Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FHWA/TX-98/1131-9		

4. Title and Subtitle	5. Report Date
URBAN ROADWAY CONGESTION—1982 TO 1994 VOLUME 2: METHODOLOGY AND URBANIZED AREA DATA	August 1997
	6. Performing Organization Code
7. Author(s) David L. Schrank and Timothy J. Lomax	8. Performing Organization Report No. Research Report 1131-9, Volume 2
9. Performing Organization Name and Address Texas Transportation Institute The Texas A&M University System College Station, Texas 77843-3135	10. Work Unit No. (TRAIS)
	11. Contract or Grant No. Study No. 0-1131
12. Sponsoring Agency Name and Address Texas Department of Transportation Research and Technology Transfer Office P. O. Box 5080 Austin, Texas 78763-5080	13. Type of Report and Period Covered Interim: September 1982 - August 1994
	14. Sponsoring Agency Code

15. Supplementary Notes

Research performed in cooperation with the Texas Department of Transportation and the U.S. Department of Transportation, Federal Highway Administration.
Research Study Title: Measuring and Monitoring Urban Mobility in Texas

16. Abstract

This research report represents the final year of a 10-year research effort focused on quantifying urban mobility. This study contains the facility information for 50 urban areas throughout the country. The database used for this research contains information on vehicle travel, system length, and urban area characteristics from 1982 to 1994. Various federal, state, and local agencies provided the information used to update and verify the primary database. The primary database and original source of most of the information is the Federal Highway Administration's Highway Performance Monitoring System (HPMS).

Researchers combined vehicle travel and system length data to develop Roadway Congestion Index (RCI) values for 50 urban areas including the seven largest in Texas. The RCI values provide an indicator of the relative mobility level within an urban area.

This report includes an analysis of the cost of congestion using travel delay and increased fuel consumption as estimated quantities. The impact of congestion was also estimated by the amount of additional facility capacity required to provide urban mobility. Congestion costs were estimated on an areawide, per eligible driver, and per capita basis.

17. Key Words	18. Distribution Statement
Mobility, Congestion, Economic Analysis, Transportation Planning, Travel Delay, RCI	No Restrictions. This document is available to the public through NTIS: National Technical Information Service 5285 Port Royal Road Springfield, Virginia 22161

19. Security Classif.(of this report)	20. Security Classif.(of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	256	

Form DOT F 1700.7 (8-72)

URBAN ROADWAY CONGESTION—1982 TO 1994
VOLUME 2: METHODOLOGY AND URBANIZED AREA DATA

by

David L. Schrank
Assistant Research Scientist
Texas Transportation Institute

and

Timothy J. Lomax
Research Engineer
Texas Transportation Institute

Research Report 1131-9, Volume 2
Research Study Number 0-1131
Research Study Title: Measuring and Monitoring Urban Mobility in Texas

Sponsored by the
Texas Department of Transportation
In Cooperation with
U.S. Department of Transportation
Federal Highway Administration

August 1997

TEXAS TRANSPORTATION INSTITUTE
The Texas A&M University System
College Station, Texas 77843-3135

IMPLEMENTATION STATEMENT

This report provides information that will assist the Texas Department of Transportation in planning future transportation needs for urban areas in Texas. This report quantifies congestion levels and the economic impact of congestion on urban motorists in seven large cities in Texas. The report also presents data for other large U.S. metropolitan areas to assist in determining mobility trends and the relative performance of Texas' roadway networks. This report is valuable for identifying transportation trends and prioritizing future needs.

DISCLAIMER

The contents of this report reflect the views of the authors who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Texas Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation. In addition, this report is not intended for construction, bidding, or permit purposes. David L. Schrank and Timothy J. Lomax (PE #54597) prepared this research report.

TABLE OF CONTENTS

LIST OF FIGURES

VOLUME 2

LIST OF TABLES

VOLUME 2

LIST OF TABLES, Continued

VOLUME 2

LIST OF TABLES, Continued

VOLUME 2

LIST OF TABLES, Continued

VOLUME 2

LIST OF TABLES, Continued

VOLUME 2

LIST OF TABLES, Continued

VOLUME 2

LIST OF TABLES, Continued

VOLUME 2

LIST OF TABLES, Continued

VOLUME 2

LIST OF TABLES, Continued

VOLUME 2

SUMMARY

This report represents the ninth year of a planned 10-year study to measure and monitor urban mobility in 50 urbanized areas throughout the United States. This research study estimates the level of congestion in the seven largest Texas urban areas and 43 other areas representing a cross-section of urban areas throughout the country. Quantitative estimates of mobility levels allow comparisons of transportation systems in the various urbanized areas and assist the transportation community in analyzing urban mobility.

The level of congestion in an urban area was estimated using procedures developed in previous research (1-4). The Roadway Congestion Index (RCI) combines the daily vehicle-kilometers of travel (VKT) per lane-kilometer for freeways and principal arterial street systems in a ratio comparing the existing value to values identified with congested conditions. Equation S-1 illustrates how the areawide and congested level travel per lane values are combined into the RCI values for each urban area.

$$\text{Roadway Congestion Index} = \frac{\frac{\text{Freeway VKT}}{\text{Ln.-Km.}} \times \text{Freeway VKT} + \frac{\text{Prin Art Str VKT}}{\text{Ln.-Km.}} \times \text{Prin Art Str VKT}}{13{,}000 \times \text{Freeway VKT} + 5{,}000 \times \text{Prin Art Str VKT}} \quad \text{Eq. S-1}$$

An RCI value of 1.0 or greater indicates that congested conditions exist areawide. It should be noted that urban areas with areawide values less than 1.0 may have sections of roadway that experience periods of heavy congestion, but the average mobility level within the urban area could be defined as uncongested. The RCI analyses presented in this report are intended to evaluate entire urban areas and not specific locations. The nature of the RCI equation (Eq. S-1) is to underestimate point or specific facility congestion if the overall system has "good" operational characteristics.

Areawide Mobility

Table S-1 combines the freeway and principal arterial street system daily VKT and daily VKT per lane-kilometer into the 1994 estimated Roadway Congestion Index (RCI). The 10 most congested urban areas in the study are displayed. The RCI values range from 1.52 (Los Angeles) to 1.18 (Atlanta). All of these urban areas have surpassed the RCI value at which undesirable levels of congestion occur (1.0).

Table S-1. 1994 Roadway Congestion Index Value

Urban Area	Freeway/Expressway		Principal Arterial Street		Roadway Congestion Index[3]	Rank
	Daily VKT[1] (000)	Daily VKT[2] Ln-Km	Daily VKT[1] (000)	Daily VKT[2] Ln-Km		
Los Angeles, CA	181,930	20,430	134,270	6,650	1.52	1
Washington, DC	49,310	18,230	29,790	7,770	1.43	2
San Fran-Oak, CA	68,960	17,480	23,670	6,230	1.33	3
Miami, FL	17,030	15,900	27,610	7,310	1.32	4
Chicago, IL	67,820	16,300	59,570	6,880	1.28	5
Seattle-Everett, WA	34,290	16,380	15,900	5,930	1.25	6
Detroit, MI	47,660	16,130	43,500	6,110	1.24	7
San Diego, CA	44,800	15,900	15,780	5,520	1.21	8
San Bernardino-Riv, CA	24,960	16,060	17,950	5,250	1.20	9
Atlanta, GA	53,130	15,350	20,530	6,010	1.18	10

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometers of travel per lane-kilometer.
[3] See Equation S-1.

See Table 1, Volume 1 for complete listing of urban areas.
Source: TTI Analysis

Table S-2 displays the 10 urban areas which have experienced the greatest growth in congestion between 1988 and 1994. The RCI values reflect the level of congestion occurring in the urban areas. Salt Lake City experienced a 31 percent increase in congestion during the seven-year period. The congestion increase rate in the top seven cities in this group approached or exceeded two percent per year.

Table S-2. Fastest Congestion Growth Areas

Urban Area	Percent Change 1988-1994	Rank 1988-1994	Year				
			1982	1988	1992	1993	1994
Salt Lake City, UT	31	50	0.63	0.72	0.90	0.92	0.94
Columbus, OH	20	49	0.68	0.79	0.93	0.93	0.95
Cincinnati, OH	19	48	0.86	0.88	1.01	1.03	1.05
Charlotte, NC	17	47	0.71	0.80	0.89	0.92	0.94
Detroit, MI	16	46	1.06	1.07	1.19	1.23	1.24
Minn-St. Paul, MN	16	45	0.76	0.90	0.99	1.02	1.04
Baltimore, MD	15	44	0.84	0.92	1.04	1.04	1.06
Miami, FL	12	43	1.05	1.18	1.30	1.32	1.32
Fort Worth, TX	11	42	0.76	0.87	0.94	0.95	0.97
Kansas City, MO	11	41	0.62	0.72	0.77	0.78	0.80

See Table 2, Volume 1 for complete listing of urban areas.

Source: TTI Analysis

The nine urban areas with the smallest growth in congestion between 1988 and 1994 are shown in Table S-3. Of the top 10, only Austin and San Bernardino-Riverside experienced a small increase in congestion levels. Congestion decreases in the other eight urban areas were between zero and one percent per year.

Table S-3. Slowest Congestion Growth Areas

Urban Area	Percent Change 1988-1994	Rank 1988-1994	Year				
			1982	1988	1992	1993	1994
Boston, MA	-4	1	0.90	1.12	1.07	1.07	1.08
Houston, TX	-3	2	1.17	1.15	1.12	1.13	1.12
Philadelphia, PA	-2	3	1.00	1.07	1.05	1.04	1.05
New Orleans, LA	-2	4	0.98	1.13	1.10	1.09	1.11
Norfolk, VA	-1	5	0.79	0.94	0.92	0.92	0.93
Los Angeles, CA	0	6	1.22	1.52	1.54	1.54	1.52
San Fran-Oak, CA	0	6	1.01	1.33	1.33	1.33	1.33
St. Louis, MO	0	6	0.83	0.98	0.95	0.96	0.98
Austin, TX	1	9	0.84	0.96	0.95	0.95	0.97
San Bernardino-Riv, CA	2	10	1.11	1.18	1.22	1.12	1.20

See Table 2, Volume 1 for complete listing of urban areas.

Source: TTI Analysis

The 10 urban areas with the highest amount of daily delay are shown in Table S-4. Los Angeles topped this list with approximately 2.4 million person-hours of delay on a daily basis. New York was the only other urban area with over a million person-hours of daily delay. While Los Angeles tops the list for greatest amount of total delay, it ranks fourth amongst all of the study cities with 63 person-hours of delay annually per eligible driver.

Another way of examining the effect of congestion on travel speeds is the areawide speed ratio (ASR). The ASR is a ratio of the network average speeds to the average free-flow speeds on the freeway and principal arterial street networks. The lower the ASR value, the slower the speeds estimated for the areawide roadway system during peak periods. Table S-5 shows the urban areas with lowest ASR values. San Francisco-Oakland has the lowest ASR of 65. This indicates that a driver in San Francisco-Oakland is experiencing peak period driving speeds that are 65 percent of free-flow speeds. All of these 11 areas have ASR values under 75.

Table S-6 lists the top 11 urban areas based on the amount of fuel wasted annually due to congested travel. Los Angeles tops the list with almost 2.5 billion liters of wasted fuel annually. New York is second with about 2.3 billion liters. Dallas and Seattle-Everett are tied at 10th in this group with about 410 million liters of fuel wasted annually. These 11 areas consume 10.4 billion liters annually due to congestion in their urban areas. San Bernardino-Riverside led this group with about 316 liters of fuel wasted annually per eligible driver.

Table S-7 combines existing freeway and principal arterial street distances with (1990 to 1994) recent annual traffic volume growth rates to produce the number of additional lane-kilometers for both freeway and principal arterial streets which would be necessary to avoid increases in areawide congestion. This value illustrates the amount of roadway that would have to be added *every year* to maintain a constant congestion level. The average amount of roadway, which was added annually during this time period, was also calculated. The annual deficiency in construction of lane-kilometers of freeway and principal arterial streets is shown. Detroit leads this list of cities with a deficiency of 238 lane-kilometers annually between 1990 and 1994 (105 lane-kilometers of freeway and 133 lane-kilometers of principal arterial streets).

Table S-4. Daily and Annual Hours of Delay for 1994

Urban Area	Daily Person-Hours of Delay (000)				Person-Annual Hours of Delay per Capita	Rank[1]	Person-Hours of Annual Delay per Eligible Driver	Rank[1]
	Recurring	Incident	Total	Rank[1]				
Los Angeles, CA	1,089	1,275	2,364	1	49	5	63	4
New York, NY	764	1,399	2,162	2	32	14	40	15
San Fran-Oak, CA	367	462	828	3	54	2	65	3
Chicago, IL	383	443	826	4	27	21	35	20
Washington, DC	293	522	815	5	59	1	71	2
Detroit, MI	257	419	677	6	42	9	57	7
Houston, TX	232	313	546	7	46	6	61	5
Boston, MA	122	332	454	8	38	12	46	12
Atlanta, GA	202	222	424	9	44	7	56	8
Seattle-Everett, WA	166	221	387	10	51	4	59	6

Notes: [1] Rank value of 1 associated with most congested conditions.

See Table 3, Volume 1 for complete listing of urban areas.

Source: TTI Analysis

Table S-5. Areawide Speeds and Congestion Levels for 1994

Urban Area	Roadway Congestion Index	Rank	Areawide Speed Ratio	Rank	Peak Period Speeds (kph)	
					Freeway	Prin. Arterial
San Fran-Oak, CA	1.33	3	65	1	60	44
Los Angeles, CA	1.52	1	69	2	61	47
Washington, DC	1.43	2	69	2	65	42
Houston, TX	1.12	13	70	4	65	48
Seattle-Everett, WA	1.25	6	70	4	65	47
San Bernardino-Riv, CA	1.20	9	72	6	65	47
New York, NY	1.15	11	73	7	71	41
San Jose, CA	1.06	21	74	8	70	47
Austin, TX	0.97	32	75	9	70	48
Chicago, IL	1.28	5	75	9	69	45

See Table 5, Volume 1 for complete listing of urban areas.

Source: TTI Analysis

Table S-6. Annual Excess Fuel Consumed Due to Traffic Congestion in 1994

Urban Area	Annual Liters of Fuel Wasted (million)				Annual Excess Fuel Consumed per Capita (liters)	Rank[1]	Annual Excess Fuel Consumed per Eligible Driver (liters)	Rank[1]
	Recurring	Incident	Total	Rank[1]				
Los Angeles, CA	1,138	1,331	2,469	1	206	5	264	4
New York, NY	802	1,469	2,271	2	134	16	167	15
San Fran-Oak, CA	391	493	884	3	228	3	279	3
Chicago, IL	398	460	858	4	111	21	144	21
Washington, DC	307	546	853	5	248	1	296	2
Detroit, MI	265	432	697	6	174	9	236	8
Houston, TX	250	337	587	7	199	6	261	5
Boston, MA	129	351	480	8	161	12	193	13
Atlanta, GA	213	234	447	9	186	8	235	9
Dallas, TX	155	256	411	10	187	7	239	7
Seattle-Everett, WA	176	235	411	10	215	4	252	6

Notes: [1] Rank value of 1 associated with greatest fuel consumption.

See Table 8, Volume 1 for complete listing of urban areas.

Source: TTI Analysis

Table S-7. Illustration of Annual Capacity Increase Required to Prevent Congestion Growth

Urban Area	Existing (1994) Lane-km		Average Annual VKT Growth (%)[1]	Annual Freeway Lane-km		Annual Prin. Art. Lane-km		Lane-km Deficiency	
	Fwy	Prin. Art.		Needed	Added	Needed	Added	Fwy	Prin. Art.
Detroit, MI	2,954	7,124	4.83	143	38	344	211	105	133
Orlando, FL	1,047	1,932	6.78	71	24	131	52	47	79
New York, NY	10,151	12,478	1.59	162	163	199	76	-1	123
Kansas City, MO	2,520	1,819	5.22	132	83	95	28	49	67
Atlanta, GA	3,462	3,413	7.25	251	177	247	221	74	26
Washington, DC	2,705	3,832	3.27	89	62	125	52	27	73
Nashville, TN	1,079	1,570	6.97	75	72	109	14	3	95
Cincinnati, OH	1,586	1,344	4.44	70	32	60	6	38	54
San Antonio, TX	1,594	1,827	4.93	79	66	90	18	13	72
Minn-St. Paul, MN	2,496	1,996	4.42	110	28	88	97	82	-9

Note: [1] Average Annual Growth Rate of Freeway and Principal Arterial Streets Daily VKT between 1990-1994.

See Table 10, Volume 1 for complete listing of urban areas.

Source: TTI Analysis

The urban areas with the highest annual congestion costs are shown in Table S-8. Delay and fuel costs comprise the total congestion costs. These 10 urban areas have an annual combined congestion cost of over $34 billion. Los Angeles and New York had the highest total congestion costs with values of $8.6 billion and $7.9 billion, respectively. The final urban area in the table, Seattle, had a total congestion cost of $1.4 billion annually.

Table S-8. Component and Total Congestion Costs by Urban Area for 1994

Urban Area	Annual Cost Due to Congestion ($ millions)			Rank
	Delay	Fuel	Total	
Los Angeles, CA	7,790	830	8,620	1
New York, NY	7,140	760	7,900	2
San Fran-Oak, CA	2,760	300	3,060	3
Chicago, IL	2,720	280	3,000	4
Washington, DC	2,690	270	2,960	5
Detroit, MI	2,210	210	2,420	6
Houston, TX	1,830	170	2,000	7
Boston, MA	1,500	150	1,650	8
Atlanta, GA	1,400	130	1,530	9
Seattle-Everett, WA	1,280	140	1,420	10

See Table 11, Volume 1 for complete listing of urban areas.

Source: TTI Analysis and Local Transportation Agency Reference

Congestion costs can be used in relation to eligible drivers to show the impact on each potential driver in the urban area. Table S-9 lists the top 10 congestion costs per eligible driver for 1994. San Bernardino-Riverside ranks first with a cost of $1,100 per driver. Dallas and Houston had costs of $810 and $890 per driver, respectively, or approximately $3.5 per driver per workday.

Table S-9. 1994 Congestion Cost per Eligible Driver

Urban Area	Total Congestion Cost	
	Per Eligible Driver (dollars)	Rank
San Bernardino-Riv, CA	1,100	1
Washington, DC	1,030	2
San Fran-Oak, CA	960	3
Los Angeles, CA	920	4
Houston, TX	890	5
Seattle-Everett, WA	870	6
Detroit, MI	820	7
Dallas, TX	810	8
Atlanta, GA	800	9
Miami, FL	760	10

See Table 12, Volume 1 for complete listing of urban areas.

Source: TTI Analysis

Expressing congestion costs on a per capita basis illustrates the congestion "tax" paid by residents (Table S-10). The highest 1994 cost per capita occurred in Washington, DC with a cost per capita of $860. Detroit and Miami had the smallest cost per capita ($600) of the top 10 urban areas with a cost of just over $2 per capita for each workday.

Table S-10. 1994 Congestion Cost per Capita

Urban Area	Total Congestion Cost	
	Per Capita (dollars)	Rank
Washington, DC	860	1
San Bernardino-Riv, CA	790	2
San Fran-Oak, CA	790	3
Seattle-Everette, WA	740	4
Los Angeles, CA	720	5
Houston, TX	680	6
Dallas, TX	640	7
Atlanta, GA	640	8
Detroit, MI	600	8
Miami, FL	600	10

See Table 12, Volume 1 for complete listing of urban areas.

Source: TTI Analysis

INTRODUCTION

Volume 2 of this report contains supporting data for Volume 1, "Urban Roadway Congestion—1982 to 1994." It is divided into six appendices.

Appendix A contains a set of tables that correspond to those in the research report with the Imperial unit equivalents. Each table from the report has a matching table in Appendix A. There are some tables that are repeated in Appendix A to provide a complete set of equivalent tables based on the Imperial system.

Appendix B provides background information concerning the development of the congestion measurement methodology utilized in the report.

Appendix C contains congestion level and congestion cost data for each of the study areas, showing levels of congestion for each urban area for 1982 to 1994. Appendix C also contains background information and methodology used to calculate congestion costs.

Appendix D shows travel and system length statistics for the urban areas for 1982 to 1994. Included in this section are the same 1992 statistics, which are normalized by population and urban area size.

Appendix E contains the congestion statistics for each urban area for 1982 to 1994. The tables are organized by individual urban area, rather than by topic or statistic. They are useful for analyses of congestion trends on urban area roadway systems.

Appendix F contains congestion delay and cost statistics for each urban area for 1982 to 1994. The tables are organized by individual urban area, rather than by topic or statistic. These tables are also useful for analyses of congestion trends on urban area roadway systems.

APPENDIX A

IMPERIAL UNIT EQUIVALENT TABLES

Table A-1. 1994 Roadway Congestion Index Value

Urban Area	Freeway/Expressway		Principal Arterial Street		Roadway Congestion Index[3]	Rank
	DVMT[1] (1000)	DVMT[2] Ln-Mile	DVMT[1] (1000)	DVMT[2] Ln-Mile		
Los Angeles, CA	113,000	20,430	83,400	6,650	1.52	1
Washington, DC	30,630	18,230	18,500	7,770	1.43	2
San Fran-Oak, CA	42,840	17,480	14,700	6,230	1.33	3
Miami, FL	10,580	15,900	17,150	7,310	1.32	4
Chicago, IL	42,130	16,300	37,000	6,880	1.28	5
Seattle-Everett, WA	21,300	16,380	9,880	5,930	1.25	6
Detroit, MI	29,600	16,130	27,020	6,110	1.24	7
San Diego, CA	27,830	15,900	9,800	5,520	1.21	8
San Bernardino-Riv, CA	15,500	16,060	11,150	5,250	1.20	9
Atlanta, GA	33,000	15,350	12,750	6,010	1.18	10
New York, NY	88,080	13,970	55,700	7,190	1.15	11
Honolulu, HI	5,600	14,000	1,940	7,610	1.13	12
Houston, TX	32,960	14,650	11,740	5,220	1.12	13
New Orleans, LA	5,510	13,280	5,030	6,790	1.11	14
Portland, OR	8,640	13,820	4,700	6,710	1.11	14
Dallas, TX	25,700	14,120	10,530	5,480	1.09	16
Phoenix, AZ	10,400	13,870	18,620	5,560	1.09	16
Boston, MA	21,750	14,310	14,250	4,900	1.08	18
Denver, CO	13,480	13,480	11,250	5,950	1.07	19
Tampa, FL	4,500	12,860	5,020	6,280	1.07	19
Baltimore, MD	18,800	13,570	10,050	5,830	1.06	21
Sacramento, CA	10,630	13,040	7,950	6,260	1.06	21
San Jose, CA	16,880	13,720	7,280	5,270	1.06	21
Cincinnati, OH	13,480	13,680	4,430	5,300	1.05	24
Philadelphia, PA	20,920	12,090	22,000	6,670	1.05	24
Minn-St. Paul, MN	20,700	13,350	7,140	5,760	1.04	26
Cleveland, OH	15,410	12,840	6,280	5,390	1.00	27
Milwaukee, WI	7,800	12,890	6,100	5,170	1.00	27
Ft. Lauderdale, FL	9,300	12,830	6,450	5,120	0.99	29
Albuquerque, NM	2,920	11,680	4,770	5,610	0.98	30
St. Louis, MO	20,600	11,870	12,730	6,360	0.98	30
Austin, TX	6,580	12,180	2,920	5,670	0.97	32
Fort Worth, TX	13,840	12,300	5,620	5,430	0.97	32
Jacksonville, FL	6,520	12,540	6,550	4,850	0.97	32
Nashville, TN	7,750	11,570	5,900	6,050	0.96	35
Columbus, OH	10,180	12,110	3,600	5,540	0.95	36
Louisville, KY	7,600	11,780	3,650	5,790	0.95	36
Charlotte, NC	3,830	11,610	3,290	5,480	0.94	38
Memphis, TN	5,400	11,490	5,770	5,390	0.94	38
Salt Lake City, UT	6,430	11,800	2,850	5,760	0.94	38
Hartford, CT	7,070	11,490	3,820	5,700	0.93	41
Norfolk, VA	6,080	10,470	5,080	6,590	0.93	41
Indianapolis, IN	9,500	11,590	5,250	5,250	0.92	43
San Antonio, TX	11,530	11,640	6,070	5,340	0.92	43
Orlando, FL	6,730	10,350	6,300	5,250	0.86	45
Oklahoma City, OK	7,750	10,470	4,650	5,310	0.85	46
Pittsburgh, PA	9,420	8,050	11,760	6,270	0.83	47
Kansas City, MO	15,630	9,990	5,620	4,970	0.80	48
El Paso, TX	3,820	10,190	3,400	3,890	0.78	49
Corpus Christi, TX	2,160	9,370	1,710	4,500	0.76	50
Northeastern Avg	28,090	13,100	19,440	6,330	1.08	
Midwestern Avg	16,700	12,750	10,290	5,650	1.01	
Southern Avg	9,020	12,570	7,210	5,920	1.02	
Southwestern Avg	11,800	12,300	7,220	5,310	0.97	
Western Avg	29,130	15,650	16,750	6,160	1.21	
Texas Avg	13,800	12,060	6,000	5,080	0.94	
Total Avg	17,760	13,180	11,380	5,820	1.05	
Maximum Value	113,000	20,430	83,400	7,770	1.52	
Minimum Value	2,160	8,050	1,710	3,890	0.76	

Notes: [1] Daily vehicle-miles of travel.
[2] Daily vehicle-miles of travel per lane-mile.
[3] See Equation 1.

Source: TTI Analysis

Table A-2. Roadway Congestion Index Values, 1982 to 1994

Urban Area	Percent Change				Year						
	Short-Term 1988 to 1994		Long-Term 1982 to 1994		1982	1986	1988	1990	1992	1993	1994
	Percent	Rank	Percent	Rank							
Boston, MA	(4)	1	20	20	0.90	1.04	1.12	1.06	1.07	1.07	1.08
Houston, TX	(3)	2	-4	2	1.17	1.21	1.15	1.12	1.12	1.13	1.12
Philadelphia, PA	(2)	3	5	3	1.00	1.06	1.07	1.05	1.05	1.04	1.05
New Orleans, LA	(2)	4	13	7	0.98	1.09	1.13	1.12	1.10	1.09	1.11
Norfolk, VA	(1)	5	18	15	0.79	0.89	0.94	0.96	0.92	0.92	0.93
Los Angeles, CA	0	6	25	29	1.22	1.42	1.52	1.55	1.54	1.54	1.52
San Fran-Oak, CA	0	6	32	42	1.01	1.24	1.33	1.36	1.33	1.33	1.33
St. Louis, MO	0	6	18	15	0.83	0.93	0.98	0.95	0.95	0.96	0.98
Austin, TX	1	9	15	13	0.84	0.94	0.96	0.94	0.95	0.95	0.97
San Bernardino-Riv, CA	2	10	8	6	1.11	1.15	1.18	1.21	1.22	1.21	1.20
Albuquerque, NM	2	11	26	33	0.78	0.96	0.96	0.98	0.95	0.96	0.98
Jacksonville, FL	2	12	7	5	0.91	0.95	0.95	0.93	0.97	0.96	0.97
Nashville, TN	2	13	25	29	0.77	0.86	0.94	0.89	0.92	0.93	0.96
Pittsburgh, PA	2	14	6	4	0.78	0.79	0.81	0.82	0.81	0.82	0.83
Sacramento, CA	3	15	33	45	0.80	0.95	1.03	1.02	1.04	1.04	1.06
Cleveland, OH	3	16	25	29	0.80	0.86	0.97	0.94	0.95	0.98	1.00
Hartford, CT	3	17	22	22	0.76	0.85	0.90	0.89	0.91	0.93	0.93
Atlanta, GA	4	18	30	40	0.91	1.09	1.14	1.14	1.17	1.16	1.18
Tampa, FL	4	19	14	10	0.94	0.96	1.03	1.05	1.07	1.06	1.07
New York, NY	5	20	14	10	1.01	1.06	1.10	1.14	1.14	1.15	1.15
Phoenix, AZ	5	21	-5	1	1.15	1.20	1.04	1.05	1.08	1.08	1.09
El Paso, TX	5	22	24	28	0.63	0.75	0.74	0.74	0.76	0.77	0.78
Honolulu, HI	6	23	23	26	0.92	1.03	1.07	1.09	1.10	1.13	1.13
San Jose, CA	6	24	23	26	0.86	0.97	1.00	1.05	1.07	1.05	1.06
Milwaukee, WI	6	25	20	20	0.83	0.90	0.94	0.99	1.00	1.00	1.00
Portland, OR	7	26	28	36	0.87	0.97	1.04	1.08	1.10	1.11	1.11
Seattle-Everett, WA	7	27	32	42	0.95	1.09	1.17	1.20	1.22	1.23	1.25
Dallas, TX	7	28	30	40	0.84	1.04	1.02	1.05	1.07	1.07	1.09
San Antonio, TX	7	29	19	18	0.77	0.88	0.86	0.88	0.90	0.91	0.92
San Diego, CA	7	30	55	50	0.78	1.00	1.13	1.22	1.22	1.21	1.21
Denver, CO	8	31	22	22	0.88	0.97	0.99	1.03	1.05	1.07	1.07
Indianapolis, IN	8	32	37	46	0.67	0.81	0.85	0.84	0.85	0.89	0.92
Chicago, IL	8	33	25	29	1.02	1.15	1.18	1.25	1.28	1.26	1.28
Corpus Christi, TX	9	34	13	7	0.67	0.71	0.70	0.72	0.74	0.75	0.76
Oklahoma City, OK	9	35	18	15	0.72	0.76	0.78	0.79	0.83	0.86	0.85
Louisville, KY	9	36	22	22	0.78	0.80	0.87	0.86	0.90	0.93	0.95
Memphis, TN	9	37	13	7	0.83	0.80	0.86	0.89	0.92	0.93	0.94
Washington, DC	10	38	28	36	1.12	1.27	1.30	1.34	1.36	1.41	1.43
Ft. Lauderdale, FL	10	39	14	10	0.87	0.85	0.90	0.94	0.96	0.98	0.99
Orlando, FL	10	40	19	18	0.72	0.76	0.78	0.77	0.80	0.82	0.86
Kansas City, MO	11	41	29	39	0.62	0.68	0.72	0.74	0.77	0.78	0.80
Fort Worth, TX	11	42	28	36	0.76	0.87	0.87	0.90	0.94	0.95	0.97
Miami, FL	12	43	26	33	1.05	1.14	1.18	1.27	1.30	1.32	1.32
Baltimore, MD	15	44	26	33	0.84	0.88	0.92	1.01	1.04	1.04	1.06
Minn-St. Paul, MN	16	45	37	46	0.76	0.89	0.90	0.95	0.99	1.02	1.04
Detroit, MI	16	46	17	14	1.06	1.05	1.07	1.13	1.19	1.23	1.24
Charlotte, NC	17	47	32	42	0.71	0.78	0.80	0.86	0.89	0.92	0.94
Cincinnati, OH	19	48	22	22	0.86	0.84	0.88	0.96	1.01	1.03	1.05
Columbus, OH	20	49	40	48	0.68	0.75	0.79	0.89	0.93	0.93	0.95
Salt Lake City, UT	31	50	49	49	0.63	0.68	0.72	0.85	0.90	0.92	0.94
Northeastern Avg					0.92	0.99	1.03	1.04	1.05	1.07	1.08
Midwestern Avg					0.80	0.87	0.91	0.94	0.97	0.99	1.01
Southern Avg					0.86	0.92	0.97	0.98	1.00	1.01	1.02
Southwestern Avg					0.83	0.93	0.91	0.93	0.95	0.96	0.97
Western Avg					0.95	1.09	1.16	1.20	1.20	1.21	1.21
Texas Avg					0.81	0.91	0.90	0.91	0.93	0.93	0.94
Total Avg					0.86	0.95	0.99	1.01	1.03	1.04	1.05
Maximum Value					1.22	1.42	1.52	1.55	1.54	1.54	1.52
Minimum Value					0.62	0.68	0.70	0.72	0.74	0.75	0.76

Source: TTI Analysis

Table A-3. Daily and Annual Person-Hours of Delay for 1994

Urban Area	Daily Person-Hours of Delay (000)				Annual Person-Hours of Delay per Capita	Rank[1]	Annual Person-Hours of Delay per Eligible Driver	Rank[1]
	Recurring	Incident	Total	Rank[1]				
Northeastern Cities								
Baltimore, MD	74	136	210	18	25	22	31	22
Boston, MA	121	328	449	8	38	12	45	12
Hartford, CT	19	38	57	40	23	24	30	23
New York, NY	761	1,388	2,149	2	32	14	40	15
Philadelphia, PA	160	215	375	12	18	38	23	38
Pittsburgh, PA	68	101	169	21	22	27	27	30
Washington, DC	291	517	808	5	59	1	70	2
Midwestern Cities								
Chicago, IL	380	440	821	3	27	21	34	21
Cincinnati, OH	43	37	80	34	16	40	21	40
Cleveland, OH	54	43	97	28	13	43	18	42
Columbus, OH	38	31	69	36	17	39	22	39
Detroit, MI	256	416	673	6	42	9	57	7
Indianapolis, IN	22	29	51	41	13	43	17	44
Kansas City, MO	20	44	63	39	12	45	15	45
Louisville, KY	24	27	51	41	16	40	19	41
Milwaukee, WI	33	34	67	38	14	42	18	42
Minn-St. Paul, MN	86	83	169	21	19	36	24	35
Oklahoma City, OK	17	19	36	48	11	46	14	47
St. Louis, MO	88	100	188	20	23	24	30	23
Southern Cities								
Atlanta, GA	200	220	421	9	44	7	55	8
Charlotte, NC	23	23	46	44	21	31	27	30
Ft. Lauderdale, FL	49	65	114	25	22	27	26	32
Jacksonville, FL	40	50	90	31	29	18	37	18
Memphis, TN	19	21	41	45	11	46	15	45
Miami, FL	144	180	323	13	42	9	53	10
Nashville, TN	24	26	50	43	20	33	25	34
New Orleans, LA	38	56	94	30	21	31	28	28
Norfolk, VA	33	62	95	29	24	23	30	23
Orlando, FL	32	43	75	35	20	33	24	35
Tampa, FL	31	38	69	36	23	24	28	28
Southwestern Cities								
Albuquerque, NM	19	21	40	46	19	36	24	35
Austin, TX	40	44	85	32	36	13	45	12
Corpus Christi, TX	4	4	7	50	6	50	8	50
Dallas, TX	142	235	377	11	43	8	55	8
Denver, CO	105	110	215	17	32	14	40	15
El Paso, TX	9	10	19	49	8	49	11	49
Fort Worth, TX	59	100	159	23	32	14	42	14
Houston, TX	230	310	539	7	46	6	60	5
Phoenix, AZ	134	110	245	15	29	18	38	17
Salt Lake City, UT	22	17	39	47	11	46	14	47
San Antonio, TX	50	55	105	27	22	27	29	26
Western Cities								
Honolulu, HI	33	52	85	32	31	17	36	19
Los Angeles, CA	1,079	1,263	2,342	1	49	5	63	4
Portland, OR	46	76	122	24	28	20	35	20
Sacramento, CA	59	51	110	26	22	27	29	26
San Bernardino-Riv, CA	133	155	288	14	54	2	74	1
San Diego, CA	124	85	209	19	20	33	26	32
San Fran-Oak, CA	363	457	820	4	53	3	65	3
San Jose, CA	110	130	240	16	39	11	50	11
Seattle-Everett, WA	164	219	383	10	50	4	59	6
Northeastern Avg	171	311	482		31		38	
Midwestern Avg	71	87	158		19		24	
Southern Avg	46	57	103		25		32	
Southwestern Avg	59	74	133		26		33	
Western Avg	188	221	409		38		49	
Texas Avg	61	87	148		28		36	
Total Avg	98	133	231		27		34	
Maximum Value	1,079	1,383	2,342		59		74	
Minimum Value	4	4	7		6		8	

Source: TTI Analysis

Table A-4. Annual Person-Hours of Delay per Eligible Driver, 1982 to 1994

Urban Area	Annual Delay per Eligible Driver						Percent Change 1982 - 1994
	1982	1986	1990	1992	1993	1994	
Northeastern Cities							
Baltimore, MD	13	21	25	30	31	31	138
Boston, MA	26	39	43	45	44	45	73
Hartford, CT	9	15	23	25	30	30	233
New York, NY	25	31	35	38	39	40	60
Philadelphia, PA	20	25	24	23	23	23	15
Pittsburgh, PA	13	20	24	25	26	27	108
Washington, DC	42	55	65	70	69	70	67
Midwestern Cities							
Chicago, IL	19	28	29	33	33	34	79
Cincinnati, OH	7	9	15	18	20	21	200
Cleveland, OH	5	7	13	15	16	18	260
Columbus, OH	11	14	22	23	22	22	100
Detroit, MI	30	36	44	51	57	57	90
Indianapolis, IN	4	5	7	8	12	17	325
Kansas City, MO	6	8	9	14	15	15	150
Louisville, KY	8	9	10	13	16	19	138
Milwaukee, WI	9	13	16	17	17	18	100
Minn-St. Paul, MN	9	15	20	22	23	24	167
Oklahoma City, OK	9	11	12	14	14	14	56
St. Louis, MO	20	24	26	26	29	30	50
Southern Cities							
Atlanta, GA	29	47	45	46	53	55	90
Charlotte, NC	17	22	26	27	27	27	59
Ft. Lauderdale, FL	13	17	21	23	24	26	100
Jacksonville, FL	22	24	32	32	35	37	68
Memphis, TN	7	8	10	12	13	15	114
Miami, FL	30	35	49	47	51	53	77
Nashville, TN	14	23	28	26	24	25	79
New Orleans, LA	14	25	26	25	25	28	100
Norfolk, VA	18	29	32	30	29	30	67
Orlando, FL	13	18	17	18	22	24	85
Tampa, FL	21	24	27	28	27	28	33
Southwestern Cities							
Albuquerque, NM	9	13	18	17	20	24	167
Austin, TX	25	37	34	34	41	45	80
Corpus Christi, TX	3	4	4	7	7	8	167
Dallas, TX	36	55	53	52	52	55	53
Denver, CO	24	28	33	37	41	40	67
El Paso, TX	5	7	7	11	11	11	120
Fort Worth, TX	21	34	33	36	39	42	100
Houston, TX	51	55	55	57	59	60	18
Phoenix, AZ	31	34	37	39	40	38	23
Salt Lake City, UT	5	6	8	10	12	14	180
San Antonio, TX	14	25	22	25	27	29	107
Western Cities							
Honolulu, HI	25	29	30	35	37	36	44
Los Angeles, CA	41	59	64	64	64	63	54
Portland, OR	16	18	27	32	33	35	119
Sacramento, CA	14	19	26	25	29	29	107
San Bernardino-Riv, CA	42	67	73	75	75	74	76
San Diego, CA	12	19	29	27	26	26	117
San Fran-Oak, CA	39	60	67	64	65	65	67
San Jose, CA	33	50	55	54	52	50	52
Seattle-Everett, WA	26	41	55	58	59	59	127
Northeastern Avg	21	29	34	36	37	38	81
Midwestern Avg	11	15	19	21	23	24	118
Southern Avg	18	25	28	29	30	32	78
Southwestern Avg	20	27	28	29	32	33	65
Western Avg	27	40	47	48	49	49	81
Texas Avg	22	31	30	32	34	36	64
Total Avg	19	26	30	32	33	34	79
Maximum Value	51	67	73	75	75	74	325
Minimum Value	3	4	4	7	7	8	18

Source: TTI Analysis

Table A-5. Areawide Speeds and Congestion Levels for 1994

Urban Area	Roadway Congestion Index	Rank	Areawide Speed Ratio	Rank	Peak-Period Speeds (mph)	
					Freeway	Prin. Arterial
San Fran-Oak, CA	1.33	3	65	1	37	28
Washington, DC	1.43	2	69	2	40	26
Los Angeles, CA	1.52	1	70	3	38	29
Seattle-Everett, WA	1.25	6	70	3	40	29
Houston, TX	1.12	13	71	5	40	30
San Bernardino-Riv, CA	1.20	9	72	6	40	29
New York, NY	1.15	11	73	7	44	25
Chicago, IL	1.28	5	75	8	43	28
Miami, FL	1.32	4	75	8	43	27
San Jose, CA	1.06	21	75	8	43	29
Austin, TX	0.97	32	76	11	44	30
Phoenix, AZ	1.09	16	76	11	42	28
Atlanta, GA	1.18	10	77	13	46	28
Dallas, TX	1.09	16	77	13	45	31
Denver, CO	1.07	19	77	13	45	29
Honolulu, HI	1.13	12	77	13	46	27
Detroit, MI	1.24	7	78	17	46	28
New Orleans, LA	1.11	14	80	18	47	30
San Diego, CA	1.21	8	80	18	47	31
Fort Worth, TX	0.97	32	81	20	48	31
Boston, MA	1.08	18	82	21	47	31
Portland, OR	1.11	14	82	21	49	29
Ft. Lauderdale, FL	0.99	29	83	23	49	30
Charlotte, NC	0.94	38	84	24	51	29
Minn-St. Paul, MN	1.04	26	84	24	51	29
Philadelphia, PA	1.05	24	84	24	53	27
Sacramento, CA	1.06	21	84	24	51	29
San Antonio, TX	0.92	43	84	24	49	32
Jacksonville, FL	0.97	32	85	29	51	30
Norfolk, VA	0.93	41	85	29	50	31
Cincinnati, OH	1.05	24	86	31	51	32
Cleveland, OH	1.00	27	86	31	51	32
Columbus, OH	0.95	36	86	31	52	30
Tampa, FL	1.07	19	86	31	54	28
Baltimore, MD	1.06	21	87	35	52	31
Orlando, FL	0.86	45	87	35	51	32
Pittsburgh, PA	0.83	47	87	35	55	28
Salt Lake City, UT	0.94	38	87	35	52	31
St. Louis, MO	0.98	30	87	35	53	29
Milwaukee, WI	1.00	27	88	40	52	31
Albuquerque, NM	0.98	30	89	41	54	31
Hartford, CT	0.93	41	91	42	55	32
Louisville, KY	0.95	36	91	42	56	29
Memphis, TN	0.94	38	91	42	55	32
Nashville, TN	0.96	35	91	42	55	32
El Paso, TX	0.78	49	92	46	54	34
Indianapolis, IN	0.92	43	92	46	55	32
Oklahoma City, OK	0.85	46	94	48	58	31
Corpus Christi, TX	0.76	50	95	49	56	34
Kansas City, MO	0.80	48	95	49	57	33
Northeastern Avg	1.08		82		50	29
Midwestern Avg	1.01		87		52	30
Southern Avg	1.02		84		50	30
Southwestern Avg	0.97		82		48	31
Western Avg	1.21		75		44	29
Texas Avg	0.94		82		48	32
Total Avg	1.05		82		49	30
Maximum Value	1.52		95		58	34
Minimum Value	0.76		65		37	25

Source: TTI Analysis

Table A-6. Areawide Speed Ratio 1982 to 1994

Urban Area	Areawide Speed Ratio						% Change 1982-1984
	1982	1986	1990	1992	1993	1994	
Seattle-Everette, WA	84	78	72	71	71	70	(17)
San Bernardino-Riv, CA	81	75	73	72	72	72	(11)
San Fran-Oak, CA	73	67	65	65	65	65	(11)
San Jose, CA	88	85	80	80	80	80	(9)
San Diego, CA	91	88	84	84	84	83	(9)
Ft. Lauderdale, FL	82	76	74	74	74	75	(9)
Phoenix, AZ	83	77	77	76	75	76	(8)
Salt Lake City, UT	95	94	93	91	89	87	(8)
Denver, CO	84	82	80	78	77	77	(8)
Washington, DC	75	73	71	69	69	69	(8)
Fort Worth, TX	88	83	84	84	82	81	(8)
Minn-St. Paul, MN	91	89	86	86	84	84	(8)
Cincinnati, OH	93	92	89	87	86	86	(8)
Cleveland, OH	93	91	89	88	86	86	(8)
Austin, TX	83	79	79	77	77	77	(7)
Atlanta, GA	86	80	80	80	81	80	(7)
New Orleans, LA	90	88	86	84	84	84	(7)
Boston, MA	90	88	86	87	85	84	(7)
Charlotte, NC	95	93	91	90	90	89	(6)
Sacramento, CA	80	79	75	76	75	75	(6)
Albuquerque, NM	81	78	78	78	77	76	(6)
Miami, FL	98	98	96	96	94	92	(6)
Detroit, MI	82	77	78	78	78	77	(6)
Portland, OR	83	82	79	79	77	78	(6)
Jacksonville, FL	87	84	82	81	82	82	(6)
Los Angeles, CA	87	87	84	82	82	82	(6)
Baltimore, MD	90	89	86	86	85	85	(6)
Orlando, FL	92	90	89	87	87	87	(5)
Hartford, CT	92	89	89	89	87	87	(5)
New York, NY	96	95	93	93	91	91	(5)
Indianapolis, IN	77	77	75	74	73	73	(5)
Chicago, IL	79	75	76	74	75	75	(5)
Dallas, TX	81	79	78	77	77	77	(5)
Honolulu, HI	88	84	85	84	84	84	(5)
San Antonio, TX	91	88	87	87	87	87	(4)
Pittsburgh, PA	92	89	88	88	88	88	(4)
Milwaukee, WI	95	95	95	94	93	91	(4)
Louisville, KY	95	94	94	93	93	91	(4)
Memphis, TN	96	94	94	92	92	92	(4)
El Paso, TX	73	69	69	69	69	70	(4)
Norfolk, VA	88	83	82	84	84	85	(3)
Columbus, OH	89	89	86	86	86	86	(3)
Oklahoma City, OK	97	96	95	94	94	94	(3)
Corpus Christi, TX	98	97	97	95	95	95	(3)
Houston, TX	86	84	84	84	84	84	(2)
Philadelphia, PA	89	89	89	89	87	87	(2)
St. Louis, MO	97	97	97	95	95	95	(2)
Kansas City, MO	72	68	70	71	70	71	(1)
Tampa, FL	87	87	85	85	86	86	(1)
Nashville, FL	91	92	89	90	91	91	0
Northeastern Avg	86	84	83	82	82	82	(5)
Midwestern Avg	91	90	89	88	87	87	(4)
Southern Avg	88	86	85	84	84	84	(5)
Southwestern Avg	87	84	84	83	83	82	(6)
Western Avg	82	78	76	75	75	75	(9)
Texas Avg	86	83	84	83	83	82	(5)
Total Avg	87	85	84	83	83	82	(6)
Maximum Value	98	98	97	96	95	95	(3)
Minimum Value	72	67	65	65	65	65	(10)

Source: TTI Analysis

Table A-7. Areawide Speeds and Delay per Capita for 1994

Urban Area	Annual Hours of Delay per Capita	Rank	Areawide Speed Ratio	Rank
Washington, DC	59	1	69	2
San Bernardino-Riv, CA	54	2	72	6
San Fran-Oak, CA	53	3	65	1
Seattle-Everett, WA	50	4	70	3
Los Angeles, CA	49	5	70	3
Houston, TX	46	6	71	5
Atlanta, GA	44	7	77	13
Dallas, TX	43	8	77	13
Detroit, MI	42	9	78	17
Miami, FL	42	9	75	8
San Jose, CA	39	11	75	8
Boston, MA	38	12	82	21
Austin, TX	36	13	76	11
Denver, CO	32	14	77	13
Fort Worth, TX	32	14	81	20
New York, NY	32	14	73	7
Honolulu, HI	31	17	77	13
Jacksonville, FL	29	18	85	29
Phoenix, AZ	29	18	76	11
Portland, OR	28	20	82	21
Chicago, IL	27	21	75	8
Baltimore, MD	25	22	87	35
Norfolk, VA	24	23	85	29
St. Louis, MO	23	24	91	42
Hartford, CT	23	24	87	35
Tampa, FL	23	24	86	31
Ft. Lauderdale, FL	22	27	83	23
Pittsburgh, PA	22	27	87	35
Sacramento, CA	22	27	84	24
San Antonio, TX	22	27	84	24
Charlotte, NC	21	31	84	24
New Orleans, LA	21	31	80	18
San Diego, CA	20	33	91	42
Minn-St. Paul, MN	20	33	87	35
Nashville, TN	20	33	80	18
Orlando, FL	19	36	89	41
Albuquerque, NM	19	36	84	24
Columbus, OH	18	38	84	24
Philadelphia, PA	17	39	86	31
Cincinnati, OH	16	40	86	31
Louisville, KY	16	40	91	42
Cleveland, OH	14	42	88	40
Milwaukee, WI	13	43	86	31
Indianapolis, IN	13	43	92	46
Kansas City, MO	12	45	95	49
Memphis, TN	11	46	91	42
Oklahoma City, OK	11	46	94	48
Salt Lake City, UT	11	46	87	35
El Paso, TX	8	49	92	46
Corpus Christi, TX	6	50	95	49
Northeastern Avg	31		82	
Midwestern Avg	19		87	
Southern Avg	25		84	
Southwestern Avg	26		82	
Western Avg	38		75	
Texas Avg	28		82	
Total Avg	27		82	
Maximum Value	59		95	
Minimum Value	6		65	

Source: TTI Analysis

Table A-8. Annual Excess Fuel Consumed Due to Traffic Congestion in 1994

Urban Area	Annual Gallons of Fuel Wasted (millions)				Annual Excess Fuel Consumed per Capita (gallons)	Rank[2]	Annual Excess Fuel Consumed per Eligible Driver (gallons)	Rank[2]
	Recurring	Incident	Total	Rank[1]				
Northeastern Cities								
Baltimore, MD	27	49	76	19	36	22	45	22
Boston, MA	44	119	163	8	55	12	66	13
Hartford, CT	7	14	21	40	33	25	44	23
New York, NY	275	502	777	2	46	15	57	15
Philadelphia, PA	55	74	129	12	25	38	31	39
Pittsburgh, PA	23	35	58	23	30	32	37	33
Washington, DC	105	186	291	5	84	1	101	2
Midwestern Cities								
Chicago, IL	135	157	292	4	38	21	49	21
Cincinnati, OH	16	14	30	34	24	40	31	39
Cleveland, OH	20	16	36	28	20	42	26	42
Columbus, OH	14	11	25	36	25	38	32	38
Detroit, MI	90	147	237	6	59	9	80	8
Indianapolis, IN	8	11	19	41	20	42	26	42
Kansas City, MO	7	16	23	39	18	45	23	45
Louisville, KY	9	9	18	42	22	41	27	41
Milwaukee, WI	12	12	24	37	20	42	26	42
Minn-St. Paul, MN	31	30	61	21	29	34	36	35
Oklahoma City, OK	6	7	13	48	15	48	20	48
St. Louis, MO	31	36	67	20	34	24	43	25
Southern Cities								
Atlanta, GA	73	80	153	9	64	7	80	8
Charlotte, NC	8	8	16	44	30	32	38	30
Ft. Lauderdale, FL	18	24	42	25	32	26	38	30
Jacksonville, FL	14	18	32	31	41	18	53	17
Memphis, TN	7	8	15	45	16	46	21	46
Miami, FL	50	62	112	13	57	10	73	11
Nashville, TN	9	9	18	42	29	34	37	33
New Orleans, LA	14	20	34	30	31	29	41	28
Norfolk, VA	12	23	35	29	36	22	44	23
Orlando, FL	12	15	27	35	29	34	35	36
Tampa, FL	11	13	24	37	31	29	38	30
Southwestern Cities								
Albuquerque, NM	7	7	14	46	26	37	34	37
Austin, TX	15	17	32	31	53	13	67	12
Corpus Christi, TX	1	1	2	50	10	50	13	50
Dallas, TX	53	88	141	10	64	7	82	7
Denver, CO	38	39	77	18	46	15	57	15
El Paso, TX	3	4	7	49	12	49	17	49
Fort Worth, TX	22	37	59	22	48	14	63	14
Houston, TX	85	115	200	7	68	6	89	5
Phoenix, AZ	48	39	87	16	41	18	53	17
Salt Lake City, UT	8	6	14	46	16	46	21	46
San Antonio, TX	18	20	38	27	32	26	43	25
Western Cities								
Honolulu, HI	12	19	31	33	45	17	53	17
Los Angeles, CA	387	453	840	1	70	5	90	4
Portland, OR	17	27	44	24	40	20	50	20
Sacramento, CA	21	18	39	26	32	26	42	27
San Bernardino-Riv, CA	48	56	104	14	78	2	108	1
San Diego, CA	47	33	80	17	31	29	39	29
San Fran-Oak, CA	134	168	302	3	78	3	95	3
San Jose, CA	41	48	89	15	57	10	74	10
Seattle-Everett, WA	60	80	140	11	74	4	86	6
Northeastern Avg	76	139	215		45		56	
Midwestern Avg	32	40	72		34		44	
Southern Avg	21	26	47		41		52	
Southwestern Avg	27	34	61		47		61	
Western Avg	86	101	187		64		81	
Texas Avg	29	40	69		53		69	
Total Avg	44	60	104		47		59	
Maximum Value	387	502	840		84		108	
Minimum Value	1	1	2		10		13	

Notes: [1] Rank value of 1 associated with greatest fuel consumption.
[2] Rank value of 1 associated with greatest fuel consumption per capita.

Source: TTI Analysis

Table A-9. Annual Wasted Fuel Due to Congestion

Urban Area	Annual Wasted Gallons (millions)						Percent Change 1982-1994
	1982	1986	1990	1992	1993	1994	
Indianapolis, IN	4	5	8	9	13	19	375
Salt Lake City, UT	10	15	26	30	34	37	270
Hartford, CT	4	7	10	10	12	14	250
Cleveland, OH	2	4	4	7	7	7	250
Minn-St. Paul, MN	6	9	15	17	20	21	250
Albuquerque, NM	4	5	7	10	12	14	250
Cincinnati, OH	19	33	47	53	58	62	226
San Diego, CA	10	12	20	27	29	31	210
Kansas City, MO	26	46	79	82	80	80	208
El Paso, TX	1	1	1	2	2	3	200
Baltimore, MD	5	7	9	12	13	15	200
Seattle-Everett, WA	26	44	57	70	74	76	192
Sacramento, CA	48	81	121	134	137	140	192
Atlanta, GA	11	20	22	23	28	32	191
Orlando, FL	8	10	12	20	22	23	188
Austin, TX	54	92	107	121	140	153	183
Louisville, KY	14	21	31	33	38	39	179
Memphis, TN	10	15	17	19	24	27	170
Corpus Christi, TX	6	10	13	15	16	16	167
Ft. Lauderdale, FL	7	8	9	12	15	18	157
Charlotte, NC	17	23	33	36	38	42	147
San Antonio, TX	16	28	29	33	36	39	144
Nashville, TN	19	23	33	40	42	44	132
Portland, OR	46	73	92	102	105	105	128
Columbus, OH	11	14	22	24	24	25	127
San Bernardino-Riv, CA	26	43	46	49	55	59	127
Fort Worth, TX	8	13	18	18	17	18	125
Jacksonville, FL	26	41	51	52	55	58	123
Pittsburgh, PA	16	28	34	34	33	35	119
Washington, DC	134	193	238	272	280	291	117
Norfolk, VA	15	18	25	27	30	32	113
Milwaukee, WI	43	72	86	91	89	88	105
San Jose, CA	145	212	237	276	280	292	101
Chicago, IL	12	17	21	22	22	24	100
Denver, CO	17	28	31	30	31	34	100
Oklahoma City, OK	39	49	61	69	75	77	97
New Orleans, LA	122	143	183	210	235	237	94
Detroit, MI	156	246	297	293	301	302	94
San Fran-Oak, CA	58	69	99	100	107	112	93
Miami, FL	12	16	20	22	21	23	92
Tampa, FL	74	120	123	127	129	141	91
Dallas, TX	46	62	75	84	87	87	89
Phoenix, AZ	87	130	155	161	158	163	87
Boston, MA	7	9	10	12	13	13	86
Honolulu, HI	17	21	25	29	31	31	82
Los Angeles, CA	469	709	818	838	851	840	79
St. Louis, MO	41	51	56	57	65	67	63
New York, NY	479	547	691	736	763	776	62
Houston, TX	132	169	177	187	197	201	52
Philadelphia, PA	86	107	119	126	130	129	50
Northeastern Avg	120	153	189	205	212	216	80
Midwestern Avg	33	44	54	63	68	71	115
Southern Avg	20	29	37	39	43	46	130
Southwestern Avg	32	46	50	55	58	61	91
Western Avg	93	144	176	182	186	186	100
Texas Avg	38	55	58	61	65	69	82
Total Avg	53	74	90	97	102	104	96
Maximum Value	479	709	818	838	851	840	375
Minimum Value	1	1	1	2	2	3	50

Source: TTI Analysis and Local Transportation Agency References

Table A-10. Illustration of Annual Capacity Increase Required to Prevent Congestion Growth

Urban Area	Existing (1994) Lane-mi		Average Annual VMT Growth (%)[1]	Annual Freeway Lane-mi		Annual Prin. Art. Lane-mi		Lane-mi Deficiency	
	Fwy	Prin. Art.		Needed	Added[2]	Needed	Added[2]	Fwy	Prin. Art.
Detroit, MI	1,835	4,425	4.83	89	24	214	131	65	83
Orlando, FL	650	1,200	6.78	44	15	81	33	29	48
New York, NY	6,305	7,750	1.59	100	101	124	48	(1)	76
Kansas City, MO	1,565	1,130	5.22	82	51	59	18	31	41
Atlanta, GA	2,150	2,120	7.25	156	110	154	138	46	16
Washington, DC	670	975	6.97	47	45	68	9	2	59
Nashville, TN	1,680	2,380	3.27	55	39	78	33	16	45
Cincinnati, OH	985	835	4.44	44	20	37	4	24	33
San Antonio, TX	990	1,135	4.93	49	41	56	11	8	45
Minn-St. Paul, MN	1,550	1,240	4.42	68	18	55	60	50	(5)
Baltimore, MD	820	1,000	4.86	40	15	49	30	25	19
Indianapolis, IN	1,385	1,725	2.99	41	34	52	16	7	36
Phoenix, AZ	750	3,350	3.22	24	31	108	58	(7)	50
Denver, CO	1,000	1,890	2.79	28	29	53	10	(1)	43
Houston, TX	2,250	2,250	3.43	77	83	77	30	(6)	47
Fort Worth, TX	1,125	1,035	4.92	55	26	51	41	29	10
Dallas, TX	1,850	1,920	3.18	58	28	61	53	30	8
Ft. Lauderdale, FL	725	1,260	5.13	37	31	65	36	6	29
Seattle-Everett, WA	1,300	1,665	2.68	35	23	45	23	12	22
Cleveland, OH	1,200	1,165	2.44	29	13	28	11	16	17
Memphis, TN	470	1,070	6.85	32	20	73	54	12	19
Philadelphia, PA	1,730	3,300	1.96	34	55	65	13	(21)	52
Louisville, KY	840	650	3.13	26	10	20	10	16	10
Columbus, OH	645	630	5.35	34	14	34	28	20	6
Pittsburgh, PA	5,530	12,550	0.74	41	75	93	36	(34)	57
Los Angeles, CA	1,170	1,875	2.62	31	43	49	14	(12)	35
Boston, MA	1,520	2,910	1.33	20	0	39	38	20	1
Austin, TX	540	515	6.07	33	23	31	21	10	10
Jacksonville, FL	520	1,350	3.99	21	18	54	38	3	16
Charlotte, NC	330	600	4.49	15	8	27	16	7	11
Salt Lake City, UT	545	495	5.95	32	9	29	35	23	(6)
Miami, FL	375	875	2.54	10	6	22	10	4	12
St. Louis, MO	665	2,345	3.28	22	15	77	68	7	9
El Paso, TX	1,735	2,000	2.07	36	11	41	50	25	(9)
Oklahoma City, OK	740	875	4.22	31	5	37	49	26	(12)
Corpus Christi, TX	230	380	5.87	13	11	22	11	2	11
Sacramento, CA	815	1,270	3.42	28	16	43	43	12	0
Hartford, CT	615	670	2.23	14	9	15	9	5	6
Honolulu, HI	400	255	5.10	20	15	13	8	5	5
Norfolk, VA	580	770	3.55	21	29	27	9	(8)	18
Portland, OR	625	700	4.54	28	18	32	34	10	(2)
San Jose, CA	1,230	1,380	1.73	21	18	24	21	3	3
Tampa, FL	2,585	5,375	4.07	105	40	219	279	65	(60)
Chicago, IL	350	800	4.55	16	13	36	35	3	1
Milwaukee, WI	605	1,180	2.75	17	3	32	44	14	(12)
New Orleans, LA	415	740	3.87	16	14	29	29	2	0
Albuquerque, NM	250	850	3.54	9	8	30	33	1	(3)
San Bernardino-Riv, CA	965	2,125	1.89	18	18	40	46	0	(6)
San Diego, CA	1,750	1,775	0.40	7	6	7	16	1	(9)
San Fran-Oak, CA	2,450	2,360	0.42	10	15	10	28	(5)	(18)

Notes: [1] Average annual growth rate of freeway and principal arterial streets between 1990 and 1994.
[2] Average lane-miles added annually from 1990 to 1994.

Table A-11. Total Congestion Costs by Urban Area for 1994

Urban Area	Annual Cost Due to Congestion ($ millions)			Rank
	Delay	Fuel	Total	
Los Angeles, CA	7,720	1,080	8,800	1
New York, NY	7,110	980	8,090	2
San Fran-Oak, CA	2,730	390	3,120	3
Chicago, IL	2,700	350	3,050	4
Washington, DC	2,670	350	3,020	5
Detroit, MI	2,200	260	2,460	6
Houston, TX	1,810	230	2,040	7
Boston, MA	1,490	190	1,680	8
Atlanta, GA	1,390	160	1,550	9
Seattle-Everett, WA	1,280	170	1,450	10
Dallas, TX	1,270	160	1,430	11
Philadelphia, PA	1,220	150	1,370	12
Miami, FL	1,050	140	1,190	13
San Bernardino-Riv, CA	950	130	1,080	14
San Jose, CA	800	110	910	16
Phoenix, AZ	800	110	910	16
Denver, CO	710	100	810	18
San Diego, CA	710	100	810	18
Baltimore, MD	700	90	790	19
St. Louis, MO	620	70	690	20
Minn-St. Paul, MN	570	80	650	21
Pittsburgh, PA	550	70	620	22
Fort Worth, TX	530	60	590	23
Portland, OR	400	60	460	24
Ft. Lauderdale, FL	380	50	430	25
Sacramento, CA	360	50	410	26
San Antonio, TX	350	40	390	27
Cleveland, OH	330	40	370	28
Norfolk, VA	320	40	360	29
New Orleans, LA	310	40	350	30
Honolulu, HI	300	40	340	31
Jacksonville, FL	280	50	330	32
Austin, TX	280	40	320	33
Cincinnati, OH	270	40	310	34
Orlando, FL	250	30	280	35
Columbus, OH	230	30	260	36
Kansas City, MO	220	30	250	38
Milwaukee, WI	220	30	250	38
Tampa, FL	220	20	240	39
Hartford, CT	190	30	220	40
Indianapolis, IN	170	20	190	42
Louisville, KY	170	20	190	42
Nashville, TN	170	20	190	42
Charlotte, NC	150	20	170	44
Albuquerque, NM	130	20	150	46
Memphis, TN	130	20	150	46
Salt Lake City, UT	130	20	150	46
Oklahoma City, OK	120	20	140	48
El Paso, TX	60	0	60	49
Corpus Christi, TX	20	0	20	50
Northeastern Avg	1,990	270	2,260	
Midwestern Avg	650	80	730	
Southern Avg	420	50	470	
Southwestern Avg	550	70	620	
Western Avg	1,690	240	1,930	
Texas Avg	620	80	700	
Total Avg	950	130	1,080	
Maximum Value	7,720	1,080	8,800	
Minimum Value	30	0	20	

Source: TTI Analysis

Table A-12. Estimated Unit Costs of Congestion in 1994

Urban Area	Congestion Cost	
	Per Eligible Driver (dollars)	Per Capita (dollars)
Northeastern Cities		
Baltimore, MD	470	370
Boston, MA	680	560
Hartford, CT	460	350
New York, NY	590	480
Philadelphia, PA	330	260
Pittsburgh, PA	390	320
Washington, DC	1,050	880
Midwestern Cities		
Chicago, IL	510	400
Cincinnati, OH	320	240
Cleveland, OH	270	200
Columbus, OH	330	260
Detroit, MI	840	620
Indianapolis, IN	260	200
Kansas City, MO	230	180
Louisville, KY	280	230
Milwaukee, WI	270	200
Minn-St. Paul, MN	370	290
Oklahoma City, OK	200	160
St. Louis, MO	450	350
Southern Cities		
Atlanta, GA	820	650
Charlotte, NC	390	310
Ft. Lauderdale, FL	390	330
Jacksonville, FL	550	430
Memphis, TN	220	170
Miami, FL	780	610
Nashville, TN	380	300
New Orleans, LA	420	320
Norfolk, VA	450	360
Orlando, FL	360	300
Tampa, FL	410	330
Southwestern Cities		
Albuquerque, NM	360	280
Austin, TX	680	540
Corpus Christi, TX	130	100
Dallas, TX	830	650
Denver, CO	600	480
El Paso, TX	170	120
Fort Worth, TX	640	480
Houston, TX	900	690
Phoenix, AZ	560	430
Salt Lake City, UT	220	170
San Antonio, TX	430	330
Western Cities		
Honolulu, HI	570	480
Los Angeles, CA	940	730
Portland, OR	530	420
Sacramento, CA	440	340
San Bernardino-Riv, CA	1,120	810
San Diego, CA	400	320
San Fran-Oak, CA	980	810
San Jose, CA	770	590
Seattle-Everett, WA	890	760
Northeastern Avg	570	460
Midwestern Avg	360	280
Southern Avg	470	370
Southwestern Avg	500	390
Western Avg	740	580
Texas Avg	540	420
Total Avg	510	400
Maximum Value	1,120	880
Minimum Value	130	100

Source: TTI Analysis

Table A-13. 1994 Rankings of Urban Area by Estimated Impact of Congestion

Urban Area	Roadway Congestion Index	Congestion Cost per Capita ($)	Congestion Cost per Eligible Driver ($)
Northeastern Cities			
Baltimore, MD	21	22	22
Boston, MA	18	12	12
Hartford, CT	41	24	23
New York, NY	11	14	16
Philadelphia, PA	24	38	38
Pittsburgh, PA	47	30	31
Washington, DC	2	1	2
Midwestern Cities			
Chicago, IL	5	21	21
Cincinnati, OH	24	40	40
Cleveland, OH	27	42	42
Columbus, OH	36	38	38
Detroit, MI	7	9	7
Indianapolis, IN	43	42	44
Kansas City, MO	48	45	45
Louisville, KY	36	41	41
Milwaukee, WI	27	42	42
Minn-St. Paul, MN	26	36	35
Oklahoma City, OK	46	48	48
St. Louis, MO	30	24	24
Southern Cities			
Atlanta, GA	10	7	9
Charlotte, NC	38	33	31
Ft. Lauderdale, FL	29	27	31
Jacksonville, FL	32	18	19
Memphis, TN	38	46	46
Miami, FL	4	10	10
Nashville, TN	35	34	34
New Orleans, LA	14	30	28
Norfolk, VA	41	23	24
Orlando, FL	45	34	36
Tampa, FL	19	27	29
Southwestern Cities			
Albuquerque, NM	30	37	36
Austin, TX	32	13	12
Corpus Christi, TX	50	50	50
Dallas, TX	16	7	8
Denver, CO	19	14	15
El Paso, TX	49	49	49
Fort Worth, TX	32	14	14
Houston, TX	13	6	5
Phoenix, AZ	16	18	18
Salt Lake City, UT	38	46	46
San Antonio, TX	43	27	27
Western Cities			
Honolulu, HI	12	14	17
Los Angeles, CA	1	5	4
Portland, OR	14	20	20
Sacramento, CA	21	26	26
San Bernardino-Riv, CA	9	2	1
San Diego, CA	8	30	30
San Fran-Oak, CA	3	2	3
San Jose, CA	21	11	11
Seattle-Everett, WA	6	4	6

Source: TTI Analysis

Table A-14. Congestion Index and Cost Values, 1993 and 1994

Urban Area	Roadway Congestion Index				Congestion Cost per Capita ($)		Annual Congestion Cost ($ millions)	
	1993 Value	1994 Value	1993 Rank	1994 Rank	1993	1994	1993	1994
Northeastern Cities								
Baltimore, MD	1.04	1.06	22	21	350	370	750	790
Boston, MA	1.07	1.08	17	18	530	560	1,590	1,680
Hartford, CT	0.93	0.93	35	41	340	350	210	220
New York, NY	1.15	1.15	11	11	460	480	7,790	8,080
Philadelphia, PA	1.04	1.05	22	24	260	260	1,350	1,370
Pittsburgh, PA	0.82	0.83	46	47	300	320	570	620
Washington, DC	1.41	1.43	2	2	840	880	2,840	3,020
Midwestern Cities								
Chicago, IL	1.26	1.28	5	5	380	400	2,850	3,050
Cincinnati, OH	1.03	1.05	25	24	230	240	290	310
Cleveland, OH	0.98	1.00	28	27	180	200	330	370
Columbus, OH	0.93	0.95	35	36	250	260	250	260
Detroit, MI	1.23	1.24	6	7	600	620	2,390	2,470
Indianapolis, IN	0.89	0.92	44	43	140	200	130	190
Kansas City, MO	0.78	0.80	48	48	170	180	220	240
Louisville, KY	0.93	0.95	35	36	180	230	150	190
Milwaukee, WI	1.00	1.00	27	27	180	200	230	250
Minn-St. Paul, MN	1.02	1.04	26	26	270	290	580	630
Oklahoma City, OK	0.86	0.85	45	46	160	160	130	130
St. Louis, MO	0.96	0.98	30	30	330	350	650	690
Southern Cities								
Atlanta, GA	1.16	1.18	10	10	600	650	1,390	1,550
Charlotte, NC	0.92	0.94	40	38	310	310	160	170
Ft. Lauderdale, FL	0.98	0.99	28	29	300	330	380	430
Jacksonville, FL	0.96	0.97	30	32	400	430	300	340
Memphis, TN	0.93	0.94	35	38	140	170	130	150
Miami, FL	1.32	1.32	4	4	580	610	1,120	1,190
Nashville, TN	0.93	0.96	35	35	270	300	170	190
New Orleans, LA	1.09	1.11	15	14	280	320	310	350
Norfolk, VA	0.92	0.93	40	41	330	360	330	360
Orlando, FL	0.82	0.86	46	45	260	300	240	280
Tampa, FL	1.06	1.07	20	19	300	330	220	250
Southwestern Cities								
Albuquerque, NM	0.96	0.98	30	30	230	280	120	150
Austin, TX	0.95	0.97	33	32	480	540	270	320
Corpus Christi, TX	0.75	0.76	50	50	80	100	20	30
Dallas, TX	1.07	1.09	17	16	600	650	1,270	1,420
Denver, CO	1.07	1.07	17	19	480	480	770	800
El Paso, TX	0.77	0.78	49	49	120	120	70	70
Fort Worth, TX	0.95	0.97	33	32	450	480	540	600
Houston, TX	1.13	1.12	12	13	670	690	1,950	2,030
Phoenix, AZ	1.08	1.09	16	16	430	430	900	910
Salt Lake City, UT	0.92	0.94	40	38	130	170	120	150
San Antonio, TX	0.91	0.92	43	43	300	330	360	390
Western Cities								
Honolulu, HI	1.13	1.13	12	12	470	480	320	330
Los Angeles, CA	1.54	1.52	1	1	730	730	8,720	8,800
Portland, OR	1.11	1.11	14	14	400	420	430	460
Sacramento, CA	1.04	1.06	22	21	320	340	390	410
San Bernardino-Riv, CA	1.21	1.20	8	9	810	810	1,070	1,090
San Diego, CA	1.21	1.21	8	8	310	320	790	810
San Fran-Oak, CA	1.33	1.33	3	3	790	810	3,040	3,120
San Jose, CA	1.05	1.06	21	21	590	590	900	910
Seattle-Everett, WA	1.23	1.25	6	6	740	760	1,380	1,450

Source: TTI Analysis and Local Transportation Agency References

Table A-15. 1994 Freeway System Length and Travel Volume

Urban Area	Daily VMT[1] (000)	Lane-Miles	Avg. No. Lanes[2]	Daily VMT Lane-Miles[3]	Rank[4]
Los Angeles, CA	113,000	5,530	8.20	20,430	1
Washington, DC	30,630	1,680	5.40	18,230	2
San Fran-Oak, CA	42,840	2,450	6.80	17,480	3
Seattle-Everett, WA	21,300	1,300	6.00	16,380	4
Chicago, IL	42,130	2,590	5.70	16,300	5
Detroit, MI	29,600	1,840	6.00	16,130	6
San Bernardino-Riv, CA	15,500	970	7.20	16,060	7
Miami, FL	10,580	670	5.50	15,900	8
San Diego, CA	27,830	1,750	7.60	15,900	8
Atlanta, GA	33,000	2,150	6.40	15,350	10
Houston, TX	32,960	2,250	6.40	14,650	11
Boston, MA	21,750	1,520	5.90	14,310	12
Dallas, TX	25,700	1,820	6.00	14,120	13
Honolulu, HI	5,600	400	5.30	14,000	14
New York, NY	88,080	6,310	5.70	13,970	15
Phoenix, AZ	10,400	750	5.80	13,870	16
Portland, OR	8,640	630	5.20	13,820	17
San Jose, CA	16,880	1,230	6.70	13,720	18
Cincinnati, OH	13,480	990	5.70	13,680	19
Baltimore, MD	18,800	1,390	5.50	13,570	20
Denver, CO	13,480	1,000	5.30	13,480	21
Minn-St. Paul, MN	20,700	1,550	5.00	13,350	22
New Orleans, LA	5,510	420	5.80	13,280	23
Sacramento, CA	10,630	820	7.00	13,040	24
Milwaukee, WI	7,800	610	5.60	12,890	25
Tampa, FL	4,500	350	5.00	12,860	26
Cleveland, OH	15,410	1,200	4.90	12,840	27
Ft. Lauderdale, FL	9,300	730	5.50	12,830	28
Jacksonville, FL	6,520	520	4.80	12,540	29
Fort Worth, TX	13,840	1,130	5.90	12,300	30
Austin, TX	6,580	540	5.60	12,180	31
Columbus, OH	10,180	840	5.90	12,110	32
Philadelphia, PA	20,920	1,730	5.10	12,090	33
St. Louis, MO	20,600	1,740	5.70	11,870	34
Salt Lake City, UT	6,430	550	5.70	11,800	35
Louisville, KY	7,600	650	4.60	11,780	36
Albuquerque, NM	2,920	250	5.10	11,680	37
San Antonio, TX	11,530	990	5.40	11,640	38
Charlotte, NC	3,830	330	4.30	11,610	39
Indianapolis, IN	9,500	820	5.50	11,590	40
Nashville, TN	7,750	670	4.90	11,570	41
Hartford, CT	7,070	620	5.60	11,490	42
Memphis, TN	5,400	470	5.40	11,490	42
Norfolk, VA	6,080	580	4.70	10,470	44
Oklahoma City, OK	7,750	740	5.20	10,470	44
Orlando, FL	6,730	650	5.00	10,350	46
El Paso, TX	3,820	380	5.30	10,190	47
Kansas City, MO	15,630	1,570	4.60	9,990	48
Corpus Christi, TX	2,160	230	5.50	9,370	49
Pittsburgh, PA	9,420	1,170	4.30	8,050	50
Northeastern Avg	28,090	2,060	5.36	13,100	
Midwestern Avg	16,700	1,260	5.37	12,750	
Southern Avg	9,020	680	5.21	12,570	
Southwestern Avg	11,800	900	5.64	12,300	
Western Avg	29,130	1,670	6.67	15,650	
Texas Avg	13,800	1,050	5.73	12,060	
Total Avg	17,760	1,240	5.62	13,180	
Maximum Value	113,000	6,310	8.20	20,430	
Minimum Value	2,160	230	4.30	8,050	

Notes: [1] Daily vehicle-miles of travel.
[2] Average number of lanes.
[3] Daily vehicle-miles of travel per lane-mile of freeway.
[4] Rank value of 1 associated with most congested condition. Ranked by daily VMT/lane-mile.

Source: TTI Analysis and Local Transportation Agency References

Table A-16. 1994 Principal Arterial Street System Length and Travel Volume[1]

Urban Area	Daily VMT[1] (000)	Lane-Miles	Avg. No. Lanes[2]	Daily VMT Lane-Miles[3]	Rank[4]
Washington, DC	18,500	2,380	4.0	7,770	1
Honolulu, HI	1,940	260	3.8	7,610	2
Miami, FL	17,150	2,350	4.6	7,310	3
New York, NY	55,700	7,750	3.4	7,190	4
Chicago, IL	37,000	5,380	3.9	6,880	5
New Orleans, LA	5,030	740	4.2	6,790	6
Portland, OR	4,700	700	3.5	6,710	7
Philadelphia, PA	22,000	3,300	3.3	6,670	8
Los Angeles, CA	83,400	12,550	4.1	6,650	9
Norfolk, VA	5,080	770	3.5	6,590	10
St. Louis, MO	12,730	2,000	3.6	6,360	11
Tampa, FL	5,020	800	3.8	6,280	12
Pittsburgh, PA	11,760	1,880	3.2	6,270	13
Sacramento, CA	7,950	1,270	4.2	6,260	14
San Fran-Oak, CA	14,700	2,360	4.0	6,230	15
Detroit, MI	27,020	4,430	4.5	6,110	16
Nashville, TN	5,900	980	3.5	6,050	17
Atlanta, GA	12,750	2,120	3.8	6,010	18
Denver, CO	11,250	1,890	3.9	5,950	19
Seattle-Everett, WA	9,880	1,670	3.5	5,930	20
Baltimore, MD	10,050	1,730	4.1	5,830	21
Louisville, KY	3,650	630	3.7	5,790	22
Minn-St. Paul, MN	7,140	1,240	3.5	5,760	23
Salt Lake City, UT	2,850	500	4.0	5,760	23
Hartford, CT	3,820	670	3.8	5,700	25
Austin, TX	2,920	520	4.2	5,670	26
Albuquerque, NM	4,770	850	4.0	5,610	27
Phoenix, AZ	18,620	3,350	4.3	5,560	28
Columbus, OH	3,600	650	3.5	5,540	29
San Diego, CA	9,800	1,780	3.5	5,520	30
Charlotte, NC	3,290	600	3.3	5,480	31
Dallas, TX	10,530	1,920	4.9	5,480	31
Fort Worth, TX	5,620	1,040	4.2	5,430	33
Cleveland, OH	6,280	1,170	3.0	5,390	34
Memphis, TN	5,770	1,070	4.6	5,390	34
San Antonio, TX	6,070	1,140	3.6	5,340	36
Oklahoma City, OK	4,650	880	3.4	5,310	37
Cincinnati, OH	4,430	840	3.5	5,300	38
San Jose, CA	7,280	1,380	4.2	5,270	39
Indianapolis, IN	5,250	1,000	3.8	5,250	40
Orlando, FL	6,300	1,200	3.8	5,250	40
San Bernardino-Riv, CA	11,150	2,130	4.2	5,250	40
Houston, TX	11,740	2,250	4.5	5,220	43
Milwaukee, WI	6,100	1,180	3.4	5,170	44
Ft. Lauderdale, FL	6,450	1,260	4.5	5,120	45
Kansas City, MO	5,620	1,130	3.6	4,970	46
Boston, MA	14,250	2,910	2.5	4,900	47
Jacksonville, FL	6,550	1,350	3.9	4,850	48
Corpus Christi, TX	1,710	380	4.1	4,500	49
El Paso, TX	3,400	880	4.3	3,890	50
Northeastern Avg	19,440	2,940	3.4	6,330	
Midwestern Avg	10,290	1,710	3.6	5,650	
Southern Avg	7,210	1,200	3.9	5,920	
Southwestern Avg	7,220	1,340	4.1	5,310	
Western Avg	16,750	2,680	3.8	6,160	
Texas Avg	6,000	1,160	4.2	5,080	
Total Avg	11,380	1,860	3.8	5,820	
Maximum Value	83,400	12,550	4.9	7,770	
Minimum Value	1,710	260	2.5	3,890	

Notes: [1] Daily vehicle-miles of travel.
[2] Average number of lanes.
[3] Daily vehicle-miles of travel per lane-mile of freeway.
[4] Rank value of 1 associated with most congested condition. Ranked by daily VMT/lane-mile.

Source: TTI Analysis and Local Transportation Agency References

Table A-17. Freeway and Expressway Recurring and Incident Vehicle-Hours of Daily Delay for 1994

Urban Area	Recurring Vehicle-Hours of Delay[1]				Incident Vehicle-Hours of Delay[1]			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	5,310	9,830	21,110	36,250	12,220	22,610	48,550	83,380
Boston, MA	9,220	7,270	48,590	65,080	32,280	25,440	170,080	227,800
Hartford, CT	1,680	3,610	3,290	8,580	4,540	9,740	8,870	23,150
New York, NY	76,410	116,740	121,680	314,830	191,020	291,850	304,190	787,060
Philadelphia, PA	8,810	8,990	13,020	30,820	18,500	18,870	27,350	64,720
Pittsburgh, PA	1,930	4,430	5,380	11,740	5,600	12,840	15,610	34,050
Washington, DC	15,730	28,810	98,400	142,940	34,610	63,380	216,480	314,470
Midwestern Cities								
Chicago, IL	14,930	25,900	132,130	172,960	17,910	31,080	158,550	207,540
Cincinnati, OH	6,780	11,870	9,160	27,810	5,420	9,490	7,330	22,240
Cleveland, OH	8,240	9,660	14,400	32,300	5,770	6,760	10,080	22,610
Columbus, OH	1,700	4,650	14,290	20,640	1,190	3,250	10,000	14,440
Detroit, MI	16,260	6,990	74,480	97,730	35,770	15,380	163,860	215,010
Indianapolis, IN	4,960	3,010	2,010	9,980	7,440	4,510	3,010	14,960
Kansas City, MO	3,540	1,810	3,390	8,740	10,980	5,620	10,500	27,100
Louisville, KY	1,240	1,360	4,750	7,350	1,370	1,490	5,220	8,080
Milwaukee, WI	3,400	4,060	6,700	14,160	3,400	4,060	6,700	14,160
Minn-St. Paul, MN	9,970	8,800	26,350	45,120	8,980	7,920	23,720	40,620
Oklahoma City, OK	1,970	1,910	90	3,970	2,160	2,100	100	4,360
St. Louis, MO	6,060	11,820	13,710	31,590	7,270	14,180	16,450	37,900
Southern Cities								
Atlanta, GA	6,380	33,620	71,650	111,650	7,010	36,980	78,820	122,810
Charlotte, NC	2,960	2,480	1,920	7,360	2,370	1,980	1,540	5,890
Ft. Lauderdale, FL	4,360	11,410	6,420	22,190	6,540	17,120	9,630	33,290
Jacksonville, FL	3,510	7,000	2,500	13,010	5,260	10,500	3,750	19,510
Memphis, TN	2,050	3,010	890	5,950	2,250	3,310	980	6,540
Miami, FL	4,490	6,810	31,500	42,800	6,740	10,220	47,250	64,210
Nashville, TN	3,110	2,570	3,120	8,800	3,420	2,820	3,430	9,670
New Orleans, LA	1,510	11,600	3,880	16,990	2,710	20,880	6,990	30,580
Norfolk, VA	3,170	7,460	3,650	14,280	7,910	18,640	9,110	35,660
Orlando, FL	3,800	2,380	8,170	14,350	5,700	3,570	12,260	21,530
Tampa, FL	400	750	5,140	6,290	600	1,120	7,720	9,440
Southwestern Cities								
Albuquerque, NM	950	1,600	2,420	4,970	1,050	1,760	2,660	5,470
Austin, TX	3,630	8,570	12,840	25,040	3,990	9,430	14,130	27,550
Corpus Christi, TX	830	210	730	1,770	910	230	810	1,950
Dallas, TX	12,830	31,490	45,370	89,690	23,090	56,670	81,670	161,430
Denver, CO	5,080	13,870	29,850	48,800	5,080	13,870	29,850	48,800
El Paso, TX	1,590	2,610	1,220	5,420	1,750	2,870	1,350	5,970
Fort Worth, TX	5,650	13,870	19,990	39,510	10,170	24,970	35,990	71,130
Houston, TX	15,430	42,760	94,130	152,320	21,600	59,860	131,790	213,250
Phoenix, AZ	7,810	8,670	26,620	43,100	3,120	3,470	10,650	17,240
Salt Lake City, UT	2,160	3,530	6,420	12,110	1,300	2,120	3,850	7,270
San Antonio, TX	2,660	9,140	18,810	30,610	2,930	10,050	20,690	33,670
Western Cities								
Honolulu, HI	2,410	4,640	11,170	18,220	4,330	8,350	20,110	32,790
Los Angeles, CA	26,500	56,170	521,210	603,880	31,790	67,400	625,460	724,650
Portland, OR	3,900	5,320	12,670	21,890	7,800	10,650	25,350	43,800
Sacramento, CA	5,330	11,260	4,940	21,530	3,200	6,750	2,960	12,910
San Bernardino-Riv, CA	6,310	16,310	50,530	73,150	7,580	19,570	60,640	87,790
San Diego, CA	25,250	23,480	32,030	80,760	15,150	14,090	19,220	48,460
San Fran-Oak, CA	21,430	46,680	163,200	231,310	27,850	60,690	212,160	300,700
San Jose, CA	7,870	15,350	43,590	66,810	9,440	18,420	52,310	80,170
Seattle-Everett, WA	5,890	27,720	67,770	101,380	8,250	38,810	94,870	141,930
Northeastern Avg	17,010	25,670	44,500	87,180	42,680	63,530	113,020	219,230
Midwestern Avg	6,590	7,650	25,120	39,360	8,970	8,820	34,630	52,420
Southern Avg	3,250	8,100	12,620	23,970	4,590	11,560	16,500	32,650
Southwestern Avg	5,330	12,390	23,490	41,210	6,820	16,850	30,310	53,980
Western Avg	11,650	22,990	100,790	135,430	12,820	27,190	123,680	163,690
Texas Avg	6,090	15,520	27,590	49,200	9,210	23,440	40,920	73,570
Total Avg	7,950	14,080	38,350	60,380	12,950	22,150	56,690	91,790
Maximum Value	76,410	116,740	521,210	603,880	191,020	291,850	625,460	787,060
Minimum Value	400	210	90	1,770	600	230	100	1,950

Notes: [1] Delay calculated based on vehicular speed in Table B-1.

Source: TTI Analysis

Table A-18. Principal Arterial Street Recurring and Incident Vehicle-Hours of Daily Delay for 1994

Urban Area	Recurring Vehicle-Hours of Delay[1]				Incident Vehicle-Hours of Delay[1]			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	2,910	2,690	17,390	22,990	3,200	2,960	19,130	25,290
Boston, MA	4,310	6,480	20,800	31,590	4,740	7,130	22,880	34,750
Hartford, CT	1,520	2,290	2,820	6,630	1,670	2,520	3,100	7,290
New York, NY	12,780	31,900	249,310	293,990	14,060	35,090	274,240	323,390
Philadelphia, PA	6,520	20,200	70,730	97,450	7,180	22,220	77,800	107,200
Pittsburgh, PA	6,760	4,600	31,180	42,540	7,430	5,060	34,290	46,780
Washington, DC	10,060	14,720	65,290	90,070	11,060	16,190	71,820	99,070
Midwestern Cities								
Chicago, IL	17,010	37,480	76,950	131,440	18,710	41,220	84,650	144,580
Cincinnati, OH	1,550	1,690	3,460	6,700	1,710	1,850	3,810	7,370
Cleveland, OH	2,270	4,720	3,850	10,840	2,490	5,190	4,230	11,910
Columbus, OH	1,530	2,490	5,630	9,650	1,690	2,740	6,190	10,620
Detroit, MI	5,980	13,190	88,120	107,290	6,580	14,510	96,940	118,030
Indianapolis, IN	1,710	3,180	2,840	7,730	1,880	3,500	3,130	8,510
Kansas City, MO	1,590	1,910	3,610	7,110	1,750	2,110	3,970	7,830
Louisville, KY	1,310	3,560	7,320	12,190	1,440	3,910	8,050	13,400
Milwaukee, WI	1,010	3,580	7,550	12,140	1,110	3,940	8,300	13,350
Minn-St. Paul, MN	2,070	2,280	19,050	23,400	2,280	2,510	20,950	25,740
Oklahoma City, OK	1,510	2,990	5,430	9,930	1,660	3,290	5,970	10,920
St. Louis, MO	9,030	9,660	19,770	38,460	9,930	10,630	21,750	42,310
Southern Cities								
Atlanta, GA	4,240	7,800	36,580	48,620	4,660	8,580	40,240	53,480
Charlotte, NC	1,190	2,670	7,280	11,140	1,310	2,940	8,010	12,260
Ft. Lauderdale, FL	3,090	4,100	9,840	17,030	3,400	4,510	10,830	18,740
Jacksonville, FL	3,590	5,150	9,960	18,700	3,950	5,670	10,950	20,570
Memphis, TN	2,930	2,710	3,900	9,540	3,220	2,980	4,290	10,490
Miami, FL	5,020	9,320	57,900	72,240	5,520	10,260	63,690	79,470
Nashville, TN	2,120	4,450	3,630	10,200	2,330	4,890	3,990	11,210
New Orleans, LA	2,620	3,130	7,310	13,060	2,880	3,440	8,050	14,370
Norfolk, VA	980	2,610	8,850	12,440	1,080	2,870	9,740	13,690
Orlando, FL	700	1,800	8,860	11,360	780	1,980	9,750	12,510
Tampa, FL	1,820	3,780	13,150	18,750	2,010	4,150	14,470	20,630
Southwestern Cities								
Albuquerque, NM	2,260	5,430	2,590	10,280	2,490	5,970	2,850	11,310
Austin, TX	1,680	2,610	2,870	7,160	1,850	2,870	3,160	7,880
Corpus Christi, TX	500	360	210	1,070	550	400	230	1,180
Dallas, TX	5,310	6,190	12,610	24,110	5,840	6,810	13,870	26,520
Denver, CO	4,530	4,140	26,650	35,320	4,990	4,550	29,310	38,850
El Paso, TX	400	300	1,060	1,760	440	330	1,170	1,940
Fort Worth, TX	2,840	2,570	2,600	8,010	3,120	2,830	2,860	8,810
Houston, TX	3,680	13,400	14,210	31,290	4,050	14,740	15,640	34,430
Phoenix, AZ	13,950	25,540	25,010	64,500	15,350	28,090	27,510	70,950
Salt Lake City, UT	2,170	1,930	1,560	5,660	2,390	2,130	1,710	6,230
San Antonio, TX	1,930	2,320	5,150	9,400	2,120	2,550	5,670	10,340
Western Cities								
Honolulu, HI	1,260	750	6,150	8,160	1,390	820	6,760	8,970
Los Angeles, CA	26,690	62,990	169,850	259,530	29,360	69,280	186,840	285,480
Portland, OR	1,580	6,570	7,040	15,190	1,730	7,230	7,740	16,700
Sacramento, CA	2,460	4,470	18,390	25,320	2,710	4,920	20,230	27,860
San Bernardino-Riv, CA	8,280	9,390	15,350	33,020	9,110	10,330	16,880	36,320
San Diego, CA	1,660	10,230	6,190	18,080	1,830	11,250	6,810	19,890
San Fran-Oak, CA	3,010	6,390	49,480	58,880	3,310	7,030	54,430	64,770
San Jose, CA	3,810	4,440	13,100	21,350	4,190	4,890	14,410	23,490
Seattle-Everett, WA	3,680	7,510	18,950	30,140	4,050	8,270	20,840	33,160
Northeastern Avg	6,410	11,840	65,360	83,610	7,050	13,020	71,900	91,970
Midwestern Avg	3,880	7,230	20,300	31,410	4,270	7,950	22,330	34,550
Southern Avg	2,570	4,320	15,210	22,100	2,830	4,750	16,730	24,310
Southwestern Avg	3,570	5,890	8,590	18,050	3,930	6,480	9,450	19,860
Western Avg	5,830	12,530	33,830	52,190	6,410	13,780	37,220	57,410
Texas Avg	2,330	3,970	5,530	11,830	2,570	4,360	6,080	13,010
Total Avg	4,230	7,890	25,350	37,470	4,650	8,680	27,880	41,210
Maximum Value	26,690	62,990	249,310	293,990	29,360	69,280	274,240	323,390
Minimum Value	400	300	210	1,070	440	330	230	1,180

Notes: [1] Delay calculated based on vehicular speed in Table B-1.

Source: TTI Analysis

Table A-19. Congested Daily Vehicle-Miles of Travel by Average Annual Daily Traffic per Lane Volumes

Functional Class	Parameters	Uncongested	Congested Daily VMT[1,2]		
			Moderate	Heavy	Severe
Freeway/Expressway	ADT/Lane	Under 15,000	15,000 - 17,500	17,501 - 20,000	Over 20,000
	Speed (mph)[3]	60	38	33	30
Principal Arterial Streets	ADT/Lane	Under 5,750	5,750 - 7,000	7,001 - 8,500	Over 8,500
	Speed (mph)[3]	35	28	25	23

Note: [1] Assumes congested freeway operation when ADT/Lane exceeds 15,000.
[2] Assumes congested principal arterial street operations when ADT/lane exceeds 5,750.

Source: TTI Analysis and Houston-Galveston Regional Transportation Study (Volume 2, Appendix B) (12)

Table A-20. 1994 Congestion Cost Estimate Variables

Urban Area	Daily Vehicle Miles of Travel		State Average Fuel Cost, ($/gallon)	Population (000)	Eligible Drivers (000)
	Freeway (000)	Prin. Art. St. (000)			
Northeastern Cities					
Baltimore, MD	18,800	10,050	1.21	2,130	1,680
Boston, MA	21,750	14,250	1.19	2,990	2,490
Hartford, CT	7,070	3,820	1.33	630	470
New York, NY	88,080	55,700	1.26	17,010	13,590
Philadelphia, PA	20,920	22,000	1.17	5,250	4,160
Pittsburgh, PA	9,420	11,760	1.17	1,910	1,580
Washington, DC	30,630	18,500	1.20	3,450	2,880
Midwestern Cities					
Chicago, IL	42,130	37,000	1.21	7,700	5,970
Cincinnati, OH	13,480	4,430	1.16	1,260	970
Cleveland, OH	15,410	6,280	1.16	1,810	1,380
Columbus, OH	10,180	3,600	1.16	1,000	790
Detroit, MI	29,600	27,020	1.11	4,010	2,950
Indianapolis, IN	9,500	5,250	1.09	970	750
Kansas City, MO	15,630	5,620	1.06	1,320	1,030
Louisville, KY	7,600	3,650	1.11	830	660
Milwaukee, WI	7,800	6,100	1.16	1,240	930
Minn-St. Paul, MN	20,700	7,140	1.19	2,180	1,730
Oklahoma City, OK	7,750	4,650	1.05	850	660
St. Louis, MO	20,600	12,730	1.06	2,000	1,550
Southern Cities					
Atlanta, GA	33,000	12,750	1.06	2,400	1,900
Charlotte, NC	3,830	3,290	1.12	540	430
Ft. Lauderdale, FL	9,300	6,450	1.22	1,320	1,100
Jacksonville, FL	6,520	6,550	1.22	790	610
Memphis, TN	5,400	5,770	1.13	910	690
Miami, FL	10,580	17,150	1.22	1,940	1,530
Nashville, TN	7,750	5,900	1.13	620	490
New Orleans, LA	5,510	5,030	1.17	1,110	840
Norfolk, VA	6,080	5,080	1.15	990	790
Orlando, FL	6,730	6,300	1.22	950	780
Tampa, FL	4,500	5,020	1.22	760	610
Southwestern Cities					
Albuquerque, NM	2,920	4,770	1.25	540	420
Austin, TX	6,580	2,920	1.13	590	470
Corpus Christi, TX	2,160	1,710	1.13	300	220
Dallas, TX	25,700	10,530	1.13	2,200	1,720
Denver, CO	13,480	11,250	1.25	1,680	1,350
El Paso, TX	3,820	3,400	1.13	580	420
Fort Worth, TX	13,840	5,620	1.13	1,240	940
Houston, TX	32,960	11,740	1.13	2,940	2,250
Phoenix, AZ	10,400	18,620	1.27	2,130	1,620
Salt Lake City, UT	6,430	2,850	1.18	880	680
San Antonio, TX	11,530	6,070	1.13	1,210	910
Western Cities					
Honolulu, HI	5,600	1,940	1.62	700	590
Los Angeles, CA	113,000	83,400	1.28	12,000	9,350
Portland, OR	8,640	4,700	1.32	1,100	880
Sacramento, CA	10,630	7,950	1.28	1,220	930
San Bernardino-Riv, CA	15,500	11,150	1.28	1,340	970
San Diego, CA	27,830	9,800	1.28	2,550	2,030
San Fran-Oak, CA	42,840	14,700	1.28	3,870	3,170
San Jose, CA	16,880	7,280	1.28	1,540	1,190
Seattle-Everett, WA	21,300	9,880	1.24	1,910	1,630
Northeastern Avg	28,090	19,440	1.22	4,770	3,840
Midwestern Avg	16,700	10,290	1.13	2,100	1,610
Southern Avg	9,020	7,210	1.17	1,120	890
Southwestern Avg	11,800	7,220	1.17	1,300	1,000
Western Avg	29,130	16,750	1.32	2,910	2,300
Texas Avg	13,800	6,000	1.13	1,290	990
Total Avg	17,760	11,380	1.19	2,230	1,750
Maximum Value	113,000	83,400	1.62	17,010	13,590
Minimum Value	2,920	1,710	1.05	300	220

Source: TTI Analysis and Local Transportation Agency References

Table A-21. 1994 Congested Daily Vehicle-Miles of Travel

Urban Area	Daily Vehicle-Miles of Travel		Percent of Peak-Period[1,2] VMT on Congested Roads		Peak Period Congested Daily VMT[1,3]		
	Freeway (000)	Prin. Art. St. (000)	Freeway (%)	Prin. Art. St. (%)	Freeway (000)	Prin. Art. St. (000)	Freeway & Prin. Art. St. (000)
Northeastern Cities							
Baltimore, MD	18,800	10,050	30	40	2,540	1,810	4,350
Boston, MA	21,750	14,250	45	40	4,400	2,570	6,970
Hartford, CT	7,070	3,820	20	35	640	600	1,240
New York, NY	88,080	55,700	60	85	23,780	21,310	45,090
Philadelphia, PA	20,920	22,000	25	75	2,350	7,430	9,780
Pittsburgh, PA	9,420	11,760	20	65	850	3,440	4,290
Washington, DC	30,630	18,500	70	85	9,650	7,080	16,720
Midwestern Cities							
Chicago, IL	42,130	37,000	60	65	11,370	10,820	22,200
Cincinnati, OH	13,480	4,430	35	30	2,120	600	2,720
Cleveland, OH	15,410	6,280	35	35	2,430	990	3,420
Columbus, OH	10,180	3,600	30	50	1,370	810	2,180
Detroit, MI	29,600	27,020	50	65	6,660	7,900	14,560
Indianapolis, IN	9,500	5,250	20	30	860	710	1,560
Kansas City, MO	15,630	5,620	10	25	700	630	1,340
Louisville, KY	7,600	3,650	15	60	510	990	1,500
Milwaukee, WI	7,800	6,100	30	35	1,050	960	2,010
Minn-St. Paul, MN	20,700	7,140	35	55	3,260	1,770	5,030
Oklahoma City, OK	7,750	4,650	10	40	350	840	1,190
St. Louis, MO	20,600	12,730	25	60	2,320	3,440	5,750
Southern Cities							
Atlanta, GA	33,000	12,750	50	65	7,430	3,730	11,150
Charlotte, NC	3,830	3,290	35	60	600	890	1,490
Ft. Lauderdale, FL	9,300	6,450	40	50	1,670	1,450	3,130
Jacksonville, FL	6,520	6,550	35	55	1,030	1,620	2,650
Memphis, TN	5,400	5,770	20	35	490	910	1,390
Miami, FL	10,580	17,150	60	70	2,860	5,400	8,260
Nashville, TN	7,750	5,900	20	35	700	930	1,630
New Orleans, LA	5,510	5,030	50	50	1,240	1,130	2,370
Norfolk, VA	6,080	5,080	40	40	1,090	910	2,010
Orlando, FL	6,730	6,300	35	30	1,060	850	1,910
Tampa, FL	4,500	5,020	20	65	410	1,470	1,870
Southwestern Cities							
Albuquerque, NM	2,920	4,770	25	45	330	970	1,290
Austin, TX	6,580	2,920	60	50	1,780	660	2,430
Corpus Christi, TX	2,160	1,710	15	15	150	120	260
Dallas, TX	25,700	10,530	55	45	6,360	2,130	8,490
Denver, CO	13,480	11,250	55	55	3,340	2,780	6,120
El Paso, TX	3,820	3,400	25	10	430	150	580
Fort Worth, TX	13,840	5,620	45	35	2,800	890	3,690
Houston, TX	32,960	11,740	70	50	10,380	2,640	13,020
Phoenix, AZ	10,400	18,620	65	70	3,040	5,870	8,910
Salt Lake City, UT	6,430	2,850	30	45	870	580	1,450
San Antonio, TX	11,530	6,070	40	30	2,070	820	2,890
Western Cities							
Honolulu, HI	5,600	1,940	50	75	1,260	650	1,910
Los Angeles, CA	113,000	83,400	75	55	38,140	20,640	58,780
Portland, OR	8,640	4,700	40	60	1,560	1,270	2,820
Sacramento, CA	10,630	7,950	35	55	1,670	1,970	3,640
San Bernardino-Riv, CA	15,500	11,150	70	60	4,880	3,010	7,890
San Diego, CA	27,830	9,800	50	35	6,260	1,540	7,800
San Fran-Oak, CA	42,840	14,700	80	65	15,420	4,300	19,720
San Jose, CA	16,880	7,280	60	55	4,560	1,800	6,360
Seattle-Everett, WA	21,300	9,880	70	55	6,710	2,440	9,150
Northeastern Avg	28,090	19,440	39	61	6,320	6,320	12,630
Midwestern Avg	16,700	10,290	30	46	2,750	2,540	5,290
Southern Avg	9,020	7,210	37	50	1,690	1,750	3,440
Southwestern Avg	11,800	7,220	44	41	2,870	1,600	4,470
Western Avg	29,130	16,750	59	57	8,940	4,180	13,120
Texas Avg	13,800	6,000	44	34	3,420	1,060	4,480
Total Avg	17,760	11,380	41	50	4,160	2,980	7,140
Maximum Value	113,000	83,400	80	85	38,140	21,310	58,780
Minimum Value	2,160	1,710	10	10	150	120	260

Notes: [1] Daily vehicle-miles of travel.
[2] Represents the percentage of daily vehicle-miles of travel on each roadway system during the peak period operating on congested conditions.
[3] Daily vehicle-miles of travel by peak-period vehicle travel and percent of congested daily VMT.

Source: TTI Analysis and Local Transportation Agency References

Table A-22. Recurring and Incident Delay Relationships for 1994

Urban Area	Peak-Period Congested Daily VMT[1]			Ratio of Incident[2] Delay to Recurring Delay		Daily Recurring Vehicle[3] Hours of Delay			Daily Incident Vehicle[3] Hours of Delay		
	Freeway (000)	Prin. Art. St. (000)	Freeway and Prin. Art. St. (000)	Freeway	Prin. Art. St.	Freeway	Hours of Delay Prin. Art. St.	Total	Freeway	Prin. Art. St.	Total
Northeastern Cities											
Baltimore, MD	2,540	1,810	4,350	2.30	1.10	36,250	22,990	59,240	83,380	25,290	108,660
Boston, MA	4,400	2,570	6,970	3.50	1.10	65,080	31,580	96,670	227,800	34,740	262,540
Hartford, CT	640	600	1,240	2.70	1.10	8,570	6,620	15,200	23,150	7,290	30,430
New York, NY	23,780	21,310	45,090	2.50	1.10	314,820	293,990	608,820	787,060	323,390	1,110,450
Philadelphia, PA	2,350	7,430	9,780	2.10	1.10	30,820	97,450	128,270	64,720	107,190	171,910
Pittsburgh, PA	850	3,440	4,290	2.90	1.10	11,740	42,530	54,270	34,050	46,790	80,840
Washington, DC	9,650	7,080	16,720	2.20	1.10	142,940	90,070	233,010	314,460	99,080	413,540
Midwestern Cities											
Chicago, IL	11,370	10,820	22,200	1.20	1.10	172,950	131,440	304,390	207,540	144,580	352,120
Cincinnati, OH	2,120	600	2,720	0.80	1.10	27,810	6,700	34,510	22,240	7,370	29,620
Cleveland, OH	2,430	990	3,420	0.70	1.10	32,310	10,830	43,140	22,620	11,920	34,530
Columbus, OH	1,370	810	2,180	0.70	1.10	20,630	9,650	30,280	14,440	10,620	25,050
Detroit, MI	6,660	7,900	14,560	2.20	1.10	97,730	107,300	205,030	215,010	118,030	333,040
Indianapolis, IN	860	710	1,560	1.50	1.10	9,980	7,740	17,710	14,960	8,510	23,470
Kansas City, MO	700	630	1,340	3.10	1.10	8,740	7,110	15,860	27,100	7,830	34,930
Louisville, KY	510	990	1,500	1.10	1.10	7,340	12,180	19,530	8,080	13,400	21,480
Milwaukee, WI	1,050	960	2,010	1.00	1.10	14,170	12,140	26,310	14,170	13,350	27,520
Minn-St. Paul, MN	3,260	1,770	5,030	0.90	1.10	45,130	23,400	68,530	40,620	25,740	66,350
Oklahoma City, OK	350	840	1,190	1.10	1.10	3,960	9,930	13,890	4,360	10,920	15,280
St. Louis, MO	2,320	3,440	5,750	1.20	1.10	31,590	38,460	70,050	37,910	42,310	80,220
Southern Cities											
Atlanta, GA	7,430	3,730	11,150	1.10	1.10	111,640	48,620	160,260	122,810	53,480	176,280
Charlotte, NC	600	890	1,490	0.80	1.10	7,350	11,140	18,490	5,880	12,250	18,140
Ft. Lauderdale, FL	1,670	1,450	3,130	1.50	1.10	22,190	17,030	39,220	33,290	18,730	52,020
Jacksonville, FL	1,030	1,620	2,650	1.50	1.10	13,010	18,700	31,700	19,510	20,570	40,080
Memphis, TN	490	910	1,390	1.10	1.10	5,950	9,540	15,490	6,540	10,490	17,040
Miami, FL	2,860	5,400	8,260	1.50	1.10	42,810	72,240	115,050	64,210	79,460	143,680
Nashville, TN	700	930	1,630	1.10	1.10	8,790	10,200	18,990	9,670	11,220	20,890
New Orleans, LA	1,240	1,130	2,370	1.80	1.10	16,990	13,060	30,050	30,580	14,360	44,940
Norfolk, VA	1,090	910	2,010	2.50	1.10	14,270	12,440	26,710	35,670	13,680	49,350
Orlando, FL	1,060	850	1,910	1.50	1.10	14,360	11,370	25,720	21,540	12,500	34,040
Tampa, FL	410	1,470	1,870	1.50	1.10	6,290	18,760	25,050	9,440	20,630	30,070

Notes: [1] Daily vehicle-miles of travel. Represents the percentage of Daily Vehicle-Miles of travel on each roadway system during the peak-period operating in congested conditions.
[2] Percentage of Incident Delay related to Recurring Delay.
[3] Facility delays as calculated by type and urban area.

Source: TTI Analysis and Local Transportation Agency References

Table A-22. Recurring and Incident Delay Relationships for 1994 (continued)

Urban Area	Peak-Period Congested Daily VMT[1]			Ratio of Incident[2] Delay to Recurring Delay		Daily Recurring Vehicle[3] Hours of Delay			Daily Incident Vehicle[3] Hours of Delay		
	Freeway (000)	Prin. Art. St. (000)	Freeway and Prin. Art. St. (000)	Freeway	Prin. Art. St.	Freeway	Hours of Delay Prin. Art. St.	Total	Freeway	Prin. Art. St.	Total
Southwestern Cities											
Albuquerque, NM	330	970	1,290	1.10	1.10	4,970	10,290	15,260	5,470	11,310	16,790
Austin, TX	1,780	660	2,430	1.10	1.10	25,040	7,170	32,210	27,550	7,880	35,430
Corpus Christi, TX	150	120	260	1.10	1.10	1,770	1,070	2,840	1,950	1,180	3,130
Dallas, TX	6,360	2,130	8,490	1.80	1.10	89,690	24,110	113,800	161,440	26,520	187,960
Denver, CO	3,340	2,780	6,120	1.00	1.10	48,800	35,320	84,120	48,800	38,850	87,650
El Paso, TX	430	150	580	1.10	1.10	5,420	1,760	7,180	5,970	1,940	7,900
Fort Worth, TX	2,800	890	3,690	1.80	1.10	39,520	8,010	47,520	71,130	8,810	79,940
Houston, TX	10,380	2,640	13,020	1.40	1.10	152,320	31,300	183,620	213,250	34,430	247,670
Phoenix, AZ	3,040	5,870	8,910	0.40	1.10	43,100	64,500	107,590	17,240	70,950	88,180
Salt Lake City, UT	870	580	1,450	0.60	1.10	12,110	5,660	17,770	7,270	6,220	13,490
San Antonio, TX	2,070	820	2,890	1.10	1.10	30,610	9,400	40,010	33,670	10,340	44,010
Western Cities											
Honolulu, HI	1,260	650	1,910	1.80	1.10	18,220	8,160	26,380	32,790	8,980	41,770
Los Angeles, CA	38,140	20,640	58,780	1.20	1.10	603,870	259,520	863,400	724,650	285,470	1,010,120
Portland, OR	1,560	1,270	2,820	2.00	1.10	21,900	15,180	37,080	43,800	16,700	60,500
Sacramento, CA	1,670	1,970	3,640	0.60	1.10	21,530	25,330	46,850	12,920	27,860	40,770
San Bernardino-Riv, CA	4,880	3,010	7,890	1.20	1.10	73,160	33,020	106,180	87,790	36,320	124,110
San Diego, CA	6,260	1,540	7,800	0.60	1.10	80,760	18,090	98,850	48,460	19,890	68,350
San Fran-Oak, CA	15,420	4,300	19,720	1.30	1.10	231,310	58,880	290,190	300,700	64,770	365,470
San Jose, CA	4,560	1,800	6,360	1.20	1.10	66,800	21,350	88,150	80,160	23,480	103,650
Seattle-Everett, WA	6,710	2,440	9,150	1.40	1.10	101,380	30,140	131,520	141,930	33,160	175,090
Northeastern Avg	6,320	6,320	12,630	2.60	1.10	87,180	83,610	170,780	219,230	91,970	311,200
Midwestern Avg	2,750	2,540	5,290	1.30	1.10	39,360	31,410	70,770	52,420	34,550	86,970
Southern Avg	1,690	1,750	3,440	1.40	1.10	23,970	22,100	46,070	32,650	24,310	56,960
Southwestern Avg	2,870	1,600	4,470	1.10	1.10	41,210	18,050	59,270	53,970	19,860	73,830
Western Avg	8,940	4,180	13,120	1.30	1.10	135,440	52,190	187,620	163,690	57,400	221,090
Texas Avg	3,420	1,060	4,480	1.30	1.10	49,200	11,830	61,030	73,560	13,010	86,580
Total Avg	4,160	2,980	7,140	1.50	1.10	60,370	37,470	97,840	91,790	41,220	133,010
Maximum Value	38,140	21,310	58,780	3.50	1.10	603,870	293,990	863,400	787,060	323,390	1,110,450
Minimum Value	150	120	260	0.40	1.10	1,770	1,070	2,840	1,950	1,180	3,130

Notes: [1] Daily vehicle-miles of travel. Represents the percentage of Daily Vehicle-Miles of travel on each roadway system during the peak-period operating in congested conditions.
[2] Percentage of Incident Delay related to Recurring Delay.
[3] Facility delays as calculated by type and urban area.

Source: TTI Analysis and Local Transportation Agency References

Table A-23. Component and Total Congestion Costs by Urban Area for 1994

Urban Area	Annual Cost Due to Congestion ($ millions)					Rank
	Recurring Delay	Incident Delay	Recurring Fuel	Incident Fuel	Total	
Los Angeles, CA	3,560	4,160	500	580	8,800	1
New York, NY	2,520	4,590	350	630	8,090	2
San Fran-Oak, CA	1,210	1,520	170	220	3,120	3
Chicago, IL	1,250	1,450	160	190	3,050	4
Washington, DC	960	1,710	130	220	3,020	5
Detroit, MI	840	1,360	100	160	2,460	6
Houston, TX	770	1,040	100	130	2,040	7
Boston, MA	400	1,090	50	140	1,680	8
Atlanta, GA	660	730	80	80	1,550	9
Seattle-Everett, WA	550	730	70	100	1,450	10
Dallas, TX	480	790	60	100	1,430	11
Philadelphia, PA	520	700	60	90	1,370	12
Miami, FL	470	580	60	80	1,190	13
San Bernardino-Riv, CA	440	510	60	70	1,080	14
Phoenix, AZ	440	360	60	50	910	16
San Jose, CA	370	430	50	60	910	16
Denver, CO	420	290	60	40	810	17
San Diego, CA	350	360	50	50	810	18
Baltimore, MD	250	450	30	60	790	19
St. Louis, MO	290	330	30	40	690	20
Minn-St. Paul, MN	290	280	40	40	650	21
Pittsburgh, PA	220	330	30	40	620	22
Fort Worth, TX	200	330	20	40	590	23
Portland, OR	150	250	20	40	460	24
Ft. Lauderdale, FL	160	220	20	[illegible]	430	25
Sacramento, CA	190	170	30	20	410	26
San Antonio, TX	170	180	20	20	390	27
Cleveland, OH	180	150	20	20	370	28
Norfolk, VA	110	210	10	30	360	29
New Orleans, LA	120	190	20	20	350	30
Jacksonville, FL	130	170	20	20	340	31
Honolulu, HI	110	170	20	30	330	32
Austin, TX	130	150	20	20	320	33
Cincinnati, OH	150	120	20	20	310	34
Orlando, FL	110	140	10	20	280	35
Columbus, OH	130	100	20	10	260	36
Milwaukee, WI	110	110	10	10	240	38
Tampa, FL	100	120	10	20	250	38
Kansas City, MO	70	150	10	20	250	39
Hartford, CT	60	130	10	20	220	40
Indianapolis, IN	70	100	10	10	190	42
Louisville, KY	80	90	10	10	190	42
Nashville, TN	80	90	10	10	190	42
Charlotte, NC	80	70	10	10	170	44
Albuquerque, NM	60	70	10	10	150	46
Memphis, TN	60	70	10	10	150	46
Salt Lake City, UT	70	60	10	10	150	46
Oklahoma City, OK	60	60	10	10	140	48
El Paso, TX	30	30	0	0	60	49
Corpus Christi, TX	10	10	0	0	20	50
Northeastern Avg	700	1,280	90	170	2,240	
Midwestern Avg	290	360	40	40	730	
Southern Avg	190	230	20	30	470	
Southwestern Avg	250	310	30	40	630	
Western Avg	780	920	110	130	1,940	
Texas Avg	260	360	30	50	700	
Total Avg	400	550	50	70	1,070	
Maximum Value	3,560	4,590	500	630	8,800	
Minimum Value	10	10	0	0	20	

Source: TTI Analysis and Local Transportation Agency References

APPENDIX B

DEVELOPMENT OF THE URBAN AREAWIDE CONGESTION MEASUREMENT METHODOLOGY

(Reprinted from TTI Research Report 1131-3)

Previous research on areawide mobility levels in Texas resulted in a methodology to compare urban roadway congestion levels (1-4). This section summarizes the purpose, database, analysis procedure, and major findings of that research effort and an FHWA research report on urban freeway congestion.

Purpose of Congestion Measurement Techniques

Transportation professionals and the general public are increasingly aware of the traffic congestion levels experienced in major cities. This interest resulted in research to develop a procedure that would allow quantitative comparisons of urbanized areawide traffic volumes and roadway length. Obviously, a procedure that utilizes generally available data would be more desirable than one which required new or more extensive data collection.

Previous Urban Mobility Comparison Studies

Lack of comparable and significant urban travel data has hampered the analysis of congestion levels on a national basis. The amount of roadway system performance statistics collected and reported by local and state agencies varies significantly across the nation. Differences in roadway functional classification terminology have resulted in significant variations between major and minor arterial street facility length. This analysis used the Highway Performance Monitoring System (HPMS) database compiled by FHWA since 1980 (5). Local planning and transportation agencies and state departments of transportation (DOT) were also contacted to obtain relevant data and provide local review.

State DOTs submit HPMS data which include information on state and locally maintained roadway systems. This should give a more accurate representation of the urbanized area roadway condition than information that could be developed from a single organization. The differences in functional classification and the amount of data used to update the database each year varies in each state. Locally developed planning data were, therefore, used to provide another source of information concerning the urban roadway system.

The boundary chosen for inclusion in a mobility analysis is also significant. City or county jurisdictions vary in the percentage of urbanized area included and the density of development. State laws pertaining to municipal incorporation and the time and manner in which the area developed also have a substantial impact on land use patterns.

In conducting the initial relative mobility studies, data availability proved to be the largest problem. Consistent data that allowed an accurate comparative assessment of urban congestion are not available from any agency or group of agencies. Data collected in several ways by many sources were acquired. In the opinion of the research staff and reviewers of the research report, however, the quantitative measures used in the studies did provide a reasonably accurate measure of overall urban mobility (1-4). The general nature of the mobility assessment and the variety of data sources, as well as the experience of the reviewing agencies, combined to provide analysis results consistent with the accuracy level desired.

Comparability of the measures was achieved using several estimates of both travel and area statistics. For example, in defining urbanized area, it was not always possible to use jurisdictional limits as the defining boundaries due to either lack of data on related travel measures or non-comparability of information. County boundaries may appear to provide consistency, but variations in county size, as well as percentage of urbanization, significantly impaired the utility of county-based data. This study uses a population density of more than 1,000 persons per square kilometer as the criterion for urbanized area delineation.

A 1986 FHWA research report entitled, "Quantification of Urban Freeway Congestion and Analysis of Remedial Measures" utilized the HPMS database to develop detailed estimates of congestion due to recurring delay (usual, high traffic volumes) and incident delay (6). Freeway systems in the 37 Metropolitan Statistical Areas (MSAs) with populations greater than one million were analyzed for travel delay and excess fuel consumption. The study ranked the urbanized areas according to a congestion severity index (total delay per million vehicle-kilometers of travel) for 1984 and 2005. The future values were derived from the traffic volume growth estimates in HPMS and applied to the existing roadway system to illustrate the effect a construction moratorium would have on the systems.

The 1984 FHWA rankings are compared to those developed within this report. It should be noted that the FHWA report focused on relatively detailed estimates of urbanized area freeway delay for large MSAs, while this project analyzed planning level estimates of delay, fuel, and insurance costs for freeways and principal arterial streets (6). While not directly comparable, these studies should illustrate areas of concern to transportation planners.

Study Design

The urbanized area traffic volume level that was consistent with desirable overall mobility was determined using data derived from the Houston area. During the late 1960s and early 1970s, citizens in Houston enjoyed one of the best transportation systems in the nation. Peak-hour speed on most facilities was reasonable, and congestion did not extend for a significant period beyond either peak hour. By 1980, however, Houston had acquired, and probably deserved, a reputation as one of the most congested cities in the country. At some point, transportation mobility had declined from desirable to undesirable.

The initial focus of the 1982 research effort was to develop an estimate of the initial point at which mobility levels could be described as undesirable (1). Having estimated this point, the measures of mobility levels associated with that time could be assumed to be representative of undesirable congestion levels.

Houston's Experience with Declining Mobility

The Houston data detailing the increase in congestion were analyzed to provide a basis for quantitative indicators of mobility decline. The rapid increase in congestion on Houston area freeways and arterial streets during the 1970s emphasized the need for actions to restore and maintain good mobility.

Table B-1 and Figure B-1 quantify the disparity between increases in freeway lane-kilometers and freeway travel during the 1970s in Houston. The rate of new freeway construction in the 1970s was one-sixth that of the 1960s, while daily freeway VKT increased at approximately the same rate

throughout the 20-year period (1). Vehicle registration, population, and traffic volume counts were thoroughly analyzed and also indicated the shift from relatively good mobility to relatively poor mobility in only a few years.

Table B-1. City of Houston Growth Trends, 1950 to 1985

Year	Annual Average Population (1000)	Annual Average Vehicles (1000)	Freeway Travel in VKT per Day[1] (1000)	Freeway Capacity (lane-kilometers)	Daily VKT per Freeway Lane-Km
1950	595[2]	240	322	40	8,400
1955	690[2]	375	998	161	6,200
1960	940[2]	480	1,682	298	5,600
1965	1,085	625	5,514	733	7,500
1970	1,235	775	11,785	1,224	9,600
1975	1,440	1,000	18,298	1,449	12,700
1980	1,610	1,270	26,259	1,546	17,000
1985	1,730	1,450	33,166	1,771	18,700
Percent Increase per Year					
1960-70	2.8	4.9	19.6	15.1	5.5
1970-80	2.6	5.1	8.4	2.4	5.9

Notes: [1] VKT--Vehicle-Kilometers of Travel.
[2] As of April 1.

Source: References 2,3,5,7

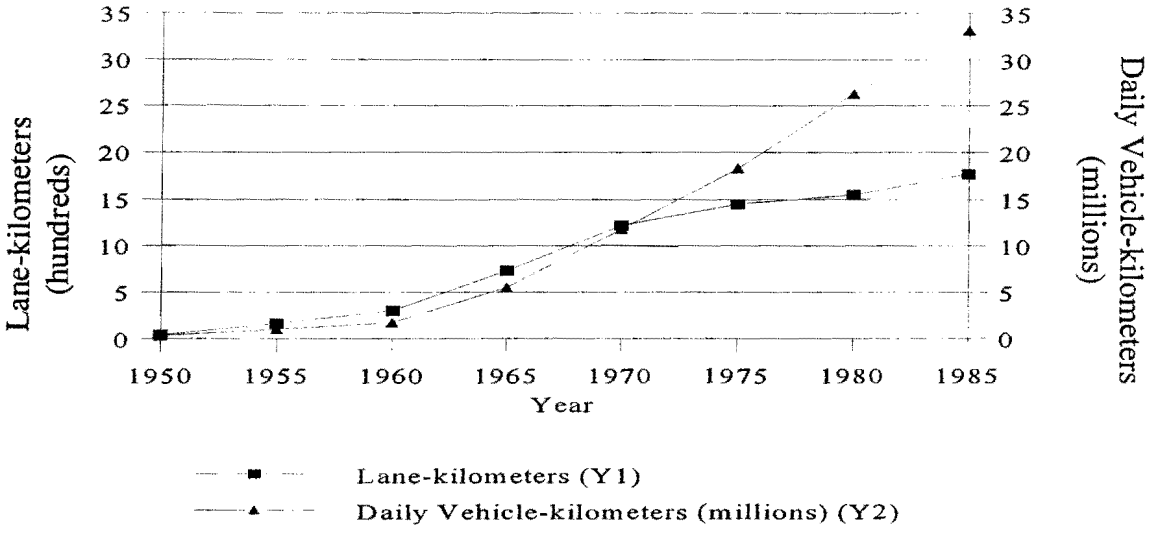

Figure B-1. Freeway Capacity and Travel in Houston, 1950 to 1985

Note: The values presented are averages of the six freeways studied (I-10W, I-10E, US 59S, US 59N, I-45S, I-45N).

Source: References 1,3,8,9

Congestion increases were also apparent in the travel delay estimates. Peak-period volume and travel time information were utilized to generate the data in Table B-2 and Figure B-2. Six major radial freeways were evaluated in each of four travel studies conducted by the Houston-Galveston Regional Transportation Study (HGRTS) (10). The dramatic (380 percent) increase in delay between I-610 and Beltway 8 (Figure B-2) from 1969 to 1979 indicates the decline in mobility outside the central city area. The decrease in delay inside I-610 (a major circumferential freeway approximately eight kilometers from downtown) may be attributable to several factors, including the completion of certain freeway sections and the traffic metering effect of I-610. As on most radial freeways, the number of lanes outside Loop 610 is less than that inside the Loop. Volumes, however, are not significantly lower, resulting in greater congestion outside I-610.

Table B-2. Average Evening Peak-Period Delay by Freeway Segment per Major Radial Freeway

Year	Inside I-610 (veh-hours)	I-610 to Beltway 8 (veh-hours)	Total (veh-hours)
1969	1,315	390	1,705
1973	1,560	685	2,245
1976	2,110	1,165	3,275
1979	1,830	1,860	3,690
1982	1,480	3,000	4,480
1985	1,615	2,565	4,180

Note: Evening peak period used for analysis was 3:30 P.M. to 6:30 P.M.

Source: References 1,3,7,8

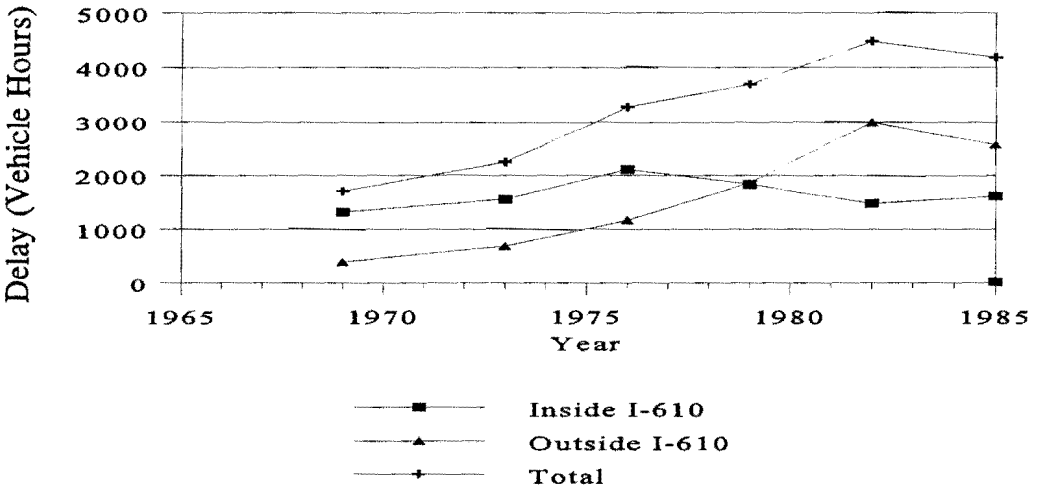

Figure B-2. Delay by Segments for Houston Freeways, P.M. Peak Period

Note: The values presented are averages of the six freeways studied (I-10W, I-10E, US 59S, US 59N, I-45S, I-45N).

Source: References 1,3,7,8,11

The maximum freeway service flow rate for level-of-service C (LOS C) is 1,550 passenger cars per lane per hour (volume/capacity ratio equal to 0.77) for a 113 kph design speed facility (12). Using average values for k-factor (the percentage of daily traffic volume during the peak hour) and directional distribution, and including some adjustment for trucks, these values can be interpreted to indicate that 15,000 vehicles per lane per day is an estimate of the beginning of level-of-service D operation. (The development of this value is consistent with the planning level analysis methodology presented in this report.)

The use of the boundary between level-of-service C and D as the beginning of congestion is consistent with reports by the Department of Transportation to Congress on the status of highways in the United States (congestion begins at a volume/capacity ratio of 0.8) and the AASHTO Policy on Geometric Design of Highways and Streets (urban freeways and streets should be designed for level-of-service C) (13,14). While the use of a single number tends to mask the myriad of factors used in roadway capacity analyses, the level of accuracy of the database, and the planning nature of the ultimate use of the results of this methodology are compatible with this approach.

Figure B-3 quantifies the increase in congested freeway lane-kilometers in Harris County between 1965 and 1985. Although it is not known what percentage of the freeway system exceeding 15,000 vehicles per lane per day (operating at LOS D or worse in the peak hour) is an "acceptable" measure, it can be assumed that the 10 percent value in 1970 did not suggest countywide deficiencies; however, the 45 percent in 1980 would appear to suggest that such deficiencies did exist.

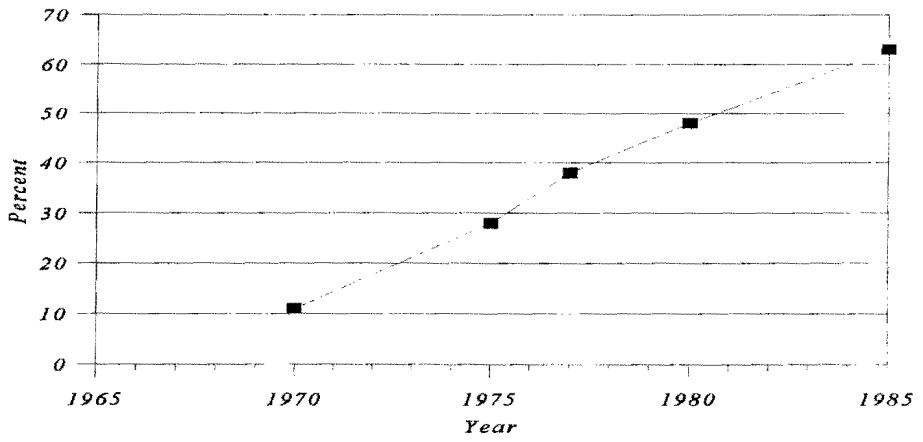

Figure B-3. Percent of Freeway Lane-kilometers with More Than 15,000 ADT for Harris County (Houston), 1970 to 1985

Source: References 1,3,10

The data available to the study team did not allow the determination of a specific date at which Houston's traffic problems became critical. For purposes of the overall analysis, however, this was not required. Prior to 1975, mobility in Houston could be characterized as "reasonably good." Peak-period speeds on freeways and major arterials were fairly high, and traffic delay was not a major concern. By the late 1970s, however, peak-period travel delay had doubled from 1970 levels, and volume per lane values reflected two or more hours of congested operation during both the morning and evening peak periods. Congested freeway lane-kilometers in Harris County (Figure B-2) increased from 10 percent in 1970 to 40 percent in 1978. When rural areas of Harris County were subtracted from the analysis, the 1978 congested urban freeway system length approached 50 percent.

Congestion Indicator Determination

The data on mobility decline for Houston indicated that an "unacceptable" level of transportation service was reached somewhere in the 1975-1976 time frame. That assumption allowed quantitative measures of impending congestion problems to be developed and compared for the major urbanized areas of Texas. The following factors, listed in apparent order of reliability and usefulness, represent guidelines that can be used to determine if congestion in an urbanized area is becoming critical.

Traffic Per Lane

As shown previously, 15,000 vehicles per lane per day for freeways can be interpreted to represent the beginning of LOS D operation. Once traffic volume has entered that range, congestion is becoming critical. As a measure of approaching congestion, the 13,000 vehicles per lane per day value used by the Federal Highway Administration in the highway needs estimate and by the Texas Department of Highways and Public Transportation in their Project Development Process would appear to represent a more appropriate value (15,9). That standard also was attained on an average urbanized area basis in Houston during the period when mobility was becoming unacceptable (1975-76).

The corresponding measure for urban arterial streets would appear to be approximately 5,000 vehicles per lane per day. This value was not reached in Houston until 1979-80, but the design of the Houston area principal arterial street system would not accommodate traffic volumes representative of congestion in other urbanized areas. An inconsistent arterial system with respect to both the number of lanes and continuous roadway length, reduced the levels of traffic volume necessary to cause undesirable congestion. This value is also in general agreement with values presented in the Highway Capacity Manual (12).

- Urbanized Area Average Traffic Volume:
  - Freeway: 13,000 daily vehicle-kilometers of travel per lane-kilometer.
  - Principal Arterial Street: 5,000 daily vehicle-kilometers of travel per lane-kilometer.

Roadway Congestion Index

Combining the freeway and principal arterial street traffic volume per lane values into one indicator (Equation B-1) generates a value to compare the major mobility providing roadways of each urbanized area. Weighing the vehicle-kilometers of travel (VKT) per lane values by the amount of VKT in each functional class provides flexibility in applying the formula to areas with very different freeway and street travel characteristics. The congestion levels are normalized, with a value of 1.0 representing the beginning of undesirable mobility levels.

$$\text{Roadway Congestion Index} = \frac{\frac{\text{Freeway VKT/Ln.-Km.}}{13{,}000} \times \frac{\text{Freeway VKT}}{\text{Freeway VKT}} + \frac{\text{Prin Art Str VKT/Ln.-Km.}}{5{,}000} \times \frac{\text{Prin Art Str VKT}}{\text{Prin Art Str VKT}}}{\text{Freeway VKT} + \text{Prin Art Str VKT}} \quad \text{Eq. B-1}$$

Percentage of Congested Freeway

The percentage of the freeway system operating under congested conditions (15,000 vehicles per lane per day or more) was determined to be another description of congestion and mobility levels. Those data for the Houston area were presented previously (Figure B-3). From that information, using the 1975-76 time frame, it appears that once 30 percent of the lane-kilometers are operating at or above 15,000 vehicles per day, mobility has become significantly impaired.

- Percentage of freeway system with ADT greater than 15,000 per lane: 30 percent.

Summary

These measures are only some of the variables examined during the assessment of possible mobility indicators (1). While all of the measures have limitations due to the reliability and accuracy of the database, the three indicators below are illustrative of urban travel conditions:

- Urbanized area traffic volumes,
- Roadway Congestion Index, and
- Percentage of freeway system with ADT per lane greater than 15,000.

These factors are also available without any new data collection requirements, which allows the use of historical traffic data collected during the usual urban planning process. A single variable may not be indicative of the traffic congestion in an urbanized area, but if all of the measures are examined, the relative mobility levels should become apparent. The analysis in the following section used the indicators to assess relative mobility levels in the study areas.

APPENDIX C

CONGESTION CLASSIFICATION AND COST ESTIMATES

Relationship Between Travel Demand and Urban Area Population

In previous reports, reference was made to relationships of daily vehicle-kilometers of travel (DVKT) and facility lane-kilometers to urban area population and size (see references 1,2,3,4). The relationship between travel demand, lane-kilometers, and population indicates on what facilities motorists place the highest demand, while the relationship between DVKT, facility lane-kilometers, and area size indicates the density of both the freeway and principal arterial street systems.

Tables C-1 and C-2 show the relationship between travel, facility length, urban area population, and size. Both tables rank the urban areas by DVKT and facility lane-kilometers per person. Comparison of the summary statistics of these tables indicates the statements listed below.

- The DVKT per person value shows each geographic region studied depends on the freeway system for service of the majority of travel demand.
- The freeway systems in the Texas region and the principal arterial street systems in the Southern region are the most dense across the regions.
- The greatest travel per capita occurs on the freeways in the Western region and on the principal arterial street system in the Southern region.

Tables C-3 through C-15 show the congestion information for the freeways and principal arterial street travel for 1982 through 1994.

Table C-1. Summary of Freeway Travel Frequency and Urban Population Statistics for 1994

Urban Area	Population (1000)	Urban Area (sq km)	Population Density Person/sq km	DVKT[1] per Person	Rank[3]	Lane Km[2] per 1000 Persons	Rank[3]
Northeastern Cities							
Baltimore, MD	2,130	1,880	1,130	14.21	24	1.05	25
Boston, MA	2,990	2,900	1,030	11.73	34	0.82	13
Hartford, CT	630	960	650	18.20	6	1.58	48
New York, NY	17,010	8,810	1,930	8.34	46	0.60	5
Philadelphia, PA	5,250	3,860	1,360	6.42	50	0.53	1
Pittsburgh, PA	1,910	2,380	800	7.94	48	0.99	21
Washington, DC	3,450	2,580	1,340	14.31	23	0.79	11
Midwestern Cities							
Chicago, IL	7,700	6,480	1,190	8.81	43	0.54	2
Cincinnati, OH	1,260	1,670	750	17.29	14	1.26	37
Cleveland, OH	1,810	1,920	940	13.71	26	1.07	27
Columbus, OH	1,000	1,140	870	16.46	16	1.36	41
Detroit, MI	4,010	3,370	1,190	11.90	31	0.74	7
Indianapolis, IN	970	1,220	800	15.77	17	1.36	42
Kansas City, MO	1,320	1,860	710	19.06	3	1.91	50
Louisville, KY	830	1,010	820	14.83	21	1.26	36
Milwaukee, WI	1,240	1,440	860	10.13	39	0.79	12
Minn-St. Paul, MN	2,180	3,110	700	15.32	19	1.15	32
Oklahoma City, OK	850	1,480	580	14.68	22	1.40	44
St. Louis, MO	2,000	2,070	970	16.58	15	1.40	43
Southern Cities							
Atlanta, GA	2,400	4,580	520	22.14	1	1.44	45
Charlotte, NC	540	800	670	11.42	35	0.98	20
Ft. Lauderdale, FL	1,320	1,170	1,130	11.34	37	0.88	15
Jacksonville, FL	790	1,440	550	13.37	27	1.07	26
Memphis, TN	910	1,150	790	9.61	41	0.84	14
Miami, FL	1,940	1,310	1,480	8.78	44	0.55	3
Nashville, TN	620	1,490	410	20.29	2	1.75	49
New Orleans, LA	1,110	950	1,170	7.99	47	0.60	6
Norfolk, VA	990	2,140	460	9.93	40	0.95	18
Orlando, FL	950	1,110	850	11.40	36	1.10	30
Tampa, FL	760	1,230	620	9.53	42	0.74	8
Southwestern Cities							
Albuquerque, NM	540	690	790	8.71	45	0.75	10
Austin, TX	590	980	600	17.94	10	1.47	47
Corpus Christi, TX	300	490	600	11.76	33	1.26	35
Dallas, TX	2,200	4,010	550	18.81	4	1.33	40
Denver, CO	1,680	2,420	690	12.95	29	0.96	19
El Paso, TX	580	580	1,000	10.60	38	1.04	24
Fort Worth, TX	1,240	2,400	520	17.97	8	1.46	46
Houston, TX	2,940	4,300	680	18.05	7	1.23	34
Phoenix, AZ	2,130	2,770	770	7.86	49	0.57	4
Salt Lake City, UT	880	1,270	690	11.76	32	1.00	22
San Antonio, TX	1,210	1,300	930	15.33	18	1.32	39
Western Cities							
Honolulu, HI	700	470	1,490	12.97	28	0.93	17
Los Angeles, CA	12,000	5,790	2,070	15.16	20	0.74	9
Portland, OR	1,100	1,150	950	12.65	30	0.91	16
Sacramento, CA	1,220	1,010	1,210	14.03	25	1.08	28
San Bernardino-Riv, CA	1,340	1,330	1,000	18.62	5	1.16	33
San Diego, CA	2,550	1,920	1,330	17.57	13	1.10	31
San Fran-Oak, CA	3,870	2,460	1,570	17.82	11	1.02	23
San Jose, CA	1,540	1,200	1,280	17.64	12	1.29	38
Seattle-Everett, WA	1,910	1,970	970	17.95	9	1.10	29
Northeastern Avg	4,770	3,340	1,180	11.59		0.91	
Midwestern Avg	2,100	2,230	860	14.55		1.19	
Southern Avg	1,120	1,580	790	12.35		0.99	
Southwestern Avg	1,300	1,930	710	13.80		1.13	
Western Avg	2,910	1,920	1,320	16.05		1.04	
Texas Avg	1,290	2,010	700	15.78		1.30	
Total Avg	2,230	2,120	940	13.75		1.06	
Maximum Value	17,010	8,810	2,070	22.14		1.91	
Minimum Value	300	470	410	6.42		0.53	

Notes: [1] Daily vehicle-kilometers of travel per person.
[2] Lane-kilometers per 1000 persons.
[3] Rank value of 1 associated with most congested condition.

Source: TTI Analysis and Local Transportation Agency References

Table C-2. Principal Arterial Street Travel Frequency and Population Density Statistics for 1994

Urban Area	Population (1000)	Urban Area (sq km)	Population Density Person/sq km	DVKT[1] per Person	Rank[3]	Lane Km[2] per 1000 Persons	Rank[3]
Northeastern Cities							
Baltimore, MD	2,130	1,880	1,130	7.60	34	1.30	18
Boston, MA	2,990	2,900	1,030	7.69	32	1.57	29
Hartford, CT	630	960	650	9.84	16	1.73	37
New York, NY	17,010	8,810	1,930	5.27	48	0.73	2
Philadelphia, PA	5,250	3,860	1,360	6.75	40	1.01	6
Pittsburgh, PA	1,910	2,380	800	9.91	15	1.58	30
Washington, DC	3,450	2,580	1,340	8.65	22	1.11	12
Midwestern Cities							
Chicago, IL	7,700	6,480	1,190	7.74	30	1.12	14
Cincinnati, OH	1,260	1,670	750	5.68	45	1.07	10
Cleveland, OH	1,810	1,920	940	5.58	46	1.04	8
Columbus, OH	1,000	1,140	870	5.83	44	1.05	9
Detroit, MI	4,010	3,370	1,190	10.86	8	1.78	38
Indianapolis, IN	970	1,220	800	8.71	21	1.66	33
Kansas City, MO	1,320	1,860	710	6.85	39	1.38	20
Louisville, KY	830	1,010	820	7.12	37	1.23	15
Milwaukee, WI	1,240	1,440	860	7.92	28	1.53	27
Minn-St. Paul, MN	2,180	3,110	700	5.29	47	0.92	4
Oklahoma City, OK	850	1,480	580	8.81	20	1.66	32
St. Louis, MO	2,000	2,070	970	10.24	14	1.61	31
Southern Cities							
Atlanta, GA	2,400	4,580	520	8.55	23	1.42	24
Charlotte, NC	540	800	670	9.81	17	1.79	39
Ft. Lauderdale, FL	1,320	1,170	1,130	7.87	29	1.54	28
Jacksonville, FL	790	1,440	550	13.43	5	2.77	50
Memphis, TN	910	1,150	790	10.26	13	1.90	41
Miami, FL	1,940	1,310	1,480	14.23	2	1.95	42
Nashville, TN	620	1,490	410	15.45	1	2.55	48
New Orleans, LA	1,110	950	1,170	7.29	36	1.07	11
Norfolk, VA	990	2,140	460	8.30	25	1.26	17
Orlando, FL	950	1,110	850	10.68	10	2.03	43
Tampa, FL	760	1,230	620	10.63	11	1.69	36
Southwestern Cities							
Albuquerque, NM	540	690	790	14.22	3	2.53	47
Austin, TX	590	980	600	7.97	27	1.41	23
Corpus Christi, TX	300	490	600	9.33	19	2.07	44
Dallas, TX	2,200	4,010	550	7.70	31	1.41	22
Denver, CO	1,680	2,420	690	10.81	9	1.82	40
El Paso, TX	580	580	1,000	9.44	18	2.43	45
Fort Worth, TX	1,240	2,400	520	7.30	35	1.34	19
Houston, TX	2,940	4,300	680	6.43	41	1.23	16
Phoenix, AZ	2,130	2,770	770	14.07	4	2.53	46
Salt Lake City, UT	880	1,270	690	5.21	49	0.91	3
San Antonio, TX	1,210	1,300	930	8.07	26	1.51	26
Western Cities							
Honolulu, HI	700	470	1,490	4.49	50	0.59	1
Los Angeles, CA	12,000	5,790	2,070	11.19	7	1.68	35
Portland, OR	1,100	1,150	950	6.88	38	1.02	7
Sacramento, CA	1,220	1,010	1,210	10.49	12	1.68	34
San Bernardino-Riv, CA	1,340	1,330	1,000	13.40	6	2.55	49
San Diego, CA	2,550	1,920	1,330	6.19	42	1.12	13
San Fran-Oak, CA	3,870	2,460	1,570	6.12	43	0.98	5
San Jose, CA	1,540	1,200	1,280	7.61	33	1.44	25
Seattle-Everett, WA	1,910	1,970	970	8.32	24	1.40	21
Northeastern Avg	4,770	3,340	1,180	7.96		1.29	
Midwestern Avg	2,100	2,230	860	7.55		1.34	
Southern Avg	1,120	1,580	790	10.59		1.82	
Southwestern Avg	1,300	1,930	710	9.14		1.74	
Western Avg	2,910	1,920	1,320	8.30		1.39	
Texas Avg	1,290	2,010	700	8.03		1.63	
Total Avg	2,230	2,120	940	8.76		1.53	
Maximum Value	17,010	8,810	2,070	15.45		2.77	
Minimum Value	300	470	410	4.49		0.59	

Notes: [1] Daily vehicle-kilometers of travel per person.
[2] Lane-kilometers per 1000 persons.
[3] Rank value of 1 associated with most congested condition.

Source: TTI Analysis and Local Transportation Agency References

Table C-3. Percent of Congested DVKT by AADT Congestion Ranges for 1982

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	14	6	0	20	3	7	14	25
Boston, MA	4	10	16	30	11	6	19	35
Hartford, CT	9	1	0	10	7	10	3	20
New York, NY	28	9	17	55	22	29	24	75
Philadelphia, PA	8	4	8	20	17	10	43	70
Pittsburgh, PA	15	0	0	15	20	13	17	50
Washington, DC	38	10	12	60	9	25	46	80
Midwestern Cities								
Chicago, IL	9	15	26	50	14	21	24	60
Cincinnati, OH	19	0	1	20	8	7	4	20
Cleveland, OH	20	0	0	20	20	0	0	20
Columbus, OH	6	12	7	25	6	16	8	30
Detroit, MI	17	13	10	40	25	9	26	60
Indianapolis, IN	5	0	0	5	4	9	2	15
Kansas City, MO	4	1	0	5	8	5	7	20
Louisville, KY	3	2	1	5	14	32	4	50
Milwaukee, WI	10	10	0	20	6	18	7	30
Minn-St. Paul, MN	13	7	0	20	9	14	16	40
Oklahoma City, OK	3	3	0	5	3	9	21	33
St. Louis, MO	9	11	0	20	25	10	30	65
Southern Cities								
Atlanta, GA	16	20	4	40	18	24	18	60
Charlotte, NC	20	0	0	20	9	21	14	45
Ft. Lauderdale, FL	9	4	7	20	27	14	4	45
Jacksonville, FL	25	0	0	25	7	7	22	35
Memphis, TN	8	2	0	10	14	12	4	30
Miami, FL	7	28	10	45	2	10	49	60
Nashville, TN	5	12	3	20	6	23	6	35
New Orleans, LA	37	3	0	40	13	5	27	45
Norfolk, VA	32	2	1	35	0	9	21	30
Orlando, FL	25	0	0	25	3	5	12	20
Tampa, FL	3	8	9	20	12	20	28	60
Southwestern Cities								
Albuquerque, NM	5	0	0	5	17	14	5	35
Austin, TX	15	25	10	50	6	26	8	40
Corpus Christi, TX	5	0	0	5	3	3	4	10
Dallas, TX	9	5	32	45	8	17	0	25
Denver, CO	31	13	2	45	26	3	21	50
El Paso, TX	15	0	0	15	1	4	0	5
Fort Worth, TX	9	3	18	30	10	8	8	25
Houston, TX	2	9	54	65	18	3	29	50
Phoenix, AZ	44	6	0	50	30	17	18	65
Salt Lake City, UT	4	4	3	10	17	2	16	35
San Antonio, TX	21	7	7	35	4	1	0	5
Western Cities								
Honolulu, HI	4	13	23	40	18	19	27	65
Los Angeles, CA	17	19	39	75	8	22	5	35
Portland, OR	16	4	10	30	33	6	21	60
Sacramento, CA	25	0	0	25	16	12	12	40
San Bernardino-Riv, CA	60	0	0	60	50	0	0	50
San Diego, CA	23	12	0	35	25	0	0	25
San Fran-Oak, CA	17	12	35	65	35	3	22	60
San Jose, CA	7	18	21	45	37	2	1	40
Seattle-Everett, WA	23	9	8	40	9	21	21	50

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Table C-4. Percent of Congested DVKT by AADT Congestion Ranges for 1983

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	16	4	0	20	2	6	17	25
Boston, MA	6	9	15	30	6	11	18	35
Hartford, CT	9	1	0	10	11	10	4	25
New York, NY	20	20	15	55	19	27	29	75
Philadelphia, PA	9	3	8	20	25	18	27	70
Pittsburgh, PA	9	6	0	15	19	16	20	55
Washington, DC	22	27	11	60	9	13	58	80
Midwestern Cities								
Chicago, IL	14	18	18	50	16	24	26	65
Cincinnati, OH	16	3	1	20	9	8	4	20
Cleveland, OH	20	0	0	20	20	0	0	20
Columbus, OH	7	11	6	25	24	7	4	35
Detroit, MI	12	12	12	35	24	6	24	55
Indianapolis, IN	5	0	0	5	6	6	4	15
Kansas City, MO	2	3	0	5	11	1	8	20
Louisville, KY	1	2	2	5	10	35	5	50
Milwaukee, WI	11	9	0	20	5	21	4	30
Minn-St. Paul, MN	10	8	2	20	5	21	14	40
Oklahoma City, OK	3	3	0	5	3	9	21	33
St. Louis, MO	7	13	0	20	26	14	26	65
Southern Cities								
Atlanta, GA	16	19	5	40	13	27	20	60
Charlotte, NC	20	0	0	20	9	22	19	50
Ft. Lauderdale, FL	10	4	6	20	25	15	5	45
Jacksonville, FL	25	0	0	25	9	16	10	35
Memphis, TN	10	0	0	10	14	13	3	30
Miami, FL	19	12	14	45	8	22	29	60
Nashville, TN	11	2	7	20	5	17	14	35
New Orleans, LA	25	12	3	40	19	3	23	45
Norfolk, VA	32	2	1	35	0	8	22	30
Orlando, FL	25	0	0	25	5	2	13	20
Tampa, FL	3	5	12	20	9	18	32	60
Southwestern Cities								
Albuquerque, NM	5	1	0	5	27	6	7	40
Austin, TX	13	28	9	50	7	26	7	40
Corpus Christi, TX	5	0	0	5	2	3	6	10
Dallas, TX	13	4	32	50	4	18	3	25
Denver, CO	18	19	8	45	17	12	21	50
El Paso, TX	15	0	0	15	2	3	0	5
Fort Worth, TX	9	3	23	35	13	5	8	25
Houston, TX	13	10	42	65	12	5	33	50
Phoenix, AZ	48	7	0	55	34	15	16	65
Salt Lake City, UT	1	9	0	10	8	5	22	35
San Antonio, TX	21	7	7	35	4	1	5	10
Western Cities								
Honolulu, HI	1	10	29	40	20	16	29	65
Los Angeles, CA	16	15	49	80	12	6	17	35
Portland, OR	20	4	6	30	29	7	24	60
Sacramento, CA	25	0	0	25	16	12	12	40
San Bernardino-Riv, CA	60	0	0	60	50	0	0	50
San Diego, CA	25	10	0	35	23	3	0	25
San Fran-Oak, CA	12	21	37	70	17	18	26	60
San Jose, CA	2	9	38	50	37	2	1	40
Seattle-Everett, WA	13	23	10	45	13	15	27	55

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Table C-5. Percent of Congested DVKT by AADT Congestion Ranges for 1984

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	15	8	2	25	3	7	20	30
Boston, MA	11	7	18	35	6	8	21	35
Hartford, CT	8	2	0	10	6	10	8	25
New York, NY	32	8	15	55	25	33	17	75
Philadelphia, PA	10	4	6	20	14	25	32	70
Pittsburgh, PA	8	3	5	15	18	12	25	55
Washington, DC	20	31	14	65	12	15	53	80
Midwestern Cities								
Chicago, IL	8	12	35	55	15	16	34	65
Cincinnati, OH	11	7	2	20	7	8	5	20
Cleveland, OH	20	5	0	25	20	0	0	20
Columbus, OH	7	7	11	25	22	10	3	35
Detroit, MI	13	13	14	40	12	18	30	60
Indianapolis, IN	5	0	0	5	5	5	6	15
Kansas City, MO	2	3	1	5	11	1	8	20
Louisville, KY	1	2	2	5	23	25	3	50
Milwaukee, WI	13	12	0	25	13	18	4	35
Minn-St. Paul, MN	11	5	4	20	7	14	24	45
Oklahoma City, OK	3	3	0	5	4	11	25	39
St. Louis, MO	11	5	5	20	20	10	35	65
Southern Cities								
Atlanta, GA	23	18	5	45	23	21	20	65
Charlotte, NC	20	0	0	20	9	24	17	50
Ft. Lauderdale, FL	8	5	7	20	16	14	14	45
Jacksonville, FL	19	6	0	25	11	8	21	40
Memphis, TN	6	4	0	10	14	11	6	30
Miami, FL	18	12	15	45	15	4	41	60
Nashville, TN	10	10	0	20	5	12	23	40
New Orleans, LA	7	14	24	45	12	6	32	50
Norfolk, VA	10	24	1	35	0	9	21	30
Orlando, FL	21	2	3	25	3	8	14	25
Tampa, FL	1	5	14	20	15	19	32	65
Southwestern Cities								
Albuquerque, NM	4	1	0	5	22	16	7	45
Austin, TX	15	22	13	50	10	27	8	45
Corpus Christi, TX	5	0	0	5	2	5	3	10
Dallas, TX	17	7	27	50	14	6	10	30
Denver, CO	4	27	14	45	12	6	32	50
El Paso, TX	15	0	0	15	3	2	0	5
Fort Worth, TX	12	5	19	35	14	6	10	30
Houston, TX	12	12	46	70	11	6	38	55
Phoenix, AZ	48	12	0	60	34	15	16	65
Salt Lake City, UT	6	4	0	10	20	7	13	40
San Antonio, TX	18	7	11	35	2	1	7	10
Western Cities								
Honolulu, HI	3	9	33	45	14	15	35	65
Los Angeles, CA	16	16	48	80	11	5	24	40
Portland, OR	20	5	5	30	37	5	18	60
Sacramento, CA	18	7	0	25	17	16	12	45
San Bernardino-Riv, CA	29	31	0	60	33	17	0	50
San Diego, CA	12	14	9	35	24	6	0	30
San Fran-Oak, CA	5	21	49	75	6	18	37	60
San Jose, CA	7	3	39	50	33	5	7	45
Seattle-Everett, WA	14	17	18	50	11	19	25	55

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Table C-6. Percent of Congested DVKT by AADT Congestion Ranges for 1985

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	14	5	6	25	4	6	25	35
Boston, MA	15	4	15	35	6	7	23	35
Hartford, CT	8	2	0	10	6	10	9	25
New York, NY	20	21	14	55	21	19	36	75
Philadelphia, PA	18	3	4	25	8	27	40	75
Pittsburgh, PA	5	3	7	15	21	26	13	60
Washington, DC	33	12	20	65	10	24	46	80
Midwestern Cities								
Chicago, IL	5	9	41	55	17	8	45	70
Cincinnati, OH	9	8	3	20	6	12	6	25
Cleveland, OH	17	6	2	25	20	0	0	20
Columbus, OH	9	6	9	25	19	13	3	35
Detroit, MI	11	11	14	35	6	11	39	55
Indianapolis, IN	5	0	0	5	3	5	8	15
Kansas City, MO	2	1	2	5	11	3	6	20
Louisville, KY	0	1	4	5	6	39	5	50
Milwaukee, WI	10	15	0	25	3	24	8	35
Minn-St. Paul, MN	6	6	8	20	11	14	20	45
Oklahoma City, OK	3	3	0	5	4	11	25	39
St. Louis, MO	5	12	3	20	16	14	35	65
Southern Cities								
Atlanta, GA	24	19	8	50	19	22	24	65
Charlotte, NC	20	5	0	25	10	24	21	55
Ft. Lauderdale, FL	8	5	7	20	12	22	16	50
Jacksonville, FL	22	8	0	30	12	10	18	40
Memphis, TN	8	2	0	10	14	9	7	30
Miami, FL	28	5	17	50	11	3	56	70
Nashville, TN	8	8	0	15	8	13	19	40
New Orleans, LA	9	14	23	45	10	5	35	50
Norfolk, VA	5	34	1	40	7	2	21	30
Orlando, FL	18	0	7	25	6	6	14	25
Tampa, FL	3	5	12	20	14	10	42	65
Southwestern Cities								
Albuquerque, NM	6	4	0	10	21	10	9	40
Austin, TX	20	18	17	55	8	23	14	45
Corpus Christi, TX	5	0	0	5	2	6	2	10
Dallas, TX	20	10	21	50	16	7	8	30
Denver, CO	16	15	15	45	22	11	17	50
El Paso, TX	20	0	0	20	3	2	0	5
Fort Worth, TX	14	7	15	35	16	7	8	30
Houston, TX	13	9	49	70	9	5	41	55
Phoenix, AZ	49	16	0	65	31	20	19	70
Salt Lake City, UT	5	2	3	10	23	4	12	40
San Antonio, TX	15	6	19	40	6	2	7	15
Western Cities								
Honolulu, HI	8	6	32	45	22	17	31	70
Los Angeles, CA	14	17	49	80	8	11	27	45
Portland, OR	16	10	4	30	36	11	13	60
Sacramento, CA	24	3	3	30	14	10	21	45
San Bernardino-Riv, CA	43	17	0	60	28	19	8	55
San Diego, CA	13	5	17	35	23	8	0	30
San Fran-Oak, CA	6	15	54	75	8	16	36	60
San Jose, CA	9	5	41	55	27	13	10	50
Seattle-Everett, WA	20	11	19	50	12	11	32	55

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Table C-7. Percent of Congested DVKT by AADT Congestion Ranges for 1986

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	15	7	3	25	5	8	22	35
Boston, MA	12	8	20	40	7	6	22	35
Hartford, CT	5	3	2	10	3	13	9	25
New York, NY	22	22	10	55	22	9	44	75
Philadelphia, PA	18	3	4	25	14	13	48	75
Pittsburgh, PA	4	7	9	20	21	20	19	60
Washington, DC	25	24	16	65	13	20	47	80
Midwestern Cities								
Chicago, IL	4	8	43	55	11	10	48	70
Cincinnati, OH	11	7	2	20	9	7	9	25
Cleveland, OH	17	6	2	25	12	8	0	20
Columbus, OH	6	11	7	25	17	11	11	40
Detroit, MI	13	11	17	40	4	7	50	60
Indianapolis, IN	5	0	0	5	6	3	6	15
Kansas City, MO	3	0	2	5	7	7	6	20
Louisville, KY	2	1	3	5	7	30	13	50
Milwaukee, WI	6	17	2	25	1	24	10	35
Minn-St. Paul, MN	10	10	6	25	11	7	33	50
Oklahoma City, OK	3	3	0	5	4	11	25	39
St. Louis, MO	11	7	2	20	18	17	30	65
Southern Cities								
Atlanta, GA	18	20	13	50	16	22	27	65
Charlotte, NC	23	2	0	25	11	24	19	55
Ft. Lauderdale, FL	15	5	5	25	6	14	30	50
Jacksonville, FL	28	2	0	30	18	8	14	40
Memphis, TN	10	0	0	10	22	6	8	35
Miami, FL	21	11	18	50	12	22	36	70
Nashville, TN	9	6	0	15	7	11	22	40
New Orleans, LA	12	15	23	50	5	4	40	50
Norfolk, VA	16	9	20	45	3	4	23	30
Orlando, FL	22	2	6	30	1	9	15	25
Tampa, FL	4	9	7	20	11	20	34	65
Southwestern Cities								
Albuquerque, NM	3	6	1	10	25	8	7	40
Austin, TX	18	14	22	55	9	11	25	45
Corpus Christi, TX	10	0	0	10	2	5	3	10
Dallas, TX	7	13	35	55	15	10	5	30
Denver, CO	17	15	19	50	25	10	15	50
El Paso, TX	15	5	0	20	3	2	0	5
Fort Worth, TX	5	10	25	40	15	10	5	30
Houston, TX	8	15	52	75	12	8	35	55
Phoenix, AZ	11	39	20	70	31	13	26	70
Salt Lake City, UT	3	5	2	10	30	4	11	45
San Antonio, TX	6	6	28	40	6	3	6	15
Western Cities								
Honolulu, HI	11	6	28	45	23	16	31	70
Los Angeles, CA	6	12	63	80	9	9	32	50
Portland, OR	12	15	3	30	29	20	11	60
Sacramento, CA	22	6	2	30	11	24	10	45
San Bernardino-Riv, CA	17	35	13	65	21	17	17	55
San Diego, CA	23	4	13	40	13	17	0	30
San Fran-Oak, CA	7	6	62	75	13	8	39	60
San Jose, CA	3	11	40	55	13	17	24	55
Seattle-Everett, WA	18	21	17	55	17	4	34	55

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Table C-8. Percent of Congested DVKT by AADT Congestion Ranges for 1987

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	14	5	5	25	7	5	24	35
Boston, MA	17	10	13	40	8	4	23	35
Hartford, CT	5	3	2	10	9	14	8	30
New York, NY	21	18	17	55	16	13	46	75
Philadelphia, PA	15	7	3	25	13	12	50	75
Pittsburgh, PA	3	9	9	20	20	13	28	60
Washington, DC	21	25	19	65	13	18	54	85
Midwestern Cities								
Chicago, IL	5	12	38	55	14	8	48	70
Cincinnati, OH	16	7	2	25	11	6	8	25
Cleveland, OH	16	7	2	25	11	14	0	25
Columbus, OH	2	10	13	25	14	15	11	40
Detroit, MI	13	7	20	40	4	6	51	60
Indianapolis, IN	5	1	0	5	7	4	5	15
Kansas City, MO	4	0	1	5	6	4	10	20
Louisville, KY	2	1	2	5	8	31	16	55
Milwaukee, WI	7	14	9	30	9	19	7	35
Minn-St. Paul, MN	5	8	17	30	15	6	34	55
Oklahoma City, OK	3	3	0	5	0	14	21	35
St. Louis, MO	9	7	5	20	23	11	31	65
Southern Cities								
Atlanta, GA	13	20	18	50	11	22	32	65
Charlotte, NC	24	1	0	25	9	18	28	55
Ft. Lauderdale, FL	18	6	6	30	6	17	27	50
Jacksonville, FL	21	8	2	30	11	16	18	45
Memphis, TN	10	0	0	10	18	8	9	35
Miami, FL	21	13	15	50	11	4	55	70
Nashville, TN	15	3	2	20	7	6	27	40
New Orleans, LA	14	14	22	50	9	2	39	50
Norfolk, VA	8	14	23	45	6	8	21	35
Orlando, FL	21	2	8	30	2	4	18	25
Tampa, FL	7	3	10	20	12	15	39	65
Southwestern Cities								
Albuquerque, NM	1	4	5	10	24	10	6	40
Austin, TX	22	11	22	55	7	15	23	45
Corpus Christi, TX	10	0	0	10	2	5	3	10
Dallas, TX	19	11	25	55	13	9	7	30
Denver, CO	15	18	16	50	26	12	12	50
El Paso, TX	7	13	0	20	3	2	0	5
Fort Worth, TX	14	8	18	40	10	12	7	30
Houston, TX	12	9	49	70	12	8	30	50
Phoenix, AZ	3	25	42	70	32	18	20	70
Salt Lake City, UT	4	9	2	15	16	14	9	40
San Antonio, TX	6	3	31	40	4	1	9	15
Western Cities								
Honolulu, HI	12	6	27	45	36	15	19	70
Los Angeles, CA	4	11	65	80	13	12	25	50
Portland, OR	17	11	7	35	12	24	25	60
Sacramento, CA	16	13	1	30	7	24	14	45
San Bernardino-Riv, CA	11	40	14	65	23	15	17	55
San Diego, CA	13	19	13	45	5	25	0	30
San Fran-Oak, CA	8	4	68	80	9	11	40	60
San Jose, CA	7	8	45	60	9	8	38	55
Seattle-Everett, WA	24	19	22	65	11	18	26	55

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Table C-9. Percent of Congested DVKT by AADT Congestion Ranges for 1988

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	12	5	8	25	7	5	23	35
Boston, MA	12	13	20	45	9	9	23	40
Hartford, CT	7	4	5	15	9	13	8	30
New York, NY	22	15	18	55	13	16	51	80
Philadelphia, PA	16	7	2	25	11	10	54	75
Pittsburgh, PA	10	3	7	20	7	10	43	60
Washington, DC	20	27	19	65	9	22	54	85
Midwestern Cities								
Chicago, IL	6	12	38	56	14	15	35	65
Cincinnati, OH	16	11	3	30	5	7	12	25
Cleveland, OH	14	10	1	25	14	13	3	30
Columbus, OH	2	10	13	25	6	24	11	40
Detroit, MI	11	8	26	45	9	5	46	60
Indianapolis, IN	9	1	0	10	12	3	5	20
Kansas City, MO	2	1	2	5	8	8	8	25
Louisville, KY	2	0	3	5	17	28	10	55
Milwaukee, WI	6	11	13	30	12	16	8	35
Minn-St. Paul, MN	7	8	16	30	14	8	33	55
Oklahoma City, OK	5	5	0	10	1	11	23	35
St. Louis, MO	9	3	8	20	14	13	28	55
Southern Cities								
Atlanta, GA	9	18	18	45	12	18	35	65
Charlotte, NC	21	4	0	25	12	16	32	60
Ft. Lauderdale, FL	18	6	6	30	5	20	25	50
Jacksonville, FL	28	2	0	30	11	20	14	45
Memphis, TN	10	0	0	10	14	8	13	35
Miami, FL	14	16	30	60	1	18	51	70
Nashville, TN	9	10	5	25	4	6	29	40
New Orleans, LA	18	7	25	50	5	2	43	50
Norfolk, VA	4	18	24	45	9	10	16	35
Orlando, FL	21	2	7	30	3	5	16	25
Tampa, FL	10	3	13	25	8	12	45	65
Southwestern Cities								
Albuquerque, NM	7	8	5	20	20	11	4	35
Austin, TX	20	15	20	55	14	14	18	45
Corpus Christi, TX	10	0	0	10	2	6	1	10
Dallas, TX	16	9	30	55	15	15	5	35
Denver, CO	12	21	17	50	27	12	10	50
El Paso, TX	7	13	0	20	3	2	0	5
Fort Worth, TX	12	6	22	40	13	13	4	30
Houston, TX	11	11	48	70	7	28	15	50
Phoenix, AZ	23	9	28	60	15	17	37	70
Salt Lake City, UT	8	6	1	15	17	15	8	40
San Antonio, TX	8	6	26	40	7	2	11	20
Western Cities								
Honolulu, HI	10	11	28	50	32	13	26	70
Los Angeles, CA	4	4	67	75	12	11	32	55
Portland, OR	18	10	8	35	11	26	24	60
Sacramento, CA	14	15	1	30	11	22	17	50
San Bernardino-Riv, CA	6	43	16	65	23	16	17	55
San Diego, CA	13	10	27	50	5	20	6	30
San Fran-Oak, CA	10	5	66	80	9	3	48	60
San Jose, CA	10	9	41	60	10	4	45	60
Seattle-Everett, WA	21	24	24	70	11	15	30	55

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Table C-10. Percent of Congested DVKT by AADT Congestion Ranges for 1989

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	6	9	10	25	6	8	21	35
Boston, MA	8	16	21	45	7	8	25	40
Hartford, CT	6	5	4	15	9	16	10	35
New York, NY	26	8	27	60	15	11	54	80
Philadelphia, PA	14	7	4	25	14	9	52	75
Pittsburgh, PA	12	0	8	20	9	9	43	60
Washington, DC	10	29	26	65	8	20	57	85
Midwestern Cities								
Chicago, IL	9	8	38	55	13	17	35	65
Cincinnati, OH	20	7	3	30	10	3	12	25
Cleveland, OH	15	11	4	30	10	13	7	30
Columbus, OH	3	10	12	25	6	25	14	45
Detroit, MI	11	5	29	45	5	8	47	60
Indianapolis, IN	9	2	0	10	13	3	4	20
Kansas City, MO	3	1	2	5	8	9	8	25
Louisville, KY	2	0	3	5	18	26	11	55
Milwaukee, WI	10	9	11	30	12	15	8	35
Minn-St. Paul, MN	7	8	16	30	17	6	33	55
Oklahoma City, OK	6	4	0	10	7	11	16	35
St. Louis, MO	8	4	8	20	8	17	35	60
Southern Cities								
Atlanta, GA	8	12	25	45	12	12	41	65
Charlotte, NC	25	5	0	30	13	13	33	60
Ft. Lauderdale, FL	21	10	4	35	10	18	22	50
Jacksonville, FL	27	8	0	35	15	17	19	50
Memphis, TN	10	0	0	10	10	14	11	35
Miami, FL	11	15	33	60	2	8	60	70
Nashville, TN	15	7	3	25	5	5	30	40
New Orleans, LA	9	20	21	50	15	3	32	50
Norfolk, VA	3	16	25	45	11	5	19	35
Orlando, FL	22	2	6	30	1	6	18	25
Tampa, FL	8	7	10	25	20	8	36	65
Southwestern Cities								
Albuquerque, NM	7	8	5	20	23	11	5	40
Austin, TX	20	17	18	55	16	17	11	45
Corpus Christi, TX	10	0	0	10	6	3	1	10
Dallas, TX	17	13	24	55	14	15	7	35
Denver, CO	15	19	17	50	18	14	18	50
El Paso, TX	9	11	0	20	3	2	1	5
Fort Worth, TX	13	10	18	40	9	13	9	30
Houston, TX	7	19	44	70	9	23	18	50
Phoenix, AZ	18	8	34	60	18	17	35	70
Salt Lake City, UT	6	3	6	15	18	14	8	40
San Antonio, TX	6	16	18	40	7	2	12	20
Western Cities								
Honolulu, HI	10	10	29	50	28	12	29	70
Los Angeles, CA	4	3	68	75	10	15	30	55
Portland, OR	16	5	13	35	10	25	26	60
Sacramento, CA	14	12	4	30	3	17	30	50
San Bernardino-Riv, CA	4	38	22	65	22	21	12	55
San Diego, CA	13	8	29	50	4	25	2	30
San Fran-Oak, CA	11	5	64	80	6	3	51	60
San Jose, CA	9	13	38	60	9	7	44	60
Seattle-Everett, WA	9	35	26	70	14	8	34	55

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Table C-11. Percent of Congested DVKT by AADT Congestion Ranges for 1990

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	6	8	12	25	4	4	26	35
Boston, MA	10	15	19	45	8	7	26	40
Hartford, CT	5	6	4	15	12	12	11	35
New York, NY	28	10	22	60	14	17	49	80
Philadelphia, PA	12	6	7	25	13	14	48	75
Pittsburgh, PA	4	6	10	20	14	9	37	60
Washington, DC	12	20	34	65	6	26	53	85
Midwestern Cities								
Chicago, IL	7	11	37	55	16	19	30	65
Cincinnati, OH	18	8	4	30	10	3	12	25
Cleveland, OH	18	10	2	30	10	10	10	30
Columbus, OH	2	12	16	30	8	15	22	45
Detroit, MI	11	5	28	45	9	13	43	65
Indianapolis, IN	8	1	1	10	13	1	6	20
Kansas City, MO	3	2	0	5	9	6	10	25
Louisville, KY	3	0	2	5	14	29	12	55
Milwaukee, WI	8	10	12	30	12	9	14	35
Minn-St. Paul, MN	7	6	17	30	14	4	37	55
Oklahoma City, OK	6	4	0	10	9	11	15	35
St. Louis, MO	10	2	8	20	13	29	18	60
Southern Cities								
Atlanta, GA	6	13	26	45	8	14	42	65
Charlotte, NC	25	5	0	30	9	20	31	60
Ft. Lauderdale, FL	24	13	3	40	7	19	24	50
Jacksonville, FL	27	8	0	35	11	15	24	50
Memphis, TN	9	1	0	10	8	15	12	35
Miami, FL	18	8	33	60	2	8	60	70
Nashville, TN	18	5	3	25	4	9	27	40
New Orleans, LA	9	25	16	50	12	10	28	50
Norfolk, VA	3	16	25	45	10	9	16	35
Orlando, FL	19	5	6	30	1	4	20	25
Tampa, FL	4	8	12	25	18	9	38	65
Southwestern Cities								
Albuquerque, NM	6	9	5	20	19	16	5	40
Austin, TX	18	20	17	55	15	15	15	45
Corpus Christi, TX	10	0	0	10	7	2	1	10
Dallas, TX	12	16	27	55	16	9	9	35
Denver, CO	11	13	25	50	11	14	25	50
El Paso, TX	10	9	1	20	1	2	1	5
Fort Worth, TX	9	12	19	40	14	8	8	30
Houston, TX	6	21	43	70	11	22	17	50
Phoenix, AZ	7	32	21	60	26	23	22	70
Salt Lake City, UT	7	6	2	15	18	11	11	40
San Antonio, TX	6	18	17	40	7	3	11	20
Western Cities								
Honolulu, HI	11	13	25	50	28	12	30	70
Los Angeles, CA	4	3	68	75	12	19	24	55
Portland, OR	16	8	11	35	7	26	27	60
Sacramento, CA	15	11	4	30	2	13	35	50
San Bernardino-Riv, CA	13	23	34	70	25	17	13	55
San Diego, CA	14	12	23	50	8	20	2	30
San Fran-Oak, CA	14	8	58	80	4	9	47	60
San Jose, CA	12	11	38	60	13	5	41	60
Seattle-Everett, WA	11	38	21	70	10	8	37	55

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Table C-12. Percent of Congested DVKT by AADT Congestion Ranges for 1991

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	6	7	12	25	3	8	24	35
Boston, MA	7	16	23	45	11	6	23	40
Hartford, CT	6	5	4	15	14	11	10	35
New York, NY	28	13	19	60	15	15	50	80
Philadelphia, PA	12	5	8	25	11	20	44	75
Pittsburgh, PA	4	6	10	20	16	14	30	60
Washington, DC	8	22	35	65	7	21	57	85
Midwestern Cities								
Chicago, IL	7	9	39	55	15	18	32	65
Cincinnati, OH	17	10	3	30	11	4	14	30
Cleveland, OH	18	9	3	30	11	10	9	30
Columbus, OH	3	12	15	30	9	14	22	45
Detroit, MI	10	6	30	45	8	14	42	65
Indianapolis, IN	8	1	1	10	14	1	5	20
Kansas City, MO	3	2	1	5	9	7	8	25
Louisville, KY	3	0	2	5	11	30	13	55
Milwaukee, WI	9	11	11	30	11	9	15	35
Minn-St. Paul, MN	8	6	15	30	11	6	38	55
Oklahoma City, OK	6	4	0	10	8	10	17	35
St. Louis, MO	10	2	8	20	12	27	21	60
Southern Cities								
Atlanta, GA	4	17	24	45	10	17	38	65
Charlotte, NC	30	5	0	35	10	13	37	60
Ft. Lauderdale, FL	23	13	4	40	9	17	23	50
Jacksonville, FL	25	9	1	35	16	13	21	50
Memphis, TN	13	2	0	15	10	14	11	35
Miami, FL	20	10	30	60	3	10	58	70
Nashville, TN	18	6	2	25	5	10	25	40
New Orleans, LA	8	24	16	49	10	12	28	50
Norfolk, VA	8	18	19	45	10	9	16	35
Orlando, FL	19	5	7	30	2	3	21	25
Tampa, FL	4	9	12	25	24	11	37	72
Southwestern Cities								
Albuquerque, NM	7	8	5	20	18	18	4	40
Austin, TX	19	21	15	55	15	17	13	45
Corpus Christi, TX	9	1	0	10	10	3	2	15
Dallas, TX	12	14	29	55	15	11	9	35
Denver, CO	12	18	25	55	7	15	28	50
El Paso, TX	11	8	1	20	1	1	2	5
Fort Worth, TX	9	10	21	40	13	9	8	30
Houston, TX	8	19	43	70	10	21	19	50
Phoenix, AZ	10	30	21	60	27	18	26	70
Salt Lake City, UT	8	9	4	20	22	10	9	40
San Antonio, TX	5	16	19	40	6	4	10	20
Western Cities								
Honolulu, HI	10	13	27	50	26	10	34	70
Los Angeles, CA	5	3	67	75	11	16	28	55
Portland, OR	16	8	11	35	6	25	28	60
Sacramento, CA	15	12	3	30	4	10	35	50
San Bernardino-Riv, CA	11	12	46	70	25	17	13	55
San Diego, CA	13	13	24	50	7	19	4	30
San Fran-Oak, CA	11	13	56	80	6	7	47	60
San Jose, CA	12	11	37	60	12	3	45	60
Seattle-Everett, WA	8	36	26	70	10	11	34	55

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Table C-13. Percent of Congested DVKT by AADT Congestion Ranges for 1992

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	8	7	15	30	5	6	25	35
Boston, MA	6	14	25	45	12	8	20	40
Hartford, CT	4	6	5	15	12	13	11	35
New York, NY	21	19	20	60	10	20	55	85
Philadelphia, PA	7	5	14	25	11	17	47	75
Pittsburgh, PA	5	6	9	20	16	11	33	60
Washington, DC	7	20	42	70	13	15	56	85
Midwestern Cities								
Chicago, IL	10	7	42	60	13	22	35	70
Cincinnati, OH	17	14	5	35	10	7	13	30
Cleveland, OH	15	7	8	30	7	16	12	35
Columbus, OH	3	9	18	30	11	9	31	50
Detroit, MI	9	4	32	45	5	16	44	65
Indianapolis, IN	8	1	1	10	15	5	6	25
Kansas City, MO	6	1	3	10	9	7	9	25
Louisville, KY	2	1	2	5	8	21	31	60
Milwaukee, WI	8	9	13	30	11	10	14	35
Minn-St. Paul, MN	10	2	18	30	6	12	38	55
Oklahoma City, OK	5	5	0	10	9	13	18	40
St. Louis, MO	11	6	3	20	15	19	26	60
Southern Cities								
Atlanta, GA	5	20	25	50	10	12	43	65
Charlotte, NC	19	7	9	35	11	14	36	60
Ft. Lauderdale, FL	16	18	6	40	13	17	20	50
Jacksonville, FL	13	20	3	35	22	6	23	50
Memphis, TN	10	4	2	15	12	14	9	35
Miami, FL	21	8	31	60	3	12	49	65
Nashville, TN	16	5	5	25	14	16	11	40
New Orleans, LA	10	30	10	50	16	12	22	50
Norfolk, VA	9	17	14	40	7	8	24	40
Orlando, FL	14	6	10	30	1	3	21	25
Tampa, FL	4	6	15	25	15	14	36	66
Southwestern Cities								
Albuquerque, NM	7	7	5	20	17	16	7	40
Austin, TX	19	19	17	55	16	16	14	45
Corpus Christi, TX	12	3	0	15	9	5	1	15
Dallas, TX	13	17	25	55	16	9	10	35
Denver, CO	13	15	27	55	12	10	29	50
El Paso, TX	11	11	3	25	3	2	5	10
Fort Worth, TX	9	12	18	40	14	8	8	30
Houston, TX	10	18	42	70	12	23	15	50
Phoenix, AZ	11	9	40	60	21	23	26	70
Salt Lake City, UT	6	8	6	20	26	13	6	45
San Antonio, TX	6	13	21	40	9	6	10	25
Western Cities								
Honolulu, HI	8	15	28	50	17	9	50	75
Los Angeles, CA	5	3	67	75	8	20	28	55
Portland, OR	13	8	19	40	9	25	25	60
Sacramento, CA	13	15	2	30	8	12	30	50
San Bernardino-Riv, CA	5	12	54	70	23	14	19	55
San Diego, CA	17	11	22	50	6	21	9	35
San Fran-Oak, CA	14	12	54	80	6	9	45	60
San Jose, CA	12	12	36	60	13	10	37	60
Seattle-Everett, WA	8	27	35	70	8	11	37	55

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Table C-14. Percent of Congested DVKT by AADT Congestion Ranges for 1993

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	9	6	15	30	5	8	27	40
Boston, MA	9	13	23	45	11	9	21	40
Hartford, CT	6	10	4	20	11	13	11	35
New York, NY	18	24	18	60	6	19	60	85
Philadelphia, PA	8	6	11	25	8	12	55	75
Pittsburgh, PA	5	7	8	20	21	11	33	65
Washington, DC	12	13	45	70	14	19	52	85
Midwestern Cities								
Chicago, IL	11	7	42	60	13	23	29	65
Cincinnati, OH	11	16	8	35	11	8	11	30
Cleveland, OH	16	8	10	35	8	12	10	30
Columbus, OH	2	10	18	30	13	8	28	50
Detroit, MI	9	5	36	50	10	8	47	65
Indianapolis, IN	10	2	2	15	10	8	7	25
Kansas City, MO	6	2	3	10	10	6	9	25
Louisville, KY	4	2	4	10	13	16	32	60
Milwaukee, WI	7	10	13	30	5	9	16	30
Minn-St. Paul, MN	14	3	18	35	8	6	36	50
Oklahoma City, OK	6	4	0	10	11	13	16	40
St. Louis, MO	9	9	7	25	20	15	25	60
Southern Cities								
Atlanta, GA	6	15	29	50	11	10	44	65
Charlotte, NC	16	9	9	35	10	16	35	60
Ft. Lauderdale, FL	11	21	8	40	18	15	17	50
Jacksonville, FL	13	18	4	35	20	11	24	55
Memphis, TN	8	5	2	15	15	9	11	35
Miami, FL	14	8	37	60	8	10	52	70
Nashville, TN	10	5	5	20	12	13	10	35
New Orleans, LA	10	33	7	50	14	15	20	50
Norfolk, VA	14	20	6	40	6	12	22	40
Orlando, FL	16	7	12	35	2	5	23	30
Tampa, FL	3	3	14	20	11	14	40	65
Southwestern Cities								
Albuquerque, NM	8	7	5	20	17	20	7	45
Austin, TX	14	20	21	55	19	16	16	50
Corpus Christi, TX	11	4	0	15	10	5	0	15
Dallas, TX	15	19	21	55	16	12	12	40
Denver, CO	11	11	33	55	12	12	31	55
El Paso, TX	11	12	2	25	3	2	5	10
Fort Worth, TX	13	15	17	45	12	9	9	30
Houston, TX	6	27	37	70	7	24	19	50
Phoenix, AZ	13	10	42	65	20	26	24	70
Salt Lake City, UT	7	10	9	25	25	14	5	45
San Antonio, TX	6	14	20	40	10	7	12	30
Western Cities								
Honolulu, HI	10	10	30	50	20	7	48	75
Los Angeles, CA	5	3	66	75	9	15	30	55
Portland, OR	11	10	19	40	12	25	24	61
Sacramento, CA	13	19	3	35	9	12	34	55
San Bernardino-Riv, CA	8	14	48	70	21	17	23	60
San Diego, CA	21	15	15	50	5	22	9	35
San Fran-Oak, CA	11	15	54	80	7	10	48	65
San Jose, CA	9	12	39	60	15	10	30	55
Seattle-Everett, WA	6	24	40	70	12	11	33	55

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Table C-15. Percent of Congested DVKT by AADT Congestion Ranges for 1994

Urban Area	Freeway and Expressway				Principal Arterial Street			
	Moderate	Heavy	Severe	Total	Moderate	Heavy	Severe	Total
Northeastern Cities								
Baltimore, MD	7	9	15	30	9	5	26	40
Boston, MA	10	5	30	45	9	9	22	40
Hartford, CT	5	8	6	20	12	12	11	35
New York, NY	20	22	18	60	7	11	67	85
Philadelphia, PA	10	7	8	25	9	18	48	75
Pittsburgh, PA	5	8	8	20	18	8	40	65
Washington, DC	12	15	43	70	17	15	53	85
Midwestern Cities								
Chicago, IL	8	10	42	60	14	20	31	65
Cincinnati, OH	12	14	9	35	11	7	12	30
Cleveland, OH	12	10	12	35	11	15	9	35
Columbus, OH	4	7	19	30	13	13	23	50
Detroit, MI	13	4	34	50	7	9	49	65
Indianapolis, IN	12	5	3	20	10	12	8	30
Kansas City, MO	5	2	3	10	9	7	10	25
Louisville, KY	4	3	8	15	11	19	30	60
Milwaukee, WI	10	8	11	30	5	11	18	35
Minn-St. Paul, MN	11	7	17	35	9	6	40	55
Oklahoma City, OK	6	4	0	10	10	13	17	40
St. Louis, MO	7	9	9	25	22	15	23	60
Southern Cities								
Atlanta, GA	4	17	29	50	10	12	43	65
Charlotte, NC	18	11	7	35	11	16	33	60
Ft. Lauderdale, FL	11	20	9	40	15	12	23	50
Jacksonville, FL	12	18	5	35	17	15	23	55
Memphis, TN	9	9	2	20	16	9	10	35
Miami, FL	10	11	40	60	9	11	50	70
Nashville, TN	9	5	5	20	11	15	9	35
New Orleans, LA	6	34	9	50	16	12	22	50
Norfolk, VA	12	20	8	40	6	10	26	42
Orlando, FL	13	6	16	35	3	6	21	30
Tampa, FL	2	3	15	20	11	15	39	65
Southwestern Cities								
Albuquerque, NM	8	9	11	28	15	22	8	45
Austin, TX	13	21	26	60	18	17	15	50
Corpus Christi, TX	9	2	5	15	9	4	2	15
Dallas, TX	11	20	24	55	16	11	18	45
Denver, CO	9	17	30	55	13	7	35	55
El Paso, TX	10	11	4	25	4	2	5	10
Fort Worth, TX	9	16	19	45	16	9	7	32
Houston, TX	11	21	38	70	10	22	18	50
Phoenix, AZ	17	14	34	65	23	27	20	70
Salt Lake City, UT	8	9	13	30	24	13	8	45
San Antonio, TX	5	13	22	40	10	7	13	30
Western Cities								
Honolulu, HI	10	14	27	50	20	8	47	75
Los Angeles, CA	5	8	62	75	10	15	30	55
Portland, OR	10	10	20	40	10	27	22	60
Sacramento, CA	12	17	6	35	10	11	34	55
San Bernardino-Riv, CA	9	17	43	70	23	16	21	60
San Diego, CA	21	14	15	50	5	20	9	35
San Fran-Oak, CA	12	18	51	80	6	8	50	65
San Jose, CA	11	15	34	60	16	12	27	55
Seattle-Everett, WA	6	21	42	70	12	15	29	55

AADT per lane ranges:

	Moderate	Heavy	Severe
Freeway and Expressway	15,000-17,500	17,501-20,000	Over 20,000
Principal Arterial Street	5,750-7,000	7,001-8,500	Over 8,500

Source: TTI Analysis and Local Transportation Agency References

Delay in travel time represents a significant cost to the motoring public. This section attempts to quantify these costs to the drivers in terms of time and fuel. The next chapter will discuss a number of constants and urbanized area/state specific variables that affect the delay calculations.

Cost Estimate Constants

The congestion cost estimate calculations are utilized in the following derived constant values.

1. Occupancy—1.25 persons per vehicle,
2. 250 working days per year,
3. Average cost of time—$10.50 per person hour[1] (7),
4. Commercial vehicle operating cost—$1.34 per kilometer (11),
5. Vehicle mix—95 percent passenger and 5 percent commercial, and
6. Vehicular speeds: Table C-16 (10).

The following derived constant values utilize the constants.

Table C-16. Congested Daily Vehicle-Kilometers of Travel by Average Annual Daily Traffic per Lane Volumes

Functional Class	Parameters	Uncongested	Congested DVKT[1,2]		
			Moderate	Heavy	Severe
Freeway/Expressway	ADT/Lane	Under 15,000	15,000 - 17,500	17,501 - 20,000	Over 20,000
	Speed (kph)[3]	97	61	53	48
Principal Arterial Streets	ADT/Lane	Under 5,750	5,750 - 7,000	7,001 - 8,500	Over 8,500
	Speed (kph)[3]	56	45	40	37

Note: [1] Assumes congested freeway operation when ADT/lane exceeds 15,000.
[2] Assumes congested principal arterial street operations when ADT/lane exceeds 5,750.
[3] Represent a "soft" conversion from miles per hour.

Source: TTI Analysis and Houston-Galveston Regional Transportation Study (10)

[1]Referenced value of $8.00/hr in 1985 adjusted with the Consumer Price Index to value used for 1994 wage rate.

Cost Estimate Variables

In addition to the derived constants, five urbanized area/state specific variables were identified and used in the congestion cost estimate calculations. Table C-17 illustrates these variables.

Daily Vehicle-Kilometers of Travel

The daily vehicle-kilometers of travel (DVKT) is the average daily traffic (ADT) of a section of roadway multiplied by the length (in kilometers) of that section of roadway. This allows the daily volume of all urban facilities to be represented in terms that can be quantified and utilized in cost calculations. DVKT was estimated for the freeways and principal arterial streets located in each urbanized study area. These estimates originate from the HPMS database and other local transportation data sources and are presented in a previous section of this report.

Fuel Costs

Statewide average fuel cost estimates were obtained from 1994 data published by the American Automobile Association (AAA) (16). These data represent the average reported fuel cost for 1994. Values for different fuel types used in motor vehicles, i.e., diesel and gasoline, did not vary enough to be reported separately. Therefore, an average rate for fuel was used in cost estimate calculations.

Population

Population data were obtained from the combination of 1990 U.S. Census Bureau estimates and 1994 population estimates reported in the Federal Highway Administration's Highway Performance Monitoring System (HPMS).

Table C-17. 1994 Congestion Cost Estimate Variables

Urban Area	Daily Vehicle Kilometers of Travel		State Average Fuel Cost, ($/liter)	Population (000)	Eligible Drivers (000)
	Freeway (000)	Prin. Art. St. (000)			
Northeastern Cities					
Baltimore, MD	28,980	16,100	0.34	2,110	1,660
Boston, MA	34,620	22,540	0.33	2,980	2,480
Hartford, CT	11,310	6,100	0.36	620	470
New York, NY	138,460	88,550	0.35	17,000	13,570
Philadelphia, PA	32,520	34,870	0.32	5,200	4,110
Pittsburgh, PA	15,050	18,520	0.32	1,900	1,570
Washington, DC	46,690	29,620	0.32	3,400	2,830
Midwestern Cities					
Chicago, IL	65,950	56,350	0.33	7,600	5,870
Cincinnati, OH	20,710	7,080	0.31	1,250	970
Cleveland, OH	24,100	9,980	0.31	1,800	1,370
Columbus, OH	15,700	5,640	0.31	980	780
Detroit, MI	47,500	41,860	0.31	4,000	2,950
Indianapolis, IN	14,330	7,250	0.30	960	740
Kansas City, MO	24,150	8,860	0.29	1,300	1,020
Louisville, KY	11,270	5,640	0.30	820	650
Milwaukee, WI	12,620	9,020	0.32	1,230	930
Minn-St. Paul, MN	32,200	11,430	0.31	2,120	1,680
Oklahoma City, OK	12,400	7,250	0.30	800	620
St. Louis, MO	31,400	20,450	0.29	1,990	1,550
Southern Cities					
Atlanta, GA	48,300	19,320	0.29	2,320	1,830
Charlotte, NC	5,640	5,190	0.31	520	410
Ft. Lauderdale, FL	13,690	10,300	0.33	1,300	1,080
Jacksonville, FL	9,660	10,060	0.33	770	590
Memphis, TN	8,290	8,950	0.31	890	680
Miami, FL	15,920	27,370	0.33	1,940	1,530
Nashville, TN	11,270	9,020	0.31	600	480
New Orleans, LA	8,370	7,080	0.33	1,110	840
Norfolk, VA	9,620	7,890	0.31	980	780
Orlando, FL	10,020	8,370	0.33	920	750
Tampa, FL	6,360	7,500	0.33	740	590
Southwestern Cities					
Albuquerque, NM	4,410	7,250	0.34	530	410
Austin, TX	10,340	4,030	0.31	570	450
Corpus Christi, TX	3,140	2,580	0.31	290	210
Dallas, TX	40,090	14,650	0.31	2,090	1,630
Denver, CO	21,330	17,870	0.34	1,610	1,290
El Paso, TX	5,960	5,380	0.31	570	410
Fort Worth, TX	21,090	7,570	0.31	1,210	920
Houston, TX	51,520	18,350	0.31	2,930	2,240
Phoenix, AZ	15,780	29,790	0.34	2,070	1,570
Salt Lake City, UT	9,760	4,300	0.31	880	680
San Antonio, TX	17,230	9,660	0.31	1,200	890
Western Cities					
Honolulu, HI	8,860	3,110	0.42	690	580
Los Angeles, CA	183,460	133,630	0.35	11,950	9,300
Portland, OR	13,440	7,080	0.36	1,080	870
Sacramento, CA	16,550	12,640	0.35	1,210	920
San Bernardino-Riv, CA	24,500	17,870	0.35	1,330	960
San Diego, CA	44,680	15,540	0.35	2,530	1,010
San Fran-Oak, CA	68,830	22,860	0.35	3,830	3,130
San Jose, CA	26,810	11,750	0.35	1,530	1,170
Seattle-Everett, WA	33,330	15,620	0.34	1,880	1,600
Northeastern Avg	43,950	30,900	0.33	4,740	3,810
Midwestern Avg	26,030	15,900	0.31	2,070	1,590
Southern Avg	13,380	11,010	0.32	1,100	870
Southwestern Avg	18,240	11,040	0.32	1,270	970
Western Avg	46,720	26,680	0.36	2,890	2,280
Texas Avg	21,340	8,890	0.31	1,270	960
Total Avg	27,760	17,790	0.33	2,200	1,730
Maximum Value	183,460	133,630	0.42	17,000	13,570
Minimum Value	3,140	2,580	0.29	290	210

Source: TTI Analysis and Local Transportation Agency References

Eligible Drivers

The number of eligible drivers for each area was obtained using the population estimate derived above, along with estimates of the percentage of population 16 years of age and older taken from the Statistical Abstract of the United States (17).

Cost Estimate Calculations

The first step in the cost estimate procedure was to convert DVKT into vehicle-hours of delay. Vehicle-hours of delay is the basis for the delay and fuel cost calculations. To obtain vehicle-hours of delay, vehicle-kilometers of travel on congested roadways during each peak period was estimated. This was accomplished by the use of two factors.

Highway Performance Monitoring System (HPMS) data were used to determine the percentage of urbanized area DVKT occurring on congested facilities. Two functional classes, freeways/expressways and principal arterial streets, were considered in the calculation of this factor. The following ADT per lane values defined congested conditions for these facilities:

- Freeways/Expressways—ADT per lane greater than 15,000, and
- Principal Arterial Streets—ADT per lane greater than 5,750.

Using these values, the percentage of DVKT operating in congested conditions could be calculated for each functional class. This percentage adjusts DVKT to congested DVKT, the first step in the process to obtain travel volume that occurs during congested conditions.

The congested daily travel values were adjusted by a factor to represent the percentage of travel occurring in the peak period. This factor was calculated using the Texas Department of Transportation's (TxDOT) "1986 Automatic Traffic Recorder Data" for the study areas in Texas (18). Using these data, the percentage of ADT occurring during the morning and evening peak

periods was estimated. These data indicated that a relatively consistent value of 45 percent of total daily traffic occurred during the peak periods. This factor was applied to all the study areas.

Once the DVKT was converted to peak-period congested vehicle-kilometers of travel (Table C-18), the recurring vehicle-hours of delay were computed (Equation C-1). The peak facility conditions during normal operations causes recurring delay. This value does not include delay resulting from accidents, construction, or maintenance operations.

$$\begin{matrix}\textit{Recurring}\\ \textit{Vehicle-Hours of}\\ \textit{Delay per Day}\end{matrix} = \frac{\textit{Peak-Period Congested DVKT}}{\textit{Avg. Peak-Period Speed}} - \frac{\textit{Peak-Period Congested DVKT}}{\textit{Avg. Off-Peak Speed}} \qquad \text{Eq. C-1}$$

This calculation was performed for both freeways and principal arterial streets in a study area; the total recurring vehicle-hours of delay is the sum of the two. Table C-19 shows the result of these calculations.

Another type of delay encountered by vehicles is incident delay. This is the delay that results from an accident or disabled vehicle. Incident vehicle-hours of delay vary for each area by facility type, i.e., freeway/expressway or arterial street. For the freeway system in individual study areas, the ratio of recurring to incident delay reported by Lindley was used (6). The resulting incident delay was calculated using Equation C-2.

$$\begin{matrix}\textit{Frwy Incident}\\ \textit{Vehicle-Hours of Delay}\\ \textit{per Day}\end{matrix} = \begin{matrix}\textit{Peak-Period}\\ \textit{Frwy Vehicle-Hours of Delay}\\ \textit{per Day}\end{matrix} \times \begin{matrix}\textit{Frwy}\\ \textit{Incident/Recurring}\\ \textit{Ratio}\end{matrix} \qquad \text{Eq. C-2}$$

Table C-18. 1994 Congested Daily Vehicle-Kilometers of Travel

Urban Area	Daily Vehicle-Kilometers of Travel		Percent of Peak-Period[1,2] VKT on Congested Roads		Peak-Period Congested Daily VKT[1,3]		
	Freeway (000)	Prin. Art. St. (000)	Freeway (%)	Prin. Art. St. (%)	Freeway (000)	Prin. Art. St. (000)	Freeway & Prin. Art. St. (000)
Northeastern Cities							
Baltimore, MD	28,980	16,100	30	40	3,910	2,900	6,810
Boston, MA	34,620	22,540	45	40	7,010	4,060	11,070
Hartford, CT	11,310	6,100	20	35	1,020	960	1,980
New York, NY	138,460	88,550	60	85	37,380	33,870	71,250
Philadelphia, PA	32,520	34,870	25	75	3,660	11,770	15,430
Pittsburgh, PA	15,050	18,520	20	65	1,350	5,420	6,770
Washington, DC	46,690	29,620	70	85	14,710	11,330	26,040
Midwestern Cities							
Chicago, IL	65,950	56,350	60	65	17,810	16,480	34,290
Cincinnati, OH	20,710	7,080	35	30	3,260	960	4,220
Cleveland, OH	24,100	9,980	35	30	3,800	1,350	5,140
Columbus, OH	15,700	5,640	30	50	2,120	1,270	3,390
Detroit, MI	47,500	41,860	50	65	10,690	12,240	22,930
Indianapolis, IN	14,330	7,250	15	25	970	820	1,780
Kansas City, MO	24,150	8,860	10	25	1,090	1,000	2,080
Louisville, KY	11,270	5,640	10	60	510	1,520	2,030
Milwaukee, WI	12,620	9,020	30	30	1,700	1,220	2,920
Minn-St. Paul, MN	32,200	11,430	30	50	4,350	2,570	6,920
Oklahoma City, OK	12,400	7,250	10	40	560	1,300	1,860
St. Louis, MO	31,400	20,450	25	60	3,530	5,520	9,050
Southern Cities							
Atlanta, GA	48,300	19,320	50	65	10,870	5,650	16,520
Charlotte, NC	5,640	5,190	35	60	890	1,400	2,290
Ft. Lauderdale, FL	13,690	10,300	40	50	2,460	2,320	4,780
Jacksonville, FL	9,660	10,060	35	55	1,520	2,490	4,010
Memphis, TN	8,290	8,950	15	35	560	1,410	1,970
Miami, FL	15,920	27,370	60	70	4,300	8,620	12,920
Nashville, TN	11,270	9,020	20	35	1,010	1,420	2,430
New Orleans, LA	8,370	7,080	50	50	1,880	1,590	3,480
Norfolk, VA	9,620	7,890	40	40	1,730	1,420	3,150
Orlando, FL	10,020	8,370	35	30	1,580	1,130	2,710
Tampa, FL	6,360	7,500	20	65	570	2,190	2,770
Southwestern Cities							
Albuquerque, NM	4,410	7,250	20	45	400	1,470	1,860
Austin, TX	10,340	4,030	55	50	2,560	910	3,460
Corpus Christi, TX	3,140	2,580	15	15	210	170	390
Dallas, TX	40,090	14,650	55	40	9,920	2,640	12,560
Denver, CO	21,330	17,870	55	55	5,280	4,420	9,700
El Paso, TX	5,960	5,380	25	10	670	240	910
Fort Worth, TX	21,090	7,570	45	30	4,270	1,020	5290
Houston, TX	51,520	18,350	70	50	16,230	4,130	20,360
Phoenix, AZ	15,780	29,790	65	70	4,620	9,380	14,000
Salt Lake City, UT	9,760	4,300	25	45	1,100	870	1,970
San Antonio, TX	17,230	9,660	40	30	3,100	1,300	4,400
Western Cities							
Honolulu, HI	8,860	3,110	50	75	1,990	1,050	3,040
Los Angeles, CA	183,460	133,630	75	55	61,920	33,070	94,990
Portland, OR	13,440	7,080	40	60	2,420	1,910	4,330
Sacramento, CA	16,550	12,640	35	55	2,610	3,130	5,730
San Bernardino-Riv, CA	24,500	17,870	70	60	7,720	4,830	12,540
San Diego, CA	44,680	15,540	50	35	10,050	2,450	12,500
San Fran-Oak, CA	68,830	22,860	80	65	24,780	6,690	31,470
San Jose, CA	26,810	11,750	60	55	7,240	2,910	10,150
Seattle-Everett, WA	33,330	15,620	70	55	10,500	3,870	14,360
Northeastern Avg	43,950	30,900	39	61	9,860	10,040	19,910
Midwestern Avg	26,030	15,900	28	44	4,200	3,850	8,050
Southern Avg	13,380	11,010	36	50	2,490	2,700	5,180
Southwestern Avg	18,240	11,040	43	40	4,400	2,410	6,810
Western Avg	46,720	26,680	59	57	14,360	6,660	21,010
Texas Avg	21,340	8,890	44	32	5,280	1,490	6,770
Total Avg	27,760	17,790	40	49	6,490	4,650	11,140
Maximum Value	183,460	133,630	80	85	61,920	33,870	94,990
Minimum Value	3,140	2,580	10	10	210	170	390

Notes:
[1] Daily vehicle-kilometers of travel.
[2] Represents the percentage of daily vehicle-kilometers of travel on each roadway system during the peak period operating on congestion conditions.
[3] Daily vehicle-kilometers of travel by peak-period vehicle travel and percent of congested daily VKT.

Source: TTI Analysis and Local Transportation Agency References

Table C-19. Recurring and Incident Delay Relationships for 1994

Urban Area	Peak-Period Congested Daily VKT[1]			Ratio of Incident[2] Delay to Recurring Delay		Daily Recurring Vehicle[3] Hours of Delay			Daily Incident Vehicle[3] Hours of Delay		
	Freeway (000)	Prin. Art. St. (000)	Freeway and Prin. Art. St. (000)	Freeway	Prin. Art. St.	Freeway	Hours of Delay Prin. Art. St.	Total	Freeway	Prin. Art. St.	Total
Northeastern Cities											
Baltimore, MD	3,910	2,900	6,810	2.3	1.1	34,650	23,570	58,220	79,700	25,930	105,630
Boston, MA	7,010	4,060	11,070	3.5	1.1	63,500	30,290	93,780	222,240	33,310	255,560
Hartford, CT	1,020	960	1,980	2.7	1.1	8,380	6,680	15,060	22,640	7,340	29,980
New York, NY	37,380	33,870	71,250	2.5	1.1	316,050	284,050	600,100	790,140	312,450	1,102,590
Philadelphia, PA	3,660	11,770	15,430	2.1	1.1	31,570	98,300	129,870	66,290	108,130	174,430
Pittsburgh, PA	1,350	5,420	6,770	2.9	1.1	11,870	39,340	51,200	34,410	43,270	77,680
Washington, DC	14,710	11,330	26,040	2.2	1.1	138,160	90,030	228,190	303,950	99,030	402,980
Midwestern Cities											
Chicago, IL	17,810	16,480	34,290	1.2	1.1	168,840	123,490	292,340	202,610	135,840	338,450
Cincinnati, OH	3,260	960	4,220	0.8	1.1	26,840	6,590	33,430	21,470	7,250	28,720
Cleveland, OH	3,800	1,350	5,140	0.7	1.1	30,320	9,500	39,820	21,230	10,450	31,670
Columbus, OH	2,120	1,270	3,390	0.7	1.1	20,260	9,600	29,850	14,180	10,560	24,740
Detroit, MI	10,690	12,240	22,930	2.2	1.1	102,210	100,460	202,660	224,860	110,500	335,360
Indianapolis, IN	970	820	1,780	1.5	1.1	6,880	5,350	12,230	10,330	5,880	16,210
Kansas City, MO	1,090	1,000	2,080	3.1	1.1	8,300	6,710	15,010	25,720	7,390	33,110
Louisville, KY	510	1,520	2,030	1.1	1.1	4,320	11,630	15,950	4,750	12,790	17,540
Milwaukee, WI	1,700	1,220	2,920	1.0	1.1	14,970	9,410	24,380	14,970	10,350	25,320
Minn-St. Paul, MN	4,350	2,570	6,920	0.9	1.1	37,340	21,020	58,360	33,610	23,120	56,730
Oklahoma City, OK	560	1,300	1,860	1.1	1.1	4,030	9,430	13,460	4,430	10,370	14,800
St. Louis, MO	3,530	5,520	9,050	1.2	1.1	29,110	38,910	68,020	34,930	42,800	77,730
Southern Cities											
Atlanta, GA	10,870	5,650	16,520	1.1	1.1	102,170	45,550	147,720	112,390	50,100	162,490
Charlotte, NC	890	1,400	2,290	0.8	1.1	7,020	11,750	18,770	5,610	12,930	18,540
Ft. Lauderdale, FL	2,460	2,320	4,780	1.5	1.1	20,300	15,810	36,110	30,450	17,390	47,840
Jacksonville, FL	1,520	2,490	4,010	1.5	1.1	11,960	17,520	29,480	17,950	19,270	37,220
Memphis, TN	560	1,410	1,970	1.1	1.1	4,200	9,330	13,530	4,620	10,270	14,890
Miami, FL	4,300	8,620	12,920	1.5	1.1	39,560	71,590	111,150	59,340	78,740	138,090
Nashville, TN	1,010	1,420	2,430	1.1	1.1	7,860	9,550	17,420	8,650	10,510	19,160
New Orleans, LA	1,880	1,590	3,480	1.8	1.1	15,720	11,430	27,150	28,300	12,580	40,870
Norfolk, VA	1,730	1,420	3,150	2.5	1.1	13,830	11,130	24,970	34,580	12,250	46,820
Orlando, FL	1,580	1,130	2,710	1.5	1.1	12,860	9,680	22,530	19,290	10,640	29,930
Tampa, FL	570	2,190	2,770	1.5	1.1	5,510	17,390	22,900	8,260	19,130	27,390

Notes:
[1] Daily vehicle-kilometers of travel. Represents the percentage of Daily Vehicle-Kilometers of travel on each roadway system during the peak-period operating in congested conditions.
[2] Percentage of Incident Delay related to Recurring Delay.
[3] Facility delays as calculated by type and urban area.

Source: TTI Analysis and Local Transportation Agency References

Table C-19. Recurring and Incident Delay Relationships for 1994 (continued)

Urban Area	Peak-Period Congested Daily VKT[1]			Ratio of Incident[2] Delay to Recurring Delay		Daily Recurring Vehicle[3] Hours of Delay			Daily Incident Vehicle[3] Hours of Delay		
	Freeway (000)	Prin. Art. St. (000)	Freeway and Prin. Art. St. (000)	Freeway	Prin. Art. St.	Freeway	Hours of Delay Prin. Art. St.	Total	Freeway	Prin. Art. St.	Total
Southwestern Cities											
Albuquerque, NM	400	1,470	1,860	1.1	1.1	3,370	10,010	13,380	3,700	11,010	14,710
Austin, TX	2,560	910	3,460	1.1	1.1	22,250	6,080	28,330	24,470	6,690	31,160
Corpus Christi, TX	210	170	390	1.1	1.1	1,430	920	2,350	1,580	1,010	2,580
Dallas, TX	9,920	2,640	12,560	1.8	1.1	85,530	17,580	103,110	153,950	19,340	173,300
Denver, CO	5,280	4,420	9,700	1.0	1.1	48,800	33,860	82,660	48,800	37,240	86,040
El Paso, TX	670	240	910	1.1	1.1	5,140	1,790	6,930	5,660	1,970	7,630
Fort Worth, TX	4,270	1,020	5,290	1.8	1.1	36,810	6,810	43,630	66,260	7,490	73,760
Houston, TX	16,230	4,130	20,360	1.4	1.1	152,090	30,940	183,030	212,920	34,040	246,960
Phoenix, AZ	4,620	9,380	14,000	0.4	1.1	43,140	65,900	109,040	17,260	72,490	89,750
Salt Lake City, UT	1,100	870	1,970	0.6	1.1	9,400	5,060	14,460	5,640	5,570	11,210
San Antonio, TX	3,100	1,300	4,400	1.1	1.1	28,440	9,150	37,580	31,280	10,060	41,340
Western Cities											
Honolulu, HI	1,990	1,050	3,040	1.8	1.1	18,410	8,050	26,460	33,130	8,860	41,990
Los Angeles, CA	61,920	33,070	94,990	1.2	1.1	626,810	258,220	885,030	752,170	284,050	1,036,220
Portland, OR	2,420	1,910	4,330	2.0	1.1	21,270	14,290	35,570	42,540	15,720	58,270
Sacramento, CA	2,610	3,130	5,730	0.6	1.1	20,300	24,860	45,160	12,180	27,340	39,520
San Bernardino-Riv, CA	7,720	4,830	12,540	1.2	1.1	74,210	33,520	107,720	89,050	36,870	125,920
San Diego, CA	10,050	2,450	12,500	0.6	1.1	81,580	17,850	99,430	48,950	19,640	68,590
San Fran-Oak, CA	24,780	6,690	31,470	1.3	1.1	236,930	55,950	292,870	308,000	61,540	369,550
San Jose, CA	7,240	2,910	10,150	1.2	1.1	68,450	21,760	90,220	82,140	23,940	106,090
Seattle-Everett, WA	10,500	3,870	14,360	1.4	1.1	99,580	29,950	129,530	139,420	32,950	172,360
Northeastern Avg	9,860	10,040	19,910	2.6	1.1	86,310	81,750	168,060	217,050	89,920	306,980
Midwestern Avg	4,200	3,850	8,050	1.3	1.1	37,780	29,340	67,130	51,090	32,280	83,360
Southern Avg	2,490	2,700	5,180	1.4	1.1	21,910	20,980	42,880	29,950	23,070	53,020
Southwestern Avg	4,400	2,410	6,810	1.1	1.1	39,670	17,100	56,770	51,960	18,810	70,770
Western Avg	14,360	6,660	21,010	1.3	1.1	138,610	51,610	190,220	167,510	56,770	224,280
Texas Avg	5,280	1,490	6,770	1.3	1.1	47,380	10,470	57,850	70,870	11,510	82,390
Total Avg	6,490	4,650	11,140	1.5	1.1	59,650	36,150	95,800	90,820	39,770	130,590
Maximum Value	61,920	33,870	94,990	3.5	1.1	626,810	284,050	885,030	790,140	312,450	1,102,590
Minimum Value	210	170	390	0.4	1.1	1,430	920	2,350	1,580	1,010	2,580

Notes: [1] Daily vehicle-kilometers of travel. Represents the percentage of Daily Vehicle-Kilometers of travel on each roadway system during the peak-period operating in congested conditions.
[2] Percentage of Incident Delay related to Recurring Delay.
[3] Facility delays as calculated by type and urban area.

Source: TTI Analysis and Local Transportation Agency References

An incident will have varying effects on different types of facilities; for the purpose of this study, incident delay for arterial streets is defined as 110 percent of arterial street recurring delay. This incident delay factor was calculated using Equation C-3.

$$\begin{array}{c}\textit{Principal Arterial Street Incident}\\ \textit{Vehicle-Hour Delay}\\ \textit{per Day}\end{array} = \begin{array}{c}\textit{Principal Arterial Street Recurring}\\ \textit{Vehicle-Hour Delay}\\ \textit{per Day}\end{array} \times 1.1 \qquad \text{Eq. C-3}$$

The factor of 1.1 is based on the following assumptions as they relate to delay.

1. Arterial street system designs are more consistent from city to city than freeway design.

2. The side streets, drives, median openings, and other appurtenances associated with arterial streets allow numerous opportunities to remove incidents from the traveled way.

3. Historical data shows the accident rate on arterial streets to be approximately twice that of freeways, but, as stated in the second assumption, there is a greater opportunity to remove the incident from the roadway.

Table C-19 shows the results of the freeway and principal arterial street recurring and incident delay calculations.

Prior to calculating the congestion costs, two other variables were calculated to simplify the cost equations. These variables are the average vehicular speed and the average fuel economy for the vehicles operating in congested conditions. Equation C-4 defines the average vehicular speed, which is a weighted average of the operating speeds on the facility under consideration.

$$\underset{(kph)}{Avg.\ Speed} = \frac{(Frwy\ speed^{1} \times Peak\text{-}Period\ Frwy\ VKT) + (Prin.Art.Speed^{1} \times Peak\text{-}Period Prin.Art.Str.\ VKT)}{Total\ Peak\text{-}Period\ VKT} \quad \text{Eq. C-4}$$

[1] Speeds determined by congestion severity (Table C-1).

Congestion Cost

Two cost components can be associated with congestion: delay cost and fuel cost. These costs can be directly related to the vehicle-hours of delay. Table C-20 is a summary of the cost calculations for the component congestion cost per each urbanized area.

The average fuel economy represents the fuel consumption of the vehicles operating in congested conditions. The equation (Eq. C-5) is a linear regression applied to a modified version of fuel consumption reported by Raus (19).

$$\underset{(kph)}{Average\ Fuel\ Economy} = 3.74 + 0.11\ \underset{(kph)}{(Average\ Vehicular\ Speed)} \quad \text{Eq. C-5}$$

Delay Cost

The delay cost is the cost of lost time due to congested roadways. Equation C-6 calculates this cost.

$$\underset{Delay Cost}{Annual} = \frac{Vehicle\text{-}Hrs\ of\ Delay}{Day} \times \frac{1.25 person}{Vehicle} \times \frac{\$10.25}{Hour} \times \frac{250\ Workdays}{Year} \quad \text{Eq. C-6}$$

where: vehicle-hours of delay/day is the combined freeway and principal arterial street representing the city's recurring or incident delay.

This equation is used to separately calculate delay costs resulting from both incident and recurring delays.

Table C-20. Component and Total Congestion Costs by Urban Area for 1994

Urban Area	Annual Cost Due to Congestion ($ millions)				
	Recurring Delay	Incident Delay	Recurring Fuel	Incident Fuel	Total
Northeastern Cities					
Baltimore, MD	250	450	30	50	780
Boston, MA	400	1,100	40	110	1,650
Hartford, CT	60	130	10	10	210
New York, NY	2,520	4,620	270	490	7,900
Philadelphia, PA	520	700	50	70	1,340
Pittsburgh, PA	220	330	20	30	600
Washington, DC	970	1,720	100	170	2,960
Midwestern Cities					
Chicago, IL	1,026	1,460	130	150	3,000
Cincinnati, OH	150	130	10	10	300
Cleveland, OH	180	150	20	10	360
Columbus, OH	130	100	10	10	250
Detroit, MI	840	1,370	80	130	2,420
Indianapolis, IN	70	100	10	10	190
Kansas City, MO	70	150	10	10	240
Louisville, KY	80	90	10	10	190
Milwaukee, WI	110	110	10	10	240
Minn-St. Paul, MN	290	280	30	30	630
Oklahoma City, OK	60	60	0	10	130
St. Louis, MO	290	330	30	30	680
Southern Cities					
Atlanta, GA	670	730	60	70	1,530
Charlotte, NC	80	70	10	10	170
Ft. Lauderdale, FL	160	220	20	20	420
Jacksonville, FL	130	170	10	20	330
Memphis, TN	60	70	10	10	150
Miami, FL	470	580	50	60	1,160
Nashville, TN	80	90	10	10	190
New Orleans, LA	120	190	10	20	340
Norfolk, VA	110	210	10	20	350
Orlando, FL	110	140	10	10	270
Tampa, FL	100	120	10	10	240
Southwestern Cities					
Albuquerque, NM	60	70	10	10	150
Austin, TX	140	150	10	10	310
Corpus Christi, TX	10	10	0	0	20
Dallas, TX	480	800	50	80	1,410
Denver, CO	350	360	40	40	790
El Paso, TX	30	30	0	0	60
Fort Worth, TX	200	340	20	30	590
Houston, TX	780	1,050	70	100	2,000
Phoenix, AZ	440	360	50	40	890
Salt Lake City, UT	70	60	10	10	150
San Antonio, TX	170	180	20	20	390
Western Cities					
Honolulu, HI	110	180	20	20	330
Los Angeles, CA	3,590	4,200	380	450	8,620
Portland, OR	150	250	20	30	450
Sacramento, CA	190	170	20	20	400
San Bernardino-Riv, CA	440	520	50	60	1,070
San Diego, CA	420	290	50	30	790
San Fran-Oak, CA	1,220	1,540	130	170	3,060
San Jose, CA	370	440	40	50	900
Seattle-Everett, WA	550	730	60	80	1,420
Northeastern Avg	710	1,290	70	130	2,200
Midwestern Avg	290	360	30	30	720
Southern Avg	190	240	20	20	470
Southwestern Avg	250	310	20	30	610
Western Avg	780	920	80	100	1,890
Texas Avg	260	370	20	40	680
Total Avg	410	550	40	60	1,060
Maximum Value	3,590	4,620	380	490	8,620
Minimum Value	10	10	0	0	30

Source: TTI Analysis and Local Transportation Agency References

Fuel Cost

Fuel cost was also related to vehicle-hours of delay per day and speed by Equation C-7 for passenger vehicles and Equation C-8 for commercial vehicles.

$$\begin{matrix}\text{Passenger} \\ \text{Fuel Cost}\end{matrix} = \frac{\frac{\text{Vehicle-Hrs of Delay}}{\text{Day}} \times 95\% \times \text{Avg. Speed} \times \text{Avg. Fuel Cost}}{\text{Avg. Fuel Economy}} \quad \text{Eq. C-7}$$

$$\begin{matrix}\text{Commercial} \\ \text{Fuel Cost}\end{matrix} = \frac{\frac{\text{Vehicle-Hrs of Delay}}{\text{Day}} \times 5\% \times \text{Avg. Speed} \times \text{Avg. Fuel Cost}}{\text{Avg. Fuel Economy}} \quad \text{Eq. C-8}$$

where: vehicle-hours of delay is the combined value for freeways and principal arterial streets representing either recurring or incident delay.

These calculations were completed for both incident and recurring delay. Equation C-9 combines the respective portions, i.e., incident and recurring, to determine the yearly fuel cost due to congestion resulting from incident and recurring delay.

$$\begin{matrix}\text{Average Urbanized Area} \\ \text{Fuel Cost}\end{matrix} = (\text{Passenger Fuel Cost} + \text{Commercial Fuel Cost}) \times \frac{250\ \text{Days}}{\text{Year}} \quad \text{Eq. C-9}$$

This calculation was done for each study area using the specific area/state fuel cost, peak-period congested VKT, and vehicle-hours of recurring and incident delay per day.

Results of Cost Estimate Calculations

Using the methods and equations discussed in the previous sections, the annual cost for each urbanized area was calculated (Table C-20). Reviewing the component costs of delay and fuel, it is shown that congestion costs associated with delay make up the majority of the annual congestion cost.

Table C-21 illustrates the impacts of the component and total congestion cost in terms of per capita and per eligible driver.

Table C-22 illustrates the categorical ranking of the urban study areas by roadway congestion index, annual cost per capita, and annual cost per eligible driver.

Tables C-23 through C-40 present estimates of congestion cost from 1986 to 1994. Previously published estimates presented in this series of reports have been revised for some areas to reflect new information. The data are the best current information on the delay, fuel, and cost values for the years 1986 through 1994. Some of the data missing in 1986 and 1987 was unobtainable because of the various methods of reporting information in the HPMS database.

Table C-21. Estimated Impact of Congestion 1994

Urban Area	Congestion Cost		Roadway Congestion Index
	Per Eligible Driver (dollars)	Per Capita (dollars)	
Northeastern Cities			
Baltimore, MD	460	360	1.06
Boston, MA	660	550	1.08
Hartford, CT	450	340	0.93
New York, NY	580	460	1.15
Philadelphia, PA	320	250	1.05
Pittsburgh, PA	380	310	0.83
Washington, DC	1,030	860	1.43
Midwestern Cities			
Chicago, IL	500	390	1.28
Cincinnati, OH	310	240	1.05
Cleveland, OH	260	200	1.00
Columbus, OH	320	250	0.95
Detroit, MI	820	600	1.24
Indianapolis, IN	250	200	0.92
Kansas City, MO	230	180	0.80
Louisville, KY	280	220	0.95
Milwaukee, WI	260	200	1.00
Minn-St. Paul, MN	360	290	1.04
Oklahoma City, OK	200	150	0.85
St. Louis, MO	440	340	0.98
Southern Cities			
Atlanta, GA	800	640	1.18
Charlotte, NC	380	310	0.94
Ft. Lauderdale, FL	380	320	0.99
Jacksonville, FL	540	420	0.97
Memphis, TN	210	160	0.94
Miami, FL	760	600	1.32
Nashville, TN	370	300	0.96
New Orleans, LA	410	310	1.11
Norfolk, VA	440	350	0.93
Orlando, FL	350	290	0.86
Tampa, FL	400	320	1.07
Southwestern Cities			
Albuquerque, NM	350	270	0.98
Austin, TX	670	530	0.97
Corpus Christi, TX	130	90	0.76
Dallas, TX	810	640	1.09
Denver, CO	580	470	1.07
El Paso, TX	170	120	0.78
Fort Worth, TX	630	480	0.97
Houston, TX	890	680	1.12
Phoenix, AZ	550	420	1.09
Salt Lake City, UT	210	160	0.94
San Antonio, TX	420	320	0.92
Western Cities			
Honolulu, HI	550	470	1.13
Los Angeles, CA	920	720	1.52
Portland, OR	510	410	1.11
Sacramento, CA	430	330	1.06
San Bernardino-Riv, CA	1,100	790	1.20
San Diego, CA	390	310	1.21
San Fran-Oak, CA	960	790	1.33
San Jose, CA	750	580	1.06
Seattle-Everett, WA	870	740	1.25
Northeastern Avg	550	450	1.08
Midwestern Avg	350	270	1.01
Southern Avg	460	360	1.02
Southwestern Avg	490	380	0.97
Western Avg	720	570	1.21
Texas Avg	530	410	0.94
Total Avg	500	390	1.05
Maximum Value	1,100	860	1.52
Minimum Value	130	90	0.76

Source: TTI Analysis and Local Transportation Agency References

Table C-22. 1994 Rankings of Urban Area by Estimated Impact of Congestion

Urban Area	Roadway Congestion Index	Congestion Cost per Capita	Congestion Cost per Eligible Driver
Northeastern Cities			
Baltimore, MD	21	22	22
Boston, MA	18	12	13
Hartford, CT	41	24	23
New York, NY	11	17	15
Philadelphia, PA	24	38	38
Pittsburgh, PA	47	30	31
Washington, DC	2	1	2
Midwestern Cities			
Chicago, IL	5	21	21
Cincinnati, OH	24	40	40
Cleveland, OH	27	42	42
Columbus, OH	36	38	38
Detroit, MI	7	9	7
Indianapolis, IN	43	42	44
Kansas City, MO	48	45	45
Louisville, KY	36	41	41
Milwaukee, WI	27	42	42
Minn-St. Paul, MN	26	35	35
Oklahoma City, OK	46	48	48
St. Louis, MO	30	24	24
Southern Cities			
Atlanta, GA	10	7	9
Charlotte, NC	38	30	31
Ft. Lauderdale, FL	29	27	31
Jacksonville, FL	32	18	19
Memphis, TN	38	46	46
Miami, FL	4	9	10
Nashville, TN	35	34	34
New Orleans, LA	14	30	28
Norfolk, VA	41	23	24
Orlando, FL	45	35	36
Tampa, FL	19	27	29
Southwestern Cities			
Albuquerque, NM	30	37	36
Austin, TX	32	13	12
Corpus Christi, TX	50	50	50
Dallas, TX	16	7	8
Denver, CO	19	15	15
El Paso, TX	49	49	49
Fort Worth, TX	32	14	14
Houston, TX	13	6	5
Phoenix, AZ	16	18	17
Salt Lake City, UT	38	46	46
San Antonio, TX	43	27	27
Western Cities			
Honolulu, HI	12	15	17
Los Angeles, CA	1	5	4
Portland, OR	14	20	20
Sacramento, CA	21	26	26
San Bernardino-Riv, CA	9	2	1
San Diego, CA	8	30	30
San Fran-Oak, CA	3	2	3
San Jose, CA	21	11	11
Seattle-Everett, WA	6	4	6

Source: TTI Analysis

Table C-23. Component and Total Congestion Costs by Urban Area for 1986

Urban Area	Annual Cost Due to Congestion ($ millions)				
	Recurring Delay	Incident Delay	Recurring Fuel	Incident Fuel	Total
Northeastern Cities					
Baltimore, MD	110	180	-	-	-
Boston, MA	240	640	-	-	-
Hartford, CT	20	40	-	-	-
New York, NY	1,280	2,370	-	-	-
Philadelphia, PA	330	420	-	-	-
Pittsburgh, PA	110	170	-	-	-
Washington, DC	480	820	-	-	-
Midwestern Cities					
Chicago, IL	680	780	-	-	-
Cincinnati, OH	40	40	-	-	-
Cleveland, OH	50	40	-	-	-
Columbus, OH	50	40	-	-	-
Detroit, MI	380	600	-	-	-
Indianapolis, IN	10	20	0	0	30
Kansas City, MO	20	40	0	0	60
Louisville, KY	30	30	0	0	60
Milwaukee, WI	60	60	10	10	140
Minn-St. Paul, MN	110	110	10	10	240
Oklahoma City, OK	30	30	0	0	60
St. Louis, MO	160	180	70	80	490
Southern Cities					
Atlanta, GA	290	320	30	30	670
Charlotte, NC	30	30	-	-	-
Ft. Lauderdale, FL	70	90	10	10	180
Jacksonville, FL	50	70	10	10	140
Memphis, TN	20	20	0	0	40
Miami, FL	210	260	20	30	520
Nashville, TN	40	50	0	10	100
New Orleans, LA	80	110	10	10	210
Norfolk, VA	60	130	-	-	-
Orlando, FL	40	60	10	10	120
Tampa, FL	50	60	10	10	130
Southwestern Cities					
Albuquerque, NM	20	20	0	0	40
Austin, TX	60	70	10	10	150
Corpus Christi, TX	0	0	0	0	0
Dallas, TX	290	510	30	60	890
Denver, CO	160	170	20	20	370
El Paso, TX	10	10	0	0	20
Fort Worth, TX	110	180	10	20	320
Houston, TX	490	650	50	70	1,260
Phoenix, AZ	220	200	30	20	470
Salt Lake City, UT	20	20	0	0	40
San Antonio, TX	90	100	10	10	210
Western Cities					
Honolulu, HI	50	90	10	10	160
Los Angeles, CA	2,210	2,600	260	310	5,380
Portland, OR	60	90	10	10	170
Sacramento, CA	70	60	10	10	150
San Bernardino-Riv, CA	220	260	30	30	540
San Diego, CA	180	120	20	20	340
San Fran-Oak, CA	730	930	90	110	1,860
San Jose, CA	220	260	30	30	540
Seattle-Everett, WA	230	310	30	40	610
Northeastern Avg	370	660	-	-	-
Midwestern Avg	130	160	10	20	160
Southern Avg	90	110	10	10	230
Southwestern Avg	130	180	10	20	340
Western Avg	440	520	50	60	1,080
Texas Avg	150	220	20	20	410
Total Avg	210	290	20	30	470
Maximum Value	2,210	2,600	260	310	5,380
Minimum Value	0	0	0	0	10

Notes: - Denotes data not available.

Source: TTI Analysis and Local Transportation Agency References

Table C-24. Estimated Impact of Congestion in 1986

Urban Area	Congestion Cost		Roadway Congestion Index
	Per Eligible Driver (dollars)	Per Capita (dollars)	
Northeastern Cities			
Baltimore, MD	-	-	0.88
Boston, MA	-	-	1.04
Hartford, CT	-	-	0.85
New York, NY	-	-	1.06
Philadelphia, PA	-	-	1.06
Pittsburgh, PA	-	-	0.79
Washington, DC	-	-	1.27
Midwestern Cities			
Chicago, IL	-	-	1.15
Cincinnati, OH	-	-	0.84
Cleveland, OH	-	-	0.86
Columbus, OH	-	-	0.75
Detroit, MI	-	-	1.05
Indianapolis, IN	50	40	0.81
Kansas City, MO	80	60	0.68
Louisville, KY	100	80	0.80
Milwaukee, WI	140	100	0.90
Minn-St. Paul, MN	160	130	0.89
Oklahoma City, OK	120	90	0.76
St. Louis, MO	330	260	0.93
Southern Cities			
Atlanta, GA	520	400	1.09
Charlotte, NC	-	-	0.78
Ft. Lauderdale, FL	180	150	0.85
Jacksonville, FL	270	200	0.95
Memphis, TN	80	60	0.80
Miami, FL	370	300	1.14
Nashville, TN	240	190	0.86
New Orleans, LA	270	200	1.09
Norfolk, VA	-	-	0.89
Orlando, FL	200	160	0.76
Tampa, FL	260	200	0.96
Southwestern Cities			
Albuquerque, NM	140	110	0.96
Austin, TX	400	320	0.94
Corpus Christi, TX	50	40	0.71
Dallas, TX	610	470	1.04
Denver, CO	310	250	0.97
El Paso, TX	80	60	0.75
Fort Worth, TX	380	290	0.87
Houston, TX	600	450	1.21
Phoenix, AZ	360	270	1.20
Salt Lake City, UT	60	50	0.68
San Antonio, TX	280	200	0.88
Western Cities			
Honolulu, HI	320	270	1.03
Los Angeles, CA	650	500	1.42
Portland, OR	200	160	0.97
Sacramento, CA	210	160	0.95
San Bernardino-Riv, CA	750	550	1.15
San Diego, CA	220	170	1.00
San Fran-Oak, CA	660	540	1.24
San Jose, CA	550	410	0.97
Seattle-Everett, WA	450	390	1.09
Northeastern Avg	-	-	0.99
Midwestern Avg	140	110	0.87
Southern Avg	260	210	0.92
Southwestern Avg	300	230	0.93
Western Avg	450	350	1.09
Texas Avg	340	260	0.91
Total Avg	300	230	0.95
Maximum Value	750	550	1.42
Minimum Value	50	40	0.68

Notes: - Denotes data not available.

Source: TTI Analysis and Local Transportation Agency References

Table C-25. Component and Total Congestion Costs by Urban Area for 1987

Urban Area	Annual Cost Due to Congestion ($ millions)				
	Recurring Delay	Incident Delay	Recurring Fuel	Incident Fuel	Total
Northeastern Cities					
Baltimore, MD	120	200	10	20	350
Boston, MA	240	620	30	70	960
Hartford, CT	30	40	0	10	80
New York, NY	1,400	2,590	160	290	4,440
Philadelphia, PA	360	460	40	50	910
Pittsburgh, PA	120	190	10	20	340
Washington, DC	540	900	60	110	1,610
Midwestern Cities					
Chicago, IL	680	790	80	90	1,640
Cincinnati, OH	50	50	10	10	120
Cleveland, OH	60	50	10	10	130
Columbus, OH	60	50	10	10	130
Detroit, MI	400	630	50	70	1,150
Indianapolis, IN	10	20	0	0	30
Kansas City, MO	20	50	0	0	70
Louisville, KY	30	30	0	0	60
Milwaukee, WI	60	70	10	10	150
Minn-St. Paul, MN	150	140	20	20	330
Oklahoma City, OK	30	30	0	0	60
St. Louis, MO	170	200	20	20	410
Southern Cities					
Atlanta, GA	330	360	40	40	770
Charlotte, NC	40	40	0	0	80
Ft. Lauderdale, FL	80	100	10	10	200
Jacksonville, FL	60	80	10	10	160
Memphis, TN	20	30	0	0	50
Miami, FL	240	290	30	30	590
Nashville, TN	50	50	10	10	120
New Orleans, LA	80	120	10	10	220
Norfolk, VA	70	150	10	20	250
Orlando, FL	50	60	10	10	130
Tampa, FL	60	70	10	10	150
Southwestern Cities					
Albuquerque, NM	20	30	0	0	50
Austin, TX	70	80	10	10	170
Corpus Christi, TX	0	10	0	0	10
Dallas, TX	280	470	30	60	840
Denver, CO	170	170	20	20	380
El Paso, TX	10	10	0	0	20
Fort Worth, TX	110	180	10	20	320
Houston, TX	480	650	60	80	1,270
Phoenix, AZ	230	210	30	30	500
Salt Lake City, UT	20	20	0	0	40
San Antonio, TX	90	100	10	10	210
Western Cities					
Honolulu, HI	50	90	10	10	160
Los Angeles, CA	2,370	2,780	290	340	5,780
Portland, OR	70	120	10	10	210
Sacramento, CA	90	70	10	10	180
San Bernardino-Riv, CA	240	280	30	30	580
San Diego, CA	240	160	30	20	450
San Fran-Oak, CA	860	1,090	100	130	2,180
San Jose, CA	260	300	30	40	630
Seattle-Everett, WA	290	380	30	50	750
Northeastern Avg	400	720	40	80	1,240
Midwestern Avg	140	170	20	20	360
Southern Avg	100	120	10	10	250
Southwestern Avg	140	180	20	20	350
Western Avg	500	590	60	70	1,210
Texas Avg	150	210	20	30	410
Total Avg	230	310	30	40	610
Maximum Value	2,370	2,780	290	340	5,780
Minimum Value	0	10	0	0	10

Source: TTI Analysis and Local Transportation Agency References

Table C-26. Estimated Impact of Congestion in 1987

Urban Area	Congestion Cost		Roadway Congestion Index
	Per Eligible Driver (dollars)	Per Capita (dollars)	
Northeastern Cities			
Baltimore, MD	240	190	0.91
Boston, MA	410	330	1.04
Hartford, CT	180	130	0.87
New York, NY	350	280	1.06
Philadelphia, PA	280	220	1.06
Pittsburgh, PA	230	190	0.79
Washington, DC	660	540	1.29
Midwestern Cities			
Chicago, IL	300	230	1.15
Cincinnati, OH	120	100	0.87
Cleveland, OH	100	70	0.89
Columbus, OH	180	140	0.78
Detroit, MI	400	290	1.04
Indianapolis, IN	50	40	0.85
Kansas City, MO	90	70	0.71
Louisville, KY	120	90	0.86
Milwaukee, WI	160	120	0.95
Minn-St. Paul, MN	220	170	0.89
Oklahoma City, OK	120	90	0.76
St. Louis, MO	280	210	0.96
Southern Cities			
Atlanta, GA	560	440	1.11
Charlotte, NC	250	190	0.79
Ft. Lauderdale, FL	210	170	0.90
Jacksonville, FL	320	240	0.94
Memphis, TN	90	70	0.84
Miami, FL	410	330	1.14
Nashville, TN	270	220	0.89
New Orleans, LA	290	220	1.14
Norfolk, VA	350	280	0.93
Orlando, FL	200	160	0.77
Tampa, FL	270	210	1.02
Southwestern Cities			
Albuquerque, NM	150	120	0.96
Austin, TX	440	350	1.00
Corpus Christi, TX	50	40	0.72
Dallas, TX	570	440	1.02
Denver, CO	310	250	0.95
El Paso, TX	90	60	0.71
Fort Worth, TX	370	280	0.87
Houston, TX	590	450	1.19
Phoenix, AZ	370	280	1.18
Salt Lake City, UT	70	60	0.70
San Antonio, TX	280	210	0.86
Western Cities			
Honolulu, HI	330	270	1.05
Los Angeles, CA	680	530	1.47
Portland, OR	250	200	0.99
Sacramento, CA	230	180	1.00
San Bernardino-Riv, CA	770	570	1.14
San Diego, CA	280	220	1.08
San Fran-Oak, CA	760	620	1.31
San Jose, CA	610	460	0.99
Seattle-Everett, WA	550	470	1.14
Northeastern Avg	340	270	1.00
Midwestern Avg	180	140	0.89
Southern Avg	290	230	0.95
Southwestern Avg	300	230	0.92
Western Avg	500	390	1.13
Texas Avg	340	260	0.91
Total Avg	310	240	0.97
Maximum Value	770	620	1.47
Minimum Value	50	40	0.70

Source: TTI Analysis and Local Transportation References

Table C-27. Component and Total Congestion Costs by Urban Area for 1988

Urban Area	Annual Cost Due to Congestion ($ millions)				
	Recurring Delay	Incident Delay	Recurring Fuel	Incident Fuel	Total
Northeastern Cities					
Baltimore, MD	130	220	20	30	400
Boston, MA	310	850	40	100	1,300
Hartford, CT	30	70	0	10	110
New York, NY	1,580	2,900	180	340	5,000
Philadelphia, PA	380	490	40	60	970
Pittsburgh, PA	150	210	20	20	400
Washington, DC	580	970	70	120	1,740
Midwestern Cities					
Chicago, IL	710	820	90	100	1,720
Cincinnati, OH	70	60	10	10	150
Cleveland, OH	80	60	10	10	160
Columbus, OH	60	50	10	10	130
Detroit, MI	450	740	50	90	1,330
Indianapolis, IN	20	30	0	0	50
Kansas City, MO	30	60	0	10	100
Louisville, KY	30	30	0	0	60
Milwaukee, WI	70	70	10	10	160
Minn-St. Paul, MN	160	150	20	20	350
Oklahoma City, OK	30	40	0	0	70
St. Louis, MO	180	200	20	20	420
Southern Cities					
Atlanta, GA	340	380	40	40	800
Charlotte, NC	40	40	0	0	80
Ft. Lauderdale, FL	90	110	10	10	220
Jacksonville, FL	70	80	10	10	170
Memphis, TN	30	30	0	0	60
Miami, FL	290	360	40	40	730
Nashville, TN	60	70	10	10	150
New Orleans, LA	90	130	10	20	250
Norfolk, VA	80	160	10	20	270
Orlando, FL	50	60	10	10	130
Tampa, FL	70	80	10	10	170
Southwestern Cities					
Albuquerque, NM	30	30	0	0	60
Austin, TX	70	80	10	10	170
Corpus Christi, TX	0	0	0	0	0
Dallas, TX	300	520	40	60	920
Denver, CO	180	190	20	20	410
El Paso, TX	10	20	0	0	30
Fort Worth, TX	110	190	10	20	330
Houston, TX	520	700	60	90	1,370
Phoenix, AZ	270	250	40	30	590
Salt Lake City, UT	20	20	0	0	40
San Antonio, TX	100	110	10	10	230
Western Cities					
Honolulu, HI	60	100	10	10	180
Los Angeles, CA	2,600	3,040	330	380	6,350
Portland, OR	80	130	10	10	230
Sacramento, CA	100	90	10	10	210
San Bernardino-Riv, CA	260	310	30	40	640
San Diego, CA	310	210	40	30	590
San Fran-Oak, CA	910	1,160	120	150	2,340
San Jose, CA	280	320	30	40	670
Seattle-Everett, WA	330	440	40	60	870
Northeastern Avg	450	820	50	100	1,420
Midwestern Avg	160	190	20	20	390
Southern Avg	110	140	10	20	270
Southwestern Avg	150	190	20	20	380
Western Avg	550	640	70	80	1,340
Texas Avg	160	230	20	30	440
Total Avg	260	350	30	40	680
Maximum Value	2,600	3,040	330	380	6,350
Minimum Value	0	0	0	0	10

Source: TTI Analysis and Local Transportation Agency References

Table C-28. Estimated Impact of Congestion in 1988

Urban Area	Congestion Cost		Roadway Congestion Index
	Per Eligible Driver (dollars)	Per Capita (dollars)	
Northeastern Cities			
Baltimore, MD	260	200	0.92
Boston, MA	540	440	1.12
Hartford, CT	250	190	0.90
New York, NY	390	310	1.10
Philadelphia, PA	300	240	1.07
Pittsburgh, PA	270	220	0.81
Washington, DC	700	570	1.30
Midwestern Cities			
Chicago, IL	310	230	1.18
Cincinnati, OH	160	130	0.88
Cleveland, OH	120	90	0.97
Columbus, OH	190	150	0.79
Detroit, MI	460	340	1.07
Indianapolis, IN	90	70	0.85
Kansas City, MO	110	90	0.72
Louisville, KY	110	90	0.87
Milwaukee, WI	170	130	0.94
Minn-St. Paul, MN	230	180	0.90
Oklahoma City, OK	150	110	0.78
St. Louis, MO	280	220	0.98
Southern Cities			
Atlanta, GA	540	420	1.14
Charlotte, NC	260	210	0.80
Ft. Lauderdale, FL	220	180	0.90
Jacksonville, FL	310	240	0.95
Memphis, TN	100	80	0.86
Miami, FL	500	400	1.18
Nashville, TN	350	280	0.94
New Orleans, LA	320	240	1.13
Norfolk, VA	370	290	0.94
Orlando, FL	200	160	0.78
Tampa, FL	310	250	1.03
Southwestern Cities			
Albuquerque, NM	170	130	0.96
Austin, TX	430	340	0.96
Corpus Christi, TX	50	40	0.70
Dallas, TX	610	470	1.02
Denver, CO	340	270	0.99
El Paso, TX	90	70	0.74
Fort Worth, TX	390	300	0.87
Houston, TX	630	480	1.15
Phoenix, AZ	430	330	1.04
Salt Lake City, UT	80	60	0.72
San Antonio, TX	270	200	0.86
Western Cities			
Honolulu, HI	360	290	1.07
Los Angeles, CA	730	570	1.52
Portland, OR	290	230	1.04
Sacramento, CA	270	210	1.03
San Bernardino-Riv, CA	840	620	1.18
San Diego, CA	340	270	1.13
San Fran-Oak, CA	790	650	1.33
San Jose, CA	660	490	1.00
Seattle-Everett, WA	630	530	1.17
Northeastern Avg	390	310	1.03
Midwestern Avg	200	150	0.91
Southern Avg	320	250	0.97
Southwestern Avg	320	240	0.91
Western Avg	540	430	1.16
Texas Avg	350	270	0.90
Total Avg	340	270	0.99
Maximum Value	840	650	1.52
Minimum Value	50	40	0.70

Source: TTI Analysis and Local Transportation Agency References

Table C-29. Component and Total Congestion Costs by Urban Area for 1989

Urban Area	Annual Cost Due to Congestion ($ millions)				
	Recurring Delay	Incident Delay	Recurring Fuel	Incident Fuel	Total
Northeastern Cities					
Baltimore, MD	150	260	20	30	460
Boston, MA	320	890	40	110	1,360
Hartford, CT	40	70	10	10	130
New York, NY	1,810	3,410	230	430	5,880
Philadelphia, PA	390	520	50	60	1,020
Pittsburgh, PA	160	230	20	30	440
Washington, DC	660	1,120	80	140	2,000
Midwestern Cities					
Chicago, IL	790	910	100	120	1,920
Cincinnati, OH	80	70	10	10	170
Cleveland, OH	100	80	10	10	200
Columbus, OH	70	60	10	10	150
Detroit, MI	500	820	60	100	1,480
Indianapolis, IN	20	30	0	0	50
Kansas City, MO	30	60	0	10	100
Louisville, KY	30	40	0	0	70
Milwaukee, WI	70	80	10	10	170
Minn-St. Paul, MN	170	160	20	20	370
Oklahoma City, OK	40	40	0	0	80
St. Louis, MO	220	250	30	30	530
Southern Cities					
Atlanta, GA	380	410	50	50	890
Charlotte, NC	50	50	10	10	120
Ft. Lauderdale, FL	100	120	10	20	250
Jacksonville, FL	80	100	10	10	200
Memphis, TN	30	30	0	0	60
Miami, FL	330	410	40	50	830
Nashville, TN	70	70	10	10	160
New Orleans, LA	90	140	10	20	260
Norfolk, VA	80	170	10	20	280
Orlando, FL	50	70	10	10	140
Tampa, FL	70	80	10	10	170
Southwestern Cities					
Albuquerque, NM	30	40	0	0	70
Austin, TX	80	80	10	10	180
Corpus Christi, TX	0	0	0	0	0
Dallas, TX	320	540	40	70	970
Denver, CO	200	210	30	30	470
El Paso, TX	10	20	0	0	30
Fort Worth, TX	120	200	10	20	350
Houston, TX	560	750	70	90	1,470
Phoenix, AZ	300	270	40	30	640
Salt Lake City, UT	30	20	0	0	50
San Antonio, TX	100	110	10	10	230
Western Cities					
Honolulu, HI	70	110	10	20	210
Los Angeles, CA	2,850	3,330	380	440	7,000
Portland, OR	90	150	10	20	270
Sacramento, CA	120	110	20	10	260
San Bernardino-Riv, CA	280	330	40	40	690
San Diego, CA	350	230	50	30	660
San Fran-Oak, CA	990	1,260	130	170	2,550
San Jose, CA	300	350	40	50	740
Seattle-Everett, WA	380	510	50	60	1,000
Northeastern Avg	500	930	60	120	1,610
Midwestern Avg	180	220	20	30	440
Southern Avg	120	150	20	20	310
Southwestern Avg	160	200	20	30	410
Western Avg	600	710	80	90	1,490
Texas Avg	170	240	20	30	470
Total Avg	280	390	40	50	760
Maximum Value	2,850	3,410	380	440	7,000
Minimum Value	0	0	0	0	10

Source: TTI Analysis and Local Transportation Agency References

Table C-30. Estimated Impact of Congestion in 1989

Urban Area	Congestion Cost		Roadway Congestion Index
	Per Eligible Driver (dollars)	Per Capita (dollars)	
Northeastern Cities			
Baltimore, MD	310	240	0.98
Boston, MA	560	460	1.09
Hartford, CT	280	220	0.89
New York, NY	450	360	1.12
Philadelphia, PA	310	240	1.05
Pittsburgh, PA	280	230	0.82
Washington, DC	790	650	1.33
Midwestern Cities			
Chicago, IL	340	260	1.21
Cincinnati, OH	180	140	0.94
Cleveland, OH	160	120	0.96
Columbus, OH	220	180	0.82
Detroit, MI	520	380	1.09
Indianapolis, IN	90	70	0.86
Kansas City, MO	110	90	0.72
Louisville, KY	120	90	0.86
Milwaukee, WI	190	140	0.97
Minn-St. Paul, MN	240	190	0.92
Oklahoma City, OK	150	110	0.78
St. Louis, MO	350	270	0.96
Southern Cities			
Atlanta, GA	570	440	1.14
Charlotte, NC	300	230	0.82
Ft. Lauderdale, FL	240	200	0.92
Jacksonville, FL	370	290	0.93
Memphis, TN	110	90	0.90
Miami, FL	570	460	1.25
Nashville, TN	360	280	0.90
New Orleans, LA	330	250	1.13
Norfolk, VA	390	310	0.95
Orlando, FL	210	170	0.77
Tampa, FL	310	250	1.03
Southwestern Cities			
Albuquerque, NM	200	160	0.98
Austin, TX	440	350	0.96
Corpus Christi, TX	50	40	0.70
Dallas, TX	640	490	1.02
Denver, CO	370	300	1.01
El Paso, TX	90	70	0.74
Fort Worth, TX	410	310	0.87
Houston, TX	670	510	1.13
Phoenix, AZ	450	340	1.03
Salt Lake City, UT	90	70	0.81
San Antonio, TX	280	210	0.87
Western Cities			
Honolulu, HI	380	320	1.07
Los Angeles, CA	800	620	1.54
Portland, OR	330	260	1.07
Sacramento, CA	320	240	1.01
San Bernardino-Riv, CA	870	630	1.17
San Diego, CA	380	300	1.18
San Fran-Oak, CA	860	710	1.36
San Jose, CA	710	530	1.03
Seattle-Everett, WA	700	590	1.20
Northeastern Avg	430	340	1.04
Midwestern Avg	220	170	0.92
Southern Avg	340	270	0.98
Southwestern Avg	340	260	0.92
Western Avg	590	470	1.18
Texas Avg	370	280	0.90
Total Avg	370	290	1.00
Maximum Value	870	710	1.54
Minimum Value	50	40	0.70

Source: TTI Analysis and Local Transportation Agency References

Table C-31. Component and Total Congestion Costs by Urban Area for 1990

Urban Area	Annual Cost Due to Congestion ($ millions)				
	Recurring Delay	Incident Delay	Recurring Fuel	Incident Fuel	Total
Northeastern Cities					
Baltimore, MD	170	300	20	40	530
Boston, MA	340	920	40	120	1,420
Hartford, CT	40	80	10	10	140
New York, NY	1,950	3,660	270	500	6,380
Philadelphia, PA	430	570	50	70	1,120
Pittsburgh, PA	170	260	20	30	480
Washington, DC	730	1,240	100	170	2,240
Midwestern Cities					
Chicago, IL	910	1,050	130	140	2,230
Cincinnati, OH	90	70	10	10	180
Cleveland, OH	110	90	20	10	230
Columbus, OH	100	80	10	10	200
Detroit, MI	580	950	70	120	1,720
Indianapolis, IN	30	40	0	0	70
Kansas City, MO	30	60	0	10	100
Louisville, KY	40	40	0	0	80
Milwaukee, WI	80	90	10	10	190
Minn-St. Paul, MN	190	190	20	20	420
Oklahoma City, OK	40	40	0	10	90
St. Louis, MO	220	250	30	30	530
Southern Cities					
Atlanta, GA	420	460	50	60	990
Charlotte, NC	50	50	10	10	120
Ft. Lauderdale, FL	110	150	10	20	290
Jacksonville, FL	90	110	10	10	220
Memphis, TN	40	40	0	0	80
Miami, FL	370	460	50	60	940
Nashville, TN	70	80	10	10	170
New Orleans, LA	100	150	10	20	280
Norfolk, VA	90	190	10	20	310
Orlando, FL	60	80	10	10	160
Tampa, FL	80	90	10	10	190
Southwestern Cities					
Albuquerque, NM	40	40	0	10	90
Austin, TX	90	90	10	10	200
Corpus Christi, TX	0	10	0	0	10
Dallas, TX	370	620	50	80	1,120
Denver, CO	240	250	30	30	550
El Paso, TX	20	20	0	0	40
Fort Worth, TX	140	230	20	30	420
Houston, TX	610	820	80	100	1,610
Phoenix, AZ	330	290	40	40	700
Salt Lake City, UT	30	30	0	0	60
San Antonio, TX	110	120	10	20	260
Western Cities					
Honolulu, HI	80	120	10	20	230
Los Angeles, CA	3,110	3,640	420	490	7,660
Portland, OR	100	160	10	20	290
Sacramento, CA	130	120	20	20	290
San Bernardino-Riv, CA	340	400	50	50	840
San Diego, CA	380	250	50	30	710
San Fran-Oak, CA	1,070	1,350	140	180	2,740
San Jose, CA	320	380	40	50	790
Seattle-Everett, WA	420	560	60	80	1,120
Northeastern Avg	550	1,000	70	130	1,760
Midwestern Avg	200	250	30	30	500
Southern Avg	130	170	20	20	340
Southwestern Avg	180	230	20	30	460
Western Avg	660	780	90	110	1,630
Texas Avg	190	270	20	30	520
Total Avg	310	430	40	60	840
Maximum Value	3,110	3,660	420	500	7,660
Minimum Value	0	10	0	0	10

Source: TTI Analysis and Local Transportation Agency References

Table C-32. Estimated Impact of Congestion in 1990

Urban Area	Congestion Cost		Roadway Congestion Index
	Per Eligible Driver (dollars)	Per Capita (dollars)	
Northeastern Cities			
Baltimore, MD	340	270	1.01
Boston, MA	580	480	1.06
Hartford, CT	310	230	0.89
New York, NY	480	380	1.14
Philadelphia, PA	320	250	1.05
Pittsburgh, PA	320	260	0.82
Washington, DC	870	720	1.34
Midwestern Cities			
Chicago, IL	390	300	1.25
Cincinnati, OH	210	160	0.96
Cleveland, OH	170	130	0.94
Columbus, OH	300	230	0.89
Detroit, MI	580	430	1.13
Indianapolis, IN	100	80	0.84
Kansas City, MO	120	90	0.74
Louisville, KY	130	100	0.86
Milwaukee, WI	210	160	0.99
Minn-St. Paul, MN	270	210	0.95
Oklahoma City, OK	160	120	0.79
St. Louis, MO	340	270	0.95
Southern Cities			
Atlanta, GA	590	470	1.14
Charlotte, NC	350	270	0.86
Ft. Lauderdale, FL	280	230	0.94
Jacksonville, FL	420	320	0.93
Memphis, TN	130	100	0.89
Miami, FL	640	510	1.27
Nashville, TN	370	300	0.89
New Orleans, LA	350	260	1.12
Norfolk, VA	430	340	0.96
Orlando, FL	230	180	0.77
Tampa, FL	340	280	1.05
Southwestern Cities			
Albuquerque, NM	230	180	0.98
Austin, TX	470	370	0.94
Corpus Christi, TX	60	40	0.72
Dallas, TX	720	560	1.05
Denver, CO	450	360	1.03
El Paso, TX	100	70	0.74
Fort Worth, TX	450	340	0.90
Houston, TX	740	560	1.12
Phoenix, AZ	490	370	1.05
Salt Lake City, UT	100	80	0.85
San Antonio, TX	300	220	0.88
Western Cities			
Honolulu, HI	420	350	1.09
Los Angeles, CA	860	670	1.55
Portland, OR	360	290	1.08
Sacramento, CA	340	260	1.02
San Bernardino-Riv, CA	990	720	1.21
San Diego, CA	390	310	1.22
San Fran-Oak, CA	910	750	1.36
San Jose, CA	740	560	1.05
Seattle-Everett, WA	750	640	1.20
Northeastern Avg	460	370	1.04
Midwestern Avg	250	190	0.94
Southern Avg	380	300	0.98
Southwestern Avg	370	290	0.93
Western Avg	640	510	1.20
Texas Avg	410	310	0.91
Total Avg	400	320	1.01
Maximum Value	990	750	1.55
Minimum Value	60	40	0.72

Source: TTI Analysis and Local Transportation Agency References

Table C-33. Component and Total Congestion Costs by Urban Area for 1991

Urban Area	Annual Cost Due to Congestion ($ millions)				
	Recurring Delay	Incident Delay	Recurring Fuel	Incident Fuel	Total
Northeastern Cities					
Baltimore, MD	180	310	20	40	550
Boston, MA	350	980	40	120	1,490
Hartford, CT	40	80	10	10	140
New York, NY	2,020	3,770	260	480	6,530
Philadelphia, PA	450	600	50	70	1,170
Pittsburgh, PA	170	260	20	30	480
Washington, DC	770	1,320	100	170	2,360
Midwestern Cities					
Chicago, IL	980	1,140	130	150	2,400
Cincinnati, OH	100	90	10	10	210
Cleveland, OH	120	100	10	10	240
Columbus, OH	100	80	10	10	200
Detroit, MI	630	1,040	80	120	1,870
Indianapolis, IN	30	40	0	0	70
Kansas City, MO	40	70	0	10	120
Louisville, KY	40	40	0	0	80
Milwaukee, WI	90	90	10	10	200
Minn-St. Paul, MN	210	200	30	20	460
Oklahoma City, OK	40	50	0	10	100
St. Louis, MO	230	260	20	30	540
Southern Cities					
Atlanta, GA	440	480	50	60	1,030
Charlotte, NC	60	60	10	10	140
Ft. Lauderdale, FL	120	160	10	20	310
Jacksonville, FL	90	120	10	10	230
Memphis, TN	40	50	10	10	110
Miami, FL	390	470	50	60	970
Nashville, TN	70	80	10	10	170
New Orleans, LA	100	150	10	20	280
Norfolk, VA	90	190	10	20	310
Orlando, FL	60	90	10	10	170
Tampa, FL	90	100	10	10	210
Southwestern Cities					
Albuquerque, NM	40	40	0	10	90
Austin, TX	90	100	10	10	210
Corpus Christi, TX	10	10	0	0	20
Dallas, TX	390	660	50	80	1,180
Denver, CO	270	280	30	40	620
El Paso, TX	20	20	0	0	40
Fort Worth, TX	150	250	20	30	450
Houston, TX	650	880	80	100	1,710
Phoenix, AZ	360	310	40	40	750
Salt Lake City, UT	40	30	10	0	80
San Antonio, TX	120	130	10	20	280
Western Cities					
Honolulu, HI	80	130	10	20	240
Los Angeles, CA	3,230	3,780	410	480	7,900
Portland, OR	110	170	10	20	310
Sacramento, CA	140	120	20	20	300
San Bernardino-Riv, CA	380	440	50	60	930
San Diego, CA	390	260	50	30	730
San Fran-Oak, CA	1,090	1,370	140	170	2,770
San Jose, CA	340	400	40	50	830
Seattle-Everett, WA	450	590	60	70	1,170
Northeastern Avg	570	1050	70	130	1,820
Midwestern Avg	220	270	30	30	540
Southern Avg	140	180	20	20	360
Southwestern Avg	190	250	20	30	490
Western Avg	690	810	90	100	1,690
Texas Avg	200	290	20	30	550
Total Avg	330	450	40	60	880
Maximum Value	3,230	3,780	410	480	7,900
Minimum Value	10	10	0	0	20

Source: TTI Analysis and Local Transportation Agency References

Table C-34. Estimated Impact of Congestion in 1991

Urban Area	Congestion Cost		Roadway Congestion Index
	Per Eligible Driver (dollars)	Per Capita (dollars)	
Northeastern Cities			
Baltimore, MD	350	270	1.02
Boston, MA	610	500	1.06
Hartford, CT	310	240	0.89
New York, NY	490	390	1.14
Philadelphia, PA	320	250	1.05
Pittsburgh, PA	320	260	0.82
Washington, DC	870	720	1.33
Midwestern Cities			
Chicago, IL	410	320	1.27
Cincinnati, OH	220	170	0.99
Cleveland, OH	180	140	0.95
Columbus, OH	300	230	0.91
Detroit, MI	640	470	1.16
Indianapolis, IN	100	80	0.84
Kansas City, MO	120	100	0.75
Louisville, KY	140	110	0.88
Milwaukee, WI	220	170	1.00
Minn-St. Paul, MN	280	220	0.96
Oklahoma City, OK	170	130	0.81
St. Louis, MO	360	280	0.95
Southern Cities			
Atlanta, GA	610	480	1.16
Charlotte, NC	380	290	0.89
Ft. Lauderdale, FL	290	240	0.95
Jacksonville, FL	410	320	0.95
Memphis, TN	150	120	0.91
Miami, FL	650	510	1.28
Nashville, TN	370	300	0.90
New Orleans, LA	350	260	1.12
Norfolk, VA	420	330	0.92
Orlando, FL	230	190	0.78
Tampa, FL	380	300	1.05
Southwestern Cities			
Albuquerque, NM	220	180	0.96
Austin, TX	470	370	0.94
Corpus Christi, TX	70	50	0.72
Dallas, TX	720	560	1.06
Denver, CO	490	390	1.03
El Paso, TX	100	70	0.75
Fort Worth, TX	490	370	0.92
Houston, TX	780	590	1.11
Phoenix, AZ	520	390	1.08
Salt Lake City, UT	120	100	0.88
San Antonio, TX	310	230	0.89
Western Cities			
Honolulu, HI	440	370	1.10
Los Angeles, CA	860	670	1.56
Portland, OR	370	300	1.08
Sacramento, CA	330	250	1.04
San Bernardino-Riv, CA	990	720	1.22
San Diego, CA	400	320	1.22
San Fran-Oak, CA	910	740	1.34
San Jose, CA	730	560	1.08
Seattle-Everett, WA	750	640	1.20
Northeastern Avg	470	380	1.04
Midwestern Avg	260	200	0.96
Southern Avg	380	300	0.99
Southwestern Avg	390	300	0.94
Western Avg	640	510	1.20
Texas Avg	420	320	0.91
Total Avg	410	330	1.02
Maximum Value	990	740	1.56
Minimum Value	70	50	0.72

Source: TTI Analysis and Local Transportation Agency References

Table C-35. Component and Total Congestion Costs by Urban Area for 1992

Urban Area	Annual Cost Due to Congestion ($ millions)				
	Recurring Delay	Incident Delay	Recurring Fuel	Incident Fuel	Total
Northeastern Cities					
Baltimore, MD	210	390	30	50	680
Boston, MA	370	1,030	40	120	1,560
Hartford, CT	50	90	10	10	160
New York, NY	2,250	4,130	280	510	7,170
Philadelphia, PA	480	650	60	80	1,270
Pittsburgh, PA	180	280	20	30	510
Washington, DC	870	1,520	110	190	2,690
Midwestern Cities					
Chicago, IL	1,120	1,290	140	160	2,710
Cincinnati, OH	120	100	10	10	240
Cleveland, OH	140	120	20	10	290
Columbus, OH	120	100	10	10	240
Detroit, MI	710	1,150	80	130	2,070
Indianapolis, IN	30	40	0	10	80
Kansas City, MO	50	120	10	10	190
Louisville, KY	50	60	10	10	130
Milwaukee, WI	90	100	10	10	210
Minn-St. Paul, MN	230	230	30	30	520
Oklahoma City, OK	50	50	10	10	120
St. Louis, MO	230	260	20	30	540
Southern Cities					
Atlanta, GA	500	550	60	60	1,170
Charlotte, NC	70	70	10	10	160
Ft. Lauderdale, FL	130	180	20	20	350
Jacksonville, FL	100	130	10	20	260
Memphis, TN	50	50	10	10	120
Miami, FL	400	490	50	60	1,000
Nashville, TN	70	80	10	10	170
New Orleans, LA	100	160	10	20	290
Norfolk, VA	100	190	10	20	320
Orlando, FL	70	100	10	10	190
Tampa, FL	90	110	10	10	220
Southwestern Cities					
Albuquerque, NM	40	50	0	10	100
Austin, TX	90	100	10	10	210
Corpus Christi, TX	10	10	0	0	20
Dallas, TX	400	680	50	80	1,210
Denver, CO	290	300	40	40	670
El Paso, TX	30	30	0	0	60
Fort Worth, TX	150	260	20	30	460
Houston, TX	680	920	80	110	1,790
Phoenix, AZ	400	340	50	40	830
Salt Lake City, UT	50	40	10	0	100
San Antonio, TX	130	150	20	20	320
Western Cities					
Honolulu, HI	100	150	10	20	280
Los Angeles, CA	3,380	3,960	420	490	8,250
Portland, OR	130	210	20	30	390
Sacramento, CA	150	130	20	20	320
San Bernardino-Riv, CA	410	480	50	60	1,000
San Diego, CA	410	280	50	40	780
San Fran-Oak, CA	1,110	1,410	140	180	2,840
San Jose, CA	360	420	40	50	870
Seattle-Everett, WA	500	660	60	80	1,300
Northeastern Avg	630	1,160	80	140	2,010
Midwestern Avg	250	300	30	40	610
Southern Avg	150	190	20	20	380
Southwestern Avg	210	260	20	30	520
Western Avg	730	860	90	110	1,780
Texas Avg	210	310	30	40	580
Total Avg	360	490	40	60	950
Maximum Value	3,380	4,130	420	510	8,250
Minimum Value	10	10	0	0	20

Source: TTI Analysis and Local Transportation Agency References

Table C-36. Estimated Impact of Congestion 1992

Urban Area	Congestion Cost		Roadway Congestion Index
	Per Eligible Driver (dollars)	Per Capita (dollars)	
Northeastern Cities			
Baltimore, MD	420	330	1.04
Boston, MA	640	530	1.07
Hartford, CT	350	260	0.91
New York, NY	530	420	1.14
Philadelphia, PA	320	250	1.05
Pittsburgh, PA	340	280	0.81
Washington, DC	980	820	1.36
Midwestern Cities			
Chicago, IL	470	360	1.28
Cincinnati, OH	260	210	1.01
Cleveland, OH	210	160	0.95
Columbus, OH	320	250	0.93
Detroit, MI	700	520	1.19
Indianapolis, IN	120	90	0.85
Kansas City, MO	200	160	0.77
Louisville, KY	180	140	0.90
Milwaukee, WI	230	180	1.00
Minn-St. Paul, MN	300	240	0.99
Oklahoma City, OK	190	140	0.83
St. Louis, MO	360	280	0.95
Southern Cities			
Atlanta, G.	650	510	1.17
Charlotte, NC	370	300	0.89
Ft. Lauderdale, FL	320	270	0.96
Jacksonville, FL	450	350	0.97
Memphis, TN	170	130	0.92
Miami, FL	650	510	1.30
Nashville, TN	360	290	0.92
New Orleans, LA	350	260	1.10
Norfolk, VA	420	340	0.92
Orlando, FL	260	210	0.80
Tampa, FL	390	310	1.07
Southwestern Cities			
Albuquerque, NM	240	190	0.95
Austin, TX	490	390	0.95
Corpus Christi, TX	100	70	0.74
Dallas, TX	740	580	1.07
Denver, CO	520	420	1.05
El Paso, TX	150	110	0.76
Fort Worth, TX	510	390	0.94
Houston, TX	810	620	1.12
Phoenix, AZ	540	410	1.08
Salt Lake City, UT	140	110	0.90
San Antonio, TX	360	260	0.90
Western Cities			
Honolulu, HI	500	420	1.10
Los Angeles, CA	890	700	1.54
Portland, OR	450	360	1.10
Sacramento, CA	350	270	1.04
San Bernardino-Riv, CA	1,060	760	1.22
San Diego, CA	400	320	1.22
San Fran-Oak, CA	910	750	1.33
San Jose, CA	760	580	1.07
Seattle-Everett, WA	830	710	1.22
Northeastern Avg	510	410	1.05
Midwestern Avg	300	230	0.97
Southern Avg	400	320	1.00
Southwestern Avg	420	320	0.95
Western Avg	680	540	1.20
Texas Avg	450	350	0.93
Total Avg	450	350	1.03
Maximum Value	1,060	820	1.54
Minimum Value	100	70	0.74

Source: TTI Analysis and Local Transportation Agency References

Table C-37. Component and Total Congestion Costs by Urban Area for 1993

Urban Area	Annual Cost Due to Congestion ($ millions)				
	Recurring Delay	Incident Delay	Recurring Fuel	Incident Fuel	Total
Northeastern Cities					
Baltimore, MD	230	420	30	50	730
Boston, MA	380	1,030	40	110	1,560
Hartford, CT	60	120	10	10	200
New York, NY	2,400	4,410	280	510	7,600
Philadelphia, PA	510	680	50	70	1,310
Pittsburgh, PA	200	310	20	30	560
Washington, DC	910	1,610	100	170	2,790
Midwestern Cities					
Chicago, IL	1,170	1,350	130	150	2,800
Cincinnati, OH	140	120	10	10	280
Cleveland, OH	160	130	20	10	320
Columbus, OH	120	100	10	10	240
Detroit, MI	800	1,330	80	130	2,340
Indianapolis, IN	50	70	0	10	130
Kansas City, MO	60	130	10	10	210
Louisville, KY	60	70	10	10	150
Milwaukee, WI	100	100	10	10	220
Minn-St. Paul, MN	260	250	30	30	570
Oklahoma City, OK	50	60	10	10	130
St. Louis, MO	270	310	30	30	640
Southern Cities					
Atlanta, GA	590	650	60	60	1,360
Charlotte, NC	70	70	10	10	160
Ft. Lauderdale, FL	150	190	20	20	380
Jacksonville, FL	120	150	10	20	300
Memphis, TN	50	60	10	10	130
Miami, FL	440	540	50	60	1,090
Nashville, TN	70	80	10	10	170
New Orleans, LA	110	160	10	20	300
Norfolk, VA	100	190	10	20	320
Orlando, FL	90	120	10	10	230
Tampa, FL	90	110	10	10	220
Southwestern Cities					
Albuquerque, NM	50	60	10	10	130
Austin, TX	110	130	10	10	260
Corpus Christi, TX	10	10	0	0	20
Dallas, TX	420	710	40	70	1,240
Denver, CO	330	340	40	40	750
El Paso, TX	30	30	0	0	60
Fort Worth, TX	180	300	20	30	530
Houston, TX	740	1,000	80	100	1,920
Phoenix, AZ	430	360	50	40	880
Salt Lake City, UT	60	50	10	0	120
San Antonio, TX	150	170	20	20	360
Western Cities					
Honolulu, HI	110	170	10	20	310
Los Angeles, CA	3,530	4,130	400	470	8,530
Portland, OR	140	230	20	30	420
Sacramento, CA	180	160	20	20	380
San Bernardino-Riv, CA	430	500	50	60	1,040
San Diego, CA	410	280	50	30	770
San Fran-Oak, CA	1,180	1,490	140	170	2,980
San Jose, CA	360	430	40	50	880
Seattle-Everett, WA	520	700	60	80	1,360
Northeastern Avg	670	1,230	70	140	2,110
Midwestern Avg	270	330	30	30	670
Southern Avg	170	210	20	20	420
Southwestern Avg	230	290	20	30	570
Western Avg	760	900	90	100	1,850
Texas Avg	230	330	20	30	630
Total Avg	380	520	40	60	1,010
Maximum Value	3,530	4,410	400	510	8,540
Minimum Value	10	10	0	0	20

Source: TTI Analysis and Local Transportation Agency References

Table C-38. Estimated Impact of Congestion 1993

Urban Area	Congestion Cost		Roadway Congestion Index
	Per Eligible Driver (dollars)	Per Capita (dollars)	
Northeastern Cities			
Baltimore, MD	440	350	1.04
Boston, MA	630	520	1.07
Hartford, CT	430	330	0.93
New York, NY	560	450	1.15
Philadelphia, PA	320	250	1.04
Pittsburgh, PA	360	290	0.82
Washington, DC	980	820	1.41
Midwestern Cities			
Chicago, IL	470	370	1.26
Cincinnati, OH	290	220	1.03
Cleveland, OH	240	180	0.98
Columbus, OH	310	250	0.93
Detroit, MI	790	590	1.23
Indianapolis, IN	170	130	0.89
Kansas City, MO	210	160	0.78
Louisville, KY	220	180	0.93
Milwaukee, WI	240	180	1.00
Minn-St. Paul, MN	340	270	1.02
Oklahoma City, OK	200	150	0.86
St. Louis, MO	410	320	0.96
Southern Cities			
Atlanta, GA	740	590	1.16
Charlotte, NC	380	310	0.92
Ft. Lauderdale, FL	350	290	0.98
Jacksonville, FL	500	380	0.96
Memphis, TN	180	140	0.93
Miami, FL	710	560	1.32
Nashville, TN	340	270	0.93
New Orleans, LA	360	270	1.09
Norfolk, VA	410	330	0.92
Orlando, FL	310	250	0.82
Tampa, FL	370	290	1.06
Southwestern Cities			
Albuquerque, NM	290	220	0.96
Austin, TX	590	470	0.95
Corpus Christi, TX	110	80	0.75
Dallas, TX	760	590	1.07
Denver, CO	580	460	1.07
El Paso, TX	160	120	0.77
Fort Worth, TX	580	440	0.95
Houston, TX	860	660	1.13
Phoenix, AZ	560	420	1.08
Salt Lake City, UT	170	130	0.92
San Antonio, TX	400	290	0.91
Western Cities			
Honolulu, HI	540	450	1.13
Los Angeles, CA	920	710	1.54
Portland, OR	480	390	1.11
Sacramento, CA	410	310	1.04
San Bernardino-Riv, CA	1,090	790	1.21
San Diego, CA	380	300	1.21
San Fran-Oak, CA	950	780	1.33
San Jose, CA	750	580	1.05
Seattle-Everett, WA	850	720	1.23
Northeastern Avg	530	430	1.07
Midwestern Avg	320	250	0.99
Southern Avg	420	340	1.01
Southwestern Avg	460	350	0.96
Western Avg	710	560	1.21
Texas Avg	490	380	0.93
Total Avg	470	370	1.04
Maximum Value	1,090	820	1.54
Minimum Value	110	80	0.75

Source: TTI Analysis and Local Transportation Agency References

Table C-39. Component and Total Congestion Costs by Urban Area for 1994

Urban Area	Annual Cost Due to Congestion ($ millions)				
	Recurring Delay	Incident Delay	Recurring Fuel	Incident Fuel	Total
Northeastern Cities					
Baltimore, MD	250	450	30	50	780
Boston, MA	400	1,100	40	110	1,650
Hartford, CT	60	130	10	10	210
New York, NY	2,520	4,620	270	490	7,900
Philadelphia, PA	520	700	50	70	1,340
Pittsburgh, PA	220	330	20	30	600
Washington, DC	970	1,720	100	170	2,960
Midwestern Cities					
Chicago, IL	1,026	1,460	130	150	3,000
Cincinnati, OH	150	130	10	10	300
Cleveland, OH	180	150	20	10	360
Columbus, OH	130	100	10	10	250
Detroit, MI	840	1,370	80	130	2,420
Indianapolis, IN	70	100	10	10	190
Kansas City, MO	70	150	10	10	240
Louisville, KY	80	90	10	10	190
Milwaukee, WI	110	110	10	10	240
Minn-St. Paul, MN	290	280	30	30	630
Oklahoma City, OK	60	60	0	10	130
St. Louis, MO	290	330	30	30	680
Southern Cities					
Atlanta, GA	670	730	60	70	1,530
Charlotte, NC	80	70	10	10	170
Ft. Lauderdale, FL	160	220	20	20	420
Jacksonville, FL	130	170	10	20	330
Memphis, TN	60	70	10	10	150
Miami, FL	470	580	50	60	1,160
Nashville, TN	80	90	10	10	190
New Orleans, LA	120	190	10	20	340
Norfolk, VA	110	210	10	20	350
Orlando, FL	110	140	10	10	270
Tampa, FL	100	120	10	10	240
Southwestern Cities					
Albuquerque, NM	60	70	10	10	150
Austin, TX	140	150	10	10	310
Corpus Christi, TX	10	10	0	0	20
Dallas, TX	480	800	50	80	1,410
Denver, CO	350	360	40	40	790
El Paso, TX	30	30	0	0	60
Fort Worth, TX	200	340	20	30	590
Houston, TX	780	1,050	70	100	2,000
Phoenix, AZ	440	360	50	40	890
Salt Lake City, UT	70	60	10	10	150
San Antonio, TX	170	180	20	20	390
Western Cities					
Honolulu, HI	110	180	20	20	330
Los Angeles, CA	3,590	4,200	380	450	8,620
Portland, OR	150	250	20	30	450
Sacramento, CA	190	170	20	20	400
San Bernardino-Riv, CA	440	520	50	60	1,070
San Diego, CA	420	290	50	30	790
San Fran-Oak, CA	1,220	1,540	130	170	3,060
San Jose, CA	370	440	40	50	900
Seattle-Everett, WA	550	730	60	80	1,420
Northeastern Avg	710	1,290	70	130	2,200
Midwestern Avg	290	360	30	30	720
Southern Avg	190	240	20	20	470
Southwestern Avg	250	310	20	30	610
Western Avg	780	920	80	100	1,890
Texas Avg	260	370	20	40	680
Total Avg	410	550	40	60	1,060
Maximum Value	3,590	4,620	380	490	8,620
Minimum Value	10	10	0	0	30

Source: TTI Analysis and Local Transportation Agency References

Table C-40. Estimated Impact of Congestion 1994

Urban Area	Congestion Cost		Roadway Congestion Index
	Per Eligible Driver (dollars)	Per Capita (dollars)	
Northeastern Cities			
Baltimore, MD	460	360	1.06
Boston, MA	660	550	1.08
Hartford, CT	450	340	0.93
New York, NY	580	460	1.15
Philadelphia, PA	320	250	1.05
Pittsburgh, PA	380	310	0.83
Washington, DC	1,030	860	1.43
Midwestern Cities			
Chicago, IL	500	390	1.28
Cincinnati, OH	310	240	1.05
Cleveland, OH	260	200	1.00
Columbus, OH	320	250	0.95
Detroit, MI	820	600	1.24
Indianapolis, IN	250	200	0.92
Kansas City, MO	230	180	0.80
Louisville, KY	280	220	0.95
Milwaukee, WI	260	200	1.00
Minn-St. Paul, MN	360	290	1.04
Oklahoma City, OK	200	150	0.85
St. Louis, MO	440	340	0.98
Southern Cities			
Atlanta, GA	800	640	1.18
Charlotte, NC	380	310	0.94
Ft. Lauderdale, FL	380	320	0.99
Jacksonville, FL	540	420	0.97
Memphis, TN	210	160	0.94
Miami, FL	760	600	1.32
Nashville, TN	370	300	0.96
New Orleans, LA	410	310	1.11
Norfolk, VA	440	350	0.93
Orlando, FL	350	290	0.86
Tampa, FL	400	320	1.07
Southwestern Cities			
Albuquerque, NM	350	270	0.98
Austin, TX	670	530	0.97
Corpus Christi, TX	130	90	0.76
Dallas, TX	810	640	1.09
Denver, CO	580	470	1.07
El Paso, TX	170	120	0.78
Fort Worth, TX	630	480	0.97
Houston, TX	890	680	1.12
Phoenix, AZ	550	420	1.09
Salt Lake City, UT	210	160	0.94
San Antonio, TX	420	320	0.92
Western Cities			
Honolulu, HI	550	470	1.13
Los Angeles, CA	920	720	1.52
Portland, OR	510	410	1.11
Sacramento, CA	430	330	1.06
San Bernardino-Riv, CA	1,100	790	1.20
San Diego, CA	390	310	1.21
San Fran-Oak, CA	960	790	1.33
San Jose, CA	750	580	1.06
Seattle-Everett, WA	870	740	1.25
Northeastern Avg	550	450	1.08
Midwestern Avg	350	270	1.01
Southern Avg	460	360	1.02
Southwestern Avg	490	380	0.97
Western Avg	720	570	1.21
Texas Avg	530	410	0.94
Total Avg	500	390	1.05
Maximum Value	1,100	860	1.52
Minimum Value	130	90	0.76

Source: TTI Analysis and Local Transportation Agency References

APPENDIX D

FREEWAY AND PRINCIPAL ARTERIAL STREET TRAVEL AND SYSTEM LENGTH STATISTICS 1982 TO 1994

Table D-1. Summary of Normalized Freeway Travel and Distance Statistics for 1994

Urban Area	Normalized by Population Density							
	VKT per Person	Rank	VKT per Sq Km	Rank	Lane-km per 1000 Persons	Rank	Lane-km per Sq Km	Rank
Northeastern Cities								
Baltimore, MD	12.53	31	14.21	24	0.92	34	1.05	26
Boston, MA	11.40	35	11.73	34	0.80	38	0.82	38
Hartford, CT	27.90	6	18.20	6	2.43	8	1.58	3
New York, NY	4.32	50	8.34	46	0.31	50	0.60	46
Philadelphia, PA	4.72	49	6.42	50	0.39	47	0.53	50
Pittsburgh, PA	9.91	43	7.94	48	1.23	24	0.99	30
Washington, DC	10.71	38	14.31	23	0.59	44	0.79	40
Midwestern Cities								
Chicago, IL	7.41	45	8.81	43	0.45	46	0.54	49
Cincinnati, OH	23.01	11	17.29	14	1.68	14	1.26	14
Cleveland, OH	14.51	26	13.71	26	1.13	27	1.07	24
Columbus, OH	18.86	16	16.46	16	1.56	16	1.36	10
Detroit, MI	10.00	42	11.90	31	0.62	43	0.74	44
Indianapolis, IN	19.79	14	15.77	17	1.71	13	1.36	9
Kansas City, MO	26.93	7	19.06	3	2.70	4	1.91	1
Louisville, KY	18.16	20	14.83	21	1.54	17	1.26	15
Milwaukee, WI	11.74	33	10.13	39	0.91	35	0.79	39
Minn-St. Paul, MN	21.90	12	15.32	19	1.64	15	1.15	19
Oklahoma City, OK	25.50	9	14.68	22	2.43	6	1.40	7
St. Louis, MO	17.18	21	16.58	15	1.45	19	1.40	8
Southern Cities								
Atlanta, GA	42.29	2	22.14	1	2.75	3	1.44	6
Charlotte, NC	16.98	22	11.42	35	1.46	18	0.98	31
Ft. Lauderdale, FL	10.02	41	11.34	37	0.78	39	0.88	36
Jacksonville, FL	24.49	10	13.37	27	1.95	11	1.07	25
Memphis, TN	12.23	32	9.61	41	1.06	29	0.84	37
Miami, FL	5.92	48	8.78	44	0.37	48	0.55	48
Nashville, TN	49.13	1	20.29	2	4.25	1	1.75	2
New Orleans, LA	6.81	47	7.99	47	0.51	45	0.60	45
Norfolk, VA	21.54	13	9.93	40	2.06	10	0.95	33
Orlando, FL	13.36	28	11.40	36	1.29	23	1.10	21
Tampa, FL	15.43	25	9.53	42	1.20	25	0.74	43
Southwestern Cities								
Albuquerque, NM	11.07	37	8.71	45	0.95	33	0.75	41
Austin, TX	29.93	5	17.94	10	2.46	5	1.47	4
Corpus Christi, TX	19.62	15	11.76	32	2.09	9	1.26	16
Dallas, TX	34.32	4	18.81	4	2.43	7	1.33	11
Denver, CO	18.73	17	12.95	29	1.39	22	0.96	32
El Paso, TX	10.65	39	10.60	38	1.05	30	1.04	27
Fort Worth, TX	34.72	3	17.97	8	2.82	2	1.46	5
Houston, TX	26.40	8	18.05	7	1.80	12	1.23	17
Phoenix, AZ	10.23	40	7.86	49	0.74	40	0.57	47
Salt Lake City, UT	16.97	23	11.76	32	1.44	20	1.00	29
San Antonio, TX	16.41	24	15.33	18	1.41	21	1.32	12
Western Cities								
Honolulu, HI	8.70	44	12.97	28	0.62	42	0.93	34
Los Angeles, CA	7.31	46	15.16	20	0.36	49	0.74	42
Portland, OR	13.25	29	12.65	30	0.96	32	0.91	35
Sacramento, CA	11.61	34	14.03	25	0.89	36	1.08	23
San Bernardino-Riv, CA	18.54	18	18.62	5	1.15	26	1.16	18
San Diego, CA	13.20	30	17.57	13	0.83	37	1.10	20
San Fran-Oak, CA	11.33	36	17.82	11	0.65	41	1.02	28
San Jose, CA	13.80	27	17.64	12	1.01	31	1.29	13
Seattle-Everett, WA	18.50	19	17.95	9	1.13	28	1.10	22
Northeastern Avg	11.64		11.59		0.95		0.91	
Midwestern Avg	17.92		14.55		1.49		1.19	
Southern Avg	19.84		12.35		1.61		0.99	
Southwestern Avg	20.82		13.80		1.69		1.13	
Western Avg	12.92		16.05		0.84		1.04	
Texas Avg	24.58		15.78		2.01		1.30	
Total Avg	17.20		13.75		1.37		1.06	
Maximum Value	49.13		22.14		4.25		1.91	
Minimum Value	4.32		6.42		0.31		0.53	

Source: TTI Analysis and Local Transportation Agency References

Table D-2. Summary of Normalized Principal Arterial Street Travel and Mileage Statistics for 1994

Urban Area	Normalized by Population Density							
	VKT per Person	Rank	VKT per Sq Km	Rank	Lane-km per 1000 Persons	Rank	Lane-km per Sq Km	Rank
Northeastern Cities								
Baltimore, MD	6.70	38	7.60	34	1.15	38	1.30	33
Boston, MA	7.47	35	7.69	32	1.53	27	1.57	22
Hartford, CT	15.09	11	9.84	16	2.65	11	1.73	14
New York, NY	2.73	50	5.27	48	0.38	50	0.73	49
Philadelphia, PA	4.96	46	6.75	40	0.74	47	1.01	45
Pittsburgh, PA	12.37	19	9.91	15	1.97	21	1.58	21
Washington, DC	6.47	41	8.65	22	0.83	45	1.11	39
Midwestern Cities								
Chicago, IL	6.51	40	7.74	30	0.95	42	1.12	37
Cincinnati, OH	7.56	32	5.68	45	1.43	31	1.07	41
Cleveland, OH	5.91	44	5.58	46	1.10	40	1.04	43
Columbus, OH	6.67	39	5.83	44	1.20	37	1.05	42
Detroit, MI	9.13	27	10.86	8	1.50	29	1.78	13
Indianapolis, IN	10.94	20	8.71	21	2.08	20	1.66	18
Kansas City, MO	9.68	22	6.85	39	1.95	22	1.38	31
Louisville, KY	8.72	28	7.12	37	1.51	28	1.23	36
Milwaukee, WI	9.18	26	7.92	28	1.78	24	1.53	24
Minn-St. Paul, MN	7.55	33	5.29	47	1.31	35	0.92	47
Oklahoma City, OK	15.30	10	8.81	20	2.88	6	1.66	19
St. Louis, MO	10.61	21	10.24	14	1.67	25	1.61	20
Southern Cities								
Atlanta, GA	16.34	7	8.55	23	2.72	9	1.42	27
Charlotte, NC	14.58	12	9.81	17	2.66	10	1.79	12
Ft. Lauderdale, FL	6.95	37	7.87	29	1.36	33	1.54	23
Jacksonville, FL	24.60	2	13.43	5	5.07	2	2.77	1
Memphis, TN	13.07	17	10.26	13	2.42	17	1.90	10
Miami, FL	9.60	23	14.23	2	1.31	34	1.95	9
Nashville, TN	37.40	1	15.45	1	6.18	1	2.55	3
New Orleans, LA	6.21	42	7.29	36	0.91	43	1.07	40
Norfolk, VA	17.99	5	8.30	25	2.73	8	1.26	34
Orlando, FL	12.52	18	10.68	10	2.38	18	2.03	8
Tampa, FL	17.21	6	10.63	11	2.74	7	1.69	15
Southwestern Cities								
Albuquerque, NM	18.08	4	14.22	3	3.22	5	2.53	4
Austin, TX	13.29	16	7.97	27	2.34	19	1.41	28
Corpus Christi, TX	15.57	9	9.33	19	3.46	3	2.07	7
Dallas, TX	14.06	14	7.70	31	2.56	14	1.41	29
Denver, CO	15.63	8	10.81	9	2.63	12	1.82	11
El Paso, TX	9.48	24	9.44	18	2.44	16	2.43	6
Fort Worth, TX	14.10	13	7.30	35	2.60	13	1.34	32
Houston, TX	9.40	25	6.43	41	1.80	23	1.23	35
Phoenix, AZ	18.31	3	14.07	4	3.29	4	2.53	5
Salt Lake City, UT	7.52	34	5.21	49	1.31	36	0.91	48
San Antonio, TX	8.64	30	8.07	26	1.62	26	1.51	25
Western Cities								
Honolulu, HI	3.01	49	4.49	50	0.40	49	0.59	50
Los Angeles, CA	5.40	45	11.19	7	0.81	46	1.68	16
Portland, OR	7.21	36	6.88	38	1.07	41	1.02	44
Sacramento, CA	8.69	29	10.49	12	1.39	32	1.68	17
San Bernardino-Riv, CA	13.34	15	13.40	6	2.54	15	2.55	2
San Diego, CA	4.65	47	6.19	42	0.84	44	1.12	38
San Fran-Oak, CA	3.89	48	6.12	43	0.62	48	0.98	46
San Jose, CA	5.95	43	7.61	33	1.13	39	1.44	26
Seattle-Everett, WA	8.58	31	8.32	24	1.45	30	1.40	30
Northeastern Avg	7.97		7.96		1.32		1.29	
Midwestern Avg	8.98		7.55		1.61		1.34	
Southern Avg	16.04		10.59		2.77		1.82	
Southwestern Avg	13.10		9.14		2.48		1.74	
Western Avg	6.75		8.30		1.14		1.39	
Texas Avg	12.08		8.03		2.40		1.63	
Total Avg	10.90		8.76		1.93		1.53	
Maximum Value	37.40		15.45		6.18		2.77	
Minimum Value	2.73		4.49		0.38		0.59	

Source: TTI Analysis

Table D-3. Summary of 1982 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	16,490	1,590	5.0	10,400	0.84
Boston, MA	25,610	2,270	5.5	11,280	0.90
Hartford, CT	6,960	720	5.0	9,600	0.76
New York, NY	101,700	8,440	5.2	12,060	1.01
Philadelphia, PA	19,920	2,010	5.0	9,900	1.00
Pittsburgh, PA	8,890	1,250	4.1	7,120	0.78
Washington, DC	25,900	2,000	4.9	12,970	1.12
Midwestern Cities					
Chicago, IL	40,980	3,290	5.4	12,450	1.02
Cincinnati, OH	13,660	1,210	5.2	11,310	0.86
Cleveland, OH	16,100	1,550	4.6	10,420	0.80
Columbus, OH	9,710	1,140	5.6	8,550	0.68
Detroit, MI	32,520	2,380	5.7	13,650	1.06
Indianapolis, IN	8,470	1,080	5.1	7,850	0.67
Kansas City, MO	14,330	1,830	4.0	7,840	0.62
Louisville, KY	6,300	690	4.3	9,100	0.78
Milwaukee, WI	9,020	870	5.3	10,370	0.83
Minn-St. Paul, MN	18,030	1,900	4.4	9,490	0.76
Oklahoma City, OK	9,380	1,070	4.9	8,760	0.72
St. Louis, MO	19,380	1,950	5.3	9,950	0.83
Southern Cities					
Atlanta, GA	25,380	2,200	5.7	11,550	0.91
Charlotte, NC	2,840	400	4.0	7,060	0.71
Ft. Lauderdale, FL	8,600	840	5.2	10,270	0.87
Jacksonville, FL	6,200	550	4.0	11,320	0.91
Memphis, TN	4,750	480	5.1	9,830	0.83
Miami, FL	9,580	830	5.2	11,550	1.05
Nashville, TN	5,230	560	4.3	9,290	0.77
New Orleans, LA	6,280	520	5.6	12,000	0.98
Norfolk, VA	6,230	660	4.2	9,440	0.79
Orlando, FL	6,960	760	4.3	9,190	0.72
Tampa, FL	3,190	310	4.7	10,420	0.94
Southwestern Cities					
Albuquerque, NM	2,470	310	4.7	8,080	0.78
Austin, TX	4,560	430	5.2	10,680	0.84
Corpus Christi, TX	2,090	260	5.2	8,130	0.67
Dallas, TX	27,160	2,500	5.3	10,880	0.84
Denver, CO	13,360	1,280	5.1	10,440	0.88
El Paso, TX	4,120	520	4.9	7,880	0.63
Fort Worth, TX	13,890	1,460	5.0	9,530	0.76
Houston, TX	33,940	2,210	5.9	15,330	1.17
Phoenix, AZ	4,590	340	4.8	13,570	1.15
Salt Lake City, UT	4,620	640	5.5	7,180	0.63
San Antonio, TX	12,240	1,220	4.9	10,000	0.77
Western Cities					
Honolulu, HI	5,960	520	5.0	11,380	0.92
Los Angeles, CA	121,540	7,330	8.1	16,590	1.22
Portland, OR	7,630	710	4.9	10,770	0.87
Sacramento, CA	8,530	1,010	6.8	8,410	0.80
San Bernardino-Riv, CA	18,870	1,300	6.7	14,470	1.11
San Diego, CA	24,270	2,450	7.3	9,920	0.78
San Fran-Oak, CA	46,470	3,540	6.7	13,120	1.01
San Jose, CA	19,420	1,740	6.2	11,170	0.86
Seattle-Everett, WA	19,750	1,620	5.7	12,210	0.95
Northeastern Avg	29,350	2,610	5.0	10,480	0.92
Midwestern Avg	16,490	1,580	5.0	9,980	0.80
Southern Avg	7,750	740	4.8	10,180	0.86
Southwestern Avg	11,190	1,020	5.1	10,150	0.83
Western Avg	30,270	2,250	6.4	12,010	0.95
Texas Avg	14,000	1,230	5.2	10,350	0.81
Total Avg	17,680	1,530	5.2	10,490	0.86
Maximum Value	121,540	8,440	8.1	16,590	1.22
Minimum Value	2,090	260	4.0	7,060	0.62

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-4. Summary of 1982 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	12,040	2,420	3.8	4,990	0.84
Boston, MA	20,540	4,150	2.3	4,940	0.90
Hartford, CT	3,780	870	3.4	4,350	0.76
New York, NY	71,380	10,790	3.4	6,620	1.01
Philadelphia, PA	30,590	4,350	2.8	7,040	1.00
Pittsburgh, PA	14,260	2,460	2.9	5,810	0.78
Washington, DC	21,400	2,820	3.4	7,590	1.12
Midwestern Cities					
Chicago, IL	33,670	5,590	3.4	6,030	1.02
Cincinnati, OH	4,860	1,250	3.3	3,900	0.86
Cleveland, OH	7,240	1,770	2.9	4,090	0.80
Columbus, OH	3,680	900	3.2	4,080	0.68
Detroit, MI	31,120	5,720	4.3	5,450	1.06
Indianapolis, IN	6,070	1,330	3.6	4,570	0.67
Kansas City, MO	6,130	1,630	3.4	3,750	0.62
Louisville, KY	4,230	790	3.7	5,360	0.78
Milwaukee, WI	6,910	1,500	3.0	4,610	0.83
Minn-St. Paul, MN	6,920	1,470	3.2	4,730	0.76
Oklahoma City, OK	4,430	930	3.0	4,780	0.72
St. Louis, MO	14,420	2,700	3.0	5,330	0.83
Southern Cities					
Atlanta, GA	10,530	1,960	3.4	5,360	0.91
Charlotte, NC	3,780	720	3.0	5,210	0.71
Ft. Lauderdale, FL	8,790	1,640	4.2	5,350	0.87
Jacksonville, FL	8,240	1,650	3.5	5,000	0.91
Memphis, TN	5,310	1,080	4.1	4,930	0.83
Miami, FL	19,110	3,020	4.2	6,330	1.05
Nashville, TN	5,720	1,270	2.9	4,490	0.77
New Orleans, LA	5,310	910	4.0	5,840	0.98
Norfolk, VA	5,260	1,070	3.3	4,920	0.79
Orlando, FL	5,740	1,470	3.7	3,900	0.72
Tampa, FL	5,140	880	3.8	5,850	0.94
Southwestern Cities					
Albuquerque, NM	4,600	920	3.5	5,020	0.78
Austin, TX	2,570	550	4.0	4,690	0.84
Corpus Christi, TX	2,010	500	3.6	4,030	0.67
Dallas, TX	10,370	2,500	4.6	4,140	0.84
Denver, CO	14,750	2,810	3.6	5,250	0.88
El Paso, TX	4,190	1,220	3.9	3,420	0.63
Fort Worth, TX	5,890	1,260	3.9	4,660	0.76
Houston, TX	15,660	2,870	3.8	5,450	1.17
Phoenix, AZ	24,040	3,990	3.3	6,020	1.15
Salt Lake City, UT	2,340	450	3.1	5,200	0.63
San Antonio, TX	5,680	1,510	3.2	3,750	0.77
Western Cities					
Honolulu, HI	2,000	320	3.5	6,200	0.92
Los Angeles, CA	92,000	17,650	3.9	5,210	1.22
Portland, OR	4,470	830	3.1	5,390	0.87
Sacramento, CA	8,040	1,340	3.9	6,020	0.80
San Bernardino-Riv, CA	12,360	2,290	4.0	5,410	1.11
San Diego, CA	9,870	2,300	3.3	4,290	0.78
San Fran-Oak, CA	15,590	2,950	3.7	5,280	1.01
San Jose, CA	8,440	1,900	3.9	4,440	0.86
Seattle-Everett, WA	11,000	2,160	3.2	5,100	0.95
Northeastern Avg	24,850	3,980	3.1	5,910	0.92
Midwestern Avg	10,810	2,130	3.3	4,720	0.80
Southern Avg	7,540	1,430	3.6	5,200	0.86
Southwestern Avg	8,370	1,690	3.7	4,690	0.83
Western Avg	18,200	3,530	3.6	5,260	0.95
Texas Avg	6,620	1,490	3.9	4,310	0.81
Total Avg	12,850	2,390	3.5	5,080	0.86
Maximum Value	92,000	17,650	4.6	7,590	1.22
Minimum Value	2,000	320	2.3	3,420	0.62

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-5. Summary of 1983 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	16,990	1,650	5.2	10,290	0.84
Boston, MA	27,070	2,280	5.5	11,880	0.93
Hartford, CT	7,760	810	5.0	9,640	0.79
New York, NY	103,430	8,560	5.3	12,090	1.02
Philadelphia, PA	21,650	2,040	5.0	10,590	1.03
Pittsburgh, PA	9,850	1,370	4.2	7,200	0.76
Washington, DC	26,000	2,000	5.0	13,020	1.11
Midwestern Cities					
Chicago, IL	41,600	3,310	5.5	12,570	1.02
Cincinnati, OH	13,660	1,270	5.2	10,740	0.83
Cleveland, OH	16,450	1,550	4.6	10,650	0.82
Columbus, OH	10,400	1,160	5.6	8,970	0.71
Detroit, MI	31,640	2,380	5.7	13,280	1.03
Indianapolis, IN	9,230	1,090	5.1	8,490	0.70
Kansas City, MO	14,470	1,870	4.0	7,750	0.62
Louisville, KY	7,140	720	4.4	9,860	0.82
Milwaukee, WI	9,340	870	5.3	10,740	0.84
Minn-St. Paul, MN	19,590	1,900	4.5	10,310	0.81
Oklahoma City, OK	9,560	1,090	4.9	8,800	0.72
St. Louis, MO	20,990	2,000	5.3	10,510	0.87
Southern Cities					
Atlanta, GA	27,380	2,270	6.0	12,060	0.95
Charlotte, NC	3,060	410	4.0	7,450	0.76
Ft. Lauderdale, FL	8,630	850	5.2	10,210	0.86
Jacksonville, FL	6,490	580	4.0	11,190	0.92
Memphis, TN	4,830	520	5.1	9,230	0.80
Miami, FL	10,090	830	5.2	12,170	1.09
Nashville, TN	5,310	560	4.4	9,430	0.79
New Orleans, LA	6,440	530	5.6	12,120	1.00
Norfolk, VA	6,430	680	4.3	9,510	0.79
Orlando, FL	7,260	760	4.3	9,490	0.75
Tampa, FL	3,450	310	4.7	11,290	1.01
Southwestern Cities					
Albuquerque, NM	2,600	310	4.7	8,500	0.83
Austin, TX	5,100	450	5.4	11,320	0.88
Corpus Christi, TX	2,210	270	5.2	8,300	0.69
Dallas, TX	29,620	2,540	5.3	11,650	0.89
Denver, CO	13,590	1,280	5.1	10,620	0.89
El Paso, TX	4,330	540	4.9	8,030	0.64
Fort Worth, TX	14,860	1,510	5.2	9,870	0.79
Houston, TX	36,310	2,270	6.0	16,000	1.21
Phoenix, AZ	4,690	370	4.9	12,650	1.13
Salt Lake City, UT	4,790	680	5.5	7,080	0.63
San Antonio, TX	12,820	1,250	4.9	10,280	0.79
Western Cities					
Honolulu, HI	6,030	520	5.0	11,520	0.94
Los Angeles, CA	127,740	7,450	8.1	17,140	1.27
Portland, OR	8,650	770	4.9	11,200	0.90
Sacramento, CA	9,340	1,010	6.8	9,210	0.84
San Bernardino-Riv, CA	19,080	1,310	6.7	14,540	1.12
San Diego, CA	26,520	2,500	7.3	10,630	0.83
San Fran-Oak, CA	48,300	3,560	6.7	13,570	1.05
San Jose, CA	20,050	1,760	6.2	11,370	0.88
Seattle-Everett, WA	21,080	1,670	5.7	12,650	0.99
Northeastern Avg	30,390	2,670	5.0	10,670	0.93
Midwestern Avg	17,010	1,600	5.0	10,220	0.82
Southern Avg	8,120	750	4.8	10,380	0.88
Southwestern Avg	11,900	1,040	5.2	10,390	0.85
Western Avg	31,870	2,280	6.4	12,430	0.98
Texas Avg	15,040	1,260	5.3	10,780	0.84
Total Avg	18,480	1,560	5.3	10,750	0.88
Maximum Value	127,740	8,560	8.1	17,140	1.27
Minimum Value	2,210	270	4.0	7,080	0.62

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-6. Summary of 1983 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	12,530	2,440	3.8	5,140	0.84
Boston, MA	20,910	4,190	2.3	5,000	0.93
Hartford, CT	4,530	890	3.4	5,070	0.79
New York, NY	74,140	10,950	3.4	6,770	1.02
Philadelphia, PA	31,430	4,440	2.8	7,070	1.03
Pittsburgh, PA	14,390	2,550	3.0	5,640	0.76
Washington, DC	21,410	2,930	3.5	7,310	1.11
Midwestern Cities					
Chicago, IL	34,780	5,780	3.4	6,020	1.02
Cincinnati, OH	5,100	1,250	3.3	4,080	0.83
Cleveland, OH	7,290	1,770	2.9	4,110	0.82
Columbus, OH	3,980	920	3.2	4,330	0.71
Detroit, MI	30,450	5,750	4.3	5,300	1.03
Indianapolis, IN	5,990	1,340	3.6	4,480	0.70
Kansas City, MO	6,210	1,630	3.4	3,800	0.62
Louisville, KY	4,380	800	3.7	5,490	0.82
Milwaukee, WI	6,890	1,510	3.0	4,550	0.84
Minn-St. Paul, MN	7,160	1,480	3.2	4,840	0.81
Oklahoma City, OK	4,670	970	3.0	4,790	0.72
St. Louis, MO	14,950	2,700	3.0	5,530	0.87
Southern Cities					
Atlanta, GA	11,330	2,080	3.4	5,460	0.95
Charlotte, NC	4,120	740	3.0	5,570	0.76
Ft. Lauderdale, FL	8,690	1,670	4.2	5,190	0.86
Jacksonville, FL	8,890	1,740	3.5	5,110	0.92
Memphis, TN	5,470	1,090	4.1	5,000	0.80
Miami, FL	19,800	3,060	4.2	6,470	1.09
Nashville, TN	6,110	1,300	3.0	4,690	0.79
New Orleans, LA	5,510	910	4.0	6,060	1.00
Norfolk, VA	5,320	1,080	3.3	4,930	0.79
Orlando, FL	5,960	1,500	3.7	3,980	0.75
Tampa, FL	5,420	880	3.8	6,170	1.01
Southwestern Cities					
Albuquerque, NM	4,960	930	3.5	5,360	0.83
Austin, TX	2,750	580	4.0	4,750	0.88
Corpus Christi, TX	2,090	510	3.6	4,130	0.69
Dallas, TX	11,330	2,570	4.6	4,410	0.89
Denver, CO	15,130	2,870	3.6	5,270	0.89
El Paso, TX	4,360	1,260	3.9	3,470	0.64
Fort Worth, TX	6,190	1,290	3.9	4,810	0.79
Houston, TX	16,660	2,970	3.8	5,610	1.21
Phoenix, AZ	24,090	4,010	3.4	6,010	1.13
Salt Lake City, UT	2,460	470	3.2	5,260	0.63
San Antonio, TX	5,930	1,550	3.2	3,820	0.79
Western Cities					
Honolulu, HI	2,090	320	3.5	6,500	0.94
Los Angeles, CA	96,930	17,870	3.9	5,420	1.27
Portland, OR	4,480	830	3.1	5,410	0.90
Sacramento, CA	8,370	1,370	3.9	6,120	0.84
San Bernardino-Riv, CA	13,300	2,350	4.0	5,660	1.12
San Diego, CA	10,450	2,330	3.3	4,480	0.83
San Fran-Oak, CA	16,460	2,980	3.7	5,530	1.05
San Jose, CA	8,710	1,940	3.9	4,490	0.88
Seattle-Everett, WA	11,790	2,200	3.2	5,360	0.99
Northeastern Avg	25,620	4,060	3.2	6,000	0.93
Midwestern Avg	10,990	2,160	3.3	4,780	0.82
Southern Avg	7,880	1,460	3.7	5,330	0.88
Southwestern Avg	8,720	1,730	3.7	4,810	0.85
Western Avg	19,180	3,580	3.6	5,440	0.98
Texas Avg	7,040	1,530	3.9	4,430	0.84
Total Avg	13,330	2,430	3.5	5,200	0.88
Maximum Value	96,930	17,870	4.6	7,310	1.27
Minimum Value	2,090	320	2.3	3,470	0.62

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-7. Summary of 1984 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	17,520	1,710	5.4	10,220	0.85
Boston, MA	27,840	2,290	5.5	12,140	0.95
Hartford, CT	8,590	830	5.1	10,360	0.86
New York, NY	105,160	9,060	5.5	11,600	0.99
Philadelphia, PA	21,950	2,040	5.0	10,740	1.04
Pittsburgh, PA	10,400	1,390	4.2	7,470	0.76
Washington, DC	29,080	2,210	5.2	13,170	1.11
Midwestern Cities					
Chicago, IL	43,090	3,340	5.5	12,900	1.05
Cincinnati, OH	13,930	1,300	5.3	10,690	0.82
Cleveland, OH	16,760	1,550	4.6	10,840	0.83
Columbus, OH	10,550	1,180	5.6	8,970	0.71
Detroit, MI	33,420	2,400	5.7	13,930	1.07
Indianapolis, IN	9,800	1,090	5.1	8,960	0.75
Kansas City, MO	15,100	2,010	4.1	7,500	0.60
Louisville, KY	7,410	760	4.4	9,790	0.82
Milwaukee, WI	9,470	880	5.3	10,790	0.87
Minn-St. Paul, MN	20,930	1,980	4.5	10,570	0.84
Oklahoma City, OK	9,760	1,090	5.0	8,910	0.75
St. Louis, MO	23,200	2,210	5.4	10,520	0.88
Southern Cities					
Atlanta, GA	29,150	2,370	6.0	12,270	0.97
Charlotte, NC	3,220	430	4.0	7,550	0.76
Ft. Lauderdale, FL	8,760	850	5.3	10,260	0.86
Jacksonville, FL	7,170	590	4.0	12,210	0.96
Memphis, TN	4,850	550	5.1	8,870	0.79
Miami, FL	10,420	850	5.3	12,320	1.10
Nashville, TN	5,870	600	4.4	9,720	0.83
New Orleans, LA	6,680	530	5.6	12,580	1.05
Norfolk, VA	6,720	690	4.3	9,710	0.81
Orlando, FL	7,490	790	4.4	9,490	0.73
Tampa, FL	4,090	350	4.7	11,550	1.03
Southwestern Cities					
Albuquerque, NM	2,750	310	4.7	9,000	0.89
Austin, TX	5,800	530	5.4	10,910	0.86
Corpus Christi, TX	2,190	270	5.2	8,240	0.69
Dallas, TX	32,080	2,610	5.7	12,300	0.94
Denver, CO	14,070	1,290	5.1	10,930	0.93
El Paso, TX	4,510	560	5.0	8,120	0.65
Fort Worth, TX	15,590	1,550	5.2	10,040	0.80
Houston, TX	39,250	2,380	6.0	16,470	1.25
Phoenix, AZ	5,070	450	5.0	11,250	1.10
Salt Lake City, UT	4,860	680	5.5	7,190	0.65
San Antonio, TX	13,600	1,260	4.9	10,760	0.82
Western Cities					
Honolulu, HI	6,220	530	5.0	11,710	0.95
Los Angeles, CA	134,250	7,530	8.2	17,820	1.32
Portland, OR	8,970	820	4.9	10,920	0.88
Sacramento, CA	10,430	1,030	6.9	10,130	0.88
San Bernardino-Riv, CA	19,510	1,320	6.8	14,780	1.13
San Diego, CA	29,750	2,540	7.3	11,730	0.91
San Fran-Oak, CA	51,870	3,560	6.8	14,580	1.12
San Jose, CA	21,320	1,800	6.3	11,820	0.91
Seattle-Everett, WA	22,400	1,710	5.8	13,070	1.02
Northeastern Avg	31,510	2,790	5.1	10,810	0.94
Midwestern Avg	17,780	1,650	5.0	10,360	0.83
Southern Avg	8,580	780	4.8	10,590	0.90
Southwestern Avg	12,710	1,080	5.2	10,470	0.87
Western Avg	33,860	2,320	6.4	12,950	1.01
Texas Avg	16,150	1,310	5.3	10,980	0.86
Total Avg	19,460	1,610	5.3	10,970	0.90
Maximum Value	134,250	9,060	8.2	17,820	1.32
Minimum Value	2,190	270	4.0	7,190	0.60

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-8. Summary of 1984 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	13,330	2,480	3.8	5,380	0.85
Boston, MA	21,170	4,200	2.3	5,040	0.95
Hartford, CT	5,020	900	3.5	5,570	0.86
New York, NY	74,690	10,950	3.4	6,820	0.99
Philadelphia, PA	31,890	4,510	2.8	7,070	1.04
Pittsburgh, PA	14,620	2,670	3.0	5,470	0.76
Washington, DC	22,350	3,120	3.8	7,150	1.11
Midwestern Cities					
Chicago, IL	36,320	5,950	3.5	6,110	1.05
Cincinnati, OH	5,190	1,250	3.3	4,160	0.82
Cleveland, OH	7,320	1,770	2.9	4,130	0.83
Columbus, OH	4,030	940	3.2	4,280	0.71
Detroit, MI	30,790	5,800	4.3	5,310	1.07
Indianapolis, IN	6,540	1,340	3.7	4,860	0.75
Kansas City, MO	6,300	1,640	3.5	3,830	0.60
Louisville, KY	4,420	800	3.7	5,550	0.82
Milwaukee, WI	7,490	1,510	3.0	4,950	0.87
Minn-St. Paul, MN	7,490	1,500	3.2	5,000	0.84
Oklahoma City, OK	5,360	1,010	3.0	5,290	0.75
St. Louis, MO	15,690	2,750	3.1	5,700	0.88
Southern Cities					
Atlanta, GA	12,010	2,150	3.4	5,590	0.97
Charlotte, NC	4,200	760	3.0	5,550	0.76
Ft. Lauderdale, FL	8,710	1,690	4.3	5,150	0.86
Jacksonville, FL	8,920	1,770	3.5	5,040	0.96
Memphis, TN	5,660	1,110	4.1	5,090	0.79
Miami, FL	20,130	3,100	4.3	6,490	1.10
Nashville, TN	6,910	1,370	3.1	5,050	0.83
New Orleans, LA	5,810	910	4.1	6,390	1.05
Norfolk, VA	5,470	1,090	3.3	5,040	0.81
Orlando, FL	5,700	1,560	3.7	3,650	0.73
Tampa, FL	5,880	920	3.7	6,410	1.03
Southwestern Cities					
Albuquerque, NM	5,430	940	3.5	5,760	0.89
Austin, TX	2,940	610	4.0	4,800	0.86
Corpus Christi, TX	2,170	520	3.6	4,220	0.69
Dallas, TX	12,300	2,660	4.6	4,630	0.94
Denver, CO	16,270	2,870	3.7	5,660	0.93
El Paso, TX	4,540	1,290	3.9	3,530	0.65
Fort Worth, TX	6,460	1,330	3.9	4,870	0.80
Houston, TX	17,480	3,090	3.8	5,660	1.25
Phoenix, AZ	24,640	4,030	3.4	6,120	1.10
Salt Lake City, UT	2,700	480	3.3	5,580	0.65
San Antonio, TX	6,310	1,580	3.2	4,000	0.82
Western Cities					
Honolulu, HI	2,130	320	3.5	6,600	0.95
Los Angeles, CA	102,120	18,110	4.0	5,640	1.32
Portland, OR	4,500	830	3.2	5,430	0.88
Sacramento, CA	8,730	1,450	4.0	6,020	0.88
San Bernardino-Riv, CA	13,930	2,530	4.0	5,510	1.13
San Diego, CA	11,410	2,380	3.4	4,790	0.91
San Fran-Oak, CA	17,370	3,060	3.8	5,680	1.12
San Jose, CA	9,270	1,990	3.9	4,660	0.91
Seattle-Everett, WA	12,540	2,270	3.3	5,520	1.02
Northeastern Avg	26,150	4,120	3.2	6,070	0.94
Midwestern Avg	11,410	2,190	3.4	4,930	0.83
Southern Avg	8,130	1,490	3.7	5,410	0.90
Southwestern Avg	9,200	1,760	3.7	4,980	0.87
Western Avg	20,220	3,660	3.7	5,540	1.01
Texas Avg	7,460	1,580	3.9	4,530	0.86
Total Avg	13,850	2,480	3.6	5,320	0.90
Maximum Value	102,120	18,110	4.6	7,150	1.32
Minimum Value	2,130	320	2.3	3,530	0.60

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-9. Summary of 1985 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	19,590	1,930	5.4	10,140	0.84
Boston, MA	29,300	2,330	5.6	12,550	0.98
Hartford, CT	8,610	840	5.2	10,280	0.85
New York, NY	106,350	9,080	5.5	11,710	1.00
Philadelphia, PA	22,230	2,070	5.0	10,740	1.04
Pittsburgh, PA	10,710	1,420	4.2	7,560	0.78
Washington, DC	32,010	2,240	5.2	14,310	1.19
Midwestern Cities					
Chicago, IL	46,160	3,430	5.5	13,460	1.08
Cincinnati, OH	14,240	1,320	5.3	10,790	0.83
Cleveland, OH	16,190	1,550	4.6	10,470	0.81
Columbus, OH	10,730	1,210	5.7	8,890	0.71
Detroit, MI	34,540	2,500	5.7	13,840	1.06
Indianapolis, IN	10,110	1,110	5.1	9,100	0.76
Kansas City, MO	16,410	2,030	4.1	8,090	0.65
Louisville, KY	7,570	770	4.4	9,790	0.82
Milwaukee, WI	9,760	890	5.3	11,030	0.88
Minn-St. Paul, MN	22,030	2,040	4.6	10,780	0.85
Oklahoma City, OK	9,940	1,100	5.0	9,010	0.75
St. Louis, MO	23,850	2,280	5.4	10,470	0.89
Southern Cities					
Atlanta, GA	31,280	2,440	6.0	12,830	1.02
Charlotte, NC	3,440	430	4.1	7,910	0.77
Ft. Lauderdale, FL	8,970	870	5.3	10,310	0.85
Jacksonville, FL	7,330	600	4.0	12,300	0.96
Memphis, TN	4,910	590	5.2	8,360	0.75
Miami, FL	11,450	870	5.3	13,170	1.13
Nashville, TN	6,300	680	4.5	9,210	0.81
New Orleans, LA	6,890	530	5.6	12,970	1.07
Norfolk, VA	7,200	710	4.3	10,160	0.84
Orlando, FL	8,420	850	4.4	9,960	0.76
Tampa, FL	4,580	420	4.9	10,940	1.00
Southwestern Cities					
Albuquerque, NM	2,930	310	4.7	9,330	0.93
Austin, TX	6,760	580	5.3	11,670	0.91
Corpus Christi, TX	2,250	270	5.2	8,480	0.71
Dallas, TX	33,970	2,640	5.7	12,870	0.98
Denver, CO	14,570	1,290	5.1	11,310	0.96
El Paso, TX	5,020	560	5.0	9,040	0.70
Fort Worth, TX	16,210	1,570	5.6	10,330	0.82
Houston, TX	38,830	2,380	6.0	16,290	1.23
Phoenix, AZ	5,680	470	5.1	12,170	1.13
Salt Lake City, UT	5,180	680	5.6	7,670	0.68
San Antonio, TX	14,620	1,290	5.0	11,350	0.87
Western Cities					
Honolulu, HI	6,420	530	5.0	12,090	0.96
Los Angeles, CA	141,100	7,650	8.2	18,450	1.36
Portland, OR	9,540	830	4.9	11,500	0.93
Sacramento, CA	11,110	1,030	6.9	10,780	0.92
San Bernardino-Riv, CA	19,720	1,340	6.8	14,670	1.12
San Diego, CA	31,640	2,570	7.4	12,320	0.95
San Fran-Oak, CA	55,810	3,650	6.8	15,270	1.17
San Jose, CA	22,430	1,820	6.4	12,330	0.95
Seattle-Everett, WA	23,910	1,770	5.8	13,500	1.05
Northeastern Avg	32,690	2,840	5.2	11,040	0.95
Midwestern Avg	18,460	1,690	5.1	10,480	0.84
Southern Avg	9,160	820	4.9	10,740	0.91
Southwestern Avg	13,280	1,090	5.3	10,960	0.90
Western Avg	35,740	2,360	6.5	13,440	1.05
Texas Avg	16,810	1,330	5.4	11,430	0.89
Total Avg	20,380	1,650	5.3	11,250	0.92
Maximum Value	141,100	9,080	8.2	18,450	1.36
Minimum Value	2,250	270	4.0	7,560	0.65

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-10. Summary of 1985 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	13,880	2,600	3.8	5,340	0.84
Boston, MA	21,710	4,220	2.3	5,150	0.98
Hartford, CT	5,100	920	3.5	5,560	0.85
New York, NY	75,190	10,950	3.4	6,870	1.00
Philadelphia, PA	32,850	4,670	2.8	7,040	1.04
Pittsburgh, PA	15,210	2,660	3.0	5,720	0.78
Washington, DC	23,880	3,200	3.9	7,450	1.19
Midwestern Cities					
Chicago, IL	36,820	5,990	3.6	6,150	1.08
Cincinnati, OH	5,300	1,260	3.3	4,220	0.83
Cleveland, OH	7,460	1,770	2.9	4,210	0.81
Columbus, OH	4,070	950	3.2	4,290	0.71
Detroit, MI	30,970	5,860	4.4	5,280	1.06
Indianapolis, IN	6,600	1,340	3.7	4,910	0.76
Kansas City, MO	6,840	1,660	3.5	4,130	0.65
Louisville, KY	4,440	810	3.7	5,510	0.82
Milwaukee, WI	7,760	1,550	3.1	5,020	0.88
Minn-St. Paul, MN	7,870	1,510	3.4	5,200	0.85
Oklahoma City, OK	5,390	1,040	3.0	5,190	0.75
St. Louis, MO	16,520	2,790	3.1	5,930	0.89
Southern Cities					
Atlanta, GA	13,470	2,170	3.4	6,200	1.02
Charlotte, NC	4,340	790	3.0	5,500	0.77
Ft. Lauderdale, FL	8,690	1,710	4.3	5,090	0.85
Jacksonville, FL	8,960	1,800	3.6	4,990	0.96
Memphis, TN	5,670	1,160	4.2	4,890	0.75
Miami, FL	20,450	3,160	4.3	6,480	1.13
Nashville, TN	7,380	1,420	3.1	5,210	0.81
New Orleans, LA	5,970	920	4.1	6,510	1.07
Norfolk, VA	5,650	1,090	3.4	5,200	0.84
Orlando, FL	5,850	1,610	3.7	3,640	0.76
Tampa, FL	6,180	960	3.8	6,450	1.00
Southwestern Cities					
Albuquerque, NM	5,800	970	3.5	6,000	0.93
Austin, TX	3,220	640	4.0	5,000	0.91
Corpus Christi, TX	2,210	520	3.8	4,280	0.71
Dallas, TX	12,800	2,700	4.6	4,750	0.98
Denver, CO	16,860	2,870	3.7	5,870	0.96
El Paso, TX	4,640	1,290	4.0	3,600	0.70
Fort Worth, TX	6,670	1,350	3.9	4,930	0.82
Houston, TX	17,470	3,110	3.9	5,620	1.23
Phoenix, AZ	25,290	4,060	3.4	6,230	1.13
Salt Lake City, UT	2,890	530	3.4	5,440	0.68
San Antonio, TX	6,900	1,640	3.3	4,200	0.87
Western Cities					
Honolulu, HI	2,000	330	3.6	6,070	0.96
Los Angeles, CA	107,600	18,350	4.0	5,860	1.36
Portland, OR	4,770	840	3.3	5,700	0.93
Sacramento, CA	9,100	1,510	4.0	6,010	0.92
San Bernardino-Riv, CA	14,100	2,540	4.0	5,540	1.12
San Diego, CA	12,080	2,420	3.4	5,000	0.95
San Fran-Oak, CA	18,320	3,120	3.8	5,870	1.17
San Jose, CA	9,750	2,000	4.0	4,860	0.95
Seattle-Everett, WA	12,980	2,320	3.3	5,600	1.05
Northeastern Avg	26,830	4,170	3.2	6,160	0.95
Midwestern Avg	11,670	2,210	3.4	5,000	0.84
Southern Avg	8,420	1,520	3.7	5,470	0.91
Southwestern Avg	9,520	1,790	3.8	5,080	0.90
Western Avg	21,190	3,720	3.7	5,610	1.05
Texas Avg	7,700	1,610	3.9	4,630	0.89
Total Avg	14,320	2,510	3.6	5,400	0.92
Maximum Value	107,600	18,350	4.6	7,450	1.36
Minimum Value	2,000	330	2.3	3,600	0.65

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-11. Summary of 1986 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	20,950	1,960	5.4	10,710	0.88
Boston, MA	32,300	2,370	5.7	13,650	1.04
Hartford, CT	8,920	860	5.3	10,360	0.85
New York, NY	115,270	9,100	5.5	12,670	1.06
Philadelphia, PA	22,740	2,090	5.0	10,870	1.06
Pittsburgh, PA	11,110	1,470	4.2	7,580	0.79
Washington, DC	36,070	2,320	5.2	15,520	1.27
Midwestern Cities					
Chicago, IL	49,820	3,510	5.6	14,190	1.15
Cincinnati, OH	14,350	1,320	5.3	10,870	0.84
Cleveland, OH	17,240	1,550	4.6	11,150	0.86
Columbus, OH	11,770	1,230	5.7	9,560	0.75
Detroit, MI	34,890	2,540	5.8	13,720	1.05
Indianapolis, IN	11,130	1,110	5.1	10,010	0.81
Kansas City, MO	17,560	2,040	4.2	8,620	0.68
Louisville, KY	7,700	810	4.4	9,570	0.80
Milwaukee, WI	10,170	890	5.3	11,480	0.90
Minn-St. Paul, MN	23,440	2,080	4.7	11,290	0.89
Oklahoma City, OK	10,110	1,110	5.0	9,100	0.76
St. Louis, MO	25,150	2,290	5.5	11,000	0.93
Southern Cities					
Atlanta, GA	34,660	2,540	6.0	13,630	1.09
Charlotte, NC	3,590	440	4.1	8,110	0.78
Ft. Lauderdale, FL	9,180	890	5.3	10,270	0.85
Jacksonville, FL	7,520	630	4.1	11,970	0.95
Memphis, TN	5,330	590	5.2	9,070	0.80
Miami, FL	11,710	870	5.3	13,470	1.14
Nashville, TN	6,840	680	4.6	10,000	0.86
New Orleans, LA	6,960	530	5.7	13,110	1.09
Norfolk, VA	7,810	710	4.5	11,020	0.89
Orlando, FL	8,560	850	4.6	10,030	0.76
Tampa, FL	4,730	430	4.9	10,890	0.96
Southwestern Cities					
Albuquerque, NM	3,110	310	4.7	9,900	0.96
Austin, TX	7,250	610	5.5	11,840	0.94
Corpus Christi, TX	2,290	270	5.2	8,350	0.71
Dallas, TX	36,350	2,660	5.8	13,680	1.04
Denver, CO	14,960	1,310	5.2	11,400	0.97
El Paso, TX	5,510	560	5.1	9,910	0.75
Fort Worth, TX	17,310	1,570	5.6	11,030	0.87
Houston, TX	38,830	2,430	6.1	15,970	1.21
Phoenix, AZ	7,440	500	5.2	14,900	1.20
Salt Lake City, UT	5,550	720	5.6	7,750	0.68
San Antonio, TX	14,890	1,300	5.1	11,420	0.88
Western Cities					
Honolulu, HI	6,770	530	5.2	12,740	1.03
Los Angeles, CA	148,300	7,730	8.2	19,190	1.42
Portland, OR	10,180	850	5.0	12,050	0.97
Sacramento, CA	11,910	1,050	6.9	11,380	0.95
San Bernardino-Riv, CA	20,400	1,350	6.9	15,080	1.15
San Diego, CA	33,840	2,620	7.4	12,940	1.00
San Fran-Oak, CA	59,450	3,680	6.8	16,160	1.24
San Jose, CA	22,960	1,830	6.5	12,560	0.97
Seattle-Everett, WA	24,960	1,790	5.8	13,960	1.09
Northeastern Avg	35,340	2,880	5.2	11,620	0.99
Midwestern Avg	19,440	1,710	5.1	10,880	0.87
Southern Avg	9,720	830	4.9	11,050	0.92
Southwestern Avg	13,950	1,110	5.4	11,470	0.93
Western Avg	37,640	2,380	6.5	14,010	1.09
Texas Avg	17,490	1,340	5.5	11,740	0.91
Total Avg	21,600	1,670	5.4	11,710	0.95
Maximum Value	148,300	9,100	8.2	19,190	1.42
Minimum Value	2,290	270	4.1	7,580	0.68

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-12. Summary of 1986 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	14,380	2,640	3.8	5,450	0.88
Boston, MA	21,590	4,240	2.3	5,090	1.04
Hartford, CT	5,180	940	3.5	5,500	0.85
New York, NY	76,400	10,980	3.4	6,960	1.06
Philadelphia, PA	34,490	4,750	2.8	7,260	1.06
Pittsburgh, PA	15,790	2,700	3.0	5,840	0.79
Washington, DC	25,600	3,300	4.1	7,760	1.27
Midwestern Cities					
Chicago, IL	40,220	6,010	3.6	6,700	1.15
Cincinnati, OH	5,220	1,260	3.3	4,150	0.84
Cleveland, OH	7,620	1,770	2.9	4,300	0.86
Columbus, OH	4,190	950	3.2	4,410	0.75
Detroit, MI	31,310	5,960	4.4	5,260	1.05
Indianapolis, IN	6,600	1,350	3.7	4,880	0.81
Kansas City, MO	6,900	1,670	3.5	4,140	0.68
Louisville, KY	4,400	810	3.7	5,470	0.80
Milwaukee, WI	7,570	1,560	3.3	4,850	0.90
Minn-St. Paul, MN	8,210	1,530	3.4	5,370	0.89
Oklahoma City, OK	5,440	1,040	3.1	5,240	0.76
St. Louis, MO	17,330	2,790	3.2	6,220	0.93
Southern Cities					
Atlanta, GA	14,580	2,200	3.4	6,630	1.09
Charlotte, NC	4,440	810	3.0	5,520	0.78
Ft. Lauderdale, FL	8,660	1,710	4.3	5,050	0.85
Jacksonville, FL	9,050	1,810	3.6	5,000	0.95
Memphis, TN	6,050	1,180	4.2	5,120	0.80
Miami, FL	20,610	3,180	4.3	6,480	1.14
Nashville, TN	7,740	1,450	3.1	5,340	0.86
New Orleans, LA	6,180	930	4.1	6,620	1.09
Norfolk, VA	5,840	1,120	3.5	5,220	0.89
Orlando, FL	5,920	1,650	3.7	3,590	0.76
Tampa, FL	5,880	970	3.8	6,080	0.96
Southwestern Cities					
Albuquerque, NM	6,040	990	3.5	6,100	0.96
Austin, TX	3,530	660	4.2	5,340	0.94
Corpus Christi, TX	2,250	520	3.8	4,380	0.71
Dallas, TX	13,250	2,700	4.7	4,900	1.04
Denver, CO	17,190	2,890	3.7	5,950	0.97
El Paso, TX	4,690	1,300	4.1	3,620	0.75
Fort Worth, TX	6,840	1,370	3.9	5,000	0.87
Houston, TX	17,400	3,150	4.1	5,530	1.21
Phoenix, AZ	25,500	4,090	3.5	6,240	1.20
Salt Lake City, UT	2,940	540	3.4	5,450	0.68
San Antonio, TX	7,380	1,660	3.4	4,450	0.88
Western Cities					
Honolulu, HI	2,320	340	3.6	6,860	1.03
Los Angeles, CA	113,360	18,690	4.0	6,060	1.42
Portland, OR	5,060	850	3.3	5,980	0.97
Sacramento, CA	9,470	1,560	4.0	6,070	0.95
San Bernardino-Riv, CA	14,280	2,540	4.0	5,610	1.15
San Diego, CA	12,640	2,460	3.4	5,130	1.00
San Fran-Oak, CA	19,320	3,180	3.8	6,080	1.24
San Jose, CA	9,970	2,010	4.1	4,950	0.97
Seattle-Everett, WA	13,400	2,330	3.3	5,740	1.09
Northeastern Avg	27,630	4,220	3.3	6,260	0.99
Midwestern Avg	12,080	2,220	3.4	5,080	0.87
Southern Avg	8,630	1,550	3.7	5,510	0.92
Southwestern Avg	9,730	1,810	3.8	5,180	0.93
Western Avg	22,200	3,770	3.7	5,830	1.09
Texas Avg	7,910	1,620	4.0	4,750	0.91
Total Avg	14,800	2,540	3.6	5,500	0.95
Maximum Value	113,360	18,690	4.7	7,760	1.42
Minimum Value	2,250	340	2.3	3,590	0.68

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-13. Summary of 1987 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	22,110	1,960	5.4	11,300	0.91
Boston, MA	32,530	2,400	5.8	13,560	1.04
Hartford, CT	9,440	890	5.4	10,660	0.87
New York, NY	118,520	9,320	5.5	12,710	1.06
Philadelphia, PA	24,350	2,150	5.1	11,330	1.06
Pittsburgh, PA	11,580	1,510	4.2	7,690	0.79
Washington, DC	36,890	2,370	5.2	15,590	1.29
Midwestern Cities					
Chicago, IL	49,820	3,520	5.6	14,160	1.15
Cincinnati, OH	15,390	1,360	5.3	11,310	0.87
Cleveland, OH	18,010	1,550	4.6	11,650	0.89
Columbus, OH	12,380	1,250	5.7	9,920	0.78
Detroit, MI	35,100	2,590	5.8	13,540	1.04
Indianapolis, IN	12,300	1,140	5.1	10,760	0.85
Kansas City, MO	19,190	2,140	4.3	8,960	0.71
Louisville, KY	8,660	840	4.4	10,350	0.86
Milwaukee, WI	10,980	890	5.3	12,400	0.95
Minn-St. Paul, MN	25,150	2,240	4.8	11,240	0.89
Oklahoma City, OK	10,190	1,130	5.0	9,040	0.76
St. Louis, MO	26,230	2,300	5.5	11,390	0.96
Southern Cities					
Atlanta, GA	36,970	2,640	6.1	14,000	1.11
Charlotte, NC	3,710	450	4.1	8,230	0.79
Ft. Lauderdale, FL	9,980	900	5.4	11,070	0.90
Jacksonville, FL	7,680	640	4.5	11,930	0.94
Memphis, TN	6,010	610	5.3	9,820	0.84
Miami, FL	11,950	890	5.4	13,370	1.14
Nashville, TN	7,250	690	4.6	10,470	0.89
New Orleans, LA	7,490	530	5.7	14,090	1.14
Norfolk, VA	8,320	720	4.5	11,480	0.93
Orlando, FL	8,920	880	4.7	10,170	0.77
Tampa, FL	5,310	450	4.9	11,790	1.02
Southwestern Cities					
Albuquerque, NM	3,260	320	5.0	10,130	0.96
Austin, TX	8,290	640	5.5	12,880	1.00
Corpus Christi, TX	2,420	290	5.3	8,330	0.72
Dallas, TX	35,580	2,670	5.8	13,310	1.02
Denver, CO	15,380	1,380	5.2	11,170	0.95
El Paso, TX	5,150	560	5.2	9,140	0.71
Fort Worth, TX	17,710	1,590	5.7	11,110	0.87
Houston, TX	41,540	2,640	6.2	15,730	1.19
Phoenix, AZ	7,370	550	5.3	13,470	1.18
Salt Lake City, UT	6,130	760	5.6	8,110	0.70
San Antonio, TX	14,490	1,310	5.1	11,040	0.86
Western Cities					
Honolulu, HI	6,980	530	5.2	13,140	1.05
Los Angeles, CA	155,990	7,860	8.2	19,850	1.47
Portland, OR	10,790	870	5.0	12,410	0.99
Sacramento, CA	12,970	1,060	6.9	12,200	1.00
San Bernardino-Riv, CA	20,690	1,380	6.9	15,030	1.14
San Diego, CA	37,280	2,640	7.4	14,120	1.08
San Fran-Oak, CA	63,720	3,710	6.8	17,170	1.31
San Jose, CA	23,490	1,840	6.5	12,800	0.99
Seattle-Everett, WA	26,730	1,840	5.8	14,560	1.14
Northeastern Avg	36,490	2,940	5.2	11,840	1.00
Midwestern Avg	20,280	1,740	5.1	11,230	0.89
Southern Avg	10,330	860	5.0	11,490	0.95
Southwestern Avg	14,300	1,160	5.4	11,310	0.92
Western Avg	39,850	2,410	6.5	14,590	1.13
Texas Avg	17,880	1,390	5.5	11,650	0.91
Total Avg	22,570	1,710	5.4	11,990	0.97
Maximum Value	155,990	9,320	8.2	19,850	1.47
Minimum Value	2,420	290	4.1	7,690	0.70

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-14. Summary of 1987 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	14,520	2,700	3.9	5,370	0.91
Boston, MA	22,060	4,310	2.3	5,110	1.04
Hartford, CT	5,160	940	3.5	5,480	0.87
New York, NY	78,070	11,110	3.4	7,030	1.06
Philadelphia, PA	36,310	5,180	2.9	7,000	1.06
Pittsburgh, PA	15,950	2,740	3.1	5,830	0.79
Washington, DC	27,430	3,380	4.1	8,110	1.29
Midwestern Cities					
Chicago, IL	40,190	6,020	3.6	6,680	1.15
Cincinnati, OH	5,340	1,270	3.3	4,200	0.87
Cleveland, OH	7,790	1,770	2.9	4,400	0.89
Columbus, OH	4,290	960	3.2	4,480	0.78
Detroit, MI	31,470	6,040	4.4	5,210	1.04
Indianapolis, IN	6,600	1,360	3.7	4,850	0.85
Kansas City, MO	7,000	1,670	3.5	4,180	0.71
Louisville, KY	4,790	810	3.7	5,890	0.86
Milwaukee, WI	7,470	1,580	3.3	4,730	0.95
Minn-St. Paul, MN	8,370	1,550	3.4	5,420	0.89
Oklahoma City, OK	5,580	1,050	3.1	5,290	0.76
St. Louis, MO	18,060	2,810	3.2	6,430	0.96
Southern Cities					
Atlanta, GA	15,050	2,250	3.4	6,700	1.11
Charlotte, NC	4,570	820	3.0	5,570	0.79
Ft. Lauderdale, FL	8,860	1,720	4.3	5,140	0.90
Jacksonville, FL	9,060	1,840	3.6	4,940	0.94
Memphis, TN	6,330	1,220	4.3	5,210	0.84
Miami, FL	20,930	3,220	4.3	6,500	1.14
Nashville, TN	7,910	1,460	3.1	5,430	0.89
New Orleans, LA	6,530	1,000	4.2	6,540	1.14
Norfolk, VA	6,210	1,130	3.5	5,510	0.93
Orlando, FL	5,950	1,660	3.7	3,590	0.77
Tampa, FL	6,250	980	3.8	6,360	1.02
Southwestern Cities					
Albuquerque, NM	6,280	1,050	3.5	6,000	0.96
Austin, TX	3,460	670	4.2	5,180	1.00
Corpus Christi, TX	2,400	520	3.8	4,660	0.72
Dallas, TX	13,200	2,720	4.7	4,850	1.02
Denver, CO	17,070	2,950	3.8	5,790	0.95
El Paso, TX	4,830	1,300	4.2	3,730	0.71
Fort Worth, TX	6,840	1,380	3.9	4,940	0.87
Houston, TX	16,910	3,170	4.2	5,330	1.19
Phoenix, AZ	26,520	4,130	3.6	6,420	1.18
Salt Lake City, UT	3,000	560	3.5	5,410	0.70
San Antonio, TX	7,730	1,690	3.4	4,570	0.86
Western Cities					
Honolulu, HI	2,340	350	3.7	6,770	1.05
Los Angeles, CA	118,830	18,970	4.0	6,270	1.47
Portland, OR	5,150	850	3.3	6,040	0.99
Sacramento, CA	9,880	1,610	4.0	6,140	1.00
San Bernardino-Riv, CA	14,330	2,610	4.0	5,490	1.14
San Diego, CA	13,170	2,510	3.4	5,240	1.08
San Fran-Oak, CA	20,400	3,230	3.9	6,320	1.31
San Jose, CA	10,210	2,030	4.1	5,030	0.99
Seattle-Everett, WA	14,410	2,370	3.3	6,070	1.14
Northeastern Avg	28,500	4,340	3.3	6,280	1.00
Midwestern Avg	12,250	2,240	3.4	5,150	0.89
Southern Avg	8,880	1,570	3.7	5,590	0.95
Southwestern Avg	9,840	1,830	3.9	5,170	0.92
Western Avg	23,190	3,840	3.7	5,930	1.13
Texas Avg	7,910	1,640	4.1	4,750	0.91
Total Avg	15,220	2,580	3.6	5,550	0.97
Maximum Value	118,830	18,970	4.7	8,110	1.47
Minimum Value	2,340	350	2.3	3,590	0.70

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-15. Summary of 1988 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	22,410	1,960	5.4	11,410	0.92
Boston, MA	36,570	2,430	5.9	15,040	1.12
Hartford, CT	9,760	890	5.5	11,020	0.90
New York, NY	125,590	9,350	5.5	13,430	1.10
Philadelphia, PA	26,850	2,250	5.2	11,910	1.07
Pittsburgh, PA	11,880	1,530	4.3	7,770	0.81
Washington, DC	38,000	2,400	5.2	15,850	1.30
Midwestern Cities					
Chicago, IL	51,460	3,550	5.6	14,500	1.18
Cincinnati, OH	15,700	1,360	5.3	11,540	0.88
Cleveland, OH	20,400	1,590	4.6	12,800	0.97
Columbus, OH	12,630	1,260	5.7	9,990	0.79
Detroit, MI	37,060	2,640	5.8	14,040	1.07
Indianapolis, IN	12,470	1,160	5.3	10,760	0.85
Kansas City, MO	19,670	2,170	4.4	9,090	0.72
Louisville, KY	9,720	910	4.4	10,690	0.87
Milwaukee, WI	11,490	940	5.6	12,200	0.94
Minn-St. Paul, MN	26,440	2,310	4.9	11,440	0.90
Oklahoma City, OK	10,660	1,140	5.0	9,390	0.78
St. Louis, MO	27,990	2,390	5.5	11,710	0.98
Southern Cities					
Atlanta, GA	38,540	2,660	6.1	14,510	1.14
Charlotte, NC	3,890	450	4.1	8,630	0.80
Ft. Lauderdale, FL	10,380	930	5.4	11,120	0.90
Jacksonville, FL	8,290	680	4.5	12,260	0.95
Memphis, TN	6,360	610	5.4	10,390	0.86
Miami, FL	12,690	930	5.4	13,710	1.18
Nashville, TN	7,710	710	4.6	10,890	0.94
New Orleans, LA	7,660	550	4.6	14,000	1.13
Norfolk, VA	8,420	730	4.6	11,490	0.94
Orlando, FL	9,310	890	4.6	10,420	0.78
Tampa, FL	5,540	470	4.6	11,860	1.03
Southwestern Cities					
Albuquerque, NM	3,580	330	4.6	10,850	0.96
Austin, TX	8,400	680	4.6	12,430	0.96
Corpus Christi, TX	2,430	300	4.6	8,160	0.70
Dallas, TX	36,030	2,700	4.6	13,360	1.02
Denver, CO	16,890	1,380	4.6	12,200	0.99
El Paso, TX	5,350	560	4.6	9,490	0.74
Fort Worth, TX	17,950	1,610	4.6	11,150	0.87
Houston, TX	43,630	2,880	4.6	15,140	1.15
Phoenix, AZ	9,420	840	4.6	11,250	1.04
Salt Lake City, UT	6,560	770	4.6	8,490	0.72
San Antonio, TX	14,570	1,320	4.6	11,040	0.86
Western Cities					
Honolulu, HI	7,100	530	4.6	13,360	1.07
Los Angeles, CA	164,450	7,990	4.6	20,590	1.52
Portland, OR	11,430	870	4.6	13,150	1.04
Sacramento, CA	13,560	1,090	4.6	12,470	1.03
San Bernardino-Riv, CA	21,820	1,400	4.6	15,570	1.18
San Diego, CA	40,310	2,730	4.6	14,770	1.13
San Fran-Oak, CA	64,990	3,740	4.6	17,360	1.33
San Jose, CA	24,080	1,850	4.6	13,000	1.00
Seattle-Everett, WA	27,680	1,840	4.6	15,080	1.17
Northeastern Avg	38,720	2,970	4.6	12,350	1.03
Midwestern Avg	21,310	1,790	4.6	11,510	0.91
Southern Avg	10,800	870	4.6	11,750	0.97
Southwestern Avg	14,980	1,220	4.6	11,230	0.91
Western Avg	41,710	2,450	4.6	15,040	1.16
Texas Avg	18,340	1,440	4.6	11,540	0.90
Total Avg	23,720	1,740	4.6	12,260	0.99
Maximum Value	164,450	9,350	4.6	20,590	1.52
Minimum Value	2,430	300	4.6	7,770	0.70

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-16. Summary of 1988 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	14,750	2,740	4.0	5,390	0.92
Boston, MA	20,700	4,330	2.3	4,780	1.12
Hartford, CT	5,510	940	3.5	5,850	0.90
New York, NY	80,030	11,450	3.4	6,990	1.10
Philadelphia, PA	35,610	5,200	3.0	6,850	1.07
Pittsburgh, PA	17,110	2,840	3.1	6,020	0.81
Washington, DC	27,660	3,460	4.1	7,990	1.30
Midwestern Cities					
Chicago, IL	41,960	6,050	3.6	6,940	1.18
Cincinnati, OH	5,530	1,280	3.3	4,320	0.88
Cleveland, OH	8,070	1,790	2.9	4,510	0.97
Columbus, OH	4,450	970	3.2	4,610	0.79
Detroit, MI	31,670	6,150	4.4	5,150	1.07
Indianapolis, IN	6,620	1,370	3.7	4,840	0.85
Kansas City, MO	7,070	1,680	3.5	4,200	0.72
Louisville, KY	4,600	820	3.7	5,610	0.87
Milwaukee, WI	7,610	1,590	3.4	4,770	0.94
Minn-St. Paul, MN	8,530	1,560	3.4	5,460	0.90
Oklahoma City, OK	5,550	1,050	3.1	5,260	0.78
St. Louis, MO	18,470	2,810	3.2	6,570	0.98
Southern Cities					
Atlanta, GA	15,750	2,400	3.5	6,570	1.14
Charlotte, NC	4,580	840	3.0	5,470	0.80
Ft. Lauderdale, FL	8,920	1,750	4.3	5,080	0.90
Jacksonville, FL	9,120	1,870	3.7	4,880	0.95
Memphis, TN	6,520	1,300	4.3	5,030	0.86
Miami, FL	22,120	3,250	4.3	6,800	1.18
Nashville, TN	8,670	1,470	3.2	5,890	0.94
New Orleans, LA	6,540	1,000	4.2	6,550	1.13
Norfolk, VA	6,380	1,140	3.5	5,580	0.94
Orlando, FL	5,960	1,690	3.7	3,520	0.78
Tampa, FL	6,540	1,010	3.8	6,500	1.03
Southwestern Cities					
Albuquerque, NM	6,440	1,130	3.5	5,710	0.96
Austin, TX	3,320	680	4.2	4,920	0.96
Corpus Christi, TX	2,320	520	3.8	4,430	0.70
Dallas, TX	13,120	2,730	4.8	4,810	1.02
Denver, CO	16,820	2,950	3.8	5,690	0.99
El Paso, TX	5,010	1,300	4.2	3,860	0.74
Fort Worth, TX	6,760	1,390	4.0	4,860	0.87
Houston, TX	16,410	3,190	4.2	5,150	1.15
Phoenix, AZ	26,850	4,480	4.0	6,000	1.04
Salt Lake City, UT	3,080	560	3.5	5,460	0.72
San Antonio, TX	8,030	1,720	3.5	4,660	0.86
Western Cities					
Honolulu, HI	2,460	350	3.7	7,090	1.07
Los Angeles, CA	125,970	19,320	4.0	6,520	1.52
Portland, OR	5,280	870	3.3	6,070	1.04
Sacramento, CA	10,710	1,690	4.0	6,340	1.03
San Bernardino-Riv, CA	14,730	2,700	4.0	5,450	1.18
San Diego, CA	14,240	2,610	3.4	5,460	1.13
San Fran-Oak, CA	21,800	3,320	3.9	6,560	1.33
San Jose, CA	10,470	2,040	4.1	5,120	1.00
Seattle-Everett, WA	14,190	2,370	3.4	5,980	1.17
Northeastern Avg	28,770	4,420	3.3	6,270	1.03
Midwestern Avg	12,510	2,260	3.5	5,190	0.91
Southern Avg	9,190	1,610	3.8	5,630	0.97
Southwestern Avg	9,830	1,880	4.0	5,050	0.91
Western Avg	24,430	3,920	3.8	6,060	1.16
Texas Avg	7,850	1,650	4.1	4,670	0.90
Total Avg	15,610	2,630	3.7	5,560	0.99
Maximum Value	125,970	19,320	4.8	7,990	1.52
Minimum Value	2,320	350	2.3	3,520	0.70

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-17. Summary of 1989 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	24,440	1,980	5.4	12,340	0.98
Boston, MA	35,540	2,440	5.9	14,570	1.09
Hartford, CT	9,950	930	5.5	10,660	0.89
New York, NY	130,270	9,440	5.6	13,800	1.12
Philadelphia, PA	29,420	2,420	5.1	12,140	1.05
Pittsburgh, PA	12,480	1,580	4.3	7,910	0.82
Washington, DC	40,280	2,450	5.3	16,460	1.33
Midwestern Cities					
Chicago, IL	55,450	3,700	5.7	14,970	1.21
Cincinnati, OH	17,530	1,430	5.5	12,240	0.94
Cleveland, OH	21,270	1,710	4.7	12,460	0.96
Columbus, OH	13,040	1,270	5.8	10,250	0.82
Detroit, MI	39,530	2,720	5.8	14,530	1.09
Indianapolis, IN	12,700	1,160	5.3	10,960	0.86
Kansas City, MO	19,920	2,180	4.3	9,130	0.72
Louisville, KY	9,890	940	4.6	10,500	0.86
Milwaukee, WI	12,100	950	5.6	12,740	0.97
Minn-St. Paul, MN	27,140	2,330	4.9	11,630	0.92
Oklahoma City, OK	11,000	1,160	5.1	9,490	0.78
St. Louis, MO	30,140	2,710	5.5	11,110	0.96
Southern Cities					
Atlanta, GA	39,600	2,700	6.1	14,640	1.14
Charlotte, NC	4,410	470	4.2	9,290	0.82
Ft. Lauderdale, FL	11,000	950	5.4	11,580	0.92
Jacksonville, FL	8,370	710	4.5	11,820	0.93
Memphis, TN	6,850	610	5.4	11,200	0.90
Miami, FL	13,440	930	5.4	14,400	1.25
Nashville, TN	7,910	770	4.6	10,230	0.90
New Orleans, LA	7,820	560	5.8	13,890	1.13
Norfolk, VA	8,590	740	4.6	11,600	0.95
Orlando, FL	9,370	930	4.9	10,120	0.77
Tampa, FL	5,520	470	4.9	11,630	1.03
Southwestern Cities					
Albuquerque, NM	3,720	350	5.0	10,740	0.98
Austin, TX	8,530	680	5.6	12,470	0.96
Corpus Christi, TX	2,450	300	5.3	8,220	0.70
Dallas, TX	36,460	2,720	5.9	13,400	1.02
Denver, CO	17,280	1,380	5.2	12,480	1.01
El Paso, TX	5,310	560	5.2	9,430	0.74
Fort Worth, TX	18,160	1,630	5.7	11,110	0.87
Houston, TX	44,500	2,990	6.2	14,860	1.13
Phoenix, AZ	11,350	970	5.6	11,650	1.03
Salt Lake City, UT	8,180	820	5.6	9,960	0.81
San Antonio, TX	14,770	1,330	5.2	11,120	0.87
Western Cities					
Honolulu, HI	7,290	550	5.2	13,310	1.07
Los Angeles, CA	171,750	8,240	8.2	20,840	1.54
Portland, OR	12,030	890	5.0	13,580	1.07
Sacramento, CA	14,250	1,180	6.9	12,120	1.01
San Bernardino-Riv, CA	21,930	1,420	7.0	15,480	1.17
San Diego, CA	43,080	2,770	7.4	15,560	1.18
San Fran-Oak, CA	67,570	3,780	6.8	17,860	1.36
San Jose, CA	25,020	1,870	6.6	13,400	1.03
Seattle-Everett, WA	29,300	1,870	5.9	15,690	1.20
Northeastern Avg	40,340	3,030	5.3	12,550	1.04
Midwestern Avg	22,470	1,860	5.2	11,670	0.92
Southern Avg	11,170	900	5.1	11,850	0.98
Southwestern Avg	15,520	1,250	5.5	11,400	0.92
Western Avg	43,580	2,510	6.6	15,310	1.18
Texas Avg	18,600	1,460	5.6	11,520	0.90
Total Avg	24,760	1,790	5.5	12,430	1.00
Maximum Value	171,750	9,440	8.2	20,840	1.54
Minimum Value	2,450	300	4.2	7,910	0.70

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-18. Summary of 1989 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	15,010	2,700	4.0	5,570	0.98
Boston, MA	20,370	4,360	2.3	4,680	1.09
Hartford, CT	5,860	1,000	3.7	5,870	0.89
New York, NY	81,840	11,830	3.4	6,920	1.12
Philadelphia, PA	34,040	5,220	3.0	6,510	1.05
Pittsburgh, PA	17,330	2,850	3.1	6,080	0.82
Washington, DC	27,840	3,540	4.0	7,860	1.33
Midwestern Cities					
Chicago, IL	45,050	6,520	3.8	6,910	1.21
Cincinnati, OH	5,830	1,280	3.3	4,550	0.94
Cleveland, OH	8,510	1,800	3.0	4,740	0.96
Columbus, OH	4,890	970	3.3	5,070	0.82
Detroit, MI	31,910	6,250	4.4	5,110	1.09
Indianapolis, IN	6,640	1,370	3.7	4,850	0.86
Kansas City, MO	7,040	1,680	3.5	4,180	0.72
Louisville, KY	4,650	820	3.7	5,670	0.86
Milwaukee, WI	7,510	1,610	3.3	4,670	0.97
Minn-St. Paul, MN	8,680	1,590	3.3	5,470	0.92
Oklahoma City, OK	5,770	1,090	3.2	5,270	0.78
St. Louis, MO	19,660	2,890	3.2	6,800	0.96
Southern Cities					
Atlanta, GA	15,630	2,510	3.6	6,220	1.14
Charlotte, NC	4,600	850	3.0	5,390	0.82
Ft. Lauderdale, FL	9,020	1,770	4.3	5,100	0.92
Jacksonville, FL	9,250	1,920	3.7	4,830	0.93
Memphis, TN	6,630	1,310	4.3	5,060	0.90
Miami, FL	23,840	3,280	4.3	7,280	1.25
Nashville, TN	8,690	1,510	3.3	5,780	0.90
New Orleans, LA	6,540	1,000	4.2	6,560	1.13
Norfolk, VA	6,570	1,170	3.5	5,630	0.95
Orlando, FL	6,160	1,710	3.7	3,610	0.77
Tampa, FL	6,730	1,010	3.8	6,630	1.03
Southwestern Cities					
Albuquerque, NM	6,760	1,130	3.5	6,000	0.98
Austin, TX	3,300	680	4.2	4,820	0.96
Corpus Christi, TX	2,330	530	3.8	4,390	0.70
Dallas, TX	13,250	2,730	4.8	4,860	1.02
Denver, CO	17,070	2,960	3.9	5,760	1.01
El Paso, TX	5,110	1,340	4.2	3,830	0.74
Fort Worth, TX	6,790	1,390	4.0	4,880	0.87
Houston, TX	16,740	3,240	4.3	5,170	1.13
Phoenix, AZ	26,800	4,590	4.0	5,840	1.03
Salt Lake City, UT	3,140	570	3.5	5,490	0.81
San Antonio, TX	8,340	1,740	3.5	4,800	0.87
Western Cities					
Honolulu, HI	2,500	350	3.8	7,070	1.07
Los Angeles, CA	128,490	19,610	4.0	6,550	1.54
Portland, OR	5,430	890	3.3	6,070	1.07
Sacramento, CA	10,960	1,740	4.0	6,310	1.01
San Bernardino-Riv, CA	15,090	2,780	4.2	5,430	1.17
San Diego, CA	14,380	2,690	3.4	5,350	1.18
San Fran-Oak, CA	22,070	3,450	3.9	6,410	1.36
San Jose, CA	10,880	2,070	4.2	5,260	1.03
Seattle-Everett, WA	14,590	2,460	3.4	5,940	1.20
Northeastern Avg	28,900	4,500	3.4	6,210	1.04
Midwestern Avg	13,010	2,320	3.5	5,270	0.92
Southern Avg	9,420	1,640	3.8	5,640	0.98
Southwestern Avg	9,970	1,900	4.0	5,080	0.92
Western Avg	24,930	4,000	3.8	6,040	1.18
Texas Avg	7,980	1,660	4.1	4,680	0.90
Total Avg	15,920	2,690	3.7	5,580	1.00
Maximum Value	128,490	19,610	4.8	7,860	1.54
Minimum Value	2,330	350	2.3	3,610	0.70

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-19. Summary of 1990 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	25,440	2,010	5.4	12,640	1.01
Boston, MA	34,790	2,450	5.9	14,220	1.06
Hartford, CT	10,020	930	5.5	10,730	0.89
New York, NY	133,500	9,500	5.6	14,050	1.14
Philadelphia, PA	29,500	2,430	5.1	12,140	1.05
Pittsburgh, PA	13,190	1,610	4.3	8,200	0.82
Washington, DC	40,790	2,460	5.3	16,610	1.34
Midwestern Cities					
Chicago, IL	61,230	3,900	5.7	15,680	1.25
Cincinnati, OH	18,320	1,460	5.7	12,570	0.96
Cleveland, OH	22,060	1,850	4.7	11,910	0.94
Columbus, OH	14,490	1,290	5.8	11,250	0.89
Detroit, MI	41,930	2,800	5.8	14,970	1.13
Indianapolis, IN	12,960	1,220	5.3	10,590	0.84
Kansas City, MO	20,210	2,190	4.4	9,230	0.74
Louisville, KY	9,970	950	4.6	10,500	0.86
Milwaukee, WI	12,380	960	5.6	12,920	0.99
Minn-St. Paul, MN	28,640	2,380	4.9	12,020	0.95
Oklahoma City, OK	11,170	1,160	5.1	9,630	0.79
St. Louis, MO	29,790	2,720	5.5	10,950	0.95
Southern Cities					
Atlanta, GA	40,190	2,750	6.1	14,600	1.14
Charlotte, NC	4,650	480	4.2	9,630	0.86
Ft. Lauderdale, FL	11,440	970	5.4	11,840	0.94
Jacksonville, FL	8,660	720	4.6	11,960	0.93
Memphis, TN	6,990	630	5.4	11,130	0.89
Miami, FL	13,800	970	5.4	14,170	1.27
Nashville, TN	8,050	790	4.6	10,200	0.89
New Orleans, LA	8,000	580	5.8	13,810	1.12
Norfolk, VA	8,770	750	4.6	11,720	0.96
Orlando, FL	9,580	950	4.9	10,080	0.77
Tampa, FL	5,840	480	4.9	12,100	1.05
Southwestern Cities					
Albuquerque, NM	3,860	350	5.0	10,910	0.98
Austin, TX	8,760	720	5.6	12,090	0.94
Corpus Christi, TX	2,510	300	5.4	8,430	0.72
Dallas, TX	38,120	2,750	5.9	13,850	1.05
Denver, CO	18,140	1,420	5.2	12,730	1.03
El Paso, TX	5,360	560	5.2	9,510	0.74
Fort Worth, TX	19,060	1,640	5.8	11,610	0.90
Houston, TX	45,450	3,090	6.3	14,700	1.12
Phoenix, AZ	12,830	1,010	5.6	12,750	1.05
Salt Lake City, UT	8,580	820	5.6	10,450	0.85
San Antonio, TX	14,940	1,330	5.3	11,250	0.88
Western Cities					
Honolulu, HI	7,440	550	5.2	13,590	1.09
Los Angeles, CA	177,660	8,420	8.2	21,100	1.55
Portland, OR	12,030	890	5.1	13,460	1.08
Sacramento, CA	14,910	1,210	6.9	12,350	1.02
San Bernardino-Riv, CA	23,470	1,440	7.1	16,290	1.21
San Diego, CA	44,580	2,780	7.4	16,050	1.22
San Fran-Oak, CA	68,570	3,850	6.8	17,820	1.36
San Jose, CA	25,410	1,870	6.6	13,600	1.05
Seattle-Everett, WA	30,460	1,950	6.0	15,640	1.20
Northeastern Avg	41,030	3,060	5.3	12,660	1.04
Midwestern Avg	23,600	1,910	5.3	11,850	0.94
Southern Avg	11,450	920	5.1	11,930	0.98
Southwestern Avg	16,150	1,270	5.5	11,660	0.93
Western Avg	44,950	2,550	6.6	15,540	1.20
Texas Avg	19,170	1,490	5.6	11,630	0.91
Total Avg	25,570	1,830	5.5	12,600	1.01
Maximum Value	177,660	9,500	8.2	21,100	1.55
Minimum Value	2,510	300	4.2	8,200	0.72

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-20. Summary of 1990 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	15,860	2,670	4.1	5,930	1.01
Boston, MA	20,190	4,440	2.3	4,540	1.06
Hartford, CT	6,040	1,020	3.7	5,910	0.89
New York, NY	83,810	12,170	3.4	6,890	1.14
Philadelphia, PA	34,440	5,230	3.1	6,580	1.05
Pittsburgh, PA	17,570	2,930	3.2	5,990	0.82
Washington, DC	28,750	3,620	4.0	7,940	1.34
Midwestern Cities					
Chicago, IL	47,410	6,860	3.7	6,910	1.25
Cincinnati, OH	5,910	1,320	3.3	4,480	0.96
Cleveland, OH	9,640	1,800	3.0	5,350	0.94
Columbus, OH	5,120	980	3.3	5,210	0.89
Detroit, MI	33,610	6,280	4.4	5,350	1.13
Indianapolis, IN	6,730	1,420	3.7	4,750	0.84
Kansas City, MO	7,740	1,710	3.5	4,540	0.74
Louisville, KY	4,740	840	3.6	5,660	0.86
Milwaukee, WI	7,700	1,620	3.4	4,760	0.99
Minn-St. Paul, MN	9,080	1,610	3.3	5,640	0.95
Oklahoma City, OK	5,770	1,090	3.2	5,270	0.79
St. Louis, MO	19,660	2,900	3.2	6,780	0.95
Southern Cities					
Atlanta, GA	15,750	2,530	3.7	6,230	1.14
Charlotte, NC	4,970	860	3.0	5,770	0.86
Ft. Lauderdale, FL	9,340	1,800	4.3	5,200	0.94
Jacksonville, FL	9,350	1,930	3.7	4,840	0.93
Memphis, TN	6,820	1,380	4.3	4,950	0.89
Miami, FL	25,450	3,340	4.3	7,620	1.27
Nashville, TN	8,760	1,510	3.3	5,790	0.89
New Orleans, LA	6,600	1,010	4.2	6,560	1.12
Norfolk, VA	6,850	1,180	3.5	5,790	0.96
Orlando, FL	6,600	1,720	3.7	3,830	0.77
Tampa, FL	7,020	1,060	3.8	6,610	1.05
Southwestern Cities					
Albuquerque, NM	6,920	1,160	3.7	5,970	0.98
Austin, TX	3,360	690	4.2	4,860	0.94
Corpus Christi, TX	2,450	540	3.9	4,540	0.72
Dallas, TX	13,380	2,750	4.8	4,860	1.05
Denver, CO	17,550	2,980	3.9	5,890	1.03
El Paso, TX	5,150	1,340	4.2	3,830	0.74
Fort Worth, TX	6,830	1,400	4.1	4,870	0.90
Houston, TX	17,440	3,430	4.3	5,080	1.12
Phoenix, AZ	28,350	5,020	4.1	5,640	1.05
Salt Lake City, UT	3,280	570	3.6	5,730	0.85
San Antonio, TX	8,440	1,750	3.5	4,810	0.88
Western Cities					
Honolulu, HI	2,530	360	3.8	6,980	1.09
Los Angeles, CA	129,400	19,970	4.0	6,480	1.55
Portland, OR	5,970	910	3.3	6,570	1.08
Sacramento, CA	11,260	1,770	4.0	6,360	1.02
San Bernardino-Riv, CA	16,340	3,120	4.2	5,230	1.21
San Diego, CA	15,040	2,750	3.4	5,460	1.22
San Fran-Oak, CA	22,530	3,620	3.9	6,220	1.36
San Jose, CA	10,910	2,080	4.2	5,230	1.05
Seattle-Everett, WA	14,700	2,540	3.4	5,800	1.20
Northeastern Avg	29,520	4,590	3.4	6,250	1.04
Midwestern Avg	13,590	2,370	3.5	5,390	0.94
Southern Avg	9,770	1,670	3.8	5,740	0.98
Southwestern Avg	10,290	1,970	4.0	5,100	0.93
Western Avg	25,410	4,130	3.8	6,040	1.20
Texas Avg	8,150	1,700	4.1	4,690	0.91
Total Avg	16,380	2,750	3.7	5,640	1.01
Maximum Value	129,400	19,970	4.8	7,940	1.55
Minimum Value	2,450	360	2.3	3,830	0.72

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-21. Summary of 1991 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	26,150	2,040	5.4	12,790	1.02
Boston, MA	34,900	2,450	5.9	14,260	1.06
Hartford, CT	10,050	930	5.5	10,760	0.89
New York, NY	133,150	9,530	5.6	13,970	1.14
Philadelphia, PA	30,670	2,530	5.1	12,130	1.05
Pittsburgh, PA	13,280	1,630	4.3	8,130	0.82
Washington, DC	41,470	2,530	5.3	16,400	1.33
Midwestern Cities					
Chicago, IL	62,760	3,920	5.7	16,010	1.27
Cincinnati, OH	18,680	1,470	5.7	12,750	0.99
Cleveland, OH	22,490	1,870	4.8	12,040	0.95
Columbus, OH	14,890	1,300	5.8	11,490	0.91
Detroit, MI	44,110	2,870	5.9	15,390	1.16
Indianapolis, IN	13,120	1,230	5.3	10,650	0.84
Kansas City, MO	20,790	2,190	4.4	9,500	0.75
Louisville, KY	10,060	950	4.6	10,590	0.88
Milwaukee, WI	12,570	970	5.6	13,020	1.00
Minn-St. Paul, MN	29,320	2,410	4.9	12,180	0.96
Oklahoma City, OK	11,470	1,170	5.2	9,830	0.81
St. Louis, MO	30,110	2,730	5.6	11,030	0.95
Southern Cities					
Atlanta, GA	41,460	2,780	6.2	14,930	1.16
Charlotte, NC	4,830	480	4.2	10,000	0.89
Ft. Lauderdale, FL	11,480	970	5.4	11,880	0.95
Jacksonville, FL	8,810	720	4.6	12,160	0.95
Memphis, TN	7,570	660	5.4	11,460	0.91
Miami, FL	14,140	990	5.4	14,280	1.28
Nashville, TN	8,390	810	4.6	10,320	0.90
New Orleans, LA	8,110	590	5.8	13,810	1.12
Norfolk, VA	8,960	820	4.6	10,910	0.92
Orlando, FL	9,730	970	4.9	10,080	0.78
Tampa, FL	5,880	490	4.9	11,970	1.05
Southwestern Cities					
Albuquerque, NM	3,990	360	5.0	11,020	0.96
Austin, TX	8,860	730	5.6	12,090	0.94
Corpus Christi, TX	2,580	300	5.5	8,630	0.72
Dallas, TX	38,480	2,760	5.9	13,940	1.06
Denver, CO	18,390	1,440	5.2	12,770	1.03
El Paso, TX	5,460	570	5.3	9,550	0.75
Fort Worth, TX	19,800	1,660	5.9	11,940	0.92
Houston, TX	47,500	3,240	6.3	14,640	1.11
Phoenix, AZ	14,570	1,070	5.6	13,610	1.08
Salt Lake City, UT	8,990	830	5.6	10,840	0.88
San Antonio, TX	15,090	1,340	5.3	11,300	0.89
Western Cities					
Honolulu, HI	7,570	550	5.2	13,820	1.10
Los Angeles, CA	177,550	8,410	8.2	21,110	1.56
Portland, OR	12,110	900	5.1	13,430	1.08
Sacramento, CA	15,520	1,220	6.9	12,680	1.04
San Bernardino-Riv, CA	24,100	1,460	7.2	16,540	1.22
San Diego, CA	44,600	2,780	7.5	16,060	1.22
San Fran-Oak, CA	67,620	3,850	6.8	17,570	1.34
San Jose, CA	26,600	1,890	6.6	14,060	1.08
Seattle-Everett, WA	30,590	1,960	5.9	15,570	1.20
Northeastern Avg	41,380	3,090	5.3	12,640	1.04
Midwestern Avg	24,200	1,920	5.3	12,040	0.96
Southern Avg	11,760	930	5.1	11,980	0.99
Southwestern Avg	16,700	1,300	5.6	11,850	0.94
Western Avg	45,140	2,560	6.6	15,650	1.20
Texas Avg	19,680	1,510	5.7	11,730	0.91
Total Avg	25,990	1,850	5.5	12,720	1.02
Maximum Value	177,550	9,530	8.2	21,110	1.56
Minimum Value	2,580	300	4.2	8,130	0.72

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-22. Summary of 1991 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	15,900	2,690	4.1	5,910	1.02
Boston, MA	20,130	4,440	2.3	4,530	1.06
Hartford, CT	6,120	1,050	3.8	5,850	0.89
New York, NY	85,360	12,270	3.4	6,960	1.14
Philadelphia, PA	34,810	5,250	3.1	6,630	1.05
Pittsburgh, PA	17,830	2,990	3.2	5,970	0.82
Washington, DC	29,380	3,700	4.0	7,930	1.33
Midwestern Cities					
Chicago, IL	50,770	7,180	3.7	7,070	1.27
Cincinnati, OH	6,920	1,330	3.3	5,210	0.99
Cleveland, OH	9,740	1,810	3.0	5,380	0.95
Columbus, OH	5,490	1,000	3.4	5,500	0.91
Detroit, MI	35,710	6,480	4.4	5,510	1.16
Indianapolis, IN	6,760	1,420	3.7	4,770	0.84
Kansas City, MO	7,790	1,720	3.5	4,520	0.75
Louisville, KY	5,020	840	3.6	6,000	0.88
Milwaukee, WI	7,940	1,630	3.4	4,880	1.00
Minn-St. Paul, MN	9,660	1,670	3.4	5,770	0.96
Oklahoma City, OK	6,070	1,110	3.2	5,460	0.81
St. Louis, MO	19,880	2,950	3.4	6,750	0.95
Southern Cities					
Atlanta, GA	15,920	2,540	3.7	6,280	1.16
Charlotte, NC	5,140	870	3.0	5,910	0.89
Ft. Lauderdale, FL	9,660	1,810	4.3	5,330	0.95
Jacksonville, FL	9,500	1,950	3.7	4,880	0.95
Memphis, TN	7,250	1,460	4.3	4,970	0.91
Miami, FL	25,760	3,350	4.3	7,690	1.28
Nashville, TN	8,790	1,530	3.4	5,750	0.90
New Orleans, LA	6,660	1,020	4.2	6,510	1.12
Norfolk, VA	7,130	1,210	3.5	5,910	0.92
Orlando, FL	7,080	1,740	3.7	4,070	0.78
Tampa, FL	7,080	1,080	3.8	6,570	1.05
Southwestern Cities					
Albuquerque, NM	6,840	1,210	3.8	5,670	0.96
Austin, TX	3,460	700	4.2	4,940	0.94
Corpus Christi, TX	2,490	560	4.0	4,410	0.72
Dallas, TX	13,520	2,770	4.8	4,880	1.06
Denver, CO	17,390	2,980	3.9	5,840	1.03
El Paso, TX	5,270	1,350	4.2	3,900	0.75
Fort Worth, TX	6,840	1,420	4.1	4,830	0.92
Houston, TX	17,550	3,500	4.3	5,010	1.11
Phoenix, AZ	29,000	5,180	4.1	5,590	1.08
Salt Lake City, UT	3,670	620	3.6	5,920	0.88
San Antonio, TX	8,770	1,800	3.6	4,890	0.89
Western Cities					
Honolulu, HI	2,610	370	3.8	7,040	1.10
Los Angeles, CA	131,550	19,960	4.0	6,590	1.56
Portland, OR	6,170	940	3.3	6,550	1.08
Sacramento, CA	11,270	1,800	4.1	6,280	1.04
San Bernardino-Riv, CA	17,150	3,360	4.2	5,110	1.22
San Diego, CA	15,300	2,790	3.5	5,490	1.22
San Fran-Oak, CA	22,590	3,700	4.0	6,100	1.34
San Jose, CA	10,990	2,090	4.2	5,250	1.08
Seattle-Everett, WA	15,780	2,580	3.4	6,130	1.20
Northeastern Avg	29,930	4,630	3.4	6,250	1.04
Midwestern Avg	14,310	2,430	3.5	5,570	0.96
Southern Avg	10,000	1,690	3.8	5,810	0.99
Southwestern Avg	10,440	2,010	4.1	5,080	0.94
Western Avg	25,930	4,180	3.8	6,060	1.20
Texas Avg	8,270	1,730	4.2	4,700	0.91
Total Avg	16,790	2,790	3.7	5,700	1.02
Maximum Value	131,550	19,960	4.8	7,930	1.56
Minimum Value	2,490	370	2.3	3,900	0.72

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-23. Summary of 1992 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	28,340	2,170	5.5	13,040	1.04
Boston, MA	35,250	2,440	5.9	14,450	1.07
Hartford, CT	10,870	970	5.6	11,160	0.91
New York, NY	134,440	9,740	5.7	13,800	1.14
Philadelphia, PA	31,220	2,600	5.1	12,010	1.05
Pittsburgh, PA	14,710	1,800	4.3	8,160	0.81
Washington, DC	44,190	2,610	5.4	16,940	1.36
Midwestern Cities					
Chicago, IL	63,110	3,930	5.7	16,070	1.28
Cincinnati, OH	19,180	1,470	5.7	13,020	1.01
Cleveland, OH	22,800	1,900	4.8	12,000	0.95
Columbus, OH	15,230	1,300	5.8	11,680	0.93
Detroit, MI	46,050	2,930	5.9	15,710	1.19
Indianapolis, IN	13,390	1,240	5.3	10,800	0.85
Kansas City, MO	22,060	2,270	4.4	9,720	0.77
Louisville, KY	10,510	970	4.6	10,790	0.90
Milwaukee, WI	12,610	970	5.6	13,060	1.00
Minn-St. Paul, MN	30,590	2,430	4.9	12,580	0.99
Oklahoma City, OK	11,750	1,170	5.2	10,070	0.83
St. Louis, MO	30,480	2,740	5.7	11,140	0.95
Southern Cities					
Atlanta, GA	42,670	2,820	6.3	15,140	1.17
Charlotte, NC	5,150	490	4.2	10,490	0.89
Ft. Lauderdale, FL	12,480	1,050	5.4	11,920	0.96
Jacksonville, FL	9,270	730	4.6	12,650	0.97
Memphis, TN	8,100	710	5.4	11,430	0.92
Miami, FL	15,090	1,010	5.4	14,990	1.30
Nashville, TN	9,660	890	4.7	10,910	0.92
New Orleans, LA	8,130	600	5.8	13,470	1.10
Norfolk, VA	9,450	900	4.7	10,480	0.92
Orlando, FL	9,740	970	4.9	10,080	0.80
Tampa, FL	6,120	500	5.0	12,260	1.07
Southwestern Cities					
Albuquerque, NM	4,030	370	5.0	10,870	0.95
Austin, TX	9,100	740	5.6	12,280	0.95
Corpus Christi, TX	2,700	300	5.5	8,910	0.74
Dallas, TX	39,450	2,820	5.9	14,000	1.07
Denver, CO	20,130	1,550	5.2	13,020	1.05
El Paso, TX	5,640	570	5.3	9,860	0.76
Fort Worth, TX	20,610	1,690	5.9	12,190	0.94
Houston, TX	49,110	3,340	6.3	14,700	1.12
Phoenix, AZ	15,700	1,130	5.7	13,930	1.08
Salt Lake City, UT	9,300	850	5.7	11,000	0.90
San Antonio, TX	16,000	1,420	5.4	11,290	0.90
Western Cities					
Honolulu, HI	8,190	600	5.3	13,570	1.10
Los Angeles, CA	180,240	8,690	8.2	20,750	1.54
Portland, OR	12,830	930	5.2	13,860	1.10
Sacramento, CA	16,290	1,290	7.0	12,640	1.04
San Bernardino-Riv, CA	24,330	1,470	7.2	16,600	1.22
San Diego, CA	44,760	2,800	7.6	15,980	1.22
San Fran-Oak, CA	68,100	3,910	6.8	17,410	1.33
San Jose, CA	26,730	1,930	6.7	13,840	1.07
Seattle-Everett, WA	32,640	2,040	6.0	15,960	1.22
Northeastern Avg	42,710	3,190	5.4	12,790	1.05
Midwestern Avg	24,810	1,940	5.3	12,220	0.97
Southern Avg	12,350	970	5.1	12,170	1.00
Southwestern Avg	17,430	1,340	5.6	12,000	0.95
Western Avg	46,010	2,630	6.7	15,620	1.20
Texas Avg	20,370	1,550	5.7	11,890	0.93
Total Avg	26,770	1,890	5.6	12,850	1.03
Maximum Value	180,240	9,740	8.2	20,750	1.54
Minimum Value	2,700	300	4.2	8,160	0.74

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-24. Summary of 1992 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	15,940	2,690	4.1	5,930	1.04
Boston, MA	20,920	4,590	2.4	4,560	1.07
Hartford, CT	6,180	1,050	3.8	5,860	0.91
New York, NY	89,070	12,280	3.4	7,260	1.14
Philadelphia, PA	34,860	5,250	3.3	6,640	1.05
Pittsburgh, PA	17,870	2,990	3.2	5,980	0.81
Washington, DC	29,790	3,740	4.0	7,970	1.36
Midwestern Cities					
Chicago, IL	52,810	7,490	3.8	7,050	1.28
Cincinnati, OH	7,250	1,330	3.3	5,450	1.01
Cleveland, OH	10,140	1,840	3.0	5,530	0.95
Columbus, OH	5,760	1,020	3.5	5,630	0.93
Detroit, MI	39,450	6,870	4.4	5,740	1.19
Indianapolis, IN	6,840	1,420	3.7	4,800	0.85
Kansas City, MO	7,870	1,750	3.6	4,490	0.77
Louisville, KY	5,350	850	3.6	6,330	0.90
Milwaukee, WI	8,370	1,710	3.4	4,910	1.00
Minn-St. Paul, MN	10,950	1,850	3.4	5,910	0.99
Oklahoma City, OK	6,390	1,160	3.3	5,510	0.83
St. Louis, MO	20,090	3,050	3.6	6,590	0.95
Southern Cities					
Atlanta, GA	16,100	2,610	3.8	6,170	1.17
Charlotte, NC	5,150	930	3.2	5,520	0.89
Ft. Lauderdale, FL	10,220	1,850	4.4	5,520	0.96
Jacksonville, FL	9,890	2,060	3.8	4,800	0.97
Memphis, TN	8,070	1,580	4.5	5,110	0.92
Miami, FL	27,050	3,590	4.4	7,530	1.30
Nashville, TN	8,860	1,550	3.5	5,730	0.92
New Orleans, LA	6,760	1,050	4.2	6,410	1.10
Norfolk, VA	7,690	1,210	3.5	6,370	0.92
Orlando, FL	7,810	1,750	3.7	4,450	0.80
Tampa, FL	7,490	1,130	3.8	6,640	1.07
Southwestern Cities					
Albuquerque, NM	6,920	1,240	3.9	5,580	0.95
Austin, TX	3,540	720	4.2	4,940	0.95
Corpus Christi, TX	2,630	600	4.1	4,370	0.74
Dallas, TX	13,770	2,820	4.8	4,890	1.07
Denver, CO	17,710	2,990	3.9	5,910	1.05
El Paso, TX	5,350	1,380	4.2	3,890	0.76
Fort Worth, TX	6,990	1,450	4.2	4,820	0.94
Houston, TX	17,940	3,510	4.5	5,110	1.12
Phoenix, AZ	29,150	5,330	4.2	5,470	1.08
Salt Lake City, UT	4,150	680	3.8	6,060	0.90
San Antonio, TX	9,560	1,810	3.6	5,280	0.90
Western Cities					
Honolulu, HI	2,810	380	3.8	7,430	1.10
Los Angeles, CA	132,830	20,130	4.1	6,600	1.54
Portland, OR	6,300	970	3.4	6,460	1.10
Sacramento, CA	12,450	2,000	4.2	6,240	1.04
San Bernardino-Riv, CA	17,310	3,380	4.2	5,120	1.22
San Diego, CA	15,620	2,790	3.5	5,590	1.22
San Fran-Oak, CA	22,830	3,740	4.0	6,110	1.33
San Jose, CA	11,910	2,190	4.2	5,440	1.07
Seattle-Everett, WA	15,810	2,620	3.5	6,040	1.22
Northeastern Avg	30,660	4,650	3.5	6,310	1.05
Midwestern Avg	15,110	2,530	3.6	5,660	0.97
Southern Avg	10,460	1,760	3.9	5,840	1.00
Southwestern Avg	10,700	2,050	4.1	5,120	0.95
Western Avg	26,430	4,240	3.9	6,110	1.20
Texas Avg	8,540	1,750	4.2	4,760	0.93
Total Avg	17,330	2,860	3.8	5,760	1.03
Maximum Value	132,830	20,130	4.8	7,970	1.54
Minimum Value	2,630	380	2.4	3,890	0.74

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-25. Summary of 1993 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	28,980	2,210	5.5	13,140	1.04
Boston, MA	34,620	2,430	5.9	14,240	1.07
Hartford, CT	11,310	980	5.6	11,520	0.93
New York, NY	138,460	9,900	5.7	13,980	1.15
Philadelphia, PA	32,520	2,720	5.1	11,950	1.04
Pittsburgh, PA	15,050	1,850	4.3	8,130	0.82
Washington, DC	46,690	2,620	5.4	17,790	1.41
Midwestern Cities					
Chicago, IL	65,950	4,160	5.7	15,850	1.26
Cincinnati, OH	20,710	1,550	5.7	13,330	1.03
Cleveland, OH	24,100	1,920	4.9	12,580	0.98
Columbus, OH	15,700	1,330	5.9	11,820	0.93
Detroit, MI	47,500	2,940	6.0	16,160	1.23
Indianapolis, IN	14,330	1,260	5.5	11,410	0.89
Kansas City, MO	24,150	2,480	4.6	9,740	0.78
Louisville, KY	11,270	990	4.6	11,380	0.93
Milwaukee, WI	12,620	970	5.6	12,960	1.00
Minn-St. Paul, MN	32,200	2,470	5.0	13,030	1.02
Oklahoma City, OK	12,400	1,180	5.2	10,480	0.86
St. Louis, MO	31,400	2,770	5.7	11,340	0.96
Southern Cities					
Atlanta, GA	48,300	3,220	6.4	15,000	1.16
Charlotte, NC	5,640	510	4.3	11,110	0.92
Ft. Lauderdale, FL	13,690	1,090	5.5	12,500	0.98
Jacksonville, FL	9,660	770	4.8	12,500	0.96
Memphis, TN	8,290	730	5.4	11,320	0.93
Miami, FL	15,920	1,030	5.5	15,450	1.32
Nashville, TN	11,270	1,010	4.9	11,110	0.93
New Orleans, LA	8,370	620	5.8	13,510	1.09
Norfolk, VA	9,620	930	4.7	10,390	0.92
Orlando, FL	10,020	990	5.0	10,120	0.82
Tampa, FL	6,360	520	5.0	12,340	1.06
Southwestern Cities					
Albuquerque, NM	4,410	390	5.1	11,420	0.96
Austin, TX	10,340	850	5.6	12,110	0.95
Corpus Christi, TX	3,140	340	5.5	9,290	0.75
Dallas, TX	40,090	2,870	6.0	13,990	1.07
Denver, CO	21,330	1,590	5.3	13,380	1.07
El Paso, TX	5,960	600	5.3	10,000	0.77
Fort Worth, TX	21,090	1,720	5.9	12,240	0.95
Houston, TX	51,520	3,460	6.4	14,880	1.13
Phoenix, AZ	15,780	1,140	5.8	13,800	1.08
Salt Lake City, UT	9,760	860	5.7	11,330	0.92
San Antonio, TX	17,230	1,510	5.4	11,380	0.91
Western Cities					
Honolulu, HI	8,860	640	5.3	13,920	1.13
Los Angeles, CA	183,460	8,810	8.2	20,810	1.54
Portland, OR	13,440	970	5.2	13,920	1.11
Sacramento, CA	16,550	1,300	7.0	12,770	1.04
San Bernardino-Riv, CA	24,500	1,510	7.2	16,280	1.21
San Diego, CA	44,680	2,810	7.6	15,900	1.21
San Fran-Oak, CA	68,830	3,920	6.8	17,560	1.33
San Jose, CA	26,810	1,960	6.7	13,650	1.05
Seattle-Everett, WA	33,330	2,070	6.0	16,110	1.23
Northeastern Avg	43,950	3,250	5.4	12,960	1.07
Midwestern Avg	26,030	2,000	5.4	12,510	0.99
Southern Avg	13,380	1,040	5.2	12,310	1.01
Southwestern Avg	18,240	1,390	5.6	12,170	0.96
Western Avg	46,720	2,660	6.7	15,660	1.21
Texas Avg	21,340	1,620	5.7	11,990	0.93
Total Avg	27,760	1,950	5.6	13,020	1.04
Maximum Value	183,460	9,900	8.2	20,810	1.54
Minimum Value	3,140	340	4.3	8,130	0.75

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-26. Summary of 1993 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	16,100	2,740	4.1	5,880	1.04
Boston, MA	22,540	4,650	2.5	4,840	1.07
Hartford, CT	6,100	1,050	3.8	5,790	0.93
New York, NY	88,550	12,400	3.4	7,140	1.15
Philadelphia, PA	34,870	5,300	3.3	6,580	1.04
Pittsburgh, PA	18,520	2,990	3.2	6,180	0.82
Washington, DC	29,620	3,780	4.0	7,830	1.41
Midwestern Cities					
Chicago, IL	56,350	8,210	3.9	6,860	1.26
Cincinnati, OH	7,080	1,330	3.5	5,330	1.03
Cleveland, OH	9,980	1,840	3.0	5,410	0.98
Columbus, OH	5,640	1,030	3.5	5,470	0.93
Detroit, MI	41,860	6,920	4.5	6,050	1.23
Indianapolis, IN	7,250	1,480	3.8	4,890	0.89
Kansas City, MO	8,860	1,810	3.6	4,890	0.78
Louisville, KY	5,640	930	3.7	6,030	0.93
Milwaukee, WI	9,020	1,800	3.4	5,000	1.00
Minn-St. Paul, MN	11,430	1,930	3.5	5,920	1.02
Oklahoma City, OK	7,250	1,290	3.4	5,630	0.86
St. Louis, MO	20,450	3,100	3.6	6,600	0.96
Southern Cities					
Atlanta, GA	19,320	3,220	3.8	6,000	1.16
Charlotte, NC	5,190	950	3.3	5,470	0.92
Ft. Lauderdale, FL	10,300	1,940	4.5	5,310	0.98
Jacksonville, FL	10,060	2,110	3.9	4,770	0.96
Memphis, TN	8,950	1,670	4.6	5,350	0.93
Miami, FL	27,370	3,630	4.6	7,540	1.32
Nashville, TN	9,020	1,560	3.5	5,770	0.93
New Orleans, LA	7,080	1,130	4.2	6,290	1.09
Norfolk, VA	7,890	1,220	3.5	6,450	0.92
Orlando, FL	8,370	1,790	3.8	4,680	0.82
Tampa, FL	7,500	1,160	3.8	6,470	1.06
Southwestern Cities					
Albuquerque, NM	7,250	1,330	4.0	5,450	0.96
Austin, TX	4,030	770	4.2	5,210	0.95
Corpus Christi, TX	2,580	600	4.1	4,320	0.75
Dallas, TX	14,650	2,880	4.9	5,080	1.07
Denver, CO	17,870	2,990	3.9	5,970	1.07
El Paso, TX	5,380	1,380	4.3	3,880	0.77
Fort Worth, TX	7,570	1,510	4.2	5,000	0.95
Houston, TX	18,350	3,540	4.5	5,180	1.13
Phoenix, AZ	29,790	5,390	4.3	5,520	1.08
Salt Lake City, UT	4,300	700	4.0	6,140	0.92
San Antonio, TX	9,660	1,820	3.6	5,310	0.91
Western Cities					
Honolulu, HI	3,110	390	3.8	7,880	1.13
Los Angeles, CA	133,630	20,210	4.1	6,610	1.54
Portland, OR	7,080	1,060	3.5	6,670	1.11
Sacramento, CA	12,640	2,010	4.2	6,280	1.04
San Bernardino-Riv, CA	17,870	3,410	4.2	5,240	1.21
San Diego, CA	15,540	2,790	3.5	5,560	1.21
San Fran-Oak, CA	22,860	3,780	4.0	6,040	1.33
San Jose, CA	11,750	2,210	4.2	5,330	1.05
Seattle-Everett, WA	15,840	2,640	3.5	6,000	1.23
Northeastern Avg	30,900	4,700	3.5	6,320	1.07
Midwestern Avg	15,900	2,640	3.6	5,670	0.99
Southern Avg	11,010	1,850	4.0	5,830	1.01
Southwestern Avg	11,040	2,080	4.2	5,190	0.96
Western Avg	26,700	4,280	3.9	6,180	1.21
Texas Avg	8,890	1,790	4.3	4,860	0.93
Total Avg	17,800	2,930	3.8	5,780	1.04
Maximum Value	133,630	20,210	4.9	7,880	1.54
Minimum Value	2,580	390	2.5	3,880	0.75

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-27. Summary of 1994 Relative Mobility Values for Freeways and Expressways

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	30,270	2,230	5.5	13,570	1.06
Boston, MA	35,020	2,450	5.9	14,310	1.08
Hartford, CT	11,370	990	5.6	11,490	0.93
New York, NY	141,800	10,150	5.7	13,970	1.15
Philadelphia, PA	33,680	2,790	5.1	12,090	1.05
Pittsburgh, PA	15,170	1,880	4.3	8,050	0.83
Washington, DC	49,310	2,700	5.4	18,230	1.43
Midwestern Cities					
Chicago, IL	67,820	4,160	5.7	16,300	1.28
Cincinnati, OH	21,690	1,590	5.7	13,680	1.05
Cleveland, OH	24,810	1,930	4.9	12,840	1.00
Columbus, OH	16,380	1,350	5.9	12,110	0.95
Detroit, MI	47,660	2,950	6.0	16,130	1.24
Indianapolis, IN	15,300	1,320	5.5	11,590	0.92
Kansas City, MO	25,160	2,520	4.6	9,990	0.80
Louisville, KY	12,240	1,040	4.6	11,780	0.95
Milwaukee, WI	12,560	970	5.6	12,890	1.00
Minn-St. Paul, MN	33,330	2,500	5.0	13,350	1.04
Oklahoma City, OK	12,480	1,190	5.2	10,470	0.85
St. Louis, MO	33,170	2,790	5.7	11,870	0.98
Southern Cities					
Atlanta, GA	53,130	3,460	6.4	15,350	1.18
Charlotte, NC	6,170	530	4.3	11,610	0.94
Ft. Lauderdale, FL	14,970	1,170	5.5	12,830	0.99
Jacksonville, FL	10,500	840	4.8	12,540	0.97
Memphis, TN	8,690	760	5.4	11,490	0.94
Miami, FL	17,030	1,070	5.5	15,900	1.32
Nashville, TN	12,480	1,080	4.9	11,570	0.96
New Orleans, LA	8,870	670	5.8	13,280	1.11
Norfolk, VA	9,780	930	4.7	10,470	0.93
Orlando, FL	10,830	1,050	5.0	10,350	0.86
Tampa, FL	7,250	560	5.0	12,860	1.07
Southwestern Cities					
Albuquerque, NM	4,700	400	5.1	11,680	0.98
Austin, TX	10,590	870	5.6	12,180	0.97
Corpus Christi, TX	3,470	370	5.5	9,370	0.76
Dallas, TX	41,380	2,930	6.0	14,120	1.09
Denver, CO	21,690	1,610	5.3	13,480	1.07
El Paso, TX	6,150	600	5.3	10,190	0.78
Fort Worth, TX	22,280	1,810	5.9	12,300	0.97
Houston, TX	53,070	3,620	6.4	14,650	1.12
Phoenix, AZ	16,740	1,210	5.8	13,870	1.09
Salt Lake City, UT	10,350	880	5.7	11,800	0.94
San Antonio, TX	18,560	1,590	5.4	11,640	0.92
Western Cities					
Honolulu, HI	9,020	640	5.3	14,000	1.13
Los Angeles, CA	181,930	8,900	8.2	20,430	1.52
Portland, OR	13,910	1,010	5.2	13,820	1.11
Sacramento, CA	17,110	1,310	7.0	13,040	1.06
San Bernardino-Riv, CA	24,960	1,550	7.2	16,060	1.20
San Diego, CA	44,800	2,820	7.6	15,900	1.21
San Fran-Oak, CA	68,960	3,940	6.8	17,480	1.33
San Jose, CA	27,170	1,980	6.7	13,720	1.06
Seattle-Everett, WA	34,290	2,090	6.0	16,380	1.25
Northeastern Avg	45,230	3,310	5.4	13,100	1.08
Midwestern Avg	26,880	2,030	5.4	12,750	1.01
Southern Avg	14,520	1,100	5.2	12,570	1.02
Southwestern Avg	19,000	1,450	5.6	12,300	0.97
Western Avg	46,910	2,690	6.7	15,650	1.21
Texas Avg	22,210	1,690	5.7	12,060	0.94
Total Avg	28,600	2,000	5.6	13,180	1.05
Maximum Value	181,930	10,150	8.2	20,430	1.52
Minimum Value	3,470	370	4.3	8,050	0.76

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

Table D-28. Summary of 1994 Relative Mobility Values for Principal Arterial Streets

Urban Area	DVKT[1] (1000)	Lane-km	Average No. Lanes	DVKT/[2] Lane-km	Congestion Index
Northeastern Cities					
Baltimore, MD	16,180	2,780	4.1	5,830	1.06
Boston, MA	22,940	4,690	2.5	4,900	1.08
Hartford, CT	6,150	1,080	3.8	5,700	0.93
New York, NY	89,680	12,480	3.4	7,190	1.15
Philadelphia, PA	35,420	5,310	3.3	6,670	1.05
Pittsburgh, PA	18,930	3,020	3.2	6,270	0.83
Washington, DC	29,790	3,830	4.0	7,770	1.43
Midwestern Cities					
Chicago, IL	59,570	8,650	3.9	6,880	1.28
Cincinnati, OH	7,120	1,340	3.5	5,300	1.05
Cleveland, OH	10,100	1,880	3.0	5,390	1.00
Columbus, OH	5,800	1,050	3.5	5,540	0.95
Detroit, MI	43,500	7,120	4.5	6,110	1.24
Indianapolis, IN	8,450	1,610	3.8	5,250	0.92
Kansas City, MO	9,050	1,820	3.6	4,970	0.80
Louisville, KY	5,880	1,010	3.7	5,790	0.95
Milwaukee, WI	9,820	1,900	3.4	5,170	1.00
Minn-St. Paul, MN	11,500	2,000	3.5	5,760	1.04
Oklahoma City, OK	7,490	1,410	3.4	5,310	0.85
St. Louis, MO	20,490	3,220	3.6	6,360	0.98
Southern Cities					
Atlanta, GA	20,530	3,410	3.8	6,010	1.18
Charlotte, NC	5,300	970	3.3	5,480	0.94
Ft. Lauderdale, FL	10,380	2,030	4.5	5,120	0.99
Jacksonville, FL	10,550	2,170	3.9	4,850	0.97
Memphis, TN	9,290	1,720	4.6	5,390	0.94
Miami, FL	27,610	3,780	4.6	7,310	1.32
Nashville, TN	9,500	1,570	3.5	6,050	0.96
New Orleans, LA	8,090	1,190	4.2	6,790	1.11
Norfolk, VA	8,170	1,240	3.5	6,590	0.93
Orlando, FL	10,140	1,930	3.8	5,250	0.86
Tampa, FL	8,080	1,290	3.8	6,280	1.07
Southwestern Cities					
Albuquerque, NM	7,680	1,370	4.0	5,610	0.98
Austin, TX	4,700	830	4.2	5,670	0.97
Corpus Christi, TX	2,750	610	4.1	4,500	0.76
Dallas, TX	16,950	3,090	4.9	5,480	1.09
Denver, CO	18,110	3,040	3.9	5,950	1.07
El Paso, TX	5,470	1,410	4.3	3,890	0.78
Fort Worth, TX	9,050	1,670	4.2	5,430	0.97
Houston, TX	18,900	3,620	4.5	5,220	1.12
Phoenix, AZ	29,980	5,390	4.3	5,560	1.09
Salt Lake City, UT	4,590	800	4.0	5,760	0.94
San Antonio, TX	9,760	1,830	3.6	5,340	0.92
Western Cities					
Honolulu, HI	3,120	410	3.8	7,610	1.13
Los Angeles, CA	134,270	20,210	4.1	6,650	1.52
Portland, OR	7,570	1,130	3.5	6,710	1.11
Sacramento, CA	12,800	2,040	4.2	6,260	1.06
San Bernardino-Riv, CA	17,950	3,420	4.2	5,250	1.20
San Diego, CA	15,780	2,860	3.5	5,520	1.21
San Fran-Oak, CA	23,670	3,800	4.0	6,230	1.33
San Jose, CA	11,710	2,220	4.2	5,270	1.06
Seattle-Everett, WA	15,900	2,680	3.5	5,930	1.25
Northeastern Avg	31,300	4,740	3.5	6,330	1.08
Midwestern Avg	16,560	2,750	3.6	5,650	1.01
Southern Avg	11,600	1,940	4.0	5,920	1.02
Southwestern Avg	11,630	2,150	4.2	5,310	0.97
Western Avg	26,970	4,310	3.9	6,160	1.21
Texas Avg	9,660	1,870	4.3	5,080	0.94
Total Avg	18,320	3,000	3.8	5,820	1.05
Maximum Value	134,270	20,210	4.9	7,770	1.52
Minimum Value	2,750	410	2.5	3,890	0.76

Notes: [1] Daily vehicle-kilometers of travel.
[2] Daily vehicle-kilometer of travel per lane-kilometer of roadway.

Source: TTI Analysis and Local Transportation Agency References

APPENDIX E

URBAN AREA
MOBILITY AND CONGESTION STATISTICS

Table E-1. Mobility and Congestion Variables in Albuquerque, NM

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	2,471	2,600	2,753	2,930	3,107	3,260	3,582	3,719	3,864	3,993	4,025	4,411	4,701
Lane-Kilometers	306	306	306	314	314	322	330	346	354	362	370	386	403
VKT/lane-kilometer	8,079	8,500	9,000	9,333	9,897	10,125	10,854	10,744	10,909	11,022	10,870	11,417	11,680
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	5	5	5	10	10	10	20	20	20	20	20	20	25
Percent of Moderate Congestion	100	90	80	60	30	10	35	33	28	37	37	38	30
Percent of Heavy Congestion	-	10	20	40	60	40	40	40	47	39	37	35	36
Percent of Severe Congestion	-	-	-	-	10	50	25	27	26	24	26	27	44
Principal Arterial Streets													
Daily VKT (000)	4,605	4,959	5,426	5,796	6,038	6,279	6,440	6,762	6,923	6,843	6,923	7,245	7,680
Lane-kilometers	918	926	942	966	990	1047	1,127	1127	1159	1208	1240	1328	1369
VKT/lane-kilometer	5,018	5,357	5,761	6,000	6,098	6,000	5,714	6,000	5,972	5,667	5,584	5,455	5,612
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	35	40	45	40	40	40	35	40	40	40	40	45	45
Percent of Moderate Congestion	48.00	68.00	49.00	53.00	63.00	60.00	58.00	58.00	48.00	46.00	43.00	38.00	33.00
Percent of Heavy Congestion	39.00	15.00	35.00	24.00	20.00	25.00	30.00	28.00	40.00	44.00	40.00	45.00	49.00
Percent of Severe Congestion	13.00	18.00	16.00	22.00	17.00	15.00	12.00	13.00	12.00	10.00	18.00	17.00	18.00
Population (000)	440	450	455	465	475	485	490	500	505	520	525	530	540
Urban Area (square kilometers)	544	544	570	596	622	635	648	648	660	673	673	673	686
Population Density	809	827	799	781	764	764	757	772	765	772	780	787	787
Registered Vehicles (000)	330	340	350	360	360	370	380	390	390	410	410	410	420
Fuel Cost ($/liter)	-	-	-	-	0.26	0.28	0.30	0.33	0.36	0.35	0.35	0.34	0.33
Total VKT (000)	11,682	12,544	13,405	14,266	14,720	15,174	15,627	16,380	16,491	16,343	16,678	17,193	18,642
Total Lane-Kilometers	2,673	2,705	2,713	2,724	2,818	2,892	2,946	2,950	2,953	2,979	2,995	3,004	3,069
Roadway Congestion Index	0.78	0.83	0.89	0.93	0.96	0.96	0.96	0.98	0.98	0.96	0.95	0.96	0.98

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-2. Mobility and Congestion Variables in Atlanta, GA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	25,382	27,378	29,149	31,282	34,663	36,974	38,543	39,598	40,186	41,458	42,665	48,300	53,130
Lane-Kilometers	2,198	2,270	2,375	2,439	2,544	2,640	2,657	2,705	2,753	2,777	2,818	3,220	3,462
VKT/lane-kilometer	11,549	12,060	12,275	12,825	13,627	14,003	14,509	14,640	14,596	14,928	15,143	15,000	15,349
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	40	40	45	50	50	50	45	45	45	45	50	50	50
Percent of Moderate Congestion	40	39	51	48	35	25	20	18	14	9	10	12	9
Percent of Heavy Congestion	50	48	39	38	40	40	40	26	28	38	40	30	33
Percent of Severe Congestion	10	13	10	15	25	35	40	55	58	53	50	58	58
Principal Arterial Streets													
Daily VKT (000)	10,529	11,334	12,011	13,468	14,579	15,054	15,754	15,633	15,746	15,923	16,100	19,320	20,528
Lane-kilometers	1,964	2,077	2,149	2,174	2198	2,246	2,399	2,512	2,528	2,536	2,608	3,220	3,413
VKT/lane-kilometer	5,361	5,457	5,588	6,196	6,634	6,703	6,567	6,224	6,229	6,279	6,173	6,000	6,014
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	60	60	65	65	65	65	65	65	65	65	65	65	65
Percent of Moderate Congestion	30.00	21.00	36.00	29.00	25.00	18.00	19.00	18.00	13.00	15.00	15.00	17.00	16.00
Percent of Heavy Congestion	40.00	46.00	33.00	34.00	34.00	34.00	28.00	18.00	22.00	26.00	19.00	15.00	18.00
Percent of Severe Congestion	30.00	33.00	31.00	37.00	42.00	49.00	54.00	63.00	65.00	59.00	66.00	68.00	66.00
Population (000)	1,610	1,610	1,610	1,615	1,695	1,770	1,900	2,000	2,100	2,150	2,275	2,320	2,400
Urban Area (square kilometers)	3,781	3,807	3,807	3,885	3,937	3,963	4,079	4,183	4,209	4,274	4,403	4,558	4,584
Population Density	426	423	423	416	431	447	466	478	499	503	517	509	524
Registered Vehicles (000)	1,230	1,240	1,240	1,250	1,310	1,380	1,480	1,560	1,650	1,690	1,790	1,830	1,900
Fuel Cost ($/liter)	-	-	-	-	0.25	0.27	0.29	0.32	0.34	0.33	0.33	0.29	0.28
Total VKT (000)	51,396	64,363	69,789	77,744	85,444	91,395	93,766	96,138	98,509	100,878	118,525	126,068	131,780
Total Lane-Kilometers	8,813	12,534	13,030	13,510	13,522	13,735	13,809	14,112	15,120	15,805	15,878	17,633	19,331
Roadway Congestion Index	0.91	0.95	0.97	1.02	1.09	1.11	1.14	1.14	1.14	1.16	1.17	1.16	1.18

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-3. Mobility and Congestion Variables in Austin, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	4,556	5,104	5,796	6,762	7,245	8,292	8,404	8,533	8,758	8,855	9,097	10,336	10,586
Lane-Kilometers	427	451	531	580	612	644	676	684	725	733	741	853	869
VKT/lane-kilometer	10,679	11,321	10,909	11,667	11,842	12,875	12,429	12,471	12,089	12,088	12,283	12,113	12,176
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	50	50	50	55	55	55	55	55	55	55	55	55	60
Percent of Moderate Congestion	30	27	30	36	33	40	36	36	33	34	35	26	21
Percent of Heavy Congestion	50	55	44	33	26	20	27	31	36	38	35	36	35
Percent of Severe Congestion	20	19	26	31	41	40	36	33	31	28	30	38	43
Principal Arterial Streets													
Daily VKT (000)	2,568	2,753	2,938	3,220	3,526	3,462	3,325	3,301	3,365	3,462	3,542	4,025	4,701
Lane-kilometers	547	580	612	644	660	668	676	684	692	700	716	773	829
VKT/lane-kilometer	4,691	4,750	4,803	5,000	5,341	5,181	4,917	4,824	4,860	4,943	4,944	5,208	5,670
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	40	40	45	45	45	45	45	45	45	45	45	50	50
Percent of Moderate Congestion	15.00	16.00	23.00	19.00	20.00	16.00	30.00	37.00	33.00	33.00	35.00	38.00	36.00
Percent of Heavy Congestion	65.00	65.00	59.00	51.00	24.00	33.00	30.00	38.00	34.00	37.00	35.00	31.00	35.00
Percent of Severe Congestion	19.00	18.00	18.00	30.00	56.00	51.00	40.00	25.00	33.00	30.00	30.00	31.00	29.00
Population (000)	380	380	420	450	465	480	505	520	540	560	565	570	590
Urban Area (square kilometers)	777	777	829	842	855	881	894	894	907	932	945	958	984
Population Density	489	489	507	535	544	545	565	582	596	601	598	595	599
Registered Vehicles (000)	300	300	330	350	370	380	400	410	430	440	450	450	470
Fuel Cost ($/liter)	-	-	-	-	0.25	0.28	0.30	0.32	0.35	0.34	0.34	0.31	0.30
Total VKT (000)	11,433	12,840	13,849	17,457	18,542	18,629	18,776	18,723	19,312	19,243	20,297	24,061	24,989
Total Lane-Kilometers	2,500	2,602	3,027	3,470	3,598	3,821	3,975	4,141	4,139	4,143	4,146	4,551	5,081
Roadway Congestion Index	0.84	0.88	0.86	0.91	0.94	1.00	0.96	0.96	0.94	0.94	0.95	0.95	0.97

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\dfrac{\textit{Freeway VKT/Ln.-Km.}}{13{,}000^{1}} \times \textit{Freeway VKT} + \dfrac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{5{,}000^{1}} \times \textit{Prin. Art. Str. VKT}}{\textit{Freeway VKT} + \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-4. Mobility and Congestion Variables in Baltimore, MD

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	16,486	16,986	17,517	19,594	20,954	22,113	22,411	24,440	25,438	26,146	28,336	28,980	30,268
Lane-Kilometers	1,586	1,650	1,715	1,932	1,956	1,956	1,964	1,980	2,013	2,045	2,174	2206	2230
VKT/lane-kilometer	10,396	10,293	10,216	10,142	10,712	11,305	11,410	12,341	12,640	12,787	13,037	13,139	13,574
Incident Ratio	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	20	20	25	25	25	25	25	25	25	25	30	30	30
Percent of Moderate Congestion	71	80	59	54	59	57	47	24	23	24	28	29	22
Percent of Heavy Congestion	2	2	32	21	27	22	21	36	30	28	22	19	28
Percent of Severe Congestion	-	-	9	25	14	22	33	40	47	49	50	52	50
Principal Arterial Streets													
Daily VKT (000)	12,043	12,526	13,331	13,878	14,377	14,522	14,748	15,013	15,859	15,899	15,939	16,100	16,181
Lane-kilometers	2,415	2,439	2,479	2,600	2,640	2,705	2,737	2,697	2,673	2,689	2,689	2,737	2,777
VKT/lane-kilometer	4,987	5,135	5,377	5,337	5,445	5,369	5,388	5,567	5,934	5,913	5,928	5,882	5,826
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	25	25	30	35	35	35	35	35	35	35	35	40	40
Percent of Moderate Congestion	13.00	9.00	11.00	13.00	14.00	19.00	20.00	17.00	13.00	9.00	14.00	13.00	23.00
Percent of Heavy Congestion	29.00	25.00	22.00	17.00	23.00	13.00	14.00	22.00	13.00	23.00	16.00	21.00	13.00
Percent of Severe Congestion	58.00	66.00	68.00	71.00	62.00	68.00	66.00	60.00	75.00	68.00	70.00	66.00	65.00
Population (000)	1,700	1,750	1,820	1,840	1,860	1,875	1,905	1,915	1,990	2,020	2,040	2,110	2,130
Urban Area (square kilometers)	1,166	1,269	1,347	1,347	1,347	1,360	1,373	1,399	1,489	1,554	1,684	1,852	1,878
Population Density	1,459	1,379	1,351	1,366	1,381	1,379	1,388	1,369	1,336	1,300	1,212	1,139	1,134
Registered Vehicles (000)	1,300	1,340	1,400	1,420	1,440	1,460	1,480	1,490	1,560	1,580	1,600	1,660	1,680
Fuel Cost ($/liter)	-	-	-	-	-	0.28	0.31	0.35	0.38	0.37	0.37	0.34	0.32
Total VKT (000)	39,390	42,837	45,843	49,023	51,330	52,955	53,666	56,274	58,562	59,446	62,262	64,572	66,472
Total Lane-Kilometers	7,200	7,844	9,077	9,185	9,256	9,333	9,420	9,517	9,576	9,678	10,103	10,157	10,225
Roadway Congestion Index	0.84	0.84	0.85	0.84	0.88	0.91	0.92	0.98	1.01	1.02	1.04	1.04	1.06

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-5. Mobility and Congestion Variables in Boston, MA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	25,607	27,072	27,845	29,302	32,297	32,530	36,571	35,541	34,792	34,905	35,251	34,615	35,018
Lane-Kilometers	2,270	2,278	2,294	2,335	2,367	2,399	2,431	2,439	2,447	2,447	2,439	2,431	2,447
VKT/lane-kilometer	11,280	11,883	12,137	12,552	13,646	13,560	15,043	14,571	14,217	14,263	14,452	14,238	14,309
Incident Ratio	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	30	30	35	35	40	40	45	45	45	45	45	45	45
Percent of Moderate Congestion	13	21	30	44	30	43	27	18	23	15	13	21	22
Percent of Heavy Congestion	33	29	20	12	20	24	28	35	34	35	31	29	12
Percent of Severe Congestion	54	50	50	44	50	33	45	47	43	50	55	51	66
Principal Arterial Streets													
Daily VKT (000)	20,536	20,914	21,172	21,711	21,590	22,057	20,705	20,367	20,189	20,125	20,922	22,540	22,943
Lane-kilometers	4,154	4,186	4,202	4,218	4,242	4,315	4,331	4,355	4,444	4,444	4,589	4,653	4,685
VKT/lane-kilometer	4,944	4,996	5,038	5,147	5,089	5,112	4,781	4,677	4,543	4,529	4,560	4,844	4,897
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	35	35	35	35	35	35	40	40	40	40	40	40	40
Percent of Moderate Congestion	30	18	17	16	19	21	21	19	19	28	30	26	24
Percent of Heavy Congestion	16	31	23	19	18	11	23	20	16	14	20	22	22
Percent of Severe Congestion	54	51	60	65	64	67	56	61	64	58	49	52	54
Population (000)	2,850	2,760	2,760	2,760	2,760	2,850	2,905	2,950	2,955	2,955	2,960	2,975	2,985
Urban Area (square kilometers)	2,357	2,668	2,668	2,668	2,668	2,681	2,707	2,758	2,771	2,771	2,771	2,849	2,901
Population Density	1,209	1,035	1,035	1,035	1,035	1,063	1,073	1,069	1,066	1,066	1,068	1,044	1,029
Registered Vehicles (000)	2,320	2,250	2,250	2,260	2,260	2,340	2,390	2,440	2,450	2,450	2,460	2,480	2,490
Fuel Cost ($/liter)	-	-	-	-	-	0.26	0.28	0.31	0.36	0.35	0.36	0.33	0.31
Total VKT (000)	70,277	72,142	73,154	75,131	78,017	78,779	79,312	82,780	82,659	83,142	84,319	86,763	87,281
Total Lane-Kilometers	14,818	14,815	14,815	14,822	14,820	14,822	14,825	14,825	15,010	15,131	15,131	15,532	15,557
Roadway Congestion Index	0.90	0.93	0.95	0.98	1.04	1.04	1.12	1.09	1.06	1.06	1.07	1.07	1.08

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-6. Mobility and Congestion Variables in Charlotte, NC

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	2,842	3,059	3,220	3,437	3,590	3,711	3,888	4,411	4,653	4,830	5,152	5,635	6,166
Lane-Kilometers	403	411	427	435	443	451	451	475	483	483	491	507	531
VKT/lane-kilometer	7,060	7,451	7,547	7,907	8,109	8,232	8,625	9,288	9,633	10,000	10,492	11,111	11,606
Incident Ratio	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	20	20	20	25	25	25	25	30	30	35	35	35	35
Percent of Moderate Congestion	100	100	100	81	94	94	84	84	84	85	55	47	51
Percent of Heavy Congestion	-	-	-	19	6	6	16	16	16	15	19	27	30
Percent of Severe Congestion	-	-	-	-	-	-	-	-	-	-	26	26	19
Principal Arterial Streets													
Daily VKT (000)	3,775	4,122	4,202	4,339	4,444	4,572	4,580	4,597	4,967	5,136	5,152	5,192	5,297
Lane-kilometers	725	741	757	789	805	821	837	853	861	869	934	950	966
VKT/lane-kilometer	5,211	5,565	5,553	5,500	5,520	5,569	5,471	5,387	5,766	5,907	5,517	5,466	5,483
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	45	50	50	55	55	55	60	60	60	60	60	60	60
Percent of Moderate Congestion	21	17	18	19	20	17	21	22	14	16	18	16	19
Percent of Heavy Congestion	48	44	49	43	44	33	26	22	33	22	23	26	26
Percent of Severe Congestion	32	39	34	39	35	50	53	56	52	62	59	58	55
Population (000)	350	350	355	360	400	415	435	440	450	460	500	515	540
Urban Area (square kilometers)	518	544	570	583	583	596	596	622	622	673	751	777	803
Population Density	676	644	623	618	686	697	730	708	724	683	666	663	673
Registered Vehicles (000)	270	270	270	280	310	320	340	340	350	360	400	410	430
Fuel Cost ($/liter)	-	-	-	-	-	0.27	0.29	0.32	0.36	0.35	0.35	0.31	0.30
Total VKT (000)	10,859	11,283	11,507	12,383	12,399	12,370	13,910	14,823	16,335	17,034	18,333	19,048	20,643
Total Lane-Kilometers	2,903	2,964	2,998	3,053	3,078	3,159	3,199	3,299	3,350	3,452	3,655	3,766	3,822
Roadway Congestion Index	0.71	0.76	0.76	0.77	0.78	0.79	0.80	0.82	0.86	0.89	0.89	0.92	0.94

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-7. Mobility and Congestion Variables in Chicago, IL

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	40,983	41,602	43,092	46,159	49,821	49,821	51,464	55,448	61,228	62,758	63,112	65,954	67,821
Lane-Kilometers	3,292	3,309	3,341	3,429	3,510	3,518	3,550	3,703	3,904	3,920	3,928	4,162	4,162
VKT/lane-kilometer	12,447	12,574	12,899	13,460	14,195	14,162	14,497	14,974	15,682	16,008	16,066	15,847	16,296
Incident Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	50	50	55	55	55	55	55	55	55	55	60	60	60
Percent of Moderate Congestion	19	28	15	9	7	9	11	16	12	13	17	18	14
Percent of Heavy Congestion	30	36	21	16	15	22	22	15	20	16	12	12	17
Percent of Severe Congestion	52	36	65	75	78	68	69	68	68	71	71	70	70
Principal Arterial Streets													
Daily VKT (000)	33,665	34,776	36,322	36,821	40,218	40,194	41,965	45,048	47,415	50,771	52,808	56,350	59,570
Lane-kilometers	5,587	5,780	5,949	5,989	6,005	6,021	6,046	6,521	6,859	7,181	7,487	8,211	8,654
VKT/lane-kilometer	6,026	6,017	6,106	6,148	6,697	6,675	6,941	6,909	6,913	7,071	7,054	6,863	8,884
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	60	65	65	70	70	70	65	65	65	65	70	65	65
Percent of Moderate Congestion	24	24	23	25	16	20	22	20	25	23	19	20	22
Percent of Heavy Congestion	36	36	25	11	15	12	23	26	29	28	31	35	30
Percent of Severe Congestion	40	39	52	64	69	68	55.00	54	47	49	50	45	48
Population (000)	7,080	7,100	7,100	7,100	7,160	7,200	7,340	7,405	7,510	7,515	7,515	7,600	7,700
Urban Area (square kilometers)	4,921	5,076	5,076	5,076	5,076	5,076	5,154	5,141	5,154	5,310	5,633	5,828	6,475
Population Density	1,439	1,399	1,399	1,399	1,410	1,418	1,424	1,440	1,457	1,415	1,334	1,304	1,189
Registered Vehicles (000)	5,320	5,350	5,370	5,380	5,440	5,490	5,610	5,670	5,770	5,790	5,790	5,870	5,970
Fuel Cost ($/liter)	-	-	-	-	-	0.28	0.31	0.34	0.39	0.37	0.38	0.33	0.32
Total VKT (000)	154,252	158,715	163,536	166,839	172,969	176,435	181,944	192,622	198,788	203,567	204,840	220,865	234,868
Total Lane-Kilometers	30,490	30,542	30,577	30,501	30,547	30,780	30,815	30,943	31,087	31,131	31,342	34,625	37,938
Roadway Congestion Index	1.02	1.02	1.05	1.08	1.15	1.15	1.18	1.21	1.25	1.27	1.28	1.26	1.28

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-8. Mobility and Congestion Variables in Cincinnati, OH

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	13,661	13,661	13,935	14,240	14,345	15,392	15,698	17,533	18,322	18,676	19,175	20,713	21,695
Lane-Kilometers	1,208	1,272	1,304	1,320	1,320	1,360	1,360	1,433	1,457	1,465	1,473	1,554	1,586
VKT/lane-kilometer	11,313	10,741	10,685	10,787	10,866	11,314	11,538	12,236	12,575	12,747	13,016	13,332	13,680
Incident Ratio	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	20	20	20	20	20	25	30	30	30	30	35	35	35
Percent of Moderate Congestion	96	81	56	47	55	66	54	67	60	58	48	31	33
Percent of Heavy Congestion	-	15	34	40	35	28	35	23	27	32	39	45	41
Percent of Severe Congestion	4	4	10	13	10	7	11	10	13	10	13	24	26
Principal Arterial Streets													
Daily VKT (000)	4,862	5,096	5,192	5,297	5,216	5,337	5,530	5,828	5,909	6,923	7,245	7,084	7,124
Lane-kilometers	1,248	1,248	1,248	1,256	1,256	1,272	1,280	1,280	1,320	1,328	1,328	1,328	1,344
VKT/lane-kilometer	3,897	4,084	4,161	4,218	4,154	4,196	4,321	4,553	4,476	5,212	5,455	5,333	5,299
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	20	20	20	25	25	25	25	25	25	30	30	30	30
Percent of Moderate Congestion	41	43	33	26	34	43	22	41	40	38	33	36	36
Percent of Heavy Congestion	37	38	40	48	29	24	30	13	13	14	23	25	25
Percent of Severe Congestion	22	20	27	26	37	32	49	46	48	48	45	38	39
Population (000)	1,130	1,130	1,130	1,130	1,130	1,130	1,130	1,140	1,140	1,200	1,220	1,250	1,255
Urban Area (square kilometers)	1,450	1,450	1,450	1,450	1,450	1,450	1,450	1,463	1,476	1,528	1,632	1,658	1,671
Population Density	779	779	779	779	779	779	779	779	772	785	748	754	751
Registered Vehicles (000)	870	870	870	870	880	880	880	880	880	930	950	970	970
Fuel Cost ($/liter)	-	-	-	-	-	0.27	0.30	0.34	0.36	0.35	0.35	0.31	0.31
Total VKT (000)	31,624	32,487	33,061	33,491	33,940	35,396	36,117	36,987	38,709	42,692	44,869	46,291	47,691
Total Lane-Kilometers	5,822	5,848	5,918	5,963	6,015	6,021	6,055	6,091	6,097	6,128	6,360	6,683	7,517
Roadway Congestion Index	0.86	0.83	0.82	0.83	0.84	0.87	0.88	0.94	0.96	0.99	1.01	1.03	1.05

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-9. Mobility and Congestion Variables in Cleveland, OH

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	16,100	16,454	16,760	16,189	17,235	18,008	20,399	21,268	22,057	22,492	22,798	24,102	24,810
Lane-Kilometers	1,546	1,546	1,546	1,546	1,546	1,546	1,594	1,707	1,852	1,868	1,900	1,916	1,932
VKT/lane-kilometer	10,417	10,646	10,844	10,474	11,151	11,651	12,798	12,462	11,913	12,043	12,000	12,580	12,842
Incident Ratio	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	20	20	25	25	25	25	25	30	30	30	30	35	35
Percent of Moderate Congestion	100	100	82	69	69	64	55	50	60	60	52	47	35
Percent of Heavy Congestion	-	-	18	23	23	29	41	37	32	30	23	24	29
Percent of Severe Congestion	-	-	-	8	8	7	5	13	8	10	26	30	36
Principal Arterial Streets													
Daily VKT (000)	7,237	7,285	7,317	7,462	7,615	7,792	8,066	8,509	9,644	9,741	10,143	9,982	10,103
Lane-kilometers	1,771	1,771	1,771	1,771	1,771	1,771	1,787	1,795	1,803	1,811	1,835	1,843	1,876
VKT/lane-kilometer	4,086	4,114	4,132	4,214	4,300	4,400	4,514	4,740	5,348	5,378	5,526	5,415	5,386
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	20	20	20	20	20	25	30	30	30	30	35	30	35
Percent of Moderate Congestion	100.00	100.00	100.00	100.00	62.00	42.00	47.00	34.00	35.00	36.00	21.00	26.00	32.00
Percent of Heavy Congestion	-	-	-	-	38.00	58.00	45.00	42.00	33.00	34.00	46.00	41.00	42.00
Percent of Severe Congestion	-	-	-	-	-	-	9.00	24.00	32.00	30.00	33.00	32.00	26.00
Population (000)	1,750	1,750	1,750	1,750	1,750	1,750	1,785	1,785	1,790	1,790	1,790	1,800	1,810
Urban Area (square kilometers)	1,632	1,632	1,632	1,632	1,632	1,632	1,658	1,658	1,671	1,671	1,709	1,813	1,917
Population Density	1,073	1,073	1,073	1,073	1,073	1,073	1,077	1,077	1,072	1,072	1,047	993	944
Registered Vehicles (000)	1,320	1,320	1,320	1,320	1,320	1,320	1,350	1,350	1,360	1,360	1,360	1,370	1,380
Fuel Cost ($/liter)	-	-	-	-	-	0.27	0.30	0.34	0.36	0.35	0.35	0.31	0.31
Total VKT (000)	40,224	41,557	42,335	42,087	43,647	44,824	47,857	50,878	53,080	55,437	56,239	56,377	57,490
Total Lane-Kilometers	8,211	8,243	8,296	8,301	8,628	8,869	8,879	8,898	8,913	8,915	8,939	8,905	8,939
Roadway Congestion Index	0.80	0.82	0.83	0.81	0.86	0.89	0.97	0.96	0.94	0.95	0.95	0.98	1.00

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-10. Mobility and Congestion Variables in Columbus, OH

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	9,708	10,401	10,546	10,731	11,769	12,381	12,630	13,041	14,490	14,893	15,231	15,698	16,382
Lane-Kilometers	1,135	1,159	1,175	1,208	1,232	1,248	1,264	1,272	1,288	1,296	1,304	1,328	1,352
VKT/lane-kilometer	8,553	8,972	8,973	8,887	9,556	9,923	9,994	10,253	11,250	11,491	11,679	11,818	12,113
Incident Ratio	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	25	25	25	25	25	25	25	25	30	30	30	30	30
Percent of Moderate Congestion	25	29	28	38	26	7	6	12	8	10	10	7	13
Percent of Heavy Congestion	48	45	28	24	44	39	40	40	40	40	30	33	25
Percent of Severe Congestion	27	26	44	38	30	54	54	48	52	51	61	60	62
Principal Arterial Streets													
Daily VKT (000)	3,679	3,977	4,033	4,073	4,186	4,291	4,452	4,894	5,120	5,490	5,756	5,635	5,796
Lane-kilometers	902	918	942	950	950	958	966	966	982	998	1,022	1,030	1,047
VKT/lane-kilometer	4,080	4,333	4,282	4,288	4,407	4,479	4,608	5,067	5,213	5,500	5,630	5,469	5,538
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	30	35	35	35	40	40	40	45	45	45	50	50	50
Percent of Moderate Congestion	21.00	69.00	63.00	56.00	43.00	36.00	14.00	13.00	19.00	20.00	21.00	26.00	27.00
Percent of Heavy Congestion	53.00	19.00	29.00	37.00	28.00	38.00	60.00	55.00	33.00	32.00	17.00	17.00	27.00
Percent of Severe Congestion	26.00	12.00	8.00	7.00	28.00	27.00	26.00	32.00	48.00	48.00	61.00	57.00	47.00
Population (000)	835	835	835	835	835	840	840	840	850	900	950	980	995
Urban Area (square kilometers)	790	790	790	790	790	790	790	790	803	816	907	1,036	1,140
Population Density	1,057	1,057	1,057	1,057	1,057	1,063	1,063	1,063	1,059	1,103	1,048	946	873
Registered Vehicles (000)	650	650	650	650	650	660	660	660	670	710	750	780	790
Fuel Cost ($/liter)	-	-	-	-	-	0.27	0.30	0.34	0.36	0.35	0.35	0.31	0.31
Total VKT (000)	20,057	20,742	21,033	21,413	22,247	23,029	23,857	26,512	29,597	33,269	34,156	34,890	36,024
Total Lane-Kilometers	4,589	4,746	4,867	5,038	5,041	5,052	5,102	5,141	5,142	5,146	5,175	5,431	5,455
Roadway Congestion Index	0.68	0.71	0.71	0.71	0.75	0.78	0.79	0.82	0.89	0.91	0.93	0.93	0.95

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion
"-" denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-11. Mobility and Congestion Variables in Corpus Christi, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	2,093	2,206	2,190	2,254	2,286	2,415	2,431	2,447	2,512	2,584	2,697	3,140	3,470
Lane-Kilometers	258	266	266	266	274	290	298	298	298	299	303	338	370
VKT/lane-kilometer	8,125	8,303	8,242	8,485	8,353	8,333	8,162	8,216	8,432	8,629	8,910	9,286	9,370
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	5	5	5	5	10	10	10	10	10	10	15	15	15
Percent of Moderate Congestion	100	100	100	100	100	100	100	100	100	90	78	73	59
Percent of Heavy Congestion	-	-	-	-	-	-	-	-	-	10	22	27	11
Percent of Severe Congestion	-	-	-	-	-	-	-	-	-	-	-	-	30
Principal Arterial Streets													
Daily VKT (000)	2,013	2,093	2,174	2,206	2,254	2,399	2,318	2,335	2,447	2,487	2,632	2,576	2,753
Lane-kilometers	499	507	515	515	515	515	523	531	539	564	602	596	612
VKT/lane-kilometer	4,032	4,127	4,219	4,281	4,375	4,656	4,431	4,394	4,537	4,414	4,372	4,324	4,500
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	10	10	10	10	10	10	10	10	10	15	15	15	15
Percent of Moderate Congestion	25.00	16.00	20.00	22.00	24.00	21.00	24.00	56.00	67.00	66.00	58.00	68.00	60.00
Percent of Heavy Congestion	30.00	29.00	50.00	60.00	47.00	48.00	62.00	31.00	22.00	21.00	33.00	32.00	28.00
Percent of Severe Congestion	45.00	55.00	30.00	18.00	29.00	31.00	15.00	13.00	11.00	13.00	9.00	-	12.00
Population (000)	250	250	250	260	270	275	275	275	280	285	285	290	295
Urban Area (square kilometers)	440	440	440	440	453	453	453	453	453	466	466	479	492
Population Density	568	568	568	591	596	607	607	607	618	611	611	605	599
Registered Vehicles (000)	180	180	180	190	200	200	200	200	200	210	210	210	220
Fuel Cost ($/liter)	-	-	-	-	0.25	0.28	0.30	0.32	0.35	0.34	0.34	0.31	0.30
Total VKT (000)	8,554	8,705	8,630	8,874	9,869	10,119	10,074	10,259	10,546	10,702	10,727	10,679	10,787
Total Lane-Kilometers	2,280	2,355	2,486	2,573	2,668	2,813	2,908	3,017	3,019	3,030	3,043	3,059	3,091
Roadway Congestion Index	0.67	0.69	0.69	0.71	0.71	0.72	0.70	0.70	0.72	0.72	0.74	0.75	0.76

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{13{,}000^{1}} \times \textit{Freeway VKT} + \frac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{5{,}000^{1}} \times \textit{Prin. Art. Str. VKT}}{\textit{Freeway VKT} + \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-12. Mobility and Congestion Variables in Dallas, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	27,161	29,624	32,079	33,971	36,346	35,581	36,032	36,458	38,125	38,479	39,445	40,089	41,377
Lane-Kilometers	2,496	2,544	2,608	2,640	2,657	2,673	2,697	2,721	2,753	2,761	2,818	2,866	2,930
VKT/lane-kilometer	10,884	11,646	12,299	12,866	13,682	13,313	13,361	13,399	13,848	13,936	14,000	13,989	14,121
Incident Ratio	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	45	50	50	50	55	55	55	55	55	55	55	55	55
Percent of Moderate Congestion	20	26	33	39	13	35	29	31	22	21	23	28	21
Percent of Heavy Congestion	10	9	13	20	24	20	16	24	29	25	31	34	36
Percent of Severe Congestion	70	65	53	41	63	45	55	44	48	54	46	38	43
Principal Arterial Streets													
Daily VKT (000)	10,368	11,326	12,300	12,800	13,250	13,202	13,122	13,250	13,379	13,524	13,766	14,651	16,945
Lane-kilometers	2,504	2,568	2,657	2,697	2,705	2,721	2,729	2,729	2,753	2,769	2,818	2,882	3,091
VKT/lane-kilometer	4,141	4,411	4,630	4,746	4,899	4,852	4,808	4,855	4,860	4,884	4,886	5,084	5,482
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	25	25	30	30	30	30	35	35	35	35	35	40	45
Percent of Moderate Congestion	33.00	17.00	47.00	52.00	51.00	44.00	43.00	39.00	46.00	43.00	46.00	39.00	35.00
Percent of Heavy Congestion	67.00	73.00	21.00	22.00	32.00	31.00	43.00	42.00	27.00	31.00	26.00	31.00	25.00
Percent of Severe Congestion	-	10.00	32.00	26.00	17.00	24.00	14.00	19.00	27.00	26.00	28.00	30.00	40.00
Population (000)	1,810	1,830	1,845	1,865	1,890	1,910	1,950	1,970	1,990	2,070	2,080	2,100	2,200
Urban Area (square kilometers)	3,548	3,587	3,600	3,626	3,652	3,678	3,717	3,724	3,730	3,756	3,756	3,781	4,015
Population Density	510	510	512	514	518	519	525	529	534	551	554	555	548
Registered Vehicles (000)	1,380	1,400	1,420	1,430	1,460	1,470	1,510	1,520	1,540	1,610	1,620	1,640	1,720
Fuel Cost ($/liter)	-	-	-	-	0.25	0.28	0.30	0.32	0.35	0.34	0.34	0.31	0.30
Total VKT (000)	61,898	65,166	68,027	72,291	78,611	78,911	79,529	81,001	80,709	81,828	81,949	85,330	91,770
Total Lane-Kilometers	14,590	15,166	15,731	16,382	17,042	18,014	18,769	19,822	19,827	20,125	20,608	20,930	21,091
Roadway Congestion Index	0.84	0.89	0.94	0.98	1.04	1.02	1.02	1.02	1.05	1.06	1.07	1.07	1.09

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-13. Mobility and Congestion Variables in Denver, CO

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	13,363	13,588	14,071	14,571	14,957	15,376	16,889	17,275	18,145	18,394	20,125	21,333	21,695
Lane-Kilometers	1,280	1,280	1,288	1,288	1,312	1,377	1,385	1,385	1,425	1,441	1,546	1,594	1,610
VKT/lane-kilometer	10,440	10,616	10,925	11,313	11,399	11,170	12,198	12,477	12,734	12,765	13,021	13,384	13,475
Incident Ratio	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	45	45	45	45	50	50	50	50	50	55	55	55	55
Percent of Moderate Congestion	68	40	9	35	33	31	23	29	22	22	24	20	16
Percent of Heavy Congestion	28	42	60	33	29	37	42	37	27	32	27	20	31
Percent of Severe Congestion	4	18	31	33	37	33	35	33	51	46	48	60	54
Principal Arterial Streets													
Daily VKT (000)	14,748	15,134	16,269	16,857	17,195	17,066	16,816	17,066	17,549	17,388	17,710	17,871	18,113
Lane-kilometers	2,809	2,874	2,874	2,874	2,890	2,946	2,954	2,962	2,979	2,979	2,995	2,995	3,043
VKT/lane-kilometer	5,249	5,266	5,661	5,866	5,950	5,792	5,692	5,761	5,892	5,838	5,914	5,968	5,952
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	50	50	50	50	50	50	50	50	50	50	50	55	55
Percent of Moderate Congestion	52.00	34.00	24.00	44.00	50.00	53.00	55.00	37.00	22.00	14.00	24.00	23.00	23.00
Percent of Heavy Congestion	6.00	24.00	12.00	22.00	20.00	24.00	25.00	28.00	28.00	30.00	19.00	21.00	13.00
Percent of Severe Congestion	42.00	42.00	63.00	34.00	30.00	24.00	21.00	35.00	50.00	56.00	57.00	56.00	64.00
Population (000)	1,350	1,350	1,450	1,485	1,500	1,510	1,550	1,565	1,580	1,580	1,600	1,610	1,675
Urban Area (square kilometers)	2,150	2,150	2,176	2,214	2,240	2,266	2,292	2,292	2,305	2,305	2,331	2,383	2,422
Population Density	628	628	666	671	670	666	676	683	685	685	686	676	692
Registered Vehicles (000)	1,080	1,080	1,160	1,190	1,200	1,210	1,240	1,260	1,270	1,270	1,290	1,290	1,350
Fuel Cost ($/liter)	-	-	-	-	0.27	0.29	0.32	0.32	0.37	0.36	0.37	0.34	0 33
Total VKT (000)	43,166	43,800	44,206	44,737	44,731	45,790	46,481	46,529	46,561	46,624	51,240	55,886	57,097
Total Lane-Kilometers	8,213	8,673	9,072	9,180	9,249	9,394	9,436	9,475	9,547	9,586	10,164	10,269	10,546
Roadway Congestion Index	0.88	0.89	0.93	0.96	0.97	0.95	0.99	1.01	1.03	1.03	1.05	1.07	1.07

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\text{Roadway Congestion Index (RCI)} = \frac{\frac{\text{Freeway VKT/Ln.-Km.}}{13{,}000^{1}} \times \text{Freeway VKT} + \frac{\text{Prin. Art. Str. VKT/Ln.-Km.}}{5{,}000^{1}} \times \text{Prin. Art. Str. VKT}}{\text{Freeway VKT} + \text{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-14. Mobility and Congestion Variables in Detroit, MI

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	32,522	31,645	33,416	34,543	34,889	35,098	37,062	39,526	41,932	44,114	46,046	47,495	47,656
Lane-Kilometers	2,383	2,383	2,399	2,496	2,544	2,592	2,640	2,721	2,801	2,866	2,930	2,938	2,954
VKT/lane-kilometer	13,649	13,280	13,930	13,842	13,715	13,540	14,037	14,527	14,968	15,393	15,714	16,164	16,131
Incident Ratio	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	40	35	40	35	40	40	45	45	45	45	45	50	50
Percent of Moderate Congestion	43	33	32	30	31	33	24	24	25	21	20	17	25
Percent of Heavy Congestion	32	33	32	30	27	17	18	11	12	13	9	10	8
Percent of Severe Congestion	26	33	36	40	42	50	58	65	63	66	71	73	67
Principal Arterial Streets													
Daily VKT (000)	31,121	30,445	30,791	30,968	31,306	31,467	31,669	31,910	33,609	35,710	39,445	41,860	43,502
Lane-kilometers	5,716	5,748	5,796	5,860	5,957	6,038	6,150	6,247	6,279	6,480	6,875	6,923	7,124
VKT/lane-kilometer	5,445	5,297	5,313	5,284	5,255	5,212	5,149	5,108	5,353	5,511	5,738	6,047	6,106
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	60	55	60	55	60	60	60	60	65	65	65	65	65
Percent of Moderate Congestion	41.00	44.00	20.00	10.00	7.00	6.00	15.00	8.00	14.00	13.00	8.00	15.00	11.00
Percent of Heavy Congestion	15.00	11.00	30.00	20.00	11.00	9.00	8.00	13.00	20.00	22.00	25.00	12.00	15.00
Percent of Severe Congestion	44.00	44.00	50.00	70.00	83.00	84.00	77.00	79.00	67.00	65.00	67.00	73.00	75.00
Population (000)	3,810	3,810	3,810	3,885	3,885	3,885	3,900	3,900	4,000	3,985	4,000	4,000	4,005
Urban Area (square kilometers)	2,823	2,953	3,082	3,212	3,225	3,225	3,238	3,238	3,250	3,263	3,341	3,354	3,367
Population Density	1,350	1,290	1,236	1,210	1,205	1,205	1,205	1,205	1,231	1,221	1,197	1,193	1,189
Registered Vehicles (000)	2,790	2,790	2,800	2,850	2,850	2,860	2,870	2,870	2,940	2,930	2,950	2,950	2,950
Fuel Cost ($/liter)	-	-	-	-	-	0.28	0.30	0.33	0.36	0.35	0.35	0.31	0.29
Total VKT (000)	99,804	100,884	102,407	106,888	116,150	115,659	123,363	127,274	129,159	131,023	133,918	138,048	135,246
Total Lane-Kilometers	19,747	19,756	19,808	20,653	20,631	20,640	20,658	20,663	20,777	20,858	20,716	20,724	20,685
Roadway Congestion Index	1.06	1.03	1.07	1.06	1.05	1.04	1.07	1.09	1.13	1.16	1.19	1.23	1.24

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-15. Mobility and Congestion Variables in El Paso, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	4,122	4,331	4,508	5,023	5,506	5,152	5,345	5,313	5,361	5,458	5,635	5,957	6,150
Lane-Kilometers	523	539	555	555	555	564	564	564	564	572	572	596	604
VKT/lane-kilometer	7,877	8,030	8,116	9,043	9,913	9,143	9,486	9,429	9,514	9,549	9,859	10,000	10,187
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1	1.1
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	15	15	15	20	20	20	20	20	20	20	20	25	25
Percent of Moderate Congestion	100	100	10	100	75	36	34	45	50	53	44	43	38
Percent of Heavy Congestion	-	-	-	-	25	64	66	55	43	42	44	48	45
Percent of Severe Congestion	-	-	-	-	-	-	-	-	7	5	12	9	17
Principal Arterial Streets													
Daily VKT (000)	4,186	4,355	4,540	4,637	4,693	4,830	5,007	5,112	5,152	5,273	5,353	5,377	5,474
Lane-kilometers	1,224	1,256	1,288	1,288	1,296	1,296	1,296	1,336	1,344	1,352	1,377	1,385	1,409
VKT/lane-kilometer	3,421	3,468	3,525	3,600	3,621	3,727	3,863	3,825	3,832	3,899	3,889	3,884	3,886
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	5	5	5	5	5	5	5	5	5	5	10	10	10
Percent of Moderate Congestion	27.00	32.00	59.00	60.00	60.00	61.00	60.00	58.00	25.00	29.00	33.00	29.00	36.00
Percent of Heavy Congestion	73.00	68.00	41.00	40.00	40.00	39.00	40.00	32.00	49.00	28.00	17.00	20.00	17.00
Percent of Severe Congestion	-	-	-	-	-	-	-	10.00	26.00	44.00	50.00	52.00	47.00
Population (000)	450	450	450	455	480	500	510	520	540	560	565	570	580
Urban Area (square kilometers)	389	492	466	479	492	518	531	531	544	544	544	570	583
Population Density	1,158	914	965	950	975	965	961	979	993	1,030	1,039	1,000	995
Registered Vehicles (000)	310	310	320	320	340	350	360	370	390	400	410	410	420
Fuel Cost ($/liter)	-	-	-	-	0.25	0.28	0.30	0.32	0.35	0.34	0.34	0.31	0.30
Total VKT (000)	10,599	10,840	11,098	11,927	12,516	13,218	14,327	14,659	15,224	15,281	15,395	16,858	17,357
Total Lane-Kilometers	2,343	2,436	2,595	2,695	2,805	3,135	3,600	4,273	4,273	4,381	4,381	4,904	4,944
Roadway Congestion Index	0.63	0.64	0.65	0.70	0.75	0.71	0.74	0.74	0.74	0.75	0.76	0.77	0.78

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
"-" denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-16. Mobility and Congestion Variables in Fort Worth, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	13,886	14,860	15,593	16,213	17,308	17,710	17,952	18,161	19,062	19,803	20,608	21,091	22,282
Lane-Kilometers	1,457	1,505	1,554	1,570	1,570	1,594	1,610	1,634	1,642	1,658	1,691	1,723	1,811
VKT/lane-kilometer	9,530	9,872	10,036	10,328	11,026	11,111	11,150	11,113	11,608	11,942	12,190	12,243	12,302
Incident Ratio	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	30	35	35	35	40	40	40	40	40	40	40	45	45
Percent of Moderate Congestion	30	26	33	39	13	35	29	31	22	21	23	28	21
Percent of Heavy Congestion	10	9	13	20	24	20	16	24	29	25	31	34	36
Percent of Severe Congestion	60	65	53	41	63	45	55	44	48	54	46	38	43
Principal Arterial Streets													
Daily VKT (000)	5,893	6,190	6,464	6,665	6,843	6,843	6,762	6,794	6,826	6,843	6,987	7,567	9,048
Lane-kilometers	1,264	1,288	1,328	1,352	1,369	1,385	1,393	1,393	1,401	1,417	1,449	1,513	1,666
VKT/lane-kilometer	4,662	4,806	4,867	4,929	5,000	4,942	4,855	4,879	4,874	4,830	4,822	5,000	5,430
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	25	25	30	30	30	30	30	30	30	30	30	30	35
Percent of Moderate Congestion	40.00	50.00	47.00	52.00	51.00	34.00	43.00	29.00	46.00	43.00	46.00	39.00	45.00
Percent of Heavy Congestion	30.00	20.00	21.00	22.00	32.00	41.00	43.00	42.00	27.00	31.00	26.00	31.00	25.00
Percent of Severe Congestion	30.00	30.00	32.00	26.00	17.00	24.00	14.00	29.00	27.00	26.00	28.00	30.00	20.00
Population (000)	1,085	1,090	1,095	1,100	1,120	1,130	1,150	1,165	1,200	1,200	1,200	1,210	1,240
Urban Area (square kilometers)	2,098	2,098	2,111	2,124	2,137	2,150	2,189	2,189	2,202	2,202	2,202	2,214	2,396
Population Density	517	520	519	518	524	526	525	532	545	545	545	546	518
Registered Vehicles (000)	820	830	830	840	850	860	880	890	910	910	910	920	940
Fuel Cost ($/liter)	-	-	-	-	0.25	0.28	0.30	0.32	0.35	0.34	0.34	0.31	0.30
Total VKT (000)	33,329	35,090	36,629	38,925	42,330	42,490	42,823	43,617	45,193	46,413	47,347	47,978	49,830
Total Lane-Kilometers	7,857	8,166	8,472	8,821	9,177	9,700	10,106	10,674	10,676	11,038	11,049	11,109	11,270
Roadway Congestion Index	0.76	0.79	0.80	0.82	0.87	0.87	0.87	0.87	0.90	0.92	0.94	0.95	0.97

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-17. Mobility and Congestion Variables in Ft. Lauderdale, FL

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	8,597	8,630	8,758	8,968	9,177	9,982	10,385	10,996	11,439	11,479	12,478	13,685	14,973
Lane-Kilometers	837	845	853	869	894	902	934	950	966	966	1,047	1,095	1,167
VKT/lane-kilometer	10,269	10,210	10,264	10,315	10,270	11,071	11,121	11,576	11,842	11,883	11,923	12,500	12,828
Incident Ratio	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	20	20	20	20	25	30	30	35	40	40	40	40	40
Percent of Moderate Congestion	45	51	40	38	60	60	60	60	60	57	40	27	27
Percent of Heavy Congestion	19	19	25	26	20	20	20	28	32	33	46	54	50
Percent of Severe Congestion	35	30	35	36	20	20	20	12	8	10	14	19	23
Principal Arterial Streets													
Daily VKT (000)	8,791	8,694	8,710	8,694	8,662	8,855	8,919	9,024	9,338	9,660	10,224	10,304	10,385
Lane-kilometers	1,642	1,674	1,691	1,707	1,715	1,723	1,755	1,771	1,795	1,811	1,852	1,940	2,029
VKT/lane-kilometer	5,353	5,192	5,152	5,094	5,052	5,140	5,083	5,095	5,202	5,333	5,522	5,311	5,119
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	45	45	45	50	50	50	50	50	50	50	50	50	50
Percent of Moderate Congestion	61.00	56.00	36.00	24.00	12.00	12.00	10.00	20.00	14.00	19.00	25.00	36.00	30.00
Percent of Heavy Congestion	30.00	33.00	32.00	44.00	28.00	35.00	41.00	36.00	39.00	34.00	35.00	30.00	25.00
Percent of Severe Congestion	9.00	11.00	32.00	32.00	60.00	53.00	49.00	44.00	47.00	47.00	40.00	34.00	46.00
Population (000)	1,065	1,090	1,105	1,135	1,165	1,170	1,205	1,255	1,270	1,275	1,285	1,300	1,320
Urban Area (square kilometers)	881	1,010	1,036	1,036	1,036	1,062	1,088	1,114	1,114	1,114	1,127	1,140	1,166
Population Density	1,209	1,079	1,067	1,096	1,125	1,102	1,108	1,127	1,140	1,145	1,141	1,141	1,133
Registered Vehicles (000)	880	900	920	940	970	970	1,000	1,040	1,060	1,060	1,070	1,080	1,100
Fuel Cost ($/liter)	-	-	-	-	0.27	0.29	0.31	0.34	0.36	0.35	0.35	0.33	0.32
Total VKT (000)	30,010	30,229	30,976	32,250	32,762	35,634	35,979	38,273	39,121	40,902	45,854	45,672	47,107
Total Lane-Kilometers	5,284	5,379	5,505	5,517	5,542	6,055	6,773	6,783	6,791	6,791	6,802	6,788	6,852
Roadway Congestion Index	0.87	0.86	0.86	0.85	0.85	0.90	0.90	0.92	0.94	0.95	0.96	0.98	0.99

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-18. Mobility and Congestion Variables in Hartford, CT

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	6,955	7,760	8,589	8,605	8,919	9,443	9,757	9,950	10,022	10,046	10,868	11,310	r11,375
Lane-Kilometers	725	805	829	837	861	886	886	934	934	934	974	982	990
VKT/lane-kilometer	9,600	9,640	10,359	10,279	10,355	10,664	11,018	10,655	10,733	10,759	11,157	11,516	11,488
Incident Ratio	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	10	10	10	10	10	10	15	15	15	15	15	20	20
Percent of Moderate Congestion	90	90	80	81	48	50	44	39	35	39	27	30	27
Percent of Heavy Congestion	10	10	20	19	33	32	25	36	39	35	41	49	42
Percent of Severe Congestion	-	-	-	-	19	18	31	26	26	26	32	21	31
Principal Arterial Streets													
Daily VKT (000)	3,784	4,532	5,023	5,104	5,176	5,160	5,506	5,860	6,038	6,118	6,182	6,102	6,150
Lane-kilometers	869	894	902	918	942	942	942	998	1,022	1,047	1,055	1,055	1,079
VKT/lane-kilometer	4,352	5,072	5,571	5,561	5,496	5,479	5,846	5,871	5,906	5,846	5,863	5,786	5,701
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	20	25	25	25	25	30	30	35	35	35	35	35	35
Percent of Moderate Congestion	36.00	44.00	25.00	24.00	14.00	29.00	30.00	27.00	35.00	41.00	33.00	31.00	35.00
Percent of Heavy Congestion	49.00	42.00	42.00	41.00	51.00	45.00	43.00	45.00	35.00	32.00	36.00	37.00	33.00
Percent of Severe Congestion	16.00	15.00	33.00	35.00	35.00	25.00	28.00	29.00	30.00	27.00	31.00	32.00	31.00
Population (000)	565	570	575	575	585	590	600	605	610	610	615	620	625
Urban Area (square kilometers)	907	919	919	919	919	932	932	932	932	932	945	945	958
Population Density	623	620	625	625	636	633	644	649	654	654	651	656	652
Registered Vehicles (000)	420	430	430	430	440	440	450	460	460	460	470	470	470
Fuel Cost ($/liter)	-	-	-	-	-	0.29	0.32	0.36	0.38	0.37	0.37	0.36	0.35
Total VKT (000)	15,305	17,630	18,380	19,183	19,930	21,233	21,841	21,883	22,376	22,571	24,308	23,371	24,041
Total Lane-Kilometers	3,006	3,716	3,742	3,755	3,774	3,780	3,806	3,838	3,856	3,875	4,096	4,064	4,068
Roadway Congestion Index	0.76	0.79	0.86	0.85	0.85	0.87	0.90	0.89	0.89	0.89	0.91	0.93	0.93

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-19. Mobility and Congestion Variables in Honolulu, HI

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	5,957	6,029	6,223	6,424	6,770	6,979	7,100	7,285	7,438	7,567	8,195	8,855	9,016
Lane-Kilometers	523	523	531	531	531	531	531	547	547	547	604	636	644
VKT/lane-kilometer	11,385	11,523	11,712	12,091	12,742	13,136	13,364	13,309	13,588	13,824	13,573	13,924	14,000
Incident Ratio	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	40	40	45	45	45	45	50	50	50	50	50	50	50
Percent of Moderate Congestion	10	4	7	17	24	26	20	21	23	19	15	20	20
Percent of Heavy Congestion	32	25	21	13	13	14	23	21	26	26	30	20	27
Percent of Severe Congestion	58	71	72	70	62	60	57	58	51	55	55	59	53
Principal Arterial Streets													
Daily VKT (000)	1,996	2,093	2,125	2,004	2,318	2,343	2,455	2,504	2,529	2,608	2,809	3,107	3,123
Lane-kilometers	322	322	322	330	338	346	346	354	362	370	378	394	411
VKT/lane-kilometer	6,200	6,500	6,600	6,073	6,857	6,767	7,093	7,068	6,982	7,043	7,426	7,878	7,608
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	65	65	65	70	70	70	70	70	70	70	75	75	75
Percent of Moderate Congestion	28.00	31.00	22.00	31.00	33.00	51.00	45.00	41.00	40.00	37.00	22.00	27.00	27.00
Percent of Heavy Congestion	30.00	25.00	23.00	24.00	23.00	21.00	18.00	17.00	17.00	15.00	12.00	9.00	10.00
Percent of Severe Congestion	42.00	44.00	54.00	44.00	44.00	27.00	37.00	42.00	43.00	48.00	66.00	64.00	63.00
Population (000)	570	580	585	585	595	610	655	660	660	670	685	690	695
Urban Area (square kilometers)	298	298	311	311	337	337	350	350	350	389	466	466	466
Population Density	1,914	1,947	1,882	1,882	1,767	1,812	1,873	1,888	1,888	1,725	1,469	1,480	1,491
Registered Vehicles (000)	460	470	470	480	490	500	540	550	550	560	570	580	590
Fuel Cost ($/liter)	-	-	-	-	0.29	0.31	0.34	0.37	0.44	0.43	0.43	0.42	0.43
Total VKT (000)	14,092	14,284	14,421	14,936	16,379	17,023	17,348	18,087	18,302	18,439	18,454	18,301	18,341
Total Lane-Kilometers	1,235	1,270	1,277	1,319	1,354	1,370	1,381	1,396	1,407	1,389	1,439	1,465	1,473
Roadway Congestion Index	0.92	0.94	0.95	0.96	1.03	1.05	1.07	1.07	1.09	1.10	1.10	1.13	1.13

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-20. Mobility and Congestion Variables in Houston, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	33,939	36,314	39,252	38,825	38,825	41,538	43,631	44,500	45,450	47,495	49,105	51,520	53,066
Lane-Kilometers	2,214	2,270	2,383	2,383	2,431	2,640	2,882	2,995	3,091	3,244	3,341	3,462	3,623
VKT/lane-kilometer	15,331	15,996	16,473	16,294	15,970	15,732	15,140	14,860	14,703	14,640	14,699	14,884	14,649
Incident Ratio	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	65	65	70	70	75	70	70	70	70	70	70	70	70
Percent of Moderate Congestion	3	20	17	18	11	18	16	10	9	11	15	9	15
Percent of Heavy Congestion	14	16	17	13	20	12	16	28	30	28	26	38	30
Percent of Severe Congestion	83	64	66	69	69	70	69	63	61	61	59	53	54
Principal Arterial Streets													
Daily VKT (000)	15,657	16,664	17,485	17,469	17,404	16,905	16,406	16,744	17,436	17,549	17,935	18,354	18,901
Lane-kilometers	2,874	2,970	3,091	3,107	3,148	3,172	3,188	3,236	3,429	3,502	3,510	3,542	3,623
VKT/lane-kilometer	5,448	5,610	5,656	5,622	5,529	5,330	5,146	5,174	5,085	5,011	5,110	5,182	5,218
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	50	50	55	55	55	50	50	50	50	50	50	50	50
Percent of Moderate Congestion	36.00	24.00	20.00	17.00	22.00	24.00	14.00	18.00	22.00	21.00	24.00	15.00	20.00
Percent of Heavy Congestion	7.00	10.00	10.00	9.00	15.00	16.00	55.00	46.00	45.00	42.00	47.00	47.00	44.00
Percent of Severe Congestion	58.00	66.00	70.00	74.00	64.00	60.00	30.00	36.00	34.00	38.00	29.00	38.00	36.00
Population (000)	2,400	2,405	2,410	2,415	2,790	2,820	2,850	2,865	2,880	2,900	2,910	2,930	2,940
Urban Area (square kilometers)	3,963	3,989	4,015	4,092	4,144	4,170	4,222	4,235	4,248	4,248	4,248	4,274	4,299
Population Density	606	603	600	590	673	676	675	677	678	683	685	686	684
Registered Vehicles (000)	1,800	1,810	1,810	1,820	2,110	2,130	2,160	2,180	2,190	2,210	2,220	2,240	2,250
Fuel Cost ($/liter)	-	-	-	-	0.25	0.28	0.30	0.32	0.35	0.34	0.34	0.31	0.30
Total VKT (000)	87,077	90,319	92,245	92,741	99,269	103,238	111,370	115,297	116,934	117,667	117,933	120,534	121,808
Total Lane-Kilometers	16,203	17,353	18,233	18,829	21,386	23,226	26,444	27,354	27,372	27,451	27,692	27,726	27,787
Roadway Congestion Index	1.17	1.21	1.25	1.23	1.21	1.19	1.15	1.13	1.12	1.11	1.12	1.13	1.12

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-21. Mobility and Congestion Variables in Indianapolis, IN

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	8,469	9,225	9,805	10,111	11,125	12,300	12,469	12,703	12,961	13,122	13,387	14,329	15,295
Lane-Kilometers	1,079	1,087	1,095	1,111	1,111	1,143	1,159	1,159	1,224	1,232	1,240	1,256	1,320
VKT/lane-kilometer	7,851	8,489	8,956	9,101	10,014	10,761	10,757	10,958	10,592	10,654	10,799	11,410	11,585
Incident Ratio	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	5	5	5	5	5	5	10	10	10	10	10	15	20
Percent of Moderate Congestion	100	100	100	100	100	90	90	85	77	77	76	70	60
Percent of Heavy Congestion	-	-	-	-	-	10	10	15	13	10	12	17	26
Percent of Severe Congestion	-	-	-	-	-	-	-	-	10	13	12	14	14
Principal Arterial Streets													
Daily VKT (000)	6,070	5,989	6,537	6,601	6,601	6,601	6,617	6,641	6,730	6,762	6,843	7,245	8,453
Lane-kilometers	1,328	1,336	1,344	1,344	1,352	1,360	1,369	1,369	1,417	1,417	1,425	1,481	1,610
VKT/lane-kilometer	4,570	4,482	4,862	4,910	4,881	4,852	4,835	4,853	4,750	4,773	4,802	4,891	5,250
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	15	15	15	15	15	15	20	20	20	20	25	25	30
Percent of Moderate Congestion	26.00	38.00	30.00	20.00	40.00	45.00	60.00	64.00	66.00	69.00	58.00	41.00	34.00
Percent of Heavy Congestion	59.00	38.00	33.00	30.00	20.00	25.00	17.00	15.00	5.00	7.00	20.00	31.00	39.00
Percent of Severe Congestion	15.00	24.00	37.00	50.00	40.00	30.00	23.00	21.00	29.00	24.00	22.00	28.00	27.00
Population (000)	860	860	860	865	895	925	930	930	945	950	955	960	970
Urban Area (square kilometers)	1,088	1,088	1,088	1,088	1,101	1,114	1,127	1,127	1,140	1,140	1,153	1,153	1,217
Population Density	791	791	791	795	813	831	825	825	829	834	829	833	797
Registered Vehicles (000)	650	650	650	660	680	710	710	710	730	730	740	740	750
Fuel Cost ($/liter)	-	-	-	-	0.26	0.28	0.30	0.33	0.35	0.34	0.34	0.30	0.29
Total VKT (000)	24,231	24,966	25,470	25,061	27,174	29,621	29,862	31,110	33,929	33,533	36,751	39,878	41,416
Total Lane-Kilometers	5,583	5,608	5,685	5,849	5,870	5,997	6,078	6,112	6,129	6,166	6,311	6,387	6,406
Roadway Congestion Index	0.67	0.70	0.75	0.76	0.81	0.85	0.85	0.86	0.84	0.84	0.85	0.89	0.92

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\dfrac{\textit{Freeway VKT/Ln.-Km.}}{13{,}000^{1}} \times \textit{Freeway VKT} + \dfrac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{5{,}000^{1}} \times \textit{Prin. Art. Str. VKT}}{\textit{Freeway VKT} + \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-22. Mobility and Congestion Variables in Jacksonville, FL

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	6,199	6,488	7,173	7,326	7,519	7,680	8,292	8,372	8,662	8,807	9,266	9,660	10,497
Lane-Kilometers	547	580	588	596	628	644	676	708	725	725	733	773	837
VKT/lane-kilometer	11,324	11,194	12,205	12,297	11,974	11,925	12,262	11,818	11,956	12,156	12,648	12,500	12,538
Incident Ratio	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	25	25	25	30	30	30	30	35	35	35	35	35	35
Percent of Moderate Congestion	100	100	75	73	93	69	94	76	77	71	37	37	35
Percent of Heavy Congestion	-	-	25	27	7	25	6	24	23	26	56	53	50
Percent of Severe Congestion	-	-	-	-	-	6	-	-	-	2	7	11	15
Principal Arterial Streets													
Daily VKT (000)	8,243	8,887	8,919	8,960	9,048	9,064	9,121	9,249	9,346	9,499	9,893	10,063	10,546
Lane-kilometers	1,650	1,739	1,771	1,795	1,811	1,835	1,868	1,916	1,932	1,948	2,061	2,109	2,174
VKT/lane-kilometer	4,995	5,111	5,036	4,991	4,996	4,939	4,884	4,828	4,838	4,876	4,801	4,771	4,852
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	35	35	40	40	40	45	45	50	50	50	50	55	55
Percent of Moderate Congestion	19.00	27.00	28.00	30.00	46.00	24.00	24.00	29.00	22.00	32.00	43.00	36.00	31.00
Percent of Heavy Congestion	19.00	44.00	19.00	24.00	20.00	36.00	44.00	33.00	30.00	26.00	11.00	19.00	28.00
Percent of Severe Congestion	62.00	29.00	53.00	46.00	35.00	40.00	31.00	38.00	49.00	41.00	45.00	44.00	41.00
Population (000)	615	620	630	645	650	660	690	715	720	750	760	770	785
Urban Area (square kilometers)	1,347	1,347	1,373	1,373	1,386	1,386	1,386	1,399	1,399	1,399	1,399	1,412	1,437
Population Density	457	460	459	470	469	476	498	511	515	536	543	545	546
Registered Vehicles (000)	460	470	480	490	490	500	530	550	550	580	590	590	610
Fuel Cost ($/liter)	-	-	-	-	0.27	0.29	0.31	0.34	0.36	0.35	0.35	0.33	0.32
Total VKT (000)	22,197	25,765	25,974	26,109	26,229	25,961	26,641	28,721	28,634	29,215	30,236	30,397	32,111
Total Lane-Kilometers	4,162	5,802	5,815	5,843	5,828	5,596	5,804	5,810	5,901	5,901	5,901	5,899	5,909
Roadway Congestion Index	0.91	0.92	0.96	0.96	0.95	0.94	0.95	0.93	0.93	0.95	0.97	0.96	0.97

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-23. Mobility and Congestion Variables in Kansas City, MO

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	14,329	14,466	15,102	16,406	17,557	19,191	19,674	19,916	20,214	20,793	22,057	24,150	25,164
Lane-Kilometers	1,827	1,868	2,013	2,029	2,037	2,141	2,165	2,182	2,190	2,190	2,270	2,479	2,520
VKT/lane-kilometer	7,841	7,746	7,504	8,087	8,621	8,962	9,086	9,129	9,232	9,496	9,716	9,740	9,987
Incident Ratio	3.1	3.1	3.1	3.1	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	5	5	5	5	5	5	5	5	5	5	10	10	10
Percent of Moderate Congestion	75	40	33	38	57	76	31	50	56	56	63	57	52
Percent of Heavy Congestion	25	60	56	23	5	5	23	11	44	32	11	18	19
Percent of Severe Congestion	-	-	11	38	38	19	46	39	-	12	26	25	29
Principal Arterial Streets													
Daily VKT (000)	6,126	6,207	6,295	6,843	6,899	7,004	7,068	7,036	7,744	7,792	7,873	8,855	9,048
Lane-kilometers	1,634	1,634	1,642	1,658	1,666	1,674	1,682	1,682	1,707	1,723	1,755	1,811	1,819
VKT/lane-kilometer	3,749	3,798	3,833	4,126	4,140	4,183	4,201	4,182	4,538	4,523	4,486	4,889	4,973
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	20	20	20	20	20	20	25	25	25	25	25	25	25
Percent of Moderate Congestion	42.00	53.00	53.00	55.00	36.00	30.00	32.00	31.00	37.00	37.00	37.00	40.00	35.00
Percent of Heavy Congestion	25.00	7.00	7.00	15.00	35.00	21.00	34.00	35.00	23.00	29.00	29.00	24.00	27.00
Percent of Severe Congestion	33.00	40.00	40.00	31.00	29.00	49.00	34.00	34.00	40.00	34.00	35.00	36.00	38.00
Population (000)	1,090	1,095	1,100	1,130	1,135	1,140	1,145	1,155	1,160	1,160	1,200	1,300	1,320
Urban Area (square kilometers)	1,425	1,437	1,450	1,476	1,502	1,528	1,554	1,580	1,580	1,580	1,645	1,813	1,865
Population Density	765	762	758	765	756	746	737	731	734	734	730	717	708
Registered Vehicles (000)	840	840	850	870	880	880	890	900	900	900	940	1,020	1,030
Fuel Cost ($/liter)	-	-	-	-	0.23	0.26	0.28	0.32	0.32	0.31	0.32	0.29	0.28
Total VKT (000)	32,211	32,916	33,559	36,297	37,729	39,361	40,688	42,219	44,223	45,028	52,639	53,978	56,241
Total Lane-Kilometers	9,444	9,493	9,552	11,096	11,103	11,360	11,391	11,523	11,603	11,581	11,729	11,693	11,829
Roadway Congestion Index	0.62	0.62	0.60	0.65	0.68	0.71	0.72	0.72	0.74	0.75	0.77	0.78	0.80

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-24. Mobility and Congestion Variables in Los Angeles, CA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	121,539	127,737	134,250	141,100	148,297	155,993	164,445	171,755	177,655	177,551	180,240	183,460	181,930
Lane-Kilometers	7,326	7,454	7,535	7,648	7,728	7,857	7,986	8,243	8,420	8,412	8,686	8,815	8,903
VKT/lane-kilometer	16,591	17,136	17,817	18,451	19,190	19,855	20,593	20,836	21,098	21,106	20,751	20,813	20,434
Incident Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	75	80	80	80	80	80	75	75	75	75	75	75	75
Percent of Moderate Congestion	20	20	20	18	7	6	5	5	5	6	7	7	7
Percent of Heavy Congestion	20	19	20	21	15	13	5	4	4	4	4	5	11
Percent of Severe Congestion	50	61	60	61	78	81	89	90	90	89	89	88	82
Principal Arterial Streets													
Daily VKT (000)	92,003	96,930	102,122	107,596	113,360	118,834	125,966	128,486	129,396	131,553	132,825	133,630	134,274
Lane-kilometers	17,646	17,871	18,113	18,354	18,692	18,966	19,320	19,610	19,972	19,964	20,125	20,206	20,206
VKT/lane-kilometer	5,214	5,424	5,638	5,862	6,065	6,266	6,520	6,552	6,479	6,590	6,600	6,614	6,645
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	35	35	40	45	50	50	55	55	55	55	55	55	55
Percent of Moderate Congestion	24.00	35.00	28.00	17.00	18.00	26.00	22.00	19.00	22.00	20.00	14.00	17.00	18.00
Percent of Heavy Congestion	63.00	17.00	11.00	23.00	18.00	25.00	20.00	27.00	34.00	28.00	36.00	28.00	27.00
Percent of Severe Congestion	13.00	48.00	61.00	59.00	63.00	49.00	58.00	54.00	44.00	52.00	50.00	55.00	55.00
Population (000)	9,900	9,900	9,900	10,500	10,710	10,920	11,140	11,305	11,420	11,760	11,845	11,950	12,000
Urban Area (square kilometers)	4,740	4,740	4,740	5,180	5,310	5,439	5,569	5,620	5,659	5,659	5,776	5,776	5,789
Population Density	2,089	2,089	2,089	2,027	2,017	2,008	2,001	2,011	2,018	2,078	2,051	2,069	2,073
Registered Vehicles (000)	7,680	7,690	7,690	8,160	8,320	8,480	8,670	8,800	8,880	9,150	9,220	9,300	9,350
Fuel Cost ($/liter)	-	-	-	-	0.27	0.29	0.31	0.35	0.38	0.36	0.37	0.35	0.34
Total VKT (000)	266,286	284,059	296,134	315,906	326,577	353,566	377,407	394,392	403,584	397,912	400,848	410,302	415,090
Total Lane-Kilometers	36,792	37,555	37,566	38,168	38,371	38,745	39,548	40,099	40,368	40,553	41,182	41,511	41,253
Roadway Congestion Index	1.22	1.27	1.32	1.36	1.42	1.47	1.52	1.54	1.55	1.56	1.54	1.54	1.52

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-25. Mobility and Congestion Variables in Louisville, KY

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	6,303	7,140	7,406	7,567	7,704	8,662	9,724	9,885	9,974	10,063	10,513	11,270	12,236
Lane-Kilometers	692	725	757	773	805	837	910	942	950	950	974	990	1,038
VKT/lane-kilometer	9,105	9,856	9,787	9,792	9,570	10,346	10,690	10,496	10,500	10,593	10,793	11,382	11,783
Incident Ratio	1.1	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	5	5	5	5	5	5	5	5	5	5	5	10	15
Percent of Moderate Congestion	54	13	10	8	35	41	47	43	57	57	42	37	25
Percent of Heavy Congestion	35	42	45	15	11	10	3	5	3	2	17	18	19
Percent of Severe Congestion	12	46	45	77	54	49	50	52	41	41	41	44	56
Principal Arterial Streets													
Daily VKT (000)	4,226	4,379	4,419	4,436	4,403	4,790	4,605	4,653	4,741	5,023	5,353	5,635	5,877
Lane-kilometers	789	797	797	805	805	813	821	821	837	837	845	934	1,014
VKT/lane-kilometer	5,357	5,495	5,545	5,510	5,470	5,891	5,608	5,667	5,663	6,000	6,333	6,034	5,794
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	50	50	50	50	50	55	55	55	55	55	60	60	60
Percent of Moderate Congestion	28.00	21.00	45.00	13.00	15.00	15.00	30.00	33.00	26.00	21.00	14.00	21.00	19.00
Percent of Heavy Congestion	64.00	70.00	49.00	78.00	60.00	56.00	52.00	47.00	53.00	55.00	35.00	26.00	32.00
Percent of Severe Congestion	9.00	9.00	6.00	9.00	25.00	30.00	18.00	19.00	21.00	24.00	51.00	53.00	50.00
Population (000)	770	780	780	785	785	790	805	805	810	810	815	820	825
Urban Area (square kilometers)	932	932	932	932	945	958	971	971	984	984	997	1,010	1,010
Population Density	826	837	837	842	830	824	829	829	823	823	817	812	817
Registered Vehicles (000)	600	610	610	620	620	620	640	640	640	640	650	650	660
Fuel Cost ($/liter)	-	-	-	-	0.26	0.27	0.29	0.33	0.35	0.34	0.34	0.30	0.29
Total VKT (000)	22,382	22,947	23,604	24,863	25,544	27,283	28,086	27,845	28,455	29,970	33,321	35,344	35,233
Total Lane-Kilometers	3,991	4,131	4,254	4,267	4,283	4,294	4,474	4,803	5,049	5,289	5,327	5,427	5,426
Roadway Congestion Index	0.78	0.82	0.82	0.82	0.80	0.86	0.87	0.86	0.86	0.88	0.90	0.93	0.95

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-26. Mobility and Congestion Variables in Memphis, TN

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	4,750	4,830	4,854	4,911	5,329	6,005	6,360	6,851	6,987	7,567	8,098	8,292	8,694
Lane-Kilometers	483	523	547	588	588	612	612	612	628	660	708	733	757
VKT/lane-kilometer	9,833	9,231	8,868	8,356	9,068	9,816	10,395	11,197	11,128	11,463	11,432	11,319	11,489
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	10	10	10	10	10	10	10	10	10	15	15	15	20
Percent of Moderate Congestion	77	100	65	80	100	100	100	100	87	89	66	53	44
Percent of Heavy Congestion	23	-	35	20	-	-	-	-	13	11	24	31	45
Percent of Severe Congestion	-	-	-	-	-	-	-	-	-	-	11	15	11
Principal Arterial Streets													
Daily VKT (000)	5,313	5,474	5,659	5,667	6,054	6,327	6,521	6,633	6,818	7,245	8,066	8,952	9,290
Lane-kilometers	1,079	1,095	1,111	1,159	1,183	1,216	1,296	1,312	1,377	1,457	1,578	1,674	1,723
VKT/lane-kilometer	4,925	5,000	5,094	4,889	5,116	5,205	5,031	5,055	4,953	4,972	5,112	5,346	5,393
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	30	30	30	30	35	35	35	35	35	35	35	35	35
Percent of Moderate Congestion	47.00	46.00	45.00	46.00	63.00	52.00	40.00	29.00	22.00	29.00	34.00	42.00	45.00
Percent of Heavy Congestion	41.00	44.00	35.00	30.00	16.00	22.00	24.00	39.00	43.00	39.00	39.00	27.00	26.00
Percent of Severe Congestion	12.00	10.00	20.00	24.00	21.00	26.00	36.00	32.00	35.00	32.00	27.00	31.00	29.00
Population (000)	760	770	770	775	800	815	830	850	860	865	880	885	905
Urban Area (square kilometers)	907	907	907	932	984	1,036	1,088	1,088	1,101	1,101	1,127	1,140	1,153
Population Density	838	849	849	831	813	787	763	781	781	786	781	777	785
Registered Vehicles (000)	570	580	580	580	600	620	630	650	650	660	670	680	690
Fuel Cost ($/liter)	-	-	-	-	0.26	0.27	0.30	0.33	0.36	0.35	0.35	0.31	0.30
Total VKT (000)	18,657	20,175	17,559	20,540	21,213	23,108	24,097	25,135	25,971	26,610	27,996	30,907	32,025
Total Lane-Kilometers	3,114	3,450	3,713	4,172	4,394	4,957	4,964	4,988	5,002	5,009	5,123	5,165	5,158
Roadway Congestion Index	0.83	0.80	0.79	0.75	0.80	0.84	0.86	0.90	0.89	0.91	0.92	0.93	0.94

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-27. Mobility and Congestion Variables in Miami, FL

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	9,580	10,087	10,417	11,447	11,713	11,946	12,695	13,444	13,798	14,136	15,086	15,923	17,026
Lane-Kilometers	829	829	845	869	869	894	926	934	974	990	1,006	1,030	1,071
VKT/lane-kilometer	11,553	12,165	12,324	13,167	13,472	13,369	13,713	14,397	14,165	14,276	14,992	15,453	15,902
Incident Ratio	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	45	45	45	50	50	50	60	60	60	60	60	60	60
Percent of Moderate Congestion	15	43	40	55	42	43	23	19	31	34	35	24	16
Percent of Heavy Congestion	63	26	28	11	22	26	27	26	14	17	14	14	18
Percent of Severe Congestion	22	31	33	34	36	31	50	55	55	50	52	62	66
Principal Arterial Streets													
Daily VKT (000)	19,111	19,803	20,125	20,447	20,608	20,930	22,121	23,836	25,446	25,760	27,048	27,370	27,612
Lane-kilometers	3,019	3,059	3,099	3,156	3,180	3,220	3,252	3,276	3,341	3,349	3,590	3,631	3,775
VKT/lane-kilometer	6,331	6,474	6,494	6,480	6,481	6,500	6,802	7,275	7,617	7,692	7,534	7,539	7,313
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	60	60	60	70	70	70	70	70	70	70	65	70	70
Percent of Moderate Congestion	3.00	14.00	25.00	16.00	18.00	16.00	1.00	2.00	3.00	4.00	5.00	12.00	13.00
Percent of Heavy Congestion	16.00	37.00	7.00	4.00	31.00	5.00	26.00	12.00	11.00	14.00	19.00	14.00	15.00
Percent of Severe Congestion	81.00	49.00	68.00	79.00	51.00	78.00	73.00	86.00	86.00	82.00	76.00	74.00	72.00
Population (000)	1,730	1,720	1,750	1,775	1,780	1,785	1,810	1,840	1,850	1,880	1,920	1,935	1,940
Urban Area (square kilometers)	1,062	1,062	1,140	1,140	1,166	1,191	1,217	1,230	1,243	1,256	1,269	1,295	1,308
Population Density	1,629	1,620	1,536	1,558	1,527	1,498	1,487	1,496	1,488	1,497	1,513	1,494	1,483
Registered Vehicles (000)	1,400	1,390	1,410	1,420	1,430	1,430	1,440	1,460	1,470	1,490	1,520	1,530	1,530
Fuel Cost ($/liter)	-	-	-	-	0.27	0.29	0.31	0.34	0.36	0.35	0.35	0.33	0.32
Total VKT (000)	37,510	38,423	38,648	41,240	43,959	45,429	49,166	51,641	53,977	54,418	55,352	56,685	58,119
Total Lane-Kilometers	4,907	5,242	5,609	6,414	6,793	7,301	8,142	8,866	9,019	9,030	9,030	10,029	10,351
Roadway Congestion Index	1.05	1.09	1.10	1.13	1.14	1.14	1.18	1.25	1.27	1.28	1.30	1.32	1.32

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-28. Mobility and Congestion Variables in Milwaukee, WI

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	9,016	9,338	9,467	9,765	10,167	10,980	11,487	12,099	12,381	12,574	12,614	12,622	12,558
Lane-Kilometers	869	869	877	886	886	886	942	950	958	966	966	974	974
VKT/lane-kilometer	10,370	10,741	10,789	11,027	11,482	12,400	12,197	12,737	12,924	13,017	13,058	12,959	12,893
Incident Ratio	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	20	20	25	25	25	30	30	30	30	30	30	30	30
Percent of Moderate Congestion	51	53	51	39	26	24	20	32	28	29	26	24	34
Percent of Heavy Congestion	49	47	49	61	68	48	36	30	33	36	32	33	28
Percent of Severe Congestion	-	-	-	-	6	29	43	38	39	36	42	42	38
Principal Arterial Streets													
Daily VKT (000)	6,907	6,891	7,495	7,760	7,567	7,470	7,607	7,511	7,696	7,937	8,372	9,016	9,821
Lane-kilometers	1,497	1,513	1,513	1,546	1,562	1,578	1,594	1,610	1,618	1,626	1,707	1,803	1,900
VKT/lane-kilometer	4,613	4,553	4,952	5,021	4,845	4,735	4,773	4,665	4,756	4,881	4,906	5,000	5,169
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	30	30	35	35	35	35	35	35	35	35	35	30	35
Percent of Moderate Congestion	19.00	17.00	37.00	9.00	3.00	25.00	34.00	35.00	34.00	31.00	30.00	17.00	15.00
Percent of Heavy Congestion	59.00	70.00	53.00	69.00	68.00	54.00	45.00	42.00	26.00	26.00	30.00	30.00	33.00
Percent of Severe Congestion	22.00	13.00	11.00	22.00	29.00	21.00	21.00	24.00	40.00	43.00	40.00	53.00	53.00
Population (000)	1,210	1,210	1,210	1,210	1,215	1,220	1,225	1,225	1,230	1,225	1,230	1,230	1,240
Urban Area (square kilometers)	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,425	1,437
Population Density	849	849	849	849	853	856	860	860	863	860	863	863	863
Registered Vehicles (000)	920	920	920	920	920	920	930	920	930	920	930	930	930
Fuel Cost ($/liter)	-	-	-	-	0.26	0.27	0.30	0.33	0.36	0.35	0.35	0.32	0.31
Total VKT (000)	33,081	33,757	37,531	39,107	41,129	42,504	44,772	45,212	46,141	47,413	47,651	49,107	49,772
Total Lane-Kilometers	7,454	7,461	7,490	7,515	7,559	7,620	7,668	7,718	7,709	7,794	7,870	7,886	7,878
Roadway Congestion Index	0.83	0.84	0.87	0.88	0.90	0.95	0.94	0.97	0.99	1.00	1.00	1.00	1.00

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-29. Mobility and Congestion Variables in Minn-St. Paul, MN

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	18,032	19,586	20,930	22,033	23,442	25,148	26,436	27,145	28,642	29,318	30,590	32,200	33,327
Lane-Kilometers	1,900	1,900	1,980	2,045	2,077	2,238	2,310	2,335	2,383	2,407	2,431	2,471	2,496
VKT/lane-kilometer	9,492	10,309	10,569	10,776	11,287	11,237	11,443	11,628	12,020	12,181	12,583	13,029	13,355
Incident Ratio	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	20	20	20	20	25	30	30	30	30	30	30	35	35
Percent of Moderate Congestion	64	50	53	31	39	17	22	22	24	27	32	39	32
Percent of Heavy Congestion	36	42	27	31	39	25	26	26	21	21	7	10	20
Percent of Severe Congestion	-	8	20	38	22	58	52	52	55	51	61	51	49
Principal Arterial Streets													
Daily VKT (000)	6,923	7,165	7,487	7,873	8,211	8,372	8,533	8,678	9,080	9,660	10,948	11,431	11,495
Lane-kilometers	1,465	1,481	1,497	1,513	1,530	1,546	1,562	1,586	1,610	1,674	1,852	1,932	1,996
VKT/lane-kilometer	4,725	4,837	5,000	5,202	5,368	5,417	5,464	5,472	5,640	5,769	5,913	5,917	5,758
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	40	40	45	45	50	55	55	55	55	55	55	50	55
Percent of Moderate Congestion	23.00	13.00	16.00	24.00	22.00	27.00	25.00	30.00	25.00	20.00	10.00	15.00	16.00
Percent of Heavy Congestion	36.00	54.00	31.00	30.00	13.00	12.00	14.00	10.00	8.00	11.00	21.00	13.00	11.00
Percent of Severe Congestion	41.00	34.00	53.00	45.00	65.00	62.00	61.00	60.00	67.00	69.00	69.00	72.00	72.00
Population (000)	1,750	1,750	1,750	1,800	1,845	1,885	1,925	1,970	2,010	2,060	2,110	2,115	2,175
Urban Area (square kilometers)	2,150	2,202	2,279	2,409	2,486	2,577	2,629	2,629	2,694	2,849	3,082	3,095	3,108
Population Density	814	795	768	747	742	731	732	749	746	723	685	683	700
Registered Vehicles (000)	1,400	1,400	1,400	1,440	1,470	1,500	1,530	1,570	1,600	1,640	1,680	1,680	1,730
Fuel Cost ($/liter)	-	-	-	-	0.26	0.29	0.31	0.34	0.36	0.35	0.35	0.31	0.31
Total VKT (000)	48,150	51,451	53,919	57,274	61,476	64,382	66,696	68,055	69,528	70,727	74,466	77,940	80,843
Total Lane-Kilometers	13,452	13,524	13,526	13,753	14,300	14,395	14,348	14,368	14,411	14,952	15,794	16,266	16,432
Roadway Congestion Index	0.76	0.81	0.84	0.85	0.89	0.89	0.90	0.92	0.95	0.96	0.99	1.02	1.04

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-30. Mobility and Congestion Variables in Nashville, TN

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	5,233	5,313	5,868	6,303	6,843	7,245	7,712	7,905	8,050	8,388	9,660	11,270	12,478
Lane-Kilometers	564	564	604	684	684	692	708	773	789	813	886	1,014	1,079
VKT/lane-kilometer	9,286	9,429	9,720	9,212	10,000	10,465	10,886	10,229	10,204	10,317	10,909	11,111	11,567
Incident Ratio	-	-	-	-	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	20	20	20	15	15	20	25	25	25	25	25	20	20
Percent of Moderate Congestion	26	56	50	50	62	75	38	58	70	70	64	52	46
Percent of Heavy Congestion	58	11	50	50	38	17	41	29	20	22	18	23	27
Percent of Severe Congestion	16	33	-	-	-	8	22	13	10	7	18	25	27
Principal Arterial Streets													
Daily VKT (000)	5,716	6,110	6,915	7,382	7,736	7,913	8,670	8,694	8,758	8,791	8,855	9,016	9,499
Lane-kilometers	1,272	1,304	1,369	1,417	1,449	1,457	1,473	1,505	1,513	1,530	1,546	1,562	1,570
VKT/lane-kilometer	4,494	4,685	5,053	5,210	5,339	5,431	5,885	5,775	5,787	5,747	5,729	5,773	6,051
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	35	35	40	40	40	40	40	40	40	40	40	35	35
Percent of Moderate Congestion	17.00	14.00	12.00	20.00	18.00	18.00	11.00	14.00	10.00	13.00	35.00	34.00	32.00
Percent of Heavy Congestion	66.00	48.00	30.00	33.00	26.00	16.00	16.00	11.00	22.00	24.00	39.00	38.00	42.00
Percent of Severe Congestion	17.00	39.00	58.00	47.00	56.00	66.00	73.00	75.00	68.00	63.00	27.00	27.00	26.00
Population (000)	500	505	510	515	520	530	540	550	565	575	590	605	615
Urban Area (square kilometers)	984	1,062	1,114	1,140	1,178	1,217	1,256	1,282	1,295	1,373	1,425	1,476	1,489
Population Density	508	476	458	452	441	435	430	429	436	419	414	410	413
Registered Vehicles (000)	390	390	400	400	410	420	430	440	450	460	470	480	490
Fuel Cost ($/liter)	-	-	-	-	0.26	0.27	0.30	0.33	0.36	0.35	0.35	0.31	0.30
Total VKT (000)	16,369	16,504	17,332	19,204	21,031	22,361	24,237	24,702	25,127	26,409	28,017	29,288	31,268
Total Lane-Kilometers	2,822	2,824	2,996	3,098	3,746	4,236	4,408	4,437	4,466	4,543	4,741	4,743	4,743
Roadway Congestion Index	0.77	0.79	0.83	0.81	0.86	0.89	0.94	0.90	0.89	0.90	0.92	0.93	0.96

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-31. Mobility and Congestion Variables in New Orleans, LA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	6,279	6,440	6,682	6,891	6,963	7,487	7,664	7,825	8,002	8,114	8,131	8,372	8,871
Lane-Kilometers	523	531	531	531	531	531	547	564	580	588	604	620	668
VKT/lane-kilometer	12,000	12,121	12,576	12,970	13,106	14,091	14,000	13,886	13,806	13,808	13,467	13,506	13,277
Incident Ratio	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	40	40	45	45	50	50	50	50	50	50	50	50	50
Percent of Moderate Congestion	92	63	16	20	24	29	36	18	18	17	20	20	13
Percent of Heavy Congestion	8	29	32	30	31	27	13	40	49	47	60	66	69
Percent of Severe Congestion	-	8	52	50	46	44	51	42	33	33	20	14	19
Principal Arterial Streets													
Daily VKT (000)	5,313	5,514	5,812	5,973	6,182	6,529	6,537	6,545	6,601	6,657	6,762	7,084	8,090
Lane-kilometers	910	910	910	918	934	998	998	998	1,006	1,022	1,055	1,127	1,191
VKT/lane-kilometer	5,841	6,062	6,389	6,509	6,621	6,540	6,548	6,556	6,560	6,512	6,412	6,286	6,791
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	45	45	50	50	50	50	50	50	50	50	50	50	50
Percent of Moderate Congestion	29.00	42.00	24.00	20.00	11.00	17.00	10.00	30.00	23.00	20.00	33.00	29.00	32.00
Percent of Heavy Congestion	12.00	6.00	13.00	10.00	9.00	4.00	5.00	5.00	20.00	23.00	23.00	31.00	24.00
Percent of Severe Congestion	59.00	52.00	64.00	70.00	81.00	79.00	85.00	65.00	57.00	57.00	44.00	41.00	43.00
Population (000)	1,080	1,080	1,075	1,070	1,070	1,060	1,055	1,050	1,080	1,095	1,100	1,105	1,110
Urban Area (square kilometers)	881	881	894	894	907	907	932	932	932	932	932	945	945
Population Density	1,226	1,226	1,203	1,197	1,180	1,169	1,131	1,126	1,158	1,174	1,180	1,169	1,174
Registered Vehicles (000)	810	810	800	800	800	800	790	790	820	830	830	840	840
Fuel Cost ($/liter)	-	-	-	-	0.25	0.28	0.31	0.32	0.37	0.36	0.36	0.33	0.31
Total VKT (000)	18,901	20,811	22,110	22,625	23,615	23,633	24,292	24,429	25,314	26,364	27,075	28,239	28,479
Total Lane-Kilometers	4,745	4,772	4,772	4,825	4,809	4,807	4,803	4,799	4,801	4,801	4,957	5,244	5,307
Roadway Congestion Index	0.98	1.00	1.05	1.07	1.09	1.14	1.13	1.13	1.12	1.12	1.10	1.09	1.11

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-32. Mobility and Congestion Variables in New York, NY

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	101,704	103,434	105,157	106,349	115,268	118,520	125,588	130,273	133,501	133,147	134,435	138,460	141,801
Lane-Kilometers	8,436	8,557	9,064	9,080	9,097	9,322	9,354	9,443	9,499	9,531	9,741	9,902	10,151
VKT/lane-kilometer	12,055	12,087	11,601	11,712	12,672	12,714	13,426	13,796	14,054	13,970	13,802	13,984	13,969
Incident Ratio	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	55	55	55	55	55	55	55	60	60	60	60	60	60
Percent of Moderate Congestion	52	36	58	35	41	38	40	43	47	46	36	29	33
Percent of Heavy Congestion	17	36	15	39	41	33	27	13	17	22	31	40	36
Percent of Severe Congestion	31	27	27	26	19	30	33	44	36	32	33	31	31
Principal Arterial Streets													
Daily VKT (000)	71,379	74,141	74,688	75,187	76,403	78,069	80,033	81,836	83,809	85,362	89,065	88,550	89,677
Lane-kilometers	10,787	10,948	10,948	10,948	10,980	11,109	11,447	11,834	12,172	12,268	12,276	12,397	12,478
VKT/lane-kilometer	6,617	6,772	6,822	6,868	6,958	7,028	6,992	6,916	6,886	6,958	7,255	7,143	7,187
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	75	75	75	75	75	75	80	80	80	80	85	85	85
Percent of Moderate Congestion	30.00	25.00	33.00	28.00	29.00	22.00	16.00	19.00	18.00	19.00	12.00	7.00	8.00
Percent of Heavy Congestion	38.00	36.00	44.00	25.00	12.00	17.00	20.00	14.00	21.00	19.00	24.00	22.00	13.00
Percent of Severe Congestion	32.00	39.00	23.00	48.00	59.00	62.00	64.00	67.00	61.00	62.00	64.00	71.00	79.00
Population (000)	16,660	16,660	15,340	15,340	15,340	16,000	16,320	16,420	16,780	16,830	16,945	17,000	17,010
Urban Area (square kilometers)	8,236	8,159	8,184	8,184	8,184	8,184	8,249	8,249	8,249	8,252	8,418	8,677	8,806
Population Density	2,023	2,042	1,874	1,874	1,874	1,955	1,978	1,991	2,034	2,040	2,013	1,959	1,932
Registered Vehicles (000)	13,010	13,040	12,030	12,060	12,090	12,620	12,910	13,000	13,320	13,380	13,510	13,570	13,590
Fuel Cost ($/liter)	-	-	-	-	-	0.26	0.29	0.33	0.38	0.36	0.37	0.35	0.33
Total VKT (000)	295,997	302,656	310,551	311,966	330,073	338,494	356,507	363,076	363,876	364,219	366,919	376,734	379,921
Total Lane-Kilometers	54,597	54,907	55,286	55,418	56,442	56,463	56,529	56,640	56,794	56,899	57,345	58,862	59,269
Roadway Congestion Index	1.01	1.02	0.99	1.00	1.06	1.06	1.10	1.12	1.14	1.14	1.14	1.15	1.15

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-33. Mobility and Congestion Variables in Norfolk, VA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	6,231	6,432	6,722	7,197	7,809	8,316	8,420	8,589	8,775	8,960	9,451	9,620	9,781
Lane-Kilometers	660	676	692	708	708	725	733	741	749	821	902	926	934
VKT/lane-kilometer	9,439	9,512	9,709	10,159	11,023	11,478	11,495	11,598	11,720	10,912	10,482	10,391	10,474
Incident Ratio	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	35	35	35	40	45	45	45	45	45	45	40	40	40
Percent of Moderate Congestion	91	91	29	13	36	17	8	8	8	18	22	35	30
Percent of Heavy Congestion	7	7	69	85	20	31	39	37	37	39	43	50	50
Percent of Severe Congestion	2	2	2	2	44	52	53	56	56	43	34	15	20
Principal Arterial Streets													
Daily VKT (000)	5,265	5,321	5,474	5,651	5,844	6,207	6,376	6,569	6,851	7,132	7,688	7,889	8,171
Lane-kilometers	1,071	1,079	1,087	1,087	1,119	1,127	1,143	1,167	1,183	1,208	1,208	1,224	1,240
VKT/lane-kilometer	4,917	4,933	5,037	5,200	5,223	5,507	5,577	5,628	5,789	5,907	6,367	6,447	6,591
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	30	30	30	30	30	35	35	35	35	35	40	40	40
Percent of Moderate Congestion	-	-	-	22.00	11.00	17.00	26.00	32.00	29.00	28.00	18.00	15.00	15.00
Percent of Heavy Congestion	29.00	28.00	29.00	7.00	14.00	24.00	28.00	14.00	24.00	25.00	21.00	30.00	25.00
Percent of Severe Congestion	71.00	72.00	71.00	70.00	76.00	60.00	46.00	55.00	47.00	47.00	61.00	55.00	65.00
Population (000)	770	780	790	800	840	870	895	920	925	950	965	975	985
Urban Area (square kilometers)	2,059	2,059	2,072	2,072	2,085	2,085	2,098	2,098	2,111	2,111	2,111	2,124	2,137
Population Density	374	379	381	386	403	417	427	439	438	450	457	459	461
Registered Vehicles (000)	600	610	620	630	660	690	710	730	730	750	770	780	790
Fuel Cost ($/liter)	-	-	-	-	-	0.27	0.30	0.32	0.36	0.35	0.36	0.31	0.30
Total VKT (000)	20,344	21,300	21,626	25,515	26,873	28,586	29,316	32,232	32,640	33,124	34,032	35,420	37,030
Total Lane-Kilometers	4,722	4,807	5,022	5,152	5,252	5,340	5,406	5,514	5,603	5,682	5,793	5,877	6,038
Roadway Congestion Index	0.79	0.79	0.81	0.84	0.89	0.93	0.94	0.95	0.96	0.92	0.92	0.92	0.93

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\text{Roadway Congestion Index (RCI)} = \frac{\frac{\text{Freeway VKT/Ln.-Km.}}{} \times \frac{\text{Freeway VKT}}{} + \frac{\text{Prin. Art. Str. VKT/Ln.-Km.}}{} \times \frac{\text{Prin. Art. Str. VKT}}{}}{13{,}000^{1} \times \frac{\text{Freeway VKT}}{} + 5{,}000^{1} \times \frac{\text{Prin. Art. Str. VKT}}{}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-34. Mobility and Congestion Variables in Oklahoma City, OK

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	9,378	9,563	9,757	9,942	10,111	10,191	10,658	10,996	11,165	11,471	11,753	12,397	12,478
Lane-Kilometers	1,071	1,087	1,095	1,103	1,111	1,127	1,135	1,159	1,159	1,167	1,167	1,183	1,191
VKT/lane-kilometer	8,759	8,800	8,912	9,015	9,101	9,043	9,390	9,486	9,632	9,828	10,069	10,476	10,473
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	5	5	5	5	5	5	10	10	10	10	10	10	10
Percent of Moderate Congestion	50	50	50	50	50	50	54	58	55	58	54	56	58
Percent of Heavy Congestion	50	50	50	50	50	50	46	42	45	42	46	41	40
Percent of Severe Congestion	-	-	-	-	-	-	-	-	-	-	-	3.00	2.00
Principal Arterial Streets													
Daily VKT (000)	4,428	4,669	5,361	5,394	5,442	5,579	5,546	5,772	5,772	6,070	6,392	7,245	7,487
Lane-kilometers	926	974	1,014	1,038	1,038	1,055	1,055	1,095	1,095	1,111	1,159	1,288	1,409
VKT/lane-kilometer	4,783	4,793	5,286	5,194	5,240	5,290	5,260	5,272	5,272	5,464	5,514	5,625	5,314
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	30	30	35	35	35	35	35	35	35	35	40	40	40
Percent of Moderate Congestion	10.00	10.00	10.00	10.00	10.00	-	3.00	21.00	25.00	23.00	23.00	26.00	25.00
Percent of Heavy Congestion	30.00	30.00	30.00	30.00	30.00	40.00	31.00	32.00	31.00	29.00	31.00	32.00	31.00
Percent of Severe Congestion	70.00	70.00	70.00	70.00	70.00	60.00	66.00	47.00	44.00	49.00	46.00	41.00	44.00
Population (000)	640	670	690	730	735	725	720	730	735	750	775	805	850
Urban Area (square kilometers)	1,088	1,166	1,243	1,269	1,295	1,295	1,295	1,295	1,295	1,321	1,347	1,450	1,476
Population Density	588	575	555	575	568	560	556	564	568	568	575	555	576
Registered Vehicles (000)	490	510	530	560	560	550	550	560	560	580	600	620	660
Fuel Cost ($/liter)	-	-	-	-	0.25	0.27	0.29	0.31	0.35	0.34	0.34	0.30	0.28
Total VKT (000)	25,915	26,641	28,283	28,392	28,624	28,766	28,975	29,998	29,866	31,405	32,382	34,592	34,745
Total Lane-Kilometers	6,066	6,173	6,366	6,360	6,368	6,374	6,583	6,595	6,607	6,611	6,809	6,946	7,139
Roadway Congestion Index	0.72	0.72	0.75	0.75	0.76	0.76	0.78	0.78	0.79	0.81	0.83	0.86	0.85

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-35. Mobility and Congestion Variables in Orlando, FL

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	6,955	7,261	7,487	8,420	8,557	8,919	9,314	9,370	9,580	9,732	9,741	10,022	10,827
Lane-Kilometers	757	765	789	845	853	877	894	926	950	966	966	990	1,047
VKT/lane-kilometer	9,191	9,495	9,490	9,962	10,028	10,165	10,423	10,122	10,085	10,075	10,083	10,122	10,346
Incident Ratio	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	25	25	25	25	30	30	30	30	30	30	30	35	35
Percent of Moderate Congestion	100	100	83	71	74	69	71	74	65	62	48	45	37
Percent of Heavy Congestion	-	-	7	-	6	6	6	5	16	15	19	20	17
Percent of Severe Congestion	-	-	10.00	29	20	26.00	23.00	21.00	19	23	33	35.00	46
Principal Arterial Streets													
Daily VKT (000)	5,740	5,957	5,699	5,852	5,917	5,949	5,957	6,158	6,601	7,084	7,809	8,372	10,143
Lane-kilometers	1,473	1,497	1,562	1,610	1,650	1,658	1,691	1,707	1,723	1,739	1,755	1,787	1,932
VKT/lane-kilometer	3,896	3,978	3,649	3,635	3,585	3,587	3,524	3,608	3,832	4,074	4,450	4,685	5,250
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	20	20	25	25	25	25	25	25	25	25	25	30	30
Percent of Moderate Congestion	13.00	27.00	13.00	23.00	5.00	10.00	14.00	5.00	5.00	6.00	4.00	5.00	12.00
Percent of Heavy Congestion	27.00	11.00	32.00	22.00	37.00	17.00	21.00	24.00	16.00	11.00	11.00	17.00	19.00
Percent of Severe Congestion	60.00	63.00	55.00	54.00	58.00	73.00	66.00	71.00	79.00	83.00	84.00	78.00	70.00
Population (000)	610	630	650	670	690	760	785	800	850	880	880	920	950
Urban Area (square kilometers)	984	984	1,010	1,010	1,023	1,023	1,036	1,036	1,062	1,062	1,075	1,088	1,114
Population Density	620	640	644	663	674	743	758	772	800	829	819	846	853
Registered Vehicles (000)	480	500	520	540	550	610	630	650	690	720	720	750	780
Fuel Cost ($/liter)	-	-	-	-	0.27	0.29	0.31	0.34	0.36	0.35	0.35	0.33	0.32
Total VKT (000)	18,745	20,838	22,962	24,477	25,910	26,472	27,451	28,516	30,155	33,430	35,304	35,699	39,572
Total Lane-Kilometers	3,635	3,761	3,878	3,986	4,152	4,624	4,743	4,833	4,862	4,878	4,878	5,756	5,788
Roadway Congestion Index	0.72	0.75	0.73	0.76	0.76	0.77	0.78	0.77	0.77	0.78	0.80	0.82	0.86

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-36. Mobility and Congestion Variables in Philadelphia, PA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	19,924	21,655	21,952	22,226	22,741	24,351	26,847	29,423	29,503	30,671	31,218	32,522	33,681
Lane-Kilometers	2,013	2,045	2,045	2,069	2,093	2,149	2,254	2,423	2,431	2,528	2,600	2,721	2,785
VKT/lane-kilometer	9,900	10,591	10,736	10,743	10,865	11,330	11,911	12,143	12,136	12,134	12,006	11,953	12,092
Incident Ratio	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	20	20	20	25	25	25	25	25	25	25	25	25	25
Percent of Moderate Congestion	42	43	52	73	71	60	63	55	49	48	27	31	39
Percent of Heavy Congestion	18	17	18	12	13	28	27	28	23	21	18	26	28
Percent of Severe Congestion	39	39	30	15	16	12	10	17	28	32	55	43	33
Principal Arterial Streets													
Daily VKT (000)	30,590	31,427	31,886	32,852	34,494	36,306	35,605	34,035	34,438	34,808	34,857	34,873	35,420
Lane-kilometers	4,347	4,444	4,508	4,669	4,750	5,184	5,200	5,224	5,233	5,249	5249	5297	5,313
VKT/lane-kilometer	7,037	7,072	7,073	7,036	7,263	7,003	6,847	6,515	6,582	6,632	6,641	6,584	6,667
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	70	70	70	75	75	75	75	75	75	75	75	75	75
Percent of Moderate Congestion	25.00	36.00	20.00	11.00	19.00	17.00	14.00	18.00	17.00	15.00	14.00	10.00	12.00
Percent of Heavy Congestion	14.00	26.00	35.00	36.00	18.00	16.00	13.00	12.00	19.00	27.00	23.00	16.00	24.00
Percent of Severe Congestion	61.00	38.00	45.00	54.00	64.00	66.00	73.00	70.00	64.00	58.00	63.00	74.00	64.00
Population (000)	4,070	4,070	4,070	4,070	4,070	4,085	4,130	4,220	4,500	4,700	5,000	5,200	5,250
Urban Area (square kilometers)	2,512	2,512	2,849	2,849	2,849	2,888	2,901	2,979	3,108	3,212	3,600	3,859	3,859
Population Density	1,620	1,620	1,429	1,429	1,429	1,415	1,424	1,417	1,448	1,463	1,389	1,347	1,360
Registered Vehicles (000)	3,150	3,160	3,160	3,170	3,180	3,190	3,240	3,310	3,540	3,700	3,950	4,110	4,160
Fuel Cost ($/liter)	-	-	-	-	-	0.26	0.29	0.32	0.36	0.35	0.35	0.32	0.31
Total VKT (000)	82,881	85,515	86,982	91,293	95,230	101,074	103,438	105,656	105,872	107,506	113,758	118,213	118,486
Total Lane-Kilometers	16,960	16,987	17,019	17,328	17,328	17,399	17,502	18,027	19,022	19,705	20,115	20,993	21,128
Roadway Congestion Index	1.00	1.03	1.04	1.04	1.06	1.06	1.07	1.05	1.05	1.05	1.05	1.04	1.05

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{13{,}000^{1}} \times \frac{\textit{Freeway VKT}}{} + \frac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{5{,}000^{1}} \times \frac{\textit{Prin. Art. Str. VKT}}{}}{\frac{\textit{Freeway VKT}}{} + \frac{\textit{Prin. Art. Str. VKT}}{}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-37. Mobility and Congestion Variables in Phoenix, AZ

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	4,589	4,685	5,072	5,683	7,438	7,374	9,419	11,351	12,832	14,571	15,698	15,778	16,744
Lane-Kilometers	338	370	451	467	499	547	837	974	1,006	1,071	1,127	1,143	1,208
VKT/lane-kilometer	13,571	12,652	11,250	12,172	14,903	13,471	11,250	11,653	12,752	13,609	13,929	13,803	13,867
Incident Ratio	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	50	55	60	65	70	70	60	60	60	60	60	65	65
Percent of Moderate Congestion	88	88	80	76	16	4	38	30	12	16	18	19	27
Percent of Heavy Congestion	12	12	20	24	56	36	15	14	53	50	16	16	21
Percent of Severe Congestion	-	-	-	-	29	60.00	46.00	56.00	35	34	66	65	53
Principal Arterial Streets													
Daily VKT (000)	24,037	24,094	24,641	25,285	25,502	26,525	26,855	26,798	28,352	2,900	29,149	29,785	29,978
Lane-kilometers	3,993	4,009	4,025	4,057	4,089	4,130	4,476	4,589	5,023	5,184	5,329	5,394	5,394
VKT/lane-kilometer	6,020	6,010	6,122	6,232	6,236	6,423	6,000	5,840	5,644	5,595	5,470	5,522	5,558
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	65	65	65	70	70	70	70	70	70	70	70	70	70
Percent of Moderate Congestion	46.00	52.00	52.00	45.00	44.00	45.00	22.00	26.00	37.00	38.00	31.00	28.00	33.00
Percent of Heavy Congestion	26.00	23.00	23.00	29.00	19.00	26.00	25.00	25.00	32.00	25.00	32.00	38.00	38.00
Percent of Severe Congestion	28.00	25.00	25.00	27.00	37.00	28.00	53.00	49.00	31.00	37.00	37.00	34.00	29.00
Population (000)	1,430	1,520	1,590	1,650	1,735	1,820	1,830	1,875	1,895	1,930	2,022	2070	2,130
Urban Area (square kilometers)	1,425	1,632	1,891	2,137	2,214	2,305	2,512	2,512	2,525	2,551	2,720	2,745	2,771
Population Density	1,004	932	841	772	783	790	728	746	750	757	744	754	769
Registered Vehicles (000)	1,070	1,140	1,190	1,240	1,300	1,370	1,380	1,420	1,430	1,460	1,530	1,570	1,620
Fuel Cost ($/liter)	-	-	-	-	0.28	0.30	0.32	0.33	0.36	0.35	0.35	0.34	0.34
Total VKT (000)	44,203	44,623	45,057	45,776	46,344	49,699	61,275	60,092	63,843	66,689	68,860	73,147	73,954
Total Lane-Kilometers	9,183	9,191	9,183	10,595	10,800	11,246	11,597	13,777	13,996	14,445	15,841	16,662	16,631
Roadway Congestion Index	1.15	1.13	1.10	1.13	1.20	1.18	1.04	1.03	1.05	1.08	1.08	1.08	1.09

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-38. Mobility and Congestion Variables in Pittsburgh, PA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	8,887	9,853	10,401	10,715	11,109	11,576	11,882	12,478	13,194	13,283	14,707	15,054	15,166
Lane-Kilometers	1,248	1,369	1,393	1,417	1,465	1,505	1,530	1,578	1,610	1,634	1,803	1,852	1,884
VKT/lane-kilometer	7,123	7,200	7,468	7,563	7,582	7,690	7,768	7,908	8,195	8,128	8,156	8,130	8,051
Incident Ratio	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	15	15	15	15	20	20	20	20	20	20	20	20	20
Percent of Moderate Congestion	100	57	50	36	18	14	50	60	20	20	23	24	24
Percent of Heavy Congestion	-	43	17	18	36	43	17	-	30	28	32	36	38
Percent of Severe Congestion	-	-	33	45	45	43	33	40	50	52	45	40	38
Principal Arterial Streets													
Daily VKT (000)	14,257	14,385	14,619	15,206	15,786	15,947	17,114	17,332	17,565	17,831	17,871	18,515	18,934
Lane-kilometers	2,455	2,552	2,673	2,657	2,705	2,737	2,842	2,850	2,930	2,987	2,987	2,995	3,019
VKT/lane-kilometer	5,807	5,637	5,470	5,724	5,836	5,826	6,023	6,082	5,995	5,970	5,984	6,183	6,272
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	50	55	55	60	60	60	60	60	60	60	60	65	65
Percent of Moderate Congestion	39.00	34.00	33.00	36.00	35.00	33.00	11.00	14.00	24.00	27.00	26.00	32.00	28.00
Percent of Heavy Congestion	27.00	30.00	21.00	43.00	33.00	21.00	17.00	14.00	15.00	23.00	19.00	17.00	12.00
Percent of Severe Congestion	34.00	36.00	45.00	21.00	32.00	46.00	71.00	71.00	62.00	50.00	55.00	50.00	61.00
Population (000)	1,810	1,810	1,810	1,810	1,810	1,810	1,845	1,850	1,865	1,865	1,875	1,900	1,910
Urban Area (square kilometers)	1,761	1,761	1,839	1,839	1,839	1,852	1,878	1,891	1,943	1,994	2,124	2,331	2,383
Population Density	1,028	1,028	984	984	984	977	983	978	960	935	883	815	802
Registered Vehicles (000)	1,470	1,480	1,480	1,480	1,480	1,480	1,510	1,520	1,530	1,530	1,550	1,570	1,580
Fuel Cost ($/liter)	-	-	-	-	-	0.26	0.29	0.32	0.36	0.35	0.35	0.32	0.31
Total VKT (000)	42,985	44,227	45,700	46,680	48,099	48,244	49,095	50,106	52,270	53,400	55,289	54,853	54,998
Total Lane-Kilometers	12,389	12,254	12,220	12,201	12,201	11,864	11,974	12,011	12,180	12,181	12,250	13,018	13,510
Roadway Congestion Index	0.78	0.76	0.76	0.78	0.79	0.79	0.81	0.82	0.82	0.82	0.81	0.82	0.83

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-39. Mobility and Congestion Variables in Portland, OR

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	7,631	8,654	8,968	9,539	10,183	10,787	11,431	12,027	12,027	12,107	12,832	13,444	13,910
Lane-Kilometers	708	773	821	829	845	869	869	886	894	902	926	966	1,006
VKT/lane-kilometer	10,773	11,198	10,922	11,505	12,048	12,407	13,148	13,582	13,459	13,429	13,861	13,917	13,824
Incident Ratio	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	30	30	30	30	30	35	35	35	35	35	40	40	40
Percent of Moderate Congestion	53	67	68	52	41	48	50	47	46	47	32	28	26
Percent of Heavy Congestion	13	14	16	33	50	33	27	16	22	23	20	26	25
Percent of Severe Congestion	33	19	16	15	9	19	23	37	32	30	49	46	49
Principal Arterial Streets													
Daily VKT (000)	4,468	4,484	4,500	4,774	5,055	5,152	5,281	5,426	5,973	6,166	6,295	7,084	7,567
Lane-kilometers	829	829	829	837	845	853	869	894	910	942	974	1,063	1,127
VKT/lane-kilometer	5,388	5,408	5,427	5,702	5,981	6,038	6,074	6,072	6,566	6,547	6,463	6,667	6,714
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	60	60	60	60	60	60	60	60	60	60	60	60	60
Percent of Moderate Congestion	54.00	48.00	62.00	60.00	49.00	20.00	18.00	16.00	12.00	10.00	15.00	20.00	17.00
Percent of Heavy Congestion	10.00	12.00	8.00	18.00	33.00	39.00	43.00	41.00	43.00	42.00	42.00	41.00	45.00
Percent of Severe Congestion	36.00	40.00	31.00	22.00	18.00	41.00	40.00	43.00	45.00	47.00	42.00	40.00	37.00
Population (000)	1,010	1,000	1,010	1,030	1,040	1,045	1,025	1,025	1,030	1,040	1,060	1,080	1,100
Urban Area (square kilometers)	907	907	907	984	1,036	1,062	1,062	1,062	1,088	1,101	1,101	1,140	1,153
Population Density	1,114	1,103	1,114	1,047	1,004	984	965	965	947	945	963	948	954
Registered Vehicles (000)	810	810	810	830	840	840	820	820	830	840	850	870	880
Fuel Cost ($/liter)	-	-	-	-	0.24	0.26	0.28	0.35	0.37	0.36	0.36	0.36	0.35
Total VKT (000)	21,204	22,817	23,957	25,000	26,623	27,727	29,857	31,015	31,231	32,181	33,692	36,326	37,197
Total Lane-Kilometers	6,136	6,377	6,438	6,459	6,500	6,532	6,801	7,005	7,053	7,113	7,153	7,385	7,503
Roadway Congestion Index	0.87	0.90	0.88	0.93	0.97	0.99	1.04	1.07	1.08	1.08	1.10	1.11	1.11

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-40. Mobility and Congestion Variables in Sacramento, CA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	8,533	9,338	10,433	11,109	11,914	12,969	13,556	14,249	14,909	15,520	16,285	16,551	17,114
Lane-Kilometers	1,014	1,014	1,030	1,030	1,047	1,063	1,087	1,175	1,208	1,224	1,288	1,296	1,312
VKT/lane-kilometer	8,413	9,206	10,125	10,781	11,385	12,205	12,474	12,123	12,347	12,684	12,644	12,770	13,043
Incident Ratio	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	25	25	25	30	30	30	30	30	30	30	30	35	35
Percent of Moderate Congestion	100	100	71	80	75	54	47	47	51	50	42	38	33
Percent of Heavy Congestion	-	-	29	10	20	42	49	40	37	40	50	54	49
Percent of Severe Congestion	-	-	-	10	5	4	3	13	13	10	8	8	18
Principal Arterial Streets													
Daily VKT (000)	8,042	8,372	8,726	9,097	9,475	9,877	10,715	10,964	11,262	11,270	12,453	12,639	12,800
Lane-kilometers	1,336	1,369	1,449	1,513	1,562	1,610	1,691	1,739	1,771	1,795	1,996	2,013	2,045
VKT/lane-kilometer	6,018	6,118	6,022	6,011	6,067	6,135	6,338	6,306	6,359	6,278	6,238	6,280	6,260
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	40	40	45	45	45	45	50	50	50	50	50	55	55
Percent of Moderate Congestion	40.00	40.00	38.00	32.00	24.00	16.00	22.00	6.00	3.00	9.00	15.00	16.00	18.00
Percent of Heavy Congestion	30.00	30.00	35.00	22.00	53.00	53.00	44.00	33.00	26.00	21.00	24.00	22.00	20.00
Percent of Severe Congestion	30.00	30.00	27.00	47.00	23.00	32.00	33.00	61.00	70.00	71.00	61.00	61.00	63.00
Population (000)	830	830	830	910	955	995	1,040	1,055	1,095	1,165	1,190	1,205	1,220
Urban Area (square kilometers)	725	725	725	829	855	881	907	919	932	945	992	1,010	1,010
Population Density	1,145	1,145	1,145	1,098	1,117	1,130	1,147	1,147	1,174	1,232	1,200	1,193	1,208
Registered Vehicles (000)	650	640	640	710	740	770	800	810	840	890	910	920	930
Fuel Cost ($/liter)	-	-	-	-	0.27	0.29	0.31	0.35	0.38	0.36	0.37	0.35	0.34
Total VKT (000)	24,441	26,847	29,056	30,706	31,105	33,248	35,362	36,772	38,027	38,555	38,614	39,939	41,044
Total Lane-Kilometers	4,589	4,648	4,687	4,703	4,774	4,917	5,163	5,371	5,627	5,833	6,099	6,174	6,195
Roadway Congestion Index	0.80	0.84	0.88	0.92	0.95	1.00	1.03	1.01	1.02	1.04	1.04	1.04	1.06

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-41. Mobility and Congestion Variables in Salt Lake City, UT

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	4,621	4,790	4,862	5,184	5,555	6,134	6,561	8,179	8,581	8,989	9,298	9,757	10,352
Lane-Kilometers	644	676	676	676	716	757	773	821	821	829	845	861	877
VKT/lane-kilometer	7,175	7,083	7,190	7,667	7,753	8,106	8,490	9,961	10,451	10,841	11,000	11,327	11,798
Incident Ratio	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	10	10	10	10	10	15	15	15	15	20	20	25	30
Percent of Moderate Congestion	38	14	65	55	33	29	53	39	45	38	30	27	26
Percent of Heavy Congestion	38	86	35	18	52	60	40	19	43	43	40	38	30
Percent of Severe Congestion	25	-	-	27	15	12	7	42	13	19	29	35	44
Principal Arterial Streets													
Daily VKT (000)	2,343	2,455	2,697	2,890	2,938	3,003	3,075	3,140	3,276	3,671	4,146	4,299	4,589
Lane-kilometers	451	467	483	531	539	555	564	572	572	620	684	700	797
VKT/lane-kilometer	5,196	5,259	5,583	5,439	5,448	5,406	5,457	5,493	5,732	5,922	6,059	6,138	5,758
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	35	35	40	40	45	40	40	40	40	40	45	45	45
Percent of Moderate Congestion	49.00	22.00	50.00	59.00	67.00	40.00	43.00	45.00	45.00	54.00	58.00	56.00	53.00
Percent of Heavy Congestion	5.00	15.00	18.00	11.00	9.00	36.00	38.00	36.00	27.00	25.00	30.00	32.00	29.00
Percent of Severe Congestion	46.00	63.00	33.00	30.00	24.00	23.00	19.00	19.00	27.00	21.00	13.00	12.00	18.00
Population (000)	680	700	720	750	760	765	785	785	800	840	860	875	880
Urban Area (square kilometers)	932	932	932	958	984	1,023	1,114	1,191	1,217	1,217	1,230	1,256	1,269
Population Density	729	751	772	783	772	748	705	659	657	690	699	697	693
Registered Vehicles (000)	530	550	560	580	590	600	610	610	620	650	670	680	680
Fuel Cost ($/liter)	-	-	-	-	0.26	0.29	0.31	0.33	0.38	0.36	0.37	0.31	0.31
Total VKT (000)	17,993	18,946	19,254	20,157	20,973	21,891	22,769	23,461	24,422	25,644	25,935	27,043	28,661
Total Lane-Kilometers	4,097	4,114	4,109	4,130	4,286	4,318	4,313	4,564	4,572	4,598	4,643	4,645	4,669
Roadway Congestion Index	0.63	0.63	0.65	0.68	0.68	0.70	0.72	0.81	0.85	0.88	0.90	0.92	0.94

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-42. Mobility and Congestion Variables in San Antonio, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	12,236	12,824	13,605	14,619	14,893	14,490	14,571	14,772	14,941	15,094	15,995	17,227	18,555
Lane-Kilometers	1,224	1,248	1,264	1,288	1,304	1,312	1,320	1,328	1,328	1,336	1,417	1,513	1,594
VKT/lane-kilometer	10,000	10,277	10,764	11,350	11,420	11,043	11,037	11,121	11,248	11,295	11,290	11,383	11,641
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	35	35	35	40	40	40	40	40	40	40	40	40	40
Percent of Moderate Congestion	60	60	50	38	15	14	20	15	15	13	16	15	13
Percent of Heavy Congestion	20	20	20	15	15	8	15	40	44	40	32	34	32
Percent of Severe Congestion	20	20	30	47	70	78	65	45	41	48	51	50	54
Principal Arterial Streets													
Daily VKT (000)	5,675	5,933	6,311	6,899	7,382	7,728	8,034	8,340	8,436	8,775	9,563	9,660	9,765
Lane-kilometers	1,513	1,554	1,578	1,642	1,658	1,691	1,723	1,739	1,755	1,795	1,811	1,819	1,827
VKT/lane-kilometer	3,750	3,819	4,000	4,201	4,451	4,571	4,664	4,796	4,807	4,888	5,280	5,310	5,344
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	5	10	10	15	15	15	20	20	20	20	25	30	30
Percent of Moderate Congestion	77.00	39.00	23.00	42.00	38.00	29.00	36.00	33.00	33.00	28.00	34.00	35.00	33.00
Percent of Heavy Congestion	18.00	12.00	10.00	10.00	23.00	9.00	8.00	9.00	14.00	22.00	24.00	24.00	25.00
Percent of Severe Congestion	5.00	48.00	67.00	48.00	38.00	62.00	56.00	58.00	53.00	50.00	41.00	41.00	42.00
Population (000)	950	960	980	995	1,020	1,050	1,165	1,165	1,170	1,180	1,185	1,195	1,210
Urban Area (square kilometers)	1,114	1,140	1,140	1,166	1,191	1,217	1,230	1,243	1,256	1,256	1,269	1,282	1,295
Population Density	853	842	860	854	856	863	947	937	931	939	934	932	934
Registered Vehicles (000)	680	690	710	720	740	770	860	860	870	880	880	890	910
Fuel Cost ($/liter)	-	-	-	-	0.25	0.28	0.30	0.32	0.35	0.34	0.34	0.31	0 30
Total VKT (000)	28,677	30,273	30,518	33,767	35,914	36,417	36,890	39,007	40,760	41,459	42,984	43,596	45,101
Total Lane-Kilometers	6,632	6,868	7,139	7,515	7,963	8,634	9,431	10,483	10,835	11,239	11,239	11,468	11,727
Roadway Congestion Index	0.77	0.79	0.82	0.87	0.88	0.86	0.86	0.87	0.88	0.89	0.90	0.91	0.92

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-43. Mobility and Congestion Variables in San Bernardino-Riv, CA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	18,869	19,079	19,513	19,723	20,399	20,689	21,816	21,928	23,474	24,102	24,327	24,504	24,955
Lane-Kilometers	1,304	1,312	1,320	1,344	1,352	1,377	1,401	1,417	1,441	1,457	1,465	1,505	1,554
VKT/lane-kilometer	14,469	14,540	14,780	14,671	15,083	15,029	15,575	15,477	16,291	16,541	16,604	16,278	16,062
Incident Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	60	60	60	60	65	65	65	65	70	70	70	70	70
Percent of Moderate Congestion	100	100	48	72	27	17	9	6	19	16	6	12	13
Percent of Heavy Congestion	-	-	52	28	53	62	67	59	33	18	17	20	25
Percent of Severe Congestion	-	-	-	-	20	21	24	34	49	66	77	69	62
Principal Arterial Streets													
Daily VKT (000)	12,365	13,299	13,927	14,104	14,281	14,329	14,732	15,086	16,342	17,147	17,308	17,871	17,952
Lane-kilometers	2,286	2,351	2,528	2,544	2,544	2,608	2,705	2,777	3,123	3,357	3,381	3,413	3,421
VKT/lane-kilometer	5,408	5,658	5,510	5,544	5,614	5,494	5,446	5,432	5,232	5,108	5,119	5,236	5,247
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	50	50	50	55	55	55	55	55	55	55	55	60	60
Percent of Moderate Congestion	100.00	100.00	67.00	51.00	39.00	42.00	42.00	41.00	46.00	46.00	41.00	34.00	39.00
Percent of Heavy Congestion	-	-	33.00	34.00	31.00	28.00	28.00	38.00	31.00	31.00	25.00	28.00	27.00
Percent of Severe Congestion	-	-	-	15.00	31.00	31.00	30.00	22.00	23.00	23.00	34.00	38.00	34.00
Population (000)	945	950	965	970	990	1,015	1,040	1,100	1,170	1,275	1,300	1,325	1,340
Urban Area (square kilometers)	1,036	1,114	1,166	1,217	1,243	1,256	1,256	1,256	1,269	1,295	1,321	1,334	1,334
Population Density	912	853	828	797	796	808	828	876	922	985	984	993	1,005
Registered Vehicles (000)	700	700	710	710	730	750	760	1,800	850	930	940	960	970
Fuel Cost ($/liter)	-	-	-	-	0.27	0.29	0.31	0.35	0.38	0.36	0.37	0.35	0.34
Total VKT (000)	22,753	25,618	27,925	28,288	30,601	32,128	34,673	38,096	40,329	43,491	43,834	45,531	46,360
Total Lane-Kilometers	4,978	5,012	5,152	5,216	5,274	5,434	5,856	6,099	6,521	7,517	7,728	7,800	7,792
Roadway Congestion Index	1.11	1.12	1.13	1.12	1.15	1.14	1.18	1.17	1.21	1.22	1.22	1.21	1.20

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-44. Mobility and Congestion Variables in San Diego, CA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	24,271	26,525	29,753	31,637	33,842	37,280	40,306	43,084	44,581	44,597	44,758	44,678	44,798
Lane-Kilometers	2,447	2,496	2,536	2,568	2,616	2,640	2,729	2,769	2,777	2,777	2,801	2,809	2,818
VKT/lane-kilometer	9,918	10,629	11,733	12,320	12,935	14,119	14,770	15,558	16,052	16,058	15,977	15,903	15,900
Incident Ratio	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	35	35	35	35	40	45	50	50	50	50	50	50	50
Percent of Moderate Congestion	67	73	34	38	58	28	27	26	29	26	34	41	42
Percent of Heavy Congestion	33	27	40	14	9	42	20	15	25	26	23	30	28
Percent of Severe Congestion	-	-	26	49	33	30	53	59	47	47	43	29	31
Principal Arterial Streets													
Daily VKT (000)	9,869	10,449	11,407	12,075	12,639	13,170	14,240	14,377	15,037	15,295	15,617	15,537	15,778
Lane-kilometers	2,302	2,335	2,383	2,415	2,463	2,512	2,608	2,689	2,753	2,785	2,793	2,793	2,858
VKT/lane-kilometer	4,287	4,476	4,787	5,000	5,131	5,244	5,460	5,347	5,462	5,491	5,591	5,562	5,521
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	25	25	30	30	30	30	30	30	30	30	35	35	35
Percent of Moderate Congestion	100.00	90.00	80.00	75.00	43.00	17.00	15.00	12.00	27.00	25.00	16.00	15.00	15.00
Percent of Heavy Congestion	-	10.00	20.00	25.00	57.00	83.00	65.00	82.00	67.00	64.00	59.00	61.00	58.00
Percent of Severe Congestion	-	-	-	-	-	-	19.00	6.00	7.00	12.00	25.00	25.00	27.00
Population (000)	1,780	1,800	1,830	1,890	1,980	2,070	2,175	2,220	2,295	2,350	2,480	2,530	2,550
Urban Area (square kilometers)	1,580	1,619	1,658	1,684	1,722	1,761	1,800	1,826	1,839	1,839	1,891	1,904	1,917
Population Density	1,127	1,112	1,104	1,123	1,150	1,175	1,208	1,216	1,248	1,278	1,312	1,329	1,330
Registered Vehicles (000)	1,400	1,420	1,440	1,490	1,560	1,640	1,720	1,760	1,820	1,870	1,970	2,010	2,030
Fuel Cost ($/liter)	-	-	-	-	0.27	0.29	0.31	0.35	0.38	0.36	0.37	0.35	0.34
Total VKT (000)	57,722	59,227	60,005	63,677	65,986	71,022	76,440	80,960	83,086	83,293	84,151	84,841	86,644
Total Lane-Kilometers	8,024	8,047	8,203	8,298	8,386	8,567	8,876	8,910	9,174	9,396	9,533	9,666	9,594
Roadway Congestion Index	0.78	0.83	0.91	0.95	1.00	1.08	1.13	1.18	1.22	1.22	1.22	1.21	1.21

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-45. Mobility and Congestion Variables in San Fran-Oak, CA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	46,473	48,300	51,866	55,811	59,449	63,724	64,988	67,572	68,570	67,620	68,103	68,828	68,964
Lane-Kilometers	3,542	3,558	3,558	3,655	3,679	3,711	3,743	3,784	3,848	3,848	3,912	3,920	3,945
VKT/lane-kilometer	13,120	13,575	14,577	15,271	16,160	17,171	17,361	17,860	17,820	17,573	17,407	17,556	17,484
Incident Ratio	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	65	70	75	75	75	80	80	80	80	80	80	80	80
Percent of Moderate Congestion	26	16	6	8	9	10	12	14	17	14	17	13	14
Percent of Heavy Congestion	19	30	29	21	8	5	6	6	10	16	15	19	22
Percent of Severe Congestion	54	53	65	72	83	86	82	80	73	70	68	68	64
Principal Arterial Streets													
Daily VKT (000)	15,593	16,462	17,372	18,322	19,320	20,399	21,799	22,073	22,532	22,588	22,830	22,862	23,667
Lane-kilometers	2,954	2,979	3,059	3,123	3,180	3,228	3,325	3,445	3,623	3,703	3,735	3,784	3,800
VKT/lane-kilometer	5,278	5,527	5,679	5,866	6,076	6,319	6,557	6,407	6,220	6,100	6,112	6,043	6,229
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	60	60	60	60	60	60	60	60	60	60	60	65	65
Percent of Moderate Congestion	59.00	28.00	9.00	14.00	21.00	16.00	15.00	10.00	7.00	10.00	9.00	10.00	10.00
Percent of Heavy Congestion	4.00	29.00	29.00	27.00	14.00	18.00	5.00	5.00	16.00	11.00	15.00	16.00	13.00
Percent of Severe Congestion	37.00	43.00	61.00	59.00	65.00	66.00	80.00	85.00	78.00	78.00	76.00	74.00	77.00
Population (000)	3,290	3,310	3,330	3,350	3,435	3,520	3,610	3,620	3,675	3,725	3,805	3,830	3,870
Urban Area (square kilometers)	2,007	2,020	2,046	2,072	2,098	2,124	2,150	2,163	2,189	2,266	2,331	2,396	2,461
Population Density	1,639	1,638	1,627	1,617	1,637	1,657	1,679	1,674	1,679	1,644	1,632	1,599	1,573
Registered Vehicles (000)	2,680	2,700	2,710	2,730	2,800	2,870	2,950	2,960	3,000	3,040	3,110	3,130	3,170
Fuel Cost ($/liter)	-	-	-	-	0.27	0.29	0.31	0.35	0.38	0.36	0.37	0.35	0.34
Total VKT (000)	84,691	90,785	99,667	107,099	110,201	115,757	120,415	125,250	123,890	123,941	125,124	127,055	130,088
Total Lane-Kilometers	13,479	13,699	13,796	13,827	13,809	14,113	14,371	14,408	14,503	14,757	14,894	15,065	14,973
Roadway Congestion Index	1.01	1.05	1.12	1.17	1.24	1.31	1.33	1.36	1.36	1.34	1.33	1.33	1.33

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \frac{\textit{Freeway VKT}}{} + \frac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{} \times \frac{\textit{Prin. Art. Str. VKT}}{}}{13{,}000^{1} \times \frac{\textit{Freeway VKT}}{} + 5{,}000^{1} \times \frac{\textit{Prin. Art. Str. VKT}}{}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-46. Mobility and Congestion Variables in San Jose, CA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	19,425	20,053	21,316	22,427	22,959	23,490	24,078	25,019	25,406	26,597	26,734	26,807	27,169
Lane-Kilometers	1,739	1,763	1,803	1,819	1,827	1,835	1,852	1,868	1,868	1,892	1,932	1,964	1,980
VKT/lane-kilometer	11,171	11,374	11,821	12,327	12,564	12,798	13,004	13,397	13,603	14,060	13,838	13,648	13,720
Incident Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	45	50	50	55	55	60	60	60	60	60	60	60	60
Percent of Moderate Congestion	14	5	15	17	6	12	17	14	19	20	20	15	18
Percent of Heavy Congestion	39	18	7	9	20	13	14	22	18	19	20	20	25
Percent of Severe Congestion	46	77	79	74	73	75	68	64	63	61	60	65	57
Principal Arterial Streets													
Daily VKT (000)	8,443	8,710	9,266	9,749	9,966	10,207	10,465	10,876	10,908	10,988	11,914	11,753	11,713
Lane-kilometers	1,900	1,940	1,988	2,004	2,013	2,029	2,045	2,069	2,085	2,093	2,190	2,206	2,222
VKT/lane-kilometer	4,444	4,490	4,660	4,863	4,952	5,032	5,118	5,257	5,232	5,250	5,441	5,328	5,272
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	40	40	45	50	55	55	60	60	60	60	60	55	55
Percent of Moderate Congestion	93.00	92.00	74.00	55.00	24.00	17.00	17.00	15.00	22.00	20.00	22.00	28.00	30.00
Percent of Heavy Congestion	4.00	5.00	10.00	25.00	31.00	14.00	7.00	11.00	9.00	5.00	17.00	17.00	22.00
Percent of Severe Congestion	3.00	3.00	16.00	20.00	44.00	69.00	76.00	73.00	69.00	75.00	61.00	55.00	49.00
Population (000)	1,200	1,250	1,275	1,300	1,340	1,355	1,370	1,390	1,410	1,500	1,505	1,525	1,540
Urban Area (square kilometers)	1,049	1,062	1,075	1,088	1,101	1,114	1,127	1,153	1,166	1,166	1,191	1,204	1,204
Population Density	1,144	1,177	1,186	1,195	1,217	1,217	1,216	1,206	1,210	1,287	1,263	1,266	1,279
Registered Vehicles (000)	880	920	940	970	1,000	1,020	1,030	1,050	1,070	1,150	1,150	1,170	1,190
Fuel Cost ($/liter)	-	-	-	-	0.27	0.29	0.31	0.35	0.38	0.36	0.37	0.35	0.34
Total VKT (000)	35,494	38,658	41,672	44,064	44,555	47,716	50,058	51,826	52,236	52,930	53,265	53,159	54,490
Total Lane-Kilometers	5,756	5,809	5,881	5,905	5,939	5,947	5,994	6,020	6,141	6,255	6,285	6,343	6,392
Roadway Congestion Index	0.86	0.88	0.91	0.95	0.97	0.99	1.00	1.03	1.05	1.08	1.07	1.05	1.06

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-47. Mobility and Congestion Variables in Seattle-Everett, WA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	19,755	21,083	22,403	23,909	24,955	26,726	27,676	29,302	30,461	30,590	32,643	33,327	34,293
Lane-Kilometers	1,618	1,666	1,715	1,771	1,787	1,835	1,835	1,868	1,948	1,964	2,045	2,069	2,093
VKT/lane-kilometer	12,209	12,652	13,066	13,500	13,964	14,561	15,079	15,690	15,636	15,574	15,965	16,109	16,385
Incident Ratio	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	40	45	50	50	55	65	70	70	70	70	70	70	70
Percent of Moderate Congestion	58	29	29	40	32	37	30	12	16	12	11	9	9
Percent of Heavy Congestion	22	50	35	22	37	29	35	50	54	52	39	34	30
Percent of Severe Congestion	19	21	37	38	31	33	35	38	30	36	50	57	61
Principal Arterial Streets													
Daily VKT (000)	11,004	11,785	12,542	12,977	13,403	14,410	14,192	14,587	14,699	15,778	15,810	15,842	15,899
Lane-kilometers	2,157	2,198	2,270	2,318	2,335	2,375	2,375	2,455	2,536	2,576	2,616	2,640	2,681
VKT/lane-kilometer	5,101	5,363	5,525	5,597	5,741	6,068	5,976	5,941	5,797	6,125	6,043	6,000	5,931
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	50	55	55	55	55	55	55	55	55	55	55	55	55
Percent of Moderate Congestion	18.00	24.00	19.00	22.00	31.00	21.00	19.00	25.00	18.00	19.00	14.00	22.00	21.00
Percent of Heavy Congestion	41.00	27.00	35.00	20.00	8.00	32.00	26.00	14.00	15.00	20.00	19.00	19.00	27.00
Percent of Severe Congestion	41.00	49.00	46.00	58.00	61.00	47.00	54.00	62.00	67.00	61.00	67.00	59.00	52.00
Population (000)	1,440	1,480	1,520	1,540	1,565	1,595	1,625	1,680	1,730	1,820	1,840	1,875	1,910
Urban Area (square kilometers)	1,684	1,684	1,684	1,761	1,800	1,826	1,852	1,852	1,878	1,878	1,891	1,930	1,968
Population Density	855	879	903	874	869	874	878	907	921	969	973	972	970
Registered Vehicles (000)	1,220	1,250	1,290	1,310	1,330	1,360	1,380	1,430	1,470	1,550	1,570	1,600	1,630
Fuel Cost ($/liter)	-	-	-	-	0.27	0.28	0.31	0.32	0.37	0.36	0.36	0.34	0.33
Total VKT (000)	41,631	47,785	47,928	49,697	51,885	56,846	62,838	65,675	65,752	69,388	77,132	78,636	78,890
Total Lane-Kilometers	9,354	9,750	9,861	10,367	10,370	10,586	10,686	10,735	10,742	10,798	10,903	11,056	11,109
Roadway Congestion Index	0.95	0.99	1.02	1.05	1.09	1.14	1.17	1.20	1.20	1.20	1.22	1.23	1.25

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-48. Mobility and Congestion Variables in St. Louis, MO

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	19,376	20,986	23,200	23,852	25,148	26,227	27,990	30,139	29,785	30,107	30,477	31,395	33,166
Lane-Kilometers	1,948	1,996	2,206	2,278	2,286	2,302	2,391	2,713	2,721	2,729	2,737	2,769	2,793
VKT/lane-kilometer	9,946	10,512	10,518	10,470	11,000	11,392	11,707	11,110	10,947	11,032	11,135	11,337	11,873
Incident Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	20	20	20	20	20	20	20	20	20	20	20	25	25
Percent of Moderate Congestion	43	36	53	27	56	43	46	38	50	50	57	35	27
Percent of Heavy Congestion	57	64	24	60	36	33	15	22	10	11	30	38	37
Percent of Severe Congestion	-	-	24	13	8	24	39	41	40	39	13	28	36
Principal Arterial Streets													
Daily VKT (000)	14,418	14,949	15,689	16,519	17,332	18,056	18,467	19,658	19,658	19,884	20,093	20,447	20,487
Lane-kilometers	2,705	2,705	2,753	2,785	2,785	2,809	2,809	2,890	2,898	2,946	3,051	3,099	3,220
VKT/lane-kilometer	5,330	5,527	5,699	5,931	6,223	6,427	6,573	6,802	6,783	6,749	6,586	6,597	6,363
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	65	65	65	65	65	65	55	60	60	60	60	60	60
Percent of Moderate Congestion	38.00	40.00	30.00	25.00	28.00	35.00	25.00	14.00	21.00	20.00	25.00	34.00	37.00
Percent of Heavy Congestion	16.00	21.00	16.00	21.00	26.00	18.00	24.00	29.00	49.00	45.00	32.00	24.00	25.00
Percent of Severe Congestion	47.00	40.00	54.00	54.00	46.00	47.00	51.00	58.00	30.00	35.00	43.00	42.00	39.00
Population (000)	1,850	1,850	1,850	1,925	1,930	1,940	1,950	1,955	1,960	1,970	1,985	1,990	2,000
Urban Area (square kilometers)	1,684	1,813	1,813	1,813	1,813	1,839	1,865	1,878	1,891	1,904	1,917	1,994	2,072
Population Density	1,099	1,020	1,020	1,062	1,065	1,055	1,046	1,041	1,037	1,035	1,036	998	965
Registered Vehicles (000)	1,420	1,420	1,430	1,480	1,490	1,500	1,510	1,510	1,520	1,530	1,540	1,550	1,550
Fuel Cost ($/liter)	-	-	-	-	1.02	0.26	0.28	0.32	0.32	0.31	0.32	0.29	0.28
Total VKT (000)	46,191	52,703	55,761	57,340	59,879	62,560	65,662	72,239	72,914	74,509	77,056	83,388	86,236
Total Lane-Kilometers	10,405	11,296	11,375	11,394	11,415	11,594	11,632	11,508	11,534	11,571	11,603	13,189	13,316
Roadway Congestion Index	0.83	0.87	0.88	0.89	0.93	0.96	0.98	0.96	0.95	0.95	0.95	0.96	0.98

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-49. Mobility and Congestion Variables in Tampa, FL

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	3,188	3,453	4,089	4,580	4,733	5,313	5,538	5,522	5,844	5,877	6,118	6,360	7,245
Lane-Kilometers	306	306	354	419	435	451	467	475	483	491	499	515	564
VKT/lane-kilometer	10,421	11,289	11,545	10,942	10,889	11,786	11,862	11,627	12,100	11,967	12,258	12,344	12,857
Incident Ratio	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	20	20	20	20	20	20	25	25	25	25	25	20	20
Percent of Moderate Congestion	17	14	7	15	20	36	38	30	18	16	17	13	10
Percent of Heavy Congestion	40	24	23	25	45	13	12	28	33	34	23	17	14
Percent of Severe Congestion	43	61	70	60	35	51	50	42	49	49	60	70	76
Principal Arterial Streets													
Daily VKT (000)	5,136	5,418	5,885	6,182	5,877	6,247	6,545	6,730	7,020	7,084	7,487	7,503	8,082
Lane-kilometers	877	877	918	958	966	982	1,006	1,014	1,063	1,079	1,127	1,159	1,288
VKT/lane-kilometer	5,853	6,174	6,412	6,454	6,083	6,361	6,504	6,635	6,606	6,567	6,643	6,472	6,275
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	60	60	65	65	65	65	65	65	65	65	65	65	65
Percent of Moderate Congestion	19.00	16.00	23.00	21.00	17.00	18.00	12.00	31.00	28.00	36.00	23.00	16.00	17.00
Percent of Heavy Congestion	34.00	30.00	29.00	15.00	31.00	22.00	19.00	13.00	13.00	17.00	22.00	22.00	23.00
Percent of Severe Congestion	47.00	54.00	49.00	64.00	52.00	60.00	69.00	56.00	58.00	57.00	56.00	61.00	60.00
Population (000)	540	560	570	580	615	645	665	670	700	710	715	740	760
Urban Area (square kilometers)	907	907	1,010	1,010	1,062	1,101	1,127	1,127	1,153	1,166	1,166	1,178	1,230
Population Density	596	618	564	574	579	586	590	595	607	609	613	628	618
Registered Vehicles (000)	420	440	450	460	480	510	530	530	560	560	570	590	610
Fuel Cost ($/liter)	-	-	-	-	0.27	0.29	0.31	0.34	0.36	0.35	0.35	0.33	0.32
Total VKT (000)	16,034	17,523	17,995	18,729	19,299	19,694	23,649	23,738	25,322	26,163	27,209	27,370	29,302
Total Lane-Kilometers	4,824	4,880	4,906	4,915	4,946	5,078	5,223	5,223	5,253	5,297	5,313	5,345	5,635
Roadway Congestion Index	0.94	1.01	1.03	1.00	0.96	1.02	1.03	1.03	1.05	1.05	1.07	1.06	1.07

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

Table E-50. Mobility and Congestion Variables in Washington, DC

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	25,897	26,002	29,085	32,015	36,072	36,885	37,996	40,282	40,789	41,466	44,186	46,690	49,306
Lane-Kilometers	1,996	1,996	2,209	2,238	2,325	2,367	2,397	2,447	2,455	2,528	2,608	2,624	2,705
VKT/lane-kilometer	12,972	13,024	13,167	14,306	15,516	15,585	15,850	16,461	16,613	16,404	16,941	17,791	18,229
Incident Ratio	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Pct of Congested Freeway DVKT													
(ADT/lane greater than 15,000)	60	60	65	65	65	65	65	65	65	65	70	70	70
Percent of Moderate Congestion	63	36	31	50	38	33	30	16	18	12	11	17	17
Percent of Heavy Congestion	17	45	47	19	37	38	41	44	30	34	29	19	22
Percent of Severe Congestion	20	18	22	31	25	29	29	40	52	54	61	64	61
Principal Arterial Streets													
Daily VKT (000)	21,397	21,413	22,347	23,876	25,599	27,434	27,660	27,837	28,755	29,383	29,785	29,624	29,785
Lane-kilometers	2,818	2,930	3,123	3,204	3,301	3,381	3,462	3,542	3,623	3,703	3,735	3,784	3,832
VKT/lane-kilometer	7,594	7,308	7,155	7,452	7,756	8,114	7,991	7,859	7,938	7,935	7,974	7,830	7,773
Incident Ratio	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Pct of Congested Prin. Art. DVKT													
(ADT/lane greater than 15,000)	80	80	80	80	80	85	85	85	85	85	85	85	85
Percent of Moderate Congestion	11.00	12.00	15.00	12.00	16.00	15.00	11.00	10.00	7.00	9.00	16.00	16.00	20.00
Percent of Heavy Congestion	31.00	16.00	19.00	30.00	26.00	21.00	26.00	24.00	31.00	24.00	18.00	22.00	18.00
Percent of Severe Congestion	57.00	72.00	66.00	58.00	59.00	64.00	63.00	67.00	62.00	67.00	66.00	62.00	62.00
Population (000)	2,700	2,780	2,810	2,860	2,920	2,980	3,040	3,080	3,100	3,280	3,285	3,400	3,445
Urban Area (square kilometers)	2,059	2,072	2,085	2,098	2,111	2,124	2,150	2,163	2,176	2,383	2,396	2,525	2,577
Population Density	1,311	1,342	1,348	1,363	1,383	1,403	1,414	1,424	1,425	1,377	1,371	1,346	1,337
Registered Vehicles (000)	2,180	2,250	2,280	2,330	2,390	2,440	2,500	2,540	2,560	2,720	2,730	2,830	2,880
Fuel Cost ($/liter)	-	-	-	-	-	0.28	0.31	0.33	0.38	0.36	0.37	0.32	0.32
Total VKT (000)	72,384	73,163	78,681	86,272	93,808	97,553	98,978	101,398	103,560	104,766	109,958	112,998	119,002
Total Lane-Kilometers	11,284	11,540	12,186	12,614	13,128	13,276	13,442	13,608	13,775	13,899	14,081	14,419	14,902
Roadway Congestion Index	1.12	1.11	1.11	1.19	1.27	1.29	1.30	1.33	1.34	1.33	1.36	1.41	1.43

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\text{Roadway Congestion Index (RCI)} = \frac{\frac{\text{Freeway VKT/Ln.-Km.}}{\text{Freeway VKT}} \times \frac{\text{Freeway VKT}}{\text{Prin. Art. Str. VKT/Ln.-Km.}} + \frac{\text{Prin. Art. Str. VKT}}{\text{Prin. Art. Str. VKT}}}{13{,}000^{1} \times \frac{\text{Freeway VKT}}{\text{Prin. Art. Str. VKT}} + 5{,}000^{1} \times \frac{\text{Prin. Art. Str. VKT}}{\text{Prin. Art. Str. VKT}}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane-kilometers
Principal Arterial = 5,000 VKT/lane-kilometers

APPENDIX F

URBAN AREA
DELAY, FUEL, AND COST STATISTICS

Table F-1. Mobility and Congestion Variables in Albuquerque, NM

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	2,471	2,600	2,753	2,930	3,107	3,260	3,582	3,719	3,864	3,993	4,025	4,411	4,701
VKT/lane-kilometer	8,079	8,500	9,000	9,333	9,897	10,125	10,854	10,744	10,909	11,022	10,870	11,417	11,680
Principal Arterial Streets													
Daily VKT (000)	4,605	4,959	5,426	5,796	6,038	6,279	6,440	6,762	6,923	6,843	6,923	7,245	7,680
VKT/lane-kilometer	5,018	5,357	5,761	6,000	6,098	6,000	5,714	6,000	5,972	5,667	5,584	5,455	5,612
Roadway Congestion Index	0.78	0.83	0.89	0.93	0.96	0.96	0.96	0.98	0.98	0.96	0.95	0.96	0.98
Hours of Delay													
Total Daily (1000 person-hrs)	12	14	19	19	19	21	22	26	27	27	28	33	40
Annual per Capita (person-hrs)	7	8	10	10	10	11	11	13	14	13	14	16	19
Annual per Driver (person-hrs)	9	10	13	13	13	14	15	17	18	17	17	20	24
Freeway Daily Delay													
Recurring Veh-Hrs	340	370	410	930	1,120	1,360	2,640	2,760	2,910	2,920	2,960	3,240	5,040
Incident Veh-Hrs	370	410	450	1,030	1,230	1,500	2,900	3,040	3,200	3,210	3,250	3,560	5,550
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	4,410	5,020	6,710	6,380	6,220	6,530	5,850	7,050	7,550	7,490	7,880	9,420	10,260
Incident Veh-Hrs	4,850	5,520	7,390	7,010	6,840	7,190	6,430	7,750	8,300	8,230	8,660	10,360	11,280
Excess Fuel Consumed due to Congestion													
Total (million liters)	13	14	19	20	20	21	23	27	28	28	29	34	42
per Capita (liters)	29	32	42	42	42	44	47	53	56	54	56	64	77
per Eligible Driver (liters)	38	43	54	55	55	57	61	68	73	69	72	83	100
Congestion Cost													
Total ($ million)	-	-	-	-	50	60	60	80	90	90	100	120	150
per Capita ($)	-	-	-	-	110	120	130	160	180	180	190	220	270
per Eligible Driver ($)	-	-	-	-	140	150	170	200	230	220	240	290	350
Calculated Speeds (kph)													
Freeway (peak period)	95	95	95	93	93	92	89	88	88	89	89	89	87
Principal Arterial Street (peak period)	51	51	50	50	51	51	51	51	50	50	50	49	49
Areawide Speed Ratio	95	94	93	93	93	93	91	91	91	91	90	90	89

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-2. Mobility and Congestion Variables in Atlanta, GA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	25,382	27,378	29,149	31,282	34,663	36,974	38,543	39,598	40,186	41,458	42,665	48,300	53,130
VKT/lane-kilometer	11,549	12,060	12,275	12,825	13,627	14,003	14,509	14,640	14,596	14,928	15,143	15,000	15,349
Principal Arterial Streets													
Daily VKT (000)	10,529	11,334	12,011	13,468	14,579	15,054	15,754	15,633	15,746	15,923	16,100	19,320	20,528
VKT/lane-kilometer	5,361	5,457	5,588	6,196	6,634	6,703	6,567	6,224	6,229	6,279	6,173	6,000	6,014
Roadway Congestion Index	0.91	0.95	0.97	1.02	1.09	1.11	1.14	1.14	1.14	1.16	1.17	1.16	1.18
Hours of Delay													
Total Daily (1000 person-hrs)	145	160	179	215	249	277	275	288	297	303	334	388	424
Annual per Capita (person-hrs)	22	25	28	33	37	39	36	36	35	35	37	42	44
Annual per Driver (person-hrs)	29	32	36	43	48	50	46	46	45	45	47	53	56
Freeway Daily Delay													
Recurring Veh-Hrs	35,480	38,670	44,270	54,040	63,830	71,780	69,070	73,680	76,020	78,580	89,220	102,170	113,280
Incident Veh-Hrs	39,030	42,540	48,700	59,450	70,210	78,950	75,980	81,050	83,620	86,430	98,140	112,390	124,610
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	19,670	22,140	23,790	27,860	31,140	33,660	35,610	36,210	37,300	36,840	37,930	45,550	48,240
Incident Veh-Hrs	21,630	24,350	26,170	30,650	34,260	37,030	39,180	39,830	41,030	40,530	41,730	50,100	53,070
Excess Fuel Consumed due to Congestion													
Total (million liters)	157	172	194	233	268	296	292	305	313	319	353	409	447
per Capita (liters)	97	107	121	145	158	167	154	152	149	148	155	176	186
per Eligible Driver (liters)	127	139	157	187	205	214	197	195	190	189	197	223	235
Congestion Cost													
Total ($ million)	-	-	-	-	680	780	800	890	980	1,020	1,160	1,360	1,530
per Capita ($)	-	-	-	-	400	440	420	440	470	480	510	590	640
per Eligible Driver ($)	-	-	-	-	520	560	540	570	590	610	650	740	800
Calculated Speeds (kph)													
Freeway (peak period)	80	80	79	77	76	75	77	77	76	76	74	74	74
Principal Arterial Street (peak period)	47	46	46	46	46	45	45	45	45	45	45	45	45
Areawide Speed Ratio	83	83	81	79	79	78	79	80	79	79	77	77	77

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-3. Mobility and Congestion Variables in Austin, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	4,556	5,104	5,796	6,762	7,245	8,292	8,404	8,533	8,758	8,855	9,097	10,336	10,586
VKT/lane-kilometer	10,679	11,321	10,909	11,667	11,842	12,875	12,429	12,471	12,089	12,088	12,283	12,113	12,176
Principal Arterial Streets													
Daily VKT (000)	2,568	2,753	2,938	3,220	3,526	3,462	3,325	3,301	3,365	3,462	3,542	4,025	4,701
VKT/lane-kilometer	4,691	4,750	4,803	5,000	5,341	5,181	4,917	4,824	4,860	4,943	4,944	5,208	5,670
Roadway Congestion Index	0.84	0.88	0.86	0.91	0.94	1.00	0.96	0.96	0.94	0.94	0.95	0.95	0.97
Hours of Delay													
Total Daily (1000 person-hrs)	31	34	39	49	55	59	58	58	60	60	62	74	85
Annual per Capita (person-hrs)	20	22	23	27	29	31	29	28	28	27	27	33	36
Annual per Driver (person-hrs)	26	28	30	35	37	39	36	35	35	34	34	41	45
Freeway Daily Delay													
Recurring Veh-Hrs	8,420	9,490	10,860	13,820	15,310	17,150	17,430	17,500	18,100	18,110	18,650	22,150	25,400
Incident Veh-Hrs	9,260	10,440	11,950	15,200	16,840	18,860	19,180	19,250	19,910	19,920	20,510	24,360	27,940
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	3,290	3,500	4,090	4,720	5,510	5,430	4,790	4,440	4,700	4,780	4,860	6,080	7,130
Incident Veh-Hrs	3,620	3,850	4,500	5,190	6,060	5,970	5,270	4,880	5,170	5,260	5,350	6,690	7,840
Excess Fuel Consumed due to Congestion													
Total (million liters)	33	37	42	53	59	64	64	63	65	66	67	80	92
per Capita (liters)	87	97	101	117	127	134	126	121	121	117	119	141	156
per Eligible Driver (liters)	111	123	129	151	159	169	159	153	152	149	150	178	196
Congestion Cost													
Total ($ million)	-	-	-	-	150	170	170	180	200	210	220	270	310
per Capita ($)	-	-	-	-	320	350	340	350	370	370	390	470	530
per Eligible Driver ($)	-	-	-	-	400	440	430	440	470	470	490	590	670
Calculated Speeds (kph)													
Freeway (peak period)	76	76	76	74	73	73	73	73	73	74	74	73	70
Principal Arterial Street (peak period)	50	50	49	49	48	48	49	49	49	49	49	48	48
Areawide Speed Ratio	81	81	80	78	78	78	78	78	78	78	78	77	75

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-4. Mobility and Congestion Variables in Baltimore, MD

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	16,486	16,986	17,517	19,594	20,954	22,113	22,411	24,440	25,438	26,146	28,336	28,980	30,268
VKT/lane-kilometer	10,396	10,293	10,216	10,142	10,712	11,305	11,410	12,341	12,640	12,787	13,037	13,139	13,574
Principal Arterial Streets													
Daily VKT (000)	12,043	12,526	13,331	13,878	14,377	14,522	14,748	15,013	15,859	15,899	15,939	16,100	16,181
VKT/lane-kilometer	4,987	5,135	5,377	5,337	5,445	5,369	5,388	5,567	5,934	5,913	5,928	5,882	5,826
Roadway Congestion Index	0.84	0.84	0.85	0.84	0.88	0.91	0.92	0.98	1.01	1.02	1.04	1.04	1.06
Hours of Delay													
Total Daily (1000 person-hrs)	70	72	98	117	119	126	132	148	160	163	194	205	212
Annual per Capita (person-hrs)	10	10	13	16	16	17	17	19	20	20	24	24	25
Annual per Driver (person-hrs)	13	13	17	21	21	22	22	25	26	26	30	31	31
Freeway Daily Delay													
Recurring Veh-Hrs	10,080	10,060	14,340	16,990	17,360	18,850	20,290	24,060	25,540	26,280	33,850	34,650	36,790
Incident Veh-Hrs	23,180	23,130	32,970	39,090	39,930	43,370	46,670	55,340	58,750	60,450	77,850	79,700	84,610
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	10,760	11,580	14,800	17,960	18,140	18,270	18,440	18,640	20,740	20,730	20,540	23,570	22,790
Incident Veh-Hrs	11,830	12,740	16,280	19,760	19,950	20,100	20,280	20,510	22,820	22,800	22,590	25,930	25,070
Excess Fuel Consumed due to Congestion													
Total (million liters)	75	77	105	124	127	134	140	156	167	170	204	216	223
per Capita (liters)	44	44	57	67	68	71	73	81	84	84	100	102	105
per Eligible Driver (liters)	58	58	75	87	88	92	94	104	107	108	128	130	133
Congestion Cost													
Total ($ million)	-	-	-	-	-	350	390	460	530	550	680	730	770
per Capita ($)	-	-	-	-	-	190	200	240	270	270	330	350	360
per Eligible Driver ($)	-	-	-	-	-	240	260	310	340	350	420	440	460
Calculated Speeds (kph)													
Freeway (peak period)	89	89	87	87	87	87	87	86	86	86	84	84	84
Principal Arterial Street (peak period)	52	52	51	50	50	50	50	50	50	50	50	49	49
Areawide Speed Ratio	92	92	90	89	90	89	89	89	89	89	87	87	87

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{13{,}000^{1}} \times \textit{Freeway VKT} + \frac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{5{,}000^{1}} \times \textit{Prin. Art. Str. VKT}}{\textit{Freeway VKT} + \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-5. Mobility and Congestion Variables in Boston, MA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	25,607	27,072	27,845	29,302	32,297	32,530	36,571	35,541	34,792	34,905	35,251	34,615	35,018
VKT/lane-kilometer	11,280	11,883	12,137	12,552	13,646	13,560	15,043	14,571	14,217	14,263	14,452	14,238	14,309
Principal Arterial Streets													
Daily VKT (000)	20,536	20,914	21,172	21,711	21,590	22,057	20,705	20,367	20,189	20,125	20,922	22,540	22,943
VKT/lane-kilometer	4,944	4,996	5,038	5,147	5,089	5,112	4,781	4,677	4,543	4,529	4,560	4,844	4,897
Roadway Congestion Index	0.90	0.93	0.95	0.98	1.04	1.04	1.12	1.09	1.06	1.06	1.07	1.07	1.08
Hours of Delay													
Total Daily (1000 person-hrs)	244	252	286	288	358	341	441	442	426	436	446	437	454
Annual per Capita (person-hrs)	21	23	26	26	32	30	38	37	36	37	38	37	38
Annual per Driver (person-hrs)	26	28	32	32	40	36	46	45	43	44	45	44	46
Freeway Daily Delay													
Recurring Veh-Hrs	32,200	32,990	38,590	38,460	51,150	47,740	65,000	65,110	62,250	64,790	66,460	63,500	66,110
Incident Veh-Hrs	112,690	115,460	135,060	134,630	179,030	167,090	227,490	227,880	217,890	226,770	232,620	222,240	231,380
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	23,930	25,240	26,300	27,430	26,880	27,470	28,670	28,840	28,760	27,280	27,480	30,290	31,360
Incident Veh-Hrs	26,320	27,760	28,930	30,180	29,570	30,220	31,540	31,730	31,640	30,010	30,230	33,310	34,490
Excess Fuel Consumed due to Congestion													
Total (million liters)	255	264	302	306	381	365	471	469	453	463	472	463	479
per Capita (liters)	89	95	109	111	138	128	162	159	153	157	160	156	161
per Eligible Driver (liters)	110	117	134	135	168	156	197	192	185	189	192	187	193
Congestion Cost													
Total ($ million)	-	-	-	-	-	950	1,290	1,360	1,420	1,490	1,560	1,560	1,650
per Capita ($)	-	-	-	-	-	330	440	460	480	500	530	520	550
per Eligible Driver ($)	-	-	-	-	-	410	540	560	580	610	640	630	660
Calculated Speeds (kph)													
Freeway (peak period)	83	84	82	82	79	80	77	77	77	77	76	77	76
Principal Arterial Street (peak period)	50	50	50	50	50	50	49	49	49	49	50	50	49
Areawide Speed Ratio	87	87	86	86	84	85	82	81	82	81	81	82	81

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-6. Mobility and Congestion Variables in Charlotte, NC

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	2,842	3,059	3,220	3,437	3,590	3,711	3,888	4,411	4,653	4,830	5,152	5,635	6,166
VKT/lane-kilometer	7,060	7,451	7,547	7,907	8,109	8,232	8,625	9,288	9,633	10,000	10,492	11,111	11,606
Principal Arterial Streets													
Daily VKT (000)	3,775	4,122	4,202	4,339	4,444	4,572	4,580	4,597	4,967	5,136	5,152	5,192	5,297
VKT/lane-kilometer	5,211	5,565	5,553	5,500	5,520	5,569	5,471	5,387	5,766	5,907	5,517	5,466	5,483
Roadway Congestion Index	0.71	0.76	0.76	0.77	0.78	0.79	0.80	0.82	0.86	0.89	0.89	0.92	0.94
Hours of Delay													
Total Daily (1000 person-hrs)	18	22	22	27	27	29	31	34	37	40	43	45	46
Annual per Capita (person-hrs)	13	16	16	18	17	17	18	19	20	22	21	22	21
Annual per Driver (person-hrs)	17	20	21	24	22	22	23	25	26	28	27	27	27
Freeway Daily Delay													
Recurring Veh-Hrs	1,560	1,680	1,760	2,540	2,520	2,600	2,830	3,850	4,060	4,910	6,270	7,020	7,460
Incident Veh-Hrs	1,240	1,340	1,410	2,030	2,010	2,080	2,260	3,080	3,250	3,930	5,010	5,610	5,960
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	5,510	6,910	6,940	7,950	8,020	8,710	9,450	9,510	10,470	11,020	10,920	11,080	11,070
Incident Veh-Hrs	6,060	7,600	7,630	8,750	8,820	9,580	10,390	10,460	11,510	12,130	12,010	12,180	12,170
Excess Fuel Consumed due to Congestion													
Total (million liters)	19	23	23	28	28	30	32	35	38	42	44	47	48
per Capita (liters)	53	65	65	76	70	72	74	80	85	91	89	91	89
per Eligible Driver (liters)	69	84	85	98	90	93	95	103	109	116	111	114	112
Congestion Cost													
Total ($ million)	-	-	-	-	-	80	90	100	120	140	150	160	170
per Capita ($)	-	-	-	-	-	190	210	230	270	290	300	310	310
per Eligible Driver ($)	-	-	-	-	-	250	260	300	350	380	370	380	380
Calculated Speeds (kph)													
Freeway (peak period)	90	90	90	88	88	88	88	86	86	84	83	82	83
Principal Arterial Street (peak period)	49	48	48	47	47	47	46	46	46	46	46	46	46
Areawide Speed Ratio	90	89	90	88	88	88	87	86	86	85	84	84	84

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-7. Mobility and Congestion Variables in Chicago, IL

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	40,983	41,602	43,092	46,159	49,821	49,821	51,464	55,448	61,228	62,758	63,112	65,954	67,821
VKT/lane-kilometer	12,447	12,574	12,899	13,460	14,195	14,162	14,497	14,974	15,682	16,008	16,066	15,847	16,296
Principal Arterial Streets													
Daily VKT (000)	33,665	34,776	36,322	36,821	40,218	40,194	41,965	45,048	47,415	50,771	52,808	56,350	59,570
VKT/lane-kilometer	6,026	6,017	6,106	6,148	6,697	6,675	6,941	6,909	6,913	7,071	7,054	6,863	6,884
Roadway Congestion Index	1.02	1.02	1.05	1.08	1.15	1.15	1.18	1.21	1.25	1.27	1.28	1.26	1.28
Hours of Delay													
Total Daily (1000 person-hrs)	405	414	488	544	606	593	589	624	669	703	779	788	826
Annual per Capita (person-hrs)	14	15	17	19	21	21	20	21	22	23	26	26	27
Annual per Driver (person-hrs)	19	19	23	25	28	27	26	28	29	30	34	34	35
Freeway Daily Delay													
Recurring Veh-Hrs	84,090	80,150	100,980	112,010	122,470	119,310	124,840	130,340	145,260	149,390	162,200	168,840	175,650
Incident Veh-Hrs	100,910	96,180	121,180	134,420	146,960	143,170	149,810	156,410	174,320	179,270	194,640	202,610	210,780
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	66,320	73,920	80,280	89,990	102,600	100,730	93,730	101,150	102,700	111,330	127,010	123,490	130,660
Incident Veh-Hrs	72,950	81,310	88,310	98,980	112,860	110,810	103,100	111,270	112,970	122,460	139,710	135,840	143,720
Excess Fuel Consumed due to Congestion													
Total (million liters)	424	435	507	562	622	611	613	648	696	730	809	821	858
per Capita (liters)	60	61	71	79	87	85	84	87	93	97	108	108	111
per Eligible Driver (liters)	80	81	94	104	114	111	109	114	121	126	140	140	144
Congestion Cost													
Total ($ million)	-	-	-	-	-	1,640	1,710	1,910	2230	2,390	2,720	2,790	2,990
per Capita ($)	-	-	-	-	-	230	230	260	300	320	360	370	390
per Eligible Driver ($)	-	-	-	-	-	300	310	340	390	410	470	470	500
Calculated Speeds (kph)													
Freeway (peak period)	74	75	72	71	71	71	72	72	71	71	69	69	69
Principal Arterial Street (peak period)	46	46	45	44	44	44	45	45	45	45	44	45	45
Areawide Speed Ratio	79	79	76	75	75	75	76	76	76	76	74	75	75

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\dfrac{\textit{Freeway VKT/Ln.-Km.}}{13{,}000^{1}} \times \dfrac{\textit{Freeway VKT}}{\textit{Freeway VKT}} + \dfrac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{5{,}000^{1}} \times \dfrac{\textit{Prin. Art. Str. VKT}}{\textit{Prin. Art. Str. VKT}}}{\dfrac{\textit{Freeway VKT}}{\textit{Freeway VKT}} + \dfrac{\textit{Prin. Art. Str. VKT}}{\textit{Prin. Art. Str. VKT}}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-8 Mobility and Congestion Variables in Cincinnati, OH

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	13,661	13,661	13,935	14,240	14,345	15,392	15,698	17,533	18,322	18,676	19,175	20,713	21,695
VKT/lane-kilometer	11,313	10,741	10,685	10,787	10,866	11,314	11,538	12,236	12,575	12,747	13,016	13,332	13,680
Principal Arterial Streets													
Daily VKT (000)	4,862	5,096	5,192	5,297	5,216	5,337	5,530	5,828	5,909	6,923	7,245	7,084	7,124
VKT/lane-kilometer	3,897	4,084	4,161	4,218	4,154	4,196	4,321	4,553	4,476	5,212	5,455	5,333	5,299
Roadway Congestion Index	0.86	0.83	0.82	0.83	0.84	0.87	0.88	0.94	0.96	0.99	1.01	1.03	1.05
Hours of Delay													
Total Daily (1000 person-hrs)	25	26	29	33	32	38	48	50	53	59	70	78	81
Annual per Capita (person-hrs)	5	6	6	7	7	8	11	11	12	12	14	16	16
Annual per Driver (person-hrs)	7	7	8	9	9	11	14	14	15	16	18	20	21
Freeway Daily Delay													
Recurring Veh-Hrs	7,680	8,160	9,230	9,790	9,550	12,250	15,750	16,830	18,140	18,510	23,070	26,840	28,180
Incident Veh-Hrs	6,140	6,530	7,390	7,830	7,640	9,800	12,600	13,470	14,510	14,810	18,450	21,470	22,550
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	2,830	2,910	3,160	4,140	4,070	3,960	4,680	4,550	4,650	6,590	6,980	6,590	6,660
Incident Veh-Hrs	3,110	3,200	3,470	4,560	4,480	4,360	5,150	5,000	5,110	7,250	7,680	7,250	7,320
Excess Fuel Consumed due to Congestion													
Total (million liters)	28	29	32	36	35	42	53	56	59	65	77	85	88
per Capita (liters)	25	26	28	32	31	37	47	49	52	54	63	68	71
per Eligible Driver (liters)	32	33	37	41	40	48	60	63	67	70	81	87	91
Congestion Cost													
Total ($ million)	-	-	-	-	-	110	140	160	180	210	250	280	300
per Capita ($)	-	-	-	-	-	100	130	140	160	170	210	220	240
per Eligible Driver ($)	-	-	-	-	-	120	160	180	210	220	260	290	310
Calculated Speeds (kph)													
Freeway (peak period)	90	89	89	89	89	87	85	85	85	85	83	82	82
Principal Arterial Street (peak period)	53	53	53	52	52	52	52	52	52	51	51	51	51
Areawide Speed Ratio	93	93	92	92	92	91	88	89	89	88	86	86	86

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{13{,}000^{1}} \times \textit{Freeway VKT} + \frac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{5{,}000^{1}} \times \textit{Prin. Art. Str. VKT}}{\textit{Freeway VKT} + \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-9. Mobility and Congestion Variables in Cleveland, OH

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	16,100	16,454	16,760	16,189	17,235	18,008	20,399	21,268	22,057	22,492	22,798	24,102	24,810
VKT/lane-kilometer	10,417	10,646	10,844	10,474	11,151	11,651	12,798	12,462	11,913	12,043	12,000	12,580	12,842
Principal Arterial Streets													
Daily VKT (000)	7,237	7,285	7,317	7,462	7,615	7,792	8,066	8,509	9,644	9,741	10,143	9,982	10,103
VKT/lane-kilometer	4,086	4,114	4,132	4,214	4,300	4,400	4,514	4,740	5,348	5,378	5,526	5,415	5,386
Roadway Congestion Index	0.80	0.82	0.83	0.81	0.86	0.89	0.97	0.96	0.94	0.95	0.95	0.98	1.00
Hours of Delay													
Total Daily (1000 person-hrs)	26	27	34	35	39	44	53	66	69	70	81	89	98
Annual per Capita (person-hrs)	4	4	5	5	6	6	7	9	10	10	11	12	14
Annual per Driver (person-hrs)	5	5	6	7	7	8	10	12	13	13	15	16	18
Freeway Daily Delay													
Recurring Veh-Hrs	8,820	9,010	12,320	12,740	13,570	14,400	16,750	21,770	21,530	22,080	23,970	30,320	32,770
Incident Veh-Hrs	6,170	6,310	8,620	8,920	9,500	10,080	11,720	15,240	15,070	15,450	16,780	21,230	22,940
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	2,840	2,860	2,870	2,930	3,720	5,230	6,560	7,670	8,880	8,890	11,550	9,500	10,790
Incident Veh-Hrs	3,130	3,150	3,160	3,220	4,100	5,750	7,220	8,430	9,770	9,780	12,710	10,450	11,870
Excess Fuel Consumed due to Congestion													
Total (million liters)	30	30	38	39	43	49	58	73	76	77	88	98	106
per Capita (liters)	17	17	22	22	25	28	33	41	43	43	49	54	59
per Eligible Driver (liters)	22	23	29	30	33	37	43	54	56	57	65	71	77
Congestion Cost													
Total ($ million)	-	-	-	-	-	130	160	210	240	240	290	320	360
per Capita ($)	-	-	-	-	-	70	90	120	130	140	160	180	200
per Eligible Driver ($)	-	-	-	-	-	100	120	160	170	180	210	240	260
Calculated Speeds (kph)													
Freeway (peak period)	90	90	88	87	87	87	87	85	85	85	85	82	82
Principal Arterial Street (peak period)	54	54	54	54	53	53	52	52	51	51	50	51	51
Areawide Speed Ratio	93	93	91	91	91	91	90	88	89	89	88	86	86

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-10. Mobility and Congestion Variables in Columbus, OH

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	9,708	10,401	10,546	10,731	11,769	12,381	12,630	13,041	14,490	14,893	15,231	15,698	16,382
VKT/lane-kilometer	8,553	8,972	8,973	8,887	9,556	9,923	9,994	10,253	11,250	11,491	11,679	11,818	12,113
Principal Arterial Streets													
Daily VKT (000)	3,679	3,977	4,033	4,073	4,186	4,291	4,452	4,894	5,120	5,490	5,756	5,635	5,796
VKT/lane-kilometer	4,080	4,333	4,282	4,288	4,407	4,479	4,608	5,067	5,213	5,500	5,630	5,469	5,538
Roadway Congestion Index	0.68	0.71	0.71	0.71	0.75	0.78	0.79	0.82	0.89	0.91	0.93	0.93	0.95
Hours of Delay													
Total Daily (1000 person-hrs)	29	30	31	31	37	41	44	48	60	62	68	68	70
Annual per Capita (person-hrs)	9	9	9	9	11	12	13	14	18	17	18	17	18
Annual per Driver (person-hrs)	11	11	12	12	14	16	17	18	22	22	23	22	22
Freeway Daily Delay													
Recurring Veh-Hrs	9,260	9,770	10,360	10,100	11,250	13,140	13,430	13,500	18,350	18,730	19,560	20,260	20,940
Incident Veh-Hrs	6,480	6,840	7,250	7,070	7,880	9,200	9,400	9,450	12,850	13,110	13,690	14,180	14,660
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	3,530	3,420	3,530	3,690	4,910	5,170	5,840	7,370	7,880	8,420	10,080	9,600	9,590
Incident Veh-Hrs	3,880	3,770	3,880	4,060	5,400	5,690	6,420	8,110	8,670	9,260	11,090	10,560	10,550
Excess Fuel Consumed due to Congestion													
Total (million liters)	31	32	34	34	40	44	46	51	63	65	71	72	73
per Capita (liters)	37	39	40	40	47	52	55	60	74	73	75	73	74
per Eligible Driver (liters)	48	50	52	52	61	67	70	77	94	92	95	92	93
Congestion Cost													
Total ($ million)	-	-	-	-	-	120	130	150	200	210	240	240	250
per Capita ($)	-	-	-	-	-	140	150	180	230	230	250	250	250
per Eligible Driver ($)	-	-	-	-	-	180	190	220	300	300	320	310	320
Calculated Speeds (kph)													
Freeway (peak period)	86	86	86	86	86	85	85	86	83	83	83	83	83
Principal Arterial Street (peak period)	51	51	51	51	50	50	50	49	49	49	48	48	48
Areawide Speed Ratio	89	89	89	89	89	88	88	88	86	86	86	86	86

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-11. Mobility and Congestion Variables in Corpus Christi, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	2,093	2,206	2,190	2,254	2,286	2,415	2,431	2,447	2,512	2,584	2,697	3,140	3,470
VKT/lane-kilometer	8,125	8,303	8,242	8,485	8,353	8,333	8,162	8,216	8,432	8,629	8,910	9,286	9,370
Principal Arterial Streets													
Daily VKT (000)	2,013	2,093	2,174	2,206	2,254	2,399	2,318	2,335	2,447	2,487	2,632	2,576	2,753
VKT/lane-kilometer	4,032	4,127	4,219	4,281	4,375	4,656	4,431	4,394	4,537	4,414	4,372	4,324	4,500
Roadway Congestion Index	0.67	0.69	0.69	0.71	0.71	0.72	0.70	0.70	0.72	0.72	0.74	0.75	0.76
Hours of Delay													
Total Daily (1000 person-hrs)	2	3	3	3	4	4	4	3	3	4	6	6	8
Annual per Capita (person-hrs)	2	3	3	3	3	3	3	3	3	4	5	5	6
Annual per Driver (person-hrs)	3	4	4	3	4	5	5	4	4	5	7	7	9
Freeway Daily Delay													
Recurring Veh-Hrs	290	300	300	310	630	660	670	670	690	740	1,210	1,430	1,800
Incident Veh-Hrs	320	330	330	340	690	730	730	740	760	810	1,330	1,580	1,980
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	660	740	700	680	720	780	710	610	600	940	1,020	920	1,060
Incident Veh-Hrs	730	810	770	750	790	850	780	670	670	1,030	1,120	1,010	1,170
Excess Fuel Consumed due to Congestion													
Total (million liters)	3	3	3	3	4	4	4	4	4	5	6	7	8
per Capita (liters)	11	11	11	11	14	15	14	13	13	17	22	23	28
per Eligible Driver (liters)	15	16	15	15	19	21	20	19	19	23	30	32	37
Congestion Cost													
Total ($ million)	-	-	-	-	10	10	10	10	10	20	20	20	30
per Capita ($)	-	-	-	-	40	40	40	40	40	50	70	80	90
per Eligible Driver ($)	-	-	-	-	50	50	50	50	60	70	100	110	130
Calculated Speeds (kph)													
Freeway (peak period)	95	95	95	95	93	93	93	93	93	93	91	91	91
Principal Arterial Street (peak period)	54	54	54	54	54	54	54	55	55	54	54	54	54
Areawide Speed Ratio	98	98	98	98	97	97	97	97	97	96	95	95	95

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \frac{\textit{Freeway VKT}}{} + \frac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{} \times \frac{\textit{Prin. Art. Str. VKT}}{}}{13{,}000^{1} \times \frac{\textit{Freeway VKT}}{} + 5{,}000^{1} \times \frac{\textit{Prin. Art. Str. VKT}}{}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-12. Mobility and Congestion Variables in Dallas, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	27,161	29,624	32,079	33,971	36,346	35,581	36,032	36,458	38,125	38,479	39,445	40,089	41,377
VKT/lane-kilometer	10,884	11,646	12,299	12,866	13,682	13,313	13,361	13,399	13,848	13,936	14,000	13,989	14,121
Principal Arterial Streets													
Daily VKT (000)	10,368	11,326	12,300	12,800	13,250	13,202	13,122	13,250	13,379	13,524	13,766	14,651	16,945
VKT/lane-kilometer	4,141	4,411	4,630	4,746	4,899	4,852	4,808	4,855	4,860	4,884	4,886	5,084	5,482
Roadway Congestion Index	0.84	0.89	0.94	0.98	1.04	1.02	1.02	1.02	1.05	1.06	1.07	1.07	1.09
Hours of Delay													
Total Daily (1000 person-hrs)	201	237	250	253	327	295	312	309	331	339	341	346	381
Annual per Capita (person-hrs)	28	32	34	34	43	39	40	39	42	41	41	41	43
Annual per Driver (person-hrs)	36	42	44	44	56	50	52	51	54	53	53	53	55
Freeway Daily Delay													
Recurring Veh-Hrs	51,920	61,160	63,380	64,260	85,230	75,710	79,460	78,070	84,480	86,490	86,820	85,530	90,970
Incident Veh-Hrs	93,450	110,080	114,090	115,670	153,410	136,270	143,020	140,530	152,060	155,670	156,270	153,950	163,740
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	7,250	8,750	10,780	10,760	10,860	11,430	12,840	13,450	13,490	13,820	13,980	17,580	23,940
Incident Veh-Hrs	7,980	9,620	11,850	11,840	11,940	12,570	14,130	14,800	14,830	15,200	15,380	19,340	26,340
Excess Fuel Consumed due to Congestion													
Total (million liters)	216	257	272	278	352	323	339	337	359	367	370	376	411
per Capita (liters)	119	140	148	149	186	169	174	171	181	177	178	179	187
per Eligible Driver (liters)	157	183	192	194	241	220	225	222	233	228	228	229	239
Congestion Cost													
Total ($ million)	-	-	-	-	890	840	930	970	1,110	1,170	1,210	1,250	1,400
per Capita ($)	-	-	-	-	470	440	470	490	560	560	580	590	640
per Eligible Driver ($)	-	-	-	-	610	570	610	640	720	720	740	760	810
Calculated Speeds (kph)													
Freeway (peak period)	76	74	75	76	72	73	73	73	72	72	73	73	73
Principal Arterial Street (peak period)	52	52	52	52	52	52	51	51	51	51	51	50	49
Areawide Speed Ratio	81	80	80	80	77	78	78	78	77	77	77	78	77

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-13. Mobility and Congestion Variables in Denver, CO

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	13,363	13,588	14,071	14,571	14,957	15,376	16,889	17,275	18,145	18,394	20,125	21,333	21,695
VKT/lane-kilometer	10,440	10,616	10,925	11,313	11,399	11,170	12,198	12,477	12,734	12,765	13,021	13,384	13,475
Principal Arterial Streets													
Daily VKT (000)	14,748	15,134	16,269	16,857	17,195	17,066	16,816	17,066	17,549	17,388	17,710	17,871	18,113
VKT/lane-kilometer	5,249	5,266	5,661	5,866	5,950	5,792	5,692	5,761	5,892	5,838	5,914	5,968	5,952
Roadway Congestion Index	0.88	0.89	0.93	0.96	0.97	0.95	0.99	1.01	1.03	1.03	1.05	1.07	1.07
Hours of Delay													
Total Daily (1000 person-hrs)	104	117	138	127	136	135	142	151	170	182	191	211	216
Annual per Capita (person-hrs)	19	22	24	21	23	22	23	24	27	29	30	33	32
Annual per Driver (person-hrs)	24	27	30	27	28	28	29	30	33	36	37	41	40
Freeway Daily Delay													
Recurring Veh-Hrs	18,810	21,790	25,500	24,600	28,490	29,200	32,940	32,980	36,750	40,560	44,390	48,800	49,520
Incident Veh-Hrs	18,810	21,790	25,500	24,600	28,490	29,200	32,940	32,980	36,750	40,560	44,390	48,800	49,520
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	21,760	24,010	28,350	25,050	24,640	23,610	22,870	26,230	29,790	30,880	30,440	33,860	35,010
Incident Veh-Hrs	23,940	26,410	31,190	27,560	27,110	25,970	25,150	28,850	32,770	33,970	33,490	37,240	38,520
Excess Fuel Consumed due to Congestion													
Total (million liters)	112	124	143	134	144	143	151	160	178	191	201	221	225
per Capita (liters)	83	92	99	90	96	95	97	102	113	121	126	137	135
per Eligible Driver (liters)	103	115	123	113	120	118	122	127	140	151	156	171	167
Congestion Cost													
Total ($ million)	-	-	-	-	370	380	420	470	570	620	670	750	790
per Capita ($)	-	-	-	-	250	250	270	300	360	390	420	460	470
per Eligible Driver ($)	-	-	-	-	310	310	340	370	450	490	520	580	580
Calculated Speeds (kph)													
Freeway (peak period)	80	78	77	78	75	75	75	75	75	73	73	72	72
Principal Arterial Street (peak period)	49	48	48	49	49	49	49	48	48	48	48	47	47
Areawide Speed Ratio	84	83	82	83	81	82	81	81	80	78	78	77	77

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-14. Mobility and Congestion Variables in Detroit, MI

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	32,522	31,645	33,416	34,543	34,889	35,098	37,062	39,526	41,932	44,114	46,046	47,495	47,656
VKT/lane-kilometer	13,649	13,280	13,930	13,842	13,715	13,540	14,037	14,527	14,968	15,393	15,714	16,164	16,131
Principal Arterial Streets													
Daily VKT (000)	31,121	30,445	30,791	30,968	31,306	31,467	31,669	31,910	33,609	35,710	39,445	41,860	43,502
VKT/lane-kilometer	5,445	5,297	5,313	5,284	5,255	5,212	5,149	5,108	5,353	5,511	5,738	6,047	6,106
Roadway Congestion Index	1.06	1.03	1.07	1.06	1.05	1.04	1.07	1.09	1.13	1.16	1.19	1.23	1.24
Hours of Delay													
Total Daily (1000 person-hrs)	340	302	370	354	408	414	460	488	521	556	604	673	677
Annual per Capita (person-hrs)	22	20	24	23	26	27	29	31	33	35	38	42	42
Annual per Driver (person-hrs)	30	27	33	31	36	36	40	43	44	47	51	57	57
Freeway Daily Delay													
Recurring Veh-Hrs	46,870	41,810	50,970	46,800	54,100	55,070	68,380	73,860	77,990	83,370	88,310	102,210	99,290
Incident Veh-Hrs	103,120	91,970	112,140	102,960	119,020	121,150	150,450	162,490	171,580	183,410	194,280	224,860	218,440
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	57,930	51,300	63,190	63,490	73,000	73,750	70,920	73,330	79,740	84,680	95,460	100,460	106,430
Incident Veh-Hrs	63,720	56,430	69,510	69,840	80,300	81,130	78,010	80,670	87,710	93,150	105,010	110,500	117,080
Excess Fuel Consumed due to Congestion													
Total (million liters)	357	316	385	365	420	426	475	504	539	573	620	691	697
per Capita (liters)	94	83	101	94	108	110	122	129	135	144	155	173	174
per Eligible Driver (liters)	128	113	137	128	148	149	166	175	183	196	210	234	236
Congestion Cost													
Total ($ million)	-	-	-	-	-	1,140	1,330	1,490	1,710	1,870	2,080	2,340	2,420
per Capita ($)	-	-	-	-	-	290	340	380	430	470	520	590	600
per Eligible Driver ($)	-	-	-	-	-	400	460	520	580	640	700	790	820
Calculated Speeds (kph)													
Freeway (peak period)	80	82	80	82	80	79	77	77	77	76	76	74	74
Principal Arterial Street (peak period)	47	48	46	46	45	45	45	45	45	45	45	45	44
Areawide Speed Ratio	83	85	82	84	82	81	80	80	79	79	79	77	78

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \frac{\textit{Freeway VKT}}{} + \frac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{} \times \frac{\textit{Prin. Art. Str. VKT}}{}}{13{,}000^{1} \times \frac{\textit{Freeway VKT}}{} + 5{,}000^{1} \times \frac{\textit{Prin. Art. Str. VKT}}{}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-15. Mobility and Congestion Variables in El Paso, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	4,122	4,331	4,508	5,023	5,506	5,152	5,345	5,313	5,361	5,458	5,635	5,957	6,150
VKT/lane-kilometer	7,877	8,030	8,116	9,043	9,913	9,143	9,486	9,429	9,514	9,549	9,859	10,000	10,187
Principal Arterial Streets													
Daily VKT (000)	4,186	4,355	4,540	4,637	4,693	4,830	5,007	5,112	5,152	5,273	5,353	5,377	5,474
VKT/lane-kilometer	3,421	3,468	3,525	3,600	3,621	3,727	3,863	3,825	3,832	3,899	3,889	3,884	3,886
Roadway Congestion Index	0.63	0.64	0.65	0.70	0.75	0.71	0.74	0.74	0.74	0.75	0.76	0.77	0.78
Hours of Delay													
Total Daily (1000 person-hrs)	6	6	6	9	10	11	11	11	12	12	17	18	19
Annual per Capita (person-hrs)	3	3	4	5	5	5	6	5	5	5	8	8	8
Annual per Driver (person-hrs)	5	5	5	7	8	8	8	7	7	7	11	11	11
Freeway Daily Delay													
Recurring Veh-Hrs	1,690	1,780	1,850	2,750	3,320	3,550	3,710	3,560	3,600	3,610	4,890	5,140	5,500
Incident Veh-Hrs	1,860	1,960	2,040	3,030	3,650	3,910	4,080	3,920	3,960	3,970	5,380	5,660	6,050
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	600	610	560	570	580	590	620	660	810	860	1,740	1,790	1,740
Incident Veh-Hrs	660	680	620	630	640	650	680	730	890	940	1,920	1,970	1,920
Excess Fuel Consumed due to Congestion													
Total (million liters)	7	7	7	10	12	12	13	12	13	13	19	20	21
per Capita (liters)	15	16	16	22	24	24	25	24	24	23	34	35	36
per Eligible Driver (liters)	22	23	22	31	34	35	35	33	33	33	47	49	49
Congestion Cost													
Total ($ million)	-	-	-	-	30	30	30	40	40	40	60	70	70
per Capita ($)	-	-	-	-	60	60	70	70	70	70	110	120	120
per Eligible Driver ($)	-	-	-	-	80	90	90	90	100	100	150	160	170
Calculated Speeds (kph)													
Freeway (peak period)	92	92	92	90	89	89	89	89	89	89	87	87	87
Principal Arterial Street (peak period)	55	55	55	55	55	55	55	55	55	55	54	54	54
Areawide Speed Ratio	96	96	96	95	94	94	94	94	94	94	92	92	92

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-16 Mobility and Congestion Variables in Fort Worth, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	13,886	14,860	15,593	16,213	17,308	17,710	17,952	18,161	19,062	19,803	20,608	21,091	22,282
VKT/lane-kilometer	9,530	9,872	10,036	10,328	11,026	11,111	11,150	11,113	11,608	11,942	12,190	12,243	12,302
Principal Arterial Streets													
Daily VKT (000)	5,893	6,190	6,464	6,665	6,843	6,843	6,762	6,794	6,826	6,843	6,987	7,567	9,048
VKT/lane-kilometer	4,662	4,806	4,867	4,929	5,000	4,942	4,855	4,879	4,874	4,830	4,822	5,000	5,430
Roadway Congestion Index	0.76	0.79	0.80	0.82	0.87	0.87	0.87	0.87	0.90	0.92	0.94	0.95	0.97
Hours of Delay													
Total Daily (1000 person-hrs)	71	87	90	90	118	112	116	116	123	129	131	147	161
Annual per Capita (person-hrs)	16	20	21	20	26	25	25	25	26	27	27	30	32
Annual per Driver (person-hrs)	22	26	27	27	35	33	33	32	34	35	36	40	43
Freeway Daily Delay													
Recurring Veh-Hrs	16,860	21,480	21,570	21,470	29,520	27,410	28,790	28,280	30,720	32,370	32,990	36,810	40,080
Incident Veh-Hrs	30,350	38,660	38,820	38,640	53,130	49,330	51,820	50,910	55,300	58,270	59,380	66,260	72,140
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	4,400	4,430	5,660	5,600	5,610	6,180	5,670	6,350	5,900	5,990	6,080	6,810	7,950
Incident Veh-Hrs	4,840	4,870	6,230	6,160	6,170	6,800	6,240	6,990	6,490	6,590	6,690	7,490	8,750
Excess Fuel Consumed due to Congestion													
Total (million liters)	76	94	98	98	127	122	125	126	133	139	143	160	173
per Capita (liters)	70	86	89	89	113	108	109	108	111	116	119	132	139
per Eligible Driver (liters)	93	113	118	117	149	142	142	141	146	153	157	174	184
Congestion Cost													
Total ($ million)	-	-	-	-	320	320	340	360	410	440	460	530	590
per Capita ($)	-	-	-	-	290	280	300	310	340	370	390	440	480
per Eligible Driver ($)	-	-	-	-	380	370	390	410	450	490	510	580	630
Calculated Speeds (kph)													
Freeway (peak period)	84	81	82	82	79	80	79	80	79	79	79	77	77
Principal Arterial Street (peak period)	52	52	52	52	52	51	52	51	52	52	52	52	50
Areawide Speed Ratio	88	86	86	86	83	84	84	84	83	83	83	82	81

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-17. Mobility and Congestion Variables in Ft. Lauderdale, FL

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	8,597	8,630	8,758	8,968	9,177	9,982	10,385	10,996	11,439	11,479	12,478	13,685	14,973
VKT/lane-kilometer	10,269	10,210	10,264	10,315	10,270	11,071	11,121	11,576	11,842	11,883	11,923	12,500	12,828
Principal Arterial Streets													
Daily VKT (000)	8,791	8,694	8,710	8,694	8,662	8,855	8,919	9,024	9,338	9,660	10,224	10,304	10,385
VKT/lane-kilometer	5,353	5,192	5,152	5,094	5,052	5,140	5,083	5,095	5,202	5,333	5,522	5,311	5,119
Roadway Congestion Index	0.87	0.86	0.86	0.85	0.85	0.90	0.90	0.92	0.94	0.95	0.96	0.98	0.99
Hours of Delay													
Total Daily (1000 person-hrs)	46	46	52	58	65	73	74	79	89	91	99	105	115
Annual per Capita (person-hrs)	11	11	12	13	14	16	15	16	18	18	19	20	22
Annual per Driver (person-hrs)	13	13	14	15	17	19	19	19	21	21	23	24	26
Freeway Daily Delay													
Recurring Veh-Hrs	6,300	6,130	6,510	6,720	7,710	10,060	10,470	12,660	14,890	15,190	17,590	20,300	22,480
Incident Veh-Hrs	9,440	9,190	9,760	10,080	11,560	15,090	15,700	18,990	22,330	22,790	26,390	30,450	33,730
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	10,060	10,250	11,950	13,920	15,680	15,690	15,770	15,200	16,180	16,460	16,670	15,810	16,910
Incident Veh-Hrs	11,070	11,280	13,140	15,310	17,250	17,260	17,350	16,720	17,800	18,100	18,340	17,390	18,600
Excess Fuel Consumed due to Congestion													
Total (million liters)	48	48	54	59	68	76	78	84	95	97	105	111	122
per Capita (liters)	45	44	48	52	58	65	65	67	75	76	82	86	92
per Eligible Driver (liters)	55	54	58	63	70	78	78	81	90	91	98	103	111
Congestion Cost													
Total ($ million)	-	-	-	-	180	200	220	250	300	310	350	370	420
per Capita ($)	-	-	-	-	150	170	180	200	230	240	270	290	320
per Eligible Driver ($)	-	-	-	-	180	210	220	240	280	290	320	350	380
Calculated Speeds (kph)													
Freeway (peak period)	89	89	88	88	87	85	85	83	81	81	80	80	80
Principal Arterial Street (peak period)	50	50	49	48	47	48	48	48	48	48	48	48	48
Areawide Speed Ratio	91	91	90	89	88	87	87	86	84	84	84	84	83

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \frac{\textit{Freeway VKT}}{} + \frac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{} \times \frac{\textit{Prin. Art. Str. VKT}}{}}{13{,}000^{1} \times \frac{\textit{Freeway VKT}}{} + 5{,}000^{1} \times \frac{\textit{Prin. Art. Str. VKT}}{}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-18. Mobility and Congestion Variables in Hartford, CT

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	6,955	7,760	8,589	8,605	8,919	9,443	9,757	9,950	10,022	10,046	10,868	11,310	11,375
VKT/lane-kilometer	9,600	9,640	10,359	10,279	10,355	10,664	11,018	10,655	10,733	10,759	11,157	11,516	11,488
Principal Arterial Streets													
Daily VKT (000)	3,784	4,532	5,023	5,104	5,176	5,160	5,506	5,860	6,038	6,118	6,182	6,102	6,150
VKT/lane-kilometer	4,352	5,072	5,571	5,561	5,496	5,479	5,846	5,871	5,906	5,846	5,863	5,786	5,701
Roadway Congestion Index	0.76	0.79	0.86	0.85	0.85	0.87	0.90	0.89	0.89	0.89	0.91	0.93	0.93
Hours of Delay													
Total Daily (1000 person-hrs)	15	19	22	23	26	28	38	42	43	42	46	56	57
Annual per Capita (person-hrs)	7	8	10	10	11	12	16	17	17	17	19	23	23
Annual per Driver (person-hrs)	9	11	13	13	15	16	21	23	23	23	25	30	31
Freeway Daily Delay													
Recurring Veh-Hrs	1,980	2,210	2,540	2,540	3,100	3,260	5,330	5,450	5,550	5,500	6,260	8,380	8,690
Incident Veh-Hrs	5,350	5,970	6,870	6,860	8,380	8,800	14,390	14,700	14,990	14,840	16,900	22,640	23,470
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	2,200	3,170	4,030	4,140	4,350	4,770	5,120	6,440	6,450	6,320	6,660	6,680	6,590
Incident Veh-Hrs	2,420	3,490	4,430	4,550	4,790	5,240	5,630	7,080	7,100	6,950	7,320	7,340	7,240
Excess Fuel Consumed due to Congestion													
Total (million liters)	16	20	24	24	27	29	40	44	45	44	49	60	61
per Capita (liters)	29	35	41	42	46	49	67	73	73	73	79	96	97
per Eligible Driver (liters)	39	46	55	56	61	66	90	96	97	96	103	127	130
Congestion Cost													
Total ($ million)	-	-	-	-	-	80	110	130	140	140	160	200	210
per Capita ($)	-	-	-	-	-	130	190	220	230	240	260	330	340
per Eligible Driver ($)	-	-	-	-	-	180	250	280	310	310	350	430	450
Calculated Speeds (kph)													
Freeway (peak period)	93	93	93	93	93	93	91	91	91	91	90	88	88
Principal Arterial Street (peak period)	53	52	52	52	52	51	51	51	51	51	51	51	51
Areawide Speed Ratio	96	96	95	95	95	95	93	93	93	93	93	91	91

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-19. Mobility and Congestion Variables in Honolulu, HI

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	5,957	6,029	6,223	6,424	6,770	6,979	7,100	7,285	7,438	7,567	8,195	8,855	9,016
VKT/lane-kilometer	11,385	11,523	11,712	12,091	12,742	13,136	13,364	13,309	13,588	13,824	13,573	13,924	14,000
Principal Arterial Streets													
Daily VKT (000)	1,996	2,093	2,125	2,004	2,318	2,343	2,455	2,504	2,529	2,608	2,809	3,107	3,123
VKT/lane-kilometer	6,200	6,500	6,600	6,073	6,857	6,767	7,093	7,068	6,982	7,043	7,426	7,878	7,608
Roadway Congestion Index	0.92	0.94	0.95	0.96	1.03	1.05	1.07	1.07	1.09	1.10	1.10	1.13	1.13
Hours of Delay													
Total Daily (1000 person-hrs)	47	49	56	55	58	57	65	67	67	70	79	86	86
Annual per Capita (person-hrs)	20	21	24	24	24	23	25	25	25	26	29	31	31
Annual per Driver (person-hrs)	25	26	30	29	29	29	30	30	31	31	35	37	36
Freeway Daily Delay													
Recurring Veh-Hrs	10,140	10,720	12,360	12,370	12,570	12,850	14,650	15,060	15,060	15,590	17,090	18,410	18,490
Incident Veh-Hrs	18,260	19,290	22,250	22,270	22,630	23,130	26,370	27,110	27,110	28,070	30,760	33,130	33,280
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	4,210	4,400	4,740	4,530	5,200	4,620	5,130	5,420	5,490	5,830	7,460	8,050	8,090
Incident Veh-Hrs	4,640	4,850	5,220	4,980	5,720	5,080	5,640	5,960	6,040	6,410	8,210	8,860	8,890
Excess Fuel Consumed due to Congestion													
Total (million liters)	49	51	59	58	61	61	69	71	72	74	84	91	91
per Capita (liters)	86	89	100	100	103	100	105	108	109	111	123	131	131
per Eligible Driver (liters)	107	109	124	122	125	122	128	130	130	133	147	156	155
Congestion Cost													
Total ($ million)	-	-	-	-	160	160	190	210	230	240	280	310	320
per Capita ($)	-	-	-	-	270	270	290	320	350	370	420	450	470
per Eligible Driver ($)	-	-	-	-	320	330	360	380	420	440	500	540	550
Calculated Speeds (kph)													
Freeway (peak period)	79	78	76	76	77	77	74	74	75	74	74	74	74
Principal Arterial Street (peak period)	46	46	45	45	45	46	46	45	45	45	43	44	44
Areawide Speed Ratio	81	81	79	79	79	80	77	77	78	77	77	77	77

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-20. Mobility and Congestion Variables in Houston, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	33,939	36,314	39,252	38,825	38,825	41,538	43,631	44,500	45,450	47,495	49,105	51,520	53,066
VKT/lane-kilometer	15,331	15,996	16,473	16,294	15,970	15,732	15,140	14,860	14,703	14,640	14,699	14,884	14,649
Principal Arterial Streets													
Daily VKT (000)	15,657	16,664	17,485	17,469	17,404	16,905	16,406	16,744	17,436	17,549	17,935	18,354	18,901
VKT/lane-kilometer	5,448	5,610	5,656	5,622	5,529	5,330	5,146	5,174	5,085	5,011	5,110	5,182	5,218
Roadway Congestion Index	1.17	1.21	1.25	1.23	1.21	1.19	1.15	1.13	1.12	1.11	1.12	1.13	1.12
Hours of Delay													
Total Daily (1000 person-hrs)	369	374	441	440	468	449	464	474	485	502	509	537	546
Annual per Capita (person-hrs)	38	39	46	46	42	40	41	41	42	43	44	46	46
Annual per Driver (person-hrs)	51	52	61	60	55	53	54	54	55	57	57	60	61
Freeway Daily Delay													
Recurring Veh-Hrs	100,480	98,940	116,740	115,900	126,350	124,180	130,800	133,820	136,780	141,990	144,770	152,090	154,570
Incident Veh-Hrs	140,670	138,520	163,430	162,260	176,890	173,860	183,110	187,350	191,500	198,780	202,680	212,920	216,390
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	25,800	29,260	34,590	35,280	33,710	29,260	27,180	27,780	28,370	28,950	28,520	30,940	31,190
Incident Veh-Hrs	28,380	32,190	38,040	38,810	37,080	32,180	29,890	30,560	31,210	31,840	31,370	34,040	34,300
Excess Fuel Consumed due to Congestion													
Total (million liters)	388	398	469	468	496	480	496	506	518	537	546	576	586
per Capita (liters)	162	166	195	194	178	170	174	177	180	185	188	197	199
per Eligible Driver (liters)	216	220	259	257	235	225	229	232	236	243	246	257	261
Congestion Cost													
Total ($ million)	-	-	-	-	1,260	1,260	1,360	1,470	1,620	1,710	1,790	1,920	2,000
per Capita ($)	-	-	-	-	450	450	480	510	560	590	620	660	680
per Eligible Driver ($)	-	-	-	-	600	590	630	670	740	780	810	860	890
Calculated Speeds (kph)													
Freeway (peak period)	66	67	65	65	62	65	65	65	65	65	65	65	65
Principal Arterial Street (peak period)	48	48	47	46	47	48	48	48	48	48	48	48	48
Areawide Speed Ratio	72	73	70	70	68	70	70	70	70	70	70	70	70

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels---Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-21. Mobility and Congestion Variables in Indianapolis, IN

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	8,469	9,225	9,805	10,111	11,125	12,300	12,469	12,703	12,961	13,122	13,387	14,329	15,295
VKT/lane-kilometer	7,851	8,489	8,956	9,101	10,014	10,761	10,757	10,958	10,592	10,654	10,799	11,410	11,585
Principal Arterial Streets													
Daily VKT (000)	6,070	5,989	6,537	6,601	6,601	6,601	6,617	6,641	6,730	6,762	6,843	7,245	8,453
VKT/lane-kilometer	4,570	4,482	4,862	4,910	4,881	4,852	4,835	4,853	4,750	4,773	4,802	4,891	5,250
Roadway Congestion Index	0.67	0.70	0.75	0.76	0.81	0.85	0.85	0.86	0.84	0.84	0.85	0.89	0.92
Hours of Delay													
Total Daily (1000 person-hrs)	11	11	12	13	13	13	20	21	22	22	25	36	52
Annual per Capita (person-hrs)	3	3	4	4	4	4	5	6	6	6	7	9	13
Annual per Driver (person-hrs)	4	4	5	5	5	5	7	7	7	7	8	12	17
Freeway Daily Delay													
Recurring Veh-Hrs	1,160	1,260	1,340	1,380	1,520	1,750	3,550	3,690	4,000	4,080	4,170	6,880	10,120
Incident Veh-Hrs	1,740	1,890	2,010	2,080	2,280	2,630	5,330	5,540	5,990	6,130	6,250	10,330	15,170
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	2,760	2,660	3,120	3,390	3,050	2,900	3,540	3,470	3,570	3,480	4,600	5,350	7,700
Incident Veh-Hrs	3,030	2,930	3,430	3,730	3,350	3,190	3,900	3,820	3,930	3,830	5,060	5,880	8,470
Excess Fuel Consumed due to Congestion													
Total (million liters)	11	12	13	14	14	14	22	23	24	24	27	39	56
per Capita (liters)	13	14	15	16	15	15	24	24	25	25	28	40	58
per Eligible Driver (liters)	18	18	20	21	20	20	31	32	33	33	37	52	75
Congestion Cost													
Total ($ million)	-	-	-	-	30	40	60	60	70	80	90	130	190
per Capita ($)	-	-	-	-	40	40	70	70	80	80	90	130	200
per Eligible Driver ($)	-	-	-	-	50	50	90	90	100	100	120	170	250
Calculated Speeds (kph)													
Freeway (peak period)	95	95	95	95	95	95	93	93	93	93	93	91	89
Principal Arterial Street (peak period)	54	54	54	54	54	54	53	53	53	53	53	52	51
Areawide Speed Ratio	97	98	97	97	98	98	96	96	96	96	96	94	92

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-22. Mobility and Congestion Variables in Jacksonville, FL

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	6,199	6,488	7,173	7,326	7,519	7,680	8,292	8,372	8,662	8,807	9,266	9,660	10,497
VKT/lane-kilometer	11,324	11,194	12,205	12,297	11,974	11,925	12,262	11,818	11,956	12,156	12,648	12,500	12,538
Principal Arterial Streets													
Daily VKT (000)	8,243	8,887	8,919	8,960	9,048	9,064	9,121	9,249	9,346	9,499	9,893	10,063	10,546
VKT/lane-kilometer	4,995	5,111	5,036	4,991	4,996	4,939	4,884	4,828	4,838	4,876	4,801	4,771	4,852
Roadway Congestion Index	0.91	0.92	0.96	0.96	0.95	0.94	0.95	0.93	0.93	0.95	0.97	0.96	0.97
Hours of Delay													
Total Daily (1000 person-hrs)	40	40	48	52	48	58	56	66	70	69	76	83	90
Annual per Capita (person-hrs)	16	16	19	20	18	22	20	23	24	23	25	27	29
Annual per Driver (person-hrs)	22	21	25	26	24	29	26	30	32	30	32	35	37
Freeway Daily Delay													
Recurring Veh-Hrs	4,240	4,440	5,410	6,680	6,350	7,240	6,970	8,790	9,060	9,490	11,380	11,960	13,180
Incident Veh-Hrs	6,360	6,660	8,110	10,030	9,530	10,860	10,460	13,190	13,590	14,230	17,070	17,950	19,760
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	10,200	9,780	11,970	11,690	10,720	13,400	13,090	14,760	15,830	15,130	15,280	17,520	18,580
Incident Veh-Hrs	11,220	10,760	13,160	12,860	11,790	14,740	14,400	16,240	17,410	16,640	16,810	19,270	20,430
Excess Fuel Consumed due to Congestion													
Total (million liters)	42	42	51	55	51	61	60	70	74	74	80	87	94
per Capita (liters)	69	68	80	85	79	92	87	98	103	98	105	113	120
per Eligible Driver (liters)	92	89	105	111	105	121	113	128	134	127	135	148	154
Congestion Cost													
Total ($ million)	-	-	-	-	130	160	170	210	230	240	260	300	330
per Capita ($)	-	-	-	-	200	240	240	290	320	320	350	380	420
per Eligible Driver ($)	-	-	-	-	270	320	310	370	420	410	450	500	540
Calculated Speeds (kph)													
Freeway (peak period)	88	88	88	86	86	85	86	84	84	84	82	82	82
Principal Arterial Street (peak period)	50	51	50	50	50	49	49	48	48	48	48	47	47
Areawide Speed Ratio	90	91	89	88	89	88	88	86	86	86	86	85	85

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-23. Mobility and Congestion Variables in Kansas City, MO

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	14,329	14,466	15,102	16,406	17,557	19,191	19,674	19,916	20,214	20,793	22,057	24,150	25,164
VKT/lane-kilometer	7,841	7,746	7,504	8,087	8,621	8,962	9,086	9,129	9,232	9,496	9,716	9,740	9,987
Principal Arterial Streets													
Daily VKT (000)	6,126	6,207	6,295	6,843	6,899	7,004	7,068	7,036	7,744	7,792	7,873	8,855	9,048
VKT/lane-kilometer	3,749	3,798	3,833	4,126	4,140	4,183	4,201	4,182	4,538	4,523	4,486	4,889	4,973
Roadway Congestion Index	0.62	0.62	0.60	0.65	0.68	0.71	0.72	0.72	0.74	0.75	0.77	0.78	0.80
Hours of Delay													
Total Daily (1000 person-hrs)	21	22	23	26	27	28	34	33	33	33	54	60	64
Annual per Capita (person-hrs)	5	5	5	6	6	6	7	7	7	7	11	12	12
Annual per Driver (person-hrs)	6	7	7	7	8	8	10	9	9	9	14	15	16
Freeway Daily Delay													
Recurring Veh-Hrs	2,160	2,460	2,700	3,090	3,120	3,040	3,850	3,620	3,270	3,470	7,450	8,300	8,870
Incident Veh-Hrs	6,700	7,640	8,380	9,570	9,670	9,430	11,940	11,230	10,130	10,750	23,110	25,720	27,500
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	3,670	3,610	3,670	3,850	4,170	4,610	5,510	5,520	6,030	5,950	6,060	6,710	7,070
Incident Veh-Hrs	4,030	3,970	4,030	4,240	4,590	5,070	6,060	6,070	6,640	6,550	6,660	7,390	7,770
Excess Fuel Consumed due to Congestion													
Total (million liters)	22	23	25	27	28	29	35	34	34	35	58	65	68
per Capita (liters)	20	21	22	24	25	26	31	30	29	30	48	50	52
per Eligible Driver (liters)	26	28	29	31	32	33	40	38	38	39	62	63	66
Congestion Cost													
Total ($ million)	-	-	-	-	70	80	100	100	110	110	190	210	230
per Capita ($)	-	-	-	-	60	70	90	90	90	100	160	160	180
per Eligible Driver ($)	-	-	-	-	80	90	110	110	120	120	200	210	230
Calculated Speeds (kph)													
Freeway (peak period)	95	95	95	95	95	95	95	95	95	95	93	93	93
Principal Arterial Street (peak period)	53	53	53	53	53	53	52	52	52	52	52	52	52
Areawide Speed Ratio	97	97	97	97	97	97	97	97	97	97	95	95	95

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-24. Mobility and Congestion Variables in Los Angeles, CA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	121,539	127,737	134,250	141,100	148,297	155,993	164,445	171,755	177,655	177,551	180,240	183,460	181,930
VKT/lane-kilometer	16,591	17,136	17,817	18,451	19,190	19,855	20,593	20,836	21,098	21,106	20,751	20,813	20,434
Principal Arterial Streets													
Daily VKT (000)	92,003	96,930	102,122	107,596	113,360	118,834	125,966	128,486	129,396	131,553	132,825	133,630	134,274
VKT/lane-kilometer	5,214	5,424	5,638	5,862	6,065	6,266	6,520	6,552	6,479	6,590	6,600	6,614	6,645
Roadway Congestion Index	1.22	1.27	1.32	1.36	1.42	1.47	1.52	1.54	1.55	1.56	1.54	1.54	1.52
Hours of Delay													
Total Daily (1000 person-hrs)	1,273	1,459	1,595	1,751	1,987	2,067	2,183	2,271	2,306	2,326	2,367	2,402	2,364
Annual per Capita (person-hrs)	32	37	40	42	46	47	49	50	50	49	50	50	49
Annual per Driver (person-hrs)	41	47	52	54	60	61	63	65	65	64	64	65	63
Freeway Daily Delay													
Recurring Veh-Hrs	369,790	426,110	446,710	472,910	529,820	562,430	564,510	591,310	611,620	608,410	616,860	626,810	613,530
Incident Veh-Hrs	443,750	511,330	536,060	567,490	635,780	674,910	677,420	709,570	733,940	730,090	740,240	752,170	736,240
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	97,700	109,250	139,680	171,470	201,980	198,400	240,090	245,800	237,720	248,890	255,580	258,220	257,850
Incident Veh-Hrs	107,470	120,180	153,650	188,610	222,180	218,240	264,100	270,380	261,500	273,770	281,140	284,050	283,640
Excess Fuel Consumed due to Congestion													
Total (million liters)	1,370	1,562	1,702	1,858	2,081	2,168	2,272	2,364	2,405	2,425	2,466	2,503	2,469
per Capita (liters)	138	158	172	177	194	198	204	209	211	206	208	209	206
per Eligible Driver (liters)	178	203	221	228	250	256	262	269	271	265	267	269	264
Congestion Cost													
Total ($ million)	-	-	-	-	5,380	5,780	6,350	7,000	7,660	79,00	8,250	8,540	8,620
per Capita ($)	-	-	-	-	500	530	570	620	670	670	700	710	720
per Eligible Driver ($)	-	-	-	-	650	680	730	800	860	860	890	920	920
Calculated Speeds (kph)													
Freeway (peak period)	63	61	61	61	59	59	61	61	61	61	61	61	61
Principal Arterial Street (peak period)	51	51	49	48	48	48	47	47	47	47	47	47	47
Areawide Speed Ratio	73	71	70	70	68	68	69	69	69	69	69	69	69

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway}}{\textit{VKT/Ln.-Km.}} \times \frac{\textit{Freeway}}{\textit{VKT}} + \frac{\textit{Prin. Art. Str.}}{\textit{VKT/Ln.-Km.}} \times \frac{\textit{Prin. Art. Str.}}{\textit{VKT}}}{13{,}000^{1} \times \frac{\textit{Freeway}}{\textit{VKT}} + 5{,}000^{1} \times \frac{\textit{Prin. Art. Str.}}{\textit{VKT}}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-25. Mobility and Congestion Variables in Louisville, KY

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	6,303	7,140	7,406	7,567	7,704	8,662	9,724	9,885	9,974	10,063	10,513	11,270	12,236
VKT/lane-kilometer	9,105	9,856	9,787	9,792	9,570	10,346	10,690	10,496	10,500	10,593	10,793	11,382	11,783
Principal Arterial Streets													
Daily VKT (000)	4,226	4,379	4,419	4,436	4,403	4,790	4,605	4,653	4,741	5,023	5,353	5,635	5,877
VKT/lane-kilometer	5,357	5,495	5,545	5,510	5,470	5,891	5,608	5,667	5,663	6,000	6,333	6,034	5,794
Roadway Congestion Index	0.78	0.82	0.82	0.82	0.80	0.86	0.87	0.86	0.86	0.88	0.90	0.93	0.95
Hours of Delay													
Total Daily (1000 person-hrs)	19	21	20	23	23	27	25	25	26	28	35	42	51
Annual per Capita (person-hrs)	6	7	6	7	7	9	8	8	8	9	11	13	16
Annual per Driver (person-hrs)	8	9	8	9	9	11	10	10	10	11	13	16	19
Freeway Daily Delay													
Recurring Veh-Hrs	1,060	1,470	1,530	1,680	1,520	1,660	1,830	1,890	1,780	1,780	1,970	4,320	7,460
Incident Veh-Hrs	1,160	1,620	1,690	1,850	1,670	1,820	2,020	2,080	1,960	1,960	2,170	4,750	8,200
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	6,230	6,660	5,980	6,960	7,190	8,690	7,590	7,610	8,040	8,780	11,290	11,630	12,120
Incident Veh-Hrs	6,850	7,320	6,570	7,650	7,910	9,560	8,350	8,370	8,840	9,650	12,410	12,790	13,330
Excess Fuel Consumed due to Congestion													
Total (million liters)	19	22	20	23	23	27	25	25	26	28	35	43	53
per Capita (liters)	25	28	26	29	29	34	31	32	32	35	43	52	64
per Eligible Driver (liters)	32	35	33	37	37	44	39	40	41	44	53	65	80
Congestion Cost													
Total ($ million)	-	-	-	-	60	70	70	80	80	90	120	140	180
per Capita ($)	-	-	-	-	80	90	90	90	100	110	140	180	220
per Eligible Driver ($)	-	-	-	-	100	120	110	120	130	140	180	220	280
Calculated Speeds (kph)													
Freeway (peak period)	95	95	95	95	95	95	95	95	95	95	95	93	90
Principal Arterial Street (peak period)	49	48	49	48	48	47	48	48	48	47	46	46	46
Areawide Speed Ratio	95	95	95	95	95	94	95	95	95	95	94	93	91

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-26. Mobility and Congestion Variables in Memphis, TN

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	4,750	4,830	4,854	4,911	5,329	6,005	6,360	6,851	6,987	7,567	8,098	8,292	8,694
VKT/lane-kilometer	9,833	9,231	8,868	8,356	9,068	9,816	10,395	11,197	11,128	11,463	11,432	11,319	11,489
Principal Arterial Streets													
Daily VKT (000)	5,313	5,474	5,659	5,667	6,054	6,327	6,521	6,633	6,818	7,245	8,066	8,952	9,290
VKT/lane-kilometer	4,925	5,000	5,094	4,889	5,116	5,205	5,031	5,055	4,953	4,972	5,112	5,346	5,393
Roadway Congestion Index	0.83	0.80	0.79	0.75	0.80	0.84	0.86	0.90	0.89	0.91	0.92	0.93	0.94
Hours of Delay													
Total Daily (1000 person-hrs)	15	15	17	17	18	21	23	24	26	29	33	36	41
Annual per Capita (person-hrs)	5	5	5	5	6	6	7	7	7	9	9	10	11
Annual per Driver (person-hrs)	7	7	7	7	8	8	9	9	10	11	12	13	15
Freeway Daily Delay													
Recurring Veh-Hrs	1,420	1,320	1,520	1,450	1,460	1,640	1,740	1,880	2,010	3,250	3,900	4,200	6,030
Incident Veh-Hrs	1,560	1,450	1,670	1,600	1,600	1,810	1,920	2,060	2,220	3,570	4,290	4,620	6,630
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	4,360	4,490	4,810	4,870	5,570	6,200	6,940	7,310	7,790	7,980	8,570	9,330	9,470
Incident Veh-Hrs	4,790	4,940	5,290	5,350	6,130	6,820	7,640	8,040	8,560	8,770	9,430	10,270	10,420
Excess Fuel Consumed due to Congestion													
Total (million liters)	16	16	17	17	19	22	24	25	27	31	34	37	43
per Capita (liters)	21	21	22	22	24	26	29	29	31	36	39	42	47
per Eligible Driver (liters)	28	28	30	30	32	35	38	38	41	47	51	54	62
Congestion Cost													
Total ($ million)	-	-	-	-	50	60	70	70	80	100	110	120	150
per Capita ($)	-	-	-	-	60	70	80	90	100	120	130	140	160
per Eligible Driver ($)	-	-	-	-	80	90	100	110	130	150	170	180	210
Calculated Speeds (kph)													
Freeway (peak period)	93	93	93	93	93	93	93	93	93	91	91	91	89
Principal Arterial Street (peak period)	52	52	52	52	51	51	51	51	50	51	51	51	51
Areawide Speed Ratio	95	95	95	95	94	94	94	94	94	93	93	93	91

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-27. Mobility and Congestion Variables in Miami, FL

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	9,580	10,087	10,417	11,447	11,713	11,946	12,695	13,444	13,798	14,136	15,086	15,923	17,026
VKT/lane-kilometer	11,553	12,165	12,324	13,167	13,472	13,369	13,713	14,397	14,165	14,276	14,992	15,453	15,902
Principal Arterial Streets													
Daily VKT (000)	19,111	19,803	20,125	20,447	20,608	20,930	22,121	23,836	25,446	25,760	27,048	27,370	27,612
VKT/lane-kilometer	6,331	6,474	6,494	6,480	6,481	6,500	6,802	7,275	7,617	7,692	7,534	7,539	7,313
Roadway Congestion Index	1.05	1.09	1.10	1.13	1.14	1.14	1.18	1.25	1.27	1.28	1.30	1.32	1.32
Hours of Delay													
Total Daily (1000 person-hrs)	170	160	166	204	199	211	253	278	288	289	288	312	324
Annual per Capita (person-hrs)	25	23	24	29	28	30	35	38	39	38	38	40	42
Annual per Driver (person-hrs)	30	29	29	36	35	37	44	48	49	49	47	51	53
Freeway Daily Delay													
Recurring Veh-Hrs	16,740	16,560	17,310	20,240	21,680	21,790	30,730	33,290	33,080	33,240	35,530	39,560	43,470
Incident Veh-Hrs	25,110	24,840	25,970	30,360	32,520	32,680	46,090	49,940	49,630	49,860	53,290	59,340	65,210
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	44,970	41,380	42,630	53,450	49,890	54,630	59,900	66,250	70,480	70,640	67,510	71,590	71,660
Incident Veh-Hrs	49,460	45,520	46,900	58,790	54,880	60,090	65,890	72,870	77,530	77,700	74,270	78,740	78,830
Excess Fuel Consumed due to Congestion													
Total (million liters)	171	164	169	207	203	215	256	280	291	293	293	316	328
per Capita (liters)	99	95	97	117	114	121	142	152	157	156	153	163	169
per Eligible Driver (liters)	122	118	120	146	142	150	178	192	198	196	193	206	215
Congestion Cost													
Total ($ million)	-	-	-	-	530	580	730	840	940	960	990	1,090	1,160
per Capita ($)	-	-	-	-	300	330	400	460	510	510	510	560	600
per Eligible Driver ($)	-	-	-	-	370	410	500	570	640	650	650	710	760
Calculated Speeds (kph)													
Freeway (peak period)	77	78	78	76	76	76	70	70	70	71	71	70	69
Principal Arterial Street (peak period)	45	46	46	44	44	44	43	43	43	43	44	44	44
Areawide Speed Ratio	80	81	81	78	79	78	75	74	75	75	76	75	75

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-28. Mobility and Congestion Variables in Milwaukee, WI

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	9,016	9,338	9,467	9,765	10,167	10,980	11,487	12,099	12,381	12,574	12,614	12,622	12,558
VKT/lane-kilometer	10,370	10,741	10,789	11,027	11,482	12,400	12,197	12,737	12,924	13,017	13,058	12,959	12,893
Principal Arterial Streets													
Daily VKT (000)	6,907	6,891	7,495	7,760	7,567	7,470	7,607	7,511	7,696	7,937	8,372	9,016	9,821
VKT/lane-kilometer	4,613	4,553	4,952	5,021	4,845	4,735	4,773	4,665	4,756	4,881	4,906	5,000	5,169
Roadway Congestion Index	0.83	0.84	0.87	0.88	0.90	0.95	0.94	0.97	0.99	1.00	1.00	1.00	1.00
Hours of Delay													
Total Daily (1000 person-hrs)	32	32	39	44	47	53	55	55	58	60	62	62	68
Annual per Capita (person-hrs)	7	7	8	9	10	11	11	11	12	12	13	13	14
Annual per Driver (person-hrs)	9	9	11	12	13	14	15	15	16	16	17	17	18
Freeway Daily Delay													
Recurring Veh-Hrs	5,910	6,080	7,780	8,330	9,200	12,650	13,800	13,880	14,430	14,520	14,880	14,970	14,380
Incident Veh-Hrs	5,910	6,080	7,780	8,330	9,200	12,650	13,800	13,880	14,430	14,520	14,880	14,970	14,380
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	6,590	6,450	7,480	8,990	9,100	8,070	7,950	7,880	8,490	8,920	9,400	9,410	12,070
Incident Veh-Hrs	7,250	7,090	8,220	9,890	10,010	8,870	8,740	8,670	9,340	9,810	10,340	10,350	13,280
Excess Fuel Consumed due to Congestion													
Total (million liters)	34	34	42	47	49	56	59	59	62	63	66	66	71
per Capita (liters)	28	28	35	39	41	46	48	48	50	52	53	53	57
per Eligible Driver (liters)	37	37	46	51	54	61	63	64	67	69	70	71	77
Congestion Cost													
Total ($ million)	-	-	-	-	130	150	160	170	190	200	220	220	250
per Capita ($)	-	-	-	-	100	120	130	140	160	170	180	180	200
per Eligible Driver ($)	-	-	-	-	140	160	170	190	210	220	230	240	260
Calculated Speeds (kph)													
Freeway (peak period)	89	89	87	87	86	84	84	84	84	84	84	84	84
Principal Arterial Street (peak period)	51	51	51	50	50	51	51	51	51	51	51	51	50
Areawide Speed Ratio	92	92	90	90	89	88	87	88	87	88	87	88	88

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-29. Mobility and Congestion Variables in Minn-St. Paul, MN

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	18,032	19,586	20,930	22,033	23,442	25,148	26,436	27,145	28,642	29,318	30,590	32,200	33,327
VKT/lane-kilometer	9,492	10,309	10,569	10,776	11,287	11,237	11,443	11,628	12,020	12,181	12,583	13,029	13,355
Principal Arterial Streets													
Daily VKT (000)	6,923	7,165	7,487	7,873	8,211	8,372	8,533	8,678	9,080	9,660	10,948	11,431	11,495
VKT/lane-kilometer	4,725	4,837	5,000	5,202	5,368	5,417	5,464	5,472	5,640	5,769	5,913	5,917	5,758
Roadway Congestion Index	0.76	0.81	0.84	0.85	0.89	0.89	0.90	0.92	0.95	0.96	0.99	1.02	1.04
Hours of Delay													
Total Daily (1000 person-hrs)	51	57	65	71	88	116	119	121	129	134	147	159	170
Annual per Capita (person-hrs)	7	8	9	10	12	15	15	15	16	16	17	19	20
Annual per Driver (person-hrs)	9	10	12	12	15	19	19	19	20	20	22	24	25
Freeway Daily Delay													
Recurring Veh-Hrs	11,330	13,190	14,380	16,900	21,180	31,550	32,220	33,080	34,980	35,220	36,980	43,560	45,810
Incident Veh-Hrs	10,200	11,870	12,940	15,210	19,070	28,390	29,000	29,770	31,480	31,700	33,290	39,210	41,230
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	9,120	9,640	11,790	11,770	14,520	15,840	16,220	16,160	17,530	19,080	22,380	21,020	23,200
Incident Veh-Hrs	10,040	10,600	12,970	12,950	15,980	17,420	17,840	17,780	19,280	20,990	24,620	23,120	25,520
Excess Fuel Consumed due to Congestion													
Total (million liters)	55	61	70	75	94	123	126	128	137	142	155	170	181
per Capita (liters)	32	35	40	42	51	65	66	65	68	69	73	80	83
per Eligible Driver (liters)	39	44	50	52	64	82	82	82	85	86	92	101	104
Congestion Cost													
Total ($ million)	-	-	-	-	240	330	350	380	430	460	510	570	620
per Capita ($)	-	-	-	-	130	170	180	190	210	220	240	270	290
per Eligible Driver ($)	-	-	-	-	160	220	230	240	270	280	300	340	360
Calculated Speeds (kph)													
Freeway (peak period)	89	89	89	88	87	83	84	84	84	84	84	82	82
Principal Arterial Street (peak period)	50	49	48	49	48	47	47	47	47	47	46	47	46
Areawide Speed Ratio	91	91	91	90	88	86	86	86	86	86	86	84	84

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-30. Mobility and Congestion Variables in Nashville, TN

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	5,233	5,313	5,868	6,303	6,843	7,245	7,712	7,905	8,050	8,388	9,660	11,270	12,478
VKT/lane-kilometer	9,286	9,429	9,720	9,212	10,000	10,465	10,886	10,229	10,204	10,317	10,909	11,111	11,567
Principal Arterial Streets													
Daily VKT (000)	5,716	6,110	6,915	7,382	7,736	7,913	8,670	8,694	8,758	8,791	8,855	9,016	9,499
VKT/lane-kilometer	4,494	4,685	5,053	5,210	5,339	5,431	5,885	5,775	5,787	5,747	5,729	5,773	6,051
Roadway Congestion Index	0.77	0.79	0.83	0.81	0.86	0.89	0.94	0.90	0.89	0.90	0.92	0.93	0.96
Hours of Delay													
Total Daily (1000 person-hrs)	21	24	31	30	37	42	52	51	51	51	49	46	50
Annual per Capita (person-hrs)	11	12	15	15	18	20	24	23	22	22	21	19	20
Annual per Driver (person-hrs)	14	15	19	19	23	25	31	29	28	28	26	24	26
Freeway Daily Delay													
Recurring Veh-Hrs	3,870	3,750	3,870	3,110	3,250	4,480	6,990	6,550	6,360	6,570	7,980	7,860	8,920
Incident Veh-Hrs	3,870	3,750	3,870	3,110	3,570	4,930	7,690	7,200	7,000	7,230	8,780	8,650	9,810
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	6,310	7,260	9,940	10,000	10,820	11,380	12,990	12,960	12,990	12,740	10,710	9,550	10,160
Incident Veh-Hrs	6,940	7,990	10,940	11,000	11,900	12,510	14,290	14,260	14,290	14,020	11,780	10,510	11,170
Excess Fuel Consumed due to Congestion													
Total (million liters)	22	25	32	31	38	43	54	53	53	53	52	48	53
per Capita (liters)	44	49	62	60	73	81	100	97	94	92	88	80	86
per Eligible Driver (liters)	57	63	80	77	92	103	125	121	118	115	111	101	108
Congestion Cost													
Total ($ million)	-	-	-	-	100	120	150	160	170	170	170	160	180
per Capita ($)	-	-	-	-	190	220	280	280	300	300	290	270	300
per Eligible Driver ($)	-	-	-	-	240	270	350	360	370	370	360	340	370
Calculated Speeds (kph)													
Freeway (peak period)	88	89	89	91	91	89	86	87	87	87	87	89	89
Principal Arterial Street (peak period)	51	50	49	49	49	49	49	49	49	49	50	51	51
Areawide Speed Ratio	91	91	90	92	92	90	88	89	89	89	90	91	91

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\text{Roadway Congestion Index (RCI)} = \frac{\frac{\text{Freeway}}{\text{VKT/Ln.-Km.}} \times \frac{\text{Freeway}}{\text{VKT}} + \frac{\text{Prin. Art. Str.}}{\text{VKT/Ln.-Km.}} \times \frac{\text{Prin. Art. Str.}}{\text{VKT}}}{13{,}000^{1} \times \frac{\text{Freeway}}{\text{VKT}} + 5{,}000^{1} \times \frac{\text{Prin. Art. Str.}}{\text{VKT}}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-31. Mobility and Congestion Variables in New Orleans, LA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	6,279	6,440	6,682	6,891	6,963	7,487	7,664	7,825	8,002	8,114	8,131	8,372	8,871
VKT/lane-kilometer	12,000	12,121	12,576	12,970	13,106	14,091	14,000	13,886	13,806	13,808	13,467	13,506	13,277
Principal Arterial Streets													
Daily VKT (000)	5,313	5,514	5,812	5,973	6,182	6,529	6,537	6,545	6,601	6,657	6,762	7,084	8,090
VKT/lane-kilometer	5,841	6,062	6,389	6,509	6,621	6,540	6,548	6,556	6,560	6,512	6,412	6,286	6,791
Roadway Congestion Index	0.98	1.00	1.05	1.07	1.09	1.14	1.13	1.13	1.12	1.12	1.10	1.09	1.11
Hours of Delay													
Total Daily (1000 person-hrs)	46	50	70	72	80	83	85	85	85	85	83	85	94
Annual per Capita (person-hrs)	11	11	16	17	19	20	20	20	20	19	19	19	21
Annual per Driver (person-hrs)	14	15	22	23	25	26	27	27	26	26	25	25	28
Freeway Daily Delay													
Recurring Veh-Hrs	7,110	8,290	12,440	12,620	13,910	14,690	14,940	15,760	15,780	15,570	15,470	15,720	17,200
Incident Veh-Hrs	12,790	14,910	22,390	22,720	25,030	26,450	26,890	28,370	28,400	28,030	27,850	28,300	30,960
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	8,120	7,830	10,170	10,760	11,800	12,140	12,650	11,230	11,350	11,600	10,830	11,430	12,970
Incident Veh-Hrs	8,930	8,620	11,190	11,840	12,990	13,360	13,920	12,360	12,490	12,760	11,910	12,580	14,260
Excess Fuel Consumed due to Congestion													
Total (million liters)	50	53	73	75	83	87	90	89	90	89	88	90	99
per Capita (liters)	46	49	68	71	78	82	85	85	83	81	80	82	90
per Eligible Driver (liters)	62	66	91	94	104	109	113	113	109	107	105	107	118
Congestion Cost													
Total ($ million)	-	-	-	-	210	230	250	260	280	290	290	300	340
per Capita ($)	-	-	-	-	200	220	240	250	260	260	260	270	310
per Eligible Driver ($)	-	-	-	-	270	290	320	330	350	350	350	360	410
Calculated Speeds (kph)													
Freeway (peak period)	82	81	77	77	75	75	75	75	75	74	75	75	75
Principal Arterial Street (peak period)	49	49	48	47	47	47	47	48	48	48	48	48	48
Areawide Speed Ratio	86	85	81	81	79	80	80	80	80	79	80	80	80

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\text{Roadway Congestion Index (RCI)} = \frac{\frac{\text{Freeway VKT/Ln.-Km.}}{13{,}000^{1}} \times \text{Freeway VKT} + \frac{\text{Prin. Art. Str. VKT/Ln.-Km.}}{5{,}000^{1}} \times \text{Prin. Art. Str. VKT}}{\text{Freeway VKT} + \text{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-32. Mobility and Congestion Variables in New York, NY

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	101,704	103,434	105,157	106,349	115,268	118,520	125,588	130,273	133,501	133,147	134,435	138,460	141,801
VKT/lane-kilometer	12,055	12,087	11,601	11,712	12,672	12,714	13,426	13,796	14,054	13,970	13,802	13,984	13,969
Principal Arterial Streets													
Daily VKT (000)	71,379	74,141	74,688	75,187	76,403	78,069	80,033	81,836	83,809	85,362	89,065	88,550	89,677
VKT/lane-kilometer	6,617	6,772	6,822	6,868	6,958	7,028	6,992	6,916	6,886	6,958	7,255	7,143	7,187
Roadway Congestion Index	1.01	1.02	0.99	1.00	1.06	1.06	1.10	1.12	1.14	1.14	1.14	1.15	1.15
Hours of Delay													
Total Daily (1000 person-hrs)	1,310	1,393	1,314	1,432	1,498	1,593	1,723	1,905	1,900	1,903	2,048	2,128	2,162
Annual per Capita (person-hrs)	20	21	21	23	24	25	26	29	28	28	30	31	32
Annual per Driver (person-hrs)	25	27	27	30	31	32	33	37	36	36	38	39	40
Freeway Daily Delay													
Recurring Veh-Hrs	198,550	209,770	199,350	215,520	226,160	241,130	255,620	294,660	291,820	289,640	302,330	316,050	319,230
Incident Veh-Hrs	496,380	524,420	498,360	538,790	565,390	602,830	639,060	736,660	729,560	724,100	755,820	790,140	798,080
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	168,100	181,080	168,510	186,300	193,850	205,120	230,520	234,690	237,540	242,140	276,310	284,050	291,590
Incident Veh-Hrs	184,910	199,190	185,360	204,930	213,230	225,630	253,570	258,160	261,300	266,350	303,940	312,450	320,750
Excess Fuel Consumed due to Congestion													
Total (million liters)	1,397	1,475	1,408	1,516	1,593	1,685	1,818	2,014	2,018	2,020	2,154	2,234	2,271
per Capita (liters)	84	89	92	99	104	105	111	123	120	120	127	131	134
per Eligible Driver (liters)	107	113	117	126	132	134	141	155	151	151	159	165	167
Congestion Cost													
Total ($ million)	-	-	-	-	-	4,430	5,010	5,880	6,370	6,520	7,170	7,600	7,900
per Capita ($)	-	-	-	-	-	280	310	360	380	390	420	450	460
per Eligible Driver ($)	-	-	-	-	-	350	390	450	480	490	530	560	580
Calculated Speeds (kph)													
Freeway (peak period)	74	74	75	74	74	74	74	71	72	72	71	71	71
Principal Arterial Street (peak period)	44	44	45	44	44	43	42	42	42	42	41	41	41
Areawide Speed Ratio	77	77	78	77	77	76	76	74	74	75	74	73	73

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-33. Mobility and Congestion Variables in Norfolk, VA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	6,231	6,432	6,722	7,197	7,809	8,316	8,420	8,589	8,775	8,960	9,451	9,620	9,781
VKT/lane-kilometer	9,439	9,512	9,709	10,159	11,023	11,478	11,495	11,598	11,720	10,912	10,482	10,391	10,474
Principal Arterial Streets													
Daily VKT (000)	5,265	5,321	5,474	5,651	5,844	6,207	6,376	6,569	6,851	7,132	7,688	7,889	8,171
VKT/lane-kilometer	4,917	4,933	5,037	5,200	5,223	5,507	5,577	5,628	5,789	5,907	6,367	6,447	6,591
Roadway Congestion Index	0.79	0.79	0.81	0.84	0.89	0.93	0.94	0.95	0.96	0.92	0.92	0.92	0.93
Hours of Delay													
Total Daily (1000 person-hrs)	43	44	53	63	76	88	90	92	94	93	93	90	96
Annual per Capita (person-hrs)	14	14	17	20	23	25	25	25	25	24	24	23	24
Annual per Driver (person-hrs)	18	18	21	25	29	32	32	32	32	31	30	29	30
Freeway Daily Delay													
Recurring Veh-Hrs	6,240	6,440	8,340	10,700	13,480	15,410	16,040	16,460	16,820	16,250	14,770	13,830	14,450
Incident Veh-Hrs	15,610	16,090	20,840	26,760	33,690	38,520	40,090	41,150	42,040	40,620	36,940	34,580	36,130
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	6,090	6,180	6,340	6,070	6,610	7,710	7,380	7,620	7,880	8,220	10,900	11,130	12,360
Incident Veh-Hrs	6,700	6,800	6,970	6,670	7,270	8,480	8,120	8,380	8,660	9,040	11,990	12,250	13,590
Excess Fuel Consumed due to Congestion													
Total (million liters)	47	48	57	67	82	93	94	97	99	98	98	95	102
per Capita (liters)	61	62	72	84	97	106	105	105	107	103	102	98	104
per Eligible Driver (liters)	79	79	91	106	124	134	133	133	136	131	128	122	129
Congestion Cost													
Total ($ million)	-	-	-	-	-	240	260	280	310	320	330	320	350
per Capita ($)	-	-	-	-	-	280	290	310	340	330	340	330	350
per Eligible Driver ($)	-	-	-	-	-	350	370	390	430	420	420	410	440
Calculated Speeds (kph)													
Freeway (peak period)	84	84	82	80	78	77	76	76	76	77	79	80	80
Principal Arterial Street (peak period)	51	51	51	51	51	50	50	50	50	50	49	49	50
Areawide Speed Ratio	88	88	87	85	83	82	82	82	82	83	84	84	85

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels--Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-34. Mobility and Congestion Variables in Oklahoma City, OK

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	9,378	9,563	9,757	9,942	10,111	10,191	10,658	10,996	11,165	11,471	11,753	12,397	12,478
VKT/lane-kilometer	8,759	8,800	8,912	9,015	9,101	9,043	9,390	9,486	9,632	9,828	10,069	10,476	10,473
Principal Arterial Streets													
Daily VKT (000)	4,428	4,669	5,361	5,394	5,442	5,579	5,546	5,772	5,772	6,070	6,392	7,245	7,487
VKT/lane-kilometer	4,783	4,793	5,286	5,194	5,240	5,290	5,260	5,272	5,272	5,464	5,514	5,625	5,314
Roadway Congestion Index	0.72	0.72	0.75	0.75	0.76	0.76	0.78	0.78	0.79	0.81	0.83	0.86	0.85
Hours of Delay													
Total Daily (1000 person-hrs)	18	19	24	24	25	24	28	27	27	28	32	35	36
Annual per Capita (person-hrs)	7	7	9	8	8	8	10	9	9	9	10	11	11
Annual per Driver (person-hrs)	9	9	11	11	11	11	13	12	12	12	14	14	14
Freeway Daily Delay													
Recurring Veh-Hrs	1,540	1,580	1,610	1,640	1,670	1,680	3,470	3,520	3,610	3,680	3,820	4,030	4,010
Incident Veh-Hrs	1,700	1,730	1,770	1,800	1,830	1,850	3,810	3,880	3,970	4,040	4,200	4,430	4,410
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	5,380	5,670	7,600	7,640	7,710	7,340	7,330	6,840	6,670	7,160	8,550	9,430	9,870
Incident Veh-Hrs	5,920	6,240	8,360	8,410	8,480	8,080	8,070	7,520	7,340	7,880	9,410	10,370	10,860
Excess Fuel Consumed due to Congestion													
Total (million liters)	19	20	25	25	26	24	29	28	28	30	34	37	38
per Capita (liters)	30	30	36	35	35	33	41	39	38	40	44	46	44
per Eligible Driver (liters)	39	39	47	45	46	43	53	51	50	51	56	59	57
Congestion Cost													
Total ($ million)	-	-	-	-	70	60	80	80	90	100	110	120	130
per Capita ($)	-	-	-	-	90	90	110	110	120	130	140	150	150
per Eligible Driver ($)	-	-	-	-	120	120	150	150	160	170	190	200	200
Calculated Speeds (kph)													
Freeway (peak period)	95	95	95	95	95	95	93	93	93	93	93	93	93
Principal Arterial Street (peak period)	52	52	51	51	51	50	50	50	50	50	50	50	50
Areawide Speed Ratio	97	97	96	96	96	96	94	95	95	95	94	94	94

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{13{,}000^{1}} \times \frac{\textit{Freeway VKT}}{\textit{Prin. Art. Str. VKT}} + \frac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{5{,}000^{1}} \times \frac{\textit{Prin. Art. Str. VKT}}{\textit{Freeway VKT}}}{\frac{\textit{Freeway VKT}}{\textit{Prin. Art. Str. VKT}} + \frac{\textit{Prin. Art. Str. VKT}}{\textit{Freeway VKT}}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-35. Mobility and Congestion Variables in Orlando, FL

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	6,955	7,261	7,487	8,420	8,557	8,919	9,314	9,370	9,580	9,732	9,741	10,022	10,827
VKT/lane-kilometer	9,191	9,495	9,490	9,962	10,028	10,165	10,423	10,122	10,085	10,075	10,083	10,122	10,346
Principal Arterial Streets													
Daily VKT (000)	5,740	5,957	5,699	5,852	5,917	5,949	5,957	6,158	6,601	7,084	7,809	8,372	10,143
VKT/lane-kilometer	3,896	3,978	3,649	3,635	3,585	3,587	3,524	3,608	3,832	4,074	4,450	4,685	5,250
Roadway Congestion Index	0.72	0.75	0.73	0.76	0.76	0.77	0.78	0.77	0.77	0.78	0.80	0.82	0.86
Hours of Delay													
Total Daily (1000 person-hrs)	26	26	31	35	40	42	43	44	46	49	53	66	75
Annual per Capita (person-hrs)	11	10	12	13	14	14	14	14	14	14	15	18	20
Annual per Driver (person-hrs)	13	13	15	16	18	17	17	17	17	17	18	22	24
Freeway Daily Delay													
Recurring Veh-Hrs	4,760	4,970	5,650	7,000	8,220	8,870	9,110	9,020	9,480	9,800	10,560	12,860	14,580
Incident Veh-Hrs	7,140	7,450	8,480	10,500	12,330	13,300	13,660	13,530	14,230	14,700	15,840	19,290	21,870
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	4,130	4,120	5,060	5,000	5,450	5,600	5,430	5,850	6,390	6,900	7,680	9,680	11,280
Incident Veh-Hrs	4,540	4,530	5,570	5,500	6,000	6,160	5,970	6,430	7,030	7,590	8,440	10,640	12,410
Excess Fuel Consumed due to Congestion													
Total (million liters)	28	29	34	38	44	46	47	47	50	53	57	70	79
per Capita (liters)	46	46	52	57	63	61	59	59	59	60	64	76	83
per Eligible Driver (liters)	59	58	65	70	79	76	74	73	73	73	79	93	102
Congestion Cost													
Total ($ million)	-	-	-	-	110	120	130	140	160	170	190	230	270
per Capita ($)	-	-	-	-	160	160	160	170	180	190	210	250	290
per Eligible Driver ($)	-	-	-	-	200	200	200	210	230	230	260	310	350
Calculated Speeds (kph)													
Freeway (peak period)	88	88	88	87	85	85	85	85	85	85	84	82	82
Principal Arterial Street (peak period)	53	53	52	52	52	52	52	52	51	51	51	51	51
Areawide Speed Ratio	92	92	91	91	89	89	89	89	89	89	89	87	87

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-36. Mobility and Congestion Variables in Philadelphia, PA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	19,924	21,655	21,952	22,226	22,741	24,351	26,847	29,423	29,503	30,671	31,218	32,522	33,681
VKT/lane-kilometer	9,900	10,591	10,736	10,743	10,865	11,330	11,911	12,143	12,136	12,134	12,006	11,953	12,092
Principal Arterial Streets													
Daily VKT (000)	30,590	31,427	31,886	32,852	34,494	36,306	35,605	34,035	34,438	34,808	34,857	34,873	35,420
VKT/lane-kilometer	7,037	7,072	7,073	7,036	7,263	7,003	6,847	6,515	6,582	6,632	6,641	6,584	6,667
Roadway Congestion Index	1.00	1.03	1.04	1.04	1.06	1.06	1.07	1.05	1.05	1.05	1.05	1.04	1.05
Hours of Delay													
Total Daily (1000 person-hrs)	252	242	258	300	312	335	343	339	344	351	369	380	375
Annual per Capita (person-hrs)	15	15	16	18	19	20	21	20	19	19	18	18	18
Annual per Driver (person-hrs)	20	19	20	24	25	26	27	26	24	24	23	23	23
Freeway Daily Delay													
Recurring Veh-Hrs	14,850	16,080	15,570	17,630	18,210	19,980	21,740	24,950	26,220	27,600	31,450	31,570	31,260
Incident Veh-Hrs	31,190	33,770	32,690	37,030	38,250	41,950	45,660	52,400	55,070	57,960	66,050	66,290	65,660
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	74,150	68,620	75,420	88,090	92,060	98,050	98,760	92,400	92,500	92,820	94,240	98,300	96,790
Incident Veh-Hrs	81,570	75,480	82,960	96,900	101,270	107,850	108,640	101,640	101,750	102,100	103,670	108,130	106,470
Excess Fuel Consumed due to Congestion													
Total (million liters)	253	246	260	302	315	337	346	344	348	355	371	382	379
per Capita (liters)	62	60	64	74	77	83	84	81	77	76	74	73	72
per Eligible Driver (liters)	80	78	82	95	99	106	107	104	98	96	94	93	91
Congestion Cost													
Total ($ million)	-	-	-	-	-	910	970	1,020	1,120	1,170	1,260	1,320	1,330
per Capita ($)	-	-	-	-	-	220	240	240	250	250	250	250	250
per Eligible Driver ($)	-	-	-	-	-	280	300	310	320	320	320	320	320
Calculated Speeds (kph)													
Freeway (peak period)	88	89	89	87	87	87	87	87	87	87	86	86	86
Principal Arterial Street (peak period)	44	45	45	43	43	43	43	43	43	43	43	43	43
Areawide Speed Ratio	86	86	86	84	84	84	84	85	84	84	84	84	84

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-37. Mobility and Congestion Variables in Phoenix, AZ

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	4,589	4,685	5,072	5,683	7,438	7,374	9,419	11,351	12,832	14,571	15,698	15,778	16,744
VKT/lane-kilometer	13,571	12,652	11,250	12,172	14,903	13,471	11,250	11,653	12,752	13,609	13,929	13,803	13,867
Principal Arterial Streets													
Daily VKT (000)	24,037	24,094	24,641	25,285	25,502	26,525	26,855	26,798	28,352	29,004	29,149	29,785	29,978
VKT/lane-kilometer	6,020	6,010	6,122	6,232	6,236	6,423	6,000	5,840	5,644	5,595	5,470	5,522	5,558
Roadway Congestion Index	1.15	1.13	1.10	1.13	1.20	1.18	1.04	1.03	1.05	1.08	1.08	1.08	1.09
Hours of Delay													
Total Daily (1000 person-hrs)	130	128	133	154	176	181	207	212	212	225	240	248	245
Annual per Capita (person-hrs)	23	21	21	23	25	25	28	28	28	29	30	30	29
Annual per Driver (person-hrs)	30	28	28	31	34	33	38	37	37	38	39	40	38
Freeway Daily Delay													
Recurring Veh-Hrs	6,590	7,410	8,990	11,110	20,450	22,340	21,650	27,310	30,990	34,770	39,860	43,140	43,750
Incident Veh-Hrs	2,640	2,960	3,600	4,440	8,180	8,940	8,660	10,920	12,390	13,910	15,940	17,260	17,500
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	45,140	43,750	44,740	51,240	53,500	53,960	64,430	62,640	60,260	62,360	64,740	65,900	64,190
Incident Veh-Hrs	49,660	48,120	49,210	56,360	58,840	59,360	70,880	68,900	66,280	68,590	71,220	72,490	70,610
Excess Fuel Consumed due to Congestion													
Total (million liters)	133	132	137	159	180	184	210	216	218	231	245	255	253
per Capita (liters)	93	87	86	96	104	101	115	115	115	120	121	123	119
per Eligible Driver (liters)	124	115	116	128	139	134	152	152	152	158	160	162	156
Congestion Cost													
Total ($ million)	-	-	-	-	470	500	600	640	700	750	820	870	890
per Capita ($)	-	-	-	-	270	280	330	340	370	390	410	420	420
per Eligible Driver ($)	-	-	-	-	360	370	430	450	490	520	540	560	550
Calculated Speeds (kph)													
Freeway (peak period)	79	77	74	72	66	64	71	70	70	70	69	67	68
Principal Arterial Street (peak period)	47	47	47	46	46	46	44	45	45	45	45	45	45
Areawide Speed Ratio	83	82	82	80	77	77	77	77	77	77	76	75	76

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-38. Mobility and Congestion Variables in Pittsburgh, PA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	8,887	9,853	10,401	10,715	11,109	11,576	11,882	12,478	13,194	13,283	14,707	15,054	15,166
VKT/lane-kilometer	7,123	7,200	7,468	7,563	7,582	7,690	7,768	7,908	8,195	8,128	8,156	8,130	8,051
Principal Arterial Streets													
Daily VKT (000)	14,257	14,385	14,619	15,206	15,786	15,947	17,114	17,332	17,565	17,831	17,871	18,515	18,934
VKT/lane-kilometer	5,807	5,637	5,470	5,724	5,836	5,826	6,023	6,082	5,995	5,970	5,984	6,183	6,272
Roadway Congestion Index	0.78	0.76	0.76	0.78	0.79	0.79	0.81	0.82	0.82	0.82	0.81	0.82	0.83
Hours of Delay													
Total Daily (1000 person-hrs)	75	88	95	101	120	127	142	143	149	146	153	161	169
Annual per Capita (person-hrs)	10	12	13	14	17	18	19	19	20	20	20	21	22
Annual per Driver (person-hrs)	13	15	16	17	20	21	24	24	24	24	25	26	27
Freeway Daily Delay													
Recurring Veh-Hrs	3,650	4,750	5,600	6,180	9,000	9,430	8,530	8,830	10,740	10,870	11,770	11,870	11,910
Incident Veh-Hrs	10,580	13,780	16,240	17,940	26,100	27,340	24,740	25,600	31,150	31,510	34,120	34,410	34,530
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	21,660	24,680	25,810	27,040	29,040	30,870	38,270	38,270	36,710	35,620	36,380	39,340	42,150
Incident Veh-Hrs	23,820	27,150	28,390	29,740	31,940	33,960	42,100	42,100	40,380	39,180	40,020	43,270	46,370
Excess Fuel Consumed due to Congestion													
Total (million liters)	77	90	96	103	122	128	142	144	149	148	154	163	170
per Capita (liters)	42	49	53	57	67	71	77	78	80	79	82	86	89
per Eligible Driver (liters)	52	61	65	69	82	87	94	95	98	96	100	104	108
Congestion Cost													
Total ($ million)	-	-	-	-	-	350	400	430	480	490	520	560	600
per Capita ($)	-	-	-	-	-	190	220	230	260	260	280	290	310
per Eligible Driver ($)	-	-	-	-	-	230	270	280	320	320	340	360	380
Calculated Speeds (kph)													
Freeway (peak period)	92	91	91	90	88	88	89	89	88	88	88	88	88
Principal Arterial Street (peak period)	48	48	47	47	47	47	45	46	46	46	46	46	45
Areawide Speed Ratio	91	90	90	89	88	87	87	87	87	87	87	87	87

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels--Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-39. Mobility and Congestion Variables in Portland, OR

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	7,631	8,654	8,968	9,539	10,183	10,787	11,431	12,027	12,027	12,107	12,832	13,444	13,910
VKT/lane-kilometer	10,773	11,198	10,922	11,505	12,048	12,407	13,148	13,582	13,459	13,429	13,861	13,917	13,824
Principal Arterial Streets													
Daily VKT (000)	4,468	4,484	4,500	4,774	5,055	5,152	5,281	5,426	5,973	6,166	6,295	7,084	7,567
VKT/lane-kilometer	5,388	5,408	5,427	5,702	5,981	6,038	6,074	6,072	6,566	6,547	6,463	6,667	6,714
Roadway Congestion Index	0.87	0.90	0.88	0.93	0.97	0.99	1.04	1.07	1.08	1.08	1.10	1.11	1.11
Hours of Delay													
Total Daily (1000 person-hrs)	51	53	52	57	62	76	80	87	90	91	109	117	123
Annual per Capita (person-hrs)	13	13	13	14	15	18	20	21	22	22	26	27	28
Annual per Driver (person-hrs)	16	16	16	17	18	23	24	26	27	27	32	34	35
Freeway Daily Delay													
Recurring Veh-Hrs	8,130	8,510	8,710	9,740	10,640	13,160	13,980	15,380	15,230	15,250	20,170	21,270	22,230
Incident Veh-Hrs	16,260	17,020	17,410	19,490	21,280	26,320	27,960	30,770	30,460	30,500	40,350	42,540	44,450
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	7,670	8,000	7,360	7,620	8,410	10,330	10,630	11,070	12,450	13,010	12,890	14,290	15,130
Incident Veh-Hrs	8,440	8,800	8,100	8,380	9,250	11,360	11,700	12,180	13,690	14,310	14,180	15,720	16,650
Excess Fuel Consumed due to Congestion													
Total (million liters)	54	57	56	61	66	82	86	92	95	97	116	124	130
per Capita (liters)	53	57	56	59	64	78	84	90	93	93	109	115	118
per Eligible Driver (liters)	67	70	69	73	79	97	105	113	115	115	136	143	147
Congestion Cost													
Total ($ million)	-	-	-	-	170	210	230	270	300	310	380	420	450
per Capita ($)	-	-	-	-	160	200	230	260	290	300	360	390	410
per Eligible Driver ($)	-	-	-	-	200	250	290	330	360	370	450	480	510
Calculated Speeds (kph)													
Freeway (peak period)	85	85	85	85	85	83	83	82	82	82	79	79	79
Principal Arterial Street (peak period)	47	47	48	48	48	46	46	46	46	46	46	47	46
Areawide Speed Ratio	87	87	87	87	87	85	85	84	84	84	82	82	82

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\dfrac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-40. Mobility and Congestion Variables in Sacramento, CA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	8,533	9,338	10,433	11,109	11,914	12,969	13,556	14,249	14,909	15,520	16,285	16,551	17,114
VKT/lane-kilometer	8,413	9,206	10,125	10,781	11,385	12,205	12,474	12,123	12,347	12,684	12,644	12,770	13,043
Principal Arterial Streets													
Daily VKT (000)	8,042	8,372	8,726	9,097	9,475	9,877	10,715	10,964	11,262	11,270	12,453	12,639	12,800
VKT/lane-kilometer	6,018	6,118	6,022	6,011	6,067	6,135	6,338	6,306	6,359	6,278	6,238	6,280	6,260
Roadway Congestion Index	0.80	0.84	0.88	0.92	0.95	1.00	1.03	1.01	1.02	1.04	1.04	1.04	1.06
Hours of Delay													
Total Daily (1000 person-hrs)	37	39	47	55	57	64	73	83	87	87	92	106	110
Annual per Capita (person-hrs)	11	12	14	15	15	16	18	20	20	19	19	22	22
Annual per Driver (person-hrs)	14	15	18	19	19	21	23	26	26	24	25	29	29
Freeway Daily Delay													
Recurring Veh-Hrs	5,840	6,390	7,970	10,160	10,960	12,750	13,640	14,740	15,200	15,750	16,860	20,300	21,810
Incident Veh-Hrs	3,500	3,830	4,780	6,100	6,570	7,650	8,180	8,850	9,120	9,450	10,120	12,180	13,080
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	9,610	10,010	11,740	13,280	13,300	14,690	17,360	20,260	21,490	21,140	22,270	24,860	25,140
Incident Veh-Hrs	10,570	11,010	12,910	14,610	14,630	16,160	19,090	22,280	23,640	23,250	24,490	27,340	27,650
Excess Fuel Consumed due to Congestion													
Total (million liters)	40	42	50	59	61	68	77	87	91	91	97	111	115
per Capita (liters)	48	51	60	65	64	68	74	82	83	78	81	92	94
per Eligible Driver (liters)	61	66	78	83	82	88	96	107	108	103	106	121	123
Congestion Cost													
Total ($ million)	-	-	-	-	160	180	210	260	290	300	320	380	400
per Capita ($)	-	-	-	-	160	180	210	240	260	250	270	310	330
per Eligible Driver ($)	-	-	-	-	210	230	270	320	340	330	350	410	430
Calculated Speeds (kph)													
Freeway (peak period)	88	88	87	86	86	85	85	85	85	85	85	83	82
Principal Arterial Street (peak period)	50	50	49	49	49	49	48	47	47	47	47	47	47
Areawide Speed Ratio	90	90	89	88	88	87	87	86	86	87	87	85	84

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{13{,}000^{1}} \times \textit{Freeway VKT} + \frac{\textit{Prin. Art. Str. VKT/Ln.-Km.}}{5{,}000^{1}} \times \textit{Prin. Art. Str. VKT}}{\textit{Freeway VKT} + \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-41. Mobility and Congestion Variables in Salt Lake City, UT

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	4,621	4,790	4,862	5,184	5,555	6,134	6,561	8,179	8,581	8,989	9,298	9,757	10,352
VKT/lane-kilometer	7,175	7,083	7,190	7,667	7,753	8,106	8,490	9,961	10,451	10,841	11,000	11,327	11,798
Principal Arterial Streets													
Daily VKT (000)	2,343	2,455	2,697	2,890	2,938	3,003	3,075	3,140	3,276	3,671	4,146	4,299	4,589
VKT/lane-kilometer	5,196	5,259	5,583	5,439	5,448	5,406	5,457	5,493	5,732	5,922	6,059	6,138	5,758
Roadway Congestion Index	0.63	0.63	0.65	0.68	0.68	0.70	0.72	0.81	0.85	0.88	0.90	0.92	0.94
Hours of Delay													
Total Daily (1000 person-hrs)	10	11	11	12	13	16	16	19	19	23	27	32	39
Annual per Capita (person-hrs)	4	4	4	4	4	5	5	6	6	7	8	9	11
Annual per Driver (person-hrs)	5	5	5	5	6	7	6	8	8	9	10	12	14
Freeway Daily Delay													
Recurring Veh-Hrs	1,690	1,770	1,520	1,810	2,010	3,350	3,260	4,650	4,450	6,480	7,010	9,400	12,290
Incident Veh-Hrs	1,010	1,060	,910	1,080	1,200	2,010	1,960	2,790	2,670	3,890	4,210	5,640	7,370
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	2,480	3,020	3,110	3,190	3,440	3,510	3,510	3,550	3,800	4,010	4,870	5,060	5,620
Incident Veh-Hrs	2,730	3,320	3,420	3,510	3,780	3,860	3,870	3,910	4,180	4,410	5,350	5,570	6,180
Excess Fuel Consumed due to Congestion													
Total (million liters)	10	12	12	13	14	17	17	20	20	25	29	34	42
per Capita (liters)	15	17	16	17	18	22	21	25	25	30	33	39	48
per Eligible Driver (liters)	20	21	21	22	23	28	28	32	33	39	43	50	62
Congestion Cost													
Total ($ million)	-	-	-	-	40	40	50	60	60	80	90	110	140
per Capita ($)	-	-	-	-	50	60	60	70	80	100	110	130	160
per Eligible Driver ($)	-	-	-	-	60	70	80	90	100	120	140	170	210
Calculated Speeds (kph)													
Freeway (peak period)	93	93	93	93	93	91	91	91	91	89	88	86	84
Principal Arterial Street (peak period)	51	50	50	50	50	50	50	50	50	50	50	50	50
Areawide Speed Ratio	95	94	94	94	94	93	93	93	93	91	91	89	87

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-42. Mobility and Congestion Variables in San Antonio, TX

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	12,236	12,824	13,605	14,619	14,893	14,490	14,571	14,772	14,941	15,094	15,995	17,227	18,555
VKT/lane-kilometer	10,000	10,277	10,764	11,350	11,420	11,043	11,037	11,121	11,248	11,295	11,290	11,383	11,641
Principal Arterial Streets													
Daily VKT (000)	5,675	5,933	6,311	6,899	7,382	7,728	8,034	8,340	8,436	8,775	9,563	9,660	9,765
VKT/lane-kilometer	3,750	3,819	4,000	4,201	4,451	4,571	4,664	4,796	4,807	4,888	5,280	5,310	5,344
Roadway Congestion Index	0.77	0.79	0.82	0.87	0.88	0.86	0.86	0.87	0.88	0.89	0.90	0.91	0.92
Hours of Delay													
Total Daily (1000 person-hrs)	39	45	50	67	76	77	78	78	78	81	89	99	106
Annual per Capita (person-hrs)	10	12	13	17	19	18	17	17	17	17	19	21	22
Annual per Driver (person-hrs)	15	16	18	23	26	25	23	23	22	23	25	28	29
Freeway Daily Delay													
Recurring Veh-Hrs	14,390	15,080	16,950	22,420	25,660	25,410	24,500	24,120	24,230	24,950	26,390	28,440	31,060
Incident Veh-Hrs	15,830	16,590	18,650	24,670	28,230	27,950	26,950	26,530	26,660	27,440	29,030	31,280	34,160
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	650	1,880	2,230	3,250	3,420	3,960	5,260	5,550	5,540	5,810	7,560	9,150	9,340
Incident Veh-Hrs	710	2,060	2,450	3,570	3,760	4,350	5,790	6,100	6,090	6,400	8,310	10,060	10,270
Excess Fuel Consumed due to Congestion													
Total (million liters)	45	50	56	74	82	82	84	84	84	87	95	105	113
per Capita (liters)	47	52	57	74	80	78	72	72	72	73	80	88	93
per Eligible Driver (liters)	66	72	79	103	111	107	97	97	97	98	108	118	124
Congestion Cost													
Total ($ million)	-	-	-	-	210	220	230	240	260	280	310	350	390
per Capita ($)	-	-	-	-	200	210	200	210	220	230	260	290	320
per Eligible Driver ($)	-	-	-	-	280	280	270	280	300	310	360	400	420
Calculated Speeds (kph)													
Freeway (peak period)	83	83	82	80	78	78	79	79	79	79	79	79	79
Principal Arterial Street (peak period)	55	54	54	54	54	54	53	53	53	53	52	51	51
Areawide Speed Ratio	88	88	88	85	84	84	84	85	85	85	84	84	84

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-43. Mobility and Congestion Variables in San Bernardino-Riv, CA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	18,869	19,079	19,513	19,723	20,399	20,689	21,816	21,928	23,474	24,102	24,327	24,504	24,955
VKT/lane-kilometer	14,469	14,540	14,780	14,671	15,083	15,029	15,575	15,477	16,291	16,541	16,604	16,278	16,062
Principal Arterial Streets													
Daily VKT (000)	12,365	13,299	13,927	14,104	14,281	14,329	14,732	15,086	16,342	17,147	17,308	17,871	17,952
VKT/lane-kilometer	5,408	5,658	5,510	5,544	5,614	5,494	5,446	5,432	5,232	5,108	5,119	5,236	5,247
Roadway Congestion Index	1.11	1.12	1.13	1.12	1.15	1.14	1.18	1.17	1.21	1.22	1.22	1.21	1.20
Hours of Delay													
Total Daily (1000 person-hrs)	117	120	150	154	198	204	218	223	251	268	284	292	290
Annual per Capita (person-hrs)	31	32	39	40	50	50	52	51	54	53	55	55	54
Annual per Driver (person-hrs)	42	43	53	54	68	68	72	70	74	72	76	76	75
Freeway Daily Delay													
Recurring Veh-Hrs	31,000	31,340	38,800	36,040	49,470	51,820	56,220	58,210	66,940	71,750	75,890	74,210	74,270
Incident Veh-Hrs	37,200	37,610	46,560	43,250	59,360	62,180	67,460	69,850	80,330	86,100	91,070	89,050	89,120
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	12,140	13,060	16,580	21,060	23,700	23,460	24,070	24,110	25,620	26,930	28,680	33,520	32,800
Incident Veh-Hrs	13,360	14,370	18,240	23,170	26,070	25,800	26,480	26,520	28,180	29,620	31,550	36,870	36,080
Excess Fuel Consumed due to Congestion													
Total (million liters)	132	135	165	170	213	219	233	238	268	284	298	307	307
per Capita (liters)	140	143	171	175	215	215	224	216	229	223	230	232	229
per Eligible Driver (liters)	188	194	232	239	292	292	306	297	316	306	318	320	316
Congestion Cost													
Total ($ million)	-	-	-	-	540	580	640	700	850	920	990	1,040	1,070
per Capita ($)	-	-	-	-	550	570	620	630	720	720	760	790	790
per Eligible Driver ($)	-	-	-	-	750	770	840	870	990	990	1,060	1,090	1,100
Calculated Speeds (kph)													
Freeway (peak period)	75	75	73	74	69	69	68	68	66	65	64	64	65
Principal Arterial Street (peak period)	51	51	50	48	48	48	48	48	48	48	48	47	47
Areawide Speed Ratio	81	81	79	79	75	75	74	74	73	72	72	71	72

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\text{Roadway Congestion Index (RCI)} = \frac{\frac{\text{Freeway VKT/Ln.-Km.}}{} \times \text{Freeway VKT} + \text{Prin. Art. Str. VKT/Ln.-Km.} \times \text{Prin. Art. Str. VKT}}{13{,}000^{1} \times \text{Freeway VKT} + 5{,}000^{1} \times \text{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-44. Mobility and Congestion Variables in San Diego, CA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	24,271	26,525	29,753	31,637	33,842	37,280	40,306	43,084	44,581	44,597	44,758	44,678	44,798
VKT/lane-kilometer	9,918	10,629	11,733	12,320	12,935	14,119	14,770	15,558	16,052	16,058	15,977	15,903	15,900
Principal Arterial Streets													
Daily VKT (000)	9,869	10,449	11,407	12,075	12,639	13,170	14,240	14,377	15,037	15,295	15,617	15,537	15,778
VKT/lane-kilometer	4,287	4,476	4,787	5,000	5,131	5,244	5,460	5,347	5,462	5,491	5,591	5,562	5,521
Roadway Congestion Index	0.78	0.83	0.91	0.95	1.00	1.08	1.13	1.18	1.22	1.22	1.22	1.21	1.21
Hours of Delay													
Total Daily (1000 person-hrs)	66	71	97	107	121	159	198	211	211	214	219	210	211
Annual per Capita (person-hrs)	9	10	13	14	15	19	23	24	23	23	22	21	21
Annual per Driver (person-hrs)	12	12	17	18	19	24	29	30	29	29	28	26	26
Freeway Daily Delay													
Recurring Veh-Hrs	26,410	28,240	38,500	42,740	47,280	63,720	81,140	87,940	87,900	88,630	86,330	81,580	81,920
Incident Veh-Hrs	15,850	16,940	23,100	25,650	28,370	38,230	48,680	52,770	52,740	53,180	51,800	48,950	49,150
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	4,850	5,460	7,580	8,250	10,160	11,840	13,660	13,450	13,280	13,820	17,680	17,850	18,060
Incident Veh-Hrs	5,330	6,000	8,340	9,070	11,170	13,020	15,020	14,790	14,610	15,200	19,440	19,640	19,870
Excess Fuel Consumed due to Congestion													
Total (million liters)	74	80	106	117	134	173	215	229	230	232	239	231	232
per Capita (liters)	41	44	58	62	68	84	99	103	100	99	96	91	91
per Eligible Driver (liters)	53	56	74	79	86	106	125	130	126	124	121	115	114
Congestion Cost													
Total ($ million)	-	-	-	-	340	450	590	670	720	740	780	770	790
per Capita ($)	-	-	-	-	170	220	270	300	310	320	320	300	310
per Eligible Driver ($)	-	-	-	-	220	280	340	380	390	400	400	380	390
Calculated Speeds (kph)													
Freeway (peak period)	83	84	82	82	81	78	75	75	75	75	75	76	76
Principal Arterial Street (peak period)	53	53	52	52	52	51	51	51	52	51	50	51	50
Areawide Speed Ratio	88	88	86	86	85	82	79	79	80	80	80	80	80

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-45. Mobility and Congestion Variables in San Fran-Oak, CA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	46,473	48,300	51,866	55,811	59,449	63,724	64,988	67,572	68,570	67,620	68,103	68,828	68,964
VKT/lane-kilometer	13,120	13,575	14,577	15,271	16,160	17,171	17,361	17,860	17,820	17,573	17,407	17,556	17,484
Principal Arterial Streets													
Daily VKT (000)	15,593	16,462	17,372	18,322	19,320	20,399	21,799	22,073	22,532	22,588	22,830	22,862	23,667
VKT/lane-kilometer	5,278	5,527	5,679	5,866	6,076	6,319	6,557	6,407	6,220	6,100	6,112	6,043	6,229
Roadway Congestion Index	1.01	1.05	1.12	1.17	1.24	1.31	1.33	1.36	1.36	1.34	1.33	1.33	1.33
Hours of Delay													
Total Daily (1000 person-hrs)	420	487	587	633	683	776	794	820	815	807	803	828	828
Annual per Capita (person-hrs)	32	37	44	47	50	55	55	57	55	54	53	54	54
Annual per Driver (person-hrs)	39	45	54	58	61	68	67	69	68	66	65	66	65
Freeway Daily Delay													
Recurring Veh-Hrs	121,970	140,000	169,350	184,190	199,990	229,440	231,090	238,360	236,160	233,560	232,050	236,930	234,840
Incident Veh-Hrs	158,560	182,000	220,150	239,440	259,980	298,270	300,420	309,870	307,010	303,630	301,670	308,000	305,290
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	26,280	32,230	38,120	39,410	41,040	44,340	49,190	51,140	51,920	51,520	51,880	55,950	58,400
Incident Veh-Hrs	28,910	35,450	41,930	43,350	45,140	48,780	54,110	56,250	57,120	56,680	57,070	61,540	64,240
Excess Fuel Consumed due to Congestion													
Total (million liters)	454	523	624	672	723	822	841	870	869	859	858	882	883
per Capita (liters)	138	158	187	201	210	233	233	240	237	231	226	230	228
per Eligible Driver (liters)	169	194	230	246	258	286	285	294	290	283	276	282	279
Congestion Cost													
Total ($ million)	-	-	-	-	1,860	2,180	2,330	2,550	2,740	2,770	2,840	2,980	3,060
per Capita ($)	-	-	-	-	540	620	650	710	750	740	750	780	790
per Eligible Driver ($)	-	-	-	-	660	760	790	860	910	910	910	950	960
Calculated Speeds (kph)													
Freeway (peak period)	68	65	62	62	61	59	59	59	60	60	60	60	60
Principal Arterial Street (peak period)	48	46	46	46	46	46	45	45	45	45	45	45	44
Areawide Speed Ratio	73	70	67	67	66	64	64	64	65	65	65	65	65

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-46 Mobility and Congestion Variables in San Jose, CA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	19,425	20,053	21,316	22,427	22,959	23,490	24,078	25,019	25,406	26,597	26,734	26,807	27,169
VKT/lane-kilometer	11,171	11,374	11,821	12,327	12,564	12,798	13,004	13,397	13,603	14,060	13,838	13,648	13,720
Principal Arterial Streets													
Daily VKT (000)	8,443	8,710	9,266	9,749	9,966	10,207	10,465	10,876	10,908	10,988	11,914	11,753	11,713
VKT/lane-kilometer	4,444	4,490	4,660	4,863	4,952	5,032	5,118	5,257	5,232	5,250	5,441	5,328	5,272
Roadway Congestion Index	0.86	0.88	0.91	0.95	0.97	0.99	1.00	1.03	1.05	1.08	1.07	1.05	1.06
Hours of Delay													
Total Daily (1000 person-hrs)	117	143	155	181	202	223	230	239	237	246	249	245	242
Annual per Capita (person-hrs)	24	29	30	35	38	41	42	43	42	41	41	40	39
Annual per Driver (person-hrs)	33	39	41	47	50	55	56	57	55	54	54	52	51
Freeway Daily Delay													
Recurring Veh-Hrs	35,840	44,920	46,720	53,240	55,960	61,780	61,630	63,880	63,840	66,580	66,740	68,450	67,810
Incident Veh-Hrs	43,010	53,900	56,060	63,890	67,150	74,140	73,950	76,660	76,600	79,890	80,080	82,140	81,370
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	7,040	7,270	10,140	13,210	18,170	20,360	23,200	24,070	23,330	24,050	25,000	21,760	21,190
Incident Veh-Hrs	7,750	8,000	11,150	14,530	19,990	22,390	25,520	26,480	25,660	26,460	27,500	23,940	23,310
Excess Fuel Consumed due to Congestion													
Total (million liters)	126	152	165	193	212	236	243	252	251	262	265	261	258
per Capita (liters)	105	122	130	149	158	174	178	182	178	174	176	171	168
per Eligible Driver (liters)	144	165	176	199	212	231	236	240	235	227	230	223	217
Congestion Cost													
Total ($ million)	-	-	-	-	550	630	680	740	790	840	880	880	890
per Capita ($)	-	-	-	-	410	460	490	530	560	560	580	580	580
per Eligible Driver ($)	-	-	-	-	550	610	660	710	740	730	760	750	750
Calculated Speeds (kph)													
Freeway (peak period)	77	73	74	72	71	69	69	69	70	70	70	69	70
Principal Arterial Street (peak period)	51	51	50	49	47	47	46	46	46	46	46	47	47
Areawide Speed Ratio	82	79	79	77	75	73	73	73	74	74	74	74	74

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway}}{\textit{VKT/Ln.-Km.}} \times \textit{Freeway VKT} + \frac{\textit{Prin. Art. Str.}}{\textit{VKT/Ln.-Km.}} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-47. Mobility and Congestion Variables in Seattle-Everett, WA

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	19,755	21,083	22,403	23,909	24,955	26,726	27,676	29,302	30,461	30,590	32,643	33,327	34,293
VKT/lane-kilometer	12,209	12,652	13,066	13,500	13,964	14,561	15,079	15,690	15,636	15,574	15,965	16,109	16,385
Principal Arterial Streets													
Daily VKT (000)	11,004	11,785	12,542	12,977	13,403	14,410	14,192	14,587	14,699	15,778	15,810	15,842	15,899
VKT/lane-kilometer	5,101	5,363	5,525	5,597	5,741	6,068	5,976	5,941	5,797	6,125	6,043	6,000	5,931
Roadway Congestion Index	0.95	0.99	1.02	1.05	1.09	1.14	1.17	1.20	1.20	1.20	1.22	1.23	1.25
Hours of Delay													
Total Daily (1000 person-hrs)	129	163	191	199	221	265	293	322	329	340	369	379	387
Annual per Capita (person-hrs)	22	28	31	32	35	42	45	48	47	47	50	50	51
Annual per Driver (person-hrs)	26	33	37	38	41	49	53	56	56	55	59	59	59
Freeway Daily Delay													
Recurring Veh-Hrs	26,660	35,320	43,170	44,730	51,640	64,830	74,100	83,070	84,080	86,560	95,280	99,580	102,890
Incident Veh-Hrs	37,320	49,450	60,430	62,630	72,300	90,770	103,740	116,300	117,720	121,190	133,390	139,420	144,040
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	18,540	21,820	23,380	24,780	24,990	26,840	27,050	27,820	29,070	30,740	31,710	30,380	29,950
Incident Veh-Hrs	20,390	24,000	25,720	27,260	27,490	29,520	29,750	30,610	31,970	33,820	34,880	33,420	32,940
Excess Fuel Consumed due to Congestion													
Total (million liters)	139	174	203	213	237	286	316	344	352	363	392	402	411
per Capita (liters)	96	118	134	139	151	179	195	205	204	200	213	214	215
per Eligible Driver (liters)	114	139	158	163	178	210	229	241	240	234	250	251	252
Congestion Cost													
Total ($ million)	-	-	-	-	600	750	870	1,000	1,110	1,170	1,300	1,350	1,420
per Capita ($)	-	-	-	-	390	470	530	590	640	640	710	720	740
per Eligible Driver ($)	-	-	-	-	450	550	630	700	750	750	830	850	870
Calculated Speeds (kph)													
Freeway (peak period)	81	78	75	76	73	69	67	66	66	66	65	65	65
Principal Arterial Street (peak period)	48	47	47	47	47	47	47	47	47	47	46	47	47
Areawide Speed Ratio	84	81	79	79	78	74	72	71	71	71	71	70	70

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-48. Mobility and Congestion Variables in St. Louis, MO

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	19,376	20,986	23,200	23,852	25,148	26,227	27,990	30,139	29,785	30,107	30,477	31,395	33,166
VKT/lane-kilometer	9,946	10,512	10,518	10,470	11,000	11,392	11,707	11,110	10,947	11,032	11,135	11,337	11,873
Principal Arterial Streets													
Daily VKT (000)	14,418	14,949	15,689	16,519	17,332	18,056	18,467	19,658	19,658	19,884	20,093	20,447	20,487
VKT/lane-kilometer	5,330	5,527	5,699	5,931	6,223	6,427	6,573	6,802	6,783	6,749	6,586	6,597	6,363
Roadway Congestion Index	0.83	0.87	0.88	0.89	0.93	0.96	0.98	0.96	0.95	0.95	0.95	0.96	0.98
Hours of Delay													
Total Daily (1000 person-hrs)	114	118	133	144	143	151	146	173	160	163	160	182	188
Annual per Capita (person-hrs)	15	16	18	19	18	19	19	22	20	21	20	23	24
Annual per Driver (person-hrs)	20	21	23	24	24	25	24	29	26	27	26	29	30
Freeway Daily Delay													
Recurring Veh-Hrs	13,080	14,480	16,120	17,520	16,590	18,800	20,580	22,840	21,730	21,940	20,350	29,110	32,040
Incident Veh-Hrs	15,690	17,370	19,350	21,020	19,910	22,560	24,690	27,400	26,080	26,330	24,420	34,930	38,440
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	29,690	29,930	33,890	36,430	36,940	37,650	34,130	42,100	38,010	39,160	39,640	38,910	38,180
Incident Veh-Hrs	32,660	32,920	37,280	40,070	40,640	41,410	37,550	46,310	41,810	43,080	43,600	42,800	42,000
Excess Fuel Consumed due to Congestion													
Total (million liters)	118	123	138	148	148	156	152	178	165	169	167	190	197
per Capita (liters)	64	66	75	77	77	80	78	91	84	86	84	96	98
per Eligible Driver (liters)	83	87	96	100	99	104	100	118	109	110	108	123	127
Congestion Cost													
Total ($ million)	-	-	-	-	500	410	420	530	520	540	550	640	680
per Capita ($)	-	-	-	-	260	210	220	270	270	280	280	320	340
per Eligible Driver ($)	-	-	-	-	330	280	280	350	340	360	360	410	440
Calculated Speeds (kph)													
Freeway (peak period)	89	89	89	88	89	89	89	88	89	89	89	86	86
Principal Arterial Street (peak period)	46	46	46	45	46	46	47	46	46	46	46	47	47
Areawide Speed Ratio	89	89	89	88	89	89	89	89	89	89	89	87	87

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-49. Mobility and Congestion Variables in Tampa, FL

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	3,188	3,453	4,089	4,580	4,733	5,313	5,538	5,522	5,844	5,877	6,118	6,360	7,245
VKT/lane-kilometer	10,421	11,289	11,545	10,942	10,889	11,786	11,862	11,627	12,100	11,967	12,258	12,344	12,857
Principal Arterial Streets													
Daily VKT (000)	5,136	5,418	5,885	6,182	5,877	6,247	6,545	6,730	7,020	7,084	7,487	7,503	8,082
VKT/lane-kilometer	5,853	6,174	6,412	6,454	6,083	6,361	6,504	6,635	6,606	6,567	6,643	6,472	6,275
Roadway Congestion Index	0.94	1.01	1.03	1.00	0.96	1.02	1.03	1.03	1.05	1.05	1.07	1.06	1.07
Hours of Delay													
Total Daily (1000 person-hrs)	36	39	45	49	47	51	58	55	59	62	64	63	69
Annual per Capita (person-hrs)	16	17	20	21	19	20	22	21	21	22	22	21	23
Annual per Driver (person-hrs)	21	22	25	27	24	25	27	26	26	28	28	27	28
Freeway Daily Delay													
Recurring Veh-Hrs	2,580	2,930	3,600	3,860	3,730	4,150	5,360	5,360	5,970	6,030	6,420	5,510	6,390
Incident Veh-Hrs	3,860	4,390	5,390	5,790	5,600	6,220	8,040	8,040	8,960	9,050	9,630	8,260	9,590
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	10,480	11,410	12,920	14,210	13,310	14,340	15,690	14,570	15,500	16,570	16,840	17,390	18,620
Incident Veh-Hrs	11,530	12,550	14,210	15,630	14,640	15,780	17,260	16,030	17,050	18,230	18,530	19,130	20,490
Excess Fuel Consumed due to Congestion													
Total (million liters)	36	39	45	49	47	51	58	56	60	65	65	63	69
per Capita (liters)	66	70	79	85	76	79	88	83	86	92	91	85	90
per Eligible Driver (liters)	85	89	100	107	98	100	110	105	107	116	114	106	113
Congestion Cost													
Total ($ million)	-	-	-	-	120	140	170	170	190	210	220	220	240
per Capita ($)	-	-	-	-	200	210	250	250	280	300	310	290	320
per Eligible Driver ($)	-	-	-	-	260	270	310	310	340	380	390	370	400
Calculated Speeds (kph)													
Freeway (peak period)	88	88	88	88	88	88	86	86	86	86	86	88	88
Principal Arterial Street (peak period)	46	46	45	45	45	45	45	46	45	48	46	45	45
Areawide Speed Ratio	87	86	86	86	87	87	85	86	85	87	85	86	86

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\frac{\textit{Freeway VKT/Ln.-Km.}}{} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

Table F-50. Mobility and Congestion Variables in Washington, DC

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Freeway													
Daily VKT (000)	25,897	26,002	29,085	32,015	36,072	36,885	37,996	40,282	40,789	41,466	44,186	46,690	49,306
VKT/lane-kilometer	12,972	13,024	13,167	14,306	15,516	15,585	15,850	16,461	16,613	16,404	16,941	17,791	18,229
Principal Arterial Streets													
Daily VKT (000)	21,397	21,413	22,347	23,876	25,599	27,434	27,660	27,837	28,755	29,383	29,785	29,624	29,785
VKT/lane-kilometer	7,594	7,308	7,155	7,452	7,756	8,114	7,991	7,859	7,938	7,935	7,974	7,830	7,773
Roadway Congestion Index	1.12	1.11	1.11	1.19	1.27	1.29	1.30	1.33	1.34	1.33	1.36	1.41	1.43
Hours of Delay													
Total Daily (1000 person-hrs)	368	393	450	477	533	580	598	652	673	696	769	789	815
Annual per Capita (person-hrs)	34	35	40	42	46	49	49	53	54	53	59	58	59
Annual per Driver (person-hrs)	42	44	49	51	56	59	60	64	66	64	70	70	71
Freeway Daily Delay													
Recurring Veh-Hrs	51,630	56,270	70,090	74,220	85,500	89,670	93,080	105,440	109,060	113,030	132,070	138,160	145,110
Incident Veh-Hrs	113,600	123,800	154,200	163,290	188,110	197,270	204,770	231,970	239,930	248,660	290,550	303,950	319,250
Principal Arterial Street Daily Delay													
Recurring Veh-Hrs	61,500	63,900	64,800	68,560	72,700	84,150	85,940	87,630	90,380	92,800	91,710	90,030	89,370
Incident Veh-Hrs	67,650	70,290	71,280	75,410	79,970	92,570	94,540	96,390	99,420	102,080	100,880	99,030	98,310
Excess Fuel Consumed due to Congestion													
Total (million liters)	390	412	474	505	564	609	628	680	700	721	800	824	853
per Capita (liters)	144	148	169	177	193	204	207	221	226	220	243	242	248
per Eligible Driver (liters)	179	183	208	217	236	250	251	268	274	265	293	291	296
Congestion Cost													
Total ($ million)	-	-	-	-	-	1,620	1,740	2,000	2,230	2,360	2,680	2,790	2,960
per Capita ($)	-	-	-	-	-	540	570	650	720	720	820	820	860
per Eligible Driver ($)	-	-	-	-	-	660	700	790	870	870	980	980	1,030
Calculated Speeds (kph)													
Freeway (peak period)	73	72	69	70	70	69	69	68	68	67	65	65	65
Principal Arterial Street (peak period)	42	42	42	42	42	41	41	41	41	41	41	42	42
Areawide Speed Ratio	75	74	73	73	73	72	72	71	72	71	69	69	69

Note: A Congestion Index value above 1.0 indicates an undesirable level of congestion.
" - " denotes data unavailable.

$$\textit{Roadway Congestion Index (RCI)} = \frac{\textit{Freeway VKT/Ln.-Km.} \times \textit{Freeway VKT} + \textit{Prin. Art. Str. VKT/Ln.-Km.} \times \textit{Prin. Art. Str. VKT}}{13{,}000^{1} \times \textit{Freeway VKT} + 5{,}000^{1} \times \textit{Prin. Art. Str. VKT}}$$

[1] Congestion Indicator Levels—Interstate and Expressway = 13,000 VKT/lane
Principal Arterial = 5,000 VKT/lane

REFERENCES

1 Lomax, Timothy J., Dennis L. Christiansen, and A. V. Fitzgerald. Texas Transportation Institute, "Estimates of Relative Mobility in Major Texas Cities," Research Report 323-1F, 1982.

2 Lomax, Timothy J. Texas Transportation Institute, "Relative Mobility in Texas Cities, 1975 to 1984," Research Report 339-8, 1986.

3 Lomax, Timothy J., Diane L. Bullard, and James W. Hanks, Jr. Texas Transportation Institute, "The Impact of Declining Mobility in Major Texas and Other U.S. Cities," Research Report 431-1F, 1988.

4 Lomax, Timothy J., Dave Schrank, and Shawn Turner. Texas Transportation Institute, "Urban Roadway Congestion—1982 to 1992," Research Report 1131-7, September 1995.

5 Federal Highway Administration. "Highway Performance Monitoring System," 1982 to 1993 Data. FHWA-M 5600.1B, August 1993.

6 Lindley, Jeffrey A. "Quantification of Urban Freeway Congestion and Analysis of Remedial Measures," FHWA-RD-87-052, October 1986.

7 Chui, Margaret K., and William E. McFarland. "The Value of Travel Time: New Estimates Developed Using a Speed Choice Model," Research Report 396-2F, Texas Transportation Institute, Research Report 396-2F, January 1987.

8 Houston Chamber of Commerce. "Houston Regional Mobility Plan," 1982.

9 Texas Department of Highways and Public Transportation. "Ten-Year Project Development Plan Documentation and Support Data," 1986.

10 Morris, D. E., and Michael Ogden. "Houston-Galveston Regional Transportation Study," Texas Transportation Institute, January 1990.

11 "Private Truck Counsel of America Cost Index Survey," Houston Post, July 6, 1987.

12 Transportation Research Board, Special Report 209, "Highway Capacity Manual," 1985.

13 Report of the Secretary of Transportation to the United States Congress. "The Status of the Nation's Highways: Condition and Performance," June 1985.

14 American Association of State Highway and Transportation Officials. *A Policy on Geometric Design of Highways and Streets*, 1984.

15 United States Department of Transportation, Federal Highway Administration, "1980-3R Study."

16 American Automobile Association, "Fuel Gauge Report," 1993.

17 Statistical Abstract of the United States 1994. U.S. Department of Commerce, Bureau of the Census 114th Edition, Washington, D.C., 1994.

18 Texas State Department of Highways and Public Transportation. "Permanent Automatic Traffic Recorder Data—1950-1984."

19 Raus, J. "A Method for Estimating Fuel Consumption and Vehicle Emissions on Urban Arterials and Networks," Report No. FHWA-TS-81-210, April 1981.