

Performance Measure Summary – Toledo, OH-MI

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 Toledo OH-MI

Inventory Measures	2007	2006	2005	2004	2003	2002
Urban Area Information						
Population (1000s)	520	520	520	520	520	510
Rank	71	71	70	70	70	70
Urban Area (square miles)	285	285	285	285	280	270
Population Density (persons/sq mile)	1,825	1,825	1,825	1,825	1,857	1,889
Peak Travelers (1000s)	286	284	282	281	279	271
Freeway						
Daily Vehicle-Miles of Travel (1000s)	4,025	4,125	4,090	4,155	4,115	4,090
Lane-Miles	335	330	330	330	330	320
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	4,855	5,040	4,920	4,930	4,785	4,725
Lane-Miles	1,210	1,210	1,200	1,180	1,175	1,085
Public Transportation						
Annual Psgr-Miles of Travel (millions)	24.0	26.4	24.9	22.8	20.6	20.4
Annual Unlinked Psgr Trips (millions)	5.8	6.2	5.7	5.1	4.4	3.6
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)	2.88	2.58	2.24	1.81	1.52	1.38
System Performance	2007	2006	2005	2004	2003	2002
Congested Travel (% of peak VMT)	25	27	26	29	26	28
Congested System (% of lane-miles)	25	25	25	25	25	25
Congested Time (number of "Rush Hours")	4.4	4.8	4.6	4.8	4.6	5.2
Annual Increase Needed to Maintain Constant Congestion Level:						
Lane-miles	2	14	13	26	24	27
Transit Riders or Carpoolers (millions)	0	3	3	5	5	6
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	2,480	2,686	2,655	2,980	2,641	2,769
Rank	74	74	72	68	69	68
Fuel per Peak Traveler (gallons)	9	9	9	11	9	10
Rank	71	72	70	66	70	67
Annual Delay						
Total Delay (1000s of person-hours)	3,916	4,217	4,207	4,753	4,111	4,227
Rank	77	74	72	69	70	69
Delay per Peak Traveler (person-hours)	14	15	15	17	15	16
Rank	73	72	71	66	70	69
Delay due to Incidents (percent)	59	58	58	58	58	58
Travel Time Index	1.08	1.09	1.09	1.10	1.09	1.10
Rank	77	70	66	63	66	61
Congestion Cost						
Total Cost (\$ millions)	83	86	82	87	72	72
Rank	74	73	72	69	69	68
Cost per Peak Traveler (\$)	290	301	290	309	258	267
Rank	74	72	72	67	70	70

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 Toledo OH-MI, Continued

Inventory Measures	2001	2000	1999	1998	1997
Urban Area Information					
Population (1000s)	505	500	495	495	495
Rank	70	70	70	69	69
Urban Area (square miles)	260	255	255	255	255
Population Density (persons/sq mile)	1,942	1,961	1,941	1,941	1,941
Peak Travelers (1000s)	265	259	253	250	247
Freeway					
Daily Vehicle-Miles of Travel (1000s)	4,095	4,025	3,805	3,745	3,590
Lane-Miles	320	320	320	320	320
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	4,665	4,610	4,550	4,480	4,430
Lane-Miles	1,025	975	910	880	850
Public Transportation					
Annual Psgr-Miles of Travel (millions)	22.9	22.2	22.3	22.0	21.2
Annual Unlinked Psgr Trips (millions)	4.4	4.6	4.6	4.8	5.1
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)	1.30	1.55	1.14	1.11	1.13
System Performance	2001	2000	1999	1998	1997
Congested Travel (% of peak VMT)	29	30	30	28	26
Congested System (% of lane-miles)	25	29	31	27	27
Congested Time (number of "Rush Hours")	5.2	5.2	5.0	5.0	4.8
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	31	44	50	69	80
Transit Riders or Carpoolers (millions)	7	10	12	16	19
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	2,884	2,907	2,721	2,485	2,211
Rank	68	68	67	66	66
Fuel per Peak Traveler (gallons)	11	11	11	10	9
Rank	64	64	65	67	66
Annual Delay					
Total Delay (1000s of person-hours)	4,387	4,441	4,169	3,806	3,544
Rank	68	68	68	66	65
Delay per Peak Traveler (person-hours)	17	17	16	15	14
Rank	65	65	68	68	69
Delay due to Incidents (percent)	59	58	57	57	56
Travel Time Index					
	1.10	1.10	1.10	1.09	1.08
Rank	62	63	63	64	67
Congestion Cost					
Total Cost (\$ millions)	75	74	65	58	53
Rank	68	68	68	66	66
Cost per Peak Traveler (\$)	282	285	258	233	215
Rank	65	65	67	68	68

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 Toledo OH-MI, Continued

Inventory Measures	1996	1995	1994	1993	1992
Urban Area Information					
Population (1000s)	495	495	490	490	490
Rank	66	66	66	65	64
Urban Area (square miles)	255	255	250	250	250
Population Density (persons/sq mile)	1,941	1,941	1,960	1,960	1,960
Peak Travelers (1000s)	244	241	235	232	229
Freeway					
Daily Vehicle-Miles of Travel (1000s)	3,380	3,305	3,295	3,095	2,950
Lane-Miles	320	320	320	320	320
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	4,425	4,000	3,560	3,120	2,800
Lane-Miles	825	810	790	775	760
Public Transportation					
Annual Psgr-Miles of Travel (millions)	20.5	21.9	23.8	26.4	28.2
Annual Unlinked Psgr Trips (millions)	4.5	4.7	5.0	5.8	5.9
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)	1.28	1.12	1.08	1.09	1.11
System Performance	1996	1995	1994	1993	1992
Congested Travel (% of peak VMT)	23	23	19	14	13
Congested System (% of lane-miles)	26	26	26	22	22
Congested Time (number of "Rush Hours")	4.6	4.0	3.6	3.0	2.8
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	86	72	62	47	21
Transit Riders or Carpoolers (millions)	21	16	13	9	4
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	1,949	1,772	1,332	860	728
Rank	67	67	70	78	78
Fuel per Peak Traveler (gallons)	8	7	6	4	3
Rank	66	68	75	80	84
Annual Delay					
Total Delay (1000s of person-hours)	3,207	2,925	2,169	1,385	1,171
Rank	65	67	71	78	78
Delay per Peak Traveler (person-hours)	13	12	9	6	5
Rank	67	69	78	83	85
Delay due to Incidents (percent)	55	55	55	54	54
Travel Time Index					
	1.07	1.07	1.06	1.04	1.04
Rank	68	66	70	78	77
Congestion Cost					
Total Cost (\$ millions)	47	41	30	18	15
Rank	65	68	70	78	78
Cost per Peak Traveler (\$)	192	171	127	79	66
Rank	67	69	79	87	87

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 Toledo OH-MI, Continued

Inventory Measures	1991	1990	1989	1988	1987
Urban Area Information					
Population (1000s)	490	490	490	490	490
Rank	64	63	62	60	59
Urban Area (square miles)	250	250	250	250	250
Population Density (persons/sq mile)	1,960	1,960	1,960	1,960	1,960
Peak Travelers (1000s)	226	223	221	220	218
Freeway					
Daily Vehicle-Miles of Travel (1000s)	2,770	2,810	2,725	2,615	2,805
Lane-Miles	320	320	320	320	320
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	2,650	2,550	2,505	2,435	2,395
Lane-Miles	735	715	705	690	675
Public Transportation					
Annual Psgr-Miles of Travel (millions)	29.6	31.4	29.3	29.4	35.0
Annual Unlinked Psgr Trips (millions)	6.0	6.4	7.1	6.7	8.9
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)	1.13	1.06	1.08	1.00	1.00
System Performance	1991	1990	1989	1988	1987
Congested Travel (% of peak VMT)	11	11	9	8	7
Congested System (% of lane-miles)	17	17	17	15	12
Congested Time (number of "Rush Hours")	2.7	2.7	2.7	2.6	2.7
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	33	23	28	25	49
Transit Riders or Carpoolers (millions)	6	4	5	4	9
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	550	551	458	398	355
Rank	82	77	79	82	82
Fuel per Peak Traveler (gallons)	2	2	2	2	2
Rank	87	86	87	84	81
Annual Delay					
Total Delay (1000s of person-hours)	897	900	739	663	585
Rank	81	77	80	82	82
Delay per Peak Traveler (person-hours)	4	4	3	3	3
Rank	87	86	87	87	83
Delay due to Incidents (percent)	54	54	54	54	54
Travel Time Index	1.03	1.03	1.03	1.02	1.02
Rank	85	80	79	86	83
Congestion Cost					
Total Cost (\$ millions)	11	11	8	7	6
Rank	81	77	80	81	82
Cost per Peak Traveler (\$)	49	48	38	32	28
Rank	87	87	87	88	88

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.

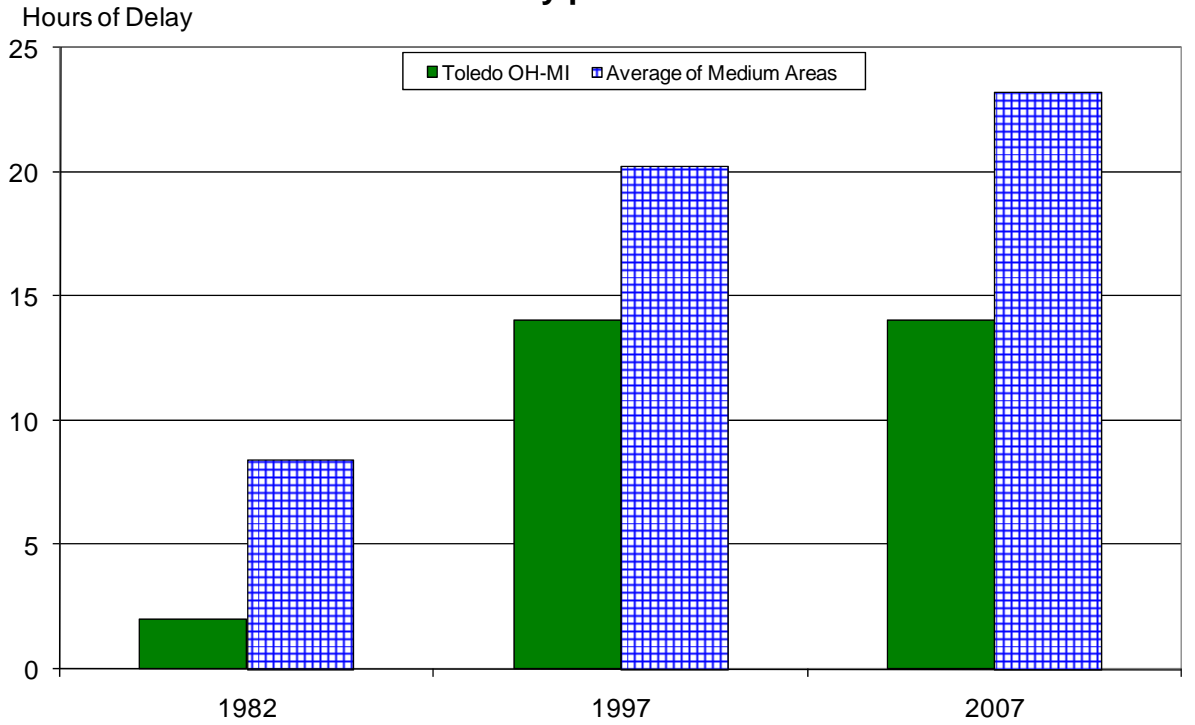
The Mobility Data for Toledo OH-MI, Continued

Inventory Measures	1986	1985	1984	1983	1982
Urban Area Information					
Population (1000s)	490	490	485	485	485
Rank	57	56	56	57	56
Urban Area (square miles)	280	250	240	240	240
Population Density (persons/sq mile)	1,750	1,960	2,021	2,021	2,021
Peak Travelers (1000s)	217	215	211	210	207
Freeway					
Daily Vehicle-Miles of Travel (1000s)	2,535	2,785	2,660	2,675	2,330
Lane-Miles	320	330	330	330	325
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	2,110	2,015	1,905	1,810	1,770
Lane-Miles	665	630	600	575	560
Public Transportation					
Annual Psgr-Miles of Travel (millions)	39.0	44.7	55.9	55.9	55.9
Annual Unlinked Psgr Trips (millions)	10.7	11.0	14.0	14.0	14.0
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)	0.98	1.28	1.29	1.32	1.38
System Performance	1986	1985	1984	1983	1982
Congested Travel (% of peak VMT)	7	7	6	6	6
Congested System (% of lane-miles)	12	12	11	11	15
Congested Time (number of "Rush Hours")	2.5	2.6	2.5	2.5	2.3
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	--	--	--	--	--
Transit Riders or Carpoolers (millions)	--	--	--	--	--
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	293	290	261	246	219
Rank	82	82	82	82	82
Fuel per Peak Traveler (gallons)	1	1	1	1	1
Rank	87	87	85	84	84
Annual Delay					
Total Delay (1000s of person-hours)	477	456	409	385	348
Rank	83	83	83	83	83
Delay per Peak Traveler (person-hours)	2	2	2	2	2
Rank	88	87	85	85	85
Delay due to Incidents (percent)	54	55	55	55	54
Travel Time Index	1.02	1.02	1.02	1.02	1.02
Rank	80	80	76	74	74
Congestion Cost					
Total Cost (\$ millions)	5	5	4	4	3
Rank	82	82	82	80	83
Cost per Peak Traveler (\$)	22	22	19	18	16
Rank	90	89	88	90	89

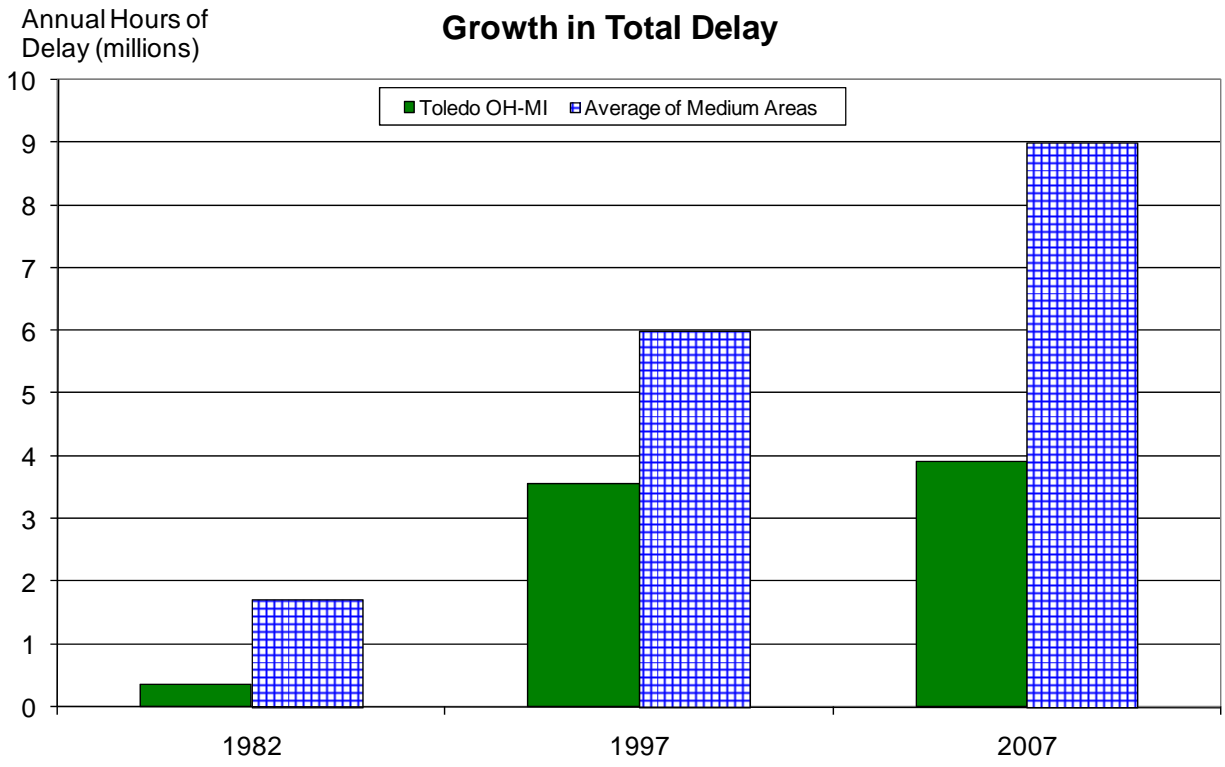
Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.

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

Growth in Delay per Peak Traveler



Growth in Total Delay



**Benefits from Public Transportation Service and Operations Strategies in
Toledo OH-MI**

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	3	--	--	--
Service Patrols				
Percent of Roadway Miles	--	--	--	--
Annual Delay Reduction (1000 hours)	1	--	--	--
Arterial Signal Coordination				
Percent of Roadway Miles	15	12	10	6
Annual Delay Reduction (1000 hours)	8	13	9	4
Arterial Access Management				
Percent of Roadway Miles	7	7	7	7
Annual Delay Reduction (1000 hours)	14	29	18	19
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	23	43	27	23
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0
Annual Congestion Cost Savings (\$million)	0.5	0.8	0.5	0.4
Travel Time Index with Strategies	1.085	1.089	1.089	1.100
Travel Time Index (Base)	1.085	1.089	1.090	1.100
Public Transportation Service	2007	2006	2005	2004
Existing Service				
Annual Passenger-miles of travel (million)	24.0	26.4	24.9	22.8
Unlinked Passenger Trips (million)	5.8	6.2	5.7	5.1
Travel Time Index (combined road and transit)	1.085	1.089	1.089	1.100
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.087	1.091	1.091	1.103
Annual Increase				
Delay (1000 hours)	141	122	114	168
Delay per Peak Traveler (hours)	0	0	0	1
Congestion Cost (\$million)	3.0	2.5	2.2	3.1

**Benefits from Public Transportation Service and Operations Strategies in
Toledo OH-MI, 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	--	--	--	--
Service Patrols				
Percent of Roadway Miles	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--
Arterial Signal Coordination				
Percent of Roadway Miles	6	6	7	7
Annual Delay Reduction (1000 hours)	1	1	1	1
Arterial Access Management				
Percent of Roadway Miles	7	8	8	8
Annual Delay Reduction (1000 hours)	25	31	31	34
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	25	32	32	35
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0
Annual Congestion Cost Savings (\$million)	0.4	0.5	0.5	0.6
Travel Time Index with Strategies	1.090	1.095	1.100	1.102
Travel Time Index (Base)	1.090	1.096	1.101	1.103
Public Transportation Service	2003	2002	2001	2000
Existing Service				
Annual Passenger-miles of travel (million)	20.6	20.4	22.9	22.2
Unlinked Passenger Trips (million)	4.4	3.6	4.4	4.6
Travel Time Index (combined road and transit)	1.090	1.095	1.100	1.102
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.091	1.098	1.103	1.105
Annual Increase				
Delay (1000 hours)	82	122	125	124
Delay per Peak Traveler (hours)	0	0	0	0
Congestion Cost (\$million)	1.5	2.1	2.2	2.1

**Comparison of Several Key Mobility Performance Measures
Medium Group – 500,000 to 1 million population urban areas**

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2007	
				Delay per Traveler	Total Delay
Nashville-Davidson, TN	H+	0	H+	F	F+
Salt Lake City, UT	H	H+	H+	F	F+
Richmond, VA	L	L-	H	0	F+
Louisville, KY-IN	H+	H+	H+	F+	F+
Hartford, CT	L	L	H	F	F+
Bridgeport-Stamford, CT-NY	H+	H+	H+	F+	F+
Oklahoma City, OK	H	L	H+	F+	F+
Tulsa, OK	0	L	0	0	F
Tucson, AZ	H+	H+	H+	F	F+
Dayton, OH	L-	L-	L-	S-	S-
Rochester, NY	L-	L-	L-	S-	S-
Birmingham, AL	H+	0	H+	F+	F+
Lancaster-Palmdale, CA	L-	L	L-	S-	S-
Honolulu, HI	H	H+	H	S	S
El Paso, TX-NM	L	L	L	0	S
Oxnard-Ventura, CA	H+	H+	H+	F+	F+
Sarasota-Bradenton, FL	H	H+	0	S-	0
Springfield, MA-CT	L-	L-	L-	S-	S-
Omaha, NE-IA	H	H	0	F+	F
Fresno, CA	L	0	L	S-	S-
Allentown-Bethlehem, PA-NJ	0	0	L	S	S-
Akron, OH	L-	L-	L-	S-	S-
Grand Rapids, MI	0	L	L	0	S
Albany-Schenectady, NY	L	L	L	0	S-
Albuquerque, NM	H+	H	H	F+	F+
New Haven, CT	L	L	L-	0	S-
Indio-Cathedral City-Palm Springs, CA	L-	0	L-	S-	S-
Toledo, OH-MI	L-	L-	L-	S	S-
Poughkeepsie-Newburgh, NY	L-	L-	L-	S-	S-
Bakersfield, CA	L-	L-	L-	S-	S-
Colorado Springs, CO	0	0	L	F	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