

Performance Measure Summary – Indianapolis, IN

There are several inventory and performance measures listed in the pages of this Urban Area Report for the years from 1982 to 2007. There is no single performance measure that experts agree “says it all.” The best comparison of congestion levels and trends is done between regions of similar size, over several years, and with a few measures of congestion. Examining a few measures over many years reduces the chance that data variations or the estimating procedures may have caused a “spike” in any single year. A few key points should be recognized by users of the Urban Mobility Report data.

Use the Trends – The multi-year performance measures are better indicators, in most cases, than any single year. (*5 years is 5 times better than 1 year*).

Use several measures – Each performance measure illustrates a different element of congestion. (*The view is more interesting from the top of a few measures*).

Compare to similar regions – Congestion analyses that compare areas with similar characteristics (for example population, growth rate, road and public transportation system design) are usually more insightful than comparisons of different regions. (*Los Angeles is not Peoria*).

Compare ranking changes and performance measure values – In some performance measures a small change in the value may cause a significant change in rank from one year to the next. This is the case when there are several regions with nearly the same value. (*15 hours is only 1 hour more than 14 hours*).

Consider the scope of improvement options – Any improvement project in a corridor within most of the regions will only have a modest effect on the regional congestion level. (*To have an effect on areawide congestion, there must be significant change in the system or service*).

Performance Measures and Definition of Terms

Travel Time Index – A measure of congestion that focuses on each trip and each mile of travel. The ratio of travel time in the peak period to travel time in free-flow. A value of 1.30 indicates a 20-minute free-flow trip takes 26 minutes in the peak.

Peak Travelers – Number of travelers (using any travel mode) who begin a trip during the morning or evening peak travel periods (6 to 9 a.m. and 4 to 7 p.m.).

Annual Delay per Traveler – A yearly sum of all the per-trip delays. This measure illustrates the effect of the per-mile congestion as well as the length of each trip. The extra time required to travel in the peak period is divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.).

Total Delay – The overall size of the congestion problem. Measured by the total travel time above that needed to complete a trip at free-flow speeds. The ranking of total delay usually follows the population ranking (larger regions usually have more delay).

Free-Flow Speeds (60 mph on freeways and 35 mph on arterials) – These values are used as the national comparison thresholds. Other speed values may be appropriate for urban areas or sub-regions.

Excess Fuel Consumed – Increased fuel consumption due to travel in congested conditions rather than free-flow conditions.

Public Transportation – Regular route service from all public transportation providers in an urban area.

Operations Treatments – Freeway incident management, freeway ramp metering, arterial street signal coordination and arterial street access management.

Congestion Cost – Value of travel delay for 2007 (estimated at \$15.47 per hour of person travel and \$102.12 per hour of truck time) and excess fuel consumption (estimated using state average cost per gallon).

Annual Increase Needed to Maintain Constant Congestion Level – Number of lane-miles that must be added to the road system each year – or – the number of new transit riders or carpoolers that must be added to keep congestion levels the same as the previous year.

Urban Area – The developed area (population density more than 1,000 persons per square mile) within a metropolitan region. The urban area boundaries change frequently (every year for most growing areas). The annual change in miles traveled, therefore, includes both new travel due to growth and travel that previously occurred in areas designated as rural.

Number of Rush Hours – Time when system might have congestion.

The Mobility Data for Indianapolis IN

Inventory Measures	2007	2006	2005	2004	2003	2002
Urban Area Information						
Population (1000s)	1,070	1,050	1,045	1,040	1,035	1,035
Rank	38	38	38	38	38	38
Urban Area (square miles)	510	505	505	505	500	500
Population Density (persons/sq mile)	2,098	2,079	2,069	2,059	2,070	2,070
Peak Travelers (1000s)	599	584	577	571	565	557
Freeway						
Daily Vehicle-Miles of Travel (1000s)	13,000	12,400	11,900	11,500	11,390	11,400
Lane-Miles	900	855	820	790	760	740
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	12,165	12,500	12,700	13,000	13,000	13,290
Lane-Miles	1,900	1,890	1,885	1,885	1,885	1,880
Public Transportation						
Annual Psgr-Miles of Travel (millions)	47	51	44	47	58	53
Annual Unlinked Psgr Trips (millions)	9	10	9	9	11	10
Cost Components						
Value of Time (\$/hour)	15.47	15.06	14.58	14.10	13.73	13.43
Commercial Cost (\$/hour)	102.12	98.77	94.06	86.24	82.38	79.96
Fuel Cost (\$/gallon)	2.98	2.60	2.26	1.84	1.50	1.29
System Performance	2007	2006	2005	2004	2003	2002
Congested Travel (% of peak VMT)	60	61	61	62	62	63
Congested System (% of lane-miles)	58	55	55	55	55	55
Congested Time (number of "Rush Hours")	7.0	7.2	7.2	7.2	7.2	7.4
Annual Increase Needed to Maintain Constant Congestion Level:						
Lane-miles	10	16	17	17	15	17
Transit Riders or Carpoolers (millions)	3	5	5	6	5	5
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	16,135	16,492	16,508	16,895	16,947	17,189
Rank	30	30	30	29	29	26
Fuel per Peak Traveler (gallons)	27	28	29	30	30	31
Rank	23	22	22	14	14	11
Annual Delay						
Total Delay (1000s of person-hours)	23,505	24,360	24,745	25,632	25,761	26,343
Rank	31	29	29	28	28	26
Delay per Peak Traveler (person-hours)	39	42	43	45	46	47
Rank	24	23	21	14	11	11
Delay due to Incidents (percent)	52	52	52	52	52	52
Travel Time Index	1.21	1.21	1.22	1.22	1.22	1.22
Rank	34	35	33	30	30	29
Congestion Cost						
Total Cost (\$ millions)	522	522	509	497	480	475
Rank	29	28	28	28	27	26
Cost per Peak Traveler (\$)	871	893	882	871	849	852
Rank	24	22	20	11	10	9

Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.

Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for Indianapolis IN, Continued

Inventory Measures	2001	2000	1999	1998	1997
Urban Area Information					
Population (1000s)	1,030	1,020	1,020	1,015	1,015
Rank	38	38	38	38	38
Urban Area (square miles)	500	495	495	495	495
Population Density (persons/sq mile)	2,060	2,061	2,061	2,051	2,051
Peak Travelers (1000s)	545	531	522	512	503
Freeway					
Daily Vehicle-Miles of Travel (1000s)	11,500	11,500	11,315	11,320	11,540
Lane-Miles	730	725	725	725	725
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	12,700	12,325	12,400	12,400	12,400
Lane-Miles	1,880	1,880	1,870	1,870	1,810
Public Transportation					
Annual Psgr-Miles of Travel (millions)	51	55	55	49	44
Annual Unlinked Psgr Trips (millions)	11	12	11	10	10
Cost Components					
Value of Time (\$/hour)	13.22	12.85	12.43	12.17	11.98
Commercial Cost (\$/hour)	80.88	80.75	74.23	72.61	74.32
Fuel Cost (\$/gallon)	1.33	1.52	1.05	1.06	1.07
System Performance	2001	2000	1999	1998	1997
Congested Travel (% of peak VMT)	63	63	63	63	66
Congested System (% of lane-miles)	55	55	51	51	55
Congested Time (number of "Rush Hours")	7.4	7.4	7.4	7.4	7.4
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	42	43	71	112	130
Transit Riders or Carpoolers (millions)	13	14	22	35	43
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	16,839	16,436	16,272	16,631	18,636
Rank	26	27	26	25	23
Fuel per Peak Traveler (gallons)	31	31	31	33	37
Rank	10	10	10	7	3
Annual Delay					
Total Delay (1000s of person-hours)	24,910	24,383	24,051	24,817	28,176
Rank	27	27	25	23	23
Delay per Peak Traveler (person-hours)	46	46	46	49	56
Rank	10	9	9	5	3
Delay due to Incidents (percent)	52	52	52	52	52
Travel Time Index	1.22	1.22	1.22	1.22	1.25
Rank	27	25	23	19	13
Congestion Cost					
Total Cost (\$ millions)	447	433	400	404	456
Rank	26	25	24	23	23
Cost per Peak Traveler (\$)	820	814	765	790	905
Rank	9	8	8	5	2

Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.

Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for Indianapolis IN, Continued

Inventory Measures	1996	1995	1994	1993	1992
Urban Area Information					
Population (1000s)	1,010	985	970	960	955
Rank	38	37	37	37	35
Urban Area (square miles)	490	485	470	445	445
Population Density (persons/sq mile)	2,061	2,031	2,064	2,157	2,146
Peak Travelers (1000s)	493	473	459	446	437
Freeway					
Daily Vehicle-Miles of Travel (1000s)	10,895	11,000	10,145	9,290	8,900
Lane-Miles	705	705	705	700	700
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	11,465	10,935	10,585	9,920	9,730
Lane-Miles	1,725	1,650	1,600	1,515	1,505
Public Transportation					
Annual Psgr-Miles of Travel (millions)	53	48	51	50	49
Annual Unlinked Psgr Trips (millions)	11	11	11	11	12
Cost Components					
Value of Time (\$/hour)	11.71	11.37	11.06	10.78	10.47
Commercial Cost (\$/hour)	74.17	71.54	69.53	67.77	66.19
Fuel Cost (\$/gallon)	1.25	1.09	0.99	1.06	1.07
System Performance	1996	1995	1994	1993	1992
Congested Travel (% of peak VMT)	62	62	61	55	49
Congested System (% of lane-miles)	54	54	53	52	45
Congested Time (number of "Rush Hours")	7.4	7.4	7.2	6.6	6.2
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	118	120	118	85	76
Transit Riders or Carpoolers (millions)	38	39	37	25	22
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	16,970	16,156	15,190	13,029	10,055
Rank	23	23	22	24	26
Fuel per Peak Traveler (gallons)	34	34	33	29	23
Rank	6	6	5	8	10
Annual Delay					
Total Delay (1000s of person-hours)	26,055	24,729	23,515	20,520	15,456
Rank	23	23	23	23	25
Delay per Peak Traveler (person-hours)	53	52	51	46	35
Rank	4	3	3	7	13
Delay due to Incidents (percent)	52	53	53	54	54
Travel Time Index	1.25	1.24	1.24	1.22	1.17
Rank	9	10	9	11	20
Congestion Cost					
Total Cost (\$ millions)	415	382	352	299	219
Rank	23	22	22	22	25
Cost per Peak Traveler (\$)	843	808	767	669	501
Rank	2	2	2	5	11

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The Mobility Data for Indianapolis IN, Continued

Inventory Measures	1991	1990	1989	1988	1987
Urban Area Information					
Population (1000s)	950	945	935	930	925
Rank	35	35	35	35	35
Urban Area (square miles)	440	440	435	435	430
Population Density (persons/sq mile)	2,159	2,148	2,149	2,138	2,151
Peak Travelers (1000s)	428	419	411	405	401
Freeway					
Daily Vehicle-Miles of Travel (1000s)	8,100	7,795	7,065	6,920	6,810
Lane-Miles	690	690	685	685	685
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	9,525	9,315	9,095	9,020	8,915
Lane-Miles	1,480	1,470	1,455	1,440	1,430
Public Transportation					
Annual Psgr-Miles of Travel (millions)	50	50	50	53	60
Annual Unlinked Psgr Trips (millions)	12	12	11	12	12
Cost Components					
Value of Time (\$/hour)	10.17	9.75	9.25	8.83	8.48
Commercial Cost (\$/hour)	64.55	62.47	59.16	56.03	54.62
Fuel Cost (\$/gallon)	1.09	1.07	1.10	1.02	1.02
System Performance	1991	1990	1989	1988	1987
Congested Travel (% of peak VMT)	45	42	36	36	34
Congested System (% of lane-miles)	44	42	37	37	35
Congested Time (number of "Rush Hours")	5.8	5.6	5.0	5.0	4.8
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	59	68	53	62	55
Transit Riders or Carpoolers (millions)	17	19	14	16	14
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	8,523	7,488	6,036	5,680	5,425
Rank	25	28	28	28	27
Fuel per Peak Traveler (gallons)	20	18	15	14	14
Rank	14	19	22	23	19
Annual Delay					
Total Delay (1000s of person-hours)	13,204	11,829	9,837	9,187	8,974
Rank	26	27	27	27	26
Delay per Peak Traveler (person-hours)	31	28	24	23	22
Rank	14	19	22	22	22
Delay due to Incidents (percent)	54	53	53	53	53
Travel Time Index	1.15	1.14	1.11	1.11	1.11
Rank	23	24	33	30	27
Congestion Cost					
Total Cost (\$ millions)	182	157	124	110	104
Rank	24	26	27	27	26
Cost per Peak Traveler (\$)	426	375	302	272	260
Rank	14	17	21	22	19

Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.

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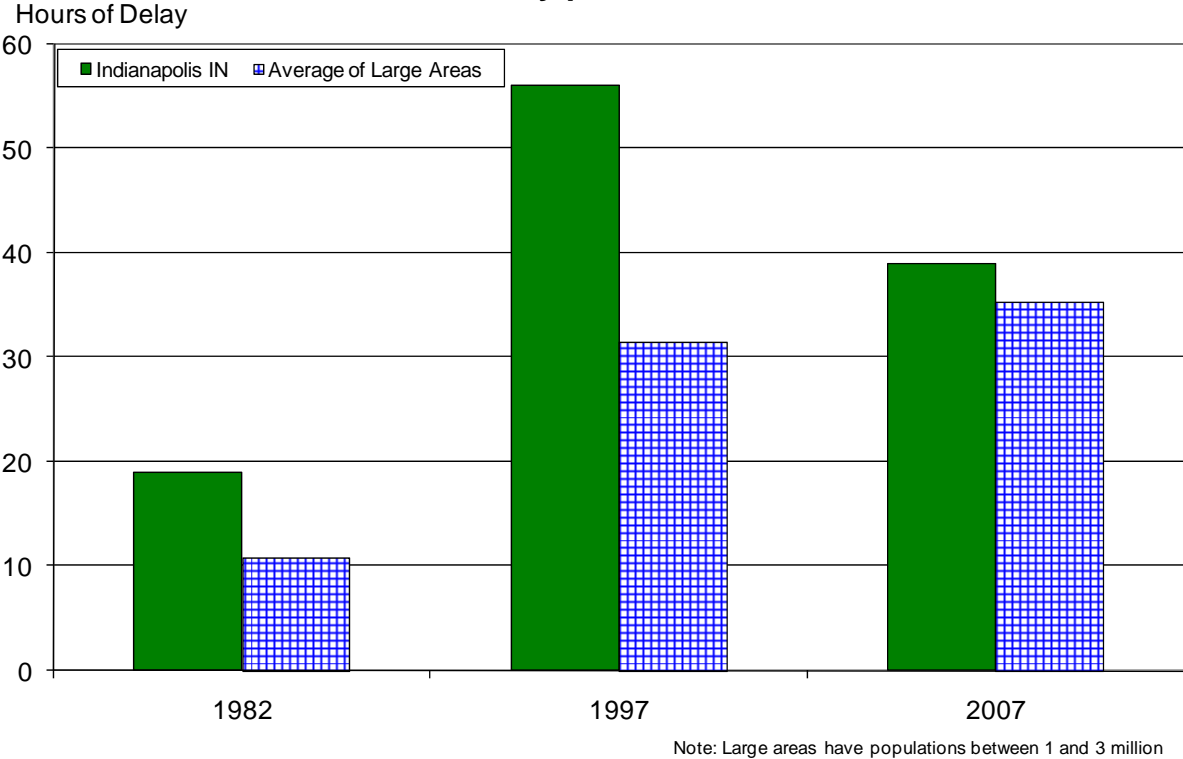
The Mobility Data for Indianapolis IN, Continued

Inventory Measures	1986	1985	1984	1983	1982
Urban Area Information					
Population (1000s)	895	865	860	860	860
Rank	35	35	35	34	34
Urban Area (square miles)	425	420	420	420	420
Population Density (persons/sq mile)	2,106	2,060	2,048	2,048	2,048
Peak Travelers (1000s)	384	368	364	361	357
Freeway					
Daily Vehicle-Miles of Travel (1000s)	6,695	6,060	5,790	5,400	5,530
Lane-Miles	685	685	685	680	670
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	8,710	8,600	8,490	8,420	8,310
Lane-Miles	1,425	1,410	1,410	1,405	1,405
Public Transportation					
Annual Psgr-Miles of Travel (millions)	65	73	69	69	69
Annual Unlinked Psgr Trips (millions)	14	16	17	17	17
Cost Components					
Value of Time (\$/hour)	8.18	8.03	7.75	7.43	7.20
Commercial Cost (\$/hour)	52.63	55.80	54.65	52.70	52.13
Fuel Cost (\$/gallon)	0.99	1.30	1.31	1.34	1.41
System Performance	1986	1985	1984	1983	1982
Congested Travel (% of peak VMT)	29	25	24	24	24
Congested System (% of lane-miles)	30	29	29	29	29
Congested Time (number of "Rush Hours")	4.6	4.2	4.0	3.6	3.8
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	--	--	--	--	--
Transit Riders or Carpoolers (millions)	--	--	--	--	--
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	5,091	4,383	4,039	3,941	3,805
Rank	26	27	25	24	23
Fuel per Peak Traveler (gallons)	13	12	11	11	11
Rank	18	17	18	15	12
Annual Delay					
Total Delay (1000s of person-hours)	8,816	7,827	7,165	7,033	6,711
Rank	25	26	25	23	23
Delay per Peak Traveler (person-hours)	23	21	20	19	19
Rank	15	14	15	15	11
Delay due to Incidents (percent)	53	53	53	53	53
Travel Time Index	1.10	1.09	1.09	1.09	1.08
Rank	24	30	23	20	22
Congestion Cost					
Total Cost (\$ millions)	99	89	80	75	71
Rank	23	23	23	22	21
Cost per Peak Traveler (\$)	258	242	219	209	199
Rank	13	14	15	9	9

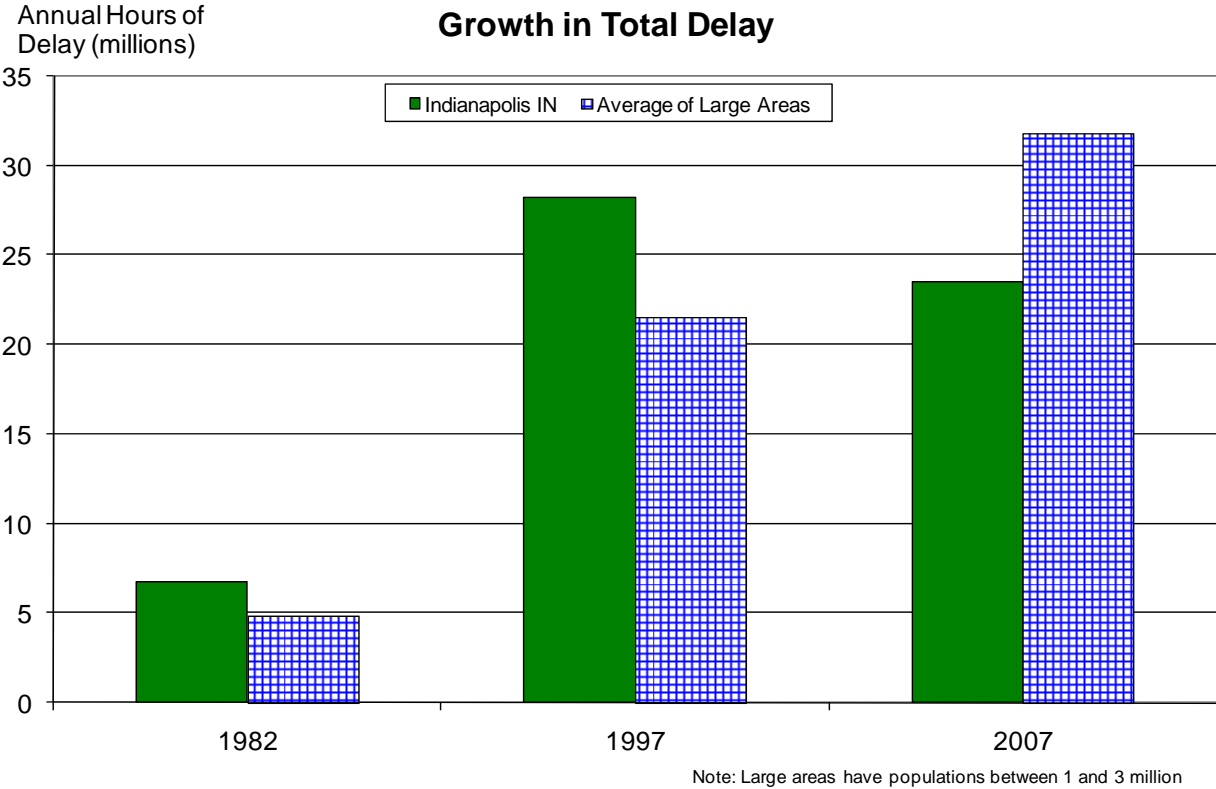
Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.

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Growth in Delay per Peak Traveler



Growth in Total Delay



Benefits from Public Transportation Service and Operations Strategies in Indianapolis IN

Operations Strategies	2007	2006	2005	2004
Freeway Ramp Metering				
Percent of Roadway Miles	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--
Freeway Incident Management				
Cameras				
Percent of Roadway Miles	50	48	49	51
Service Patrols				
Percent of Roadway Miles	39	41	43	44
Annual Delay Reduction (1000 hours)	249	254	240	220
Arterial Signal Coordination				
Percent of Roadway Miles	59	36	29	27
Annual Delay Reduction (1000 hours)	113	79	137	121
Arterial Access Management				
Percent of Roadway Miles	26	26	22	22
Annual Delay Reduction (1000 hours)	336	448	301	305
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	697	781	677	646
Annual Delay Saved per Peak Traveler (hours)	1	1	1	1
Annual Congestion Cost Savings (\$million)	15.5	16.7	14.0	12.6
Travel Time Index with Strategies	1.205	1.212	1.215	1.222
Travel Time Index (Base)	1.211	1.219	1.221	1.227
Public Transportation Service	2007	2006	2005	2004
Existing Service				
Annual Passenger-miles of travel (million)	47	51	44	47
Unlinked Passenger Trips (million)	9	10	9	9
Travel Time Index (combined road and transit)	1.210	1.217	1.220	1.226
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.213	1.220	1.222	1.228
Annual Increase				
Delay (1000 hours)	431	394	331	313
Delay per Peak Traveler (hours)	1	1	1	1
Congestion Cost (\$million)	9.5	8.3	6.7	6.0

**Benefits from Public Transportation Service and Operations Strategies in
Indianapolis IN, Continued**

Operations Strategies	2003	2002	2001	2000
Freeway Ramp Metering				
Percent of Roadway Miles	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--
Freeway Incident Management				
Cameras				
Percent of Roadway Miles	53	8	8	8
Service Patrols				
Percent of Roadway Miles	46	48	40	30
Annual Delay Reduction (1000 hours)	216	168	175	126
Arterial Signal Coordination				
Percent of Roadway Miles	27	27	27	27
Annual Delay Reduction (1000 hours)	121	118	100	107
Arterial Access Management				
Percent of Roadway Miles	22	21	21	21
Annual Delay Reduction (1000 hours)	304	240	220	230
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	641	527	495	463
Annual Delay Saved per Peak Traveler (hours)	1	1	1	1
Annual Congestion Cost Savings (\$million)	12.0	9.6	9.0	8.3
Travel Time Index with Strategies	1.224	1.225	1.224	1.222
Travel Time Index (Base)	1.229	1.229	1.228	1.226
Public Transportation Service	2003	2002	2001	2000
Existing Service				
Annual Passenger-miles of travel (million)	57	53	51	55
Unlinked Passenger Trips (million)	11	10	11	12
Travel Time Index (combined road and transit)	1.228	1.228	1.227	1.224
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.231	1.231	1.230	1.228
Annual Increase				
Delay (1000 hours)	449	400	415	402
Delay per Peak Traveler (hours)	1	1	1	1
Congestion Cost (\$million)	8.3	7.2	7.4	7.1

**Comparison of Several Key Mobility Performance Measures
Large Group – 1 million to 3 million population urban areas**

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2007	
				Delay per Traveler	Total Delay
San Diego, CA	H+	H+	H+	F+	F+
Minneapolis-St., Paul MN	H	0	H+	F+	F+
Baltimore, MD	H+	H+	H+	F+	F+
Tampa-St. Petersburg, FL	H+	H+	H+	0	F+
St. Louis, MO-IL	L-	L-	0	S-	S
Denver-Aurora, CO	H+	H+	H+	F	F+
Riverside-San Bernardino, CA	H+	H+	H+	F+	F+
Sacramento, CA	H	H+	H	0	F+
Pittsburgh, PA	L-	L-	L-	S-	S-
Portland, OR-WA	0	H	0	0	F
Cleveland, OH	L-	L-	L-	S-	S-
San Jose, CA	H+	H+	H+	F	F+
Cincinnati, OH-KY-IN	L-	L	L	S	S-
Virginia Beach, VA	L	L	L	S-	S-
Kansas City, MO-KS	L-	L-	L-	S-	S-
Milwaukee, WI	L-	L-	L-	S-	S-
San Antonio, TX	H	0	0	F+	F
Las Vegas, NV	H+	H	0	F+	F+
Orlando, FL	H+	H	H	F+	F+
Providence, RI-MA	L	L	L	0	S-
Columbus, OH	L	L	L	0	S-
Buffalo, NY	L-	L-	L-	S-	S-
New Orleans, LA	L-	L	L-	S-	S-
Charlotte, NC-SC	H	0	L	F	S-
Indianapolis, IN	H	0	L	S	S-
Jacksonville, FL	H	0	L	0	S-
Austin, TX	H	H	L	F	S-
Memphis, TN-MS-AR	L-	L-	L-	S	S-
Raleigh-Durham, NC	0	L	L-	0	S-

0 – Average congestion levels or average congestion growth

H Higher congestion; H+ Much higher congestion; F Faster congestion growth; F+ Much faster growth

L Lower congestion; L- Much lower congestion; S Slower congestion growth; S- Much slower growth

Key Mobility Performance Measure Labels

Note: Designation of an urban area congestion problem as “Much higher”, “Much faster growth”, etc. is determined using a general indicator of the accuracy of the congestion estimates. For regions with the same indicator label, there may be no difference in congestion levels. Different values are used for the indicators in regions over 1 million population and below 1 million population.

Measures	Differences Within These Values May Not Indicate a Difference in Congestion Level	
	Above 1M Population	Below 1M Population
2007 Values Delay per Traveler - Travel Time Index - Total Delay -	Above 1M Population 5 Hours 5 Index Points 5 Hours x Average Population	Below 1M Population 3 Hours 3 Index Points 3 Hours x Average Population
1982 to 2007 Trends Delay per Traveler - Total Delay -	5 Hours 5 Hours x Average Population	3 Hours 3 Hours x Average Population