Performance Measure Summary – Lancaster-Palmdale, CA

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 Lancaster-Palmdale CA

Inventory Measures	2007	2006	2005	2004	2003	2002
Urban Area Information						
Population (1000s)	715	715	685	660	640	620
Rank	55	55	57	58	59	60
Urban Area (square miles)	220	220	220	215	215	210
Population Density (persons/sq mile)	3,250	3,250	3,114	3,070	2,977	2,952
Peak Travelers (1000s)	393	391	372	356	344	329
Freeway						
Daily Vehicle-Miles of Travel (1000s)	1,175	1,150	1,120	1,035	1,005	925
Lane-Miles	80	80	80	75	75	75
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	2,780	2,650	2,640	2,630	2,615	2,600
Lane-Miles	750	715	685	665	640	625
Public Transportation						
Annual Psgr-Miles of Travel (millions)	37.7	40.4	35.3	38.2	37.4	32.3
Annual Unlinked Psgr Trips (millions)	3.3	3.1	2.7	2.7	2.7	2.5
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 ($/gallon)	3.24	2.88	2.62	2.28	1.78	1.66
System Performance	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**
Congested Travel (% of peak VMT)	30	30	30	26	26	24
Congested System (% of lane-miles)	38	38	38	33	33	32
Congested Time (number of "Rush Hours")	5.2	5.0	5.0	5.0	5.0	4.6
Annual Increase Needed to Maintain Constant Congestion Level:						
Lane-miles	19	14	15	11	10	7
Transit Riders or Carpoolers (millions)	3	2	3	2	2	1
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	1,315	1,266	1,218	1,061	1,050	935
Rank	80	80	80	80	80	82
Fuel per Peak Traveler (gallons)	3	3	3	3	3	3
Rank	89	89	89	89	89	89
Annual Delay						
Total Delay (1000s of person-hours)	2,208	2,143	2,041	1,814	1,800	1,629
Rank	80	80	80	80	80	82
Delay per Peak Traveler (person-hours)	6	5	5	5	5	5
Rank	89	89	89	89	89	89
Delay due to Incidents (percent)	54	54	54	53	53	53
Travel Time Index	1.10	1.10	1.10	1.09	1.09	1.08
Rank	64	63	62	67	66	72
Congestion Cost						
Total Cost ($ millions)	44	41	37	32	30	26
Rank	80	80	80	80	80	82
Cost per Peak Traveler ($)	111	105	101	89	87	80
Rank	89	89	89	89	89	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.

The Mobility Data for Lancaster-Palmdale CA, Continued

Inventory Measures	2001	2000	1999	1998	1997
Urban Area Information					
Population (1000s)	590	555	510	470	430
Rank	61	65	68	70	70
Urban Area (square miles)	210	210	205	205	200
Population Density (persons/sq mile)	2,810	2,643	2,488	2,293	2,150
Peak Travelers (1000s)	309	287	261	237	214
Freeway					
Daily Vehicle-Miles of Travel (1000s)	855	770	765	780	745
Lane-Miles	75	75	75	75	75
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	2,610	2,650	2,630	2,600	2,620
Lane-Miles	610	590	565	540	525
Public Transportation					
Annual Psgr-Miles of Travel (millions)	32.5	31.7	30.9	32.0	32.1
Annual Unlinked Psgr Trips (millions)	2.4	2.3	2.2	2.1	2.0
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 ($/gallon)	1.93	1.72	1.59	1.27	1.40
System Performance	**2001**	**2000**	**1999**	**1998**	**1997**
Congested Travel (% of peak VMT)	21	20	18	19	19
Congested System (% of lane-miles)	28	27	23	23	23
Congested Time (number of "Rush Hours")	4.2	4.0	4.4	4.6	4.8
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	5	4	5	5	3
Transit Riders or Carpoolers (millions)	1	1	1	1	1
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	813	785	710	714	704
Rank	85	84	85	83	81
Fuel per Peak Traveler (gallons)	3	3	3	3	3
Rank	89	88	88	88	88
Annual Delay					
Total Delay (1000s of person-hours)	1,433	1,407	1,267	1,249	1,212
Rank	84	83	85	82	81
Delay per Peak Traveler (person-hours)	5	5	5	5	6
Rank	89	89	88	88	87
Delay due to Incidents (percent)	53	53	53	53	53
Travel Time Index	1.07	1.07	1.06	1.06	1.06
Rank	76	75	77	76	76
Congestion Cost					
Total Cost ($ millions)	23	22	19	18	17
Rank	84	83	84	82	81
Cost per Peak Traveler ($)	75	77	73	76	82
Rank	89	89	89	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 Lancaster-Palmdale CA, Continued

Inventory Measures	1996	1995	1994	1993	1992
Urban Area Information					
Population (1000s)	400	350	300	260	230
Rank	71	76	79	81	83
Urban Area (square miles)	200	195	195	190	190
Population Density (persons/sq mile)	2,000	1,795	1,538	1,368	1,211
Peak Travelers (1000s)	197	170	144	123	108
Freeway					
Daily Vehicle-Miles of Travel (1000s)	730	720	695	700	730
Lane-Miles	75	75	75	75	75
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	2,615	2,600	2,575	2,560	2,540
Lane-Miles	515	505	480	470	460
Public Transportation					
Annual Psgr-Miles of Travel (millions)	24.7	23.2	19.4	17.6	7.2
Annual Unlinked Psgr Trips (millions)	1.8	1.5	1.2	1.2	0.8
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 ($/gallon)	1.21	1.27	1.16	1.23	1.28
System Performance	**1996**	**1995**	**1994**	**1993**	**1992**
Congested Travel (% of peak VMT)	20	17	18	18	18
Congested System (% of lane-miles)	22	18	18	18	18
Congested Time (number of "Rush Hours")	4.8	4.8	5.0	5.2	5.4
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	9	12	12	16	17
Transit Riders or Carpoolers (millions)	2	2	2	3	4
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	736	622	644	641	636
Rank	81	81	80	80	80
Fuel per Peak Traveler (gallons)	4	4	4	5	6
Rank	82	82	81	77	68
Annual Delay					
Total Delay (1000s of person-hours)	1,287	1,083	1,128	1,109	1,106
Rank	80	81	81	80	80
Delay per Peak Traveler (person-hours)	7	6	8	9	10
Rank	82	85	80	75	70
Delay due to Incidents (percent)	53	53	53	53	53
Travel Time Index	1.06	1.05	1.06	1.06	1.06
Rank	75	78	70	68	66
Congestion Cost					
Total Cost ($ millions)	18	15	15	14	14
Rank	81	82	81	80	80
Cost per Peak Traveler ($)	92	87	104	116	129
Rank	88	87	81	78	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 Lancaster-Palmdale CA, Continued

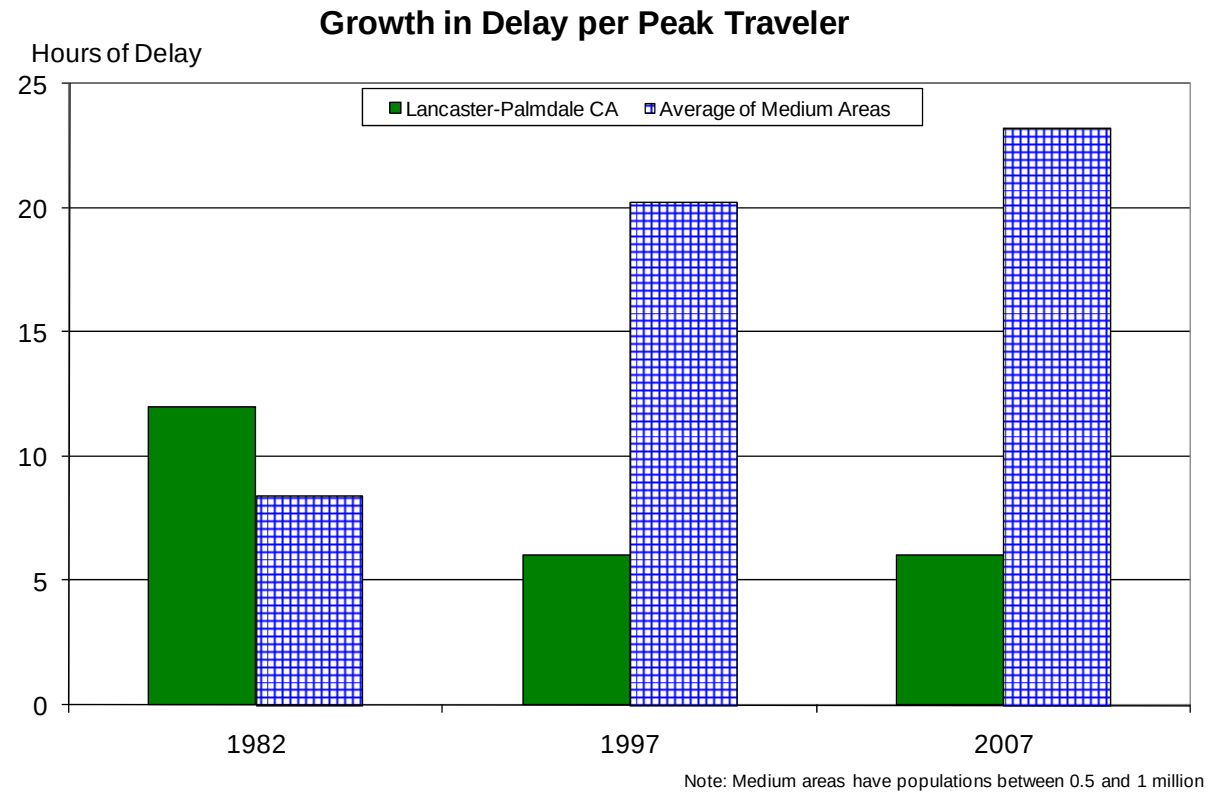
Inventory Measures	1991	1990	1989	1988	1987
Urban Area Information					
Population (1000s)	220	215	210	205	200
Rank	83	83	83	83	84
Urban Area (square miles)	185	180	175	165	165
Population Density (persons/sq mile)	1,189	1,194	1,200	1,242	1,212
Peak Travelers (1000s)	102	98	95	92	89
Freeway					
Daily Vehicle-Miles of Travel (1000s)	605	605	570	485	490
Lane-Miles	75	75	75	75	75
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	2,490	2,400	2,375	2,320	2,290
Lane-Miles	445	430	405	385	360
Public Transportation					
Annual Psgr-Miles of Travel (millions)	6.8	6.3	6.5	6.7	5.0
Annual Unlinked Psgr Trips (millions)	0.8	0.7	0.5	0.4	0.4
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 ($/gallon)	1.11	1.14	1.14	1.05	1.05
System Performance	**1991**	**1990**	**1989**	**1988**	**1987**
Congested Travel (% of peak VMT)	18	14	15	16	17
Congested System (% of lane-miles)	18	14	13	13	13
Congested Time (number of "Rush Hours")	5.0	5.0	5.2	5.4	5.8
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	18	18	19	16	16
Transit Riders or Carpoolers (millions)	4	4	4	3	4
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	627	498	496	476	493
Rank	77	81	78	77	75
Fuel per Peak Traveler (gallons)	6	5	5	5	6
Rank	63	67	68	67	53
Annual Delay					
Total Delay (1000s of person-hours)	1,115	890	874	829	855
Rank	76	78	77	77	76
Delay per Peak Traveler (person-hours)	11	9	9	9	10
Rank	62	66	65	65	59
Delay due to Incidents (percent)	53	53	53	53	53
Travel Time Index	1.06	1.05	1.05	1.05	1.05
Rank	56	65	63	59	58
Congestion Cost					
Total Cost ($ millions)	13	10	10	9	9
Rank	77	79	77	77	76
Cost per Peak Traveler ($)	133	105	101	94	97
Rank	65	68	68	68	62

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.

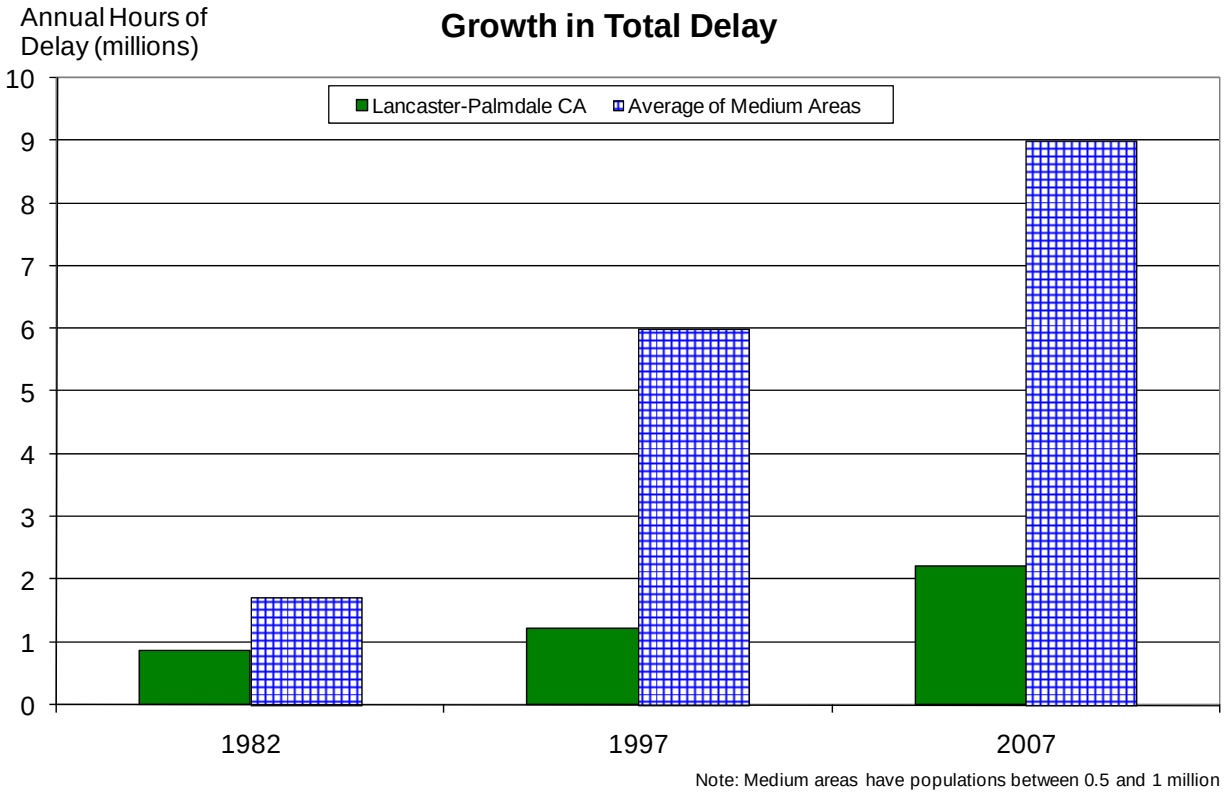
The Mobility Data for Lancaster-Palmdale CA, Continued

Inventory Measures	1986	1985	1984	1983	1982
Urban Area Information					
Population (1000s)	195	190	185	180	175
Rank	84	84	85	85	85
Urban Area (square miles)	160	155	150	145	140
Population Density (persons/sq mile)	1,219	1,226	1,233	1,241	1,250
Peak Travelers (1000s)	86	83	80	78	75
Freeway					
Daily Vehicle-Miles of Travel (1000s)	355	340	330	320	315
Lane-Miles	75	75	75	70	70
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	2,260	2,200	2,100	2,050	2,000
Lane-Miles	335	300	285	280	270
Public Transportation					
Annual Psgr-Miles of Travel (millions)	3.9	3.9	3.9	3.9	3.9
Annual Unlinked Psgr Trips (millions)	0.3	0.3	0.3	0.3	0.3
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 ($/gallon)	1.03	1.35	1.36	1.39	1.46
System Performance	**1986**	**1985**	**1984**	**1983**	**1982**
Congested Travel (% of peak VMT)	19	20	20	20	20
Congested System (% of lane-miles)	13	13	13	13	13
Congested Time (number of "Rush Hours")	6.6	7.2	7.2	7.2	7.2
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	- -	- -	- -	- -	- -
Transit Riders or Carpoolers (millions)	- -	- -	- -	- -	- -
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	531	553	529	512	503
Rank	75	71	69	70	70
Fuel per Peak Traveler (gallons)	6	7	7	7	7
Rank	53	40	37	33	30
Annual Delay					
Total Delay (1000s of person-hours)	920	952	911	881	864
Rank	74	71	69	70	68
Delay per Peak Traveler (person-hours)	11	11	11	11	12
Rank	52	45	42	38	28
Delay due to Incidents (percent)	53	53	53	53	53
Travel Time Index	1.06	1.06	1.06	1.06	1.06
Rank	49	46	42	39	37
Congestion Cost					
Total Cost ($ millions)	9	9	9	8	8
Rank	75	71	69	69	68
Cost per Peak Traveler ($)	104	112	108	105	104
Rank	56	51	46	40	35

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.



Note: Medium areas have populations between 0.5 and 1 million



Note: Medium areas have populations between 0.5 and 1 million

Benefits from Public Transportation Service and Operations Strategies in Lancaster-Palmdale CA

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	--	--	--	--
Service Patrols				
Percent of Roadway Miles	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--
Arterial Signal Coordination				
Percent of Roadway Miles	68	71	74	76
Annual Delay Reduction (1000 hours)	25	22	16	24
Arterial Access Management				
Percent of Roadway Miles	8	8	9	9
Annual Delay Reduction (1000 hours)	40	23	32	25
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	64	45	48	48
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0
Annual Congestion Cost Savings ($million)	1.3	0.8	0.9	0.8
Travel Time Index with Strategies	1.100	1.100	1.097	1.086
Travel Time Index (Base)	1.103	1.102	1.099	1.088
Public Transportation Service	**2007**	**2006**	**2005**	**2004**
Existing Service				
Annual Passenger-miles of travel (million)	37.7	40.4	35.3	38.2
Unlinked Passenger Trips (million)	3.3	3.1	2.7	2.7
Travel Time Index (combined road and transit)	1.100	1.099	1.097	1.086
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.108	1.108	1.105	1.094
Annual Increase				
Delay (1000 hours)	190	204	179	179
Delay per Peak Traveler (hours)	0	1	0	1
Congestion Cost ($million)	3.7	3.9	3.3	3.1

Benefits from Public Transportation Service and Operations Strategies in Lancaster-Palmdale CA, 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	79	81	81	84
Annual Delay Reduction (1000 hours)	19	17	14	13
Arterial Access Management				
Percent of Roadway Miles	9	10	10	10
Annual Delay Reduction (1000 hours)	16	17	7	11
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	35	35	21	24
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0
Annual Congestion Cost Savings ($million)	0.6	0.6	0.3	0.4
Travel Time Index with Strategies	1.087	1.079	1.069	1.068
Travel Time Index (Base)	1.088	1.080	1.070	1.069
Public Transportation Service	**2003**	**2002**	**2001**	**2000**
Existing Service				
Annual Passenger-miles of travel (million)	37.4	32.3	32.5	31.7
Unlinked Passenger Trips (million)	2.7	2.5	2.4	2.3
Travel Time Index (combined road and transit)	1.086	1.078	1.068	1.067
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.092	1.085	1.075	1.072
Annual Increase				
Delay (1000 hours)	155	155	141	118
Delay per Peak Traveler (hours)	0	0	0	0
Congestion Cost ($million)	2.6	2.5	2.3	1.9

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	
2007 Values	**Above 1M Population**	**Below 1M Population**
Delay per Traveler -	5 Hours	3 Hours
Travel Time Index -	5 Index Points	3 Index Points
Total Delay -	5 Hours x Average Population	3 Hours x Average Population
1982 to 2007 Trends		
Delay per Traveler -	5 Hours	3 Hours
Total Delay -	5 Hours x Average Population	3 Hours x Average Population