously determined attendance figures to determine more specific congestion impacts in the Detroit area. With 81 games per year, the average attendance at a Detroit Tigers professional baseball game is 32,000 people. That means that 2,592,000 people attend events at Comerica Park in Detroit each year, which is approximately 18 percent of all planned special event attendance in the Detroit area. The results of the attendance breakdown can be seen in Exhibit 3-8.

Exhibit 3-8: Congestion Impacts in Detroit by Event Type

Venue Type	Avg. Attendance	Number of Events	Total Attendance	Percent of Total (%)
Professional Football	55,000	10	550,000	4
Professional Baseball	32,000	81	2,592,000	18
Professional Basketball	20,000	70	1,400,000	10
Professional Ice Hockey	18,000	46	828,000	6
College Football	15,000	5	75,000	1
College Basketball	15,000	10	150,000	1
Auto Racing	30,000	3	90,000	1
Golf Tournaments	40,000	4	160,000	1
Marathons	15,000	2	30,000	0
Concerts	15,000	177	2,655,000	18
Parades	100,000	1	100,000	1
Festivals	40,000	3	120,000	1
Expositions and Shows	10,000	44	440,000	3
Concerts	47,000	2	94,000	1
High School Football	25,000	3	75,000	1
Auto Show	58,600	17	996,200	7
NAACP Event	125,000	3	375,000	3
Target Fireworks	500,000	1	500,000	3
Thanksgiving Arts Festival	105,000	4	420,000	3
Rockin' Riverfront	10,000	8	80,000	1
Winter Blast	125,000	4	500,000	3
Eastern Market Flower Day	125,000	1	125,000	1
GM River Days	117,000	3	351,000	2
Comerica City fest	87,000	1	87,000	1
Detroit International Jazz Festival	250,000	4	1,000,000	7
Winter Blast	125,000	4	500,000	3
Boat Race	33,000	3	99,000	1
College Hockey	12,000	12	144,000	1

Given that 18 percent of all attendance at special events in the Detroit area is at professional baseball games, between 463,800 hours and 927,600 hours of travel delay are attributable to this PSE. On a per-game basis, given 81 games per year, this breaks down to between 5,700 hours and 11,400 hours of delay caused by each professional baseball game in the Detroit area.

This delay affects both attendees as well as non-attendees of games at Comerica Park, the site of Detroit's professional baseball team. The attendees experience delay while they are trying to enter the venue, and non-attendees also experience delay due to increased traffic volumes during the games, in addition to possible roadway closures and detours. The excess fuel consumed in the Detroit area due to professional baseball is between 305,300 and 610,600 gallons per year, or between 3,800 and 7,500 gallons per game. The congestion cost of professional baseball in the Detroit area is between $9 million and $17 million per year, which translates to between $110,000 and $210,000 of congestion cost per professional baseball game.

The preceding analysis looks at each step in the process as being equal. However, a closer look at the characteristics of Comerica Park reveals that there are many factors that help to reduce congestion caused by planned special events. Specifically, Comerica Park is located near an interstate highway, which provides a good access scheme for the events and helps to reduce congestion on the local network of arterial streets.

PORTLAND CASE STUDY

Portland was chosen as the case study city to represent the *Large* category and is located in the western region of the U.S. This section presents the results of a case study of PSEs in the Portland metropolitan area.

In conducting the case study, an exhaustive search of national and local data was conducted to identify venues where large events might occur and also to search data by event type, such as professional and college football, basketball and other sports, to identify event generators in the case study area. This dual approach of compiling data by both venue and event type was designed to maximize the coverage of events.

Venues and Event Types

The following specially designed facilities in the Portland area with event days that attract crowds of more than 10,000 people were identified and contacted:

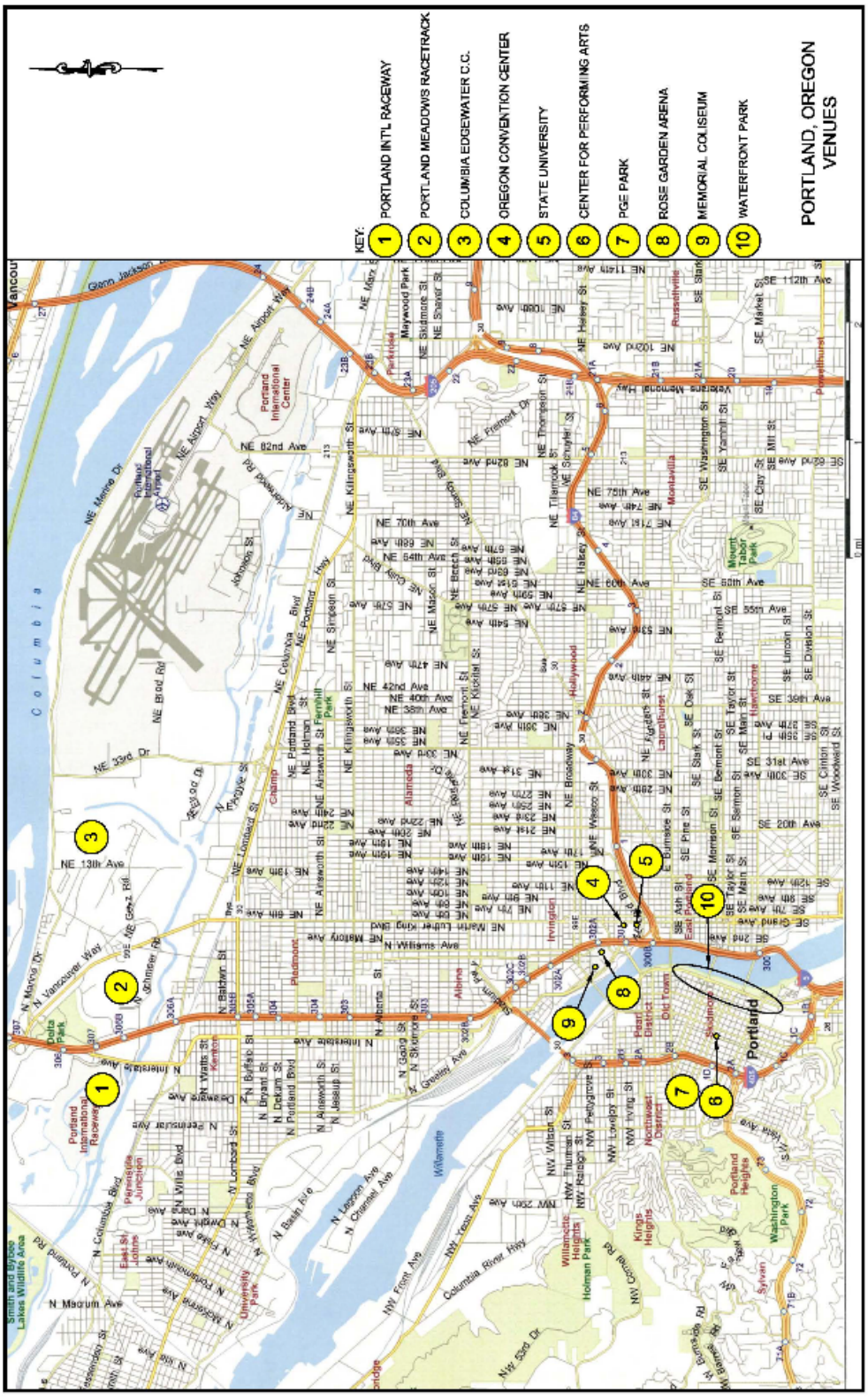
- Rose Garden Arena – maximum capacity 20,500
- Memorial Coliseum – maximum capacity 19,980
- PGE Park (formerly Civic Stadium) – maximum capacity 19,000
- Oregon Convention Center – maximum capacity 10,000
- Portland Metropolitan Exposition Center – maximum capacity not available
- Portland International Raceway – maximum capacity 86,000
- Columbia Edgewater Country Club – maximum capacity not available

Other event-hosting facilities that were examined, but found not to host events with crowds larger than 10,000, include:

- Portland Meadows (Horse Racing) – maximum capacity 4,450
- Portland Center for the Performing Arts – maximum capacity 2,992
- Portland State University's Peter W. Stott Center – maximum capacity 1,500

A map of some of these venues is provided in Exhibit 4-1. All of these venues are located well within five miles of a major highway.

Exhibit 4-1: Map of Venues in Portland that Host PSEs with More Than 10,000 Attendees



Additionally, the following municipal departments were contacted to collect information on open-area PSEs:

- Department of Transportation
- Department of Parks and Recreation
- Revenue Bureau
- Police Bureau

Data Collection by Venue

The next few paragraphs provide a description of each of the PSE hosting venues in the city that draws crowds of more than 10,000 people.

Rose Garden Arena

Rose Garden Arena is an indoor venue located in downtown Portland. The Rose Garden Arena and Memorial Coliseum are both part of the Rose Quarter, a sports and entertainment district that is managed by Global Spectrum Inc. The Rose Garden is the largest stadium in the city and has a maximum capacity of 20,500. It is the home of the National Basketball Association (NBA) Portland Trailblazer team. Other PSEs hosted at the Rose Garden Arena include concerts and shows (e.g., circuses). The Rose Garden arena hosts an average of 66 PSEs annually.

PGE Park

The maximum capacity of PGE Park is 19,600 for typical sporting events. During concerts, the capacity is increased to 26,000 by utilizing floor space and adding a few additional bleachers. The maximum capacity ever obtained for an event at PGE Park was 29,000 for a special one-time-only soccer event.

The tenants of PGE Park include a AAA Minor League Baseball team known as the Portland Beavers. The Beavers host 76 events per year and have an average attendance of 8,000 people. Around seven Beaver games exceed 10,000 in an average year. The Portland Timbers, a professional soccer team, also plays an average of 18 games per year in PGE Park and has an average attendance of 9,000 people per game. About six of these games draw crowds in excess of 10,000 per year.

In addition to these professional teams, the Portland State University college football team plays in PGE Park and has an average attendance of 5,000. One PSU game in 2007 drew over 10,000 attendants. There are approximately 20 events per year related to football, but this number also includes a few high school football games. The total number of events at PGE Park in an average year is 138, with the remaining events comprised of concerts, special soccer matches, or other sporting events. About 17 of these events draw crowds in excess of 10,000 per day.

Oregon Convention Center

The Oregon Convention Center hosts 600,000 visitors annually. On average it has 35 exhibitions that draw crowds larger than 10,000 people. The convention center is also host to an annual cheerleading competition that achieves six event days with over 10,000 attendees.

Portland Metropolitan Exposition Center

The Portland Metropolitan Exposition Center in downtown Portland hosts about five PSEs per year with attendance of over 10,000 people. The five PSEs usually consist of one concert and four expositions. Unlike most other specially designed facilities, the Center does not have dedicated parking.

Portland International Raceway

Portland International Raceway (PIR) is capable of hosting 66,000 people. The raceway has 26,000 bleacher seats and can host an additional 60,000 standing participants. The largest event hosted at the PIR is the annual Champ Car race, a three day event with an average daily attendance of 11,500 people. The Champ Car race is the only event at the PIR that attracts more than 10,000 attendants.

Columbia Edgewater Country Club

The Columbia Edgewater Country Club hosts the annual Safeway Classic tournament. This annual golf tournament is for professional golfers on the Ladies Professional Golf Association (LPGA) Tour and is held over the course of a week during the month of August. There are usually four event days with attendance exceeding 10,000 during the tournament. The Safeway Classical is the only golf tournament in Portland that draws PSE-level crowds.

Data Collection by Activity

The next few paragraphs describe data collected for each of the PSE event types in the Portland area.

Professional Sports

Portland has three professional sports teams: baseball, basketball, and ice hockey. The city does not have a professional football team. Event data for the professional teams are summarized in Exhibit 4-2.

Exhibit 4-2: Professional Sports Teams in Portland

Sport	Team	League	Primary Venue	Average Number of Event Days with More Than 10,000 Attendees
Baseball	Beavers	AAA*	PGE Park	6
Basketball	Trailblazers	NBA	Rose Garden Arena	44
Ice Hockey	Winter Hawks	CHL**	PGE Park	0

* AAA Minor Baseball League
** Canadian Hockey League

College Sports

The Portland State University football team plays at PGE Park. During the 2007 session the team had only one game with more than 10,000 in attendance.

Auto Racing

As discussed above, Portland is home to the popular annual Champ Car race held at the Portland International Raceway (PIR). The race is a three-day event with an average daily attendance of 11,500 people. According to officials at the PIR, there are no other race tracks in the Portland area that attract crowds of more than 10,000 people.

Golf Tournaments

The four golf courses that have hosted tournaments with greater than 10,000 attendees since 2000 in the Portland area were contacted for this study. The golf courses are:

- Oregon Golf Club
- Crosswater Golf Club
- Columbia Edgewater Country Club
- Pumpkin Ridge Golf Club

Additional comprehensive information on golf tournaments and their associated attendance was gathered from Peter Jacobson Productions (PJP), a sports marketing and event management company run by its namesake professional golfer and CEO.[14]

According to PJP, as of 2006 there was only one ongoing golf tournament occurring in the Portland area, the Safeway Classic at the Columbia Edgewater Country Club. There are usually four event days with attendance exceeding 10,000 during the tournament. As a result, an estimate of four event days with more than 10,000 attendants was used in this study. Information about golf tournaments in the Portland area is summarized in Exhibit 4-3.

[14] Telephone interview with officials at Peter Jacobson Productions on 24 January 2008.

Exhibit 4-3: Golf Tournaments in the Portland Area

Golf Course	Tournament	Start Year	End Year	Duration (days)	Attendance by day during tournament (in thousands)							
					Mon	Tues	Wed	Thurs	Fri	Sat	Sun	Total
Oregon Golf Club	Fred Meyer Challenge	1998	2002	3	N/A	N/A	N/A	N/A	50	50	50	150
Crosswater Golf Club	JELD-WEN Tradition	2003	2006	4	N/A	N/A	N/A	18	18	18	18	72
Columbia Edgewater Country Club	Safeway Classic	1970	Continuing	7	5	5	5	18	18	18	18	51
Pumpkin Ridge Golf Club	US Women's Open	2003	2003	7	3	3	3	15	15	15	15	69

Street Events

Street events in the Portland area include fairs, festivals, marathons, and protests. Information on street events was collected from the Portland Revenue Bureau, which issues permits for these events. According to the Revenue Bureau, an average of six street PSEs occur annually.

Expositions and Shows

As discussed earlier, most large exhibitions in Portland are held at the Oregon Convention Center and the Portland Metropolitan Exposition Center. The Oregon Convention Center is the larger of the two, averaging 41 PSEs with an attendance of over 10,000 people annually. The Portland Metropolitan Exposition Center in downtown Portland hosts about five PSEs per year, usually one concert and four expositions.

PSE Event Days Summary Matrix

The matrix in Exhibit 4-4 categorizes event days for PSEs in the Portland area by event type and venue location. Portland is host to approximately 187 PSEs annually. Accordingly, there is an average of about one PSE every two days.

Exhibit 4-4: Matrix of PSE Event Days with More Than 10,000 Attendees in Portland

	Affiliated team / event	Average Attendance	Rose Garden Arena	Memorial Coliseum	PGE Arena	Oregon Convention Center	Portland Metropolitan Exposition Center	Street	Parks	Portland International Raceway	Columbia Edgewater Country Club	TOTAL
Professional Football												0
Professional Baseball	Beavers	8,000			7							7
Professional Basketball	Trailblazers	15,500	44									44
Professional Ice Hockey	Winterhawks											0
College Football	PSU				1							1
College Basketball	PSU											0
Auto Racing	Champ Car	11,500								3		3
Horse Racing												0
Golf Tournaments	Safeway Classic										4	4
Marathons		22,000						4				4
Concerts		12,400	20	1	2		1		1			25
Parades		250,000						1	1			2
Fairs												0
Festivals		14,222							38			38
Protests / Political Events		19,000						1	1			2
Expositions and Shows		12,000				35	4					39
Other - Cheerleading		10,000				6						6
Other - Family shows		11,000	2									2
Other - Soccor	Timbers				7							7
Other - Bicycling									3			3
TOTAL			66	1	17	41	5	6	44	3	4	187
Maximum Facility Capacity			20,500	19,980	19,000	10,000	NA	NA	NA	86,000	NA	
Public Transportation (Y/N)			Y	Y	Y	Y	Y	Y	NA	Y	N	
Near Interstate (Y/N)			Y	Y	Y	Y	Y	Y	NA	Y	Y	
Type of Public Transit*			B, L	B,L	B	B,L	L	B,L	NA	L	NA	
Number of Parking Spaces			2,600	2,600	0	NA	2,500	0	NA	1,500	200	
Venue Location**			D	D	D	D	U	D	R	U	U	

* Response options are: B (Bus), L (Light Rail), and H (Heavy Rail)
** Response options are: D (Downtown), U (Urban), S (Suburban), R (Rural)

The number of venue-specific PSE event days with more than 10,000 attendees as a percent of the total number of PSEs with more than 10,000 attendees is summarized in Exhibit 4-5. There are on average approximately 187 PSE event days with attendance over 10,000 annually. Statistically, this is an average of 3.6 PSE event days per week, or one every 1.9 days. The majority of these events, 35 percent, are hosted at the Rose Garden Arena. The second most frequent host of these events is the Portland Park System, which hosts 24 percent of all PSEs with attendance over 10,000. In third place is the Oregon Convention Center, which hosts 22 percent of all PSEs with attendance over 10,000.

Exhibit 4-5: PSE Event Days with More Than 10,000 Attendees by Venue in Portland

Venue	Venue type	Number of PSE event days annually	Percent of Total (%)
Rose Garden Arena	Stadium	66	35.3
Memorial Coliseum	Stadium	1	0.5
PGE Park	Stadium	17	9.1
Oregon Convention Center	Convention	41	21.9
Portland Metropolitan Exposition	Convention	5	2.7
Street	Street	6	3.2
Parks	Parks	44	23.5
Portland International Raceway	Raceway	3	1.6
Columbia Edgewater Country Club	Golf Course	4	2.1
TOTAL		187	100.0

Note: Due to rounding, the percentages may not add up to 100.

The majority of PSEs with attendance over 10,000 take place in stadiums and convention centers. The three stadiums and two convention centers listed in Exhibit 4-6 hosted about 70 percent of all such PSEs.

Exhibit 4-6: PSE Event Days with More Than 10,000 Attendees by Activity in Portland

Activity category	Activity	Number of PSE Event Days Annually	Percent of Total (%)
Professional Sports	Professional Football	0	0.0
	Professional Baseball	7	3.7
	Professional Basketball	44	23.5
	Professional Ice Hockey	0	0.0
	Other - Professional Soccer	7	3.7
College & High School Sports	College Football	1	0.5
	College Basketball	0	0.0
	Other	0	0.0
Racing	Auto Racing	3	1.6
	Horse Racing	0	0.0
	Other - Bicycle	3	1.6
Golf	Golf Tournaments	4	2.1
Concerts	Concerts	25	13.4
Marathons	Marathons	4	2.1
Parades	Parades	2	1.1
Fairs	Fairs	0	0.0
Festivals	Festivals	38	20.3
Protests / Political Events	Protests / Political Events	2	1.1
Expositions & Shows	Expositions & Shows	47	25.1
TOTAL		187	100.0

Note: Due to rounding, the percentages do not add up to 100.

Professional sports account for 27 percent of PSEs with attendance over 10,000. Concerts, festivals, and expositions, account for 13, 20, and 25 percent of PSEs respectively. These four categories combined account for about 85 percent of all PSEs with attendance over 10,000.

Traffic Impacts

Results of the congestion analysis for the Portland area are summarized in Exhibit 4-7.

Exhibit 4-7: Congestion Costs per Year Due to PSEs in Portland.

Congestion Category	Units	AM Peak (44%)	PM Peak (56%)	PSE Caused (4%)	PSE Caused (8%)	Totals
Average Delay per traveler	Hours	16.8	21.2	0.8	1.7	38
Wasted Fuel per Traveler	Gallons	11.9	15.1	0.6	1.2	27
Travel Delay	Hours	14,893,805	18,766,195	750,648	1,501,296	33,660,000
Excessive Fuel Consumed	Gallons	10,622,566	13,384,434	535,377	1,070,755	24,007,000
Congestion Cost	$ Million	277	348	14	28	625

The annual delay per traveler in Portland is estimated to range between 0.8 and 1.7 hours per year as a result of planned special events, while the wasted fuel per traveler is between 0.6 and 1.2 gallons. The cumulative travel delay for Portland as a result of planned special events is between 751,000 and 1,501,000 hours per year, and excess fuel consumed is between 535,000 and 1,071,000 gallons per year. Finally, the congestion cost of these events is estimated to be between $14 million and $28 million dollars per year.

The previously determined attendance figures were used to assess more specific congestion effects in the Portland area. The 44 Portland Trailblazers professional basketball games per year have an average attendance of 15,500 people. That equals 682,000 attendees of professional basketball in the Portland area per year, or approximately 30 percent of all planned special event attendance in the Portland area.

The total annual travel delay for Portland as a result of professional basketball is between 225,300 and 450,300 hours. On a per game basis, given 44 games per year, this breaks down to between 5,120 hours and 10,200 hours of delay caused by each professional basketball game in the Portland area.

The excess fuel consumed in the Portland area due to professional basketball is between 160,500 and 321,000 gallons per year, which translates to between 3,650 and 7,300 gallons per game. The congestion cost is between $4 million and $8 million per year, or between $91,000 and $182,000 of congestion cost per professional basketball game.

A closer look at the characteristics of the Rose Garden Arena reveals many factors that help to reduce congestion caused by planned special events. Both buses and light rail are available and the Arena is located near an interstate, which provides a good access scheme for the events.

EL PASO CASE STUDY

El Paso was selected as the case study city representative of the *Medium* size group and the southern geographical area. This section presents the results of the case study of PSEs in the El Paso metropolitan area.

Venues and Event Types

The following specially designed facilities with event days generating crowds of more than 10,000 people in the El Paso area were contacted:

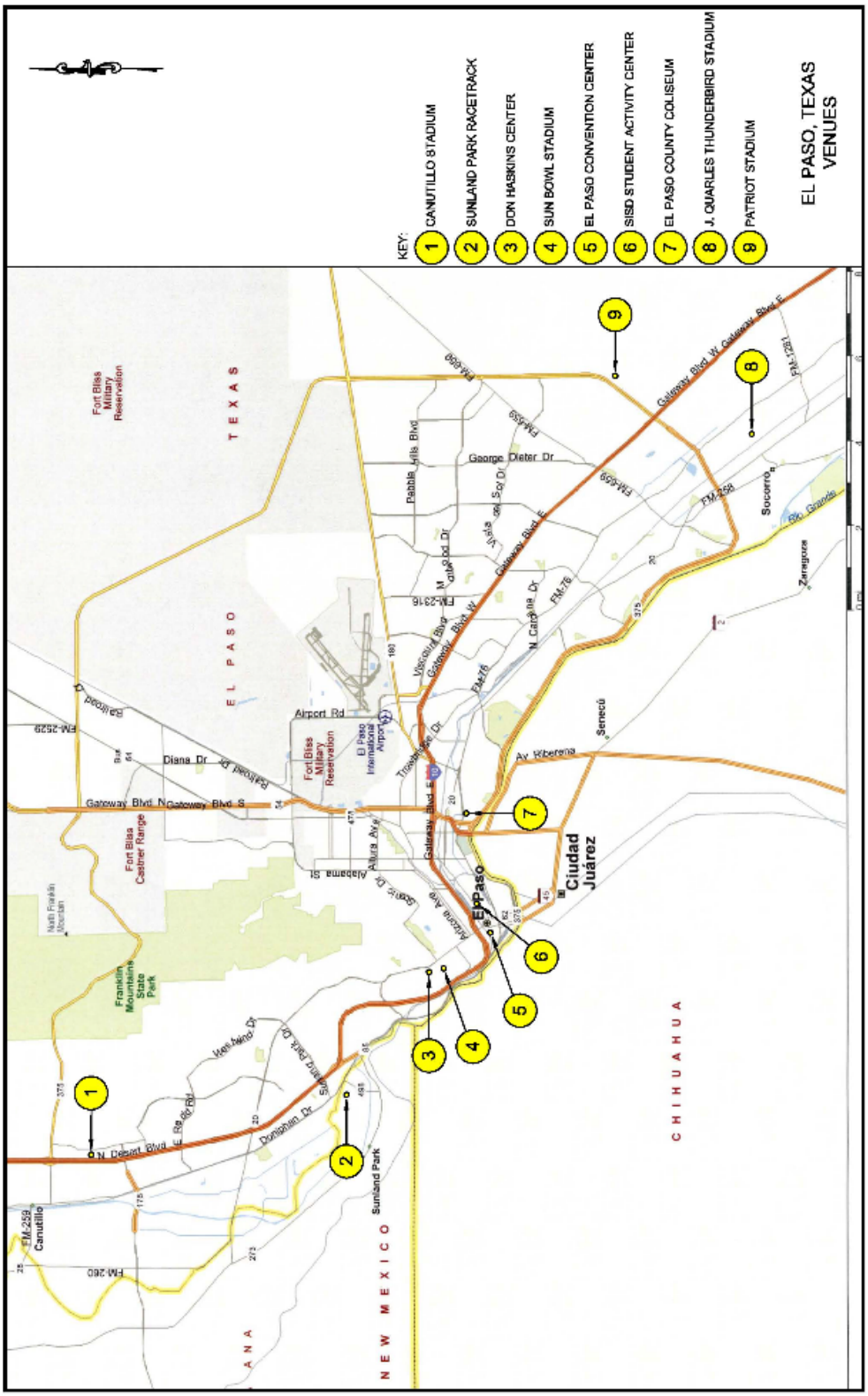
- Canutillo Stadium – maximum capacity 12,000
- El Paso County Coliseum – maximum capacity 11,000
- Sun Bowl Stadium – maximum capacity 51,500
- Don Haskins Center – maximum capacity 12,222
- SISD Student Activity Center – maximum capacity 11,000
- Sunland Park Raceway – maximum capacity not available

Other event hosting facilities that were examined, but found not to host events with crowds larger than 5,000, include:

- Cohen Stadium – maximum capacity 9,725
- El Paso Convention Center – maximum capacity 8,000
- J. Quarles Thunderbird Stadium – maximum capacity 2,250
- Patriot Stadium – maximum capacity 3,000

A map of some of these venues is provided in Exhibit 5-1. As the map shows, all of the venues are located within two to three miles of Interstate 10.

Exhibit 5-1: Map of Venues in El Paso that Host PSEs with More Than 10,000 Attendees



The following municipal departments were contacted to collect information on open area PSEs:

- Development and Infrastructure Services
- Transportation and Economic Development
- Department of Parks and Recreation

Data Collection by Venue

The next few paragraphs provide a description of each of the PSE hosting venues in the city that draw crowds of more than 10,000 attendees. For the purposes of a sensitivity analysis, data was also collected on events that drew crowds of more than 5,000 attendees.

Cohen Stadium

Cohen Stadium is located on the northeast side of El Paso, by the Patriot Freeway next to the Franklin Mountains. It is primarily used for baseball, and is the home field of the El Paso Diablos minor league baseball team. It opened in 1990 and holds 9,725 people. Cohen Stadium is also used for concerts, boxing, and soccer games.

Canutillo Stadium

Canutillo Stadium is located at Canutillo High School and is owned and operated by the Canutillo Independent School District. Opened to the public in 2005, the stadium has a capacity of around 12,000 and is about 14 miles away from downtown El Paso. It is mainly used for high school football games.

El Paso County Coliseum

El Paso County Coliseum is a 5,250-seat multi-purpose arena in El Paso. The Coliseum opened in 1942 and can be adapted to seat up to 11,000 for concerts.

Sun Bowl Stadium

The Sun Bowl is an outdoor football stadium on the campus of the University of Texas at El Paso (UTEP). It is home to the UTEP Miners of Conference USA (formerly of the Western Athletic Conference), and a late December college football bowl game, the Brut Sun Bowl. The stadium was opened in 1963 and has a current seating capacity of 51,500.

Don Haskins Center

The Don Haskins Center (capacity 12,222), the home of UTEP Miners basketball, is considered one of the top college basketball facilities in the United States and perhaps the top in Conference USA. Fans are seated extremely close to the playing floor, and the UTEP student section is located near the opponent's bench. "The Don" is so notorious as a tough place for opponents to win that UTEP has historically had difficulty convincing top-rated teams to play there.

SISD Student Activity Complex

The Socorro Independent School District (SISD) Student Activities Complex, known locally as "The SAC," is a high school football stadium located in the far east side of El Paso. It has a capacity of 11,000. It is owned and operated by the SISD for high school football, soccer, and track and field events. It is also used for the SISD high school graduation ceremonies.

Street and Park Events

Street events in the El Paso area include fairs, festivals, and marathons. Information on street events was collected from the El Paso Convention Center and Visitors Bureau.

El Paso Convention Center

The El Paso Convention Center has a maximum capacity of 8,000. It hosts 16 PSE event days with crowds above 5,000, but does not host any PSE event days with crowds above 10,000.

Sunland Park Racetrack

The Sunland Park Racetrack hosts an average of 6,000 attendees every Saturday and Sunday between December and April, or approximately 40 event days annually. In addition, an annual Derby has an attendance of 13,000 people.

Data Collection by Activity

The next few paragraphs describe data collected for each of the PSE event types in the El Paso area that draw crowds in excess of 10,000 or 5,000 attendees.

College Sports

University of Texas El Paso (UTEP) has the most well-attended college sports games in El Paso. The UTEP basketball team hosts about 17 games a year that draw crowds in excess of 10,000. The football team plays at the Sun Bowl Stadium and during the 2007 session had six games with about 48,000 attendees.

Horse Racing

El Paso's only horse racing venue is the Sunland Park Raceway. As discussed above, Sunland Park hosts an average of 6,000 attendees every Saturday and Sunday between December and April, or approximately 40 event days. The only event hosting more than 10,000 people is an annual Derby that attracts 13,000.

Expositions and Shows

Most large exhibitions in El Paso are held at the El Paso Convention Center. The Convention Center averages 16 PSEs with an attendance of over 5,000 people annually, but none that exceed 10,000.

PSE Event Days Summary Matrixes

A matrix listing the number of event days for PSEs with more than 10,000 attendees in the El Paso is provided in Exhibit 5-2. In total, there is an average of 93 events with more than 10,000 attendees annually. Attendance at these large PSEs ranges from 10,000 to 150,000.

Exhibit 5-2: Matrix of PSE Event Days in Excess of 10,000 People in the El Paso Area

	Affiliated team / event	Average Attendance	Cohen Stadium	Canutillo Stadium	El Paso County Coliseum	Sun Bowl Stadium	Don Haskins Center	SISD Student Activity Complex (SAC)	Street	Parks	El Paso Convention Center	Sunland Park Raceway	TOTAL
Professional Football													0
Professional Baseball													0
Professional Basketball													0
Professional Ice Hockey													0
College Football		48,000				6							6
College Basketball		10,000					17						17
Auto Racing													0
Horse Racing		13,000										1	1
Golf Tournaments													0
Marathons		10,000							1				1
Concerts		10,000					12						12
Parades		150,000							1				1
Fairs													0
Festivals		30,000								1			1
Protests / Political Events													0
Expositions and Shows													0
Other - HS Football		15,000				6							6
Other - Graduation		12,000					17						17
Other - Festival		15,000							2				2
Other - Festival		12,000			5								5
Other		23,000					24						24
TOTAL			0	0	5	12	70	0	4	1	0	1	93
Maximum Facility Capacity			9,725	12,000	11,000	51,500	12,222	11,000	NA	NA	8,000	NA	
Public Transportation (Y/N)			Y	Y	Y	Y	Y	Y	Y	Y	Y	N	
Type of Public Transit*			B	B	B	B	B	B	B	B	B	N	
Near Interstate (Y/N)			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Number of Parking Spaces			NA	NA	NA	NA	NA	NA	NA	NA	1,425	NA	
Venue Location**			U	U	U	U	U	U	U	R	D	S	

* Response options are: B (Bus), L (Light Rail), and H (Heavy Rail)
** Response options are: D (Downtown), U (Urban), S (Suburban), R (Rural)

As stated in the Study Methodology section, in an attempt to exclude low attendance PSEs that have small impacts on traffic demand, project staff, in coordination with FHWA, selected an event attendance size cut-off of 10,000. However, in order to examine the sensitivity of these results, data on the number of events of over 5,000 was collected for the smaller case study cities of El Paso and Columbia, where data collection was relatively less complex. Exhibit 5-3 summarizes events with more than 5,000 attendees. There were 244 events in this category, more than double the number of events with more than 10,000 attendees.

Exhibit 5-3: Matrix of PSE Event Days in Excess of 5,000 People in the El Paso Area

	Affiliated team / event	Average Attendance	Cohen Stadium	Canutillo Stadium	El Paso County Coliseum	Sun Bowl Stadium	Don Haskins Center	SISD Student Activity Complex (SAC)	Street	Parks	El Paso Convention Center	Sunland Park Raceway	TOTAL
Professional Football													0
Professional Baseball													0
Professional Basketball													0
Professional Ice Hockey													0
College Football		48,000				6							6
College Basketball		9,000					42						42
Auto Racing													0
Horse Racing		6,000										40	40
Golf Tournaments													0
Marathons		10,000							1				1
Concerts		8,000	6										6
Parades		150,000							1				1
Fairs		5,000								5			5
Festivals		30,000								1			1
Protests / Political Events													0
Expositions and Shows		5,000	4								16		20
Other - College Baseball		6,000	12										12
Other - Concerts		6,000			25								25
Other - HS Football		15,000				6							6
Other - HS Football		7,000						11					11
Other - Rodeo		6,000	2										2
Other - Graduation		5,000		1				4					5
Other - Graduation		12,000					17						17
Other - Concert		10,000					12						12
Other - Festival		15,000							2				2
Other - Festival		12,000			5								5
Other - Horse Racing		13,000										1	1
Other		23,000					24						24
TOTAL			24	1	30	12	95	15	4	6	16	41	244
Maximum Facility Capacity			9,725	12,000	11,000	51,500	12,222	11,000	NA	NA	8,000		
Public Transportation (Y/N)			Y	Y	Y	Y	Y	Y	Y	Y	Y		
Type of Public Transit*			B	B	B	B	B	B	B	B	B		
Near Interstate (Y/N)			Y	Y	Y	Y	Y	Y	Y	Y	Y		
Number of Parking Spaces			NA	NA	NA	NA	NA	NA	NA	NA	1,425		
Venue Location**			U	U	U	U	U	U	U	R	D		

* Response options are: B (Bus), L (Light Rail), and H (Heavy Rail)
** Response options are: D (Downtown), U (Urban), S (Suburban), R (Rural)

Venue-specific PSE event days with attendance over 5,000 and 10,000 as a percentage of the total number of PSEs with attendance over 5,000 and 10,000, respectively, are summarized in Exhibit 5-4. There are on average approximately 93 PSE event days with attendance over 10,000 annually. This is an average of 1.8 PSE event days per week, or one every four days. The majority of these events, 75 percent, are hosted at the Don Haskins Center. The second most frequent host of these events is the Sun Bowl Stadium, which hosts 13 percent of all PSEs with attendance over 10,000. Both facilities are at located the University of Texas at El Paso (UTEP). These two facilities combined host 88 percent of all PSEs with attendance over 10,000 and 44 percent of all PSEs with attendance over 5,000 in El Paso.

Exhibit 5-4: PSE Event Days With Attendance Over 5,000 and 10,000 by Venue

Venue	Venue type	Event days with more than 5,000 people		Event days with more than 10,000 people	
		Number of PSE event days annually	Percent of Total (%)	Number of PSE event days annually	Percent of Total (%)
Cohen Stadium	Stadium	24	9.8	0	0.0
Canutillo Stadium	Stadium	1	0.4	0	0.0
El Paso County Coliseum	Stadium	30	12.3	5	5.4
Sun Bowl Stadium	Stadium	12	4.9	12	12.9
Don Haskins Center	Arena	95	38.9	70	75.3
SISD Activity Complex	Arena	15	6.1	0	0.0
Street Events	Street	4	1.6	4	4.3
Park Events	Park	6	2.5	1	1.1
El Paso Convention Center	Convention Center	16	6.6	0	0.0
Sunland Park Racetrack	Racetrack	41	16.8	1	1.1
Total		244	100.0	93	100.0

Note: Due to rounding the percentages do not add up to 100.

Exhibit 5-5 lists PSE event days by activity categories. As discussed above, the majority of events are sporting, graduation, and concert events hosted at UTEP.

Exhibit 5-5: PSE Event Days with Attendance Above 5,000 and 10,000 by Activity

Activity category	Activity	Events Days W/ More Than 5,000 People		Events Days W/ More Than 10,000 People	
		Number of PSE Event Days Annually	Percent of Total (%)	Number of PSE Event Days Annually	Percent of Total (%)
Professional Team Sports	Professional Football	0	0.0		0.0
	Professional Baseball	0	0.0		0.0
	Professional Basketball	0	0.0		0.0
	Professional Ice Hockey	0	0.0		0.0
College & High School Sports	College & HS Football	23	9.4	12	12.9
	College & HS Basketball	42	17.2	17	18.3
	Other – College Baseball	12	4.9		0.0
Racing	Auto Racing	0	0.0		0.0
	Horse Racing	41	16.8	1	1.1
	Other – Boat Racing	0	0.0		0.0
Golf	Golf Tournaments	0	0.0		0.0
Concerts	Concerts	43	17.6	12	12.9
Marathons	Marathons	1	0.4	1	1.1
Parades	Parades	1	0.4	1	1.1
Fairs	Fairs	5	2.0		0.0
Festivals	Festivals	8	3.3	8	8.6
Protests / Political Events	Protests / Political Events	0	0.0		0.0
Expositions & Shows	Expositions & Shows	20	8.2	0	0.0
Other	Other	48	19.7	41	44.1
TOTAL		244	100.0	93	100.0

Note: Due to rounding the percentages do not add up to 100.

College and high school sports account for 31 percent of PSEs with attendance over 10,000, while concerts account for another 13 percent. The large "Other" category includes university and high school graduations, university events, rodeos, and fairs hosted in stadiums. This category accounts for about 49 percent of all PSEs with attendance over 10,000.

Traffic Effects

The annual delay per traveler in El Paso attributable to PSEs that host more than 10,000 attendees is between 0.5 and 1.1 hours per year for every traveler. The wasted fuel per traveler due to PSEs is between 0.4 and 0.7 gallons per year. Cumulatively, the travel delay is between 193,000 and 387,000 hours in the El Paso area, while the excess fuel consumed is between 128,000 and 256,000 gallons per year. The cost of congestion is between $4 million and $7 million dollars per year. The results of the congestion analysis for the El Paso area are summarized in Table 5-6.

Exhibit 5-6: Congestion Impacts Due to PSEs in El Paso

Congestion Category	Units	AM Peak (44%)	PM Peak (56%)	PSE Caused (4%)	PSE Caused (8%)	Totals
Average Delay per Traveler	Hours	10.6	13.4	0.5	1.1	24
Wasted Fuel per Traveler	Gallons	7.1	8.9	0.4	0.7	16
Travel Delay	Hours	3,838,496	4,836,504	193,460	386,920	8,675,000
Excessive Fuel Consumed	Gallons	2,542,035	3,202,965	128,119	256,237	5,745,000
Congestion Cost	$ Million	$70	$89	$4	$7	$159

The major congestion factor when considering college and high school football is the day on which the game is played. The majority of college football games are played on weekends, either Saturday afternoons or Saturday evenings. The cost of congestion is relatively low, because games do not occur during peak commuting periods. Similarly, the majority of the congestion caused by the games affects attendees, and the percentage of non-attendees affected by the planned special event is much lower. In addition, college football tends to attract a large amount of students who walk to the games from campus, greatly reducing congestion on the roadways.

Finally, college football games attract many tailgaters, who tend to arrive much earlier than game time and stay after the completion of the game. Since attendee arrivals and departures are spread out, roadway congestion is further reduced. College football is a very good example of how timing of the event and type of event affects congestion.

COLUMBIA CASE STUDY

Columbia was selected as the case study city representing the *Small* size category. It is located in the eastern region of the United States. This section presents the results of a case study of PSEs in the Columbia metropolitan area.

Venue and Event Types

The following specially designed facilities in the Columbia area with event days that draw crowds of more than 10,000 people were contacted:

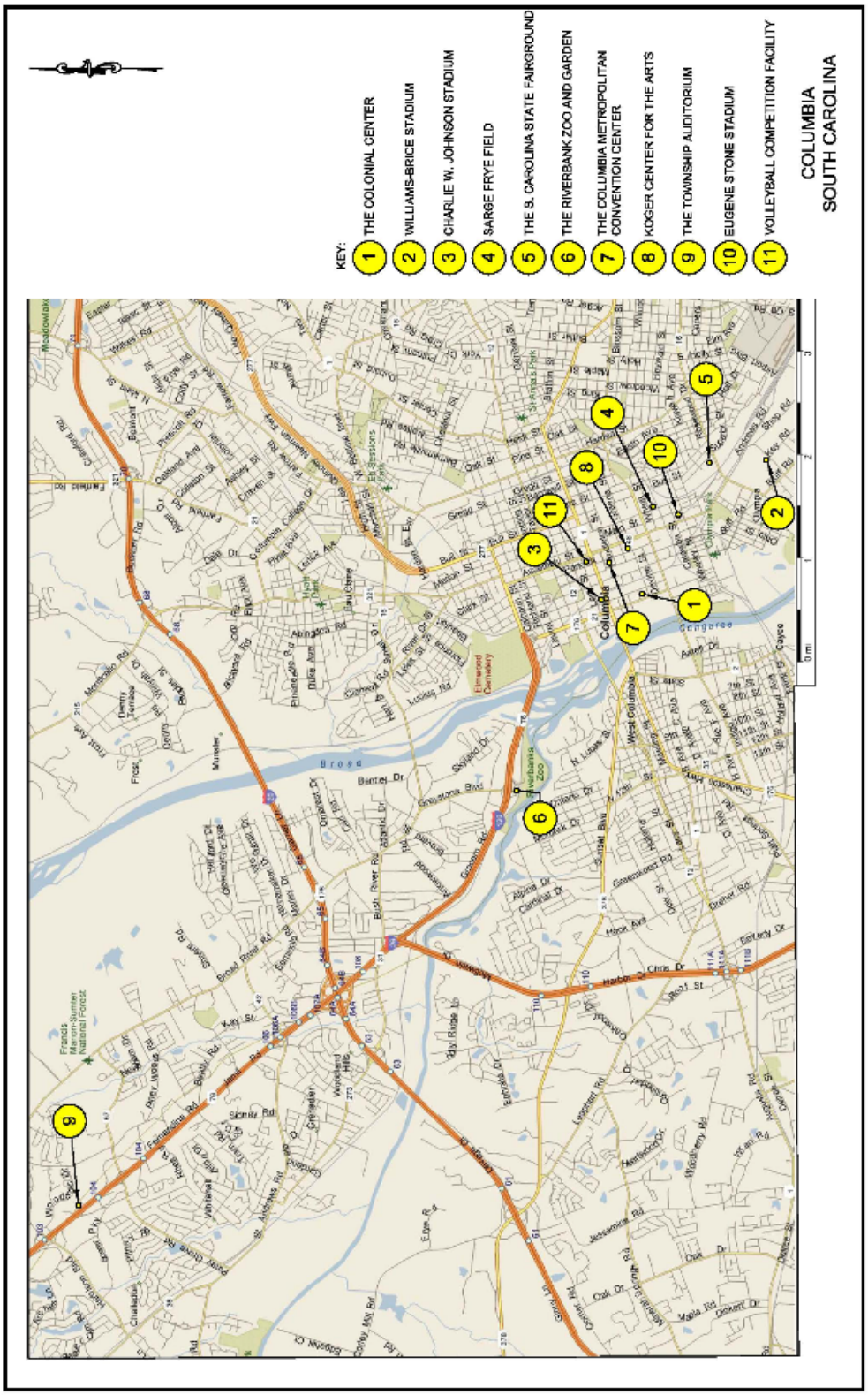
- The Colonial Center – maximum capacity 18,000
- Williams-Brice Stadium – maximum capacity 18,000
- Charlie W. Johnson Stadium – maximum capacity 11,000
- The South Carolina State Fairground – maximum capacity not available
- The Riverbank Zoo and Garden – maximum capacity not available

Other event-hosting facilities that were examined, but found not to host events with crowds larger than 5,000, include:

- Eugene Stone Stadium – maximum capacity 5,700
- Sarge Frye Field – maximum capacity 5,000
- The Township Auditorium – maximum capacity 3,200
- Koger Center for the Arts – maximum capacity 2,500
- Volleyball Competition Facility – maximum capacity 2,000
- The Columbia Metropolitan Convention Center – maximum capacity not available

A map of these venues is provided in Exhibit 6-1. As the map shows, many of these venues are closely clustered in the downtown area, and all are within three miles of an interstate highway. The high concentration of PSE-hosting venues in the city center and the lack of immediate access to major highways from these venues may exacerbate PSE-caused congestion in the city.

Exhibit 6-1: Map of Venues in Columbia that Host PSEs with More Than 10,000 Attendees



Columbia does not have a municipal office that tracks or issue permits for street and park events. In order to estimate the number of street and park events in the city, project staff contacted every event organizer listed in the event calendar in Exhibit 6-2, which was provided by the Columbia Metropolitan Convention Center and Visitor Bureau.

Exhibit 6-2: Calendar of Events in the Columbia Area, provided by the Columbia Metropolitan Center and Visitors Bureau

Month	Event	Month	Event
January	A Grand Affair: A Celebration of Life After 55	October	Boo at the Zoo
	Boat Show 2007 at the Fairgrounds		Columbia Blues Festival
	Ringling Brothers Barnum & Bailey Circus		Fall For the Arts
February	South Carolina Book Festival		Governor's Cup Road Race
March	Carolina Craftmen's Spring Classic		Hallowonka
	Jamil Shrine Circus		Sleepy Hollow on the River
	Palmetto Sportsmen's Classic		South Carolina State Fair
	St. Patrick's Day in Five Points	November	Carolina Craftsmen's Christmas Classic
	SC High School Basketball Tournament		Colonial Cup Horse Races
	Carolina Cup-Camden		Gem, Mineral & Jewelry Show
	Columbia International Festival		Festival of Trees
April	Historic Elmwood Park Tour of Homes		Governor's Carol Lighting
	Midlands Plant & Flower Show		Historic Columbia Holiday Tours
May	Carolina Poultry Festival		Holiday Lights on the River
	Heart and Sole Woman's 5 Miler		Saluda Shoals
	Historic Columbia Annual Spring Tour		Lights Before Christmas
June	All American Soap Box Derby		Riverbanks Zoo
	Lake Murray's July 4th Celebration		Veteran's Day Parade
July	Carolina Celebration of Liberty	December	Vista Lights
	Lexington County Peach Festival		Carolina Carillon Holiday Parade
	Torchlight Tattoo at Fort Jackson		Christmas Festival – Blythewood
August	Jubilee Heritage Festival		Christmas Open House
	South Carolina Pelion Peanut Party		Lorick Plantation House
September	Chapin Labor Day Festival		Christmas Traditions
	Collard Festival – Gaston		Cayce Historical Museum
	Columbia Greek Festival		Devine Evening
	Lexington Fun Fest		Eight Nights of Wonder
	Okra Strut - Irmo		Saluda Shoals Park
			Historic Columbia Holiday Tours
			Historic Columbia Candlelight Tours
			Lights Before Christmas
			Riverbanks Zoo
			Wow New Year's Eve Celebration

Data Collection by Venue

The next few paragraphs provide a description of each PSE-hosting venue in the city that draws crowds of more than 10,000 attendees. For the purposes of a sensitivity analysis, data was also collected on venues that draw crowds of more than 5,000 attendees.

Colonial Center

The Colonial Center is a multi-purpose arena in Columbia, primarily home to the University of South Carolina men's and women's basketball teams. Opened in 2002 as a replacement for the Carolina Coliseum, the 18,000-seat arena is also host to events such as conferences, concerts,

and graduation ceremonies throughout the year. It is the largest arena in the state of South Carolina and the tenth largest college arena in the U.S. The Center has 36 home basketball games with an average attendance of 11,000. It hosts eight shows with 10,000 in attendance, as well as 12 concerts. Half the concerts have about 6,000 attendees and the other half have about 11,000 attendees.

Williams-Brice Stadium

Williams-Brice Stadium is the home of the USC Gamecocks' football team and is one of the largest college football stadiums in the nation. It seats 80,250 and is located just south of downtown Columbia.

Sarge Frye Field

Sarge Frye Field is the home field of the University of South Carolina Gamecock baseball team. The stadium, which is named after a longtime groundskeeper of the college, holds 5,000 people. The team will move into a new ballpark in 2009.

Charlie Johnson Stadium

Charlie W. Johnson Stadium in Columbia is primarily used for football and is the home field of Benedict College. The stadium opened in 2006 and holds 11,000 people.

Street and Park Events

Street events in the Columbia area include fairs, festivals, and marathons. As noted above, information on street events was collected by contacting every event organizer listed in an annual event calendar sent to project staff by the Columbia Metropolitan Convention Center and Visitors Bureau.

South Carolina State Fairground

The South Carolina State Fairground is the site of the South Carolina state fair and other events.

Riverbank Zoo and Garden

The Riverbank Zoo and Garden hosts many large attendance events such as Boo at the Zoo and Lights before Christmas.

Other

Other venues that were surveyed include the South Carolina State Museum and Fort Jackson, a U.S. Army installation.

Data Collection by Activity

The next few paragraphs describe data collected for each of the PSE event types in the Columbia area.

College Sports

The University of South Carolina (USC) has the most well-attended college sports teams in Columbia. The USC Gamecocks play 36 home basketball games at the Colonial Center with an average attendance of 11,000.

Expositions and Shows

Most large exhibitions in Columbia are held at the Colonial Center. There is an average of eight expositions and shows in the Colonial Center with attendance over 5,000 every year.

PSE Event Days Summary Matrix

The matrix in Exhibit 6-3 lists the number of event days for PSEs with more than 10,000 attendees in Columbia. In total, there is an average of 94 events with more than 10,000 attendees annually. Attendance at these large PSEs ranges from 10,000 to 75,000.

Exhibit 6-3: Matrix of PSE Event Days in Excess of 10,000 People in the Columbia Area

	Affiliated team / event	Average Attendance	The Colonial Center	Williams-Brice Stadium	Sarge Frye Field	Charlie Johnson Stadium	Street	Parks	State Fair Ground	Riverbank Zoo and Garden	Other	TOTAL
Professional Football												0
Professional Baseball												0
Professional Basketball												0
Professional Ice Hockey												0
College Football	USC Gamecocks	80,000		7								7
College Basketball	USC Gamecocks	11,000	36									36
Auto Racing												0
Horse Racing												0
Golf Tournaments												0
Marathons												0
Concerts		30,000		2								2
Parades		15,000					1					1
Fair		12,500							3		1	4
Festival	Benedict College	10,000									1	1
Protests / Political Events		30,000		1								1
Expositions and Shows		10,000	8									8
Other - Concert		11,000	6									6
Other - College football	Benedict College	11,000				3						3
Other - Fair		40,000					1		12			13
Other - Festival	Benedict College	10,000									1	1
Other - Festival		24,000					9					9
Other - Festival		40,000					1					1
Other - Festival		75,000					1					1
TOTAL			50	10	0	3	13	0	15	0	3	94
Maximum Facility Capacity			18,000	80,250	5,000	11,000	NA	NA	NA	NA	NA	
Public Transportation (Y/N)			NA	NA	NA	NA	NA	NA	NA	NA	NA	
Near Interstate (Y/N)			Y	Y	Y	Y	Y	Y	Y	Y	Y	
Type of Public Transit*			NA	NA	NA	NA	NA	NA	NA	NA	NA	
Number of Parking Spaces			NA	NA	NA	NA	NA	NA	NA	NA	NA	
Venue Location**			U	U	U	U	U	U	U	U	U	

Note: University of South Carolina is abbreviated as USC
* Response options are: B (Bus), L (Light Rail), and H (Heavy Rail)
** Response options are: D (Downtown), U (Urban), S (Suburban), R (Rural)

As stated in the Study Methodology section, in an attempt to exclude low attendance PSEs that have small impacts on traffic demand, project staff, in coordination with FHWA, selected an event attendance size cut-off of 10,000. However, in order to examine the sensitivity of these results, data on the number of events with more than 5,000 attendees was collected for El Paso and Columbia, where data collection was relatively less complex. As shown in Exhibit 6-4, there are approximately 167 events with more than 5,000 attendees annually. Accordingly, there is an average of one PSE with more than 5,000 people every other day in the Columbia area.

Exhibit 6-4: Matrix of PSE Event Days in Excess of 5,000 People in the Columbia Area

	Affiliated team / event	Average Attendance	The Colonial Center	Williams-Brice Stadium	Sarge Frye Field	Charlie Johnson Stadium	Street	Parks	State Fair Ground	Riverbank Zoo and Garden	Other	TOTAL
Professional Football												0
Professional Baseball												0
Professional Basketball												0
Professional Ice Hockey												0
College Football	USC Gamecocks	80,000		7								7
College Basketball	USC Gamecocks	11,000	36									36
Auto Racing												0
Horse Racing												0
Golf Tournaments												0
Marathons												0
Concerts		30,000		2								2
Parades		15,000					1					1
Fairs		6,300					2		7		1	10
Festivals		5,000						5		7		12
Protests / Political Events		30,000		1								1
Expositions and Shows		10,000	8									8
Other - Concert		5,500	6				2	5				13
Other - Concert		11,000	6									6
Other - College football	Benedict College	11,000				3						3
Other - College baseball	USC Gamecocks	5,000			36							36
Other - Highschool football		8,000		3								3
Other - Fair		12,500							3		1	4
Other - Fair		40,000					1		12			13
Other - Festival	Benedict College	10,000									1	1
Other - Festival		24,000					9					9
Other - Festival		40,000					1					1
Other - Festival		75,000					1					1
TOTAL			56	13	36	3	17	10	22	7	3	167
Maximum Facility Capacity			18,000	80,250	5,000	11,000	NA	NA	NA	NA	NA	
Public Transportation (Y/N)			NA	NA	NA	NA	NA	NA	NA	NA	NA	
Near Interstate (Y/N)			Y	Y	Y	Y	Y	Y	Y	Y	Y	
Type of Public Transit*			NA	NA	NA	NA	NA	NA	NA	NA	NA	
Number of Parking Spaces			NA	NA	NA	NA	NA	NA	NA	NA	NA	
Venue Location**			U	U	U	U	U	U	U	U	U	

Note: University of South Carolina is abbreviated as USC
* Response options are: B (Bus), L (Light Rail), and H (Heavy Rail)
** Response options are: D (Downtown), U (Urban), S (Suburban), R (Rural)

Venue-specific PSE event days with attendance of more than 5,000 and 10,000 as a percent of the total number of PSEs with attendance of more than 5,000 and 10,000, respectively, is summarized in Exhibit 6-5. There are on average approximately 97 PSE event days with attendance of more than 10,000 annually. Statistically, there is an average of 1.9 PSE event days per week, or one every 3.7 days. The majority of these events, 75 percent, are hosted at the Colonial Center. The second most frequent host of these events is the South Carolina State Fairground, which hosts 15 percent of all PSEs with attendance of more than 10,000. The Colonial Center, Williams-Brice Stadium, and Sarge Frye Field are affiliated with the University of South Carolina Gamecocks. These three facilities combined host 64 percent of all PSEs with attendance over 10,000 and 64 percent of all PSEs with attendance of more than 5,000.

Exhibit 6-5: PSE Event Days with Attendance Over 5,000 and 10,000 by Venue

Venue	Venue type	Event days with more than 5,000 people		Event days with more than 10,000 people	
		Number of PSE event days annually	Percent of Total (%)	Number of PSE event days annually	Percent of Total (%)
Colonial Center	Arena	56	34	50	53
Willimas-Brice Stadium	Stadium	13	8	10	11
Sarge Frye Field	Stadium	36	22	0	0
Charlie Johnson Stadium	Stadium	3	2	3	3
Street Events	Street	17	10	13	14
Park Events	Park	10	6	0	0
SC State Fairground	Fairground	22	13	15	16
Riverbank Zoo and Garden	Zoo	7	4	0	0
Other		3	2	3	3
TOTAL		167	100	94	100

Note: Due to rounding, the percentages do not add up to 100.

Exhibit 6-6 lists PSE event days by activity categories. College and high school sports account for 49 percent of PSEs with attendance of more than 10,000. Concerts account for nine percent of events with more than 10,000 attendees.

Exhibit 6-6: PSE Event Days with Attendance Above 5,000 and 10,000 by Activity

Activity category	Activity	Events Days W/ More Than 5,000 People		Events Days W/ More Than 10,000 People	
		Number of PSE Event Days Annually	Percent of Total (%)	Number of PSE Event Days Annually	Percent of Total (%)
Professional Sports	Professional Football	0	0.0	0	0.0
	Professional Baseball	0	0.0	0	0.0
	Professional Basketball	0	0.0	0	0.0
	Professional Ice Hockey	0	0.0	0	0.0
College & High School Sports	College & HS Football	13	7.8	10	10.6
	College & HS Basketball	36	21.6	36	38.3
	Other – College Baseball	36	21.6	0	0.0
Racing	Auto Racing	0	0.0	0	0.0
	Horse Racing	0	0.0	0	0.0
	Other – Boat Racing	0	0.0	0	0.0
Golf	Golf Tournaments	0	0.0	0	0.0
Concerts	Concerts	21	12.6	8	8.5
Marathons	Marathons	0	0.0	0	0.0
Parades	Parades	1	0.6	1	1.1
Fairs	Fairs	27	16.2	17	18.1
Festivals	Festivals	24	14.4	13	13.8
Protests / Political Events	Protests / Political Events	1	0.6	1	1.1
Expositions & Shows	Expositions & Shows	8	4.8	8	8.5
Other	Other	0	0.0	0	0.0
TOTAL		167	100.0	94	100.0

Note: Due to rounding, the percentages do not add up to 100.

Traffic Impacts

The annual delay per traveler in Columbia as a result of PSEs is between 0.4 and 0.7 hours per year. The wasted fuel per traveler is between 0.2 and 0.4 gallons per year. Annual travel delay in Columbia due to planned special events totals between 83,000 and 166,000 hours. Between 53,000 and 105,000 gallons of excess fuel are consumed per year. Finally, the congestion cost of planned special events is between $2 million and $3 million per year.

The results of the congestion analysis for the Columbia area are summarized in Exhibit 6-7.

Exhibit 6-7: Congestion Impacts Due to PSEs in Columbia

Congestion Category	Units	AM Peak (44%)	PM Peak (56%)	PSE Caused (4%)	PSE Caused (8%)	Totals
Average Delay per traveler	Hours	7.1	8.9	0.4	0.7	16
Wasted Fuel per Traveler	Gallons	4.4	5.6	0.2	0.4	10
Travel Delay	Hours	1,650,442	2,079,558	83,182	166,365	3,730,000
Excessive Fuel Consumed	Gallons	1,046,018	1,317,982	52,719	105,439	2,364,000
Congestion Cost	$ Million	32	41	2	3	73

The previously-determined attendance figures were used to determine more specific congestion effects in the Columbia area. Average attendance at the Williams-Brice Stadium for University of South Carolina Gamecock college football games is 80,000 people, with seven games per year. This means that approximately 22 percent of all planned special event attendance in the Columbia area is at college football games.

The major congestion factor when considering college and high school football is the day on which the game is played. The majority of college football games are played on weekends, either Saturday afternoons or Saturday evenings. Games do not occur during peak commuting periods, so the majority of congestion caused by the games affects only attendees. The percentage of non-attendees affected by the planned special event is much lower. In addition, college football tends to attract a large amount of students who walk to the game from campus, which greatly reduces congestion on the roadways.

College football games also attract many tailgaters, who tend to arrive much earlier than game time and to stay much longer than other attendees after the completion of the game. As attendee arrivals and departures are spread out, roadway congestion is reduced. College football is a very good example of how timing of the event and type of event play into the role of congestion.

Summary of Case Study Cities

There is significant variation in the frequency of events across the case study cities. City size appears to affect the types of events that occur in cities. For example, *Very Large* and *Large* cities tend to host professional sports teams, while *Medium* and *Small* cities do not. The occurrence of some event types is also influenced by geography. Detroit, for instance, is situated

along Lake Michigan and can host boat races, while landlocked El Paso and Columbia cannot. At other times, the occurrence and frequency of events depends on social and cultural attributes. Fairs are popular in *Small* rural cities like Columbia, for example, but tend to occur less frequently in *Very Large* and *Large* cities. A summary table of the results from all the case studies is provided in Exhibit 6-8.

Exhibit 6-8: Summary Matrix of PSE Event Days for All the Case Study Cities

		Detroit, MI		Portland, OR		El Paso, TX >5K		El Paso, TX >10K		Columbia, SC >5K		Columbia, SC >10K	
Activity category	Activity	Number of PSE Event Days Annually	Percent of Total (%)	Number of PSE Event Days Annually	Percent of Total (%)	Number of PSE Event Days Annually	Percent of Total (%)	Number of PSE Event Days Annually	Percent of Total (%)	Number of PSE Event Days Annually	Percent of Total (%)	Number of PSE Event Days Annually	Percent of Total (%)
Professional Sports	Professional Football	10	1.9		0.0		0.0		0.0		0.0		0.0
	Professional Baseball	81	15.4	7	3.7		0.0		0.0		0.0		0.0
	Professional Basketball	70	13.3	44	23.5		0.0		0.0		0.0		0.0
	Professional Ice Hockey	46	8.7		0.0		0.0		0.0		0.0		0.0
	Other - Professional Soccer		0.0	7	3.7		0.0		0.0		0.0		0.0
College & High School Sports	College Football	8	1.5	1	0.5	23	9.4	12	12.9	13	7.8	10	10.6
	College Basketball	10	1.9		0.0	42	17.2	17	18.3	36	21.6	36	38.3
	Other - Baseball		0.0		0.0	12	4.9		0.0	36	21.6		0.0
	Other - Ice Hockey	12	2.3		0.0		0.0		0.0		0.0		0.0
Racing	Auto Racing	3	0.6	3	1.6		0.0		0.0		0.0		0.0
	Horse Racing		0.0		0.0	41	16.8	1	1.1		0.0		0.0
	Other - Bicycle		0.0	3	1.6		0.0		0.0		0.0		0.0
	Other - Boat	3	0.6		0.0		0.0		0.0		0.0		0.0
Golf	Golf Tournaments	4	0.8	4	2.1		0.0		0.0		0.0		0.0
Concerts	Concerts	179	34.0	25	13.4	43	17.6	12	12.9	21	12.6	8	8.5
Marathons	Marathons & Walks	2	0.4	4	2.1	1	0.4	1	1.1		0.0		0.0
Parades	Parades	1	0.2	2	1.1	1	0.4	1	1.1	1	0.6	1	1.1
Fairs	Fairs		0.0		0.0	5	2.0		0.0	27	16.2	17	18.1
Festivals	Festivals	33	6.3	38	20.3	8	3.3	8	8.6	24	14.4	13	13.8
Protests / Political Events	Protests / Political Events	3	0.6	2	1.1		0.0		0.0	1	0.6	1	1.1
Expositions & Shows	Expositions & Shows	61	11.6	47	25.1	20	8.2		0.0	8	4.8	8	8.5
Other			0.0		0.0	48	19.7	41	44.1		0.0		0.0
TOTAL		526	100.0	187	100.0	244	100.0	93	100.0	167	100.0	94	100.0

NATIONAL ESTIMATES

Large attendance events can be subdivided into several event type categories. These categories include sport, entertainment, social, and cultural events. Information collection to develop estimates of the number of large PSEs nationally focused heavily on the individual event type categories. As mentioned earlier, the event type categories included in this report are:

1. Professional Football
2. Professional Baseball
3. Professional Basketball
4. Professional Hockey
5. College Football
6. College Basketball
7. College Hockey
8. Auto Racing
9. Horse Racing
10. Golf Tournaments
11. Marathons
12. Concerts
13. Parades
14. Fairs
15. Festivals
16. Protests/Political Events
17. Expositions and Shows

Several approaches were employed to collect event size and frequency data for these event type categories. The approaches included a venue and permitting authority-based approach and an association-based approach. The venue and permitting authority-based approach was designed to collect data from a sample of special events venues and permitting authorities, such as stadiums and police departments, at a micro or city-level. The results of this approach are provided in the previous four sections. The association-based approach was designed to collect data from trade associations representing the types of entities at issue within various special events categories at the national or macro level.

For the macro or national approach, the first step in the process was to collect the available data at the national level from the Census and from associations and other organizations. Data was collected by event type only for events of over 10,000 attendees. The information for these event types included number of events, total attendance, and in-event spending or revenue. Spending outside the venue, as well as indirect and induced economic effects, are estimated and applied separately later in this section. This process was effective for many types of events, particularly for sporting events which have national groups that collect such data, such as the NFL, NBA, and NCAA. However for other types of events, especially street-use events, data is often not available at the national level. Therefore, for these types of events, the local case studies were used to capture data and develop national estimates using scaling factors.

The remainder of this section includes 17 subsections, each of which discusses data collection for one of the event types. These subsections are followed by a discussion of the national economic and fiscal effects of PSEs and a summary of national PSE-induced congestion estimates.

Professional Football

The two major professional football leagues in the U.S. are the National Football League (NFL) and the Arena Football League (AFL). The NFL has the highest per-game attendance of any professional team sports league in the world.[15] The NFL's 32 teams played 256 regular season games and 11 post season games in 2007.[16] Average attendance at these NFL games was 68,301.[17] The AFL hosts 144 games annually, with an average attendance of 13,105.[18] Assuming all the AFL games had more than 10,000 attendees, the total attendance for both leagues was 20.1 million for 411 games in 2007.

There are several sources of data on spending and revenue for professional football. The 2002 Census reports revenues of $4.6 billion for 67 football clubs. However, the Census does not identify the clubs included in its estimates. Forbes magazine estimates NFL revenue in 2007 at $6.5 billion.[19] Another source of data is the Fan Cost Index (FCI), an estimate of direct spectator spending on tickets, concessions and merchandise published in the 2007 Team Marketing Report (TMR).[20] The FCI includes two average-priced adult tickets and two average-priced children's tickets, two small draft beers, four small soft drinks, four regular hot dogs, two programs, two of the least expensive adult-sized adjustable caps, and parking for one car. The 2007 FCI for the NFL was $367.31. Accordingly, a per capita spending of $91.83 per attendee can be estimated by taking one quarter of the FCI. However, the FCI has been criticized by some for overestimating the average spectator spending on concessions and merchandise.[21]

Multiplying the FCI average spectator spending by the 18.2 million NFL regular and post-season attendees results in total spending of about $1.7 billion, far below the Census and Forbes revenue estimates. This gap is likely due to the large revenues from sources such as television, radio, advertizing, stadium naming rights, merchandise, and corporate suites.

The Forbes revenue estimate was selected as the best measure of the economic importance of the NFL, as it is more recent than the Census data and more inclusive than the FCI. As no estimates

[15] "NFL Sets Regular-Season Paid Attendance Record," NFL.com, January 3, 2008, http://www.nfl.com/news/story;jsessionid=AF4D3B22C7A59A3DF3D2ACA800E9C944?id=09000d5d805b5d53&template=without-video&confirm=true (accessed 5/5/08).
[16] "NFL Play-offs, 2006-07," in Wikipedia, http://en.wikipedia.org/wiki/NFL_playoffs,_2006-07 and "Superbowl XLI" in Wikipedia, http://en.wikipedia.org/wiki/Super_Bowl_XLI.
[17] "NFL Attendance-2007," ESPN.com, http://sports.espn.go.com/nfl/attendance?year=2007 (accessed 5/5/08).
[18] David Haney (Director of Marketing, Arena Football League), interview May 2, 2008.
[19] "Team Valuations," *Forbes*, 2007, http://www.forbes.com/business/sportsmoney/ (accessed 5/5/08).
[20] "Fan Cost Index" (Team Marketing Report), http://www.teammarketing.com/fancost/ (accessed 5/2/2008). Team Marketing Report is a leading publisher of sports marketing and sponsorship information.
[21] "Fixing the Fan Cost Index," (Baseball Prospectus, April 21, 2008), http://www.baseballprospectus.com/article.php?articleid=2790 (accessed 5/2/2008).

of AFL revenue were available, an estimate of AFL revenue per attendee was developed by taking the NFL's average revenue per attendee and applying it to the ratio of an average price of an AFL ticket to a NFL ticket. According to Team Marketing Report (TMR), the average NFL ticket is $67. The average price of an AFL ticket is $24.[22] The ratio of the two average ticket prices is 0.35. Accordingly, average revenue per attendee for the AFL is estimated to be $128.23. Following this methodology, AFL revenue is estimated at $242 million. Adding the AFL revenue to the Forbes $6.5 billion NFL revenue estimate brings total professional football revenues to $6.7 billion.

Professional Baseball

The three major professional baseball leagues in the U.S. are the Major League Baseball (MLB) and the two Minor League Baseball AAA leagues (AAA). Among professional and college sports, MLB attracts the largest number of total attendees per season. This is due to MLB's long regular season schedule, currently 162 games per team with about 81 home games each, plus playoffs.[23] The MLB's 30 teams averaged 32,781 attendees per game in 2007.[24] It is assumed that virtually all MLB games had more than 10,000 attendees in 2007. The AAA hosts 366 games that would qualify as large PSE events, with an average attendance of about 11,500.[25] Between the two leagues there were 2,791 games with more than 10,000 spectators. These 2,791 games had a total attendance of 83.7 million.

There are several sources of data on spending and revenue for professional baseball. The 2002 Census reports revenues of $3.8 billion for 242 clubs. However, the Census does not identify all the clubs included in its estimates. Forbes magazine estimates MLB revenue in 2007 was $4.2 billion,[26] while the2007 FCI for the MLB was $176.55, or $44.14 per attendee. As previously noted, the FCI has been criticized by some for overestimating the average spectator spending on concessions and merchandise. It has been suggested that the average spending per attendee for MLB games may be 19 percent lower than the FCI.[27] Multiplying the FCI average spectator spending by the 79.5 million MLB season attendees results in total spending of $3.5 billion, which is lower than the Census and Forbes revenues estimates. This gap is likely due to revenues from sources such as television, radio, advertising, stadium naming rights, merchandise, and corporate suites.

The Forbes revenue estimate was selected as the best measure of the economic importance of the MLB, as it is more recent than the Census data and more inclusive than the FCI. As no estimates of AAA revenue were available, it is assumed that ticket and concession sales compose the majority of AAA revenue. Ticket and concession spending per attendee for AAA games is assumed to be $22.07, which is half the per-attendee spending for MLB games. Following this

[22] Ben Klayman,"Sports Leagues Bullish on Fans Despite Economy," Reuters, January 22, 2008, http://www.reuters.com/article/sportsNews/idUSN2250043920080123 (accessed 5/5/08).
[23] "NFL Sets Regular-Season Paid Attendance Record," NFL.com, January 3, 2008.
[24] "NFL Attendance–2007," ESPN.com, http://sports.espn.go.com/nfl/attendance?year=2007.
[25] Jim Ferguson (Media Relations Director, Minor League Baseball), 1 May 2008, personal email.
[26] "Team Valuations," *Forbes*, 2007, http://www.forbes.com/business/sportsmoney/
[27] "Fixing the Fan Cost Index" (Baseball Prospectus, April 21, 2008), http://www.baseballprospectus.com/article.php?articleid=2790.

methodology, AAA revenue is estimated at $92.8 million. Adding the AAA estimates to the Forbes $5.48 billion MLB estimate brings total professional baseball revenue to $5.58 billion.

Professional Basketball

The two professional basketball leagues that host regular large PSEs are the National Basketball Association (NBA) and the Women's National Basketball Association (WNBA). The NBA has 30 teams and averaged 17,761 attendees per game for the 1,228 regular season games in 2007.[28] It was assumed that all NBA games exceeded 10,000 spectators in 2007. In 2007 the WNBA hosted 29 games with more than 10,000 attendees. The average attendance for those WNBA games was 12,654.[29] Between the NBA and WNBA leagues, there were 1,257 games with more than 10,000 spectators. These 1,257 games had a total attendance of about 22.2 million.

There are several sources of data on spending and revenue for professional basketball. However, the 2002 Census does not provide separate data for professional basketball. Instead, it is included in product line 7112119, *Other Professional Sports Teams and Clubs*, with 365 establishments and $4.7 billion in revenues. Forbes magazine estimates NBA revenue in 2007 at $3.5 billion.[30] The 2007 Fan Cost Index for the NBA was $281.90. [31] A per capita spending of $70.48 per attendee can be estimated by taking one quarter of the FCI. However, multiplying the FCI average spectator spending by the 21.8 million attendees of the 2007 NBA season results in total spending of $1.5 billion, $2 billion less than the Forbes revenue estimates. This gap is likely due to the large revenues from sources such as television, radio, advertising, arena naming rights, merchandise and corporate suites.

The Forbes revenue estimates were selected as the best measure of the economic importance of the NBA, as they are more recent than the Census data and more inclusive than the FCI. In 2002, the total revenue of the WNBA was $85 million.[32] Total attendance for all WNBA games was 1.7 million.[33] Accordingly, the average revenue per WNBA attendee was $49.93. Thus, in 2007 revenue from WNBA games with more than 10,000 attendees was assumed to be $18.3 million. The combined revenue of the NBA and WNBA for games with more than 10,000 attendees is approximately $3.6 billion.

Professional Hockey

The only professional hockey league that hosts regular large PSEs is the National Hockey League (NHL). Like the MBL and NBA, the NHL has 30 teams. The NHL averaged 16,957

[28] "NBA Attendance -2007," ESPN.com, http://sports.espn.go.com/nba/attendance?year=2007 (accessed 5/5/08).
[29] "WNBA Attendance 2007," WomensBasketballOnline.com, http://womensbasketballonline.com/wnba/attendance/attendance07.pdf.
[30] "Team Valuations," *Forbes* (2007), http://www.forbes.com/business/sportsmoney/
[31] "Fan Cost Index" (Team Marketing Report), http://www.teammarketing.com/fancost/.
[32] Rachel Elyachar and Lauren Moag,"The Growth of Women's Sports," Moag and Company, http://www.moagandcompany.com/i_a/Dec_02_womens_sports.pdf.
[33] "WNBA Attendance 2002," Women'sBasketballOnline.com, http://womensbasketballonline.com/wnba/attendance/attendance02.pdf.

attendees per game for 1,230 regular season games in the 2007 season.[34] All NHL games are assumed to have exceeded 10,000 spectators.

There are several sources of data on spending and revenue for professional hockey. However, like professional basketball, the 2002 Census does not provide data for professional ice hockey. Instead, it is included in product line 7112119, *Other Professional Sports Teams and Clubs*, with 365 establishments and $4.7 billion in revenues. Forbes magazine estimates NHL revenue in 2007 was $2.4 billion.[35] The 2007 FCI for the NHL was $282.95.[36] Per capita spending of $70.74 per attendee can be estimated by taking one quarter of the FCI. However, note that multiplying the FCI average spectator spending by the 20.9 million in attendance only results in total spending of approximately $1.4 billion, which is $1 billion less than the Forbes revenue estimates. This gap is likely due to alternative revenues from sources such as television, radio, advertising, arena naming rights, merchandise, and corporate suites.

The Forbes revenue estimates were selected as the best measure of the economic importance of the NHL, as there is no hockey-specific data in the 2002 Census and the Forbes estimate is more inclusive than the FCI.

College Football

Most large college sporting events in the U.S. are organized and regulated by the National Collegiate Athletic Association (NCAA), a voluntary association of about 1,200 institutions. The NCAA provides total season attendance figures as well as average attendance per-game estimates for the following college sports categories:[37]

- Football
- Field Hockey
- Men's Soccer
- Women's Soccer
- Women's Volleyball
- Men's Basketball
- Women's Basketball
- Men's Ice Hockey
- Women's Ice Hockey
- Baseball
- Softball
- Men's Lacrosse
- Women's Lacrosse

[34] "NBA Attendance Report-2007," ESPN.com, http://sports.espn.go.com/nba/attendance?year=2007 (accessed 5/5/08).
[35] "Team Valuations," *Forbes*, 2007, http://www.forbes.com/business/sportsmoney/
[36] "Fan Cost Index" (Team Marketing Report), http://www.teammarketing.com/fancost/.
[37] "NCAA Sports Statistics," NCAA.org , http://www.ncaa.org/stats/.

The NCAA data does not provide attendance information on a per game basis, but rather provides information on total attendance, average attendance, and number of home games on a per-season basis. In order to develop PSE estimates for college sports, the number of games played by college teams with an average attendance per game of more than 10,000 attendees in each sports category was measured. While some of these teams' games had fewer than 10,000 spectators, those events were assumed to be offset by events of more than 10,000 spectators for teams with average attendance under 10,000. Of the college sport categories listed above, only four have teams with an average attendance of more than 10,000 attendees per game. All these teams were in Division I of their respective sports. The four categories are:

- Football
- Men's Basketball
- Women's Basketball
- Men's Ice Hockey

The NCAA has Division I, II, and III football programs. Division I football (which includes I-A and I-AA Subdivisions) has 152 teams with an average attendance of more than 10,000 people; Division II football has four teams that meet that criteria. Together these 156 teams played a total of 952 games and averaged 38,909 attendees per game in 2007. Division III football does not have any team that averages more than 10,000 attendees per game.[38]

An NCAA report on the 11 major athletic conferences and a group of independent universities estimates the revenue for Division I-A football teams was $11.4 million per school in 2002.[39] Applying this revenue figure to all Division I and II football teams with an average attendance of more than 10,000 spectators results in a revenue estimate of about $1.8 billion for the 156 teams.[40]

College Basketball

College basketball in the U.S. is organized and regulated by the NCAA. The NCAA includes Division I, II, and III basketball programs. Total season attendance in 2007 for Division I basketball was about 18 million for men's basketball and 4 million for women's basketball.

The most recent college basketball revenue estimates are from an NCAA report on the 11 major athletic conferences and a group of independent universities. The report estimated the average Division I men's basketball revenue per team at $3.9 million in 2002.[41] The same report

[38] "NCAA Sports Statistics," NCAA.org, http://www.ncaa.org/stats/.
[39] "Revenues and Expenses, Profits and Losses of Division I-A Intercollegiate Athletics Programs Aggregated by Conference - 2003 Fiscal Year," NCAA.org, http://www.ncaa.org/library/research/i_ii_rev_exp/2003/2003D1aConfReport.pdf.
[40] "Revenues and Expenses, Profits and Losses of Division I-A Intercollegiate Athletics Programs Aggregated by Conference - 2003 Fiscal Year," NCAA.org, http://www.ncaa.org/library/research/i_ii_rev_exp/2003/2003D1aConfReport.pdf.
[41] "Revenues and Expenses, Profits and Losses of Division I-A Intercollegiate Athletics Programs Aggregated by Conference - 2003 Fiscal Year," NCAA.org, http://www.ncaa.org/library/research/i_ii_rev_exp/2003/2003D1aConfReport.pdf

estimated women's Division I basketball generated $336,000 in revenue per team. The universities included in the NCAA report are assumed to correspond closely with the 100 men's teams and 50 women's teams for which the NCAA provides online attendance statistics. Accordingly, season revenue for the top 100 men's Division I basketball teams is estimated at $390 million and season revenue for the top 50 women's Division I basketball teams is estimated at $16.8 million.[42] The NCAA does not provide data for the remaining Division I men's and women's teams. Teams for which the NCAA does not provide data were excluded from this study.

Average revenue per attendee was estimated using the ratio of total season attendance for teams with an average attendance of more than 10,000 spectators per game to the total attendance for all teams for which the NCAA provides online statistics. Division I basketball has 47 men's teams and 4 women's teams out of 325 that have an average attendance of more than 10,000 attendees.[43] The 51 men's and women's teams with average attendance above 10,000 played a total of 877 home games in 2007. These games attracted 62 percent of all attendance to the top 100 men's team games and 19 percent of all attendance to the top 50 women's team games. Therefore, men's and women's team games with average attendance of more than 10,000 had season revenues of $243.6 million and $3.1 million, respectively. The resulting revenue per attendee estimates are $21.68 for these men's teams and $4.17 for these women's teams. The weighted average revenue per attendee is $20.59.

College Ice Hockey

There are only three Division I men's ice hockey teams with an average attendance of more than 10,000 people per game. These three teams play a combined total of 68 home games each season and attract an average of 10,898 attendees per game. None of the Division I women's ice hockey teams has an average attendance of more than 10,000 spectators.

The NCAA does not publish college ice hockey revenue estimates. In order to develop revenue estimates for college ice hockey, revenue per attendee was assumed to be the same as men's college basketball. Assuming men's college ice hockey and college basketball have the same average revenue per spectator of $20.59, the total revenue of college ice hockey games with more than 10,000 spectators is about $15 million.

Horse Racing

The 2002 Economic Census includes data for 121 horse racetrack operations, with $3.8 billion in revenue. However, a national database of horse racetrack attendance and revenue is not available. California is the largest state in terms of racing revenue, and therefore, data on attendance and revenue from the California Horse Racing Board, along with Census data on the share of racing in California, was used to develop national estimates.

[42] "NCAA Sports Statistics," NCAA.org., 2007, http://www.ncaa.org/stats/.

[43] "NCAA Sports Statistics," NCAA.org,, 2007, http://www.ncaa.org/stats/

According to the California Horse Racing Board, in 2006 there were 944 horse racing events in California, including 279 with more than 10,000 in average attendance.[44] The average attendance at horse races with more than 10,000 spectators was 17,345. The total revenue from those races was $485.5 million, or $100.33 per spectator. While some of the races at racetracks with average attendance of more than 10,000 spectators have attendance of less than 10,000 spectators, those events are assumed to be offset by events of more than 10,000 spectators at racetracks with average attendance under 10,000.

Data from the 2002 Census indicates that California accounted for 9.9 percent of racetrack spectator revenues nationally in 2002.[45] The Census data includes auto, horse, and dog racetracks. Assuming the ratio is the same for horse racetracks, which are the most common type, there are an estimated 2,819 large horse racing events in the U.S. The California data for average attendance and revenue per spectator were used to estimate attendance and revenues at the national level. The total attendance at large horse races nationally is estimated to be 48.9 million, and the associated revenue is estimated to be $4.9 billion.

Golf Tournaments

Top-level professional golf consists of a year-round schedule of weekly tournaments. Most of the tournaments are organized into series, or tours. There are separate tours for men and women. Each tour is based in a specific geographical region in the U.S., though some of them also feature events in other parts of the world.

The major tours in the U.S. are operated by the Professional Golf Association (PGA) and Ladies Professional Golf Association (LPGA). The PGA organizes three major tours. The major tours of the PGA are the PGA Tour (54 events), the Nationwide tour (30 events), and the Champions tour (33 events). Fourteen of these events are held outside the U.S. and were excluded, reducing the number of applicable events to 103. The LPGA has 35 events. Among these four tours there are a total of 138 major golf tournaments. Golf tournaments are typically one week long, but usually have the highest attendance over the four day period between Thursday and Sunday, when the main event is played. These four days are assumed to attract at least 10,000 spectators at each of the 138 tournaments. This results in an estimate of 552 event days with more than 10,000 spectators nationally. While it is likely that some of these event days account for less than 10,000 spectators, non-tour event days at events such as the U.S. Open and the Seniors PGA Championship tour are assumed to offset those events.

Average or total attendance data for golf were not available. As a result, estimates were based on the average daily attendance of 22,125 for golf tournaments in the Portland case study. This attendance estimate appears reasonable against other data for some of golf's premier events. For example, the Saturday attendance for Tiger Woods' signature tournament in 2007 had 38,000

[44] "California Horse Racing Board Statistical Report of Operations 2006," California Horse Racing Board, http://www.chrb.ca.gov/statistical_reports_of_operation/2006_statistical_report.pdf.

[45] U.S. Census Bureau, "2002 Economic Census: Miscellaneous Subjects," http://www.census.gov/prod/ec02/ec0271sxsb.pdf.

spectators. Additionally, the U.S. Golf Association usually prints 30,000 to 35,000 tickets for the U.S. Open, depending on the size of the venue.[46]

Revenue data for the tours were also not available. However, the PGA and LPGA do publish the total purse information for each tournament. As these purses would represent the largest cost component of an event, and were the only monetary data available, they were used as a surrogate for economic magnitude. The purses of the four tours for events in the U.S. totaled $383 million, or approximately $31.37 per attendee.

Auto Racing

Auto racing is subdivided into many categories based on auto types. These auto type categories include:

- Single seater
- Touring car
- Stock car
- Sports car
- Drag
- Rallying
- Production car

Within these auto racing categories are multiple leagues that represent various regions, league levels, and auto specifications. For example, drag racing has two major leagues in the U.S., the National Hot Rod Association (NHRA) and the International Hot Rod Association (IHRA).

The 2002 Census includes data for 478 auto racetracks that have a combined $2.0 billion in annual revenue. However, neither the Census nor any other data source collects auto racing attendance statistics for all the auto racing categories. As a result, national auto racing attendance estimates were developed by contacting the major auto racing leagues in the U.S. The major auto racing leagues that were contacted include:

- National Association for Stock Car Auto Racing (NASCAR)
- IndyCar
- Grand American Road Racing Association (Grand Am)
- National Hot Rod Association (NHRA)
- International Hot Rod Association (IHRA)
- American Le Mans (ALMS)

According to the NHRA, these leagues are likely to be the only auto racing leagues that regularly host events with more than 10,000 spectators.[47] Data on the number of event days in all the

[46] Thomas Boswell, "Golf Has Never Looked So Much Like Us," *Washington* Post, July 8, 2007, http://www.washingtonpost.com/wp-dyn/content/article/2007/07/07/AR2007070701243.html.

[47] Jerry Archambeault (Vice President-Public Relations & Communications, NHRA), telephone interview, 25 June 2008.

major auto leagues was collected, as were most attendance estimates. However, attendance data for two major racing series were unavailable. These two series were the NHRA's POWERade and the Grand Am's KONI Challenge. Average race-day attendance at these two series was estimated using the average attendance of the known race attendances. Incorporating the POWERade and KONI Challenge estimate, there are an estimated 284 auto racing event days with more than 10,000 attendees, and the average attendance for these event days is 58,160 people. Detailed attendance estimates for the major leagues and series are provided in Exhibit 7-1.

Exhibit 7-1: Major Auto Racing Leagues

Series		Race Type	Number of Races in Seaon	Number of Race Event Days	Number of Races over 10K	Number of Event Race Days over 10K	Average Race Attendance	Average Race Attendance for Events Over 10K	Total Season Attendance	Total Season Attendance for Events Over 10K
National Association for Stock Car Auto Racing (NASCAR)	Sprinit Cup	Stock	39	39	39	39	NA	120,000	NA	4,680,000
	Nationwide	Stock	35	35	35	35	NA	60,000	NA	2,100,000
	Truck	Stock	25	25	25	25	NA	40,000	NA	1,000,000
	Whelen Modified Tour	Stock	29	29	0	0	NA	NA	NA	NA
	Whelen All-American Series	Stock	NA	NA	0	0	NA	NA	NA	NA
Stockcar Racing League		Stock	8	8	1	1	NA	12,000	NA	12,000
IndyCar	IndyCar Series in DIRECTTV HD	Single Seater	18	18	18	18	75,000	75,000	1,350,000	1,350,000
	Firestone Indy Lights Series	Single Seater	16	16	16	16	25,000	25,000	400,000	400,000
Grand American Road Racing Association (Grand Am)	Rolex Sports Car Series	Sports Car	15	15	15	15	62,804	62,804	942,060	942,060
	KONI Challenge Series	Stock	11	11	11	11	45,400	45,150	499,400	496,654
	Ferrari Challenge	Sports Car	7	7	7	7	10,000	10,000	70,000	70,000
	Shell Historic Challege	Sports Car	7	7	7	7	10,000	10,000	70,000	70,000
National Hot Rod Association (NHRA)	POWERade	Drag	24	85	85	85	45,400	45,150	3,859,000	3,837,778
International Hot Rod Association (IHRA)	Knoll-Gas Nitro Jam™ Drag Racing Series	Drag	11	33	11	11	11,000	11,000	121,000	363,000
	O'Reilly Thunder Jam	Drag	15	15	3	3	NA	10,000	NA	30,000
American Le Mans (ALMS)		Sports Car	11	11	11	11	106,000	106,000	1,166,000	1,166,000
		TOTAL	271	354	284	284	NA	NA	8,477,460	16,517,492

Average in-event spending for auto races was estimated at $149, based on the Grand Prix data in the San Jose report described in the Study Methodology section.[48] This updated estimate was applied to all auto racing events to develop a revenue estimate of $2.4 billion.

Marathons and Walkathons

There is limited public information available regarding attendance and revenues for walkathon events. Marathon attendance information is more readily available. Each year, MarathonGuide.com publishes a report detailing national marathon attendance data. This report is claimed to be the most comprehensive and accurate marathon data available.[49] However, the report only records the number of runners that finished the race at each marathon and does not include estimates of spectators.

According to MarathonGuide.com, there were eight marathons with more than 10,000 participants in 2007. Assuming there are four spectators for every runner at a marathon, there

[48] "Analysis of the Economic and Fiscal Impact of Cultural and Sporting Events in San Jose: Explanation of Recommended Methodology and Impact Assessment for Six Representative Event," Sports Economics, LLC. 2007.

[49] "USA Marathoning: 2007 Overview," MarathonGuide.com, http://www.marathonguide.com/features/Articles/2007RecapOverview.cfm.

would be 33 marathons with more than 10,000 participants and spectators. This assumption is based on the spectator-to-participant ratio of four to one at the 2006 Marine Corps Marathon in Washington, D.C.[50] Accordingly, the average number of participants and spectators at the 33 large marathons was 43,522. The average in-event spending per attendee at marathons and walkathons is estimated to be $49, based on data for the Rock n' Roll marathon from the San Jose study.[51] Thus, marathons with more than 10,000 attendees generated $70.4 million in spending.

Attendance and revenue data for walkathons is very fragmentary and limited. Most walkathon organizers fundraise for specific causes such as health, poverty, and education. These types of walkathons are also called charity walks. A list of some major walkathons in the U.S. includes:

1. MS Challenge Walk – National MS Society
2. Stop the Silence – Prevention and treatment of child sexual abuse
3. Avon Walk for Breast Cancer – Breast cancer
4. Relay for Life – American Cancer Society
5. Race for Hope – Brain Tumor Society and Accelerate Brain Cancer Cure
6. Walk to Cure Diabetes – Juvenile Diabetes Research Foundation
7. Walk to Empower – Y-ME Nation Breast Cancer Organization
8. Susan G. Komen National Race for the Cure – Breast cancer
9. Ivy Vine Charities Walk for Diabetes and Scholarship
10. Take Steps Walk for Crohn's and Colitis
11. Walk for the Kids
12. American Kidney Fund Steps that Count
13. AIDS Walk
14. Down Syndrome Association Buddy Walk
15. National Kidney Foundation Kidney Walk
16. Race for Humanity – Habitat for Humanity
17. Step Out to Fight Diabetes – American Diabetes Association
18. Help the Homeless
19. Jingle Bell Run/Walk – Arthritis Foundation
20. March for Babies – March of Dimes Foundation

Race for the Cure and Relay for Life estimate all of their events are attended by more than 10,000 attendees.[52] However, only Relay for Life provided specific attendance estimates for its events. Race for the Cure hosts 122 events with more than 10,000 attendees annually. The average attendance at these walkathons is 30,000 people. Based on the assumption that each of the 20 identified major walkathons hosts the same number of events as the Race for the Cure, it is estimated there are approximately 2,440 large walkathons in the U.S. annually. Average attendance at all these walkathons is assumed to be 30,000 per event, based on the data for Race for the Cure.

[50] Marine Corps Marathon Press Release, October 26, 2006, http://www.marinemarathon.com/Assets/Map+2.pdf.

[51] "Analysis of the Economic and Fiscal Impact of Cultural and Sporting Events in San Jose: Explanation of Recommended Methodology and Impact Assessment for Six Representative Events," Sports Economics, LLC, 2007.

[52] Phone receptionists, Race for the Cure and Relay for Life, telephone conversations, 2 May 2008.

The spending per attendee estimate for walkathons was also $49, based on the San Jose marathon. When applied to walkathons with more than 10,000 attendees, this estimate indicates that walkathon events generate $3.58 billion in revenue annually. Combined with the $70.4 million estimate for marathons, this category generates $3.6 billion annually.

Concerts

Comprehensive national data on concerts across the U.S. is available from Pollstar, a weekly magazine and prominent trade publication for the concert industry. Pollstar estimates there were approximately 1,867 concerts in the U.S. with more than 10,000 attendees in 2007, and the average attendance at those concerts was 18,686.[53] Given these figures, total attendance at these large concerts is estimated to total 34.9 billion. The Pollstar data only includes ticketed concerts that charge an admission fee; free admission concerts are omitted. Unfortunately, there are no national estimates of free admission concerts in the U.S., and the case study cities did not provide enough information to generate national estimates. As a result, free admission concerts are not included in this report.

No national information on revenues from concerts was available. However, ticket revenue is the largest component of total concert revenue, and the average concert ticket price is $50, according to Pollstar. Based on this average ticket price, large concerts are estimated to generate approximately $1.7 billion annually.

A report by the National Endowment for the Arts entitled "The Performing Arts in the GDP, 2002" found that "consumers spent $12.1 billion ($42 per person) on admissions to performing arts events. This amount was $2.5 billion more than spending on tickets to movie theaters, but $1.5 billion less than outlays on admissions to sporting events."[54] The National Endowment for the Arts' estimate includes all types of performing arts events regardless of attendance. Large concerts represent only a small portion of this spending. Hence, the Pollstar data is considered to be more relevant to the purposes of this study.

Parades

Searches at the national level revealed very little comprehensive data on parade attendance and revenue. This was also true for other park and street type events including fairs, festivals, protests, political events, expositions, and shows. This is due to the wide dispersion in occurrence, large number of event organizers, and lack of a national association or trade group that collects information regarding these types of events.

To circumvent these challenges, national estimates for these types of events were developed using data from the case studies of four cities conducted as part of this research. For the parades case study data extrapolation, the results for each of the case study cities were scaled up based on

[53] Bradley Rogers (Box Office Editor, POLLSTAR), telephone conversation, 1 May 2008.
[54] Bonnie Nichols, "The Performing Arts in the GDP, 2002," National Endowment for the Arts, July 2004, http://www.nea.gov/research/Notes/86.pdf.

the number of cities in their respective size class. The underlying methodology used to develop the scaled-up estimates from the case study cities is discussed in the Study Methodology section. Using this methodology, it is estimated there are approximately 486 parades with more than 10,000 attendees in the U.S. annually and that the total attendance for these parades is about 25.5 million. A summary of the case study and the scaling results for parades is provided in Exhibit 7-2.

Exhibit 7-2: National Estimates for Parades

Case Study City Size	Number of Event Days Over 10K in Case Study	Number of Similar Sized Cities in U.S.	Event Days Over 10K in U.S.	Average Event Attendance in Case Study
Very Large	1	13	13	100,000
Large	2	26	52	250,000
Med	1	36	36	150,000
Small	1	385	385	15,000
Weighted Average	NA	NA	NA	52,418
Total	NA	460	486	NA

No national data on parade revenue was available. As a result, average in-event spending per attendee at parades was estimated at $27.43 based on an average of fair and festival events data that was collected in the San Jose report that is also described in the Study Methodology section. Based on this estimate, the 25.5 million attendees at large parades annually spend approximately $699 million.

Fairs

National-level data documenting the frequency and attendance sizes of fairs does not exist. As a result, national estimates for these types of events were developed using data from the case studies of four cities conducted as part of this research. The only case study city that provided data on fairs was Columbia, which had 17 fair event days with more than10,000 attendees. This estimate was divided by four to represent the average number of fairs per case study city. Using this methodology, it is estimated there are approximately 1,955 fairs with more than 10,000 attendees in the U.S. annually. The average attendance at these fairs is assumed to be 12,500, the same as the Columbia average. Accordingly, fairs with more than 10,000 attendees are estimated to attract a total of 24.4 million attendees annually. A summary of the case study and the scaling results for fairs is provided in Exhibit 7-3.

Exhibit 7-3: National Estimates for Fairs

Case Study City Size	Number of Event Days Over 10K in Case Study	Number of Urban Areas in the U.S.	Event Days Over 10K in U.S.	Average Event Attendance in Case Study
All Cities	4.25	460	1,955	12,500

These results also appear reasonable against two other estimates. The International Association of Fairs and Expositions notes that "Today, over 3,200 fairs are held in North America each year. They provide industrial exhibits, demonstrations and competition aimed at the advancement of livestock, horticulture and agriculture with special emphasis placed on educational activities such as 4-H, FFA and similar youth development programs."[55] Additionally, the International Association of Fairs and Expositions website includes a database of fairs that allows the user to list the fairs by state, including data on the name of the fair, the city, the state, and the dates of the fair. This state level data can be used to extrapolate national averages. For example, there are 22 fairs listed for the state of Indiana. If Indiana is a representative state, the database could be expected to list over 1,000 fairs in the U.S.

Revenue estimates for fairs were derived using the average in-event attendee spending figure of $27.43 for fairs and festivals developed from the San Jose study. Accordingly, it is estimated that about $670 million is spent by 24.4 million attendees at large fairs annually.

Festivals

There are no comprehensive data sources on festival revenue and attendance on a national level. National-level estimates were developed by scaling local results from the four case study cities. Using this methodology, there are an estimated 3,110 large festivals in the U.S. annually, which are estimated to have a total attendance of about 111 million. Columbia appeared to have an abnormally large number of festivals, so the results from that case study were reduced from 13 to 5 by scaling the results for El Paso based on population. A summary of the case study and the scaling results is provided in Exhibit 7-4.

[55] "History of Fairs," International Association of Fairs and Expositions, http://www.fairsandexpos.com/about/historyfairs.aspx.

Exhibit 7-4: National Estimates for Festivals

Case Study City Size	Number of Event Days Over 10K in Case Study	Number of Similar Sized Cities in U.S.	Event Days Over 10K in U.S.	Average Event Attendance in Case Study
Very Large	33	13	429	111,606
Large	18	26	468	14,222
Med	8	36	288	15,000
Small	5	385	1,925	27,000
Weighted Average	NA	NA	NA	35,637
Total	NA	460	3,110	NA

The in-event spending estimate for festivals is based on the $27.43 estimate derived from the San Jose study. Total in-event spending for festivals is estimated to be about $3.0 billion.

Protests and Political Events

Frequency and attendance estimates for protests and political events across the U.S. are poorly documented. As a result, national-level estimates were developed by scaling local results in four case study cities conducted as part of this study. The case studies of Detroit and El Paso did not record any protests or political events. To smooth out the data for *Very Large* cities, data for this category was assumed to be the same as for *Large* cities. Data for *Medium* cities was smoothed out by substituting in *Small* city data.

Using this methodology, there are an estimated 499 large protests and political events in the U.S. annually. These events are estimated to have a total attendance of 14.1 million. Data for *Medium* cities were based on the *Small* city data, as no observations were recorded in the El Paso case study. A summary of the case study and the scaling results is provided in Exhibit 7-5.

Exhibit 7-5: National Estimates for Protests and Political Events

Case Study City Size	Number of Event Days Over 10K in Case Study	Number of Similar Sized Cities in U.S.	Event Days Over 10K in U.S.	Average Event Attendance in Case Study
Very Large	2	13	26	19,000
Large	2	26	52	19,000
Med	1	36	36	30,000
Small	1	385	385	30,000
Weighted Average	NA	NA	NA	28,281
Total	NA	460	499	NA

Revenue estimates for protests and political events were derived using the in-event attendee spending average of $27.43 for fairs and festivals developed from the San Jose study. Accordingly, it is estimated that about $387 million is spent by 14.1 million attendees at large protests and political events annually.

Expositions and Shows

The most comprehensive list of conference centers in the U.S. is provided by Wikipedia.com, which lists 216 conference centers in an article titled "Convention Centers in the United States."[56] This number is close to the number of conference centers in the U.S. that are part of the International Association of Conference Centers.[57]

To allocate the 216 conference centers to the four city size categorizes, it was assumed that *Very Large* and *Large* cities had one conference center each and that the remaining conference centers were in *Medium* and *Small* cities. No expositions or shows were observed in El Paso; whereas Columbia recorded 8 event days. In order to smooth out the data, the average of the El Paso and Columbia cities was applied to both *Medium* and *Small* city categories. Exhibit 7-6 provides a summary of the case study and the scaling results.

Exhibit 7-6: National Estimates for Expositions and Shows

Case Study City Size	Number of Event Days Over 10K in Case Study	Number of Convention Centers in Similar Sized Cities	Event Days Over 10K in U.S.	Average Event Attendance in Case Study
Very Large	61	13	793	27,609
Large	47	26	1,222	11,702
Med	4	88.5	354	10,000
Small	4	88.5	354	10,000
Weighted Average	NA	NA	NA	15,892
Total	116	216	2,723	NA

Revenue estimates for expositions and shows were derived from a report on the San Diego Convention Center.[58] This report estimated that the convention center had $33.8 million in revenue and about 984,000 visitors, for an average revenue of $34.44 per visitor. Therefore, it is estimated that 43.3 million visitors spend about $1.5 billion annually at expositions and shows across the U.S.

[56] "Convention Centers in the United States," in Wikipedia, http://en.wikipedia.org/wiki/Category:Convention_centers_in_the_United_States.

[57] "Members Properties and Venues," International Association of Conference Centers, http://www.iaccnorthamerica.org/directory/index.cfm.

[58] San Diego Convention Center Corporation, Annual Report 2007, http://www.sdccc.org/pressroom/annualreport/fy07/PDF/FY07AnnualReport.pdf.

Economic and Fiscal Impacts

Measuring the economic and fiscal effects of large PSEs is essential to a better understanding of the role that these events play in the economic vitality of our cities and our nation.

The economic impact of spectator spending and revenue on the local economy can be estimated using a multiplier. In economics, the multiplier effect refers to the idea that an initial spending rise can lead to an even greater increase in local spending and income. In other words, an initial change in aggregate demand can cause a further change in aggregate output for the economy.

Assigning economic and fiscal impact multipliers to the 17 event type categories is difficult due to the lack of exact matches between this report's event categories and the event categories in secondary studies regarding economic and fiscal impact. For consistency, all the economic and fiscal impact multipliers in this report, except for expositions and shows, are based on an economic and impact assessment of events in San Jose.[59] The San Jose report has the advantage of covering multiple event types, using actual data collected from 10,000 actual event attendees, and defining economic impacts to include only outside-event spending that would not have occurred without the event. Multipliers in the San Jose study were assigned to the most closely-matching event type categories in this report. The economic and fiscal impact multipliers assigned to each event type in this report are listed in rows 17 and 19 of Exhibit 2-13. Since data by event type represent only in-event spending, the multipliers combine outside-event spending with indirect and induced multiplier effects.

Total economic and fiscal estimates were developed using data for the 17 event type categories discussed in earlier sections of this report for in-event revenue or spending-per-attendee estimates. Economic and fiscal impacts were estimated to be the product of an appropriate multiplier and either an average revenue per attendee estimate or an average spending per attendee estimate. The results of these estimates are provided in Exhibit 7-7. For example, professional football has a total of 19.4 million attendees annually. The average in-event revenue per attendee is $337. This results in $6.7 billion in revenue for the event category. The economic impact of this initial revenue is $22 billion after taking into account an economic multiplier of 3.246. The fiscal impact to local, state, and federal levels of government is estimated to be $521 million using a fiscal impact multiplier of 0.024.

[59] "Analysis of the Economic and Fiscal Impact of Cultural and Sporting Events in San Jose: Explanation of Recommended Methodology and Impact Assessment for Six Representative Events," Sports Economics, LLC, 2007.

Exhibit 7-7: Economic and Fiscal Impacts of PSEs

Event Category	Event Type	Number of Event Days	Average Attendance	Total Attendance (Millions)	Revenue or Spending per Attendee ($)	Total Attendee Revenue or Spending ($ Millions)	Economic Impact		Fiscal Impact	
							Multiplier	Total Impact ($ Millions)	Multiplier	Total Impact ($ Millions)
Professional Team Sports	Football	411	48,962	20.1	337	6,781	3.246	22,012	0.024	521
	Baseball	2,791	29,990	83.7	67	5,582	3.246	18,120	0.024	429
	Basketball	1,257	17,642	22.2	162	3,591	3.246	11,658	0.024	276
	Ice Hockey	1,230	16,957	20.9	117	2,436	3.246	7,908	0.024	187
College Sports	Football	952	38,909	37.0	48	1,791	3.246	5,815	0.024	138
	Basketball	877	13,668	12.0	21	247	3.246	801	0.024	19
	Ice Hockey	68	10,898	0.7	21	15	3.246	50	0.024	1
Other Professional Sports	Auto Racing	284	58,160	16.5	149	2,453	3.246	7,964	0.024	188
	Horse Racing	2,819	17,345	48.9	100	4,905	3.246	15,924	0.024	377
	Golf	552	22,125	12.2	31	383	3.246	1,244	0.024	29
Street and Park Events	Marathons and Walkathons	2,473	30,180	74.6	49	3,631	8.619	31,297	0.034	1,054
	Parades	486	52,418	25.5	27	699	5.576	3,896	0.024	93
	Fairs	1,955	12,500	24.4	27	670	5.576	3,737	0.024	89
	Festivals	3,110	35,637	110.8	27	3,040	5.576	16,949	0.024	404
	Protests / Political Event	499	28,281	14.1	27	387	5.576	2,158	0.024	51
Shows & Concerts	Expositions & Shows	2,723	15,892	43.3	34	1,490	5.899	8,791	0.024	214
	Concerts	1,867	18,686	34.9	50	1,744	3.262	5,689	0.015	85
	TOTAL	24,353	NA	601.9	NA	39,847	NA	164,012	NA	4,155
	WEIGHTED AVERAGE	NA	24,715	NA	66	NA	4.78	NA	0.02	NA

National Congestion Estimates

According to the Urban Mobility Report (UMR), the total annual delay per traveler for all of the 437 urban areas analyzed is 38 hours.[60] The annual delay per traveler nationally in the PM peak period would be 21.2 hours. The percent of this delay attributable to PSEs is between four and eight percent of the total. Accordingly, the delay caused by planned special events results in between 0.8 and 1.7 hours of delay per year per traveler. The results of the congestion analysis for the 437 urban areas are summarized in Exhibit 7-8.

Exhibit 7-8: Nationwide Congestion Costs per Year due to Planned Special Events

Congestion Category	Units	AM Peak	PM Peak	PSE Caused (4%)	PSE Caused (8%)	Totals
Average Delay per Traveler	Hours	16.8	21.2	0.8	1.7	38.0
Wasted Fuel per Traveler	Gallons	11.5	14.5	0.6	1.2	26.0
Travel Delay (Millions)	Hours	1,853	2,335	93.4	186.8	4,188
Excessive Fuel Consumed (Millions)	Gallons	1,269	1,599	63.9	127.9	2,869
Congestion Cost (Millions)	US$	34,573	43,563	1,743	3,485	78,136

Source: TTI, *Urban Mobility Report*, 2007, http://mobility.tamu.edu/ums/congestion_data/national_congestion_tables.stm

The next category analyzed in the UMR is wasted fuel per traveler, which is 26 gallons per year. Wasted fuel per year attributable to the PM peak period is 14.5 gallons, which translates to wasted fuel per year of between 0.6 and 1.2 gallons due to planned special events.

[60] "Urban Mobility Report," Texas Transportation Institute, 2007, http://mobility.tamu.edu/ums/congestion_data/national_congestion_tables.stm.

The travel delay as stated in the UMR for the 437 analyzed urban areas is 4.1 billion hours of total delay. The delay in the PM peak period was calculated as 2.3 billion hours. Planned special events, therefore, account for between 93.4 million hours and 186,824,000 hours of delay in the 437 urban areas analyzed in the UMR.

Planned special events account for between 4 percent and 8 percent of all PM peak period delay. The remaining delay is caused by a list of many other factors. The key aspect of this congestion is that the delay affects both attendees as well as non-attendees of the planned special events. The attendees experience delay while they are trying to enter the various venues and parking facilities for the event. However, this delay is almost expected, since attendees of planned special events realize that the planned special event will increase traffic and disrupt normal traffic patterns. .

Further analysis of the UMR reveals that the excess fuel consumed in the 437 urban areas due to congestion is 2.8 billion gallons per year. The excess fuel consumed in the PM peak period was calculated as approximately 1.6 billion gallons, which translates to between 63.9 million and 127.9 million gallons per year due to planned special events.

Finally, the congestion cost as determined by the UMR for the 437 urban areas analyzed as part of the report is $78 billion dollars. The congestion cost in the PM peak period would translate to $44 billion, and the congestion cost of planned special events would work out to between $1.7 billion and $3.5 billion per year.

A close look at the numbers reveals that planned special events have a significant effect on the traveling public throughout the country. A total cost of $3.5 billion for the 437 analyzed urban areas is substantial.

CONCLUSION AND RECOMMENDATIONS

The purpose of this study is to estimate economic and congestion impacts caused by large planned special events (PSEs) on a national level. It is an attempt to systematically collect and estimate the size and frequency of large PSEs, an effort that is not known to have been undertaken previously. This initiative is based on the premise that a clearer awareness of the scale of PSEs is essential to better understanding the role that transportation planning can and should play in managing the transportation aspects of these events.

This final section of this report opens with a review of the key findings and conclusions of the study. It continues with a discussion of recommendations for further research and concludes with some recommendations for local jurisdictions addressing the congestion and fiscal impacts of PSEs.

Findings and Conclusions

This section summarizes some of the key findings and conclusions of this research. It begins with an overview of the number of PSEs in the case study cities and the nation as a whole. It then examines the breakdown of events by type, the regional patterns of events and the economic significance of the sector. The section concludes with a discussion of mitigation techniques.

Number of Events

Through the use of case studies and a compilation of national data sources by event type, a first glance at the number of PSEs with over 10,000 in attendance was developed. This data is presented in Exhibit 8-1.

Exhibit 8-1: PSE Event Days – Total, Per Week and Per Million Capita

		With Attendance >10,000			With Attendance >5,000		
	Population	Event Days	Event Days	Event Days	Event Days	Event Days	Event Days
	(Millions)		Per Week	Per Million Capita		Per Week	Per Million Capita
Detroit	3.931	526	10.1	133.8			
Portland	1.729	187	3.6	108.2			
El Paso	0.656	93	1.8	141.8	244	4.7	372.0
Columbia	0.440	94	1.8	213.6	167	3.2	379.5
U.S.	304.000	24,353	468.3	80.1			

At the national level, there are approximately 24,000 PSEs annually with over 10,000 in attendance, or approximately 470 per week. This translates to about 80 event days per million persons per year. Since the average event of over 10,000 has about 25,000 in attendance, this means the average person attends approximately two large PSEs per year.

The four case studies indicate that there are on the order of two to ten event days per week, depending on city size. For three of the four cities, the number of event days per week per million capita ranged from 108 to 142, just above the national estimate of events per capita, reflecting a higher urban rate per capita. The rate for Columbia was almost twice the national average, perhaps reflecting the large number of event days for the South Carolina State Fairgrounds, which are located in that city.

For the two smaller cities, data were also collected for event days hosting more than 5,000 people. According to the data that were collected, including events with 5,000 to 10,000 attendees roughly doubles the number of events.

Types of Events

PSEs encompass a strikingly wide variety of events. However, despite this variety, PSEs can be categorized into the following five major groups:

- Professional team sports
- College and high school sports
- Individual professional sports
- Concerts, expositions and shows
- Street and park events.

Exhibit 8-2 provides estimates of the number of events of each event type.

Exhibit 8-2: National Estimates on the Scale of PSEs by Event Type

Event Category	Event Type	Number of Event Days	Average Attendance	Total Attendance (Millions)
Professional Team Sports	Football	411	48,962	20.1
	Baseball	2,791	29,990	83.7
	Basketball	1,257	17,642	22.2
	Ice Hockey	1,230	16,957	20.9
College Sports	Football	952	38,909	37.0
	Basketball	877	13,668	12.0
	Ice Hockey	68	10,898	0.7
Other Professional Sports	Auto Racing	284	58,160	16.5
	Horse Racing	2,819	17,345	48.9
	Golf	552	22,125	12.2
Street and Park Events	Marathons and Walkathons	2,473	30,180	74.6
	Parades	486	52,418	25.5
	Fairs	1,955	12,500	24.4
	Festivals	3,110	35,637	110.8
	Protests / Political Event	499	28,281	14.1
Shows & Concerts	Expositions & Shows	2,723	15,892	43.3
	Concerts	1,867	18,686	34.9
	TOTAL	24,353	NA	601.9
	WEIGHTED AVERAGE	NA	24,715	NA

Regional, Cultural, and City-Specific PSE Patterns

One of the most interesting findings from the case studies and other data collected as part of this report was the large differences between regions and cities in the types of PSEs. For example, according to Census data by state presented in the Study Methodology section, Iowa accounts for 4.5 percent of nationwide racetrack revenue, but only 0.1 percent of nationwide revenues from sports teams and clubs.

These differences may be regional in origin, as some types of activities tend to exist primarily in certain areas of the country. For example, most hockey teams tend to be in the north. Large cities are more likely to have professional sports teams in the top leagues such as the MLB, the NFL and the NBA. Some cities have a large number of university events, as is the case for El Paso and Columbia, while the Detroit and Portland areas have relatively few college sports events. Some PSEs are the result of city-level tradition, culture or history. For example, Portland has huge crowds for the Rose Festival and the associated parade, while Detroit has a 17-day auto show event, reflecting the city's history as the center of U.S. auto production. The high number of PSEs in Columbia is driven by the location of the state fairgrounds in that city.

Importance to the Economy

This study has developed an estimate of the overall economic impact of PSEs with more than 10,000 in attendance. This estimate was developed using data that was often dispersed and fragmented and involved a large degree of speculation and guesswork by both industry and association officials, as well as project staff. Despite these caveats, these estimates represent a rough first glance at the economic magnitude of this sector.

Exhibit 8-3: Economic Magnitude of Large PSEs by Event Type

Event Category	Event Type	Number of Event Days	Average Attendance	Total Attendance (Millions)	Revenue or Spending per Attendee ($)	Total Attendee Revenue or Spending ($ Millions)	Economic Impact		Fiscal Impact	
							Multiplier	Total Impact ($ Millions)	Multiplier	Total Impact ($ Millions)
Professional Team Sports	Football	411	48,962	20.1	337	6,781	3.246	22,012	0.024	521
	Baseball	2,791	29,990	83.7	67	5,582	3.246	18,120	0.024	429
	Basketball	1,257	17,642	22.2	162	3,591	3.246	11,658	0.024	276
	Ice Hockey	1,230	16,957	20.9	117	2,436	3.246	7,908	0.024	187
College Sports	Football	952	38,909	37.0	48	1,791	3.246	5,815	0.024	138
	Basketball	877	13,668	12.0	21	247	3.246	801	0.024	19
	Ice Hockey	68	10,898	0.7	21	15	3.246	50	0.024	1
Other Professional Sports	Auto Racing	284	58,160	16.5	149	2,453	3.246	7,964	0.024	188
	Horse Racing	2,819	17,345	48.9	100	4,905	3.246	15,924	0.024	377
	Golf	552	22,125	12.2	31	383	3.246	1,244	0.024	29
Street and Park Events	Marathons and Walkathons	2,473	30,180	74.6	49	3,631	8.619	31,297	0.034	1,054
	Parades	486	52,418	25.5	27	699	5.576	3,896	0.024	93
	Fairs	1,955	12,500	24.4	27	670	5.576	3,737	0.024	89
	Festivals	3,110	35,637	110.8	27	3,040	5.576	16,949	0.024	404
	Protests / Political Event	499	28,281	14.1	27	387	5.576	2,158	0.024	51
Shows & Concerts	Expositions & Shows	2,723	15,892	43.3	34	1,490	5.899	8,791	0.024	214
	Concerts	1,867	18,686	34.9	50	1,744	3.262	5,689	0.015	85
	TOTAL	24,353	NA	601.9	NA	39,847	NA	164,012	NA	4,155
	WEIGHTED AVERAGE	NA	24,715	NA	66	NA	4.78	NA	0.02	NA

Mitigation Techniques

The case studies revealed several important facts concerning PSEs and the venues where they are held. One of the most important is that a large number of these events are recurring events at permanent venues. In addition, the vast majority of these permanent venues are located near interstate highways and are well served by transit.

As a result, a significant opportunity exists to employ various mitigation techniques to minimize travel interruptions associated with these events. Available mitigation techniques can be tested and, if successful, used at future events. Transit solutions can be readily applied, as existing transit services are already available. The presence of high-volume interstates allows for the movement of large volumes of traffic, especially if events are timed to avoid peak periods. The presence of the interstates also permits using many mitigation techniques unique to multi-lane highways and limited access ramps.

Recommendations for Future Research

In the course of this study, a number of pressing research needs became evident. The following paragraphs describe each of these needs, including the purpose and the methodology.

Further Research on the PSE Event Days, Attendance, and Revenues

One area of research need is for improvement of the preliminary estimates developed in this study of the number of event days and associated attendance and revenues. This study represents a first attempt to collect data on the prevalence and economic magnitude of planned special events. In conducting this research, much was learned about the data sources and data collection techniques that could be used to collect data on PSEs. Perhaps the most central discovery was the seemingly endless number of event types. While the major types of events were covered in this research, many event types were not covered – from tennis to rodeos.

Building on the results and knowledge gained in this study, a more complete attempt could be made to collect data on the economic role of PSEs. As discussed earlier, excellent data is available at the national level for some types of PSEs, while for other types data must be collected at the local level. For those event types that require data collection at the local level, the high variance in event types across cities requires a much larger sample size than the few case studies used in this research effort.

Development of a GIS Database of Events

The majority of planned special events occur at relatively few venues in each city. In the four case studies conducted as part of this research effort, there are fewer than ten permanent venues in each city. Not including events hosted in park and street settings, Detroit had nine main venues, Portland had seven, El Paso had four, and Columbia had five. As a result, a database of major venues could be fairly readily developed and coded in a GIS format. As many of these venues publish schedules well in advance, especially major professional sports teams, the

database could include event dates and times. Estimates of attendance at the PSE could also be included.

This database could have many applications. For example, it could be used by traffic reporters to warn travelers of potential congestion. It could be part of a variable message sign component of an Intelligent Traffic System (ITS). It could also be used by in-car navigation devices to warn travelers and suggest alternative routes.

Conduct of Controlled PSE Congestion Studies

One of the findings of this study is that there is little or no data which report congestion near venues where there is comparable data for both event and non-event days. In order to properly estimate the contribution of PSEs to congestion, it is necessary to measure congestion in such a way that congestion can be properly attributed to factors such as background traffic, weather, incidents, as well as the event itself.

For example, in California, historical and real-time freeway data from freeways is collected in order to compute freeway performance measures. The Freeway Performance Measurement System (PeMS) project is conducted by the Department of Electrical Engineering and Computer Sciences at the University of California at Berkeley, with the cooperation of the California Department of Transportation, California Partners for Advanced Transit and Highways, and Berkeley Transportation Systems.[61] This data could be combined with data on PSE location and attendance to model the impact of PSEs. Using this system, the effect of a PSE can be isolated, because the PeMS has data on background traffic (from non-event days), as well as data on incidents and other variables that might influence delay and congestion.

Other cities and states will also have traffic data; data can also be collected directly. Such studies could help to accurately measure the contribution PSEs make to congestion.

PSE Cost Management and Recovery

The data collected in this study reveals that PSEs are held with great regularity. As a result, it is important for state and local transportation, police, and traffic agencies to become better able to account for and recover the costs required to plan and implement the transportation plans for these events. One potential area of research would be to collect information on what both PSE cost management and cost recovery entail. This would include how to manage, track, and recover the costs devoted to the planning and implementation of PSEs. It would also entail developing tools to allow event managers to recover costs for PSEs, better manage costs, and keep cost management systems effective. Finally, tools could be developed to allow state and local agencies to develop and add a line item in the city/county department of transportation budget for PSEs.

[61] For PeMS data see https://pems.eecs.berkeley.edu/.

Benefits and Costs of PSEs

PSEs have a range of positive effects on a community, including attracting visitors and tourists, increasing economic activity, raising the community's prestige and visibility, providing cultural and educational opportunities, and allowing the exercise of free speech. As documented in the literature, a large portion of the spending on these events is not new spending, but merely transfers of spending from other activities, something often classified by economists as economic transfers rather than economic benefits. On the negative side, these events also add to road congestion, add real costs for transportation planning and management, and add to pollution and energy use. A better understanding and quantitative analysis of the full range of benefits and costs of different types of events could lead to better public policy toward this sector of the economy.

Equity Impacts of PSEs

A study of the benefits and costs of hosting PSEs can help determine whether they provide net benefits to the community as a whole. However, even if there are net benefits in total, there still may be individual groups and individuals that suffer negative consequences. As a result, a natural extension of benefit-cost analysis is the examination of the incidence of benefits and costs across income groups, racial groups, and geographical groups. For example, when new stadiums are planned, local residents are often vocal opponents. These individuals face a number of potential negative consequences such as parking problems, congestion, noise, and loss of historical and cultural resources. However, they also may realize significant benefits such as increased property values, lower crime rates, the availability of new services, and the availability of increased recreational and cultural activities.

A similar analysis can be conducted for government revenues and expenditures. PSEs generate fiscal impacts that are positive in the case of taxes and fees and negative in the case of expenditures for planning, traffic management, and safety. For example, the San Jose study collected data on five types of tax revenues, including:

- Sales Taxes
- Transit Occupancy (Hotel Occupancy) Taxes
- Hotel Business Improvement District (HBID) Fees
- Food and Beverage Taxes
- Gate Fees
- Other Taxes

Certain portions of each level of government will realize increased revenue and face increased expenditures as a result of PSEs. Research can help to identify the winners and losers and develop tax policies and other mechanisms to mitigate potential inequities.

Recommendations for Local Transportation Planners and Officials

In hosting PSEs, cities and other jurisdictions will face a number of issues, most importantly, traffic congestion and the costs of planning for and providing transportation management and control.

The first step for a city or MPO attempting to manage the congestion from these events will be to develop an understanding of the number of events, their size, and the venues that host them. Based on the case studies conducted as part of this research effort, this is a task that can be handled with a couple of weeks of persistent effort. The key is to identify venues that host large events and to contact top staff to collect information concerning attendance. In most cases, schedule information is published for individual teams, tours or series or can be collected from venue officials. In addition, most cities have a street and/or park event permitting department that can provide dates and attendance for these types of events. In cases where this data is not available, chambers of commerce or similar civic organizations can provide a calendar of events.

Once event sizes and dates have been collected, officials can move on to assess the congestion impacts of the events and the available mitigation techniques. While methods for assessing congestion were beyond the scope of this study, this report does summarize potential mitigation techniques. In addition, more information on planning and mitigation techniques for PSEs is available in the FHWA publication, *Managing Travel for Planned Special Events Handbook*.[62]

Local planners and officials realize that these events are an important component of the jurisdiction's economy, culture, and prestige. They will also be well aware of the positive and negative fiscal aspects of these events. Increased taxes will be offset by transportation infrastructure and maintenance costs. While officials will be eager to collect traffic management costs directly, event managers will be quick to point out the tax revenues already paid out by attendees and spectators. In addition, many of the events whose organizers would find it most difficult to pay will be hosted by charitable groups or groups exercising their constitutionally protected right to free speech. The key to resolving these conflicting issues and agendas will lie in gaining more information about the nature of PSEs and the ways to beneficially manage their effects.

[62] The FHWA publication, "Managing Travel for Planned Special Events Handbook," is available at http://ops.fhwa.dot.gov/program%5Fareas/sp%2Devents%2Dmgmt/handbook/Special Events Handbook.

APPENDIX: CONGESTION MITIGATION MEASURES

This section discusses congestion mitigation measures that can reduce the traffic impacts of PSEs. The first part of this section describes the implications of various event types. Event types are important because they have a large role in determining traffic congestion levels and potential mitigation measures. The second part of the section discusses twelve specific mitigation measures, from traffic control to transit incentives.

Congestion Implications of Various Event Types

The FHWA publication *Managing Travel for Planned Special Events Handbook* classifies PSEs into five distinct categories. Each of these categories has a distinct impact on the roadway network and on congestion.[63] These categories are:

- Discrete and recurring event at a permanent venue
- Continuous event
- Street use event
- Regional/multi-venue event
- Rural event

The traffic mitigation measure aspects of each of these event types are discussed in the following paragraphs.

Discrete and Recurring Event at a Permanent Venue

A discrete and recurring event at a permanent venue occurs on a regular basis, and it has a specific starting time and predictable ending time. Events classified under this category have predictable peak arrival and departure rates relative to other categories of planned special events. These events generate high peak-travel demand rates and thus congestion, since people have to arrive by a specific time. Moreover, these events end abruptly upon game completion or perhaps at the conclusion of a final song, which creates high peak departure rates and congestion.

These types of events account for a large share of PSE-caused congestion due to the recurring nature of the high peak demands they create. For example, in Detroit, 75 percent of all PSEs are discrete and recurring events at three permanent venues (the Palace of Auburn Hills, Joe Louis Arena, and Comerica Park). At the same time, however, there are significant opportunities to mitigate congestion, as measures that are adopted at a few key locations can impact a large number of events.

[63] S. Latoski, W. Dunn, Jr., B. Wagenblast, J. Randall, M. Walker. M., "Managing Travel for Planned Special Events," FHWA Report #OP-04-010 (U.S. Department of Transportation, September 2003).

Continuous Event

A continuous event occurs over a single day or multiple days. Unlike a discrete/recurring event at a permanent venue, continuous events do not exhibit sharp peak-arrival and peak-departure rates. Event patrons typically arrive and depart throughout the event day. Aside from conventions and fairs, many continuous events take place at a temporary venue, a park, or other large open space. As a result, roadway and parking capacity issues may arise in the immediate area and increase congestion. Temporary venues may not have a defined spectator capacity, thus creating uncertainties in forecasting event-generated trips, since a "sell-out" cap does not exist. Due to the infrequent nature and relatively low peak demand of these events, there is little opportunity to mitigate congestion.

Street-Use Event

A street-use event occurs on a street requiring temporary closure. These events generally occur in a city or town central business district; however, race events or motorcycle rallies may necessitate temporary closure of arterial streets or limited-access highways, which increases congestion. A street-use event significantly impacts businesses and neighborhoods adjacent to the event site from the perspective of parking and access. A street use event closes a segment(s) of the roadway network and causes background and event traffic to divert onto alternate routes, thus increasing traffic demand on other streets in the roadway network and increasing congestion.

These problems can often be mitigated by scheduling these events at times and locations that will minimize impacts on travelers. Additional focus can be placed on producing adequate information on travel alternatives for both attendees and non-attendees.

Regional/Multi-Venue Event

A regional/multi-venue event refers to multiple planned special events that occur within a region at or near the same time. The collection of events may have different starting times and be of different types. Mitigation of congestion for these events can focus on avoiding scheduling conflicts. For example, in Philadelphia, where multiple sports venues are located in close proximity, the team management groups often meet in order to minimize schedule conflicts.

Rural Event

Rural events encompass any discrete and recurring or continuous event occurring in a rural area. These areas usually have limited road capacity and potentially limited parking capacity, which increases congestion. In addition, the existence of fewer alternate routes to accommodate event and background traffic has an impact on congestion. Rural events also tend to have a lack of regular transit service and hotels near the venue, as well as a lack of permanent infrastructure.

Congestion Mitigation Techniques

The following paragraphs discuss traffic mitigation techniques that can be applied to various transportation modes or infrastructures. Many of these techniques are classified as Intelligent Transportation Systems (ITS). These systems apply information and communications technologies to transportation infrastructure and vehicles in an effort to manage vehicles, loads, and routes to improve safety and reduce vehicle wear, transportation times, and fuel consumption.

Freeway Traffic Control

Some of the key ways to mitigate congestion caused by planned special events on freeways include ramp closures or the addition of capacity. Closing a ramp eliminates merging or weaving maneuvers on that section of freeway. Additional ramp capacity may be added by converting a one-lane ramp to a two-lane ramp during the event by the use of cones. Lane configuration changes can be made to the local street where the ramp intersects to provide two free-flowing lanes onto the local roadway.

Another option in freeway operations is the use of alternate routes. In this manner traffic can be spread over several routes to access a venue. This is especially useful when freeway exits are close together and can provide access to different event parking lots. Motorists attending the planned special event can be informed of alternate exits for a different parking lot that may have more capacity. In this manner, traffic can be split up between different roadways as well as different parking areas.

Ramp metering can also be used to mitigate congestion caused by planned special events. Ramp metering has been used by many agencies to control recurring congestion on freeways during peak periods. The same concepts can be applied to the congestion caused by planned special events.

Rolling roadblocks can be used upstream of a congested ramp junction or weaving area. Rolling roadblocks help to reduce the level of congestion at the primary bottleneck location. Similar to ramp closures, traffic is diverted to another access point, and this helps to eliminate congestion caused by traffic merging with heavy freeway mainline traffic.

Lane diverge prohibitions can be enacted for planned special events using traffic cones. This helps to reduce congestion at diverge ramp junctions caused by motorists attempting to make a sudden lane change to access an exit ramp.

Street Traffic Control

To reduce congestion on the local street system, several tactics can be used, including on-street parking restrictions, vehicle travel on the road shoulder, and alternative lane operations. Alternative lane operations make use of the fact that traffic destined to some planned special events is very directional. In this manner, the lane configurations can be modified to provide

more lanes for entering traffic before the planned special event and, conversely, more lanes for exiting traffic after the event. Alternative lane operations can be either reversible lane operations or a contra-flow operation.

A key guidance system for planned special events is a series of trailblazers along the travel route. This helps attendees find the venue and also helps to promote the use of the preferred travel route. When erected along a local flow route, the route marker assemblies collectively trailblaze a route to the drivers' destination of choice.

Intersection Traffic Control

The key to reducing congestion at the intersection level is simplifying traffic movements and minimizing the number of conflict points as well as traffic signal phases. Consideration can be given to prohibiting all left-turn movements. In addition, the number of competing movements can be lowered by a planned road closure.

Traffic Incident Management

Traffic incident management can be used to reduce congestion by adding service patrols during planned special events as well as staging a tow truck on the main access routes. In this manner, any crashes or disabled vehicles can be handled quickly.

En-route Traveler Information

En-route traveler information can be provided to both attendees and non-attendees by way of changeable message signs along the main roadway sections. In addition, highway advisory radio and sources within the media can be utilized, as well as static signing.

Transit Incentives

Transit incentives include transit service expansion by supplementing the existing service with additional vehicle hours. Also, creating a route deviation with a stop near the event venue can increase ridership of the existing service. Transit can also provide an express service to the event site in order to promote its use.

Express bus services also can be used to help reduce congestion. An exclusive bus lane can be provided from park and ride lots to help reduce bus delay as well as promote the service as a less congested way to get to the venue. The best location of these types of facilities will intercept spectator traffic as it approaches the event site.

In order for public transit to be effective, the general public must be made aware of the benefits of using the transit system. This can be accomplished through a comprehensive transit-marketing program that would help to inform the public of the availability of public transit service to/from a special event venue as well as convince them to use the service.

High Occupancy Vehicles

High-occupancy vehicle incentives attempt to increase the number of persons traveling in each vehicle and thus reduce congestion on the roadways. One method to increase high-occupancy vehicle use is to continue HOV restrictions on HOV lanes during planned special events. Another technique is to provide reduced parking fees for vehicles with more than two people at the venue site and/or allow HOV parking in a specially designated lot closer to the entrance of the venue.

Event Patron Incentives

Event patron incentives try to encourage event patrons to arrive early or leave late to reduce congestion on the roadway. Some possible ways to make it attractive for attendees to stay late after an event are post-event fireworks or a concert, special programming on stadium video screens, “Meet the mascot" promotions for children, special discounts with a ticket stub at nearby restaurants, and extended parking at no additional cost for event-goers to encourage their patronage of downtown restaurants and shops after an event.

Some strategies to encourage attendees to arrive early to an event include free drawings and contests that occur before an event, early opening of venue restaurants and the offer of special discounts, encouraging tailgating in venue parking areas, and encouraging spectators to watch teams warm-up before the game.

Venue Operator Roles

To provide successful congestion mitigation for planned special events, the venue operators need to play an active role in the planning of the special event. In order for patrons to arrive early and stay late, the venue operator needs to offer incentives. Venues that do not have pre-event or post-event activities can solicit suggestions from the public through mailings or via the venue website. For example, when season ticket applications or tickets to the event are mailed, an accompanying survey can ask event patrons which type of pre-game or post-game activities they would be more likely to take advantage of. Similar types of questions can be presented on an event or venue website.

As a result, the pre-game or post-game events will cater to the persons who actually attend the event, thus increasing the number of spectators attending staged activities. For recurring events, venue operators can survey the patrons in the venue or distribute suggestion cards when patrons enter or exit. These incentives help to reduce congestion by spreading out the peak arrival and departure rates of event patrons. Collectively, these types of incentives help to make a discrete event more like a continuous event.

Bicycles

Another way to reduce congestion is to encourage the use of bicycles. Accommodations can be made to locate bicycle parking close to the venue entrance. In addition, bicycle racks can be provided on transit buses to allow spectators to access mass transit while carrying a bicycle.

Staffed "bicycle valet parking" can allow riders to drop off their bicycles in a secure and supervised temporarily enclosed area during an event, while providing an opportunity for valet staffers to actively promote cycling. This is useful for temporary venues or street closure events where installing many new permanent bicycle racks would not be cost-effective or practical.

Background Traffic

One of the major factors in congestion for any planned special event is the accommodation of background traffic. Drivers who make up this traffic are not attending the event, but they are nonetheless impacted by the presence of the planned special event. One of the major differences between background traffic and attendee traffic is that the travel patterns of the background traffic may be more flexible than those of the event traffic. Thus, it may be possible to adjust the background traffic during times of the planned special event.

Techniques for doing this include increasing the use of public transit through aggressive advertising campaigns, encouraging car pools, and shifting work hours. Some other ways to reduce background traffic include the shift of commercial truck travel routes and delivery schedules. This can be done to avoid travel during times of event ingress and egress and possibly to avoid travel near the event venue all together.

Local business can be encouraged to implement Travel Demand Management techniques by allowing workers to telecommute, encouraging carpooling, and allowing flexible hours, modified delivery schedules, and even early release from work on event dates.

Pre-trip Traveler Information

The purpose of pre-trip traveler information is to assist drivers with decisions regarding route planning, mode of travel, and the time of day to travel. Accurate pre-trip travel information provides benefits to all transportation system users in the form of time and cost savings. Various techniques are used to disseminate information to the public, including both event patrons and non-attendee road users, so they can be better informed when planning their trips to or around a planned special event. The Internet, television and newspapers can all be used as part of an overall pre-trip public information campaign.

Most large events publish an event or venue transportation guide. This can be very helpful in the reduction of congestion on the roadways by providing preferred routes to the venue as well as alerting attendees to any special promotions that may encourage them to come early and/or stay late. Information can also be provided on kiosks in areas near the venue that will have updated information on best routes and local traffic conditions.

Information can also be provided to drivers by the use of changeable message signs and highway advisory radio, as well as static signing. These techniques are especially helpful in informing attendees of the planned special event, as well as non-attendees who drive the route frequently.

Congestion Mitigation Techniques List

The congestion mitigation techniques described above and a few additional techniques are listed in Exhibit A-1.

Exhibit: A-1: List of Congestion Mitigation Techniques

Strategy	Techniques	Benefits
Transit Service Strategies		
Public transit service expansion	Maximize use of public transit: • Existing service with additional vehicle hours • Modifying existing service by creating a route with a stop near the event venue • Implementation of an express service to establish a special purpose route to and from the event site	Reduces auto traffic and parking demand
Express bus service	Discourage event patrons from driving their vehicles to the event site due to expected site parking deficiencies and anticipated roadway congestion • Using express bus service between a park and ride facility or remote parking lot and event venue • Using park and ride lots that best intercept spectator traffic as it approaches the event site	Reduces auto traffic and parking demand
Charter service	• Use a contract service to provide transportation directly to the event site from outlying areas (e.g., other neighborhoods and cities) • Consider both charter bus operations and charter rail service	Reduces auto traffic and parking demand
Transit Service marketing	Establish a comprehensive transit marketing program • Informing the public of the availability of public transit service to/from the event venue • Convincing the public to use the service	Reduces auto traffic and parking demand
Travel Demand Management		
High occupancy vehicle (HOV) incentives	• Consider continuing HOV restrictions on HOV lanes to later weekday hours, or even into weekend hours, in order to encourage event patrons to carpool • Reduce weekend parking fees for vehicles with more than two people • Provide free advertising for private lots to balance discounts given for HOV parking	Increase the number of persons traveling in each vehicle
Event patron incentives	Consider departure strategies that encourage spectators to stay late after an event: • Post-event fireworks or concert • Special programming on stadium video screens • "Meet the mascot" promotion for children • Special discount with a ticket stub at nearby restaurants and pubs • Extending parking, at no additional cost, for event-goers to encourage their patronage of downtown restaurants and shops after an event Consider arrival strategies that encourage spectators to arrive early before an event: • Registration in free drawing and contents that occur before an event • Early opening of venue restaurants and/or offering of special discounts • Tailgating encouraged in venue parking areas • Encouraging spectators to watch teams warm-up before the game	Encourage event patrons to arrive earlier or leave late in order to reduce peak traffic demand
Bicyclist accommodation	Provide bicycle and bicyclist friendly services: • Provide proper bicycle paths (permanent and temporary) • Maximization of safety for bicyclists • Avoidance of roadways with higher traffic volumes due to the event • Provide security in bicycle parking areas • Locate bicycle parking close to venue entrance. • Provide bicycle racks on transit buses to allow spectators to access mass transit while carrying a bicycle	Encourage the use of bicycles in traveling

Local travel demand management (TDM)	Encourage alternative travel choices: • Avoidance of travel during times of event ingress and egress • Avoidance of travel near event venue Encourage businesses to implement TDM strategies: • Telecommuting • Carpooling • Flexible hours • Modified delivery schedules • Early release from work on event dates for infrequent night events Use media to announce alternative routes to and around events Contact commercial trucking companies: • Times to avoid routes serving the event venue • Reduction of number of truck trips • Shifting of some truck trips to nighttime (non-event) hours	Provide road users with more information
Interchange Operation Tactics		
Rolling road block	Initiate tactic on freeway mainline upstream of congested interchange ramp(s)	Alleviates traffic demand at interchange, thus permitting street or ramp bottleneck to dissipate
Rolling road block	Initiate tactic on freeway mainline upstream of a congested ramp junction or weaving area Use tactic to meter freeway mainline traffic demand without creating a secondary bottleneck upstream of the congested area	Reduces level of congestion at the primary bottleneck location
Entrance ramp closure	Initiate tactic on ramps in close proximity to and upstream of interchange target point for event traffic Divert affected traffic to another downstream access point	Eliminates congestion caused by traffic merging with heavy freeway mainline traffic
Entrance ramp closure	Initiate tactic as necessary to reduce freeway mainline congestion in the vicinity of closely-spaced entrance ramps	Reduces freeway mainline congestion or prevents congestion from occurring
Exit ramp closure	Close ramp, as needed, to alleviate congestion on a downstream local flow route Initiate only if a downstream exit ramp and local street system can handle diverted traffic	Reduces congestion on local flow route
Exit ramp closure	Initiate tactic at freeway interchanges connecting local traffic flow routes that have special egress traffic control measures in effect	Prevents traffic from accessing local flow routes in the direction of the event venue that operate in favor of egress traffic flow
Elimination of weaving area	Close cloverleaf interchange entrance ramp to facilitate unimpeded diverge to access adjacent exit ramp	Eliminates weaving area congestion and extends deceleration lane for traffic using exit ramp
Elimination of weaving area	Close cloverleaf interchange exit ramp and mainline right-lane to facilitate unimpeded merge with mainline	Eliminates weaving area congestion and extends acceleration lane for traffic using entrance ramp
Ramp metering	Meter freeway entrance ramps upstream of interchange target point for event traffic	Reduces congestion caused by traffic merging with heavy freeway mainline traffic
Ramp metering	Meter freeway entrance ramps downstream of interchange target point for event traffic	Reduces congestion caused by traffic merging with heavy freeway mainline traffic
Late diverge prohibition	Deploy traffic cones along barrier line extending upstream of exit ramp gore area	Improves safety and reduces congestion at diverge ramp junction caused by motorists attempting to make a sudden lane-change to access an exit ramp

Additional exit ramp lane	Cone an additional lane on exit ramps serving traffic destined to an event venue	Provides additional ramp storage capacity and proves particularly effective if two-lane ramp traffic does not have to merge at downstream end of ramp

Effectiveness of PSE Congestion Mitigation Measures

Research on PSE congestion mitigation measures indicates that these measures have the potential to substantially reduce congestion. Two main types of PSE congestion mitigation studies have been identified:

- Before and after studies that measure traffic conditions before and after specific PSEs.
- Research studies that use simulation models that incorporate theoretical conditions and/or real-world case studies.

Some state departments of transportation, such as the Michigan Department of Transportation (DOT), regularly conduct before and after event studies, which are also sometimes referred to as after-action reviews.[64] An example of the after-action review performed by the Michigan DOT for the 2005 MLB All Star Week is provided in Exhibit A-2. [65] As Exhibit A-2 shows, the observations made in after-action reviews can be qualitative.

Exhibit A-2: After-Action Review for the 2005 MLB All Star Week

TOPIC	NOTES
Ingress Traffic	• I-94 was slow around the I-96 interchange because of construction activity. o The secondary route included use of the NB M-39 to EB I-96 ramp, which was closed on the days-of-event. It was thought that this ramp would be open.
Egress Traffic	• Woodward traffic flowed very well once past (west/north of) the I-75 Service Drive. o Officers did not override the signal timing plan (e.g., implementation of "double-green"). • Temple was backed up due to parking on both sides. • Southbound Woodward was congested near Jefferson due to parking.
Day-of-Event	• Traffic was a "non-event" and spectators were orderly. • Michigan State Police reported that freeway operations went extremely well.

As mentioned earlier, there are also research studies that use simulation models that incorporate theoretical conditions and/or real world case studies. In recent years, many state and local authorizes have required that PSE traffic impact research studies be conducted prior to the construction of new large event-hosting facilities. Other research reports have examined the traffic mitigation impacts of introducing ITS at existing venues. Two important reports on this

[64] "After Action Report, 2005 North American International Auto Show and Winter Blast," Dunn Engineering Associates, February 15, 2005.

[65] "After Action Report, 2004 Thanksgiving Day Special Events," Dunn Engineering Associates, January 19, 2005.

topic were prepared by the University of California Transportation Center and the Maricopa County Department of Transportation.

The University of California Transportation Center report, *Simulation of Advanced Traveler Information Systems (ATIS) Strategies to Reduce Non-Recurring Congestion from Special Events*,[66] uses the DYNASMART simulation to estimate delays corresponding to an event venue with three different attendance levels: 5,000, 10,000, and 15,000 vehicles. Travel time reductions associated with the introduction of ITS systems ranged from 14 to 34 percent for attendees and from 10 to 13 percent for non-attendees.

The Maricopa County Department of Transportation report examines the introduction of ITS to the Phoenix International Raceway in Maricopa County, Arizona. The report estimates that travel time for outbound travel from the events decreased from 5.5 hours in 1998 to 2.5 hours in 2005 as a result of capacity enhancements and application of ITS. The ITS measures that were introduced to the Phoenix International Raceway area included cameras, Dynamic Message Signs (DMS), and Traffic Management Centers (TMC).[67]

[66] R. Jayakrishnan, M. McNally, M. Cohen, "Simulation of Advanced Traveler Information Systems (ATIS) Strategies to Reduce Non-Recurring Congestion from Special Events," University of California Transportation Center, UCTC No. 173 (August 1993).

[67] N. Swart, "Phoenix International Raceway (PIR) Traffic Management," Maricopa County DOT, April 26, 2005.

Planned Special Events — Economic Role and Congestion Effects

Federal Highway Administration
U.S. Department of Transportation
1200 New Jersey Ave., N.E.
Washington, DC 20590
Toll-Free "Help Line" 866-367-7487
FHWA-HOP-08-022